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Predicted Harbor Porpoise Bycatch under Potential Mitigation Measure Scenarios

by Debra L. Palka

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Abstract

During the Harbor Porpoise Take Reduction Team meeting in December 2007, questions were raised concerning what the predicted harbor porpoise bycatch would have been in 2005 and 2006 if: (a) the current Harbor Porpoise Take Reduction Plan (HPTRP) was followed (Scenario I); (b) if, in addition, pingers had been used in the entire Northeast gillnet fishery (Scenario II); and (c) if, in addition, the gillnet fishery off of New Jersey, including the Mudhole area, had also used pingers (Scenario III). Using the observed data collected since the implementation of the HPTRP, average bycatch rates of harbor porpoise were estimated for each of these scenarios. Based on these estimated bycatch rates, the average predicted annual harbor porpoise bycatch in 2005 and 2006 under Scenario I (641 animals) would have been slightly above the Potential Biological Removal (PBR) level (610 animals). The average predicted annual bycatch under Scenario II (370 animals) would have been about 61% of PBR, and the predicted bycatch under Scenario III (243 animals) would have been about 40% of PBR. All of the estimates exceed the Zero Mortality Rate Goal (ZMRG) level of 61 animals.

List of Acronyms

HPTRP	=	Harbor Porpoise Take Reduction Plan
HPTRT	=	Harbor Porpoise Take Reduction Team
NEFOP	=	Northeast Fisheries Observer Program
PBR	=	Potential Biological Removal
VTR	=	Vessel Trip Report
ZMRG	=	Zero Mortality Rate Goal

Introduction

During discussions at the Harbor Porpoise Take Reduction Team (HPTRT) meeting, questions arose from HPTRT members regarding the effectiveness of the existing Harbor Porpoise Take Reduction Plan (HPTRP) and, in particular, the effectiveness of pingers as a bycatch reduction measure. To this end, the HPTRT requested information on what the bycatch of harbor porpoises would have been under three different bycatch mitigation scenarios. The predicted harbor porpoise bycatches under these scenarios could then be compared to current bycatch estimates to determine if the potential mitigation measure might reduce bycatches to below the Potential Biological Removal (PBR) level (currently 610 animals), or to levels below the Zero Mortality Rate Goal (ZMRG) level (currently 61 animals). The three scenarios were:

- I. What if there had been 100% compliance with the regulations specified in the HPTRP implemented on January 1, 1999 (NMFS 1998)?
- II. In addition to conditions under Scenario I, what if pingers has been required in the fall and winter for the entire Northeast gillnet fishery (in the Gulf of Maine and southern New England waters north of New York)?
- III. In addition to the conditions under Scenario II, what if pingers had been required in the waters off New Jersey, including the Mudhole area, during January to April?

Methods

The three scenarios were evaluated using fishing effort data from 2005 and 2006 as reported in the commercial dealer and Vessel Trip Report (VTR) databases, and harbor porpoise bycatch rates were derived from data collected by the Northeast Fisheries Observer Program (NEFOP) during 1 January 1999–31 May 2007. The bycatch rate for each scenario was estimated using the time and area strata developed for the 2005 and 2006 harbor porpoise bycatch estimates. Details on the 2005 and 2006 harbor porpoise bycatch estimates are provided in Belden (2007) and Belden and Orphanides (2007), respectively.

The Northeast gillnet fishery (referred to as “Northeast”) is prosecuted within Gulf of Maine and southern New England waters north and east of New York. For this fishery, winter is defined as January–May, summer as June–August, and fall as September–December. For the gillnet fishery in waters off New Jersey, including the Mudhole, (referred to as “NJ Mid-Atlantic”) only fishing activity between January and April was considered because this time period is when harbor porpoise takes had been documented in the Mid-Atlantic gillnet fishery.

Annual harbor porpoise bycatch under each of the scenarios was estimated by multiplying the estimated average bycatch rate for that scenario (see next paragraph) by the actual effort observed (metric tons [mtons] of fish landings) within each stratum in that scenario. This procedure assumes that: (1) landings are not affected by the assumed actions within each scenario; (2) the factors affecting the bycatch rate and landings in 2005 and 2006 were similar to those since the implementation of the HPTRP, that is since 1 January 1999; (3) a cause-and-effect relationship exists between the bycatch rate and the actions proposed in each of the

scenarios; and (4) the bycatch rate of hauls with pingers in the NJ Mid-Atlantic area is similar to the average bycatch rate observed in the Mid-coast Management Area.

From January 1999–May 2007, the average bycatch rate of observed hauls which used all of the required number of pingers in the Mid-coast Management Area was 0.041 harbor porpoises per mtons landed, and was 0.023 harbor porpoises per mtons landed in the Cape Cod South Management Area. In the NJ Mid-Atlantic area, the average bycatch rate of hauls in compliant with the HPTRP regulations was 0.203 harbor porpoises per mtons landed.

Results

Under Scenario I (Tables 1 and 2), the predicted annual harbor porpoise bycatch during 2005 and 2006 was 641 animals (651 in 2005, and 630 in 2006), slightly higher than the current value of PBR (610 animals).

Under Scenario II (Tables 1 and 2), the predicted annual harbor porpoise bycatch during 2005 and 2006 was 370 animals (367 in 2005, and 373 in 2006), about 61% of PBR.

Under Scenario III (Tables 1 and 2), the predicted annual harbor porpoise bycatch during 2005 and 2006 was 243 animals (246 in 2005, and 240 in 2006), about 40% of PBR.

All of the predicted bycatch estimates exceed the ZMRG level of 61 animals.

References

- Belden D. 2007. Estimates of cetacean and pinniped bycatch in the 2005 Northeast sink gillnet and Mid-Atlantic coastal gillnet fisheries. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 07-08; 16 p. Available at: <http://www.nefsc.noaa.gov/publications/crd/crd0708/>
- Belden D, Orphanides CD. 2007. Estimates of cetacean and pinniped bycatch in the 2006 Northeast sink gillnet and Mid-Atlantic coastal gillnet fisheries. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 07-20; 18 p. Available at: <http://www.nefsc.noaa.gov/publications/crd/crd0720/>
- National Marine Fisheries Service (NMFS). 1998. Taking of marine mammals incidental to commercial fishing operations; harbor porpoise take reduction plan regulations. Fed Regis. 63(231): 66464-66490.

Table 1. Predicted harbor porpoise bycatch from 2005 under different potential take reduction management actions

		Scenario I.		Scenario II.		Scenario III.	
Time/Area	2005 bycatch estimates	Bycatch when all hauls are in compliance under current TRP	Details about changes	Bycatch when required number of pingers used everywhere in NE (Winter and Fall)	Details about changes	Bycatch when required number of pingers used in NE (winter and fall) and in NJ (Jan-Apr)	Details about changes
Winter NE	306	306		68	Bycatch rate = 0.041 for all areas	68	Bycatch rate = 0.041 for all areas
Summer NE	52	52		52		52	
Fall NE	272	141	Midcoast closure bycrate = 0.041 (117->36) + Mass Bay closures bycrate = 0.041 (56->6)	95	Bycatch rate = 0.041 for all areas	95	Bycatch rate = 0.041 for all areas
NORTHEAST SUBTOTAL	630	499		215		215	
NJ MidAtlantic	470	152	Average compliant bycatch rate = 0.203	152	Average compliant bycatch rate = 0.203	31	Bycatch rate = 0.041 for all areas
GRAND TOTAL	1100	651		367		246	

Table 2. Predicted harbor porpoise bycatch from 2006 under different potential take reduction management actions

		Scenario I.		Scenario II.		Scenario III.	
Time/Area	2005 bycatch estimates	Bycatch when all hauls are in compliance under current TRP	Details about changes	Bycatch when required number of pingers used everywhere in NE (Winter and Fall)	Details about changes	Bycatch when required number of pingers used in NE (winter and fall) and in NJ (Jan-Apr)	Details about changes
Winter NE	420	369	Bycatch rate in S. Cape Closure = 0.023 (67->16)	123	Bycatch rate = 0.041 for all areas	123	Bycatch rate = 0.041 for all areas
Summer NE	37	37		37		37	
Fall NE	57	57		46	Bycatch rate = 0.041 for all areas	46	Bycatch rate = 0.041 for all areas
NORTHEAST SUBTOTAL	514	463		206		206	
NJ MidAtlantic	512	167	Average compliant bycatch rate = 0.203	167	Average compliant bycatch rate = 0.203	34	Bycatch rate = 0.041 for all areas
GRAND TOTAL	1026	630		373		240	

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