Referee #1

Review of "Flaws and fallacies in the analysis of spatial catch rate data"

By Myers and Edwards

This manuscript refers mainly to the papers by Myers and Worm (2003) and Walters (2003). The main topics are the problems associated with spatial analysis of catch per unit effort (CPUE) from the Japanese long-line fishery.

1. An important assumption that should be addressed at the start is whether CPUE is proportional to abundance. One could make a case for hyperstability if the long-line became saturated, or hyperdepletion if the fishery depletes the high-density hotspots, then moves on to low-density areas.

2. A second potential problem was dividing the total catch by total effort instead of averaging the CPUE calculated in each cell. The correct method is to average the CPUEs weighted by the area of each cell (Quinn and Deriso 1999, p. 17). Strictly speaking, the CPUE in each 55 grid cell should be weighted by cos(latitude). However, the authors show that in this application, there was not a big difference between the two methods (Fig. 2), so this does not appear to be a fatal flaw.

3. A third problem is how to deal with missing data (cells with no catch or effort). Myers and Worm (2003) essentially ignored cells with no data, which in the early years of fishing could overestimate total abundance and the rate of depletion. Walters (2003) suggested a way to backfill the missing cells, so that they can be included in the averages. The authors show that if the unfished abundance in each cell was equal (as might be expected for migratory fish), Walters approach can underestimate the rate of depletion. The simulations in Fig. 1 assumed equal initial abundance in each cell. If areas of highest abundance were targeted first, unfished abundance would be overestimated by ignoring the empty cells. The authors dismiss this possibility, but not convincingly.

One point of agreement is that better models of spatio-temporal patterns of long-line fisheries are needed. Linear mixed-effects models, as described on page 8, seem a good place to start. This is analogous to 2-way ANOVA with location and time effects.

I recommend that this article be shortened and recast as a response to Walters (2003) because the paper is basically a rebuttal. From the CJFAS guidelines for Perspectives: "Manuscripts that challenge the conclusions or interpretations of articles previously published in the Journal are best considered for the Comments (Discussions) section." The section on the depth distribution of hooks (page 9) appears as an afterthought that may be adequately treated in the primary papers by Wood and Myers. A perspective paper on the spatial analysis of long-line data would need to be more comprehensive and less reactionary. Several other critiques of the Myers and Worm (2003) paper have appeared or are about to appear. It would be good to let the dust settle before writing a comprehensive perspective.

At the end of the day, whether a stock has declined by 90% or 85%, the need to rebuild is the same. When starting from depleted state, even a shifted baseline can be a good rebuilding target. Finally, recall Ricker's (1975) comparison of a lightly-fished stock with a stand of virgin timber. ‘This effect, perhaps more than any other, accounts for the fisherman's nostalgia for the "good old days" when for a few years, catch per hour or per set was so much greater than at present.’

Minor comments:

Generally, there shouldn't be citations in the abstract. I would suggest replacing 'virgin' with 'pristine' or 'unfished'.

Editor’s note: Referee #1 also marked some minor comments on the hard copy of the manuscript, and we shall return this to you by mail.

Referee #2

Review of “Flaws and fallacies in the analysis of spatial catch rate data” by Ransom A. Myers and Andrew M. Edwards.

This manuscript is a third in a series:

1. The first: “Rapid worldwide depletion of predatory fish communities” by R. Myers and B. Worm.

2. The second “Folly and fantasy in the analysis of spatial catch rate data” by C. Walters.

3. And finally the current rejoinder “Flaws and fallacies in the analysis of spatial catch rate data” by R. Myers and A. Edwards.

The significant declines in world fisheries are of course of wide concern, but this doesn’t mean that everything written on the subject is worthy of publication. The original paper, written in the style required by the journal Nature, did not allow the caveats and cautions that should have been in the original paper, rather than the current paper trail. In particular, the issue of missing data should have been covered, and the potential this had, and still has, to bias our perceptions of these declines. Filling in missing data with ad hoc procedures does not seem to be a strategy that would bring comfort to the majority of researchers. This reminds me of the old saw about making a “silk purse out of a sow’s ear.”

In my opinion, the current manuscript is weak:

1. On the p4 and the top of p5, it states what seems obvious.

2. On p5 it reiterates what was an interesting presentation in Myers and Worm (2003)

3. On the bottom of p5 and the top of p6 it provides a simulation to rebut Walters’ ad hoc procedure to fill in missing data. (This is useful, if one thinks the Walter’s approach deserves serious consideration)

4. The use of ratio estimators top of p9 seems almost a non-issue.

5. The bottom of p9, “depth effects” seems to be something that hits the mark.

Concerning the style of Walters’ review of Myers and Worm (2003), I am sympathetic toward giving Myers the opportunity to respond. However, I think that this final rebuttal should be in the form of a letter/comment rather than a scientific paper. A letter could be made shorter, more of a rebuttal of Walters, and could be given freedom of expression generally broader than that of a scientific paper.