Marine Protected Areas

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1 Abstract

Marine protected areas (MPAs) are small “underwater state parks” where laws limit or prohibit taking or harming of marine life. MPAs can affect overfishing, nutrient input, and sediment pollution by conserving vital marine habitats and species, especially when they are left out of the decision-making process, or when MPAs have strict rules. Here in San Diego, eleven MPAs help fish and habitats, but also preserve our culture as surfers, swimmers, kayakers, and beachgoers.

2 Introduction

Marine protected areas (MPAs) are small “underwater state parks” where laws restrict or ban extraction, or take of, any marine life (“Marine Protected Areas in San Diego” 2010). They are defined where natural and/or cultural resources are given greater protection than surrounding waters and land (Wenzel & D’Iorio 2015). MPA is a general term used to describe a wide range of marine areas, including the pelagic ocean, coastal areas, intertidal zones, estuaries, and Great Lakes (Wenzel & D’Iorio 2011), which have different protected and conservation strategies depending on the habitat (Pauly et al. 2011). MPAs are not just in the ocean. There are at least 15 federal MPAs and managed areas within the Great Lakes, which are freshwater environments (“Clarifying misconceptions” 2016). Protected zones can include some land to prevent pollution and runoff.

There are five levels of protection as defined by the National Oceanic and Atmospheric Administration (NOAA; Wenzel & D’Iorio 2011):

- Unprotected
- Uniform Multiple-Use
- Zone Multiple-Use
- No-take
- No Access

These are the most common in the US as national state parks.

3 Marine Protected Areas and the Ecosystem

Overfishing is when fish have been taken from their environment faster than they can recover and reproduce, causing a drop in the population. Overfishing has had side effects on marine ecosystems, not just on the targeted fish, but also by changing the ecosystem structure and food webs (Selig et al. 2015). Scientists estimate that fish biomass in coastal regions around the world, has, on average, been reduced by about two-thirds compared to untouched, perfect conditions (Haerger 2014). One of the goals of MPAs is to increase the size and abundance of organisms, especially fish (Soykan & Lewandson 2015). Scientists found that the population numbers and of fish that are targeted for protection are both increased inside an MPA, rather than outside and unprotected. Specifically, in no-take zones, fish numbers have doubled in Southern California (Dalton 2010). A scientist in Santa Cruz found that MPAs lead to older and fatter fish, which are good for fish populations because they produce stronger larvae, and stronger larvae mean a higher chance of survival and residency (Avasthi 2005). In California, many of the MPAs were planned and based on where fish species migrate for food and reproduction, and for their larvae travel (Avasthi 2005). This way, fish can safely feed and grow to be as big as they should.

Inside an MPA, not only have fish shown improvement, but the ecosystem and habitat has been shown to be healthier overall (Dalton 2010). For example, coral reefs, which create important habitats for biodiversity, have benefited from protection (see Fig. 2). MPAs have had positive effects on coral reef cover by limiting nutrients that cause algae to boom and take over, and letting corals have time to spread over more area. Unprotected reefs continue to have coral cover go down and potentially harmful activity. MPAs do not prohibit fishing, but it is argued that fishing stocks need to be managed in a smart way, and overall there needs to be “less fishing everywhere,” (Dalton 2010).

A scientific survey showed that fishers are more accepting of MPAs that are implemented for the purpose of fishery management, instead of “just” habitat conservation. Fishermen expressed negative attitudes towards no-take areas, and would rather have restrictions and limitations over extreme rules (Pauly et al. 2011). Scientists have shown that MPAs in key places can both raise profits for fisheries, and boost fish populations (Dalton 2010), so everyone would benefit. MPAs have mixed opinions and attitudes on the effectiveness of MPAs on species, and the environment (Haerger 2011). When California was trying to connect and manage its 105 MPAs, there was resistance from fisherman who disliked the size and places of the MPAs, and felt that they had been left out of the decision-making process that impacted them so directly (Avasthi 2005). Pike et al. (2011) suggests that including them in the process could change their point of view on how MPAs can benefit both fish and fishermen, and help fishermen support in managing MPAs since they will be invested. The battle between marine conservationists and fishermen in California had gone so hostile that at public meetings there were armed game wardens present in case it got too violent (Dalton 2010). Normand de Vil, a former commercial fisherman, advocates that fishing stocks need to be managed in a smart way, and overall there needs to be “less fishing everywhere.” (Dalton 2010).

4 Fishermen and MPAs

Only in recent years have scientists started to look at the human interaction with MPAs such as money, management, culture, and other general relations. Commercial fishermen are the most directly affected by MPAs and can impact MPAs the most, since they rely on fish populations for their well being (see Fig. 3) and have the most interaction with the areas (Pauly et al. 2011). Understanding the attitudes and perceptions of fishermen towards MPAs could help predict fisher’s behavior and attitude towards MPAs. Working together as a team could help MPAs succeed overall (Pauly et al. 2011).

5 San Diego’s MPAs

California set up its first MPA in La Jolla in 1957, and 104 have been added by the coast since then (Avasthi 2005). In San Diego, MPAs also preserve our heritage as surfers, swimmers, kayakers, and beachgoers. There are eleven MPAs in San Diego County and ten are shown in Fig. 4 (“Marine Protected Areas in San Diego” 2010). In 1999, California passed the Marine Life Protection Act to protect the coastal ecosystems (“Marine Protected Areas in San Diego” 2010). The many MPAs along California’s coast were scattered and managed individually which made it difficult to communicate between areas and have consistent rules. In 2010, CA Fish and Game voted to connect these MPAs and have a unified network (“Marine Protected Areas in San Diego” 2010).

In December 2010, South La Jolla State Marine Reserve (SMR) received the highest level of protection of any MPA in San Diego. It is 4.7 miles of fully protected reserve, as well as a large area that allows limited keep harvest and limited recreational fishing (“Marine Protected Areas in San Diego”) 2010). However, at 12 miles of area, the SEawater Reef is the largest MPA in San Diego County. This MPA includes recreational shore fishing and some native Madaluyi MPA uses fishing so that the local marine life can use this space to grow to maturity and reproduce, but people can observe wildlife from their kayaks, websites, and dive masks.

6 References