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Letter to the Editor

Editor's note: The following letter is from Pierre Kleiber, a fishery biologist based in Honolulu, Hawai'i (USA). He writes in response to two articles that have recently appeared in *MPA News*: one on the decline in population of large oceanic predators (MPA News 4:11) and one on the use of biodiversity hotspots as a basis for open-ocean reserves for these predators (5:3). Both articles focused on research by Boris Worm of Kiel University (Germany) and Ransom Myers of Dalhousie University (Canada).

Dear *MPA News*:
It is questionable at this point in time whether reserves are necessary or desirable for predators in the pelagic, "blue" ocean. The presumption that there has been a universal, drastic decline of large marine fishes is based on statistical analyses of raw catch-per-unit-effort data, based on incomplete and improperly lumped data across species, among other errors. A detailed response to the Myers/Worm analysis can be found at http://www.soest.hawaii.edu/PFRP/large_pelagic_predators.html.

As for marine turtles, it is evident that several populations are in decline, but it is not clear that high-seas fisheries are significantly responsible for the decline. Much evidence points to disruption of nesting beaches and directed harvest of eggs and adults as primary causes.

High-seas marine reserves might be considered as an option in case of need. However, in the case of most large predatory fishes, we are not at that stage yet, and management of high-seas fisheries to aid turtle populations is unlikely to be of any use.

If a need to consider marine reserves arises, I would hope that it would involve a more sophisticated analysis than the one performed by Worm and Myers. The authors simply estimate possible changes in total catch of a range of species. To assess the possible efficacy of a reserve, the projected catch needs to be split into catch by species, age, and location as part of an age and spatially structured population dynamics model in order to estimate what the response of the population would be.

In writings of Worm and Myers, there is the notion of a pre-industrial "pristine" ocean as an ideal to which we should either aspire or at least juxtapose the current conditions. But there is evidence that century-long cycles of five-fold changes in abundance have existed for at least one large tuna species (bluefin) for long before the advent of modern industrial fishing. It is likely that other fish populations have undergone similar fluctuations. So "pristine" is in fact undefinable. What are needed are analyses of where we are, compared to where we want (or can hope) to be, and how to get from here to there.

Pierre Kleiber
3039 Alencastre Pl., Honolulu, HI 96816, USA. Tel: +1 808 983 5399; Email: pkleiber@bluelink.andover.edu