Interactions Between Cetaceans and Small-scale Fisheries in the Mediterranean

Conclusive Report

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The present report is part of a collection of Reports where interaction between cetaceans and small-scale fisheries in the Mediterranean has been analysed. This is the Conclusive Report integrating main information of the studies conducted in three different areas in the Mediterranean in a coordinated approach, with common methodology and database. Please see the specific case study reports for further information.

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Conclusive Report

A multiregional pilot research project supported by the **MAVA Foundation** was initiated by the **Low Impact Fishers of Europe platform (LIFE**) in 2019, in order to assess the socio-economic and ecological impacts linked to the phenomenon of cetacean-fishery interaction in the Mediterranean, and to search for potential measures to mitigate this problem.

The project, entitled **"Interaction between cetaceans and small-scale fisheries in the Mediterranean",** involved mainly small-scale fishing fleets characterized by fishing vessels under 12 meters of length using non-towed gears, which operate

within 12 nautical miles from the coast, daily landing relatively small catches, and operated by small family businesses.

The initiative was based on LIFE's core principle of promoting collaboration between fishers and scientists in order to combine the local and experiential knowledge and data generated by the fishers with scientific knowledge and the data gathered by the scientists to provide jointly arrived at solutions, and to be taken into account in decision-making processes. Local organizations involved in the project for data collection, analysis and reporting were the **Asociación Herpetológica Española (AHE)**, the **Malta College of Arts, Science and Technology (MCAST)**, and the Italian Associations **MareCamp** and **eConscience.**

Investigations were located in three focal areas of the **Western and Central Mediterranean Sea:** 1) North **Alboran Sea** (Andalusia, **Spain**) between the Strait of Gibraltar (Tarifa) and Garrucha (Almería) (GSA01); 2) around the Maltese islands (GSA15) (**Malta**); 3) **Ionian Sea**, eastern **Sicily** (GSA19), and southern **Tyrrhenian Sea,** north-east Sicily and **Aeolian Islands** (GSA10) (**Italy**). In the **Gulf of Catania,** a 300 km2 zone in east Sicily, a pilot "**Floating Laboratories"** initiative was undertaken to monitor local small-scale fishing activities using a sentry vessel manned by scientists.

The whole region has a great oceanographic importance, from the Alboran Sea that constitutes the hydrological motor of the Mediterranean and a biodiversity hotspot, to the Strait of Sicily and the other Sicilian waters with a high biological productivity which favour a high marine mammals' diversity. However, a gradual regression of cetacean populations has been observed in recent decades.

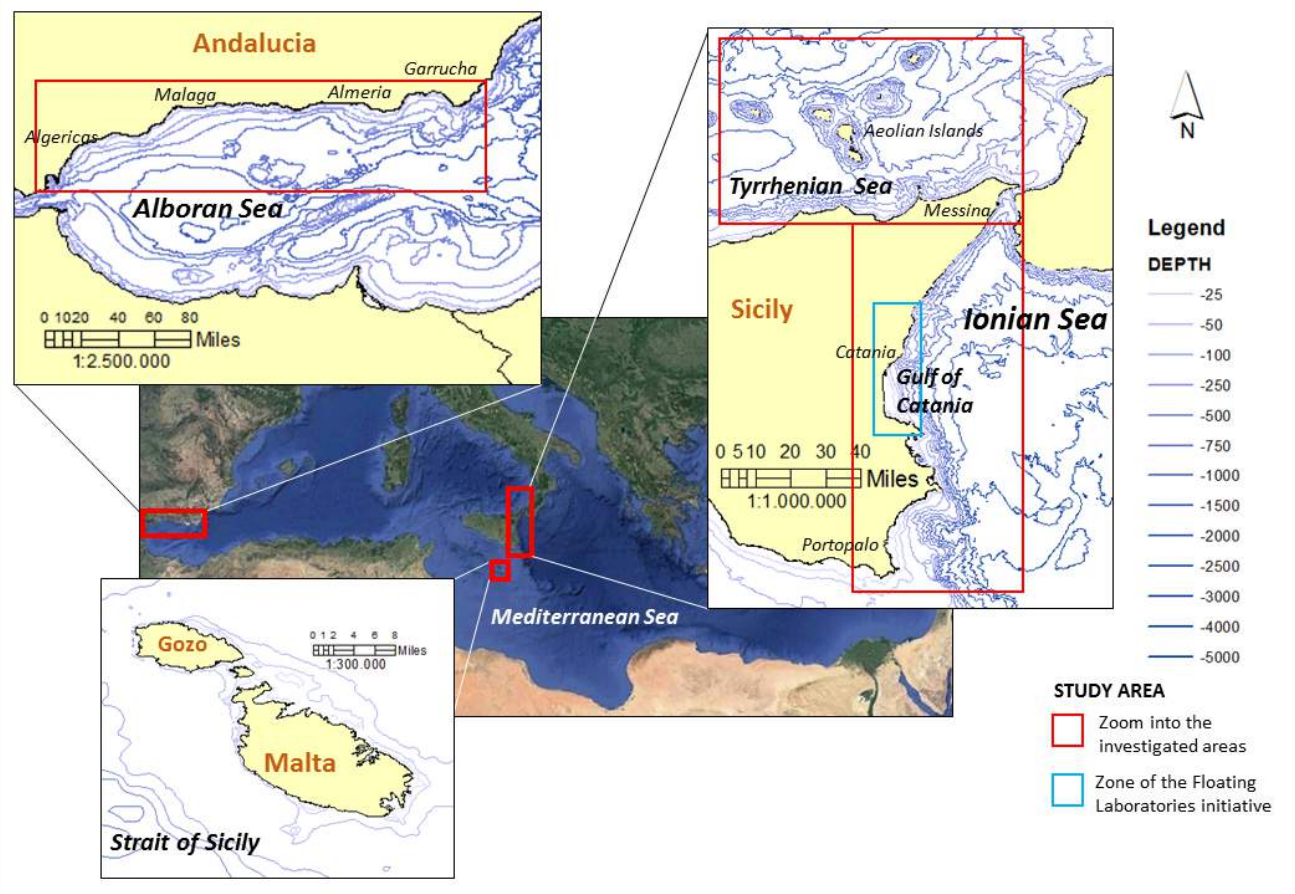


Image 1: Locations of investigations in the framework of the "Interaction between cetaceans and small-scale fisheries in the Mediterranean" project.

Summarizing, seven species of toothed whale (Odontocetes) (*Delphinus delphis*, *Tursiops truncatus, Stenella coeruleoalba, Grampus griseus, Ziphius cavirostris, Physeter microcephalus, Globicephala melas*) and one baleen whale species (Mysticetes) (*Balaenoptera physalus*) are regularly present in the Mediterranean waters. Some of these, although being cosmopolitan species, constitute isolated **subpopulations that are at risk of extinction** in the Mediterranean and therefore are catalogued as Vulnerable or Endangered in the IUCN red list. Further species of cetaceans like *Balaenoptera acutorostrata, Megaptera novaeangliae, Orcinus orca, Pseudorca crassidens*, and *Steno bredanensis* are incidental for the Mediterranean and together with other as *Kogia breviceps*, and *Phocoena phocoena* they can transit or feed in the area, especially at the entrance of the Strait of Gibraltar.

Study Area

1. Italy

10800 Km2
520 km of coast*

2. Spain

12260 Km2
730 km of coast

3. Malta

4200 Km2
115 km of coast

*considering only the Floating Laboratories range: 300 Km2, 100 km of coast

Interactions with small-scale fisheries (SSF) usually occur when there is a **spatial overlap** between the distribution of these species and those areas where fishing takes place, in most cases because both cetaceans and humans share the same target species. It follows therefore that the species most often reported in depredation cases is the coastal species **bottlenose dolphin** (*Tursiops truncatus*).

The study was based on **standardized systematic research protocols** and survey sheets shared between the participating countries in order to allow its extension to other areas and to enable comparison of the results across the Mediterranean in the future. The activities were carried out among the different fleets chosen through stratified sampling and applying a **multidisciplinary**, **participative and cooperative approach**. A good part of the investigation has been addressed to **depredation events** which correspond to the partial or complete removal of bait or captured fish in the fishing gears by marine wildlife such as cetaceans, fishes, birds, and turtles, that often find in the nets an easy way to exploit food resources.

Data about technical characteristics of the fishing fleet, catches, incidence of interaction with cetaceans, types of damage in case of depredation, losses and costs incurred, and mitigation measures employed were collected through interviews with fishers based on a **common structured questionnaire** including closed-ended and open-ended questions in all the three focal areas, that would revert into a **shared database**, easing comparison and shared data.

Observers on board the Sicilian fishing vessels of the Floating Laboratories project investigated the fishing effort, dam-

ages of depredation and by-catch events observing fishing activities, recording the start/end time of gear setting/retrieval, assessing the integrity of the gears before their use and measuring eventual following damages. Data on course steered, fishing area, number and duration of fishing trips, and catch characteristics were also collected.

Visual monitoring with the scientific boat used as sentinel ready to receive real-time communication by the fishers of the network when spotting dolphins or in case they interact with fishing gears, was aimed at understanding the peculiarities, strengths, weaknesses and internal management modalities of the fleet, and how each *métier* is impacted and responds to interaction with cetaceans. Recording the depredation cases also had the objective to map the movements of the dolphins, and the dynamics that define their opportunistic behaviour towards the fishing gears. Environmental and **bioacoustical data** were also collected in order to find any existing relation between more parameters during sightings.

1. Italy

Effort from the Floating Laboratories (only Gulf of Catania, Sicily):

10 fishing vessels (3 of which with observers onboard)

1 scientific sentinel boat

45 events of depredation confirmed

6000 Nautical Miles (distance covered by vessels)

1721 hours of observation

395 fishing sets with different gears

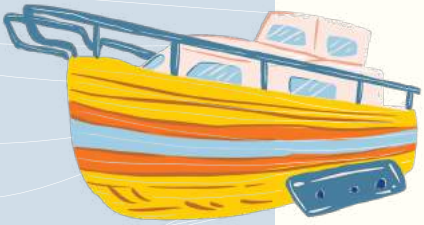
Sample SSF Fleets

1. Italy

- **780** registered vessels
- **420** really operative in the region
- **30** interviewed (7%)
- **14** harbors

2. Spain

- **376** registered vessels
- **33** interviewed (8,7%)
- **14** harbors



3. Malta

- **916** registered vessels
- **33** interviewed (3,6%)
- **6** harbors

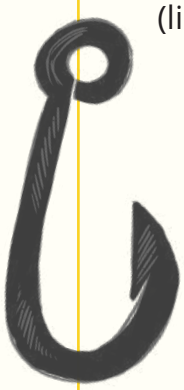
Interviewed Fishers and Fleets

	Category of interviewed fishers:	Composition of the interviewed fleets
1. Italy	all full-time	Averages: Tonnage: **3.25 GT** Power: **43.79 HP** LOA: **9.3 meters** **38 years old**
2. Spain	all full-time	Averages: Tonnage: **3.1 GT** Power: **40.4 HP** LOA: **8.6 meters** **24 years old**
3. Malta	9 full-time 14 part-time	Averages: Tonnage: **3.558 GT** Power: **101.89kW** LOA: **7.2 meters** **36 years old**

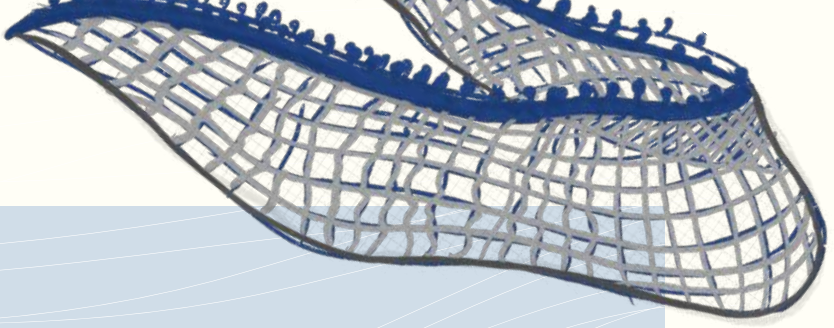
Interviews involved only one fisher per vessel, usually the captain of the crew. Although in 2 cases fisherwomen were observed to participate in fishing activities, in Andalusia and Sicily, no fisherwomen working at sea were consulted in the study. However, one fisherwoman working on land was consulted in Spain.

The investigated fishing fleets are strongly characterized by traditional and multipurpose *métiers*, but a **decrease of their capacity** was recorded in the last decade, both in terms of tonnage and power. Considering the average values of the fishing vessels, the **sample fleets** selected in the three countries were similar for the **gross tonnage** (3.3 GT) but had different characteristics in **engine power**, with the highest values in kW for the Maltese fleet (40.4 Andalusia; 43.8 Sicily; 102 Malta), and in **length overall** for which the Sicilian fleet resulted to have the longest boat in metres (7.4 Malta; 8.6 Andalusia; 9.3 Sicily), but always below 12m. Sicily was also found to have the most ancient boats with an **average of 38 years old,** followed by Malta (36) and Andalusia (24).

In terms of **gear used**, varieties of trammel nets were the most employed in the Maltese sample, followed by set longlines, set gillnets, and baited traps; Fish Aggregating Devices, are used too as ancillary gears. Also, the Andalusian fleet showed a greater recourse to use trammels like the ***trasmallo de salmonete*** and the ***trasmallo de jibia***, followed by different kinds of single wall surface set gillnet (***bonitera, agujetera, sardinal, melvera, solta, volaera***), mechanized dredges, longlines ***(voracera***) and traps. Looking at the Sicilian sample, the main recurring licenses were the ***tremaglio*** (trammel nets), the ***palangaro*** (longlines), single layered nets (primarily including the ***monofilo***, and also the ***menaida*** net), hooks and lines (mainly used for the ***totanara*** *métier*), encircling nets (like the ***sciabichedda***), and the ***nassa*** (pots).



Fishing gear



	Main fishing gears used:	Main fishing gears depradated:
1. Italy	1. Longlines (27%) 2. Single wall nets (27%), 3. Trammel nets (21%) 4. Pots (11%) 5. Encircling nets (8%), 6. Gears for squids (6%)	1. Entangling single wall net (monofilo) 2. Trammel nets 3. Longlines 4. Other single wall net (Menaide)
2. Spain	1. Surface set 2. Gillnet 3. Trammel nets 4. Mechanized dredges 5. Longlines and traps	**Bottom-set trammel nets:** 1. Trasmallo de salmonete (37%) 2. Trasmallo de jibia (26%), 3. Other trammel nets (5%) **Gillnets:** 4. Melvera (8%) 5. Sardinal (8%) 6. Solta (5%) 7. Volaera (5%) 8. Bonitera (3%) 9. Pijotera (3%)
3. Malta	1. Trammel nets 2. Set longlines 3. Set gillnets	1. Longlines 2. Trammel nets 3. Gillnets

Category	Gear type	Country	Common name	Size (mesh or hook) in cm	Length (m)	Height (m)	Number of hooks/ traps	Lures	Number of times / day	Depht (m)	Gear price (€)	Catch average (kg)	Catch average (€/kg)	Interaction
GNS	Gillnets	ES	*Bonitera*	5	500-3000	4	–	–	1	surface	2000	10-100	2-3	yes
		ES	*Sardinal*	1,5-2	300-700	6-7	–	–	1	0-18	2000	0-250	0,5-4	yes
		ES	*Melvera*	4,5-5	450-1000	2-55	–	–	1	0-500	3500	0-2000	1,7	yes
		ES	*Volaera or Voladera*	2,4-2,8	500-1000	2-6	–	–	1	2-20	2500	0-100	1	yes
		ES	*Pijotera*	4-7	2000	3	–	–	1	0-300	4800	5-100	7	yes
		ES	*Solta*	4-5	1000	3-9	–	–	1	0-33	2000	2-80	4	yes
		ES	*Red clara*	8-12	2000-2500	5	–	–	1	7-70	2500	0-100	5	no
		ES	*Enmalle*	4,5-10	1500-1700	3-7	–	–	1	25-40	2800	0-100	5	no
		MT	*Gillnet*	2-5	600	1-7	–	–		25-35				yes
GND	Driftnets	IT	*Menaida or Menaide*	0,5-1,4	200-400	10-12	–	–	1-3	20-70	3000	0-150	5-10	yes
		IT	*Monofilo and other single wall nets*	2,5-4	80-2000	1-3	–	–	1-2	7-400	2000	0-30	5-20	yes
LLS	Set longlines	ES	*Voracera*	3-6	70-100	–	180	Natural	1-3	80-800	2000	0-120	5-20	no
		IT	*Palangaro di fondo or Conso*	1-4	4000	–	750	Artificial / Natural	1	50-2000	350	0-400	10-15	yes
		MT	*Longlines*	6-7	8000-16000	–	200-4000	Natural	1	50-700	170-5000	0-5000	15-35	yes
LLD	Drifting longlines	IT	*Palangaro di superficie or Conso*	2,5-4	5000	–	600-1000	Natural	1	10-15	5000	0-30	5-15	yes
LNS	Shore-operated	ES	*Moruna*	11-14	300	12-14	–	–	–	0-10	5000	0-500	5-12	no
NK	Not known	ES	*Palangre*	16	7000	–	700	Natural	1	27-120	6000	0-500	5-14	no
DLL	Drifting longlines	MT	*Drifting longline*	8-10		–	600-2000	Natural	1-2	40-700	1200-2000	0-500	8-10	
GTR	Trammel nets	ES	*Trasmallo de salmonete*	2-5	600-4500	1-2	–	–	1	5-100	2000-10800	2-150	5-8	yes
		ES	*Trasmallo*	3-8	800-2200	2	–	–	1	0-90	6000	4-40	10	yes
		ES	*Trasmallo de jibia*	4,5-8	2000	1-10	–	–	1	2-50	3000-9600	2-80	5,7-8	yes
		MT	*Trammel net*	2,5-4,5	150-4000	1-3			1-4	15-150	1000-4000	3-200	6-40	yes
		IT	*Tremaglio or Tramaglio*	6-12	900	1,5	–	–	1-2	6-200	4000	0-40	5-50	yes
LHM	Handlines & pole-lines (mechanised)	IT	*Totanara*	–	–	–	1	Natural	2-10	200-500	400	0-20	5-15	yes
		ES	*Linea de mano*	6	70	–	1	Natural	3-5	2-5	130	0-1	15-20	no
LHP/LTL	Handlines & pole-lines hand-operated	IT	*Lenza*	4-8	40	–	1	Artificial	1-5	surface	5	0-40	8-10	no
FPO	Pots	ES	*Nasa*	–	4500	–	200	Natural	1	8-90	2500	0-60	5-10	no
		IT	*Nassa*	–	1000	–	80-200	Natural	1	50-400	3000	20-100	15-50	no
HMD	Mechanised dredges	ES	*Draga mecanizada*	–	–	–	–	–	3-5	3-5	600	0-5	12-18	no
PS	Encircling nets	IT	*Circuizione for swordfish, albacore and dolphinfish*	0,5-10	200	30	–	–	1-2	500	6000	0-1000	15-30	yes
		IT	*Sciabichella or Sciabicheddu*	2,5	50	4	–	–	1	360	2000	0-10	12	no

Table 1: Resume of the gears used by the small-scale fishers interviewed in the investigations and its main characteristics, indicating as well whether they have had interactions or not.

Diversification of fishing techniques and their seasonal alternation enable access to a wide range of resources, which makes Sicily the region with the highest number of landed species, including 98 **seafood species**, followed by Andalusia (39) and Malta (27), even if each *métier* captures only a few of them and in small quantities at a time.

The main species of cetacean blamed for depredation of the gears mentioned above is the **bottlenose dolphin** (*Tursiops truncatus*) for all the fleets. However, the striped dolphin (*Stenella coeruleoalba*) and the **Risso's dolphin** (*Grampus griseus*) are responsible for a small part of the total events reported in Sicily, especially linked to the totanara gear. Furthermore, in Eastern Sicily depredation events of **sharks**, and in Andalusia cormorants were reported. In all the three countries it was also reported that other marine wildlife also causes damage, including the European conger, swordfish, bluefin tuna, moray eel, octopus, and crabs.

All fleets agreed that dolphins are present in their fishing areas year-round and that the interaction events have increased over the last 5 years (68% Sicily; 76% Malta; 84% Andalusia), having the perception that the lack of food availability could be the cause. **Negative interactions** (depredation) with cetaceans occurred on average in 46% of the fishing trips for the Spanish and the Italian fleets, and 53% for the Maltese. 6% of the Maltese and Spanish fishers also reported frequent cases of **positive interaction** with common dolphin and striped dolphin in leading the fish into the nets. As many as 14 focal zones more susceptible to depredation by dolphins have been identified in Sicily, while 42% of Maltese fishers stated that most of the events occur near tuna fish farms. Instead, the probability of observing cetacean interactions in Andalusian waters was in function to a W-E gradient, except for the fleets of Tarifa and Algeciras where no interaction was reported.

Interactions with cetaceans and other species

1. Italy

Negative dolphins: bottlenose dolphin (main), striped dolphin (20%), Risso's dolphin (only in fishing for squid)

In some cases, sharks, less frequent also octopus and morays

2. Spain

Positive common dolphin and striped dolphin.
Negative only bottlenose dolphin

In some cases (13.8%) also conger, swordfish, bluefin tuna, cormorant

3. Malta

Positive (6%) and **Negative**: dolphins (bottlenose dolphin as main species)

In some cases sharks, tuna, birds, sea turtles

% of Interactions with cetaceans

1. Italy

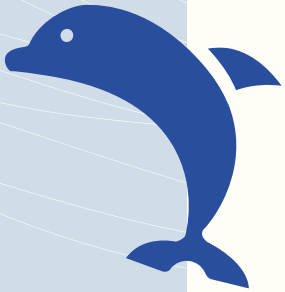
45% of the fishing trips have actually suffered negative interactions

80% of fishers in northen ports, and 55% of fishers of the eastern ports consider the interactions cases have increased in the last 5 years

2. Spain

46% of the fishing trips have suffered negative interaction

100% of fishers considered that interaction cases have increased in the last 5 years

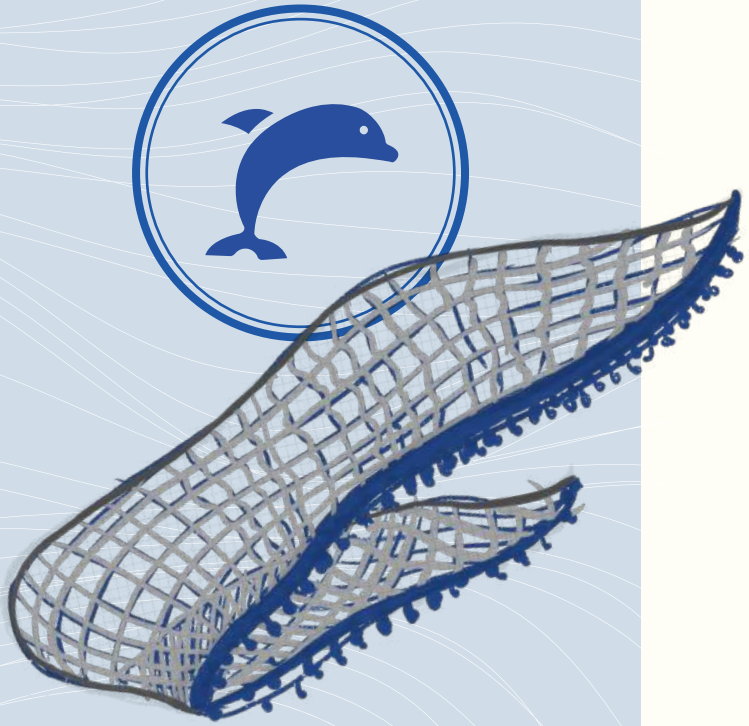


3. Malta

76% of fishers considered that interaction cases have increased in the last 5 years

Type of damage caused by cetaceans

1. Scattering or sinking of entire fish schools, frequently leading to the complete loss of the catch of a fishing trip or the destruction of the gear
2. Preying on or damaging fish trapped in the nets
3. Tearing of large holes in the fishing nets
4. Loss of fishing time for the fisherman
5. Disruption of fishing activities
6. Damaging of large sections of nets when dolphins get entangled in the gear (not reported in this study)



1. Italy

Holes in the nets, **bent** hooks, **bite** marks on the catch, head of the **eaten fish** left in the net, **scattering** of fish schools, **depredation** of lures

2. Spain

Total or partial **depredation** of the catch in the fishing nets, **scattering** of fish, **holes**, head of the **eaten fish** left on the net

3. Malta

Bite marks on the catch or presence of **decapitated fish** which were captured in their fishing gear. **Scattering** of the catch resulting in a loss of catch. Both artificial and natural lures **depredated**. Presence of **holes** in the nets

Considering the **main depredated fishing gears**, the entangling single wall net *monofilo* prevailed in Sicily, followed by trammel nets, longlines and other single wall nets like the *menaida*. Bottom-set trammel nets as the *trasmallo de salmonete* and the *trasmallo de jibia* were the most affected by the bottlenose dolphin in Andalusia, followed by set gillnets. Longlines, trammel nets and gillnets were affected in Malta. On the other hand, the occurrence of depredation-free gears was highlighted such as the *sciabichella* (little encircling net) in Sicily, the pots in Sicily and Andalusia, the dredges and the *voracera* (longlines) in Andalusia.

As a **consequence of depredation** events by dolphins, bite marks on the catch, heads of eaten fishes left in the net, and holes in the nets have been the major damages reported in the three countries, causing a reduction in the amount or value of the catch, and loss of time for fishers due to failed fishing trips or need to repair the gears. Bent hooks, scattering of fish schools away from the nets, and depredation of lures on the longlines have also been reported in Sicily. It has been calculated that a single depredation event could lead to 59% (Andalusia), 76% (Malta), 78% (Sicily) reduction of the catch, and that 33-76% of the gear could be damaged, and even its total destruction.

The costs that a captain has to bear for a fishing trip, even when it fails due to conflicts with marine wildlife, are: fuel and maintenance of the boat, sailors' salary, purchase of ice to maintain fresh the catch, salary for the days passed repairing the damage and, in case of longlines, purchase of the natural lures. While in Spain and Malta the **economic loss** has been estimated at 178-582€ per depredation event, in Italy a 520-730€ cost of one fishing trip was calculated, and an overall

Loss estimation

1. Italy

Average cost of a failed fishing trip: 520-730€

Potential daily income loss: 78%

2. Spain

Average cost of a failed fishing trip: 871€

Average reduction of catch: 76% per negative event

Economic losses: 582€ per negative event

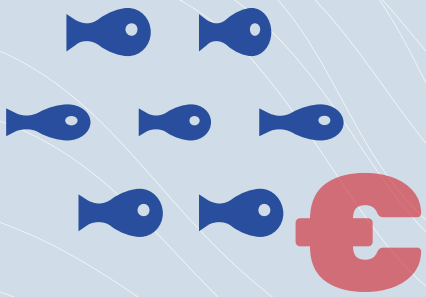
3. Malta

Economic losses: 178,33€ per negative event

Average reduction of catch: 59,22% per negative event

Why dolphins engage in depredation:

1. Opportunistic behaviour (optimization to spend less energies for foraging)
2. Overlap dolphins' home range/coastal fishing areas
3. Coincidence preys/target species
4. Stock availability decreasing



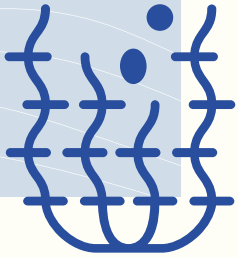
loss of 37 250€ was assessed for the 5 Floating Laboratories which underwent 45 depredation events during the field investigations, for a medium daily income loss of € 444 for the entire fleet.

While no Spanish fishermen reported any **by-catch events** for any wildlife species, some reports of the capture of dolphins, sharks, tuna, sea turtles, and seabirds have been collected from the Maltese fleet using longlines and trammel nets. Although no by-catch of cetaceans has been observed by the Floating Laboratories, some bottlenose dolphins and striped dolphins in the Gulf of Catania displayed scarring and evidence of surviving to prior fishery interaction, especially with fishing lines, suggesting that depredation is a behaviour that could put at risk the individuals who practice it. Moreover, gears including the *monofilo, tremaglio* and *palangaro* were responsible for by-catch of species cataloged as non-target species, as the case of the smooth-hound shark (*Mustelus mustelus*).

Previous studies in Malta and Sicily demonstrated the persistence of conflicts between cetaceans and fisheries in the islands and tested the feasibility and efficacy of using acoustic deterrents to reduce dolphin depredation, but did not pro-

Bycatch

	Bycatch of cetaceans	Bycatch of other vulnerable species:
1. Italy	Never	Little sharks: Smooth-hound (*Mustelus mustelus*), and Angel shark (*Squatina squatina*) using single wall nets
2. Spain	Never	Not reported
3. Malta	Dolphin (4 times in 1 year for the whole fleet sample)	Sharks, sea turtles, sea birds with longlines and trammels



duce any positive long-term results that could mitigate the problem. However, most of fishers in the three countries showed their interest in participating in new pilot actions that could be developed in the future to reduce these interactions, and express their willingness also in contributing in the online voluntary survey for professional fishers launched by LIFE, to report possible new negative interaction events in the future.

Thanks to 1 721 hours of observation, covering 6 000 Nautical Miles in the Gulf of Catania, the **Floating Laboratories initiative**, in addition to having provided a working and replicable example of a research system in the marine field, have provided some new and interesting results. In particular, cetacean-fishery interactions were verified together with the sighting of the cetaceans, the presence of damages on the fishing gears or on the catches, monitoring the behaviour of the animals, and recording sound emissions associated with their feeding behaviour, such as echolocation clicks, burst pulses, click train and creaks.

Direct observations of the animals during interaction made it possible to construct an ethogram of the **"feeding in net" behavioural pattern**, defining 3 principal attack phases including respiration, surfacing and submergence behaviour. Moreover, the relationship between the degree of residence of a cetacean population, the type of fishing system (gear and related target species (single and multiple)), and the species of cetacean responsible for the depredation was confirmed through a Multiple Correspondence Analysis.

The study also made us aware about other problems which merit further attention, affecting the investigated fleet, as

well as the entire marine ecosystem. One such example is the **invasion of exotic species** like brown seaweed *Rugulopteryx okamura* from Marbella to Tarifa, and growing to the east of the northern Alboran Sea (Spain) where algae biomass accumulations cause an important economic impact on the fishing sector, as fishing gear ceases to function and catches are reduced. The need to nominate the Gulf of Catania and its surrounding waters as **Areas of Importance for Marine Mammals** also emerged due to the existing strong anthropogenic pressure, and its importance as a cetaceans breeding, feeding and nursery area, and for the initiation to group life, including endangered species such as the common dolphin (*Delphinus delphis*).

The study has provided us with a base of data on which to base some new **proposals for the mitigation** of the cetacean-fishery interaction problem, other than the use of pingers. Possible solutions for the fishermen include **acoustic, chemical and visual deterrents, and warning systems** adapted to specific gears and environments. These will begin to be tested in 2021.

Thanks to the systemic research protocol and the shared surveys, a **collective database** has been launched that can be expanded in subsequent years with data from other areas of the Mediterranean in which the study could be replicated.

In the next project phases, the reasons that are leading to an increase in the incidence of depredation by dolphins and other vulnerable marine species in recent years will be examined in depth, as well as the changes in fishing productivity and in the incidence of interaction cases after the use of new mitigation systems. To this end, the collaboration between

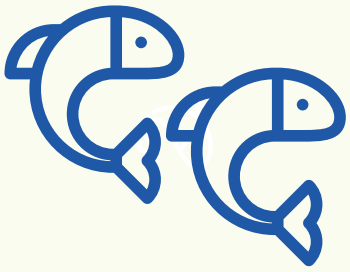
fishermen and scientists will continue to be a fundamental condition, in addition to the role of observers on board fishing vessels, and the compensation for fishers who actively participate in the experimentation.

Previous studies and further issues

	Previous study and experimentations in the same area	Further issues
1. Italy	Yes, pingers, not working (mainly used for bottlenose dolphins)	Excessive IUU causes unfair competition and stocks reduction; global warming change distribution of target species
2. Spain	Previous studies were focused to evaluate the interactions of cetaceans with purse seiners only. Not to apply disuasory tools.	Invasive algae obliges not to fish, to change *métier* or fishing area (Estepona and Tarifa) No interaction cases at all in Algeciras and Tarifa
3. Malta	Yes, acoustic devices, unsuccessful in warding off bottlenose dolphins	High concentration of interaction with SSF close to tuna fish farms

Results Overview

- Systematic protocol to investigate cetacean-fisheries interaction
- First estimation of damages
- First estimation of losses
- Activation of a Floating Laboratories network
- Definition of the ethogram of bottlenose dolphins interacting with single wall fishing nets
- Definition of areas more susceptible to dolphin depredation
- Characterization of the fleets and their *métiers*
- Launch of a permanent online questionnaire for fishers to report new interaction events
- Suggestions for the next steps



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