Naive fish easy targets for spear fishers

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(Phys.org)—Big fish that have grown up in marine reserves do not seem to know enough to avoid fishers armed with spear guns waiting outside the reserve.

The latest research by an Australian team working in the Philippines into the effects of marine reserves has found there is an unexpected windfall awaiting fishers who obey the rules and respect reserve boundaries – in the form of big, innocent fish wandering out of the reserve.

"There are plenty of reports of fish, both adults and juveniles, moving out of reserves and into the surrounding sea. Having grown up in an area where they were protected from hunting, we wondered how naïve they would be with regard to avoiding danger from humans," says Fraser Januchowski-Hartley of the ARC Centre of Excellence for Coral Reef Studies at James Cook University.

The answer is: pretty naïve.

"Educated fish normally turn tail and flee when a diver armed with a spear gun approaches within firing range of them. The typical flight distance is usually just over four metres," he explains.

"However in our studies of marine reserves in the Philippines, Vanuatu and Papua New Guinea, where spearfishing remains a major way of harvesting table fish, we discovered that reserve-reared fish were much less wary and allowed people to get much closer.

"The fish are literally more catchable."

The team studied fish across the boundaries of marine reserves from 200m inside the protected areas to 200m into the fished areas. They used underwater markers and measuring tapes to measure the 'flight initiation distance' of fish targeted locally by spear fishers. This indicates how close a skin diver can approach to a large fish before it decides to turn and flee.

They found that target fish living in fished areas were typically much warier of divers, and took flight at distances a metre or two further away, than ones living within the reserve.

They also established that the 'naivete radius', whereby more catchable fishes spill out of the marine reserves extended for at least 150 metres from the boundary.

The team's findings suggest that fishers are more likely to catch fish that stray out of the reserve, and so improve the local fish harvest. This may help fishers become more supportive of marine reserves.

JCU's Dr Nick Graham, a co-author on the study said that in these parts of the oceans, spear fishing was still very much about survival for humans and putting food on the family table.

"So it is important that local fishers feel they are deriving some benefit from having a local area that is closed to fishing, or they may not respect it," Dr Graham said.

"This information is also useful in traditional reserves where fishing is taboo most of the time, but then they are opened for fishing by village elders just a few days a year."

Mr Januchowski-Hartley said that on the face of it, this work suggests that marine reserves can play an important role in putting more fish on the table of local communities in these tropical locations – as well as conserving overall fish stocks and replenishing those outside the reserve.

More information: Januchowski-Hartley, F., et al., Spillover of fish naïveté from marine reserves. *Ecology Letters*. doi.wiley.com/10.1111/ele.12028

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