

Biological Considerations of the Effects of Spearfishing



Snapper

Photo: FGBNMS/Schmahl

Public Comment and Response

NOAA's gear prohibition for fish harvesting in FGBNMS should be reconsidered. The impact of spearfishing on the sanctuary environment is minimal. What research has been done to support the current prohibition and why is spearfishing not allowed in the sanctuary?

NOAA is not proposing to change regulations associated with spearfishing, or any other type of fishing, at this time. If the boundary of FGBNMS is expanded, however, any regulations related to fishing, including spearfishing, would be evaluated through a public process for each new area under consideration.

Spearfishing has been prohibited in FGBNMS since its designation in 1992. The prohibition was due primarily to concerns raised by studies that demonstrated that spearfishing could be detrimental to fisheries resources through the selective removal of large predator species. Research conducted since sanctuary designation supports this concern and reinforces the rationale for a spearfishing prohibition. A summary of this research is presented on this page.

This comment and response were generated during public review of the sanctuary's draft management plan.

Fishing Impacts

Spearfishing is a highly efficient harvesting gear that selectively targets larger fish relative to other fishing gears and can significantly alter abundance and size structure of target species toward fewer and smaller fish (Chapman and Kramer 1999, Matos-Caraballo et al. 2006). In areas that are spearfished, that activity is believed to be the likely cause of lower fish density and size compared to areas that are not spearfished (Jouvenel and Pollard 2001). Research has shown significantly reduced populations of larger predatory fishes such as snapper and grouper where spearfishing occurs (Bohnsack 1982; Chapman and Kramer 1999; Sluka and Sullivan 1998; Jouvenel and Pollard 2001). Spearfishing has been shown to have a greater overall impact on reef fishes than hook-and-line fishing, relative to effort expended (Meyer 2007). Overall, spearfishers remove larger fish and more biomass per outing than fishers using other recreational modes (Morales-Nin et al. 2005; Meyer 2007; Frisch et al. 2008). Although bycatch, gear loss (hence, increased debris), and removal of fish biomass as bait are higher with hook-and-line fishing than with spearfishing, the effectiveness and efficiency of spearfishing has resulted in overharvest and restrictions on the fishery, including a ban on spearfishing using scuba, in

many other parts of the world (e.g., Coll et al. 2004; Frisch et al. 2008).

Selective Removal

Larger predators are favored targets of spearfishers (Sadovy et al. 1994; Morales-Nin et al. 2005; Meyer 2007, Lloret et al. 2008), selectively removing males of protogynous (sex-changing) species. Selective removal of males can make the population susceptible to sperm limitation, especially for species like gag that form small spawning aggregations (Alonzo and Mangel 2004). Spearfishing also removes the largest females, which are those with the highest potential spawning output.

Top-Down Effect

Reduction in the larger predatory fishes can have a "top-down" effect on fish assemblages by allowing other fish populations to increase, altering the composition of the overall natural community of species, including invertebrates. The largest fish are important as predators in maintaining a balanced and complete ecosystem; their selective removal causes ecological imbalance (McClanahan and Muthiga 1988; Dulvy et al. 2002; Lloret et al. 2008).



Photo: FGBNMS/Schmahl

Tiger grouper at Flower Garden Banks National Marine Sanctuary

Behavior Changes

Spearfishing is also known to alter fish behavior, causing fish to move to different (and perhaps less favorable) habitats (Jouvenel and Pollard 2001). In addition, target fish species within areas that are regularly hunted with spearguns have been shown to exhibit avoidance behavior when approached by spearfishers (Feary et al. 2010). And, finally, there is effectively no catch-and-release spearfishing, as regulatory discards are often dead. Discard rates of dead fish by spearfishers (3 percent of all fish speared) are three times what they are for hook-and-line fishers (1 percent of their catch) (Frisch et al. 2008).



Photo: FGBNMS/Schmah

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