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REVIEW OF THE CURRENT CITIZEN SCIENCES INITIATIVES IN THE ACCOBAMS AREA

REVIEW OF THE CURRENT CITIZEN SCIENCES INITIATIVES IN THE ACCOBAMS AREA

Presented by Simone Panigada, Chair of the ACCOBAMS Scientific Committee

Issue: non-exhaustive review on the current citizen science initiatives in the ACCOBAMS Area

1. Action requested

The Scientific Committee is invited to:

a. **note** of the information presented in the review of current citizen sciences initiatives;
b. **advise** on:

- the elaboration of basic guidelines on the use and how to gather information
- the relevance of "Citizen Science" input of cetaceans' sightings in expert-supervised databases

2. Background

Resolution 7.6 "Work Programme and Budget for the triennium 2020-2022", adopted by Parties at MOP7 in November 2019, requests the Scientific Committee to:

- review the current citizen sciences initiatives in the ACCOBAMS area;
- evaluate the relevance of "Citizen Science" input of cetaceans' sightings in expert-supervised databases;
- produce basic guidelines on the use and how to gather information.

In order to assist the Scientific Committee in this task, the ACCOBAMS Secretariat prepared for the previous Scientific Committee Meeting (SC13, February 2020) a preliminary overview of opportunity platforms and Citizen observations.

This document is still a living document that will be updated regularly, as appropriate.

Tethys Research Institute

CFA - CITIZEN SCIENCE PROJECT

The "Citizen science" initiative

The collaboration between Tethys, FAI "Fondo Ambiente Italiano" (Italian Fund for the Environment) and the Italian Coast Guard allowed the development of the project entitled Cetacei FAI Attenzione - CFA ("Be aware of cetaceans"), both a public awareness and a citizen science project, carried out between 2018 and 2020.

The goal of the project is to spread information among the public, mitigate the disturbance to cetaceans possibly caused by pleasure boats and acquire georeferenced data on whale and dolphin sightings along the entire coast of Italy (Fig.1).

One of the main target species of the CFA project is the Risso's dolphin. The decline of the encounters observed from 2015, in the western Ligurian Sea, brought Tethys' researchers to look for the "disappeared" dolphin population at larger scale. Together with a well-established network of collaborating research institutes, the CFA citizen science project also contributed to the identification of new areas of occurrence for this species.

Cetacean encounters were reported by different sea users (sailors, whale watching operators, fishermen, etc.) by means of a dedicated website (https://www.cetaceifaiattenzione.it/), where sighting data, pictures and videos can be uploaded.

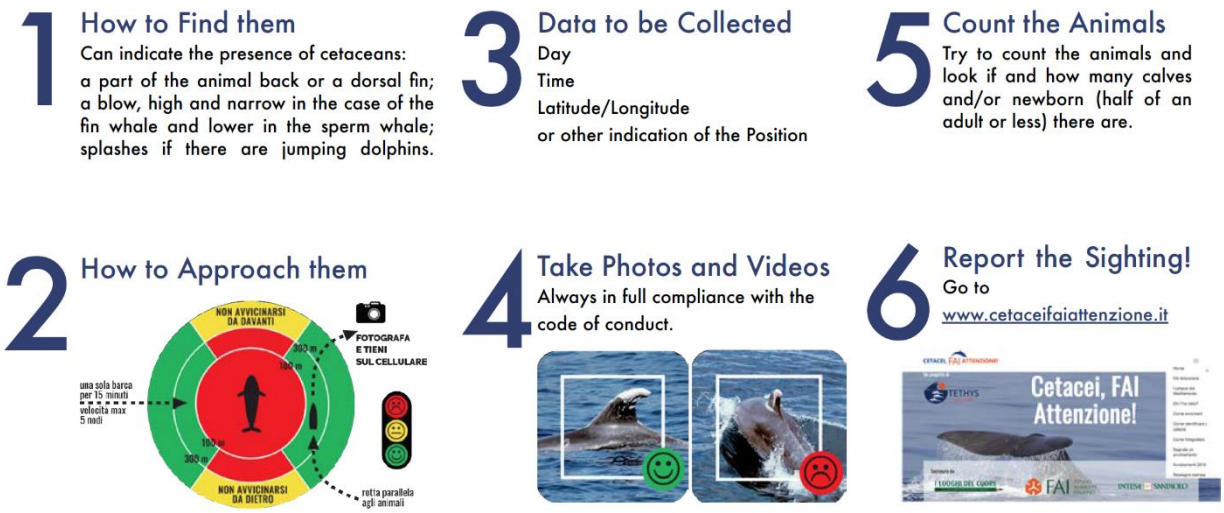


Figure 1. Information and tools provided by the CFA project.

Two dedicated posters and a leaflet about the Mediterranean species, also presenting a code of conduct for boaters to apply when coming across cetaceans, have been produced (Fig. 2). 2,200 posters and 30,000 leaflets have been distributed and are now displayed in the port authority offices of the main Italian harbours and marinas. Both posters and leaflets are also available for download from the CFA website(https://www.cetaceifaiattenzione.it/).

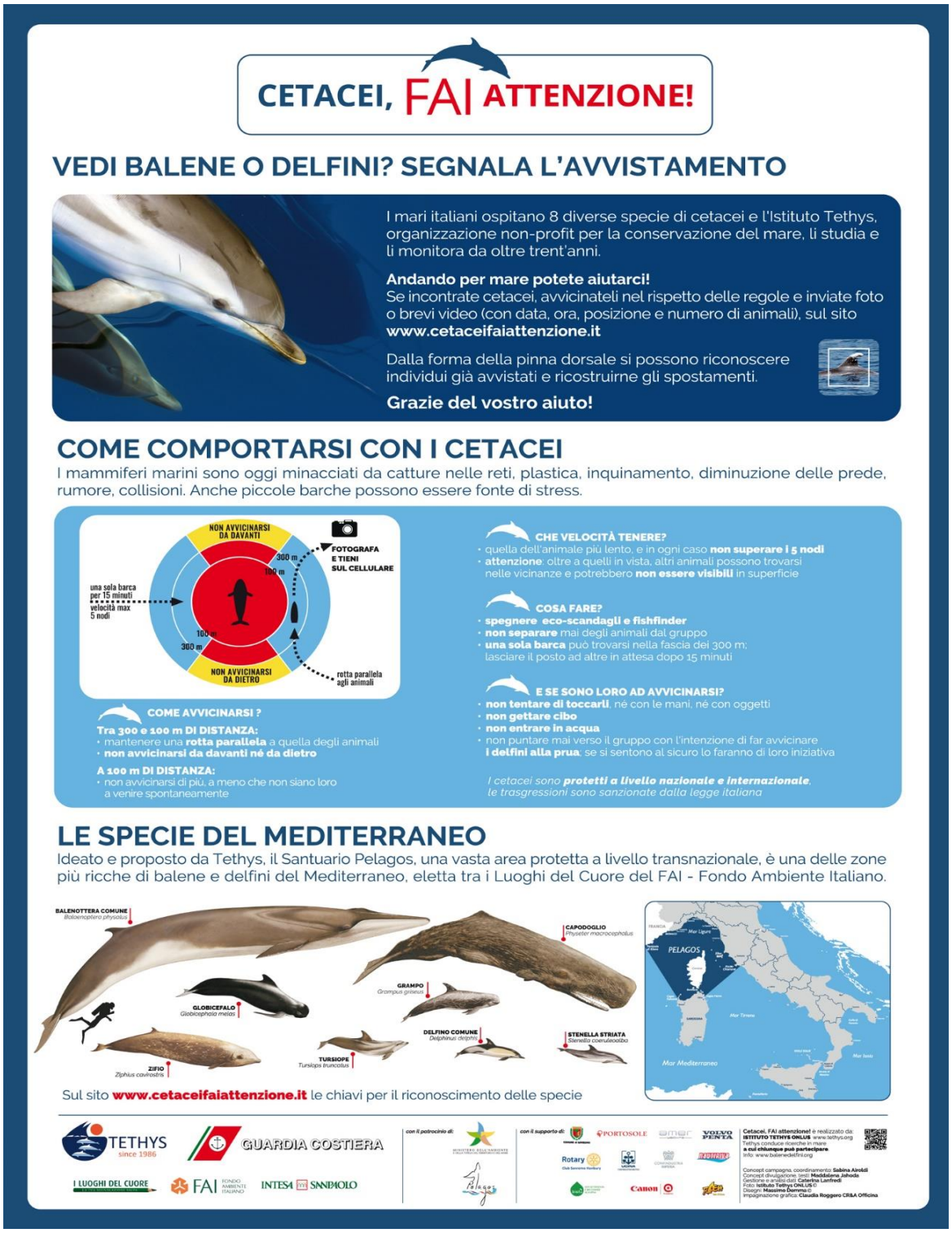


Figure 2. CFA poster distributed in 2019 in all Italian harbours and marinas.

Reported encounters through the CFA "Citizen Science" Initiative

During the three years of activity (2018-2020) the Cetacei FAI Attenzione - CFA ("Be aware of cetaceans") network collected about 1,600 reports of sightings of cetacean species.

The most frequent species reported were striped dolphins (669 sightings, 41.9%), followed by common bottlenose dolphins (250 sightings, 15.7%), fin whales (234 sightings, 14.7%), sperm whales (141 sightings, 8.8%) and Cuvier's beaked whales (130 sightings, 8.1%).

45 sightings (2.8%) of Risso's dolphins have been reported mainly in the Ligurian Sea, Southern Tyrrhenian Sea, Ionian Sea and in the Strait of Sicily (Fig. 3).

In addition, 19 encounters of Mediterranean "occasional" species belonging to false killer whales (n=4), killer whales (n=7), humpback whales (n=5) and common minke whales (n=3) have been reported.

Table 1. Summary of the encounters of cetacean's species reported by CFA network.

Species	CFA	%
Striped dolphin	669	41.9
Common bottlenose dolphin	250	15.7
Fin whale	234	14.7
Sperm whale	141	8.8
Cuvier's beaked whale	130	8.1
Risso's dolphin	45	2.8
Species < 10m	40	2.5
Common dolphin	33	2.1
Not identified	13	0.8
Long-finned pilot whale	12	0.8
Killer whale	7	0.4
Species > 10m	6	0.4
Humpback whale	5	0.3
False killer whale	4	0.3
Unidentified dolphin	4	0.3
Common minke whale	3	0.2
Rough-toothed dolphin	1	0.1
Total	1597	

The programme contributed to achieve a crucial engagement with the public adding to the ocean literacy and marine citizenship. Furthermore, and together with a consolidated network of collaborating partners, new areas of occurrence of the species were identified.

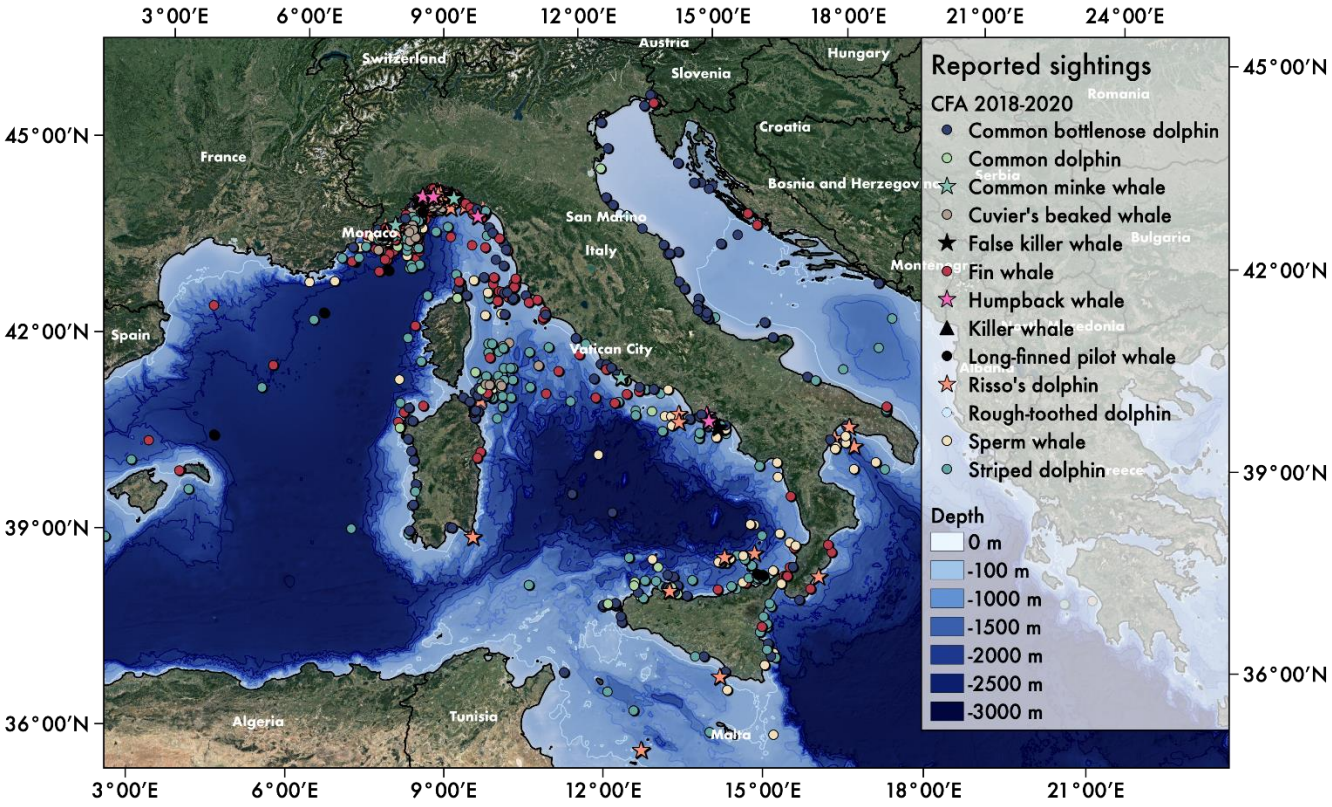


Figure 3. Overall sighting collected by the CFA network.

PECULIARITIES EMERGED DURING CFA 2020 SEASON

In 2020, during the spring "lockdown" (March-May) Tethys used the CFA web portal and database to collect cetaceans' encounters reported by the Coast Guard and fishermen or those posted on the web (i.e., social networks, YouTube). In summer, sightings were also reported from pleasure boats' owners, whale watching platforms and other organisations operating at sea.

A total of 644 encounters of 12 different cetacean species (Fig. 4) have been reported from January to December 2020. The most frequent species were striped dolphins (189 sightings, 29.3%) followed by fin whales (136 sightings, 21.1%).

Risso's dolphins have been reported in 2020 in the Ligurian Sea, Southern Tyrrhenian Sea and in the Strait of Sicily.

In 2020 "Cetacei Fai Attenzione" (CFA) network showed a marked increase of fin whales encounters (+148%; n=134 in 2020) reported in coastal waters. Further analyses are needed to better understand the potential causes of the fin whale observed distribution.

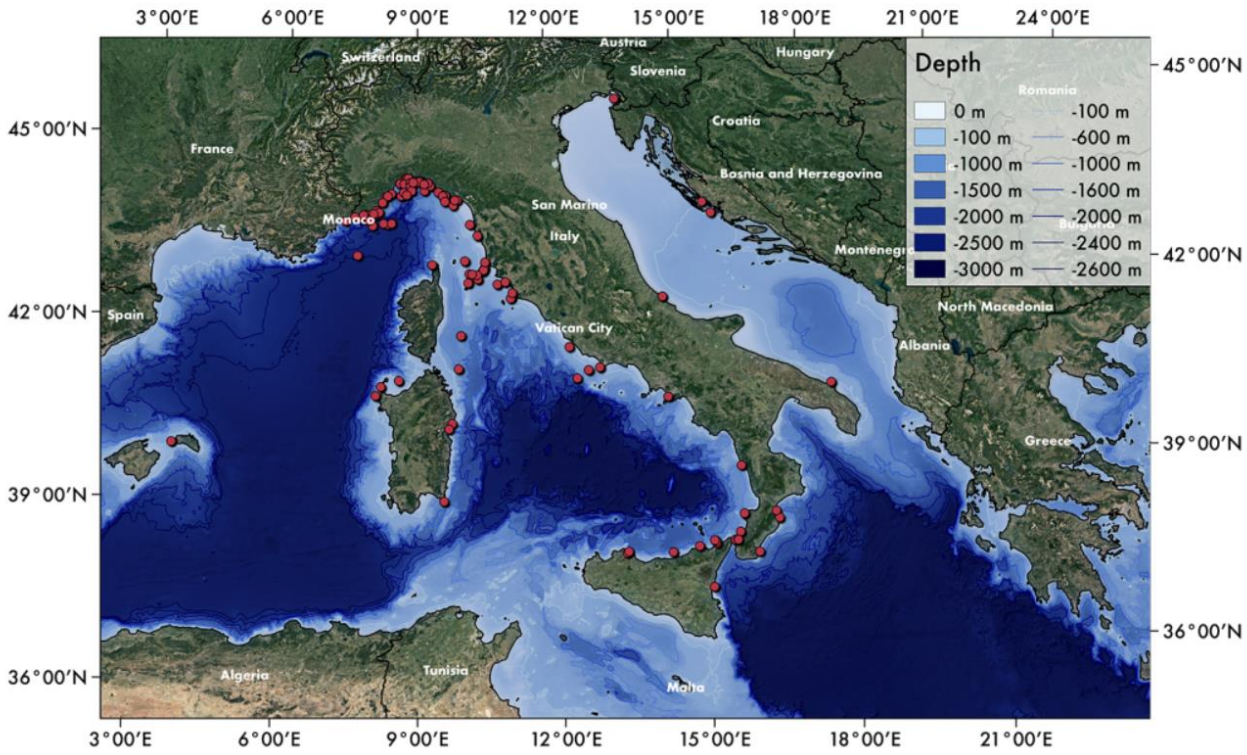


Figure 4. Map showing the position of fin whale encounters reported by the CFA network in 2020.

Citizen Science at the Ionian Dolphin Project

The Ionian Dolphin Project (IDP), by Tethys Research Institute, is conducting research and conservation activities in the coastal waters of western Greece since 1991. The first IDP website was produced in 2012. In summer 2019 the new IDP website was officially released https://www.ioniandolphinproject.org. In addition to provide education material such as basic information on marine mammal species present in Greek waters, as well as guidelines for boaters and sea users on how to behave when coming across cetaceans and monk seals, this website offers a digital platform to report marine mammal sightings (i.e., citizen science programme) through a very user-friendly interface.

The IDP website has been recently upgraded and freshened up by developing new infographics used for the SMART guidelines and adding more information on the project itself and our research activities. Mini posters with marine mammal species, species guides and code of conduct guidelines when encountering marine mammals were made available for download at the IDP website (https://www.ioniandolphinproject.org/download/) and distributed among sailing holiday companies. Since 2019 most sailing flotilla companies and the main marinas are making available print-outs of the IDP public awareness and education materials among their clients. When at sea, whenever boats where observed interaction either with dolphins or monk seals, Tethys researchers approach those boats, inform them about this project and invite them to visit our website, download those materials and follow the guidelines.

Nowadays the use of digital cameras, cell phones and other devices capable of recording easily several minutes of video, or to capture high quality digital images is widespread among boaters. Using the on-line sighting form videos and images can be sent to us to facilitate additional information and to allow us to confirm the identification of the species reported. It also includes essential information about the cetacean species found in the Greek seas and identification tips.

The number of charter boats and flotilla sailing holiday companies operating around the Ionian Islands has steadily increased during the last couple of decades. Together they pose a fleet of several hundred boats, regularly navigating the waters between the islands of Zakynthos and Corfu. The resulting regular activity of this large fleet not only offers a huge potential for the recording of opportunistic cetacean sightings (i.e., common dolphins), but also calls for the design of adequate education and awareness initiatives addressed to boat users. This increase in boat traffic and the potential disturbance it generates pose a threat to marine mammal populations by causing unnecessary stress by disrupting their natural behaviors. Such threats can be minimised by applying a basic code of conduct when coming across a group of cetaceans or monk seals. The IDP website has guidelines for cetaceans and monk seal watching at:

- https://www.ioniandolphinproject.org/cetaceans-watching-guidelines/
- https://www.ioniandolphinproject.org/monk-seal-watching-guidelines/

At the moment of the preparation of this report the IDP had received 400+ sighting reports. The success in this pioneer initiative in Greek Ionian waters could not have been possible without the collaboration in of Sunsail, Neilson, Sail Ionian, Sailing Holidays, Island Sailing, Seafarer, Kiriakoulis and Odysseus who printed, laminated and distributed the IDP Cetacean Species Guide among their clients to encourage them to collaborate, as well as basic guidelines. D Marine management group, owners of Marina Lefkas and Gouvia Marina, two of the largest in Greece, helped greatly to spread the word among their clients. All these companies have manifested their interest to continue to collaborate in this initiative.

The IDP will continue to involve those flotilla companies willing to collaborate and will establish contacts with different companies and other stakeholders with the aim of not only promoting the participation of boaters in our sighting network but also to organize public awareness and educational events addressed particularly to them.

Sighting reports referred primarily to the two species subject of our study, common bottlenose dolphin Tursiops truncatus and common dolphin Delphinus delphis. A few sightings were reported also for striped dolphins Stenella coeruleoalba and Monk seals Monachus monachus. Other species reported only twice or less included fin whales Balaenoptera physalus, Sperm whales Physeter macrocephalus, Risso's dolphin Grampus griseus and Cuvier's beaked whale Ziphius cavirostris. Everyone who reported a sighting to us was diligently contacted via e-mail and acknowledged for their collaboration. Many had not initially provided us any images or video but, once contacted, most people provided us support material that allowed us to confirm (or to establish) the species identity.

IMMRAC - Citizen Science in Israel

Overview:

In the past, IMMRAC collected reports of dolphin sightings from fishermen via a designated VHF channel for fisheries. Since then, IMMRAC and Delphis have broadened their reach and today, both organizations are collectively recording sightings reported by fishermen, sailors, security vessels, dive operators, kayakers, swimmers, surfers, lifeguards and more.

In the past, signs were posted at many beaches, dive shops and sailing clubs, urging the public to report dolphin sightings to IMMRAC, and there is still a designated portion of the website for the public to report sightings.

Today, dolphin sighting reports are either sent directly to members of IMMRAC / Delphis, or are seen by members of both organizations on Whatsapp groups or Facebook and are then forwarded to the main researchers from each group.

All reports are followed up by the main data recorder to obtain the most details possible.

Information recorded:

- Date
- Time
- Reliability: 1 = unvalidated with image, unreliable reporter, 2 = unvalidated with image, reliable reporter, 3 = validated with image
- Approximate location
- GPS position (if available)
- Species
- Group size
- Presence of calves (yes/no)
- Following trawler (yes/no)
- Reporter name
- Reporter group (fisherman / sailor / kayaker /swimmer etc…)
- Link to video/image (if available)

Longevity of the dataset

The data set was stored and recorded differently in the years before 2015, and an effort has been made to merge the old and new datasets. This task has not been completed due to time constraints but is set to be completed in the near future. Currently only a portion of the later data has been plotted on a map, also due to time constraints.

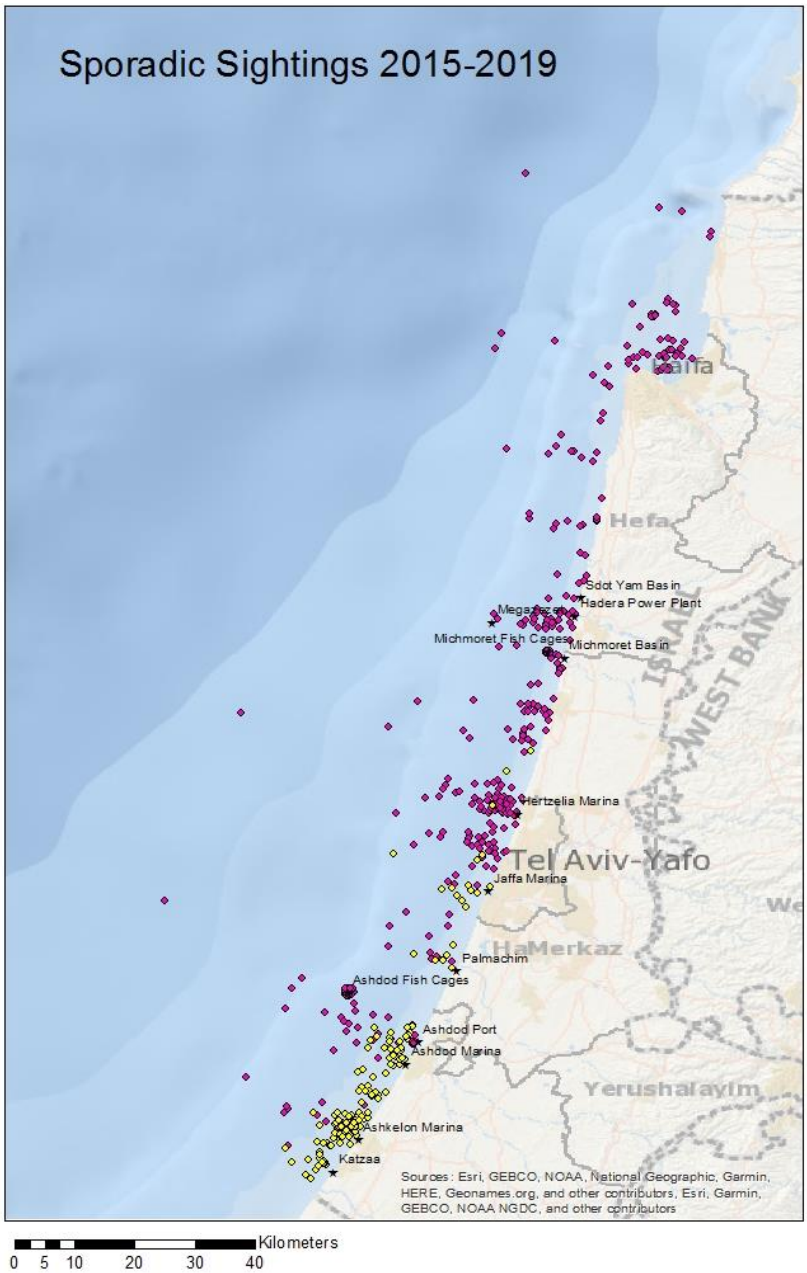
Summary of data collected through-out recent years:

Year	No. of Med sightings	Tursiops truncatus	Delphinus delphis	Stenella Sp.	Steno bredanensis	Grampus griseus	Unknown dolphin	Ziphius cavirostris	Pseudorca crassidens	Physeter macrocephalus	Balaenoptera physalus	Orcinus orca
2015	13	-	11	1	-	-	-	-	1	-	-	-
2016	128	86	25	2	2	1	11	-	-	-	1	-
2017	115	70	35	2	1	-	3	-	-	3	1	-
2018	200	121	48	1	-	3	15	3	1	6	2	-
2019	312	221	57	4	1	2	24	-	-	3	-	-
2020	282	220	33	-	-	-	9	3	6	3	1	7
2021*	176	126	26	-	-	2	10	1	1	8	2	-

*Data for 2021 includes all reports up until September 30, 2021.

**Most data comes from coastal waters but some sightings are also from deeper waters between Israel and Cyprus.

Mapping (between the years 2015-2019)



DMAD-Marine Mammals Research Association runs citizen science activities within the waters of Montenegro and Turkey

Montenegro Dolphin Research (MDR) started in 2016 with the aim of combining research citizen science activities to create an ecological consciousness of the locals and the expats of Montenegro. During this last five years;

- 8 workshops (interactive theatre games against captivity, recycled art, art and crafts) that engages the youth and children of Montenegro (Figure 1);
- 25 talks on the dolphins of Montenegro and the existing threats (Figure 2);
- 5 dolphin watch tours for the locals that explains;
- 20 beach and shore clean up were organised in collaboration with local and international schools, NGO 'Our action' and the expat community.

Figure 1: Recycling workshop with craft and arts school

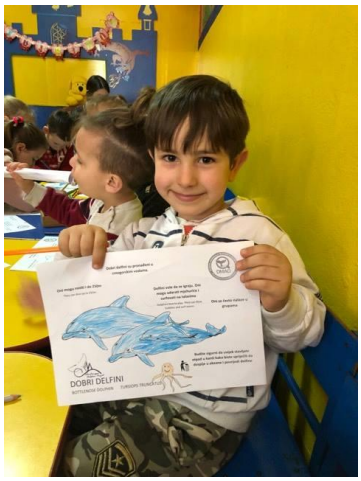


Figure 2: Talk in "Meksiko"

Additionally,

- Montenegro Sighting Network is created

Figure 3: Montenegro Sighting Network poster and flyer.

Montenegro Sighting network

Montenegro Sighting Network was created in September 2020 not only to collect important data on dolphin sightings but also to include residents of Montenegro to the project for the project ownership. The posters and flyers of this project were distributed along the whole coastline of Montenegro (Figure 3). The Facebook page of the network was advertised on social media channels.

Bottlenose dolphins (*Tursiops truncatus*) were the only species that was reported by the Network, with an overall 39 sighting report (Figure 4). 35 of the sightings were reported during the COVID19 pandemic from July 2020 up until July 2021. This seems like a relatively low number; however, 57 sightings of bottlenose dolphins were recorded through our land and boat survey efforts during the same time frame, which is only double than the citizen-science reports. This means that citizen science played an important role in collecting the data in a year where there was a limited possibility of surveying, due to the limitation of COVID-19 pandemic. From the reporting 84% of the sightings were reported from the Boka Kotorska Bay (Northern waters of Montenegro) while the rest was from the south of Montenegro (Figure 4). 45% of the reports did also have good quality photographs of the focal groups.

It is important to highlight that this network is at the development face in Montenegro with a continuous effort to spread its presence within the stakeholders. The network link can be found below:

https://www.facebook.com/montenegrodolphinsightingsnetwork

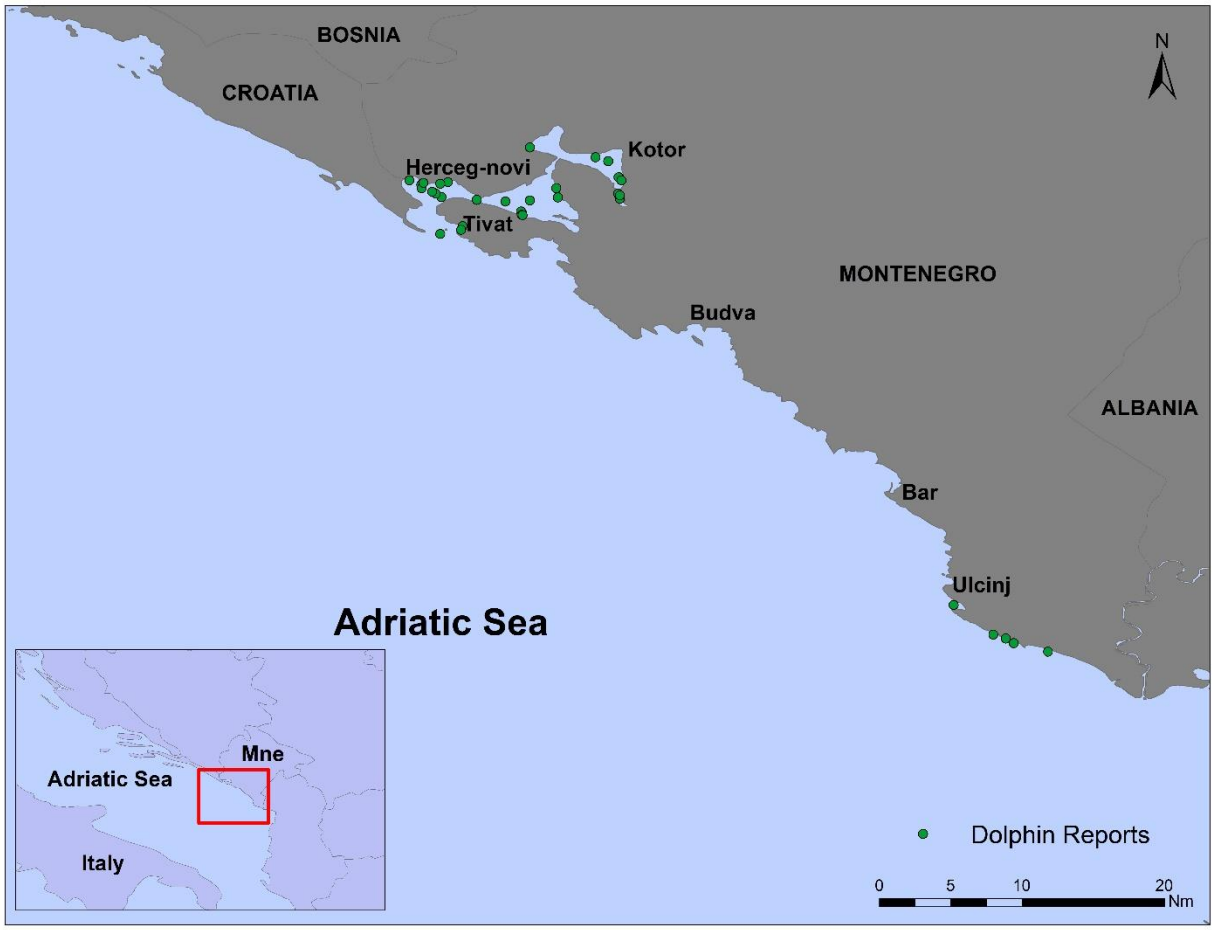


Figure 4: The map of reported bottlenose dolphins by the Montenegro Sighting Network

Social Media for Social Species

In 2018, MDR conducted a pilot study under the name of "Social Media for Social Species" where social media was searched for dolphin sightings. During the research a hashtag was used to gather data about the changing behaviour of the bottlenose dolphin due to the increasing interaction with touristic vessels and suitable photo-id photos. For this research the hashtag tracking website keyhole.co was used. This website uses hashtags and keywords to filter which photos and videos are important to the research (Which species and geographical location). It uses different media sites like Facebook, Instagram and Twitter. After a two-week search period a total of 625 posts were available for use for the research. 166 of these posts were assessed for their suitability for photo-ID and other data uses. Of these 166 posts, 44 (26.5% success rate) posts had high grade suitability for the proposed use.

For this research the highest proportion of suitable posts were seen in the hashtags or keywords 'porpoise' and 'common dolphin' whilst the phrases 'marine mammal' and 'cetaceans' yielded the lowest proportion of suitability, as many of these posts were linked to research centres, NGO's or dedicated marine mammal social media pages.

The gathered information was published under the name of "Social Media for Social Species: A case study on the behavioural transitions of bottlenose dolphins (*Tursiops truncatus*) in the presence of tourism, Montenegro, South Adriatic".

https://www.semanticscholar.org/paper/Social-Media-for-Social-Species%3A-A-case-study-on-of-Clarkson-Abbiss/c68b59d783426178a3321f499fb7ec2441f8a351

Additionally, our research and citizen-science activities were broadcasted in multiple television, radio and newspaper in Montenegro. Due to the COVID-19 pandemic and the restrictions in 2020 and 2021 it was almost impossible to organize events where people could safely gather like presentations at schools and beach clean ups. However, MDR found new ways to reach people by creating the kids' corner on DMADs website with craft and recycling ideas. https://www.dmad.org.tr/kids-corner

Further, we provided remote internship opportunities with no cost attached to the local students/early career researchers of Montenegro.

https://www.dmad.org.tr/remote-internships

In regards to the public outreach and citizen-science activities in Turkey;

- Turkey Dolphin Sighting Network is developed.
- 20 dolphin watch tours were organised for the disadvantage children and youth of Turkey
- Written and visual media channels were used to spread the cetacean knowledge of Turkey
- Five workshops on field techniques, photo-identification and GIS mapping were provided to the local students of Turkey
- ACCOBAMS Highly Qualified MMO/PAM certification workshop were organised to the interested parties
- 20 GPS loggers were placed to the fishers' boat to document their movement in the Antalya Bay
- Over 50 students were joined to our research team for practical skills
- A report to highlight the presence "noise pollution" in Turkish waters were prepared and distributed to the stakeholders
- An art exhibition on the "Dolphins and Whales of Turkey" were presented.

Turkey Dolphin Sighting Network

DMAD has started a preliminary sighting network in Turkey since 2016. The network targets fishers and sailors and the observers send their sighting information (date, time, location, picture and video) to a WhatsApp number. Overall, 67 sightings were reported, of which 37% had location references or coordinates to be mapped. Therefore only 25 of these sightings were mapped, composing from eight cetacean species (Figure 5). While majority of the sightings were belonged to bottlenose dolphin species, Risso's dolphins were the second most reported species. The majority of the sightings were reported from Gokceada, North Aegean Sea as a result of our strong relationship with the fisher's community of the island, emphasizing the importance of the mutually respectful connections between the stakeholders.

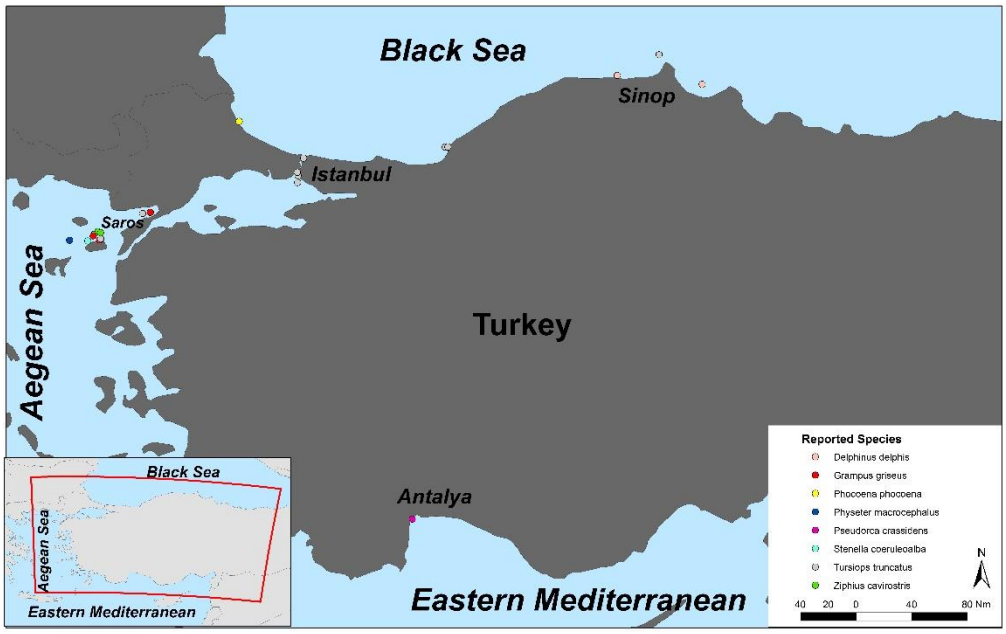


Figure 5: Reported cetacean sightings in Turkey

It is too Loud Now! The Ignored Consequences of Noise Pollution in the Mediterranean Sea

DMAD's long-term research on the Giant Guardians of Deep Seas after three years and twelve expedition experiences showed clearly the Eastern Mediterranean underwater noise pollution problem and under this information, the report "It is too Loud Now!" prepared and released in 2021. The report is bilingual and summaries the evidences of noise pollution on different species, cetaceans, solution proposals and ACCOBAMS Resolutions with the aim to be used as a guide for the mitigation efforts. The report is already distributed to the Ministry of Agriculture and Forestry, Directorate of National Parks, WWF-Turkey and TUDAV which can be found in the below link;

https://irp.cdn-website.com/2cebdaf3/files/uploaded/SeismicReport_Brochure_ENG.pdf

An Art Gallery on "Dolphins and Whales of Turkey"

To increase the awareness of the cetaceans of Turkey, DMAD prepared an art exhibition between the 22 th of September till the 26th of September in Cesme Marina. The exhibition was completed in four days with over 200 visitors. In the exhibition area, we additionally presented our seismic guide and strategy plan. (Figure 6)

Figure 6: Exhibition in Cesme Marina

A collaboration with Setur Marinas

Setur Marinas is the corporation that has the most inveterate and widespread marinas in Turkey, with overall 10 marinas throughout the coastline of Turkey and one in Greece. Pursuant to company policies, they follow a roadmap that aims to be a pioneer in nature conservation, successfully follows nature conservation trends, and develops sub-institutions for this purpose, trying to spread them in society. Therefore, DMAD partnered up with the Setur Marina in September2021 to draw attention on the cetaceans of Turkey and the threats they are facing with. Currently, the marinas display the stickers and posters of DMAD that emphasize that we do have whales in Turkey and they are under heavy human pressure.

Short documentary of the dolphins of Istanbul

Istanbul Municipality prepared a short documentary in October 2021 about Istanbul Strait dolphins to draw attention on the marine biodiversity of this cosmopolitan city (https://www.youtube.com/watch?v=nor-N1U82G8).

Mapping the Small-scale fishery practices in the Bay of Antalya through off the self GPS loggers

A pilot study was run to understand the effect of simple GPS loggers to map the fishery dense location, targeting the small-scale fishery activities between 2015 and 2017. Additionally, dolphin distribution data was collected to understand the overlapping zones of dolphins and fishery practices.

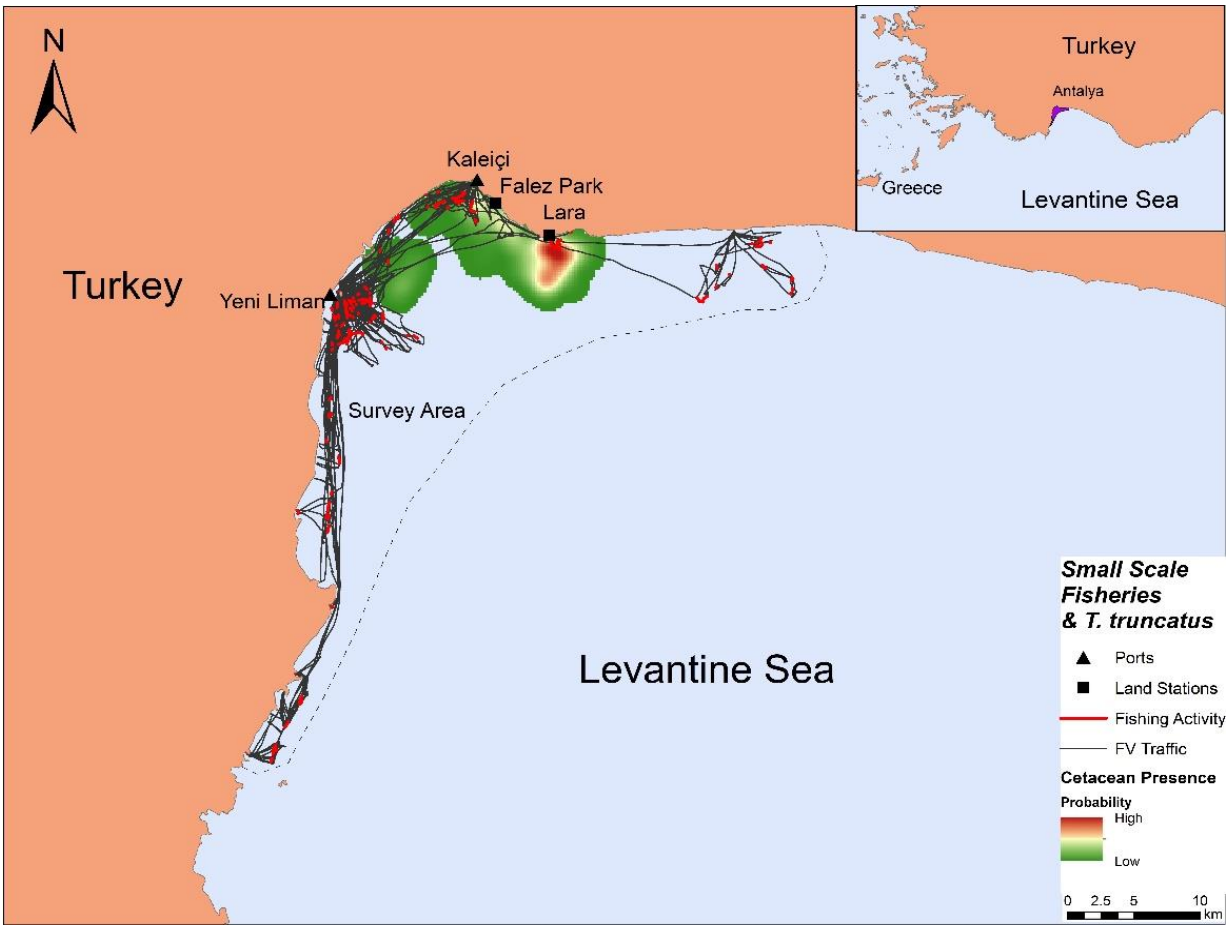


Figure 7: Small scale fishery presence and bottlenose dolphin heat maps in the Antalya Bay.

The above work (Figure 7) is presented during the European Cetacean Society Conference in 2019 and its link can be found below;

https://irp-cdn.multiscreensite.com/2cebdaf3/files/uploaded/PosterWMMC19_final%20%282%29.pdf

ACCOBAMS Highly Qualified MMO/PAM certification

DMAD has organised the first certification program on ACCOBAMS Highly Qualified Marine Mammal Observers and Passive Acoustic Monitoring Operators training in Marmaris, Turkey in 2019. During this five days of training, 15 participants, including the locals, were certified as MMO/PAM operators (Figure 8 and 9).

Figure 8: ACCOBAMS Highly Qualified MMO/PAM

Figure 9: ACCOBAMS Highly Qualified MMO/PAM

Informative Posters for Pupils, Fishers and Decisionmakers

DMAD also created informative posters on cetaceans of Turkey and the blue-economy and distributed within the schools, public halls, fishery cooperatives and governmental bodies (Figure 10 and 11).

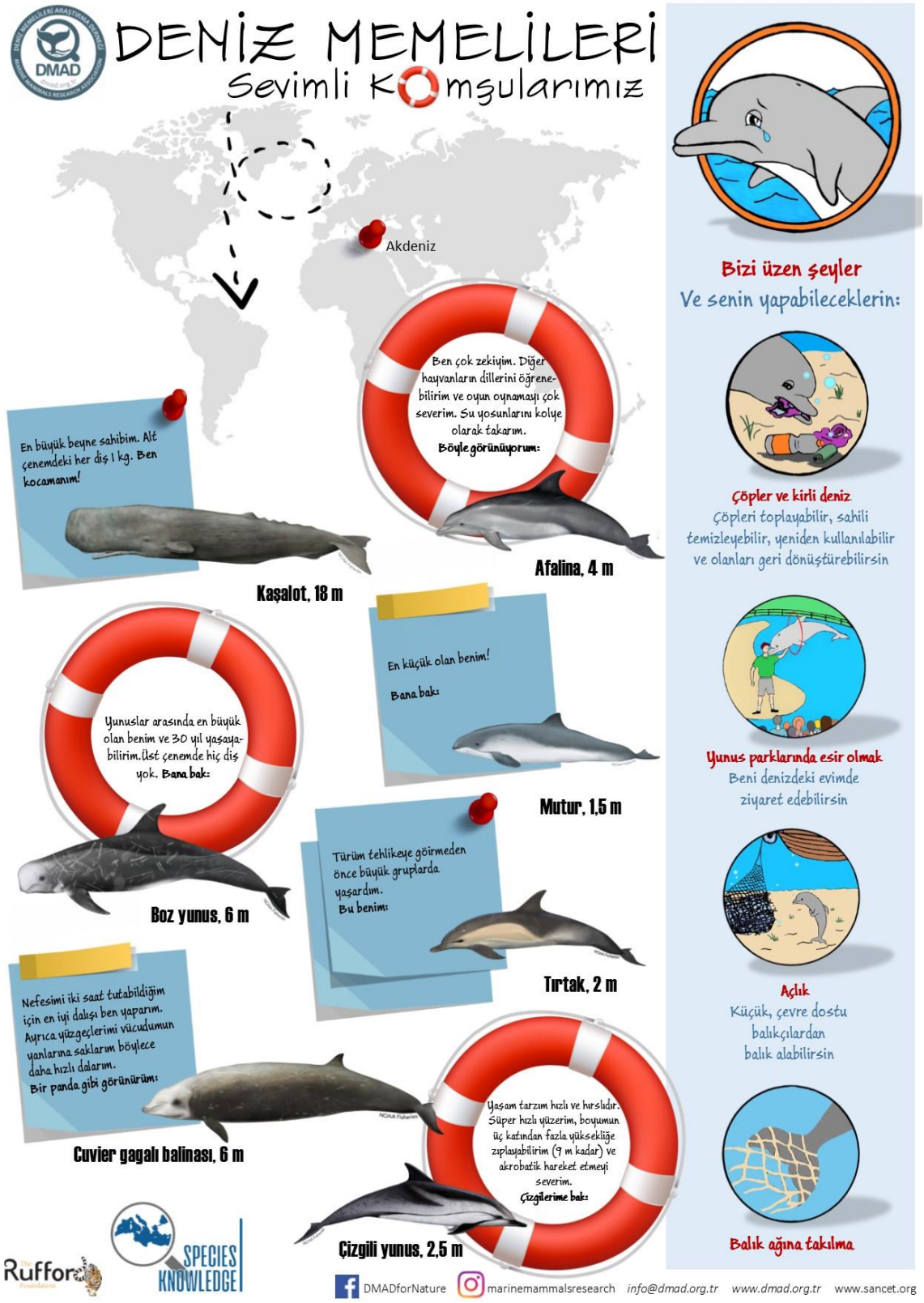


Figure 10: Informative posters for schools.

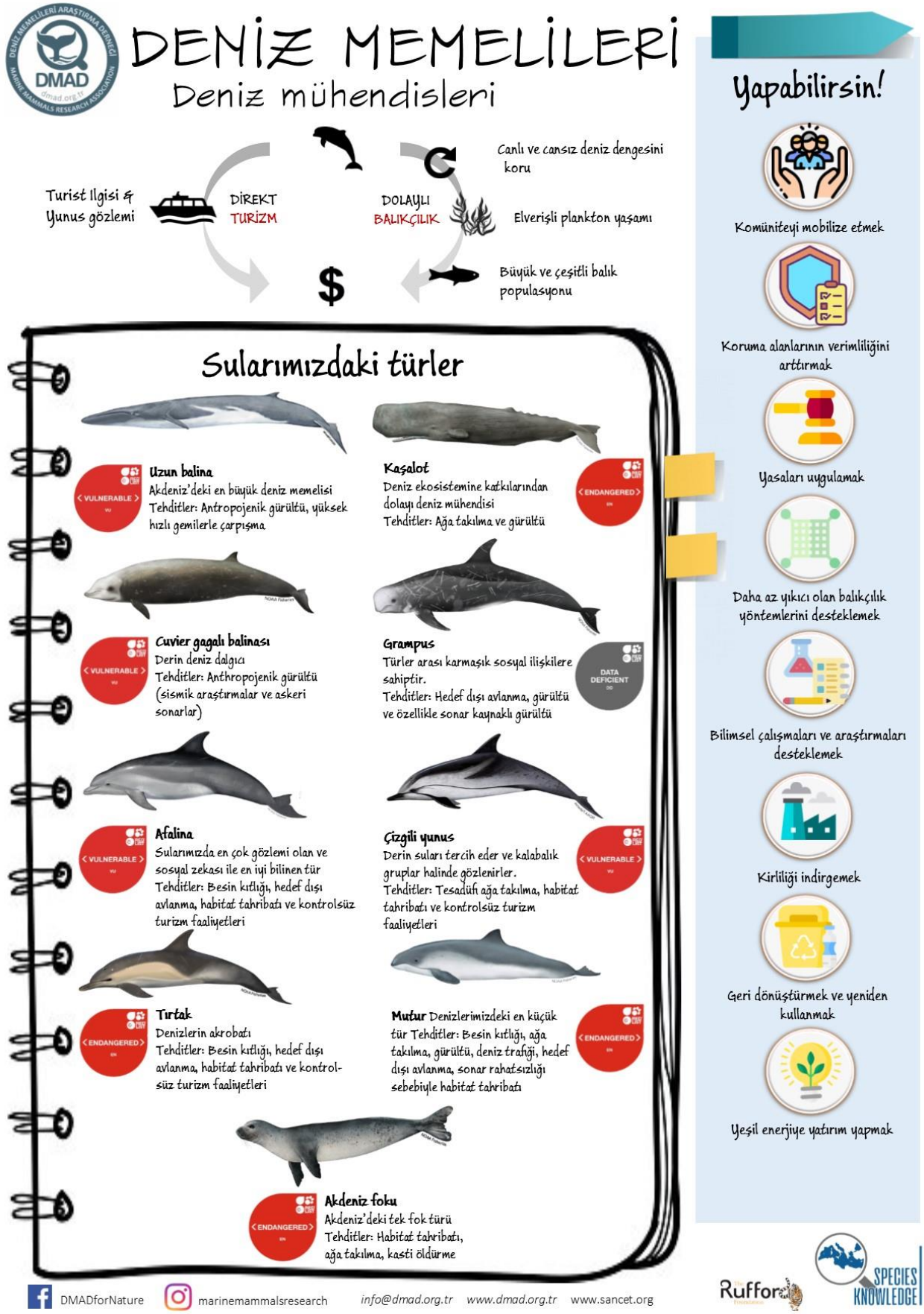


Figure 11: Informative for governmental bodies, public halls and fishing cooperatives.

BLACK SEA WATCH - CITIZEN SCIENCE PROJECT

BLACKSEAWATCH.ORG
Encouraging citizen science for marine biodiversity of the Black Sea

Black Sea marine environment research with public participation- Black Sea Watch (in short)" is a joint initiative of Green Balkans NGO, Bulgaria and Turkish Marine Research Foundation (TUDAV), Turkey, aiming to raise public awareness on biodiversity of the Black Sea – a fragile ecosystem facing multiple threats. This initiative was financed by the European Union and the Republic of Turkey (within the framework of the Civil Society Dialogue Programme CSD-ENV). The active implementation period lasted for 12 months from February 2016 to January 2017. The project has been finalized, however the tools that were developed for this project are still available online for the public.

The overall objectives of the project are to increase public awareness on marine biodiversity in the Black Sea and to increase public participation in biodiversity data collection for the Black Sea. To achieve this a web-based database and an application for smart phones were developed (Figure 1).

Figure 1. Usage of the BlackSeaWatch tool.

A catalogue was prepared in three different language (English, Turkish, Bulgarian) for all the species that can be uploaded to the application (Figure 2).

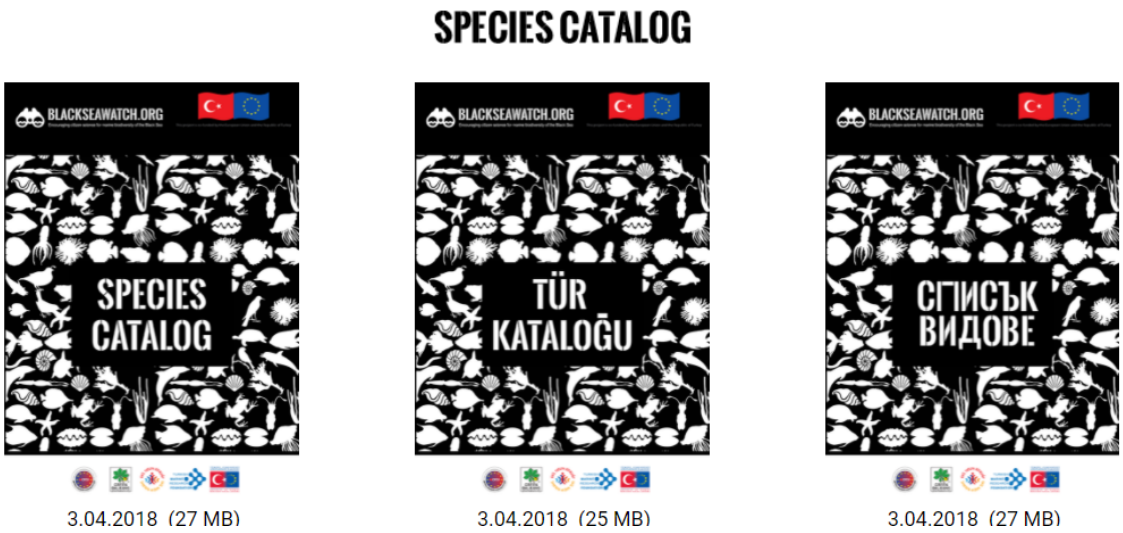


Figure 2. Species catalogue (available in the website)

For the cetaceans, 68 (12 of them alive, others are dead stranding) observations were reported to this day. Of these observations 15 of them are *Tursiops truncatus ponticus* (Black Sea Bottlenose dolphin) (Figure 3, 4, Table 1), three of them are *Delphinus delphis ponticus* (Black Sea common dolphin) (Figure 5, 6, Table 2) and 50 of them *Phocoena phocoena relicta* (Black Sea harbour porpoise) (Figure 7, 8, Table 3).

Tursiops truncatus ponticus (Black Sea Bottlenose dolphin)

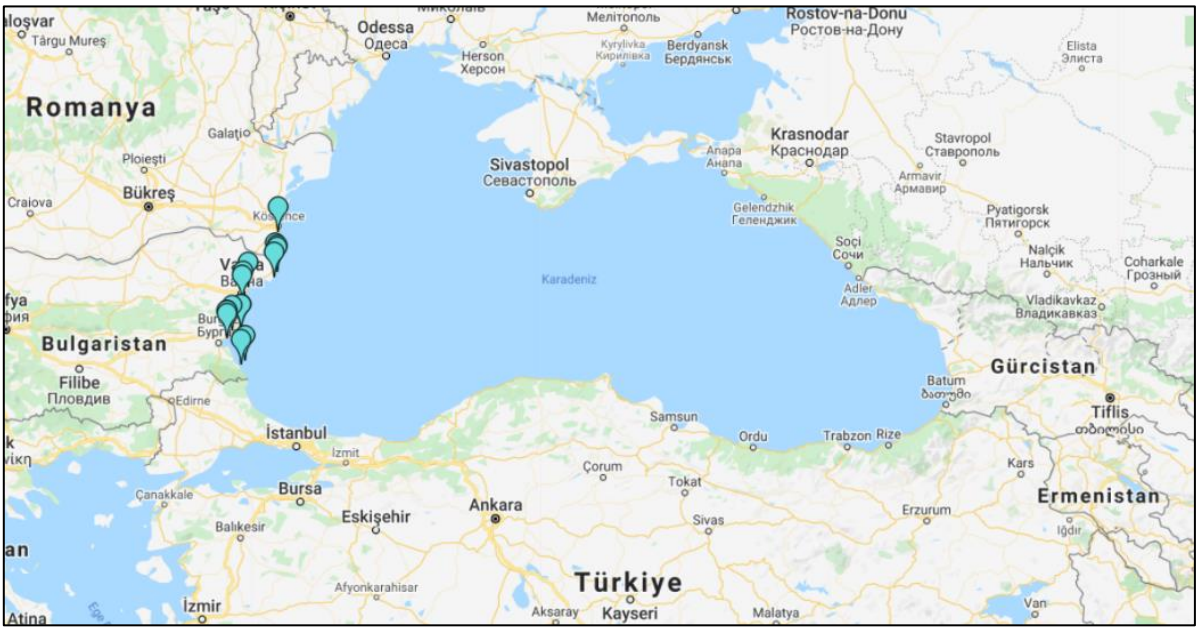


Figure 3. Reported locations of the *Tursiops truncatus ponticus*

Table 1. Observation details of the *Tursiops truncatus ponticus*

No	Date	Location	Dead or Alive	Additional Information
1	10.09.2021	42°33'51.3"N 27°38'33.1"E	Dead	Male, 240 cm
2	27.02.2021	43°33'55.8"N 28°35'21.2"E	Dead	Female, 180 cm
3	19.11.2019	43°32'25.9"N 28°36'48.3"E	Alive	Several groups feeding among trawlers
4	13.04.2019	42°11'50.8"N 27°54'29.4"E	Dead	-
5	26.03.2019	42°37'21.2"N 27°38'02.7"E	Dead	223 cm
6	19.09.2018	43°10'05.2"N 27°57'06.2"E	Alive	2 adults, group 4 max, no young observed, socialising with windsurfers , swimming in the same direction as them: from NW to SE, interaction continued for 90 sec from 10:15h onward
7	18.09.2018	43°31'03.5"N 28°36'40.2"E	Alive	Single or maximum 2, swimming
8	18.09.2018	43°26'37.3"N 28°33'58.9"E	Alive	Big group around 17, 2 young observed, socialising among themselves and bowriding with our Zodiak motor boat, also interested by the 2 windsurfers that we were escorting. 4 of them were riding a wave in unison and the interaction continued for 28 min.
9	05.06.2018	43°06'33.0"N 27°56'10.4"E	Alive	Group of 5
10	22.05.2018	42°37'00.7"N 27°37'56.1"E	Dead	166 cm
11	08.06.2017	42°42'08.4"N 27°54'03.9"E	Alive	Group of 15 or more
12	24.10.2016	44°04'28.5"N 28°38'18.3"E	Dead	stranded on the beach, male, 180 cm
13	28.05.2016	42°41'10.8"N 27°43'19.3"E	Alive	At about 12:00, total 8 in several groups
14	17.05.2016	42°14'45.0"N 27°59'04.4"E	Alive	-
15	07.05.2016	43°17'43.5"N 28°02'53.7"E	Dead	-

Figure 4. Some photos of the reported bottlenose dolphin

Delphinus delphis ponticus (Black Sea common dolphin)

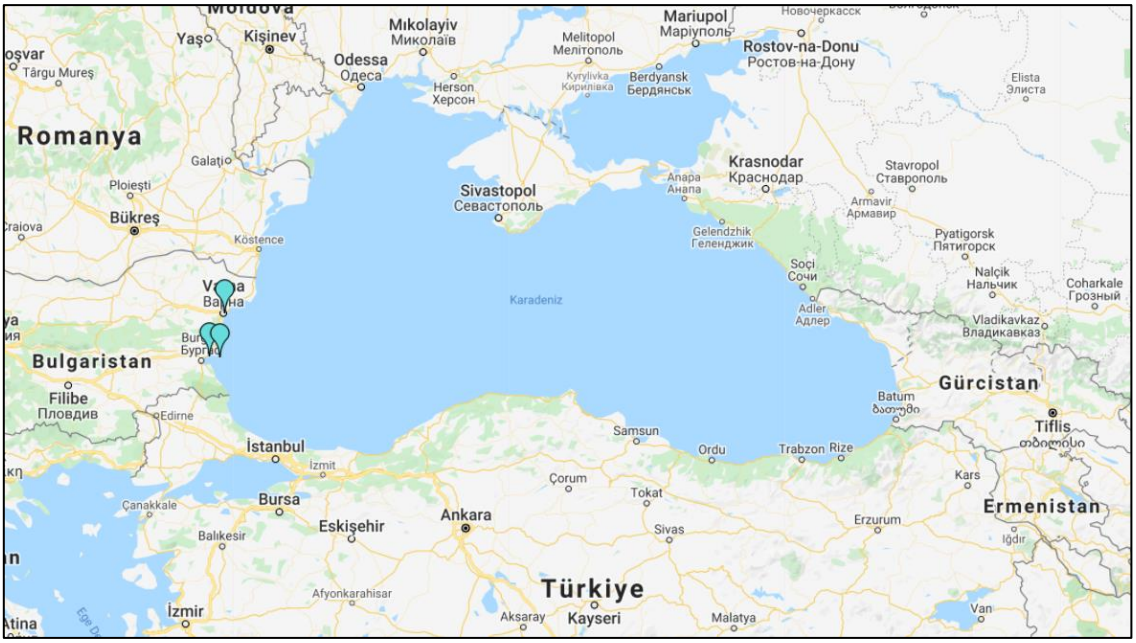


Figure 5. Reported locations of the *Delphinus delphis ponticus*

Table 2. Observation details of the *Delphinus delphis ponticus*

Figure 6. Some photos of the reported common dolphin.

No	Date	Location	Dead or Alive	Additional Information
1	26.03.2018	42°33'45.0"N 27°38'37.2"E	Dead	Male
2	25.11.2017	42°32'50.4"N 27°51'44.2"E	Alive	-
3	10.05.2017	43°12'43.9"N 27°57'05.5"E	Dead	-

Phocoena phocoena relicta (Black Sea harbor porpoise)

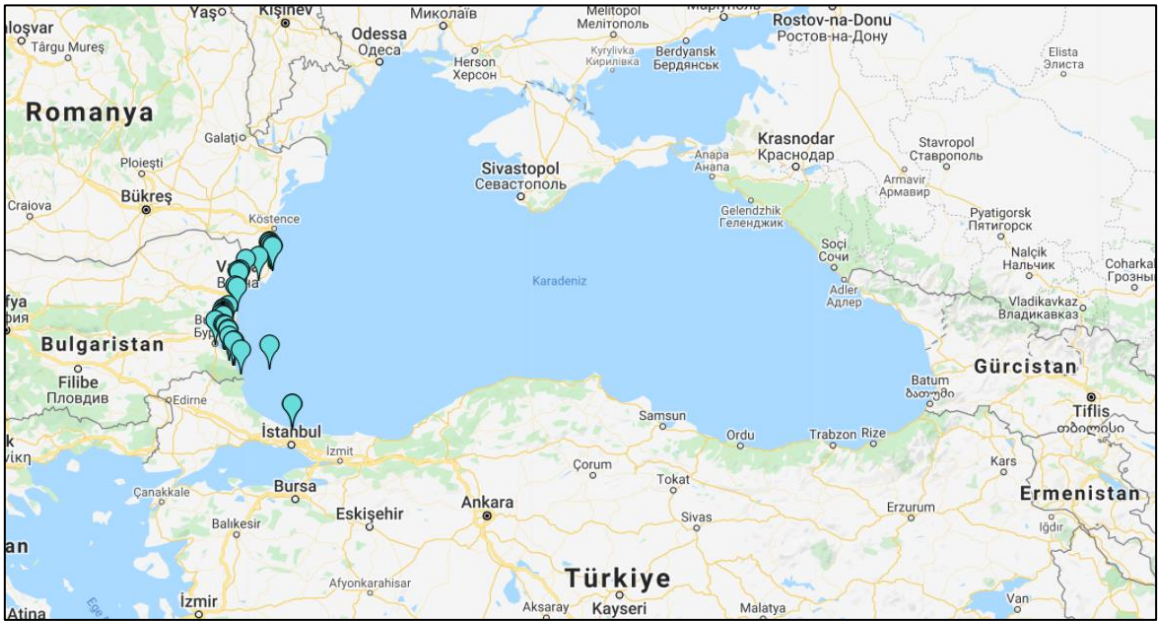


Figure 7. Reported locations of the *Phocoena phocoena relicta*

Figure 8. Some photos of the reported harbour porpoise

No	Date	Location	Dead or Alive	Additional Information
1	27.07.2021	43°33'26.2"N 28°35'57.6"E	Dead	-
2	25.04.2021	42°36'58.2"N 27°37'53.4"E	Dead	-
3	19.08.2020	43°22'28.1"N 28°05'26.2"E	Dead	60 cm, headles, probably cut off
4	03.08.2020	43°36'47.9"N 28°34'09.1"E	Dead	-
5	28.07.2020	43°32'36.9"N 28°36'21.3"E	Dead	-
6	24.07.2020	43°36'41.6"N 28°34'08.3"E	Dead	-
7	17.07.2020	42°34'55.3"N 27°37'58.1"E	Dead	90 cm
8	26.05.2020	42°20'48.8"N 27°43'29.8"E	Dead	Pregnant, missing head and pectoral fin, cut post mortem. Stranded whole on 23 May
9	10.05.2020	42°33'49.3"N 27°37'25.0"E	Dead	Female, 93 cm
10	29.04.2020	42°35'40.1"N 27°37'53.0"E	Dead	Male, 126 cm, missing tail
11	26.08.2019	42°35'30.5"N 27°37'53.7"E	Dead	Heavily decomposed carcass about 130 cm
12	14.08.2019	42°35'22.8"N 27°37'54.3"E	Dead	Juvenil, 68 cm
13	14.08.2019	42°36'24.3"N 27°37'51.2"E	Dead	Male, 73 cm
14	14.08.2019	42°35'43.8"N 27°37'52.2"E	Dead	Male, 112 cm
15	26.06.2019	42°29'43.5"N 27°29'00.1"E	Dead	-
16	10.04.2019	43°12'04.7"N 27°55'25.6"E	Dead	1m
17	12.10.2018	42°34'17.3"N 27°38'11.8"E	Dead	Female, 97 cm
18	09.10.2018	42°21'04.6"N 27°43'12.8"E	Dead	119 cm
19	19.09.2018	43°10'26.4"N 27°56'37.7"E	Alive	2 to 4 individuals, 0 young, 10:01h, swimming from East to West
20	27.08.2018	42°10'24.2"N 27°51'35.0"E	Dead	Less than 1 m
21	14.08.2018	43°37'26.4"N 28°34'07.1"E	Dead	-
22	12.07.2018	42°10'23.4"N 27°51'35.0"E	Dead	Male
23	18.06.2018	42°10'44.7"N 27°50'43.9"E	Dead	Female, decomposed, approx. 1 m
24	07.05.2018	42°34'55.0"N 27°37'58.2"E	Dead	Missing tail, about 100 cm w/o tail fluke
25	24.11.2017	42°06'46.1"N 28°33'45.6"E	Alive	-
26	08.07.2017	42°24'39.3"N 27°39'38.0"E	Dead	-
27	18.05.2017	42°33'43.9"N 27°36'16.6"E	Dead	1.20 cm
28	18.05.2017	42°33'34.3"N 27°38'45.5"E	Dead	About 1.20 cm
29	14.04.2017	43°13'02.0"N 27°58'52.8"E	Alive	Group ~20
30	14.04.2017	42°38'50.0"N 27°39'06.2"E	Dead	0.75 long and 0.35 wide with the tail cut off I think it's human intervention
31	02.04.2017	42°35'17.3"N 27°37'19.9"E	Dead	Length 1.00 and width 0.35
32	18.08.2016	43°24'43.3"N 28°21'07.9"E	Dead	-
33	08.08.2016	42°59'17.2"N 27°53'30.9"E	Dead	72 cm
34	08.08.2016	42°58'30.6"N 27°53'40.0"E	Dead	68 cm
35	06.08.2016	42°03'19.5"N 27°59'10.2"E	Dead	Juvenil, 12:50 EET
36	06.08.2016	43°34'24.0"N 28°34'45.2"E	Dead	Male, 70 cm
37	04.08.2016	42°25'00.4"N 27°39'01.4"E	Dead	About 60 cm, at 16:30
38	01.08.2016	43°34'27.3"N 28°34'50.3"E	Dead	Quite advanced stage of decomposition
39	31.07.2016	41°14'53.3"N 28°59'43.9"E	Dead	-
40	30.07.2016	43°36'38.4"N 28°34'09.2"E	Dead	-
41	17.07.2016	42°24'46.4"N 27°40'59.0"E	Dead	-
42	17.07.2016	42°33'21.2"N 27°39'00.1"E	Dead	Female, fillets cut
43	16.07.2016	42°37'44.4"N 27°38'13.7"E	Dead	74 cm
44	16.07.2016	42°37'07.0"N 27°37'58.1"E	Dead	67 cm
45	02.07.2016	43°12'04.5"N 27°55'24.0"E	Dead	About 50 m
46	02.07.2016	43°13'10.0"N 27°58'53.8"E	Dead	About 60 m
47	11.06.2016	42°42'00.7"N 27°43'10.0"E	Dead	dead for at least 5 to 7 days
48	13.05.2016	42°37'32.4"N 27°38'07.9"E	Dead	-
49	15.08.2015	41°14'52.8"N 28°59'45.9"E	Dead	-
50	03.08.2015	42°14'47.8"N 27°45'19.3"E	Dead	-

Table 3. Observation details of the *Phocoena phocoena relicta*

“There is a dolphin here right now” – Facebook Group

This group was created on July 2, 2012 on Facebook to share information when a dolphin is seen in the İstanbul Strait. There are a total of 278 members. Posts includes informations such as date, time and location, species and number of observed indivduals (if its detected). So far, hunderds posts were uploaded (Figure 9).

Link for the Facebook Group: https://www.facebook.com/groups/403154469722204/

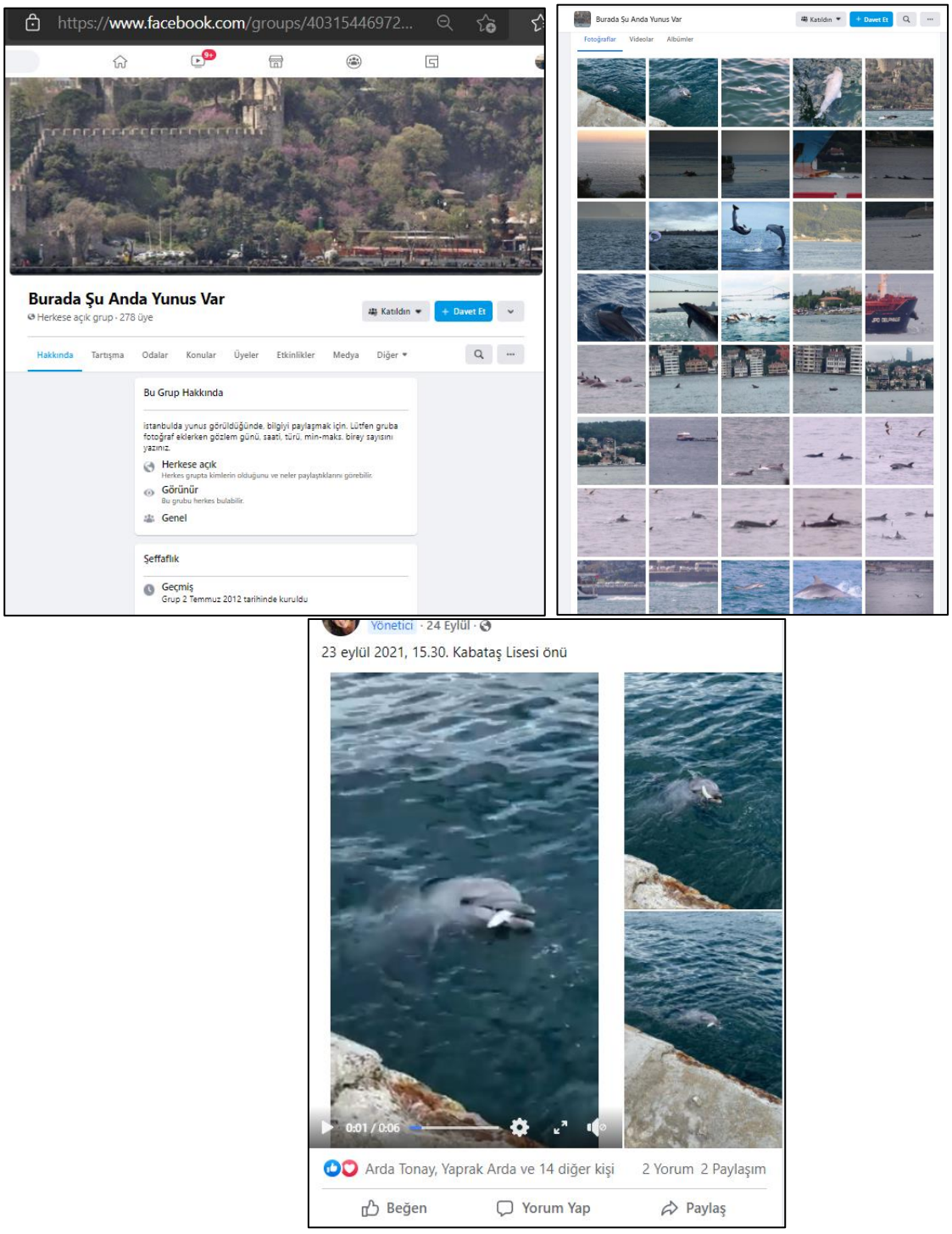


Figure 9. Screenshots from the group page

TUDAV's Opportunustic Cetacean Sighting Collection

The opportunistic data have been collected via above-mentioned observation sheet, from 1985 to 2007 (Figure 10). With some of these data, the article titled "Preliminary Study on Dolphin Occurrence in the Turkish Straits System" was published in the Proceedings of the Eleventh Annual Conference of the European Cetacean Society, Stralsund, Germany, 10-12 March 1997. (The article is attached.)

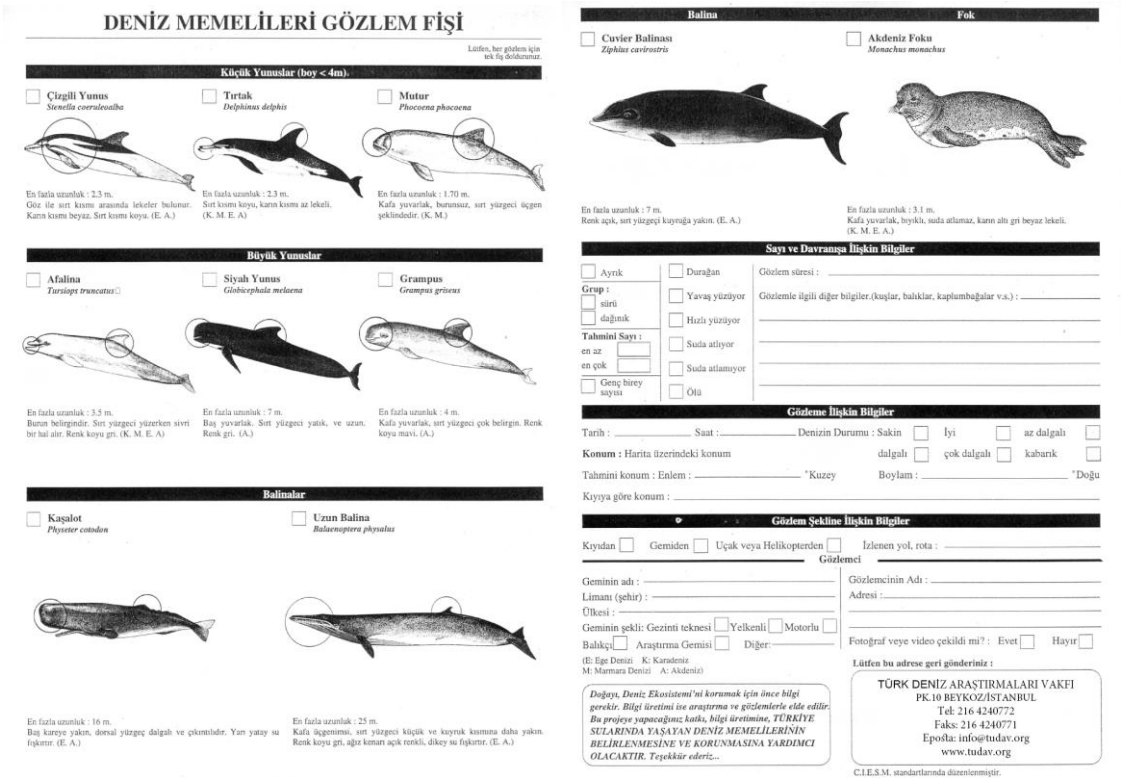


Figure 10. Observation sheet.

The tool “OBSenMER” from “Cybelle Méditerranée” French Mediterranean citizen program officer

Cybelle Méditerranée is a French structure leading citizen science programs and missions at sea in the Mediterranean Sea and also one of the two initiators of the tool OBSenMER. This tool is a collaborative platform that facilitates the capture and analysis of observations at sea. It concerns all types of observations: marine mammals, sea turtles, fish, birds, but also human activities, such as boating, fishing, pollution, etc.

OBSenMER is aimed at collecting and sharing data on the Mediterranean macro-fauna and environmental factors. More information on http://www.obsenmer.org/ .

- **Open source tools**
  - **Mobile Application, OBSenMER** : from beginner to expert users
  - **Web platform :** to manage, see, and export data. www.obsenmer.org
  - **Tool to manage and share Photo-Identification catalogues**
- **Exchanges and sharing facilitated**
  - Between Observers and their Organization
  - Between Organizations and Data Users
- **Data Base**
  - **Shared**
  - **Open sharing** (CC-by-NC)
  - Data collected by expert naturalists **can be private**
- **Protection of sensitive species**
  - Public display delayed of 12 H
  - No public GPS coordinates
  - Possibility to privatize access to specific observations

The Mobile App

3 user levels

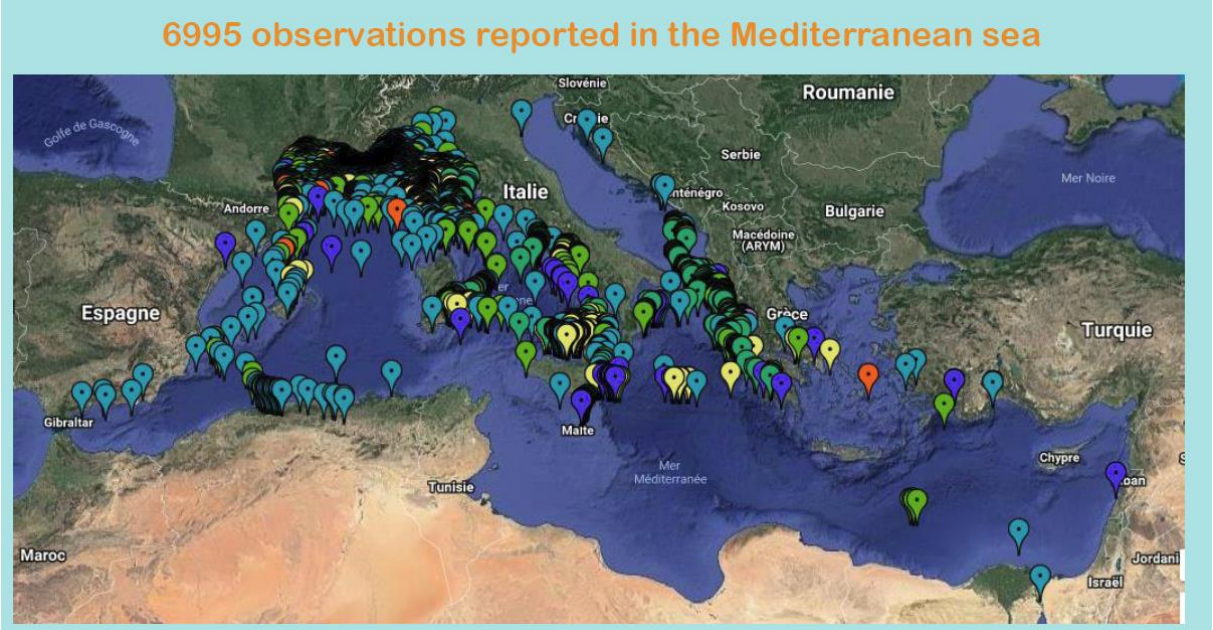
- **Level 1 : Opportunistic observations**– free access
- **Level 2 : Sighting effort without protocol**– free access – at least 15 minutes
- **Level 3 : Sighting effort with a protocol** only for expert naturalists – limited access

Data collected

- **Levels 1 and 2 :**
  - Marine mammals, rays and sharks, pelagic fishes, marine turtles, macro-plankton.
  - A **not dynamic interface** (non-changeable protocol)
- **Level 3 :**
  - Marine mammals, rays and sharks, pelagic fishes, marine turtles, macro-plankton, birds…
  - Weather conditions, Maritime Traffic…
  - **A dynamic interface** to add group of species or improve the protocol easily

Disponible sur App Store

DISPONIBLE SUR Google play



These data have already been used conjointly with others in scientific analysis and contributed to the development of numerous scientific publications (18) on very specific subjects since 2009.

In 2020/2021 the data within the database of OBSenMER have been analyzed alone through :

1. a naturalistic assessment in order to observe whether our database makes it possible to highlight trends in animal populations.
[1]*Arnal C., Coux C., 2021. Programme de sciences participatives Cybelle Méditerranée, Bilan 2009-2020 : Etude naturaliste, Analyse du programme, Recommandations techniques. Cybelle Planète.*

2. a socio-technical assessment in order to concretely assess the effectiveness of the program, the successes and points to improve.
[2]*De Laage R., Litvine D., 2020. Les moteurs de l'engagement dans le programme de sciences participatives Cybelle Méditerranée : de l'intérêt au passage à l'action. SSE Conseil et ISEA, Novembre 2020.*

1. Results of the Naturalist study

The data used for this naturalistic study concerns a total of: 4902.25 hours of effort observation, over 692 effective days of collection at sea (level 2 and 3 of OBSenMER protocols, meaning with effort).

Overall, the results obtained for the different species studied are consistent with the state of the knowledge about their ecology (type of habitat, environmental parameters, group size).
Moreover, the long-term data allow some findings in trends considering the evolution in group size of some species (lower for striped dolphin and common dolphin, and higher for sperm whale), in distance to the coast of sightings of some species (striped dolphin, Bottlenose dolphins…), in relative abundance for striped dolphin, sperm whale and long-finned pilot whales.

[1] https://www.cybelle-planete.org/agir-en-mer-mediterranee/cybelle-mediterranee-2/publication-et-resultats/bilan-2009-2020-cybelle-mediterranee-sciences-participatives-en-mer.html

[2] *Included in the annexes of the previous report*

2. Results of the Socio-behavioral study of citizen

For this part of the study, all the observations from the OBSenMER database were considered between 2016 and 2020, in the western basin and the eastern basin of the Mediterranean Sea.

Almost 2,000 people are registered in the “Cybelle Méditerranée” program, but not all of them are active. Between 2009 and 2020, 453 contributors reported at least one animal encounter with non-expert protocols (levels 1 and 2), or 22.6% of registrants.

The objectives of this study are to answer several questions:
What are the advantages for a successful science program? participatory at sea?
- Have a powerful tool
- Unity is strength (collaboration between several structures)

How to motivate sea users and contributors?
- communicate and communicate
- require significant human and therefore financial resources;

What kind of boat users are involved ? Are all potential contributors involved ?
The profile of the users of OBSenMER are : a minority of boat owners, a majority of people practicing sailing, and a strong propensity to participate in club or association activities (sailing, diving, associative sea trips, etc.). They are more going at sea in summer. Sea users who are not yet involved in the participatory science program are : mainly boat owners, going at sea all year round for sailing, motor boating or fishing.

Environmental profile: an important factor
The study reveals that the main reason for the engagement of those most involved in the program is "the contribution to the preservation of biodiversity". Conversely, people with little or no involved tend to seek a more rational purpose: to participate in a participatory project and learn more about marine species. A quarter of those registered but not active did so only by simple curiosity.

Do not neglect the means of communication

Be popular is a factor of security

Is the use of non-expert protocols really advantageous?
- Non-expert protocols = A large geographic area !
- Bias in the information collected to be taken into account = Species identification; Emotional bias (tendency to point out charismatic species more than others); Unsystematic reports; Navigation area (coastal); complexity of information (group size)
- Report rare species = Participatory science seems totally appropriate for these types of reports

Conclusion

The level 1 (opportunistic data) gives partial and more or less reliable results. The comparison between the results carried out using expert data (level 3) and opportunistic data (level 1) revealed that the opportunistic protocol allows to obtain sometimes only partial results, that are sometimes contradictory with the results obtained from expert data. So, results from opportunistic data should be considered with caution and great critical sense.

Study : Citizen science data, what contribution can they bring for the knowledge on cetaceans?

Objectives of the study

Belhadjer *et al.* (2016)[3] analyzed the existing French opportunistic data (1996-2016) collected by several type of contributors in order to complete the scientific data on the presence of cetaceans in the Pelagos Sanctuary and discuss the results obtained, as well as the contribution of this type of data for the knowledge on cetaceans.

To do this, several analyzes were carried out to answer the following questions:

- What are the seasonal and / or spatial sampling limits of opportunistic data.
- If these data are representative and / or complementary with dedicated scientific campaigns in terms of spatio-temporal coverage (seasonal mapping).
- If the seasonal populations obtained with these data were representative of those observed in the scientific literature for the cetacean populations of the northwestern Mediterranean.
- If opportunistic data could fill certain gaps in knowledge about cetacean demography and in particular to help identify or confirm the location of calving and breeding areas and peak birth and reproduction periods.

Results

The contributors of opportunistic data are of different type, from whale-watching operator, mariners, Navy, professional seafarer, marine protected area, NGO, to simple citizen. A data validation protocol, based in particular on the cetacean skills of the contributors, was applied to the data to determine their reliability for the identified species. The sightings were classified into 3 categories: "reliable", "probable" or "uncertain". Thus, 19% of the duplicated data were deleted and 56% of the remaining observations were deemed “reliable” or “probable” and could be used in cartographic analyzes. The analyzes show results most often in agreement with what is already scientifically known about the animals in the Pelagos Sanctuary.

The contribution of opportunistic data is interesting from a spatio-temporal point of view, only when the contributors prospect areas little sampled by scientists, and outside the well-known summer period. Regarding the topic of demography, the contribution of opportunistic data is limited by lack of information or imprecision. This contribution could become interesting with regard to knowledge about young and/or newborns if the contributors noted more precisely and on a regular basis the information on the presence or absence of these age groups and if possible separated newborns from young. In the Mediterranean, several online platforms housing databases of opportunistic observations on different taxa (mammals, birds, amphibians, etc.) are good compilation and valuation tools. The advantages and limitations of these existing platforms have been analyzed.

[3] *Belhadjer A., David L., Di-Méglio N., Jourdan J., Labach H., Martin A., Ratel M. Et Roul M., 2016. Valorisation des données opportunistes d'observation de cétacés dans le Sanctuaire Pelagos. Rapport GIS 3M (GECEM, EcoOcéan Institut/Souffleurs d’écume) pour le Parc national de Port-Cros, Animateur de la Partie française de l'Accord Pelagos et. Fr. : 99 pp + 6 annexes. (https://www.sanctuaire-pelagos.org/fr/la-recherche/etudes-realisees-ou-en-cours)*

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ANEMONE

Black Sea CROSS BORDER COOPERATION

Citizen science - a tool to assess cetacean population status

Common borders. Common solutions.

CROSS BORDER COOPERATION

This report is based on the activities of the **ANEMONE** project (Assessing the vulnerability of the Black Sea marine ecosystem to human pressures) with the financial support from the Joint Operational Programme Black Sea Basin 2014-2020.

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Citizen science - added value for cetacean monitoring

Citizen science can be defined as the non-professional involvement of volunteers in the scientific process, commonly in data collection, but also in other phases of the scientific process, such as quality assurance, data analysis and interpretation, problem definition, or dissemination of results (Science Communication Unit, 2013). Other definitions exist and are under debate in the scientific community (Auerbach et al. 2019).

Citizen science is growing and attracting increasingly the attention of the scientific community, governments and the media, but it is not new. It is born out of a long history of public participation in scientific research enacted through many approaches. Volunteers in many local and national bird monitoring schemes and networks of weather collectors and ocean monitoring have been collecting data for decades (e.g., UK's Breeding Bird Survey, Vigie-Nature in France, Rainfall Observers in Scotland, the US National Weather Service programme on storm spotters).

Citizen science is mostly connected with the environmental domain, because provides an opportunity to expand the knowledge base, through local involvement, and at the same time provides an increase in citizens' awareness and engagement. Citizen science plays a critical role in advancing knowledge about biodiversity, e.g., in relation to monitoring trends in occurrence, distribution, or status of species. The vast data volume that can be collected in a cost-efficient manner by a large number of volunteers dwarfs any professional capacity for monitoring.

This is better applicable for biodiversity monitoring spanning large spatial (e.g., Europe) and temporal extents (e.g., decades).

The new technologies, such as mobile internet and apps for mobile devices, have broadened the scope and the number of citizens' contributions. There are many different types of citizen science projects in the environmental area. According to a recently published study (Bio Innovation Service, 2018), the majority are 'contributory' projects, designed by scientists, but enlisting the help of volunteers to collect monitoring data.

The value of citizen science is being more and more recognised in the literature and practices, having an important effect on policies, science and society. It should be noted that the value in most citizen science projects is not easy to categorise and may emerge from broad aims, or as projects develop beyond their original scope. It is common for projects fitting the public participation in research model to have both scientific and educational goals. However, social and policy benefits may also emerge, for example, when projects are based around local people motivated by solving local environmental problems.

Policy value. Citizen Science can contribute to various phases of the policy-making cycle, including:

- Identify problems or issues, by making valuable, systematic observations and voicing public concerns with supporting scientific evidence to decision makers.
- Help formulate public policy, for instance by contributing to the development of policy options and assessing their potential impacts. Here, citizen science can particularly facilitate the inclusion of diverse societal perspectives in decision-making processes.

Scientific value. Policy decisions increasingly rely on the best available scientific evidence, but this does not necessarily come from the best peer-reviewed publications from the academic sector alone. Citizen science can complement or provide advantages over conventional science in multiple ways. One of its primary benefits is the collection of data that would otherwise be unavailable (e.g., because of its temporal or local granularity and detail, long time scales of observations, amount of data submitted etc.). Key aspects are however fit-for-purpose, data quality, long-term access and re-usability. The access and inclusion of tacit knowledge proves equally important.

Societal value. Citizen science projects empower citizens to draw public attention to local issues and provide them the evidence base to ask for, propose or collaborate towards solutions (e.g., noise pollution). Promotion of citizen science projects and their outcomes can also help to raise broader awareness for environmental issues, supports life-long learning and potentially stimulate behavioural change – here, especially related to issues that are not immediately visible (e.g., air pollution near schools, radiation from radon or longer-term health effects). Citizen science can bring a lot of benefits for the society, for science, policy and for the participants themselves (*Figure 12* and *Figure 13*).

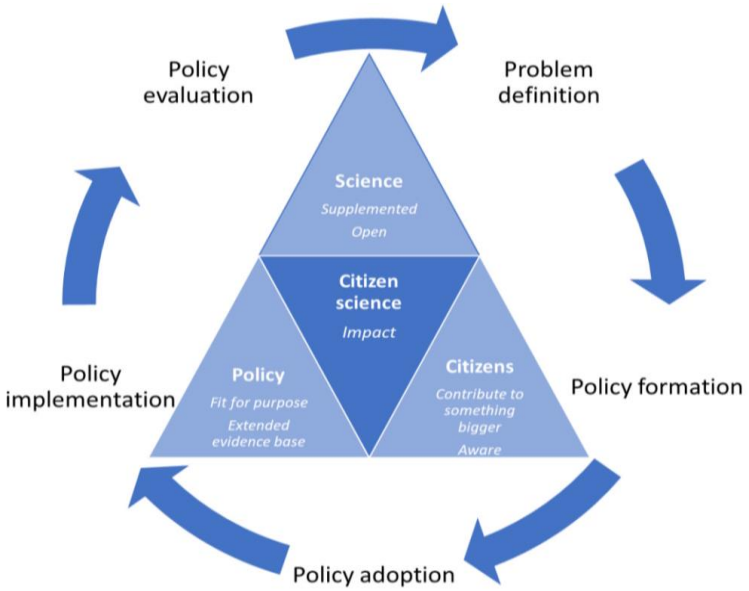

Figure 12 - Interaction between policy, science, society and citizen science.

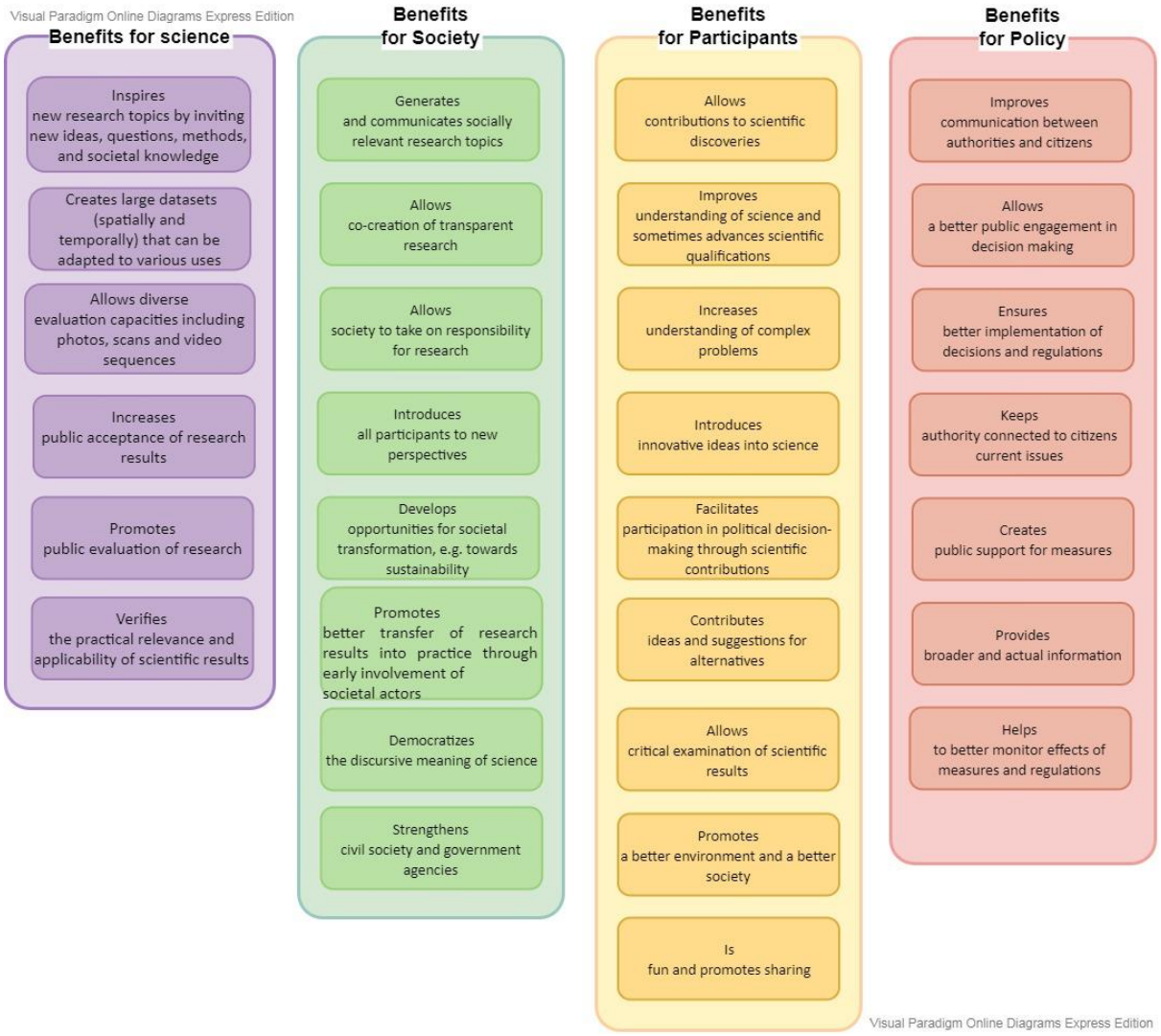

Figure 13 - Classified benefits of citizen science.

Citizen science in cetacean monitoring

Having in mind the previous experience of the partners involved in the Citizen Science activity, Anemone project offered a very good framework to implement Citizen Science at Black Sea basin level. The purpose was to prove that citizens can provide real, useful and accurate data for scientists to use. For cetacean monitoring this approach is used since a very long time in the Black Sea. The main challenge is to transform this citizen involvement in an added value work for science.

Research results can be easily tampered if contributors are using different scale of measures or have little experience is proving information. This makes citizen science a restricted domain to the ones trained to do it. Since for stranded cetacean, for example, a telephone line is used, it happened for a high number of times to get incomplete or wrong information from citizens, just because they had few information on the case (ex: small dolphins of 2m long, stranded cetacean when in reality is was a picked dogfish, wrong location reporting with an error of 200-300 m). It is recommended to check all this kind of provided information by phone and to ask for extra confirmation in order to make an accurate data collection. Using of technology at hand and available very cheap for people can make these sightings more useful for science and research. The sense of

usefulness that common citizens get when having contributed to research activities can be valued by asking for detailed information.

Several aspects have to be established and mandatory used:

- Clear photos, with good light and a standard object that can give information related to dimensions (a plastic bottle of 0.5 l);
- Share location on Smartphone apps – even if the location is not 100% accurate, it is the closest option to the real positioning;
- Extra details related to time, weather, colour of the animal or marks.

Just by looking at the numbers resulted, it is clear that it would have been impossible to reach such an extensive extent by only involving researchers.

The figure below (Figure 14) shows the dimensions of the citizen involvement in cetacean monitoring. Although the training was performed in all 4 partner countries, only in Romania and Turkey it was applied the citizen science methodology for cetacean monitoring.

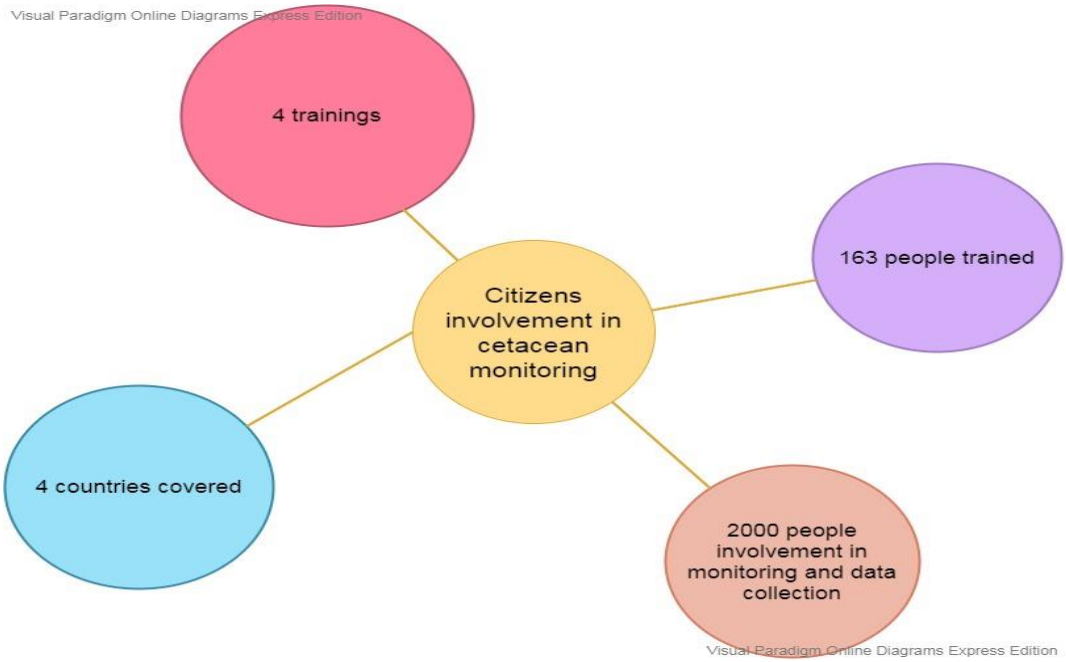

Figure 14 - Citizen's involvement in cetacean monitoring within the ANEMONE project.

The most fast and easy to apply is the cetacean stranded monitoring. Media and social media have a multiplier effect, making the opportunity available for more people, even for tourists that visit for a short time the area.

Mare Nostrum NGO extended the involvement in citizens in data collection related to cetacean, to the boat and sailing boats owners. Having in mind, that during summer, they perform quite a number of expeditions at sea, they are more likely to encounter groups of dolphins and for sure they make photos or videos. The only "scientific" addition is to ask for a GPS location of the encounter, date and time. This added to a share of the media recorded, can make a nice map of sightings, that further on can provide data on migration patterns, distribution and resident populations. For this purpose, a Facebook group was created and all potential contributors were included. They have in this way an easy way to share all data, to communicate with other people with the same interest and dedication and to have their activity promoted for the greater public. The group gathered 109 members and already shared more than 30 media files and sightings.

The success of the activity was assured through a complex process of public engagement and continuous communication. In order to have a useful citizen science project and to maximize the results for all the stakeholders and beneficiaries, it is very important to have a clear and agreed process and to communicate all details to all participants. The 4 workshops organized within the same project, in autumn 2019, in each partners country (Bulgaria, Romania, Turkey and Ukraine) made an introduction of the cetacean topic. Also, it provided the participants with knowledge about the methodology, the possible biases and the tools to be used in the field.

Further efforts were made by Mare Nostrum and TUDAV to train and accept citizens (NASEM, 2018), with low to high qualification, into the cetacean monitoring programs as was presented in the previous chapters. Citizens together with specialists participating in data collection expedition both within the project limits but also after in the so-called Cetacean Monitoring Networks.

Conclusions

1. Citizen science concept and projects investigate a range of phenomena using scientific practices. It allows people with diverse motivation and intention to participate in science as in the particular case of Cetacean Stranding Networks where the input from citizens covers more than scientist which are restricted due to the low budget allocation, reduced staff, large area to be covered etc.
2. Because citizen science supports the scope of contributing to science, or who can contribute, it can introduce new processes, observations, data to science and at the same time be a trigger towards protecting the environment and awareness rise in the coastal communities, and even outside through tourists.
3. Participants learning through citizen science, within the activities, have benefit not only for their own development but also interact with scientists for further development of the communities and science.
4. The concept is underdeveloped, and the data are not yet existing in many other science branches due to bias and lack of validation bodies, and this should be worked on. With careful planning, intentional design, and learning support, citizen science can amplify the efforts in science, provide an opportunity for participants to learn about data, data analysis, and interpretation of data.
5. Citizen science projects that welcome and respond to participants motivation and interests are more likely to maximize their skills and the quality of data collected in the future.
6. Overall, the project offered numerous opportunities for citizens to both be involved in the research actions (stranding monitoring, vessel surveys) and be trained to assure a high quality of the data collected.
7. The seasonal distribution of the surveys performed within the project and with the help of citizen and expert observers revealed the seasonal variation in the abundance and distribution of cetaceans in the Black Sea, at least for Romania and western Turkey.
8. Cetacean surveys require trained individuals such as researchers in this study. The involvement of citizens (yacht captains and/or students) to scientific surveys is a good way of capacity building for them. Such occasions are rare but should be realized whenever possible. The ANEMONE project provided such rare opportunities which will contribute to the overall research effort for cetacean observation in the Black Sea.
9. Based on the preliminary results, the Sakarya Canyon (Turkey) and coastal waters (Romania) were proposed as a candidate Important Marine Mammal Area of IUCN in February 2021. The areas should be monitored carefully on a regular basis to elaborate conservation measures for these vulnerable animals.