



FORCE Management Brief #4 for Caribbean Reef Management

Economic value of reef fishes to the dive tourism industry: the implications of reef fish decline

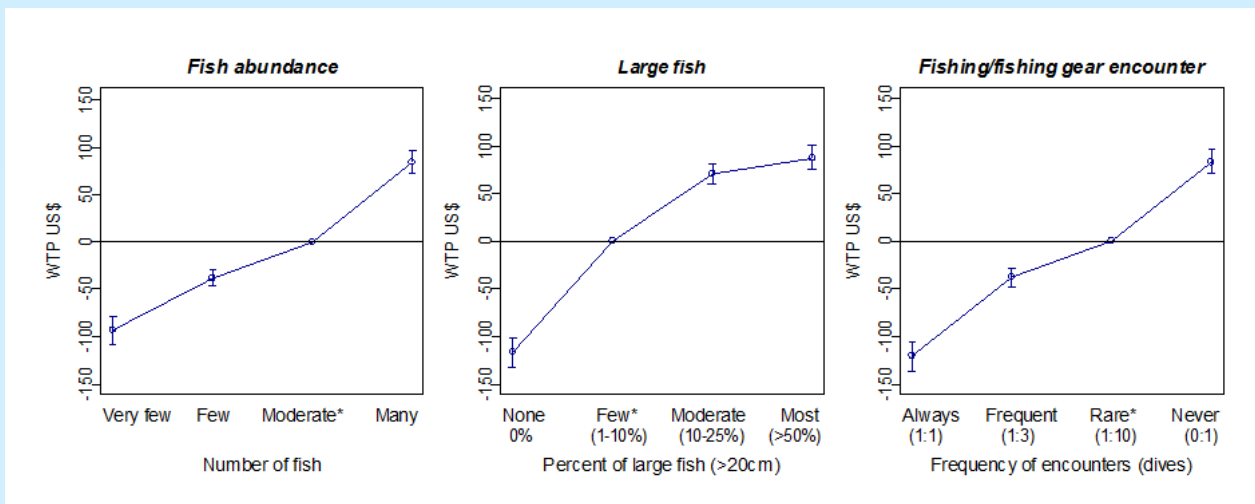
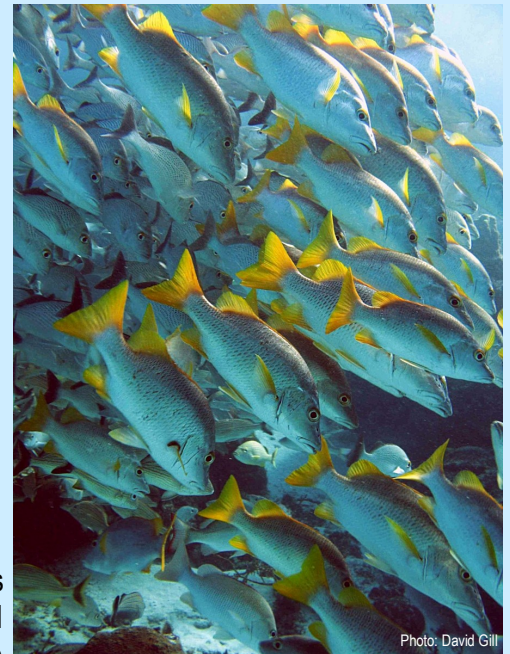
The issue

Every year, dive tourism contributes billions of dollars to Caribbean economies and funds marine conservation in many locations. However, the coral reefs and associated fish species that attract millions of dive tourists each year are severely stressed from factors such as climate change and unsustainable fishing. With the current financial downturn in global economies, consumers are more conscious of their spending and want more for their money. Lower quality reefs may cause conscientious consumers to go elsewhere to experience the quality of reefs they are willing to pay for. Areas with degraded reefs and declining fish populations could therefore experience significant losses due to a decrease in their share of the dive market.

The evidence

A large-scale survey of divers in Barbados, St. Kitts and Nevis and Honduras looked at their willingness to pay for dives with varying levels of fish life as well as avoiding encounters with fishing/fishing gear. Divers stated they would be willing to pay US\$51-\$79 more to dive with moderate numbers of large fish (10-25% of fish greater than 20cm) compared to current conditions (i.e. 1-10%). Further, divers were willing to pay US\$93-\$110 more to avoid diving with very few fish compared to current conditions. Although these values do not directly represent the price that can be charged for a dive trip, the results confirm that divers are willing to pay significant sums to see large and abundant fish life and that healthy reef fish communities are a very important component of the dive experience.

If nothing is done to stem the decline of the sizes and numbers of reef fish in the Caribbean, the losses to the dive tourism industry could be significant. For example, based on the number of divers in Barbados and St. Kitts and Nevis, annual losses of US\$1.2-2.1 million in diver consumer surplus (i.e. reductions in willingness to pay for diving) could be expected in each country. In the Bay Island sites (Honduras) with extremely high diver traffic, total losses could be as high as US\$7.6-\$12.2 million annually. Although it is not possible to exactly determine how this will affect diver numbers, divers will not utilise an area when their willingness to pay falls below the price of a dive.



Divers willingness to pay (WTP in US dollars) for a two-dive package with varying numbers of fish, amount of large fish and fishing/fishing gear encounters, relative to the baseline/current conditions (average model with mean and standard errors)



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Management uses

Option 1: Investment in conservation

With such potential losses from declines in reef fish, spending a portion of the potential lost value to ensure the sustainability of reef fish populations is clearly justified. If fish populations are sustained or even improved, divers will receive considerable satisfaction from these areas, increasing their likelihood of return.

Option 2: Investment in conservation and user fees

In order to fund conservation activities, some of the diver consumer surplus can be captured by charging user fees. For example, the operation of marine protected areas in Bonaire and Saba is funded entirely through user fees. Furthermore, in the current study, divers were willing to pay significant amounts to avoid fishing gear. It is therefore financially feasible to designate no fishing areas where entrance fees are charged.



Frequently asked questions

1) Aren't divers just happy to dive in warm water?

Although the dive market consists of many novice divers who may be less concerned about reef quality, more experienced divers spend more to visit higher quality sites. If your fish population degrades to the point where it is not worth their money (i.e. below their willingness to pay), they will go elsewhere to find better reefs. Better reefs gain a better reputation and more reputable reefs bring more divers, increasing revenue to local communities. This also applies to snorkeling and other underwater viewing activities.

2) How does dive tourism benefit the rest of the economy?

The spill-over effect of dive tourism is tremendous. The average diver spends almost twice as much as the average tourist during their stay. In many areas, the presence of a strong dive industry has also promoted environmental awareness and involvement by local resource users.

3) From a fisher's point of view, how does it benefit me? Does this mean that I will have to stop fishing?

Other studies have shown that protecting fish stocks in one area has had noticeable benefits to fishing on neighbouring reefs. The aim is not to rob fishers of their livelihood but to manage areas to improve the benefits to all stakeholders. Areas for SCUBA diving where fishing is not allowed can co-exist with and benefit zones with priority for fishers.

4) As a manager, what are the best ways that I can spend money based on these results?

Fish abundance is closely linked to the quality of the habitat. Spending funds on reducing stressors to coral reefs such as pollution and physical damage will help maintain the quality of the reef habitat that high fish populations are dependent upon.

Fishing reduces the average size of fish on the reef. To see improvements in the overall size of fish, fisheries-related management should be a priority. As divers appear to be adverse to seeing fishing activity/gear, designating separate recreational and fishing zones can improve the dive experience as well as reduce conflicts between user groups.

Further information

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