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Baseline data to characterize and manage the small-scale fishery (SSF) of an oncoming Marine Protected Area (Cape Milazzo, Italy) in the western Mediterranean Sea

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ABSTRACT

This study characterizes the small-scale fishery (SSF) of the oncoming Italian Marine Protected Area of Cape Milazzo in the western Mediterranean Sea and describes the recent evolution of SSF activities in the study area during recent years. Data on fishing activities, catch and effort were collected in 2006–2007 and 2014 and then compared. Information on fishermen perceptions about local fishery management and conflicts were collected by a questionnaire survey relating fisheries policies and regulations during 2012–2013. A substantial reduction of fleet (−27.5% of vessels) was recorded between the 2006–2007 and 2014. The use of fishing gears varied during season depending on fishing tactics, meteorological conditions and resource availability, particularly in the case of gregarious fish, as revealed by statistical analysis (e.g., small tunas, carangids and mackerels). A general increase in hake and cuttlefish CPUE during 2014 was recorded. However, the study highlighted a suffering status for local SSF, due to both the difficulty to apply a growing amount of rules and prohibitions and the conflicts with illegal and recreational fishing. The establishment of a Local Management Plan (LMP) in the area has been the first step for increasing the fight against illegal fishing as well as the management of fishing grounds. Furthermore, the establishment of a new MPA should take into account these results in order to develop appropriate management measures for environmental protection, also allowing for the maintenance of biologic, social and economic sustainability of artisanal fishing activities.

1. Introduction

The upgrade and improvement of fishing vessel technologies, the objective difficulties in enforcing effective fishery management and policy, as well as the spreading of illegal, unreported and unregulated fishing (IUUF), have produced high levels of fishing pressure in the Mediterranean waters and the overexploitation of most marine resources (Öztürk, 2015). In recent years, the European Union adopted a sound conservative strategy and has introduced a whole set of regulations. They were aimed to achieve the sustainable exploitation of fisheries resources in European waters, establishing the new Common Fisheries Policy (CFP; Reg. EU 1380/2013; UE, 2013), increasing the fight against illegal fishing and adopting new Directives, such as the Marine Strategy Framework Directive (MSFD; 2008/56/EC; EC, 2008) which aims to achieve Good Environmental Status (GES) for European marine waters by 2020. Although the European policy is focusing on the management of fisheries and fishing resources, small-scale fishing (SSF) is declining in many Mediterranean areas, but it still represents about 80% of the Mediterranean fleet (Gómez et al., 2006). This fishing sector includes vessels less than 12 m using artisanal gears, mainly operating in coastal areas and on a daily trip basis. The

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competition with industrial fishing and illegal fishing, over-exploitation of resources, costs of activity, increased levels of pollution, conflicts with other marine activities, habitat degradation, climate change influence on environment and biodiversity are among the main problems faced by Mediterranean SSF (Gómez et al., 2006; Griffiths et al., 2007; Guyader et al., 2013; Raicevich et al., 2017). An important tool to mitigate problems of SSF is represented by some innovative management measures introduced by the Council Regulation (EC) N. 1198/2006 (EC, 2006b). In particular this Regulation includes "collective actions" (art. 37, m) for the development of local management plan (LMP), which is a cluster of technical and socio-economic measures of common interest for the management of artisanal fisheries (Spagnolo, 2006, 2012; Raicevich et al., 2017). The objective of LMP is to adopt specific and more efficient rules concerning access, management and control of the fishing areas delimited by each LMP (Spagnolo, 2006, 2012; Raicevich et al., 2017). In Italy a collective management body (CO.GE.PA.), together with research institutes, is responsible for the definition and implementation of a LMP (Spagnolo, 2006, 2012; Raicevich et al., 2017).

Moreover, one of the most recognized tools for managing biodiversity and fishery resources is represented by the establishment of Marine Protected Areas (MPAs), given their effectiveness in protecting habitats with particular ecological value (e.g., nursery areas), assuring a refuge for protected or endangered species, supporting the recovery of fish stocks and the spillover effect, i.e. the spreading of large fish towards adjacent no-protected areas (Russ and Alcala, 1996; Goñi et al., 2008). For these reasons, the MSFD identifies the establishment of a representative and coherent network of MPAs as an important management measure to achieve GES, supporting the objective of the Convention on Biological Diversity (CBD), on "halting biodiversity loss, ensuring the conservation and sustainable use of marine biodiversity, and on the creation of a global network of marine protected areas".

Since 1991, 30 MPAs have been established in Italian waters and others have been listed among MPAs of future creation, in order to achieve this goal. However, the establishment of MPAs has often produced conflicts between governing bodies and fishermen, the latter being usually afraid of restrictions on their fishing activities. Furthermore, the fragmentary information on fishing activities, fishing areas, catch composition and trends has represented a limit during the establishment of several MPAs (Fraschetti et al., 2002).

The aim of this study is to provide baseline data in order to characterize the small-scale fishery (SSF) of the forthcoming Italian Marine Protected Area of Cape Milazzo (Italian Law, 2013) in the western Mediterranean Sea (Fig. 1). These data will be useful to develop appropriate management measures for environmental protection while designing the new MPA as well as lessening potential conflicts with fishermen, and achieve a sustainable development of artisanal fishing activities. Our analysis also focussed on describing the evolution of SSF activities in the study area in recent years. The study area, involving several management actions (i.e. MPA establishment, local management plan for artisanal fishing, other access restrictions to fishing grounds) can be considered an important case of interactions between different management policies. For this reason, it could be considered a pilot area for developing new co-management approach in order to sustain artisanal fishery and resource restoration as well as reduce conflicts between marine uses. This study represents an essential step for the description of the baseline knowledge for designing the oncoming MPA and the future planning of new actions for the fishery management in the area.

1.1. Study area

The study area of Cape Milazzo (Fig. 1) is located in the north-eastern coast of Sicily (western Mediterranean Sea) and includes a peninsular rocky coast with marine and coastal habitats of high ecological value, such as *Posidonia* meadows (ISPRA, 2016) and vermetid reefs (Consoli et al., 2008; ISPRA, 2016). This peninsula extends towards north in the southern Tyrrhenian and separates the Gulf of Milazzo from the Gulf of Patti. It is surrounded by a highly anthropized area (urban and industrial area of Milazzo) which hosts many productive activities, such as a oil refinery, thermal power plants, steelworks, shipbuilding industries and a commercial and tourist harbor (ISPRA, 2011). Moreover, a SSF usually operates around Cape Milazzo (Cannizzaro et al., 2000).

1.2. Fishery management in the study area

The fishing activities in the study area are currently managed by a Local Management Plan (LMP) in conjunction with a series of other restrictions concerning the access to some fishing grounds, which are regulated by regional and local laws, which are detailed below.

1.2.1. Local management plan (LMP)

Since September 2012, artisanal fishermen of Milazzo were involved in the Local Management Plan (LMP), in the geographical context of a Sub-Management Unit (SMU) that includes the coastal area from Cape Milazzo to Cape Calavà (Fig. 1). This plan was adopted by the Sicilian Region and was developed by a collective management body (Consorzio di gestione della pesca artigianale, CO.GE.PA.), including more than 70% of all fishermen registered in the area, as required by Sicilian Region (2011). Established rules were more restrictive than existing EU regulations and included: the demarcation of fishing zones, fishing calendars based on gears, closures of nursery areas, adoption of appropriate technical measures on gear selectivity [under regulation of Italian Ministry of Agricultural Food and Forestry Policies, MIPAAF, 2012) and Maritime Authority of Milazzo (2013)]. Some specific technical measures of LMP directly regarded also the area of the forthcoming MPA of Cape Milazzo, i.e.:

- the maximum length of trammel net, gillnet and combined net per fishing vessel was fixed at 3000 m;
- the selectivity of fixed nets was regulated by introducing a size limit in mesh used for red mullet fishery (>25 mm for mesh side during daylight and >31.2 mm for mesh side during night, respectively).

1.2.2. Other access restrictions to fishing grounds

Since 1990, a ban of bottom trawl fishing in the Gulf of Patti has been established (Sicilian Region, 1990), in order to restock fishing resources in this area and to prevent conflicts between trawlers and artisanal fishing fleet. Other limitations to fishing activities are linked to the commercial and industrial activities of the harbor and the nearby refinery, as well as the presence of a dismissed submarine cable which connected Aeolian Islands and Sicily. For these reasons fishing activities in a large area in front of the city of Milazzo are prohibited.

2. Material and methods

Data on the fishing activities carried out in the study area were collected from different sources:

- Data from MeSFiDe project (Mediterranean Small Craft Fishery And Development, MeSFiDe; EU Community Initiative Programme Interreg III B ARCHIMED), concerning fleet