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Not all fisheries will be collapsed in 2048

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Abstract

In a recently published paper, Worm et al. [Impacts of biodiversity loss on ocean ecosystem services. *Science* 2006;314:787–90.] project “the global collapse of all taxa currently fished” by 2048. Using their criteria and data, this paper shows that the number of not-collapsed fisheries actually increased over time to a plateau of about 5600 in 1985–2003. Furthermore, if trends are projected into the future, more than half of the world’s fisheries would always be in a recovered state.

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In a paper recently published in *Science*, Worm et al. [1] project “the global collapse of all taxa currently fished” by 2048, and magnify this statement through press releases prominently displayed in newspapers worldwide. Using their criteria and data, it is shown in this paper that this projection is incorrect.

Their definition of a “collapsed” fishery as one in which current catches are less than 10% of their historic high is followed. Accordingly, fisheries that are “not collapsed” may never have collapsed or may have recovered from collapse. Their problematic assumption that catch is a proxy for abundance is set aside, while noting that catches fluctuate for many reasons, for example, regulations [2], the environment [3], cyclical dominance [4,5], market forces, and errors in global catch databases [6].

Over time, their data include an increasing number of fisheries that have exceeded the 10,000t threshold in cumulative catch used for inclusion in Worm et al.’s analysis. During 1951–2003 the number of “not-collapsed” taxa increased to an asymptote of 5563 (range 5316–6026) in 1985–2003 (Fig. 1a). Thus, while an increasing percentage of fisheries are in a collapsed state, the total number of fisheries has grown and counterbalances this effect.

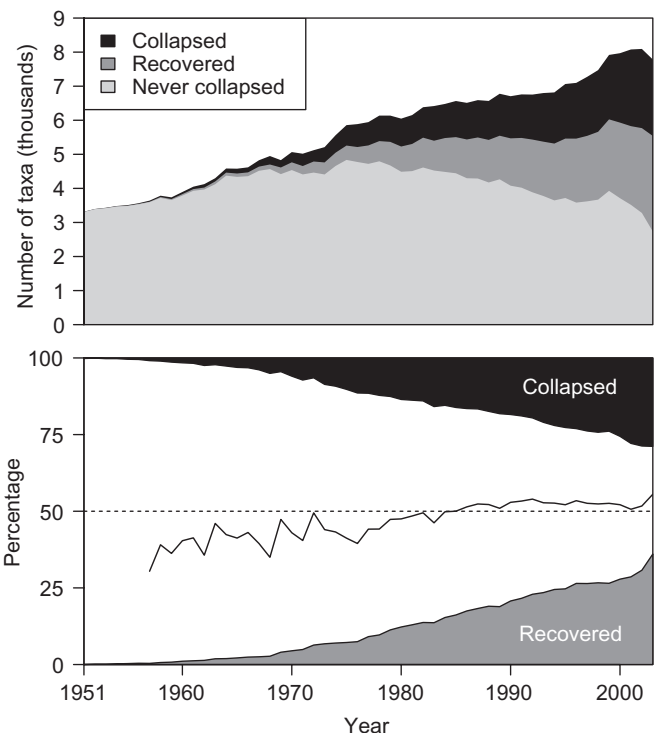


Fig. 1. (a) Total fishery taxa grouped into categories of never collapsed, recovered, and collapsed. (b) Percentages of recovered taxa, collapsed taxa, and a solid line showing the recovered taxa divided by recovered + collapsed taxa (excluding years with <1% collapsed taxa).

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Given catch variability and infinite time, all fisheries will eventually record a catch less than 10% of their maximum, that is, cumulative collapses will reach 100%. At this point, all fisheries will either be collapsed or recovered. Within the collapsed plus recovered categories, the percentage of recovered fisheries has increased steadily over time to a plateau of 52% (range 50–55%) in 1985–2003 (Fig. 1b). In other words, if in the future every fishery had collapsed at least once, 50–55% would be recovered.

Thus, while Worm et al. [1] present important results about the relationship between diversity and ecosystem functioning, their prediction that all fisheries will have collapsed by 2048 is naive for two reasons: first, the number of not-collapsed fisheries shows an increasing trend to about 5600, and second, even if all fisheries collapsed at least once, 50–55% would be recovered in any given year.

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