

Problem Scenario: The Gulf of Castellammare Fishery Reserve

Read the MPA problem scenario below. As you read, complete the notetaking worksheet.

Geography

The Gulf of Castellammare is located on the northwest coast of Sicily, an island off the southern coast of Italy. The gulf is one of the widest bays in Sicily. It has a coastline of more than 70 kilometers (43.5 miles) and a surface area of 300 square kilometers (186 square miles). The gulf is also quite deep in places. It gently slopes from the shore to greater than 500 meters (1,640 feet) along the outermost edge.

The westernmost point of the Gulf of Castellammare is located at Capo San Vito. The seabed in this area is characterized by a hard, rocky bottom. The eastern edge of the gulf is marked by Capo Rama. It has a seafloor consisting primarily of sandy, muddy sediments. These sediments are the result from the erosion of the unstable cliffs above. The middle of the gulf is also a mix of sand and mud. Vertical relief features characterize the western portion of the gulf. Near Capo San Vito, the middle and eastern portions of the gulf are relatively flat and featureless. The only exceptions to this are a number of artificial reefs placed there in the 1980s to provide habitat for fish and discourage trawling.

Marine Life

Researchers conducting experimental trawls in the sandy, muddy portions of the gulf have documented the presence of more than 127 species. These include five different types of crustaceans (shrimps and prawns), 17 types of cephalopods (octopi, squid, and cuttlefish), and 105 types of fish. Researchers examining mollusks (oysters, mussels, and snails) at artificial and natural reefs reported finding 116 species. In addition to the great diversity of mollusks, these rocky areas also support many types of algae and encrusting organisms such as corals. The corals provide habitat and food for many species of fish, shrimp, lobster, and crab.

Northwest Sicily is home to a great number of fish, shellfish, seabirds (pelicans, albatross, and petrels), sea turtles, and marine mammals (sperm whales, common dolphins, and bottlenose dolphins). Endangered Mediterranean monk seals are also found in Northwest Sicily. Their numbers have decreased so much that today they are only found in the waters around Greece.

Fisheries & Other Human Uses

Recreational and commercial fisheries in the gulf operate from four main ports: Balestrate, Trappeto, Castellammare, and Terrasini. Prior to 1990, about 175 artisanal vessels (less than 12 meters, or about 39 feet) fished from these four ports. About 15 large trawlers from the port of Terrasini also fished in the area. More recently, it has been reported that roughly 77 artisanal boats fish in the gulf. Eleven trawlers continue to fish farther offshore adjacent to the outer edge of the gulf.

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All of the artisanal vessels fish with relatively low-impact gear such as trammel nets, set gillnets, and hook-and-line. The trawlers fish with fairly high-impact, very small mesh (40 millimeters, or about 1.6 inches) bottom trawls. These nets are indiscriminate and catch nearly everything in their path. This bycatch includes non-target species and juveniles.

Sport Fishers and Artisanal Fishers

Since the mid-1990s, recreational fishing in the Gulf of Castellammare has grown in popularity. Now it appears to be a growing source of conflict with artisanal fishermen. In fact, recreational vessels now outnumber artisanal vessels 14 to 1. This increased competition for fishing space threatens to renew the type of conflict that originally existed between artisanal fisheries and trawl fisheries. These conflicts are what the reserve was established to prevent. In addition, this increased recreational fishing may also undermine some of the conservation gains the trawl ban helped to create.

As a result of these different-sized vessels and the types of gear they used, there has been significant conflict between the two groups over where each may fish. There was a common belief that the larger trawlers limited the amount of fish that were available to the smaller, artisanal fishermen by catching too many of them. Fishermen in the area target roughly 96 commercially important species. These include very high-value fish such as red mullet, annular seabream, hake, swordfish, and various tunas. They even target low-value “soup-fish.” These soup-fish are not actually a specific type of fish. Fishermen in the area use this term for many different types of low-value fish, because their only economic value is related to their use in soups.

In addition to fishing pressure, the Gulf of Castellammare has significant problems with pollution. This pollution comes in the form of agricultural runoff from nearby vineyards and the waste associated with grape processing and winemaking. Other sources of pollution include industrial pollution from factories, municipal waste from cities and towns, and offshore disposal of sludge. These nutrient inputs have caused significant eutrophication in the nearshore areas. Nocella stream system and the beach at Alcamo Marina near Balestrate are particularly impacted.

No-Trawl Zone

In 1990, the Sicilian regional government created the Gulf of Castellammare Fishery Reserve (GCFR) as a “no-trawl zone.” This fishery reserve covers an area of 200 square kilometers (124 square miles) in the interior part of the gulf. It extends out 10 kilometers (6.2 miles) offshore, reaching depths of nearly 500 meters (1,640 feet) along the outer edge of the reserve. This represents about 55 percent of the total surface area of the gulf.

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Within this zone, trawlers are strictly prohibited. However, recreational fishermen and small-scale artisanal fishermen using low-impact gears are still able to fish.

The reserve was created for two reasons. The first was to reduce fishing pressure on a number of severely depleted demersal fish stocks. Demersal fish spend most of their lives living on or near the sea bottom. This makes them very susceptible to being caught by bottom trawlers. The second reason for the creation of the fishery reserve was to reduce conflict between large trawlers and local small-scale artisanal fisheries. Artisanal fisheries use low-impact trammel nets, set gillnets, and hook-and-line.

Species Recovery/Conflict Management

The majority of small-scale artisanal fishermen operating in the gulf feel that their average daily catch has improved since the creation of the reserve. They say this is due to increased abundance of fish and because they no longer have to compete with the larger trawlers that used to fish in the same area. While it is hard for managers to confirm, there is no question that the reserve enjoys great support among artisanal fishermen.

Not only the artisanal fishermen benefited from the creation of the reserve's "no-trawl zone." Scientists conducting research within the reserve in the late 1990s determined at that time there had been an eight-fold increase in total fish biomass since the reserve was created. Including the commercially important red mullet, the increase in biomass was roughly 32-fold.

Another group of scientists studying the area 10 years later noted that with the exclusion of trawlers, the total fishing-related mortality in the area had decreased significantly. The best improvement was shown among juveniles. This has allowed many more juveniles to grow up and "recruit" to the fishery. This has contributed greatly to the biomass increase.

It seems clear that while the Gulf of Castellammare is not a pure "no-take zone," it has nonetheless achieved the two goals it was established to address. It has reduced the conflict between large trawlers and small-scale artisanal fishermen. This allows the artisanal fishermen to continue to remain financially viable. Also, it has resulted in a significant increase in the biomass of demersal fish. Demersal fish biomass was severely depleted when trawling was allowed.

Pollution from land-based sources continues to be a problem in the Gulf of Castellammare. However, it looks like the fishery reserve has helped create sustainable fisheries and has contributed to the recovery of severely depleted species.

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