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Fishers as Sentinels of the Sea in data collection for cetacean conservation

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Introduction

Cetaceans are marine mammals that represent an essential component of marine biodiversity. As apex predators in marine and other aquatic ecosystems, they play a crucial ecological role. (Bowen, 1997). Due to their position at the top of the food chain (Pace et al., 2015; Bowen, 1997), cetaceans can accumulate high levels of contaminants, in particular due to anthropogenic activity, which can also have harmful effects on their health and survival (Campana et al., 2015; Franzosini et al., 2013). So, they could help to monitor the status of ecosystem variability and degradation as bioindicators. By monitoring migratory and coastal species of whales and dolphins, it is possible to study both the major ecosystem changes and nearshore habitats (Moore, 2008). These species may become the key to a better understanding of how the environment responds, and marine litter pollution may provide information about the state of the cetaceans' environment. In this instance, a constant monitoring is required, and it may come directly from fishers, who may act as "Sentinels" while engaging in fishing operations and provide crucial information about the presence of cetaceans and other marine vulnerable species, marine debris, and anthropogenic activity in their fishing area.

Methods

Through a participatory approach and also carrying out awareness and information workshops in several coastal communities, a network of "Sentinels of the Sea" was created, made up of 40 small-scale fishers operating year-round in the study area. Face to face meetings allowed fishers to learn about vulnerable species as marine mammals, and the threats to their survival, as well as the importance of their safeguard and the protection measures currently in place in the Mediterranean Sea. In addition, we provided them with the following resources required to communicate their reports during fishing activities onboard their fishing vessels: data collection sheets where indicate date, time, position, species, number of individuals; waterproof cameras for high-quality image and video recording equipped with GPS; and guides for the identification of the species. The network is still active, so fishers continue to send image and sheets of their sighting immediately to SEA MARVEL researchers for species confirmation and subsequent data analysis (fig. 1).

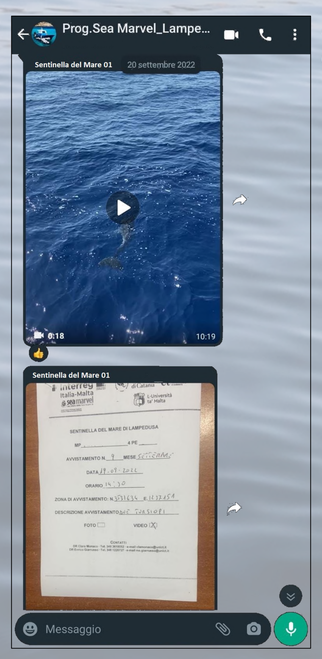

Figure 1. Screenshot of the chat between the fishers Sentinels of the Sea and the researchers of the University of Catania.

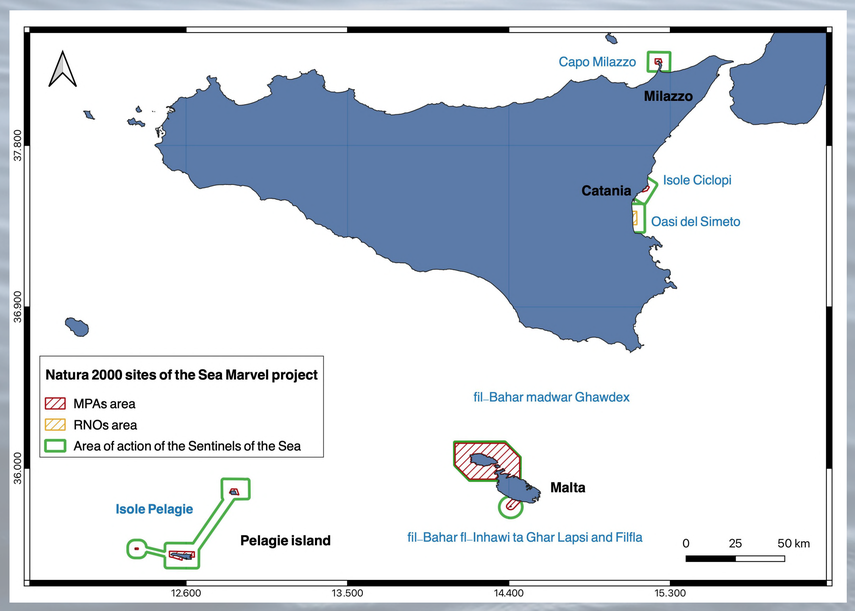

Figure 2. Map showing the areas of action of the Sentinels of the Sea.

Study area

Considering the important role played by protected areas in preventing the loss of biological diversity, we have chosen as study area the set of six Natura 2000 sites in Sicily and Malta: the MPAs “Capo Milazzo” (Milazzo (ME), Italy), “Isole Ciclopi” (Aci Trezza (CT), Italy), “Isole Pelagie” (Linosa and Lampedusa (AG), Italy); the Oriented Nature Reserve “Oasi del Simeto” (Catania, Italy); two protected areas in Malta, in particular those around Gozo, and near Ghar Lapsi and Fifla (fig. 2). In specific individual areas of these locations or nearby, professional fishing is permitted to whom own a special permission granted by the management body of the MPA

Results

During the year 2022, a total of 44 records were collected, of which 7 on cetaceans’ sightings, and 37 on floating marine litter. Fishers have reported the presence of 41 individuals of dolphins, of which, 38 common bottlenose dolphins (*Tursiops truncatus*), and 3 short-beaked common dolphins (*Delphinus delphis*). About the floating litter observed, the main material of composition was plastic, the size of which was between 30-100 cm, and almost all belonged to the fish sector.

Conclusions

The efficiency and value-added of this network consists of several points. First of all, the constant presence of the fishers at sea, during the whole year, allows researchers to have data regularly, even when scientific monitorings cannot occur. Furthermore, given the largeness of the area to be monitored, only scientific surveys will not permit to have complete surveillance of the sites. Therefore, the possibility of having multiple sentinels distributed in the area gives a more homogeneous and accurate sight of the state of conservation. Lastly, active involvement makes possible to increase the awareness and knowledge of fishers, as assiduous users of marine resources, in order to protect and respect them, in the interest of the same fishers and of the entire community.

Acknowledgments

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