# Anecdotes and the shifting baseline syndrome of fisheries

Fisheries have recently become a topic for media with global audiences – but then again, fisheries are a global disaster: one of the few that affect, in very similar fashion, developed countries with well-established administrative and scientific infrastructure, newly industrialized countries, and developing countries.

This is quickly summarized:

- Heavily subsidized fleets, exceeding by a factor of 2 or 3 the numbers required to harvest nominal annual catches of about 90 million tonnes.
- Staggering levels of discarded bycatch, representing about one third of the nominal catch, a large unrecorded catch that perhaps raises the true global catch to about 150 million tonnes per year, well past most previous estimates of global potential.
- The collapse, depletion or recovery from previous depletion of the overwhelming majority of the over 260 fish stocks that are monitored by the Food and Agriculture Organization of the United Nations.

Fisheries science has responded as well as it could to the challenge this poses by developing methods for estimating targets for management – earlier the fabled Maximum Sustainable Yield (MSY)[1], now annual total allowable catch (TAC) or individual transferable quotas (ITQ). If these methods are to remain effective, fisheries scientists need to follow closely the behavior of fishers and fleets, but this has tended increasingly to separate us from the biologists studying marine or freshwater organisms and/or communities, and to factor out ecological and evolutionary considerations from our models. There are obviously exceptions to this, but I believe the rule generally applies, and it can be illustrated by our lack of an explicit model accounting for what may be called the 'shifting baseline syndrome'. Essentially, this syndrome has arisen because each generation of fisheries scientists accepts as a baseline the stock size and species composition that occurred at the beginning of their careers, and uses this to evaluate changes. When the next generation starts its career, the stocks have further declined, but it is the stocks at that time that serve as a new baseline. The result obviously is a gradual shift of the baseline, a gradual accommodation of the creeping disappearance of resource species, and inappropriate reference points for evaluating economic losses resulting from overfishing, or for identifying targets for rehabilitation measures.

These are strong claims that I can illustrate best by using analogies. For example, astronomy has a framework that uses ancient observations (including Sumerian and Chinese records that are thousands of years old) of sunspots, comets, supernovae or other phenomena that were recorded by ancient cultures, and this has made possible the testing of pertinent hypotheses. Similarly, oceanography has had, since the days of Commodore F. Maury, protocols for consolidating scattered observations on currents and winds, and later on sea surface temperatures; the latter have enabled the extending of the Comprehensive Ocean and Atmospheric Data Set (COADS) back to 1870, and infer that, indeed, global warming is occurring.

In contrast, fisheries science does not have formal approaches for dealing with early accounts of 'large catches' of presently extirpated resources, which are viewed as anecdotes. Yet the grandfather of my colleague Villy Christensen did report being annoyed by the bluefin tuna that entangled themselves in the mackerel nets he was setting in the waters of the Kattegat in the 1920s, and for which no market then existed. This observation is as factual as a temperature record, and one that should be of relevance to those dealing with bluefin tuna, whose range now excludes much, if not all, of the North Sea.

I could list hundreds of such observations – drawn from the historical or anthropological literature and elsewhere – but here it may be more useful to highlight two small fisheries-related studies that have attempted to consolidate them, and which have led, I believe, to important new insights. In the first, a (female) scientist[2] compiled scattered observations of (male) anthropologists reporting on fishing in the South Pacific, and concluded that, despite cultural emphasis on the catching of large fish by men, the gleaning of smaller reef organisms by women and children often accounted for as much catch as the more spectacular activities of the men (even though it does not enter official catch statistics). This fact, now widely confirmed by field studies, should lead to a re-evaluation of the fisheries potential of coral reefs.

The authors of the second study[3] used the anecdotes in Farley Mowat's *Sea of Slaughter*[4] to infer that the biomass of fish and other exploitable organisms along the North Atlantic coast of Canada now represents less than 10% of that two centuries ago. Some colleagues will find it difficult to accept that the early fishing methods should have had such impact, given their relative inefficiency when compared to our factory ships. However, it must be remembered that the large animals of low fecundity at the top of earlier food webs must have been less resilient to fishing than the survivors that are exploited today. That is, the big changes happened way back, but all that we have to recall them are anecdotes.

Developing frameworks for incorporation of earlier knowledge – which is what the anecdotes are – into the present models of fisheries scientists would not only have the effect of adding history to a discipline that has suffered from lack of historical reflection[1], but also of bringing into biodiversity debates an extremely speciose group of vertebrates: the fishes, whose ecology and evolution are as strongly impacted by human activities as the denizens of the tropical and other rain forests that presently occupy center stage in such debates. Frameworks that maximize the use of fisheries history would help us to understand and to overcome – in part at least – the shifting baselines syndrome, and hence to evaluate the true social and ecological costs of fisheries.

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## References

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