

## Opinion piece: Where are the fish?

By: Peter Craig

A certain unease is creeping into my view of coral reefs in American Samoa, including those in NPSA. I've been for work on coral reef issues in the territory for some 12 years. During that time, several hurricanes have come and gone. Major hurricanes strike American Samoa at intervals of about 10 years, so we see a cycle of coral reef disturbance followed by a lengthy period of recovery. The hurricane in 1991 was particularly bad -- many of our reefs were reduced to rubble and rolling hills of pink coralline algae and low-relief corals. But as the years progressed, coral growth was good and diverse thickets appeared.

The one thing that didn't seem to recover much was the fish. That's hard to gauge, of course, if we don't know how many fish used to be on our reefs. But today we see relatively few and/or small sizes of the species commonly taken for food. Figure 1 shows the pooled lengths of all parrotfish, snappers, emperors, groupers and jacks sighted during surveys in 2002. It is readily apparent that few fish were 40 cm (16 inches) or larger. Sometimes, when I stop to scan the reefs, it's a bit eerie to see few fish at all other than a sprinkling of small ones. A few years ago, one noted biologist summarized our post-hurricane recovery of corals as "the house has been rebuilt, but the rooms are empty". In other words, where were the fish?



I don't mean to imply that the hurricanes caused these problems. A much more likely culprit is fishing pressure. The general consensus among local biologists and visiting coral reef experts like Ali Green and Chuck Birkeland is that American Samoa's reefs have simply been over fished. Fish stocks may well have been depleted years ago by over fishing. Knowledgeable locals and elder Samoans recall seeing far more fish on our reefs 25 years ago. Although the current fishing level does not seem excessive, I would assume that it is at least retarding a recovery.

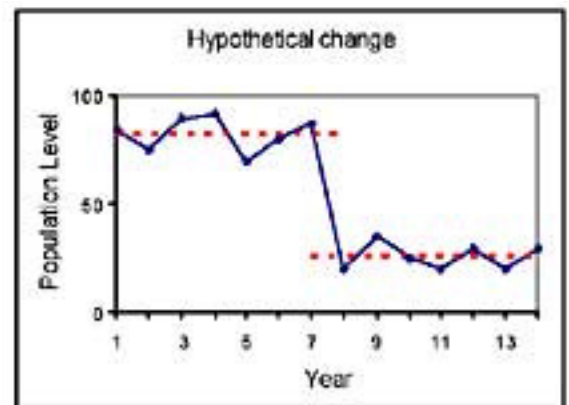
The straightforward solution is, of course, to reduce fishing pressure, but there may be more to it than that. Another little-discussed factor may also be working to keep our fish stocks at a perpetual low level: their age structure. As more and more coral reef fishes have been aged, an unanticipated pattern is emerging: they are fish far older than expected. They can live on the reef for decades; maximum ages of 20-30 years are common. Forget the old idea that coral reef fishes are generally highturnover populations that can be fished hard because they grow fast and die young. They don't.

The realization that coral reef fish can be old is not merely interesting, it has some significant management implications. A likely rationale for this life history pattern is that mortality of their young is extremely high, so a fish has to live and spawn for decades in order to insure that at least a few of its juveniles successfully make it back to the reef and grow to maturity. For all the millions and millions of eggs a fish spawns during its long lifetime, only 2 recruits must survive to adulthood in order for the population to maintain itself at its current abundance. Successful recruitment must be a very rare event. And it would be even rarer if the number of spawners was reduced to a skeleton population through over fishing.

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I think we are looking at a hardened case of “recruitment over fishing” where “fishing reduces the size of the adult stock to a point where production of larvae and subsequent recruitment are impaired”. Further, I would suggest that the reduced gamete production of today’s small population, coupled with naturally occurring years of recruitment failure, makes population recovery difficult and may, in effect, hold the population down at a lower level of abundance, a sort of impoverished steady state (Fig. 2).



We might leap up and say that’s where NPSA and other MPAs come in. True in concept, but unfortunately none of our MPAs has an enforcement capability; indeed, the territory itself has little ability to conduct nighttime marine operations of any sort.

A meaningful recovery might require nothing short of a territory-wide reduction in the harvest of coral reef fishes for at least 10 years. That’s what the long life span of the fish is telling us. Additionally, a comprehensive recovery plan would need to address a number of related issues such as: (1) promote other sources of fish for consumption (such as the bycatch of pelagic fish that is discarded by the domestic longline fleet), (2) develop a policy about imported coral reef fish (ie, we shouldn’t transport our over fishing problem to another neighboring country by importing their coral reef fish), (3) prohibit export of all coral reef products, (4) strengthen territorial fisheries regulations to prevent the introduction of overly efficient types of fishing gear, and (5) implement a sound, long-term monitoring program that specifically provides quantitative data on these fisheries issues. A balanced solution might still allow some continued take for subsistence (which appears to be at a modest level and has been declining steadily over the past 20 years), but any overall strategy would need to demonstrate an actual reduction in harvest.