Some Questions & Answers for the April 2013 Harbor Porpoise TRT Working Group Meeting Provided by the Science Center

Responses provided by Chris Orphanides, Joshua Hatch and Debi Palka

Below are some brief answers to questions posed by members of the Harbor Porpoise TRT. Detailed answers to some questions are provided in attached documents. Answers to some additional questions may be provided at the TRT working group meeting April 10th 2013 or at the May 2013 TRT meeting.

Data Availability

How quickly can the Team be apprised of observed takes and estimates of fishing effort and total bycatch?

The observed takes can be viewed in SIMM within weeks (if not sooner) after they occur. Fishing effort and total bycatch theoretically could be provided 6-9 months after calendar year is complete, though this time table does not necessarily include review by the SRG. These estimates would be DRAFT estimates until reviewed by the SRG. With review by the SRG a more realistic estimate may be 9-12 months. It appears that the SRG may be willing to review the estimates earlier than the typical 2-year SAR process. This schedule assumes 3-months for data processing by NEFOP, 4 months for the preparation of Allocated Dealer data (Dealer data matched up to VTR as best as possible), roughly 3 months for analysis and calculations, and additional time for NEFSC review (and possibly reviews by the SRG or other groups). Fishing effort (VTR or Dealer data) could be provided on its own sooner than this - within months of the completion of the calendar year - if it would be useful on its own. However, the Allocated Dealer data is typically not available until at least May 1 of the following year (e.g., 2012 calendar year data available May 1 of 2013).The time schedule presented here (6-9 months for analysis and data preparation, additional time for review) could be accelerated under certain circumstances, though it would not be advisable to make this a regular occurrence.

When will the 2012 bycatch estimate be available?

A preliminary DRAFT 2012 estimate is in the attached document. In order to provide realistic estimates for this meeting, the usual effort dataset could not be used because it is not ready yet. Therefore, the estimates are nearly GUARANTEED TO CHANGE in the future. Our preferred effort dataset will not be ready until May 1 at the earliest. However, aside from using an effort dataset with less spatial and temporal precision, the estimates provided here were done using the same process that generates the final estimates and should be accurate enough to provide a sense of the magnitude of takes in 2012. New England had an estimated 176 takes, and the Mid-Atlantic had an estimated 73 takes, for a regional total of 249 animals.

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Comprehensive Consequence Closure Question

What is the history of bycatch levels in each of the Consequence Closure areas during their effective dates by year from 1993 through March 2013?

- The estimated take level by area by year?
- The percentage of observer coverage by area by year?
- The percentage of total take by area by year through 2012?
- The raw data on the number of observed takes by year?
- A map showing the Consequence Closure boundaries and effective periods?

This question was not investigated in detail at this time. However, some of this information is available for the time period from May 2007 to January 2012 in the Meeting Document B7 from Day 2 (New England Management Areas: Harbor Porpoise Bycatch Patterns during 1 January 2007 to 31 May 2012, by Debi Palka). Monthly bycatch rates and approximate estimates by area are in tables 4-7, (pg 19-22). Approximate estimated take level by CCA area and year/month are in Figure 27 (pg 63). For Jan 2007 - May 2012 the raw data on the number of observed takes by year are in Table 2 (pg 16-17). A map showing the CCA boundaries and effective periods in Figure 1c pg 31.Other information that may be useful on VTR landings by month, year, and CCA area is in Figure 10, pg 44.

After the working group meeting, if team members would still find it useful to investigate these patterns back into the 1990s, we could undertake this for the May meeting.

What is the Science Center's assessment of the most likely reason(s) why bycatch has declined over the past four years given the relatively low compliance rates?

To begin to answer this question we investigated patterns in the 2009-2011 annual estimates. A paper summarizing this effort is included, though we will conduct additional analysis to answer this question in the future. We plan to add in the 2012 annual estimates and examine other possible factors as well. Please consider the included paper as a work in progress.

To summarize the analysis done so far, despite the seemingly large differences in the annual estimates, these annual estimates are not statistically significantly different. Though, the 2012 estimates (not included yet in the analysis) may break this trend and be significantly different than at least the 2009 estimate. It looks like the largest amount of the recent downward trend stems from the Fall of 2009 when there was a lot of effort in the MidCoast region and the bycatch rate was a little higher than other years as well. Generally speaking, bycatch rates have decreased while effort has either stayed the same or decreased.

Common Pool vs Sectors

What is observer coverage on sector versus common pool vessels?

For the current fishing year the common pool coverage rate is 17% and the sector coverage rate is 25%. For the next groundfish fishing year the common pool will likely be covered at 8% (NEFOP only) and sectors will be covered at 22%.

What proportion of takes occurred in sector vessels versus common pool vessels?

In the 2011 calendar year roughly 85% of observed takes occurred on sector hauls, 12% occurred on common pool hauls, and 3% occurred on non-groundfish hauls. In 2012 roughly 75% of observed takes occurred on sector hauls, 11% occurred on common pool hauls, and 14% occurred on non-groundfish hauls. However, it is important to remember that this does not take into account higher coverage levels for sector vessels. Also, these numbers are only the raw numbers of observed takes; these are not percentages of the total annual harbor porpoise estimate. To provide some context, in the 2011 and 2012 calendar years combined, observed sector hauls made up roughly 86% of all observed hauls in harbor porpoise management areas, common pool hauls accounted for 3%, and non-groundfish accounted for 11%.

Oct/Nov – Feb/Mar closure analysis

What was the bycatch estimate for the Oct/November 2012 period that had originally been scheduled for a closure? And how does it compare with prior years? What percentage of the total bycatch was in the area that would have otherwise been closed?

Using the methods applied to assess the Oct/Nov –Feb/Mar closure shift, the 2012 Oct-Nov bycatch was assessed in the table below. The point estimate was 49 animals with 95% Confidence Intervals of 31-67. This estimate is not statistically significantly different than those presented for earlier time periods (Feb 99-Mar 12, Feb 08-Mar 12, Oct 10-Mar 12 – see the Nov TRT meeting document from Day 1, document D.3.f). The point estimate of 49 harbor porpoise incidentally taken is with the 95% CI of takes in this time and area from Feb 99 through Mar 2012 (27-55) and the CI for Oct-Nov 2012 overlaps with the CIs for the other time periods assessed. This take level is roughly 55% of the seasonal fall total and 81% of the estimated takes during the fall in the Gulf of Maine.

Table 1. 2012 Coastal Gulf of Maine Oct-Nov Estimated bycatch.

Year	Month	Observed HP	Obs Mtons	VTR Mtons	Bycatch Rate	HP Estimate	CV	CI
2012	Oct	6	54.03	280.46	0.111	31		
2012	Nov	5	106.23	378.45	0.047	18		
Total						49	16.24%	31-67

Do data indicate that one of these closure times is preferable from a conservation perspective? I assume fall would be, based on history...but data would be helpful.

See above answer about fall 2012 takes and the existing document on shifting the closure (Day 1, document D.3.f)

Mid-Atlantic

Are boats in sectors going to the mid-Atlantic and contributing to the high rate of take there in the winter? If so, and NMFS were to allocate a percentage of bycatch by region (as it discussed) would take by these NE boats (particularly if these boats are in sectors) be "counted against" their region of origin (i.e., the Gulf of Maine or S. of NE) or would it "count against" the mid-Atlantic ?

Generally yes, vessels from New England, some of which are in a sector, contribute to the high bycatch rate in the Mid-Atlantic (see Nov TRT meeting document, Day 2, B.6). It is theoretically possible to distinguish which vessels were from New England using the permit number recorded in the NEFOP, ASM, VTR, and Dealer data. This would allow accounting of takes in the Mid-Atlantic from vessels with a New England home port.

In regard to takes in the Mid-Atlantic, are New England vessels complying with the gear restrictions? And, how does the compliance rate breach out by target species?

Both the New England and Mid-Atlantic vessels are complying with the Mid-Atlantic gear restrictions on about 50% of hauls. Most of the violations are for floatline length with the next most common violation type for twine size.

DRAFT 2012 Harbor Porpoise Bycatch Estimates

DRAFT 2012 Harbor Porpoise Bycatch Estimates

A preliminary DRAFT 2012 estimate is provided below. In order to provide realistic estimates for this meeting, the usual effort dataset could not be used because it is not ready yet. Therefore, the estimates are nearly **GUARANTEED TO CHANGE** in the future. Our preferred effort dataset will not be ready until May 1 at the earliest. However, aside from using an effort dataset with less spatial and temporal precision, the estimates provided here were done using the same process that generates the final estimates and should be accurate enough to provide a sense of the magnitude of takes in 2012. For the Mid-Atlantic dataset the total effort may be reduced in the future once a NMFS gillnet experiment in this region is accounted for. This will likely reduce the estimate slightly. New England had an estimated 176 takes, and the Mid-Atlantic had an estimated 73 takes, for a regional total of 249 animals.

Table 1. 2012 preliminary DRAFT Mid-Atlantic harbor porpoise bycatch estimates. *This estimate is nearly guaranteed to change once additional data is available.*

Species	Time Period	Region	Mesh Size	Soak Duration	Observed Takes	Bycatch Rate	Estimated Takes	CV	95% CI
Harbor porpoise	Dec-Apr	WoffNJ	Large (>= 7")	Long (>72 hrs)	1	0.048	15.89	0.95	1-47
Harbor porpoise	Dec-Apr	WoffNJ	Large (>= 7")	Short (<= 72 hrs)	1	0.120	56.74	1.06	1-175
Harbor porpoise	Annual	Mid-Atlantic Total			2		72.63	0.85	2-195

Table 2. 2012 New England PRELIMINARY DRAFT harbor porpoise bycatch estimate. Strata without takes are not shown below to enable the table to fit better on the page. ***This estimate is nearly guaranteed to change once additional data are available.***

2012 Winter (Jan-May)	Observed Takes	Bycatch Rate (Take/Ton)	Estimated Takes	C.V. (%)	95% C.I.
Port Group-Area Strata					
North of Boston	1	0.144	8.41	103%	1-25
Management Areas					
Midcoast	2	0.083	5.46	63%	2-11
Stellwagen Bank	7	0.063	20.56	32%	7-30
Massachusetts Bay	2	0.077	5.48	55%	2-10
South Cape Closure	3	0.014	21.86	56%	3-44
Southern New England	3	0.011	21.04	54%	3-41
Subtotal	18		82.81	27%	39-126
Summer (Jun-Aug)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata					
Southern Maine	1	0.006	3.98	88%	1-10
Subtotal	1		3.98		
Fall (Sept-Dec)	**Observed Takes**	**Bycatch Rate (Take/Ton)**	**Estimated Takes**	**C.V. (%)**	**95% C.I.**
Port Group-Area Strata					
North of Boston	3	0.04	21.87	54%	3-43
Management Areas					
Midcoast	8	0.047	28.09	37%	8-44
Stellwagen Bank	1	0.017	4.53	85%	1-11
Massachusetts Bay	1	0.032	5.74	93%	1-16
South Cape Closure	2	0.089	28.52	127%	2-100
Subtotal	15		88.76	48%	15-172
2012 Total	**34.00**		**175.55**	**27%**	**82-269**

Some thoughts on why the bycatch estimates decreased from 2009 to 2011

Some thoughts on why the bycatch estimates decreased from 2009 to 2011

The annual point estimate of the harbor porpoise bycatch estimate in the New England region (offshore of Maine to Rhode Island) decreased from 2009 – 2011, while the fishing effort, as measured by the prorated landings (mtons) increased (Table 1). However, when considering the 95% confidence interval of the annual harbor porpoise bycatch estimates (Figure 1), the annual bycatch estimates are not significantly different.

Table 1. For the New England gillnet fisheries, for the years 2009 – 2011 the following are displayed: the annual amount of fishing effort as measured by the total amount of landing (mtons); the percent observer coverage as measured by the percentage of the mtons landings that was observed; and the annual harbor porpoise bycatch estimates, their upper and lower 95% confidence intervals (CI), and percent coefficient of variations (%CV).

Year	Effort (Prorated Landings (mtons)	% Observer Coverage (mtons)	Annual Bycatch			
			Point Estimate	Lower 95% CI	Upper 95% CI	%CV
2009	17,207	4	591	322	835	23
2010	17,237	17	387	156	603	30
2011	17,975	19	324	178	465	23

This is the same pattern when looking at the harbor porpoise bycatch point estimates and the 95% CIs (Figure 1) for each season: winter (Jan – May), summer (Jun – Aug), and fall (Sep – Dec). The 95% CI for 2011 were smaller, most likely because of the increased observer coverage (Table 1).

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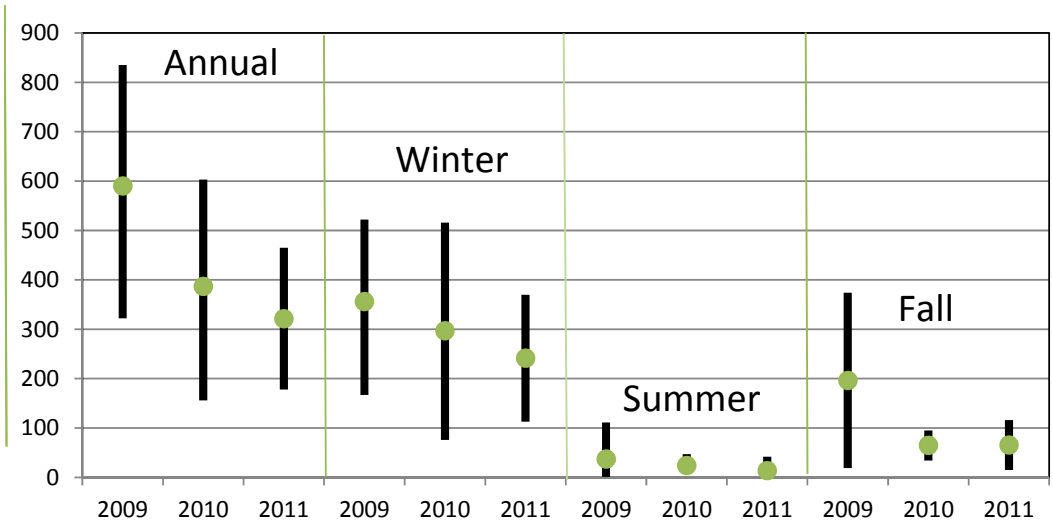
Figure 1. Point estimate (filled circle) and 95% confidence interval (vertical line) for each season and each year, 2009 – 2011.



Overall Patterns

In general, the seasonal bycatch estimates during 2004 – 2011 appear to be due to both changes in the bycatch rate and in fishing landings (effort).

The low summer bycatch estimates appear to be mostly driven by the bycatch rates, since bycatch estimates do not vary very much (0 – 50 harbor porpoises), but the landings for the entire NE fishery vary greatly from 4600 – 8400 mtons (Figure 2).

For both the fall and winter, there is a general weak trend of when landings for the entire NE region increased so did the bycatch estimate for the corresponding year (Figure 2). However, there is a lot of inter-annual variability, particularly in the winter when most years had similar levels of landings, about 4000 mtons, and the bycatch estimate varied from 240 – 450 harbor porpoises for those years. This inter-annual variability is most likely due to different bycatch rates due to local hot spots of harbor porpoises and fishing effort and to different rates due to the use of working pingers.

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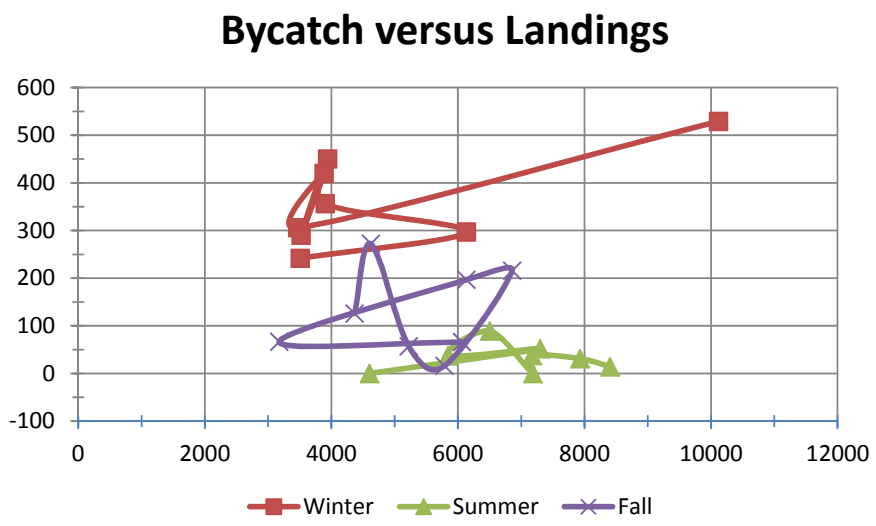
Figure 2. For each season during 2004 – 2011, the relationship between the seasonal Northeast gillnet fishery harbor porpoise bycatch estimate (x axis) and landings for corresponding season for the entire Northeast gillnet fishery (y axis).



Explorations at a smaller scale, at the different management areas and port groups, within each season are discussed below.

Fall Patterns (Table 2)

The biggest change in the bycatch estimates during 2009 – 2011 was the decrease in the Midcoast MA (139, 44, 17 harbor porpoises). This appears to be due to a decrease in both the bycatch rates (0.084, 0.051, 0.018 harbor porpoises/mtons landed) and landings (1660, 860, 940 mtons).

The bycatch estimates in the Mass Bay MA also decreased during 2009 – 2011 (34, 3, 5 harbor porpoises). This appears to be due to only a decrease in the bycatch rates (0.188, 0.024, 0.028 harbor porpoises/mtons landed), because the landing were similar each year (180, 120, 180 mtons).

The bycatch estimates from the East of Cape Cod area decreased during 2009 – 2011 (23, 3, 0), though the magnitudes are low for all of the years. The decrease appears to be due to a decrease in the bycatch rates (0.021, 0.009, 0 harbor porpoises) while the landings actually increased (1100, 330, 1400 mtons landed) and so did the observer coverage (4, 8, 25% of mtons landed).

In contrast, the bycatch in the Cape Cod South MA increased (0, 0, 24), though the magnitudes are low. This is most likely due to the increased landings (210, 120, 480 mtons landed) with the corresponding increased observer coverage (0, 5, 8% mtons landed).

Winter Patterns (Table 3)

The largest change in the winter bycatch estimate was in the areas south and east of Cape Cod, which corresponds to the current Southern New England MA (210, 270,140 harbor porpoises). This is associated with a slight decrease in landings (2700, 3932, 2400 mtons). Thus the decreased bycatch estimates is mainly driven by a decreasing observed bycatch rate. However most of this decrease in the bycatch rate was in the lack of fishing in the East of Cape Cod area during 2011.

In the Midcoast and Mass Bay Management Areas (MAs) during 2009 – 2011, bycatch estimates did not change much: in the Midcoast MA the estimates were similar (28, 28, 32) while in the Mass Bay MA bycatch slightly decreasing bycatch estimates (27, 0, 18). These patterns appear to be attributed to an increase in the bycatch rates in 2011 along with a decrease in landings in 2011.

The offshore areas only had a small amount of fishing (98, 67, 58 mtons landed) and no bycatch during all years 2009 – 2011.

In the rest of the Gulf of Maine (which includes mostly the Stellwagen Bank MA and surrounding region), the bycatch estimates decreased (93, 0, 52 harbor porpoises) from 2009 – 2011, while the landings increased (445, 1392, 562 mtons); meaning the bycatch rates decreased.

Summer Patterns (Table 4)

Harbor porpoise bycatch has only been observed in the New Hampshire and North Boston port groups. During 2009 – 2011 the bycatch estimates were low and decreased (38, 31, 14 harbor porpoise) while the landings were similar (about 2400, 2100, and 2200 mtons). Thus the bycatch rates decreased during 2009 – 2011.

Table 2. Fall and annual estimates for 2009 – 2011 for the harbor porpoise bycatch rates (takes/mtons), estimated takes, and fishing effort as measured by the prorated metrics tons landed for the port groups, area strata, and management areas.

	Bycatch rate (Takes/Mton)				Estimated Takes				Prorated Metric Tons Landed			
Fall (Sep-Dec)												
Port Group-Area Strata	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012
Northern Maine									23.71	20.94	0	
Southern Maine		0.022				3.29			239.57	149.57	246.18	
New Hampshire									210.65	57.93	168.29	
North of Boston		0.024	0.010			7.89	2.8		676.6	328.68	254.78	
South of Boston									246.91	109.4	64.78	
South Of Cape Cod									1358.28	562	1354.41	
East Of Cape Cod	0.021	0.009			23.02	2.96			1096.3	328.82	1377.65	
Offshore						1.00			137.87	192.75	236.33	
Management Areas												
Northeast Closure												
Offshore									95.73	46.97	160.08	
Midcoast	0.084	0.051	0.018		139.24	43.85	16.94		1657.58	859.8	941.14	
Stellwagen Bank		0.016	0.048			3.35	16.1			209.18	335.4	
Massachusetts Bay	0.188	0.024	0.028		34.29	2.81	5.1		182.4	117.27	182.06	
Cape Cod South			0.052				24.83		207.85	120.86	477.58	
Southern New England										71.08	264.98	
Subtotal					196.55	65.15	65.77		6133.45	3175.25	6063.66	
Annual Total					590.50	386.75	321.63		17,207	17,237	17,975	

Table 3. Winter estimates for 2009 – 2011 for the harbor porpoise bycatch rates (takes/mtons), estimated takes, and fishing effort as measured by the prorated metrics tons landed for the port groups, area strata, and management areas.

	Bycatch Rate (Takes/Mton)				Estimated Takes				Prorated Metric Tons Landed			
Winter (Jan-May)												
Port Group-Area Strata	**2009**	**2010**	**2011**	**2012**	**2009**	**2010**	**2011**	**2012**	**2009**	**2010**	**2011**	**2012**
Northern Maine									0.4	0.2	0	
Southern Maine									44.06	23.49	29.94	
New Hampshire									0	3.29	0.25	
North of Boston	0.296		0.257		92.530		5.37		312.59	1142.64	20.89	
South of Boston									131.93	249.58	1.54	
South Of Cape Cod	0.088	0.069			117.220	141.60			1332.05	2128.89	162.84	
East Of Cape Cod	0.117	0.117			80.210	99.98			685.54	854.55	58.75	
Offshore									98.14	66.53	58.34	
Management Areas												
Offshore									213.57	271.9	227.98	
Cashes Ledge Closure									12.53	0	17.18	
Midcoast	0.127	0.140	0.338		27.55	27.56	32.29		216.91	196.88	95.54	
Stellwagen Bank			0.087				46.93				539.43	
Massachusetts Bay	0.154		0.171		26.81		17.69		174.09	228.29	103.45	
Cape Cod Bay									2	8.9	9.05	
Cape Cod South		0.031	0.091			27.03	64		634.18	871.91	703.34	
Southern New England	na	na	0.051				75.44				1479.24	
Great S. Channel Closure									0.45	8.23		
Hanging Ratio Study												
South Of Cape Cod Study		-			12.00	1.00			43.28	76.7	0	
Subtotal					**356.32**	**297.17**	**241.72**		**3901.72**	**6131.98**	**3507.76**	
Group S & E of Cape					209.43	269.61	139.44	0.00	2695.05	3932.05	2404.17	0.00
Group rest of GOM					92.53	0.00	52.30	0.00	444.52	1392.22	561.86	0.00

Table 4. Summer estimates for 2009 – 2011 for the harbor porpoise bycatch rates (takes/mtons), estimated takes, and fishing effort as measured by the prorated metrics tons landed for the port groups, area strata, and management areas.

	Bycatch rate (Takes/Mton)				Estimated Takes				Prorated Metric Tons Landed			
Summer (Jun-Aug)												
Port Group-Area Strata	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012
Northern Maine									103.27	33.47	5.92	
Southern Maine						2.00			817.03	216.05	521.63	
New Hampshire	0.035	0.015			37.63	11.83			1075.02	655.48	1046.25	
North of Boston		0.006	0.012			8.60	14.14		1297.9	1433.07	1178.67	
South of Boston									216.98	766.36	796.44	
South Of Cape Cod									1586.3	2205.53	2416.05	
East Of Cape Cod						1.00			1922.97	2428.12	2218.57	
Offshore						1.00			150.23	162.44	219.06	
Management Areas												
Northeast Closure												
Great S. Channel Closure									1.91	29.11	1.15	
Subtotal					37.63	24.43	14.14		7171.61	7929.63	8403.74	
NH + N Boston					37.63	20.43	14.14	0.00	2372.92	2088.55	2224.92	0.00

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Response to Question 11 in TRT Questions for April Meeting

Response to Question 11 in TRT Questions for April Meeting

Question 11) "In regard to takes in the Mid-Atlantic, are New England vessels complying with gear restrictions? And, how does the compliance rate breach out by target species?"

Response)

New England vessels fishing in the Mid-Atlantic were only observed using large-mesh gillnets in the following management areas: South Mudhole, Waters off New Jersey (Closure & Gear Modifications), and Southern Mid-Atlantic (see Table 1). Interestingly, all observed New England vessels (i.e. 11) fishing in the Mid-Atlantic region were targeting MONKFISH and have temporary home ports[1] located in the following states: CT, RI, MA, and NH. The proportion of all observed hauls on New England vessels fishing in the Mid-Atlantic by state and management area can be found in Figure 1.

Compliance rates between New England and Mid-Atlantic fishing vessels were comparable; with 50% of hauls on New England vessels and 50% of hauls on Mid-Atlantic vessels complying with Mid-Atlantic management area regulations (Tables 1 and 2; Figure 2). This suggests that something other than non-compliance is resulting in higher bycatch rates for harbor porpoises on New England vessels gillnetting in the Mid-Atlantic, compared to Mid-Atlantic vessels fishing in the same region (Table 3; e.g. spatiotemporal distribution of fishing practices concerning New England versus Mid-Atlantic vessels).

In order to investigate potential differences between New England and Mid-Atlantic vessels fishing in the Mid-Atlantic, several classification algorithms were fitted to NEFOP-observed hauls within the Waters off New Jersey management area, where majority of New England vessels are observed. The classification algorithms considered were a generalized additive model assuming a binomial distribution with a logit link and an adaptive boosting algorithm using classification trees as base classifiers (Adaboost). The Adaboost method showcased better predictive ability, as determined by the lower test error rates from 3-fold cross-validation (see Figure 3), and as such was chosen as the preferred approach. The purpose of classification was two-fold: 1) to determine important variables distinguishing New England versus Mid-Atlantic vessels and 2) to predict whether or not ASM-monitored hauls occurred on New England or Mid-Atlantic vessels, as ASM does not collect this type of information. As such, included variables were limited to those jointly collected by NEFOP and ASM, although other factors may be important to classifying hauls on New England or Mid-Atlantic vessels.

[1] Temporary home port is defined as the location where the vessel is mostly kept, which may be neither where registered nor where sold catch.

Variables shown to be influential for classifying hauls to New England or Mid-Atlantic vessels were Latitude (latdd), Longitude (londd), Number of Nets per String (NNETS), Soak Duration (SOAKDUR), and Bottom Depth (DEPTH) (Figures 4). The distributions of influential variables were further compared using bootstrapped Kolmogorov-Smirnov tests to determine if differences between hauls on New England or Mid-Atlantic vessels were statistically significant (Figure 5). It appears that New England vessels have a tendency to use more nets per string and fish at deeper depths for longer periods of time, compared to Mid-Atlantic vessels, while fishing almost exclusively near Hudson Canyon (Figure 6). Moreover, application of the classification algorithm (Adaboost) to ASM data suggests that the majority of harbor porpoise takes monitored by ASM occurred on New England vessels (i.e. 9 takes out of 10). This finding was further validated through comparison to documented hailing ports from the corresponding vessels' fishing permits.

Non-compliance rates (calculated at the haul level) of New England vessels fishing in the Mid-Atlantic, concerning gear restrictions, vary by management area, but are generally lower than those of Mid-Atlantic fishers (see Table 1 and Figure 1). See Table 2 for a breakdown of non-compliance rates by region (i.e. New England versus Mid-Atlantic), management area, and gear modification.

Table 1: Non-compliance and compliance rates[2] of New England vessels gillnetting within Mid-Atlantic management areas, as defined by the 1998 and 2010 Harbor Porpoise Take Reduction Plans. First row corresponds to South Mudhole, Large-mesh, Gear Modifications. Second row corresponds to Waters off New Jersey, Large-mesh, Closure. Third row corresponds to Waters off New Jersey, Large-mesh, Gear Modifications. Fourth row corresponds to Southern Mid-Atlantic, Large-mesh, Gear Modifications. Fifth row is the proportion of non-compliant and compliant hauls on New England vessels gillnetting in Mid-Atlantic management areas.

Non-compliant							Compliant								
2007	2008	2009	2010	2011	2012	Total	2007	2008	2009	2010	2011	2012	Total	% Compliant	NE Total
-	-	-	-	2	-	2	-	-	-	-	0	-	0	0%	2
-	6	10	-	-	-	16	-	0	0	-	-	-	0	0%	16
-	4	0	4	0	0	8	-	11	10	26	5	6	58	88%	66
-	4	8	3	10	10	35	-	0	0	0	4	0	4	10%	39
-	11%	15%	6%	10%	8%	50%	-	9%	8%	21%	7%	5%	50%		

Table 2: Non-compliance and compliance rates[2] of Mid-Atlantic vessels gillnetting within Mid-Atlantic management areas, as defined by the 1998 and 2010 Harbor Porpoise Take Reduction Plans. First row corresponds to South Mudhole, Large-mesh, Gear Modifications. Second row corresponds to Waters off New Jersey, Large-mesh, Closure. Third row corresponds to Waters off New Jersey, Large-mesh, Gear Modifications. Fourth row corresponds to Southern Mid-Atlantic, Large-mesh, Gear Modifications. Fifth row is the proportion of non-compliant and compliant hauls on Mid-Atlantic vessels gillnetting in Mid-Atlantic management areas.

Non-compliant							Compliant								
2007	2008	2009	2010	2011	2012	Total	2007	2008	2009	2010	2011	2012	Total	% Compliant	MA Total
-	-	-	-	11	13	24	-	-	-	-	1	0	1	4%	25
-	3	-	-	-	-	3	-	0	-	-	-	-	0	0%	3
-	14	18	27	6	9	74	-	9	14	13	5	9	50	40%	124
-	26	42	14	9	4	95	-	39	65	18	12	13	147	61%	242
-	11%	15%	10%	7%	7%	50%	-	12%	20%	8%	5%	6%	50%		

Table 3: Non-compliance rates[2] for New England (NE) and Mid-Atlantic (MA) vessels fishing in Mid-Atlantic management areas during required gear modifications as mandated by the 1998 and 2010 Harbor Porpoise Take Reduction Plans. Rates are pooled across years.

	South Mudhole		Waters off New Jersey		Southern Mid-Atlantic	
Gear Modifications	NE	MA	NE	MA	NE	MA
Floatline Length	100%	68%	0%	43%	87%	10%
Twine Size	0%	28%	6%	6%	5%	19%
Tie Downs	0%	0%	0%	0%	0%	13%
Tie Down Length	0%	0%	6%	15%	0%	0%
Net Size	0%	0%	0%	0%	0%	3%
Net Number per Vessel	0%	8%	0%	3%	0%	0%
Number of Nets within a String	100%	60%	0%	42%	85%	10%

Table 4: Harbor porpoise bycatch rates (Takes/Mtons) for New England versus Mid-Atlantic fishing vessels using large-mesh gillnets in the New Jersey region. MA = Management Area, Closure/Gear = area Closure or Gear modifications, Takes = number of harbor porpoise Takes, Hauls = number of NEFOP-observed hauls, Mtons = landed kept catch in Metric tons, and Rate = bycatch Rate.

		NE				MA			
MA	Closure/Gear	Takes	Hauls	Mtons	Rate	Takes	Hauls	Mtons	Rate
South Mudhole	Gear	0	2	0.369	0.000	1	25	9.008	0.111
Waters off NJ	Closure	2	16	4.236	0.472	0	3	0.724	0.000
Waters off NJ	Gear	21	66	13.260	1.584	0	124	41.826	0.000

[2] Unknown or missing gear modification information on any observed haul was assumed to be in compliance with the 1998 and 2010 Harbor Porpoise Take Reduction Plans during calculation of non-compliance and compliance rates.

This information is distributed solely to inform discussions of the Harbor Porpoise Take Reduction Team, and is subject to future review and revision. It has not been formally disseminated by NOAA. It does not represent any final agency determination or policy.

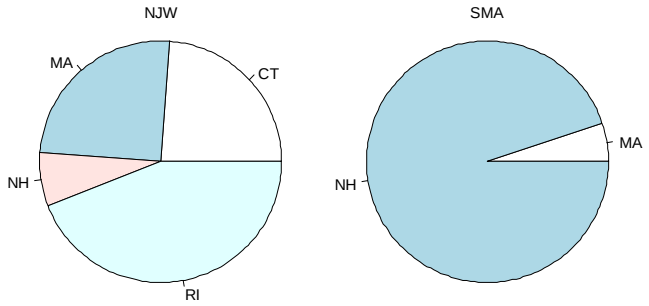


Figure 1: Proportion of all observed hauls on New England vessels fishing in the Mid-Atlantic by state within which the vessels' temporary home port[1] is located. NJW = Waters off New Jersey and SMA = Southern Mid-Atlantic.

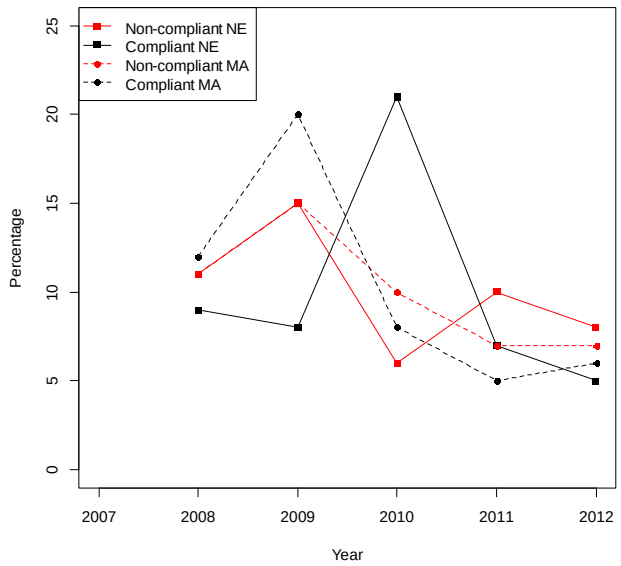


Figure 2: Non-compliance and compliance rates for hauls on New England (NE) versus Mid-Atlantic (MA) vessels fishing in Mid-Atlantic waters. Rates are pooled across management areas.

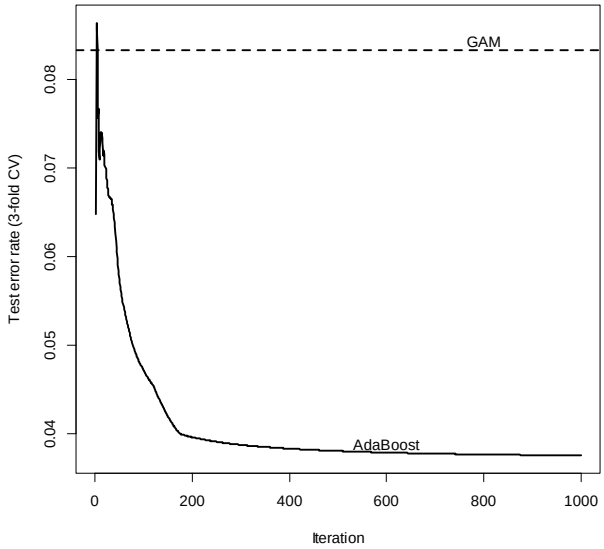


Figure 3: Test error rates for different classification algorithms using NEFOP data to predict whether or not a haul occurred on a New England or Mid-Atlantic vessel.

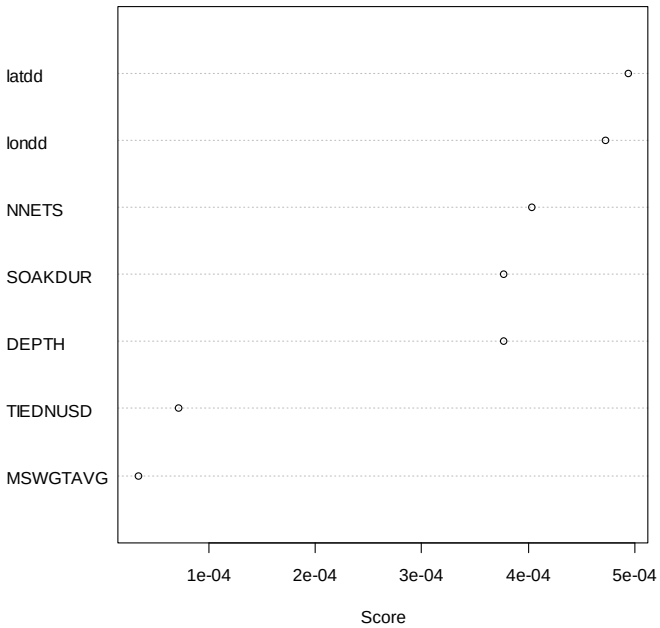


Figure 4: Variable importance plot based on the Adaboost classification algorithm. Variables considered included those that are jointly collected by NEFOP and ASM, so as to allow ASM-monitored hauls to be classified to New England or Mid-Atlantic vessels. The higher the score, the more important that variable is at assigning hauls to New England or Mid-Atlantic vessels.

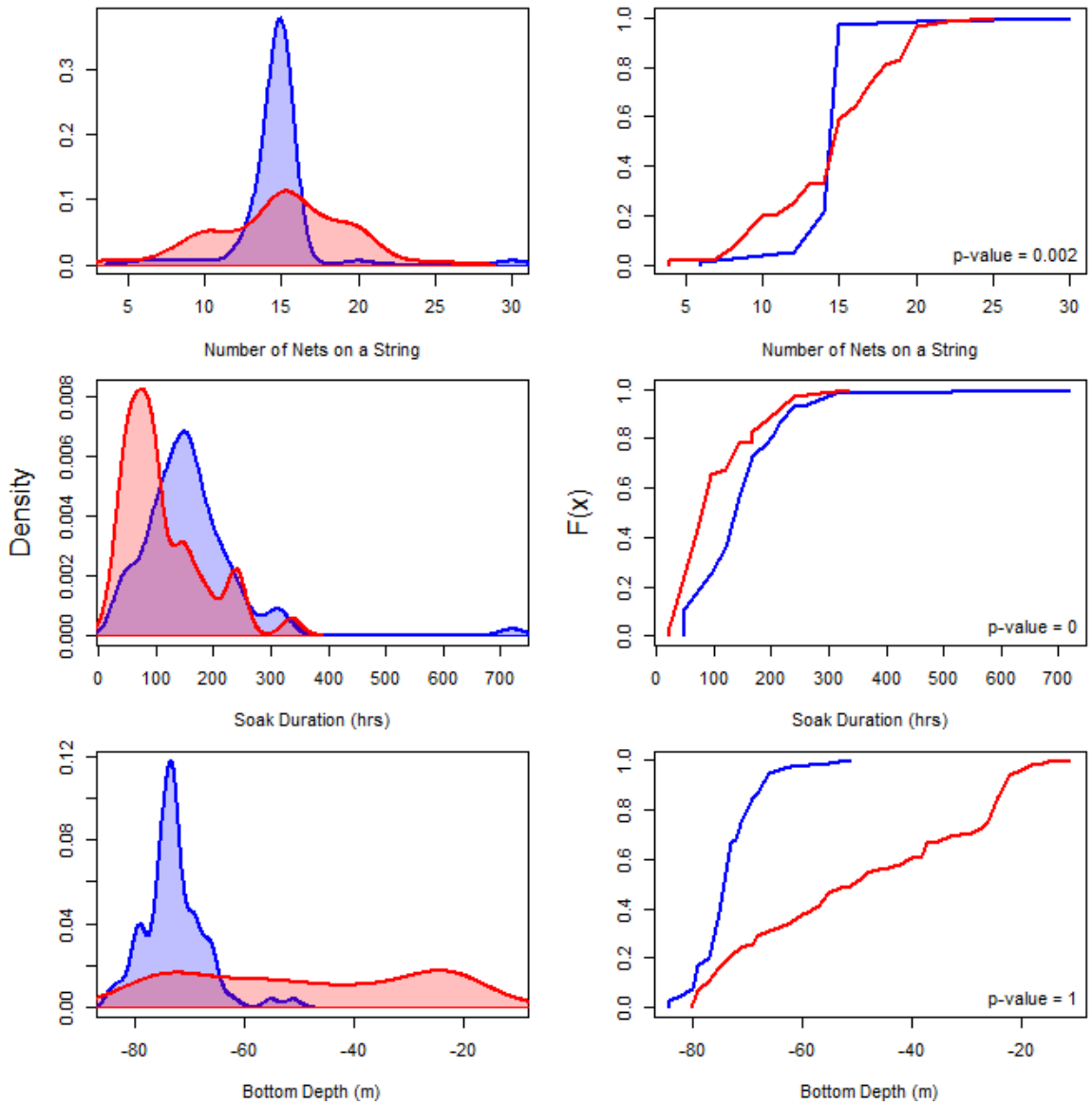
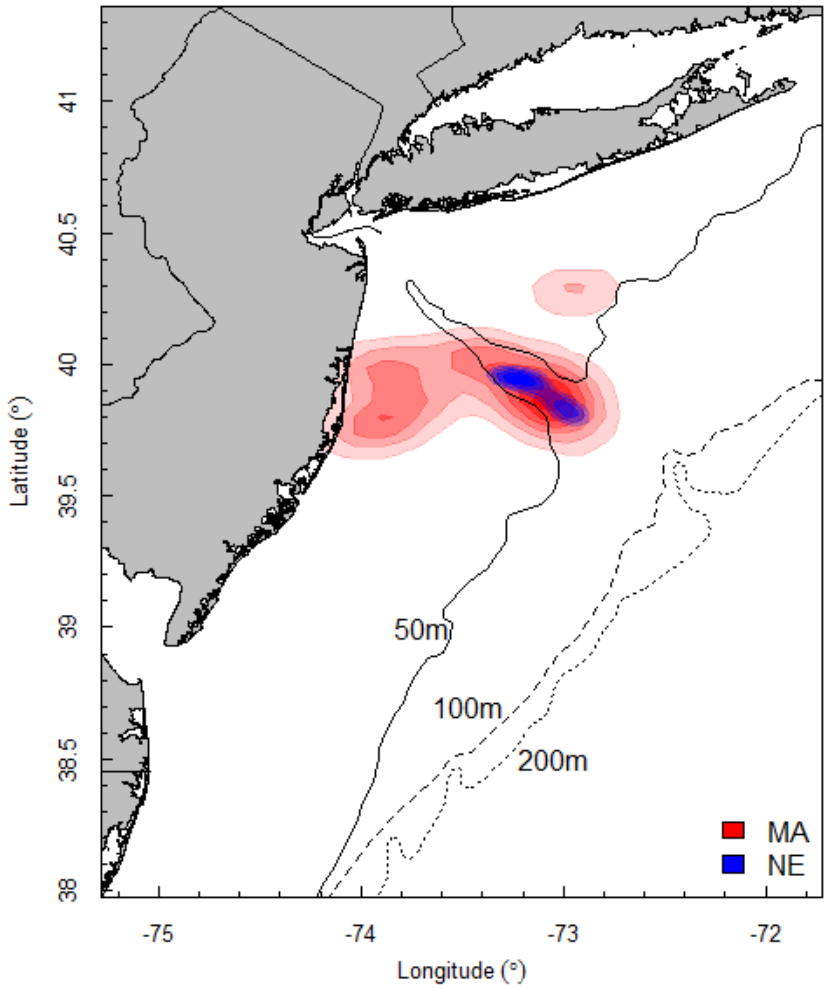


Figure 5: Kernel density estimates and cumulative distribution functions for variables determined to be important for predicting whether or not a haul occurred on a New England or Mid-Atlantic vessel. The *p*-values correspond to bootstrapped Kolmogorov-Smirnov tests on the null hypothesis that the variables' distributions were greater for New England vessels (blue), relative to Mid-Atlantic vessels (red).


41
40.5
40
39.5
39
38.5
38
Latitude (°)
-75
-74
-73
-72
Longitude (°)
50m
100m
200m
MA
NE