



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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Dear Dr. Wiersma:

We've received your white paper entitled "Alternative estimates of the compliance bycatch rate for harbor porpoises in the Northeast management area," dated April 23, 2012. Thank you for sharing this paper with us. In this letter, we will provide you with some thoughts regarding your approach, and we look forward to further discussing the ideas you've presented at the Take Reduction Team meeting this fall.

In summary, the white paper's primary focus is incorporating fishery uncertainty in the compliance bycatch rate (referred to as target bycatch rate in Orphanides & Palka 2012). Two alternative methods for estimating the compliance bycatch rates (and their confidence intervals) are presented, and an argument is made for using hauls as a metric for calculating these rates. For the sake of consistency with the white paper, in this response we will use the term "compliance bycatch rate" as a shorthand description of the bycatch rate that triggers a closure of a consequence closure area, where the "published compliance bycatch rate" refers to the bycatch rate in the 2010 harbor porpoise take reduction plan (HPTRP) and in Orphanides & Palka (2012), and the "proposed compliance bycatch rates" refers to the bycatch rates derived from the methods used in the white paper.

It was stated that the same input data used for this analysis was used in the published compliance bycatch rate. However, the model results presented in the white paper state that there were 28 observations used to develop the proposed consequence bycatch rates, though there are only 27 values in Appendix 1, comprising bycatch rates for 9 years and 3 areas. It is not clear what the 28th observation is, perhaps the published compliance bycatch rate? When ANOVAs were rerun in Splus with the 27 bycatch rates, results were similar (landings in Table 1 and number of hauls in Table 2) and would not have changed any of the white paper's conclusions. So, we will disregard this discrepancy for the purposes of this letter.

The white paper lists reasons the compliance bycatch rate varies from year to year. However, there appears to be a conceptual misunderstanding. That is, there is no disagreement that future bycatch rates (which are supposed to be compared to the compliance bycatch rate) will vary from year to year. The purpose of the compliance bycatch rate was to set an upper bound on future



bycatch rates in the hopes that future bycatch estimates of the total harbor porpoise taken would be below the potential biological removal level, or PBR, and that progress would be made towards the zero mortality rate goal. The published compliance bycatch rate was not designed to predict the future bycatch rate, as was stated in the white paper, but was designed to be part of a management rule to set an upper limit to future bycatch rates.

The white paper states that the published compliance bycatch rate does not include a confidence interval, does not account for uncertainty in the fishery, and assumes the dynamics are constant from year to year. It is true the published compliance bycatch rate is a point estimate and a confidence interval for this rate was not published. A confidence interval could have been reported, but it was not necessary for the management rule. However, the published compliance bycatch rate does incorporate uncertainties that occurred in the fishery. This was accomplished by deriving the published compliance bycatch rate using observed conditions that occurred in 3 areas and over 9 years for hauls that had the correct numbers of pingers. Also, since some of the observed hauls that had the correct number of pingers likely had non-functioning pingers, this sort of variability was also implicitly incorporated. In addition, the published compliance bycatch rate (which incorporates some types of variability) is then compared to the average of two future annual bycatch rates (which also is a way to incorporate variability). There are, of course, other ways uncertainty could have been incorporated into a management rule.

The question that should be asked is, if this trigger closure strategy is to be used, how should natural variability be incorporated in a management rule that would trigger a closure only when necessary, ensure the overall bycatch is below PBR, and also show progress towards the zero mortality rate goal?

Two other ways to derive the consequence bycatch rate were suggested in the white paper: (1) use the mean slope of the linear regression of observed bycatch rates that encompass the past underlying variability in the fishery-harbor porpoise-environment system, and (2) use the upper 95% confidence limit of the slope of the same linear regression. There are other potential methods; for example, a bootstrap approach could be used to estimate the possible distribution of estimated takes from hauls that have the correct number of functional pingers.

In the white paper the number of observed harbor porpoise takes was regressed against the observed metric tons of landings and the observed number of hauls. Both landings and hauls were statistically significant as independent variables for predicting harbor porpoise observed takes and the paper states landings and hauls were collinear. This conclusion can be interpreted as support of the use of observed metric tons of landings or observed number of hauls as an appropriate unit of effort in the ratio estimator bycatch rate. This is because an underlying assumption of the ratio estimator technique is that, on average, as the unit of effort increases, so does the number of bycaught harbor porpoises. So it is not clear why it was stated observed hauls were a more appropriate unit of effort because it accounts for changes in the fishery, when the analysis indicates either unit of effort is appropriate. In fact, if the R^2 values are compared, then landings could be considered a better predictor of harbor porpoise takes than number of hauls.

Even if the proposed regression methods were used, the observed bycatch rate during the first two fishing seasons would still exceed the proposed consequence bycatch rates. That is, using

landings as the unit of effort, the actual 2-year weighted average (Table 3) was 0.057 takes/mton landings (%CV=25%) as compared to the following possible trigger consequence bycatch rates: 0.031 (the published rate), 0.0424 (regression slope point estimate) or 0.0515 (regression upper 95% confidence limit of the slope). If the unit of effort was number of hauls, then the actual 2-year average bycatch rate was 0.012 takes/haul, which would be compared to the following possible trigger consequence bycatch rates: 0.005 takes/haul (using the same process as the published rate = 8 takes/1528 hauls), 0.006 takes/haul (regression slope point estimate), or 0.009 takes/haul (regression upper 95% confidence limit of the slope). The good news is the second year's bycatch rate was much lower than the first year's bycatch rate.

In conclusion, the white paper raised some good ideas that could be considered if the trigger consequence strategy were to be reconsidered by the harbor porpoise take reduction team. However, even if the proposed regression methods were used, the conclusion would be the same as that when using the published consequence bycatch rates. That is, the two-year average in the Coastal Gulf of Maine consequence closure associated areas was greater than the consequence bycatch rate. So, given the available information, it does not seem that changing the way the consequence closure bycatch rate is calculated would have a noticeable impact. As mentioned above, we look forward to further discussing the ideas you've presented at the Take Reduction Team meeting this fall. We also recognize that the upcoming harbor porpoise take reduction team will need to discuss the larger issue of how the bycatch of harbor porpoises can be reduced and maintained at a low level.

Sincerely,

Russell W. Beon
for

William A. Karp, Ph.D.
Science and Research Director

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