Attachment for Windowpane Flounder AM Alternative

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1.0 METHODS USED TO DELINEATE WP AM AREAS

The approach used to identify the Windowpane AM areas used observer data to model d/k ratios and VMS data to model fleet effort. The development of different AMs occurred in four phases:

1. Model spatial and temporal variations in windowpane and scallop catch rates and resulting d/k ratios.
2. Iteratively close portions of the study domain and reallocate displaced effort until targeted decreases in windowpane catch are accomplished.
3. Use the output from (2) to design spatial and temporal closure scenarios.
4. Test the closure scenarios to determine the predicted impact on windowpane catches and displacement of fishing effort.

1.1 MODEL SPATIAL AND TEMPORAL VARIATIONS IN WINDOWPANE D/K RATIOS

Observer data for windowpane and sea scallop catch rates (catch per haul) from 2006 – 2012 were extracted from the NEFSC OBDBS database and aggregated by gear type, year, month, and ten-minute squares (hereafter TMS). The geographic extent of the analysis was then visually cropped to the area that had sufficient density for analysis. Generalized Additive Models (GAMs) for windowpane and scallop catch rates were developed independently and different GAM model structures were compared based on AIC values. Final model structures were:

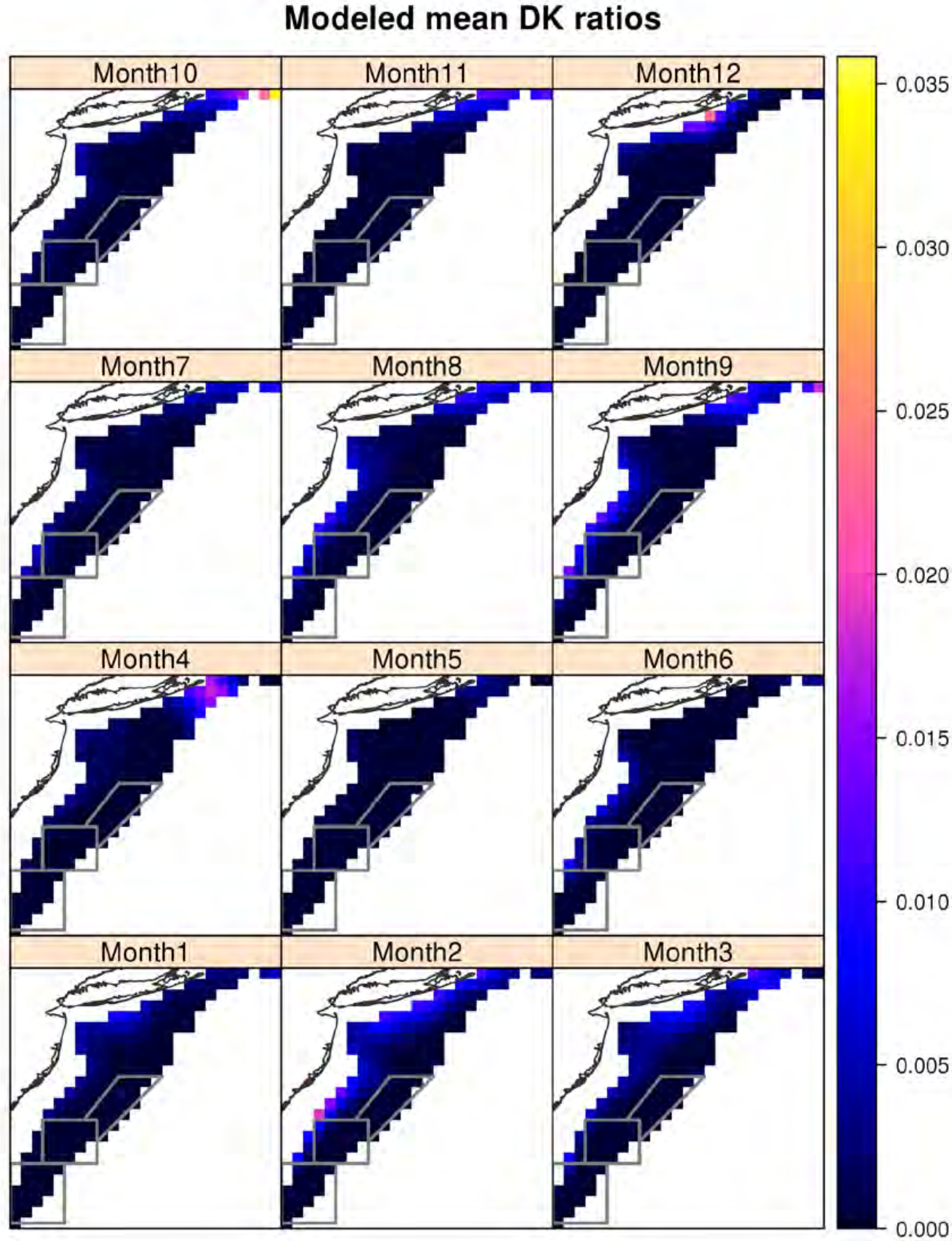
Windowpane catch rates:
sqrt(WPcpue)~s(Month, Latitude, Longitude) + factor(Year) + factor(Gear), weights=ObsEffort

Sea Scallops catch rates:
sqrt(SScpue)~s(Time, Latitude, Longitude) + factor(Gear) , weights=ObsEffort

where Month is the numeric month of the year, Year is the year observed, Time is decimal years based on the combination of Month and year, Latitude and Longitude are the coordinates of the centroid of the TMS, Gear is the gear type (dredge vs. trawl) and ObsEffort is the number of hauls observed in the TMS in a given year and month. Thus, windowpane catch rates are modeled as a consistent and repeating spatial and temporal pattern within a year with offsets for different years and gear types. Conversely, sea scallop catch rates are modeled as a spatial patterns that changes continuously throughout the time series. The PDT then used each model to predict the catch rates for all TMS in all months and years and combined model predictions to obtain spatially- and temporally-explicit d/k ratios. The PDT then calculated the median d/k ratio for each TMS and each month across all years (Figure 1).

The primary outputs for this step are summarized in Figure 1, and additional plots are in Section 2.0.

Figure 1 – Median d/k ratio for each TMS and each month across all year



1.2 ITERATIVE CLOSURE OF THE STUDY DOMAIN

The model-based windowpane and scallop catch rates were combined with total fleet effort for each TMS to estimate total catches. Fleet effort for each TMS was estimated using scallop fleet VMS data from 2006 – 2012. Because VMS data from 2006 and 2008 were incomplete (missing months) these years were not used to model the reallocation of effort. Effort for each TMS and months within years were calculated as the total number of pings (records) for each TMS and time period, given an average velocity of less than 5 knots. This process was only done for the redge fleet as there was insufficient data to re-distribute effort for the trawl gear type.

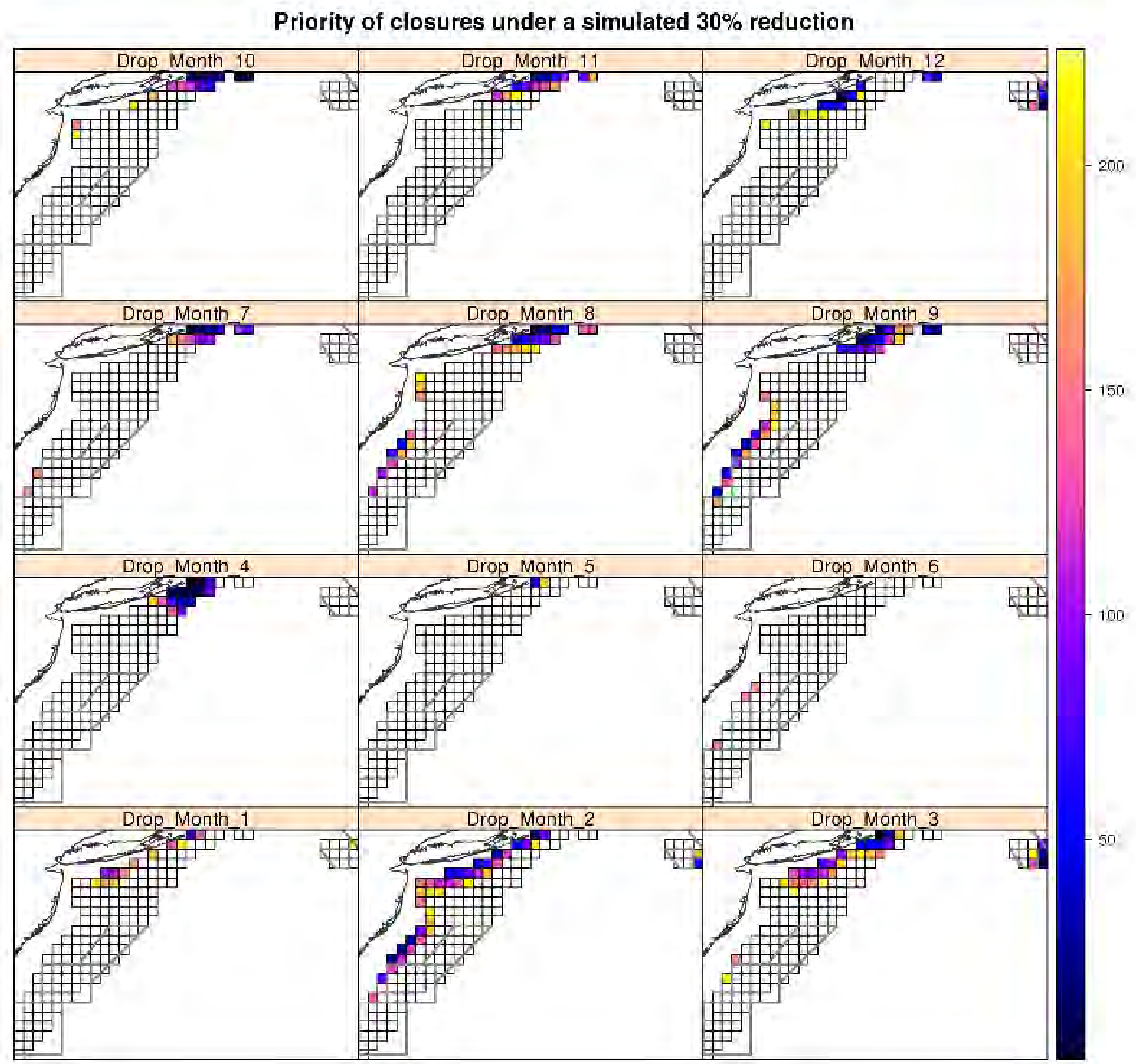
The following iterative process was then invoked:

1. Calculate a base-case total catch of windowpane across all years.
2. Declare a target reduction of windowpane catch (i.e. 10% below base-case)
3. Close the cell representing the TMS and month with the highest calculated median d/k ratio and calculate the scallop catch for that cell.
4. For each year, locate the cells adjacent to the newly closed cell.
    a. Determine which of the eight spatially adjacent cells are within the study domain and are currently open (spatial neighbors).
    b. Determine if the cells in the month prior-to or following the closed cell are open (temporal neighbors).
    c. If the total observed effort of neighbors from ‘a’ and ‘b’ is zero, expand the neighborhood to include the eight spatial neighbors of the two temporal neighbors.
5. Pro-rate the scallop catch from the closed cell across the neighbors based on the observed effort in the neighbors.
6. Based on the new scallop catches and the scallop and windowpane CPUE estimates, estimate new total catches of WP for the neighbors.
7. Estimate the total catch of WP assuming the closures and re-distribution of effort.
8. Repeat steps 3-7, drawing from the remaining open cells with the highest d/k ratios, until the target reduction has been reached.

1.2.1 Primary results related to this step

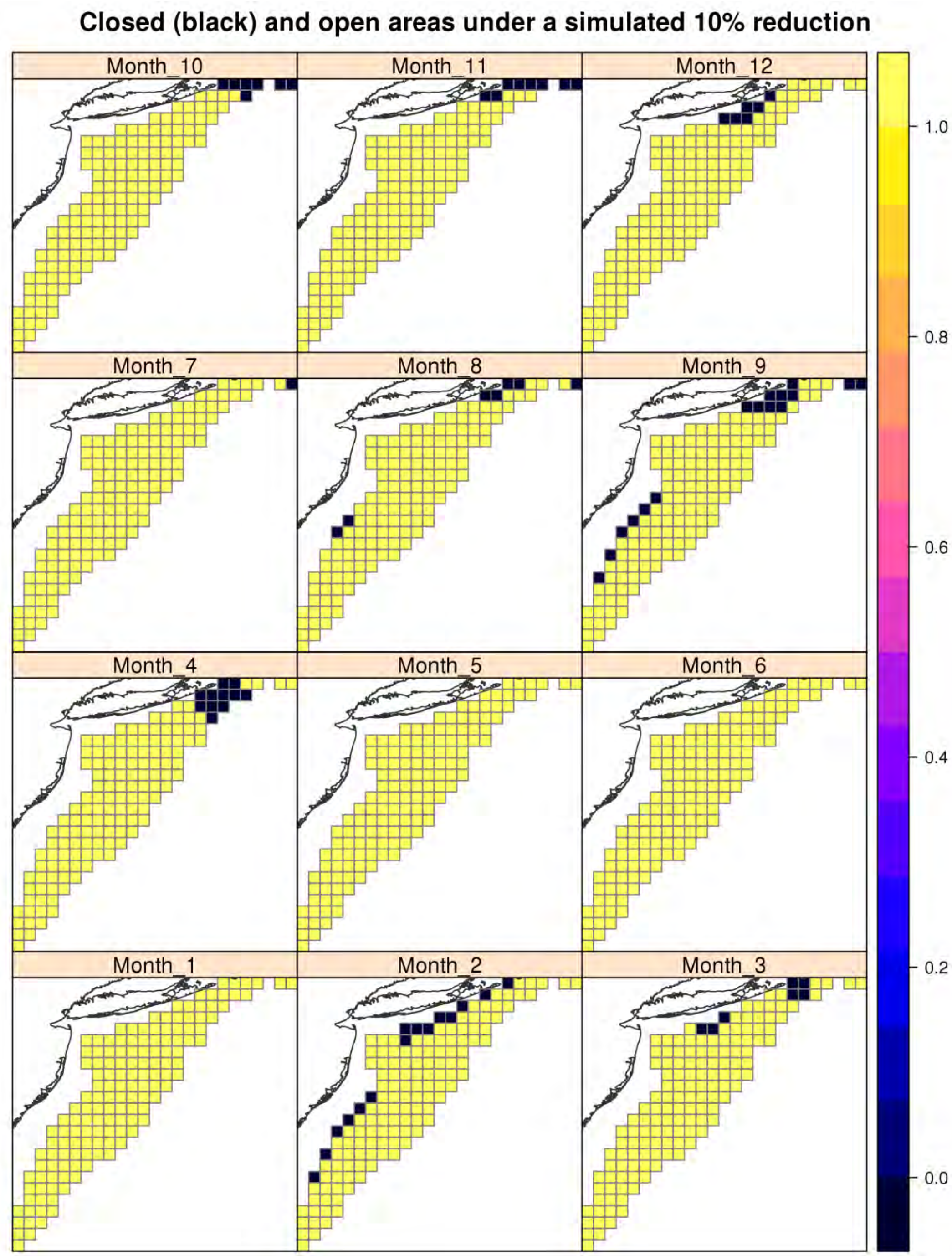
The following figures are the output of the second step of this process. The model identifies "priority" TMS with higher d/k ratios by month. The darker colors are the TMS that would have the highest d/k ratios and would be recommended for closure first. The PDT evaluated several different target reduction plots, but the highest (30% reduction) is shown below as an example. The units are in terms of TMS cells needed to attain the target reduction; for example, about 200 TMS cells would be needed to attain an overall 30% reduction for the year.

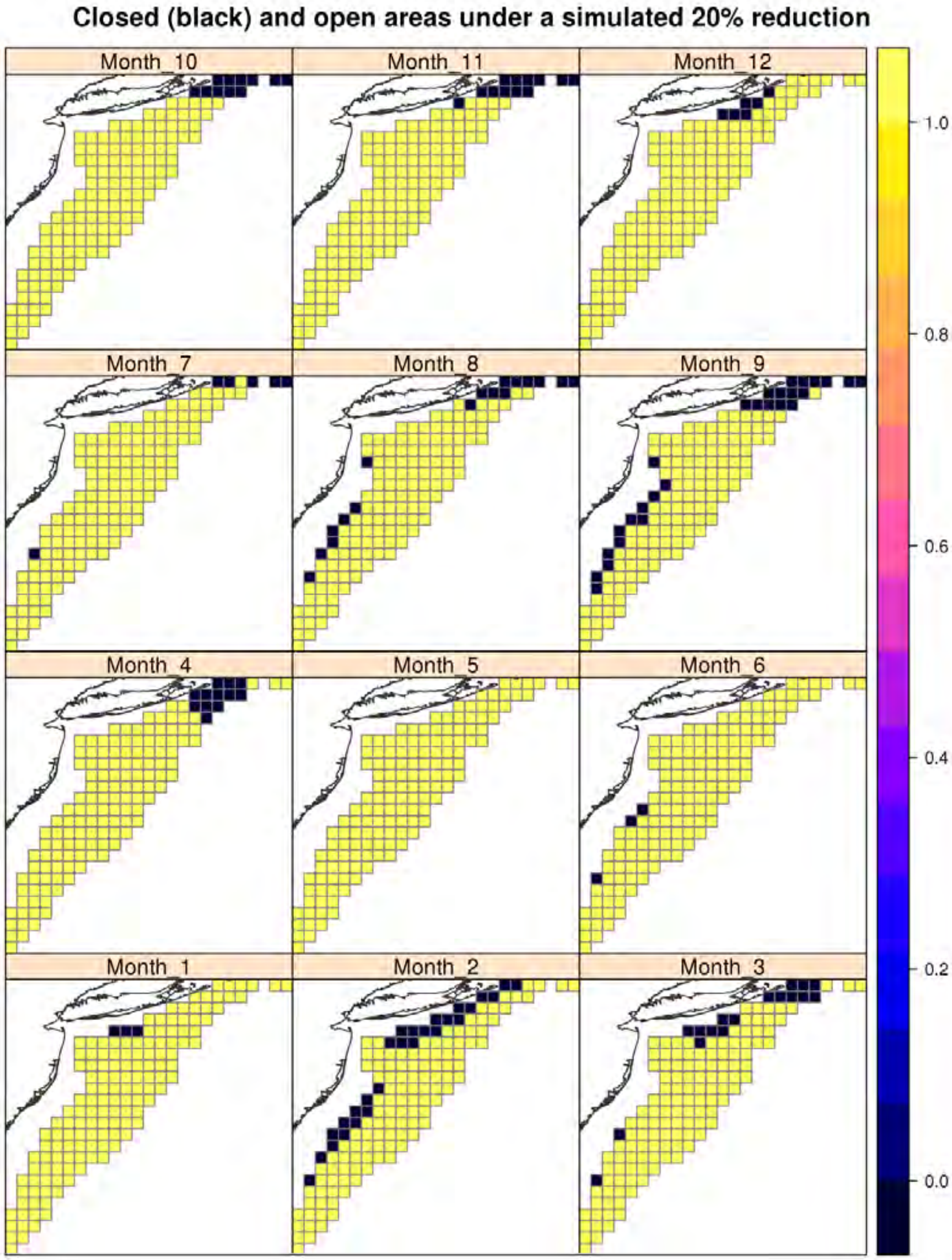
Figure 2 – Priority TMS for a target reduction of 30%



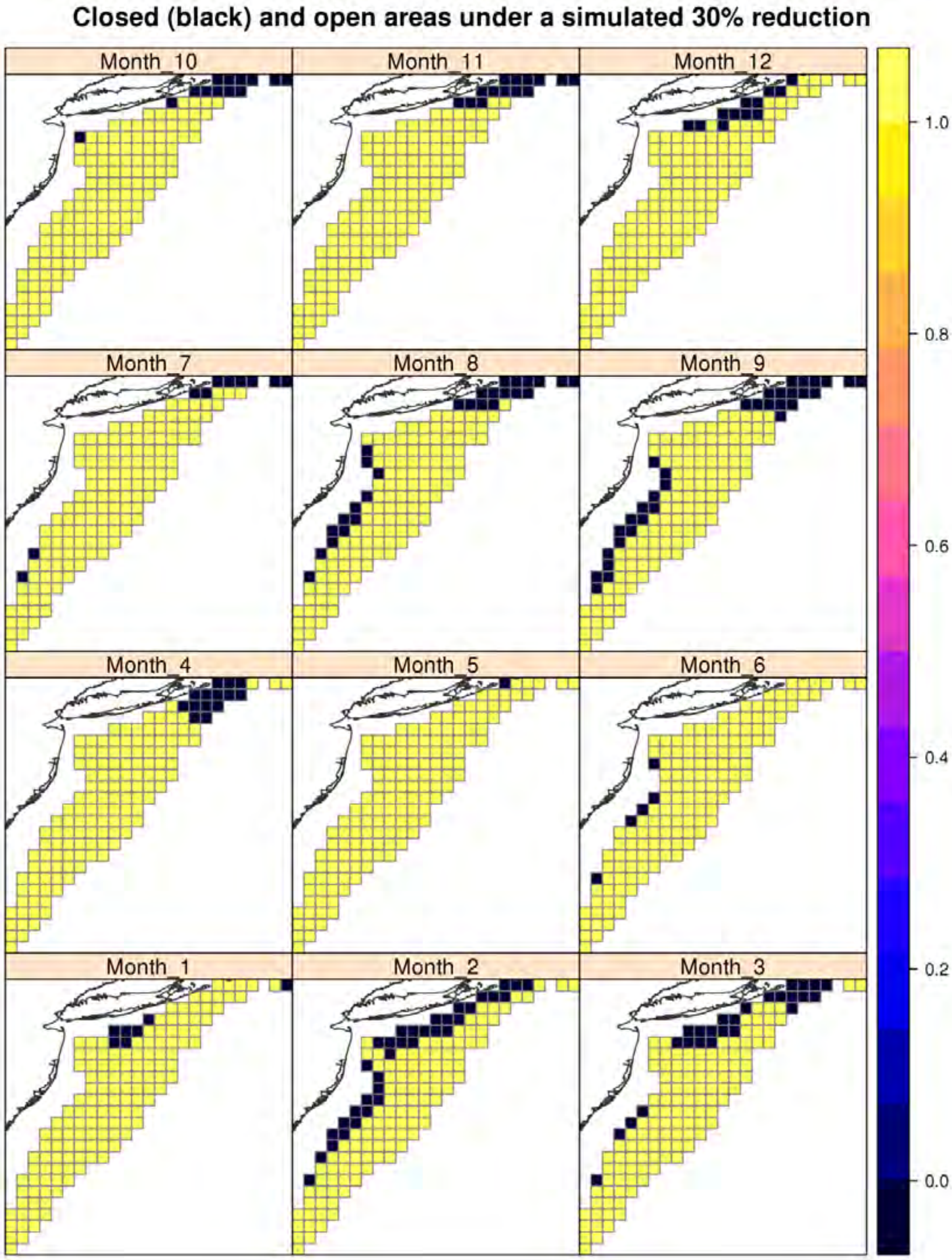
The following figures are the next step within the second phase of this process. The model identified certain TMS to close in order to attain a target reduction of WP catch (10%, 20% and 30%). The PDT used these outputs and further modified them in the section below.

Figure 3 – Model generated closures to attain a target reduction of WP catch





Closed (black) and open areas under a simulated 20% reduction
Month_10
Month_11
Month_12
Month_7
Month_8
Month_9
Month_4
Month_5
Month_6
Month_1
Month_2
Month_3
1.0
0.8
0.6
0.4
0.2
0.0


Closed (black) and open areas under a simulated 30% reduction
Month_10
Month_11
Month_12
Month_7
Month_8
Month_9
Month_4
Month_5
Month_6
Month_1
Month_2
Month_3
1.0
0.8
0.6
0.4
0.2
0.0

1.3 USE OF THE ITERATION MODEL OUTPUT TO DESIGN SPATIAL AND TEMPORAL CLOSURE SCENARIOS.

The PDT modified the closures identified by the iteration model to produce spatial and temporal closure scenarios. The raw model output consists of collections of cells that are often scattered spatially or temporally and thus, are not viable for implementation or enforcement. The PDT modified both the spatial extent and temporal extent of the closures to produce spatially-and temporally-contiguous closed areas and offset the impacts of the closures across the fleet.

The primary sources of information used to develop the final range of candidate AM areas are:

1) the “priority” TMS areas with the highest d/k rates (Figure 2);

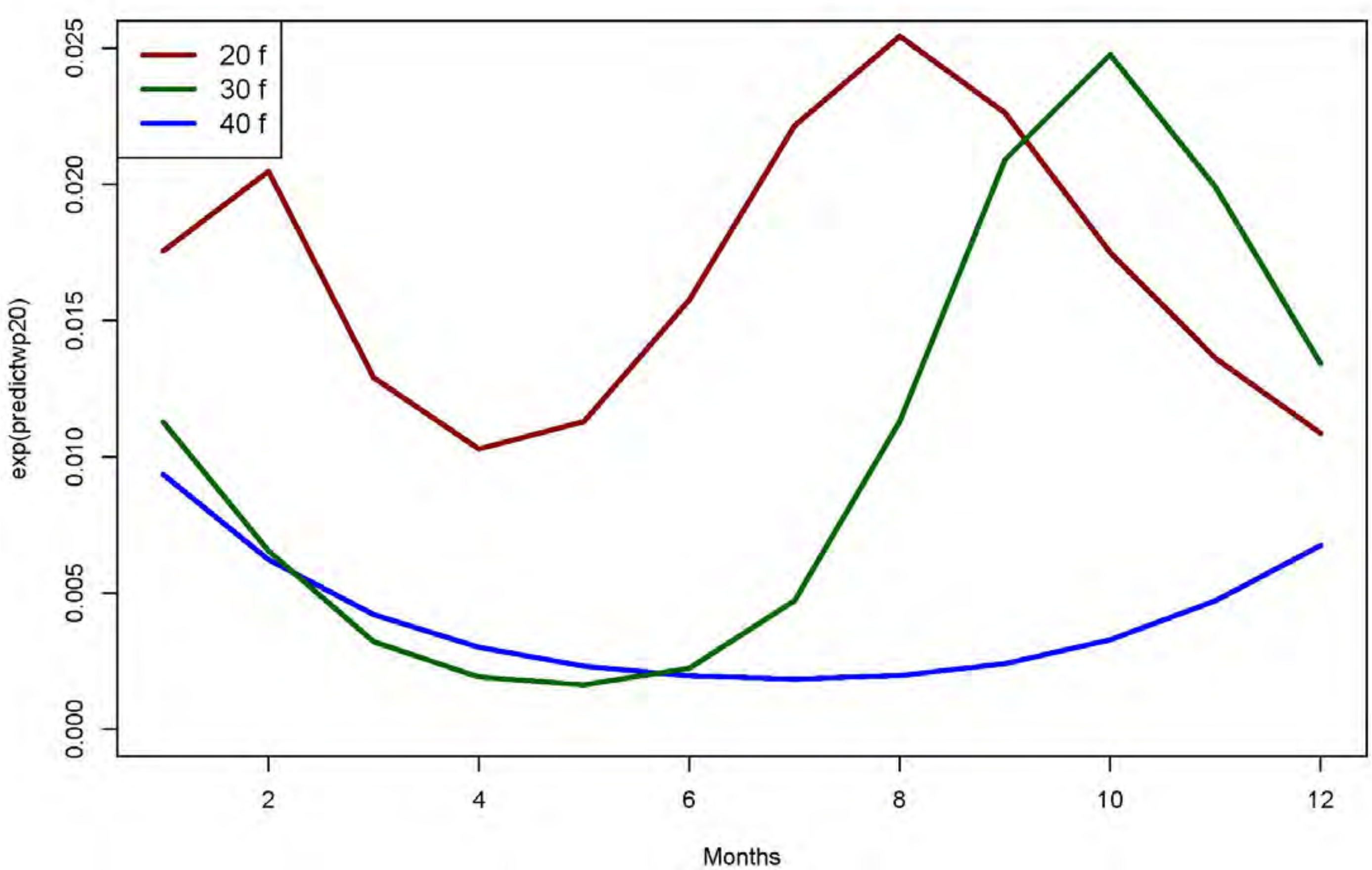
2) the model generated closure TMS scenarios (Figure 3);

3) a separate GAM model that was developed that predicts bycatch by month and depth to identify the appropriate seasons (described below **Figure 4**); and

4) VTR effort location for LA and LAGC vessels (described below **Figure 5**).

A separate GAM model was developed that predicts bycatch by month and depth using all observed scallop trips from 1999-2011. Analyses were broken out by depth as well as month. During most months, bycatch is highest at 20 fathoms (**Figure 4**). However, during the fall, bycatch seems to be higher at 30 fathoms. Based on these results the PDT supports potential adoption of a season for either an area closure of gear restricted AM for windowpane, in late summer/fall. Therefore, the PDT used this information as well as the outputs in **Figure 4** to identify the seasons associated with the various AM areas developed.

Figure 4 – Predicted WP d/k ratios by month and depth (GAM model results from 1999-2011 scallop fishery observer data)

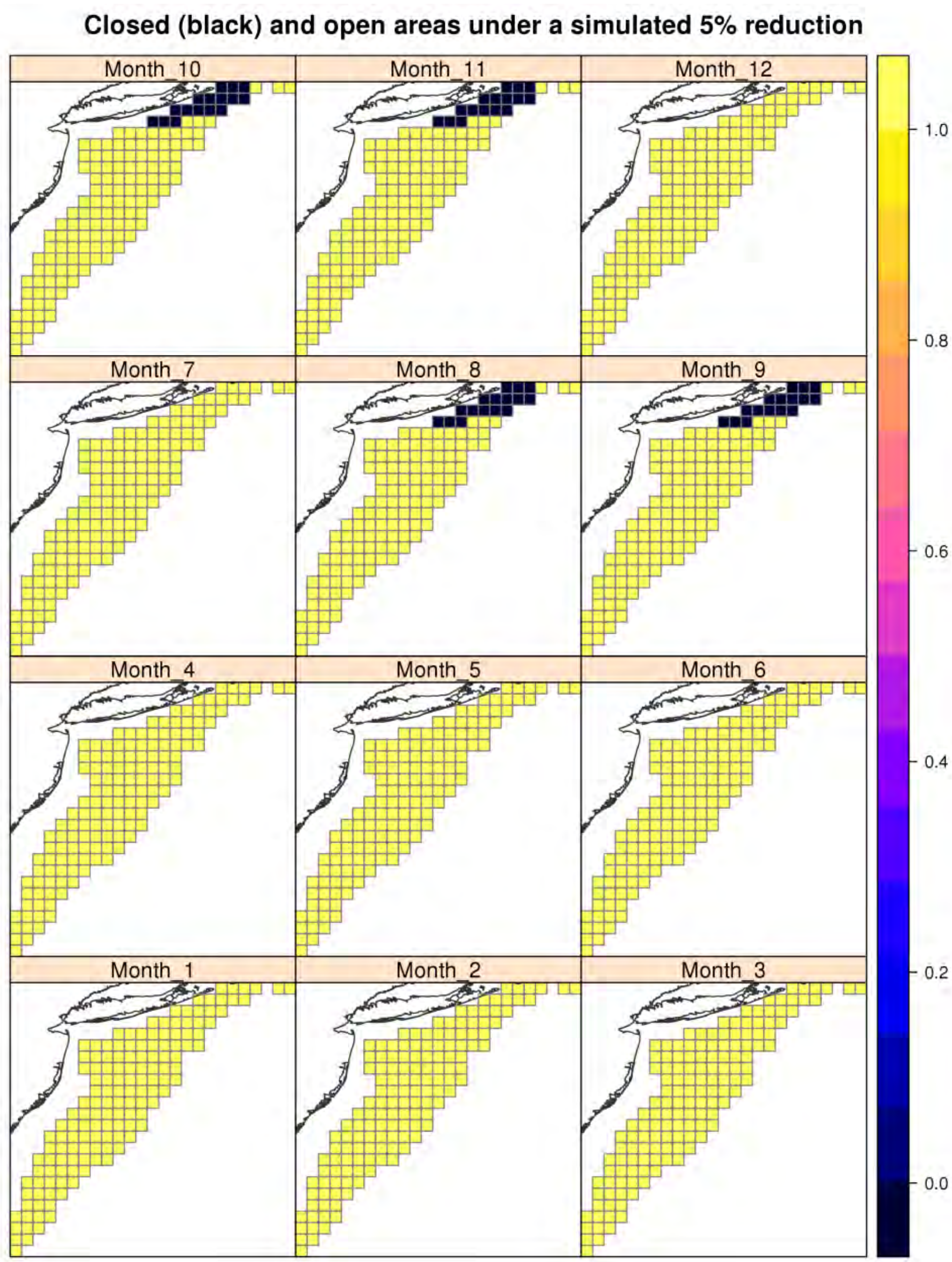


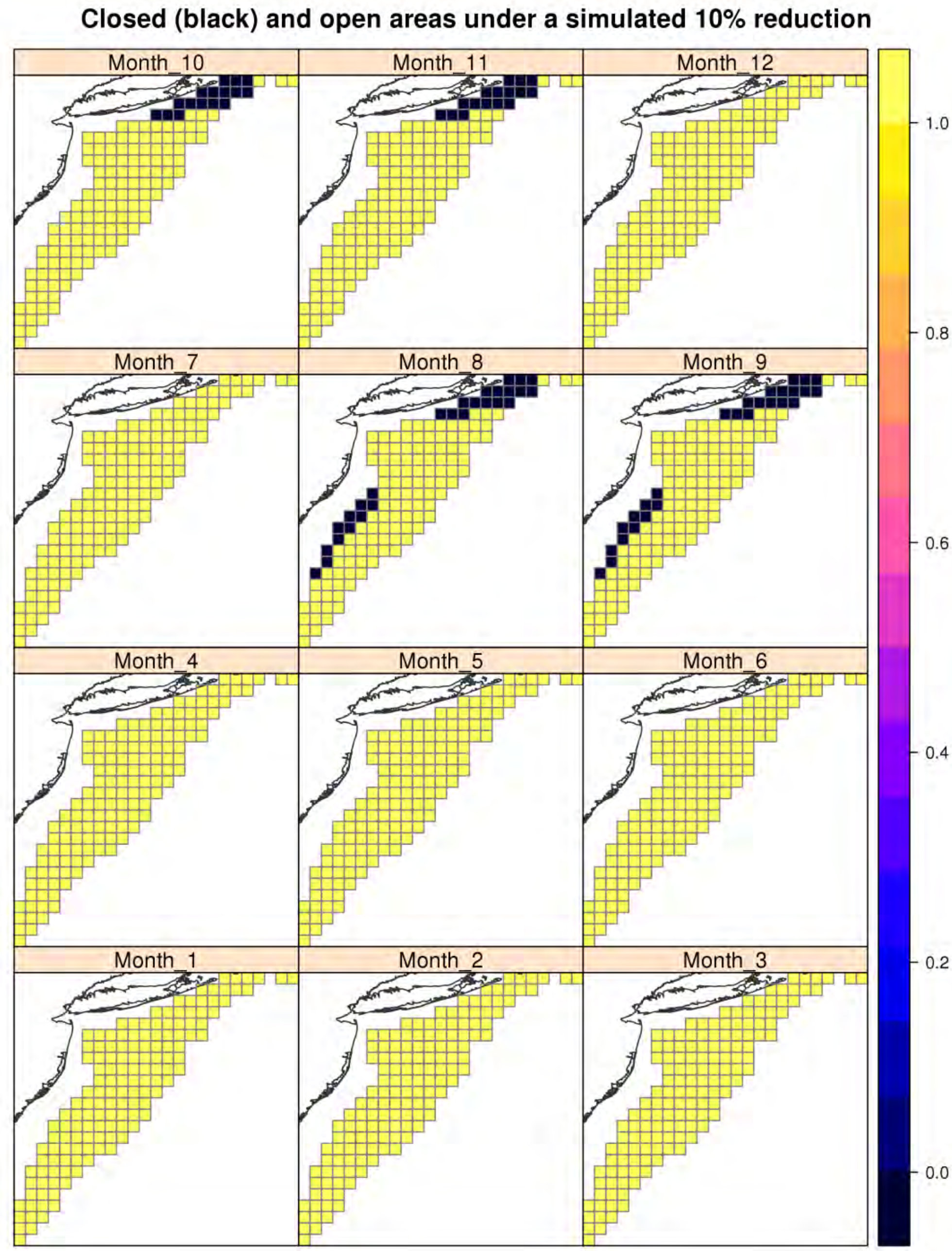
Finally, the PDT did use VTR fishing location information to further refine AM areas. Areas with higher concentrations of effort were avoided. In the end, several areas were developed that encompassed as many of the higher WP bycatch cells, constrained by seasons with higher bycatch rates, and avoiding as many primary fishing locations as possible.

Figure 5 – Scallop fishing effort location based on VTR data 2008-2012 (trips under 600 pounds are in red and trips over 600 pounds in blue)

First the PDT used the TMS grids to delineate the boundaries of the AM areas. The figures below represent areas that would generate 5%, 10% and over 20% reductions (Figure 6). The PDT had a conference call on January 6 and decided to turn these areas into more regularly shaped polygons (Figure 7).

Figure 6 – Initial scenarios for 5%, 10% and 20%





Closed (black) and open areas under a simulated 10% reduction
Month_10
Month_11
Month_12
Month_7
Month_8
Month_9
Month_4
Month_5
Month_6
Month_1
Month_2
Month_3
1.0
0.8
0.6
0.4
0.2
0.0

Closed (black) and open areas under a simulated 20% reduction

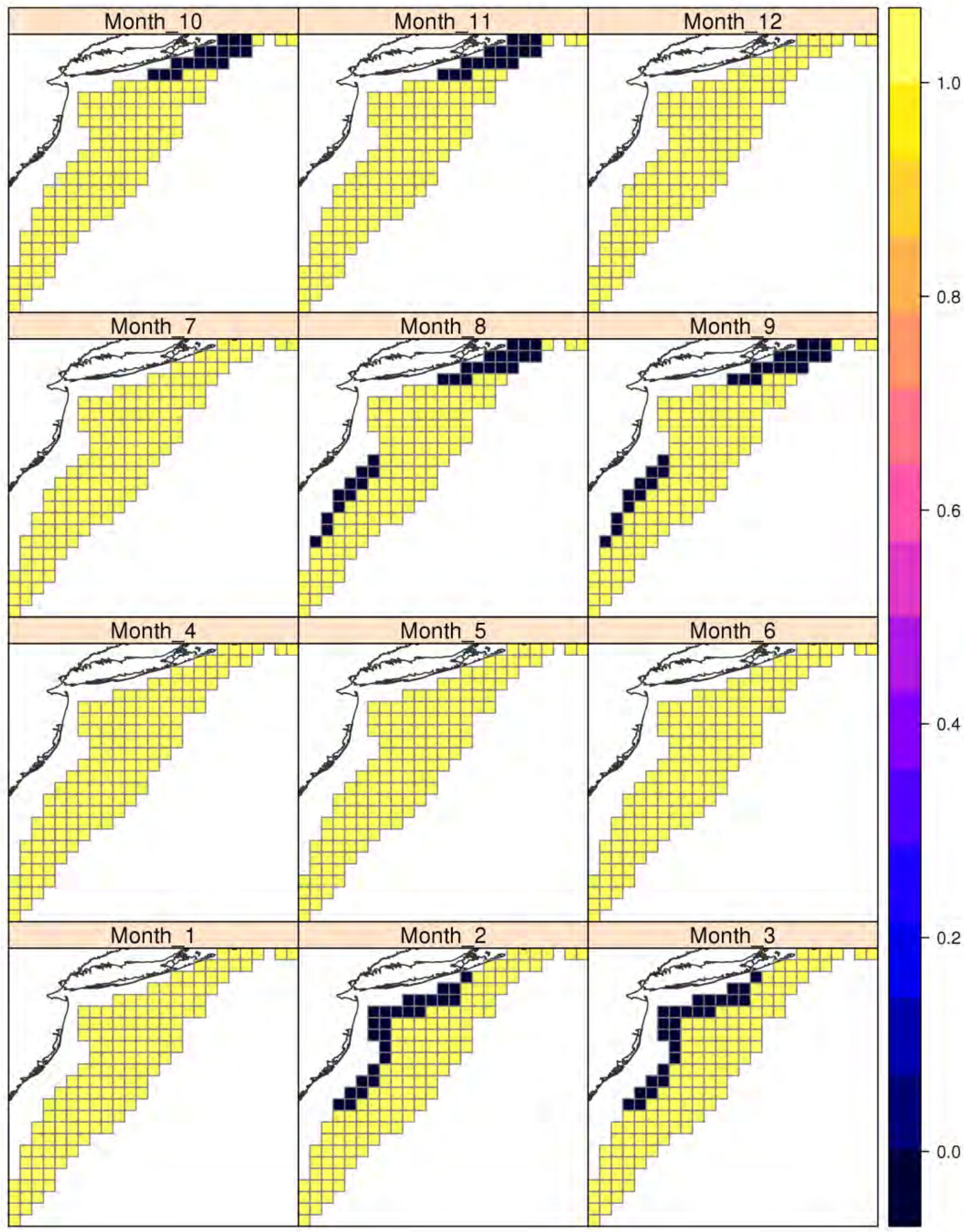


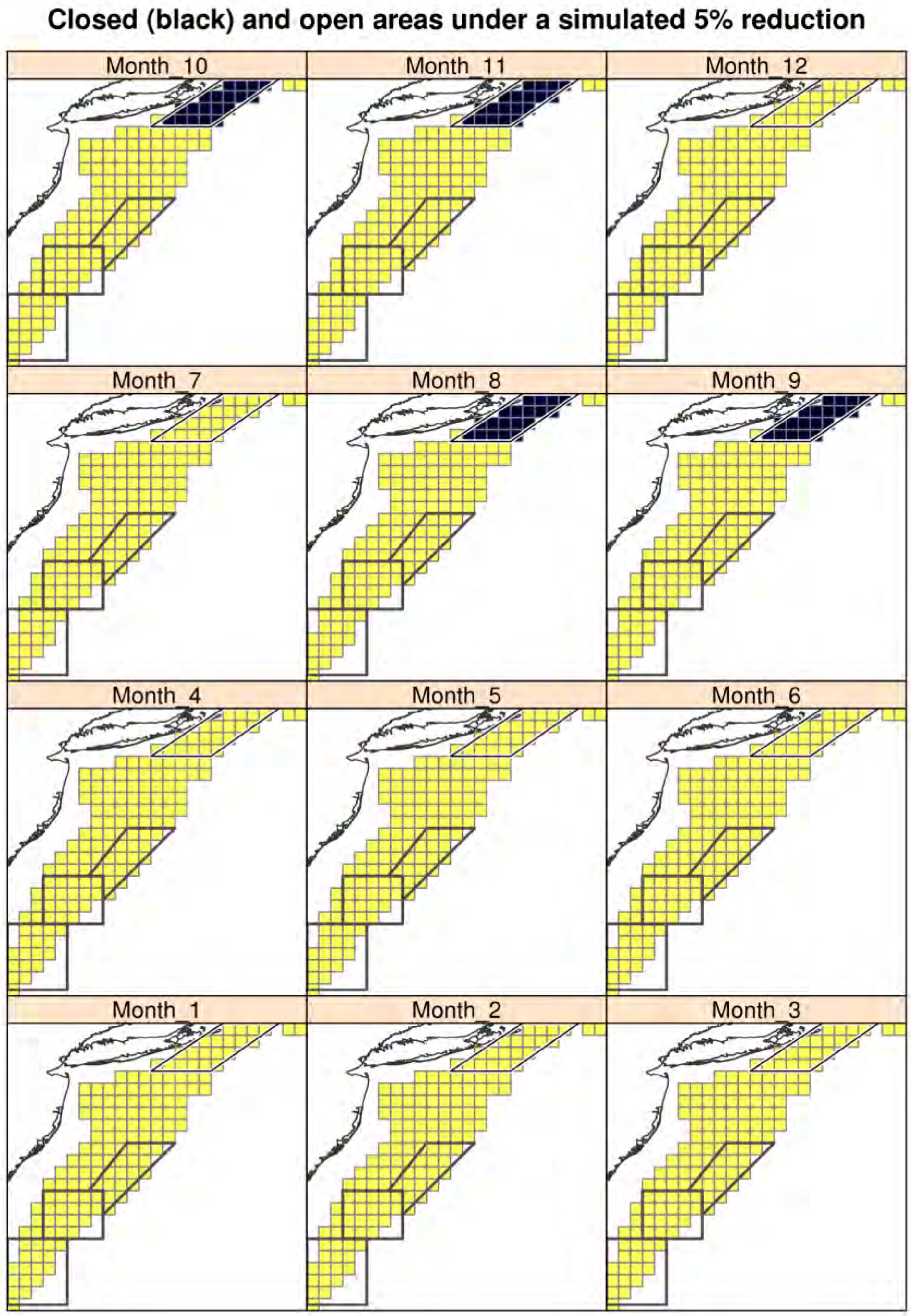
Figure 7 – WP AM area alternatives

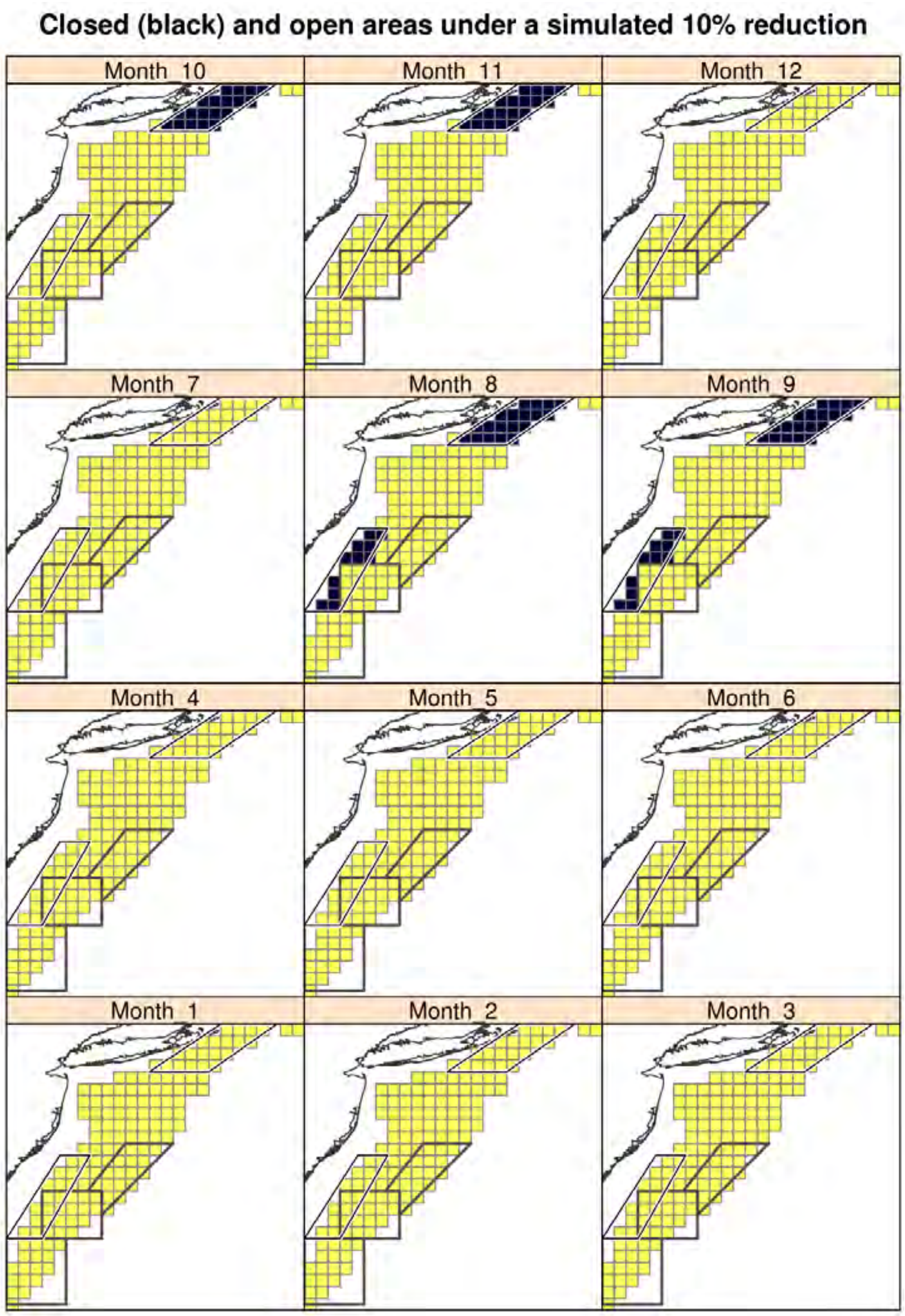
1.4 TEST THE MODIFIED CLOSURE SCENARIOS

Finally, the PDT tested each closure scenario by feeding the spatial- and temporal-extent of the closure back into the iterative model and closing individual cells, in order of highest median d/k ratios, until all the cells for the closure had been implemented. The PDT then examined if the model-based windowpane reduction was similar to the original target reduction and how the reduction varied across years. The PDT further examined the displacement of fishing effort based on the VMS declaration codes, broken down by vessel type (Limited Access or General Category) and declared fishing area (open access or access area).

Based on the final polygons developed by the PDT updated runs were completed using the final area boundaries to estimate % of WP reduced and % of scallop effort displaced. These data are binned by TMS, so if the center of a TMS fell in the boundary of the final polygon AM areas, the data for the entire TMS were included in the results. Figure below shows the cells used in the results and Table summarizes the estimates of WP reduction and % of effort displaced by the various scenarios.

Figure 8 – TMS cells associated with the final polygon layers for each of the AM scenarios




Closed (black) and open areas under a simulated 10% reduction
Month 10
Month 11
Month 12
Month 7
Month 8
Month 9
Month 4
Month 5
Month 6
Month 1
Month 2
Month 3

Closed (black) and open areas under a simulated 20% reduction

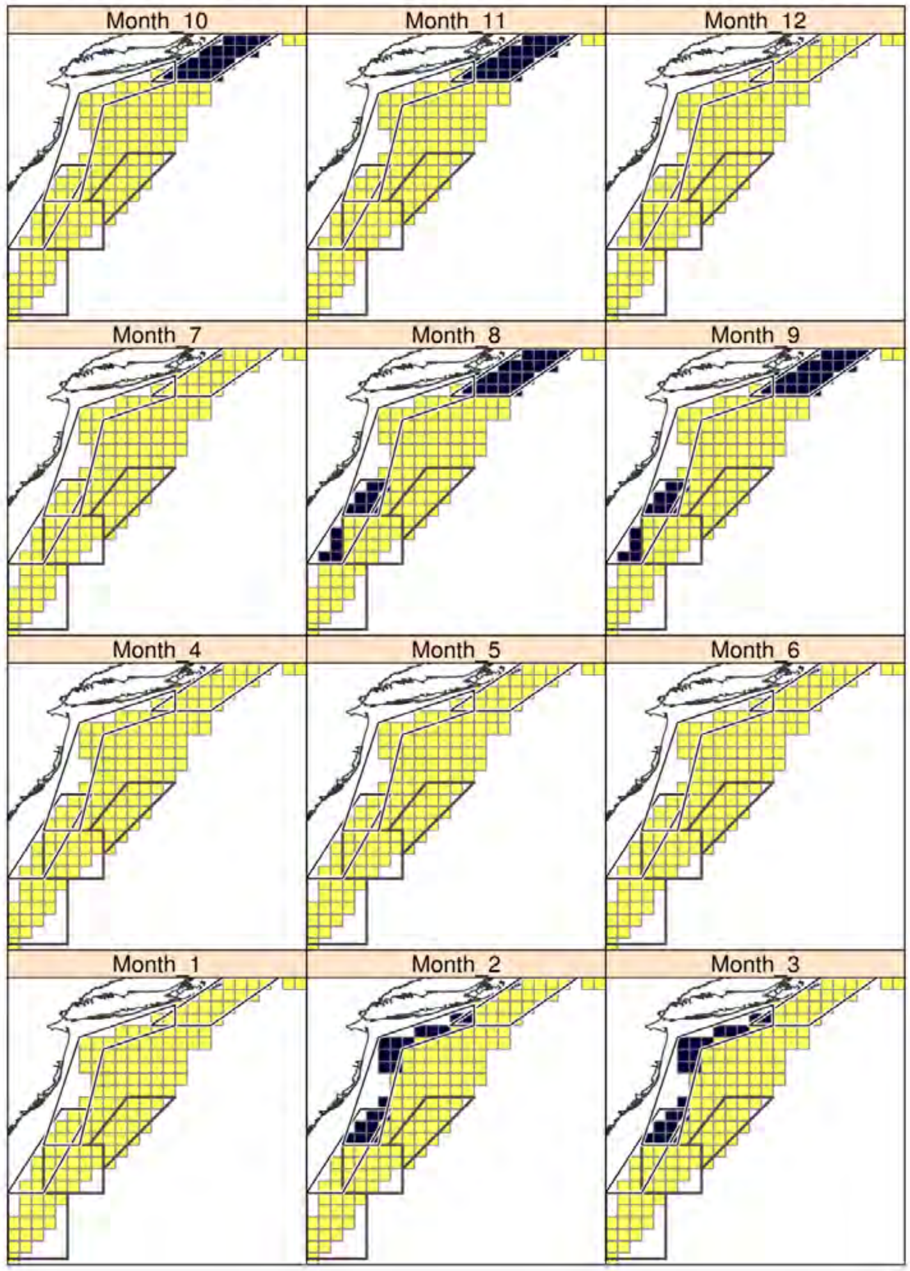


Table 1 – Summary of estimated WP reduction and % of scallop fishery effort displaced by the three AM alternative areas

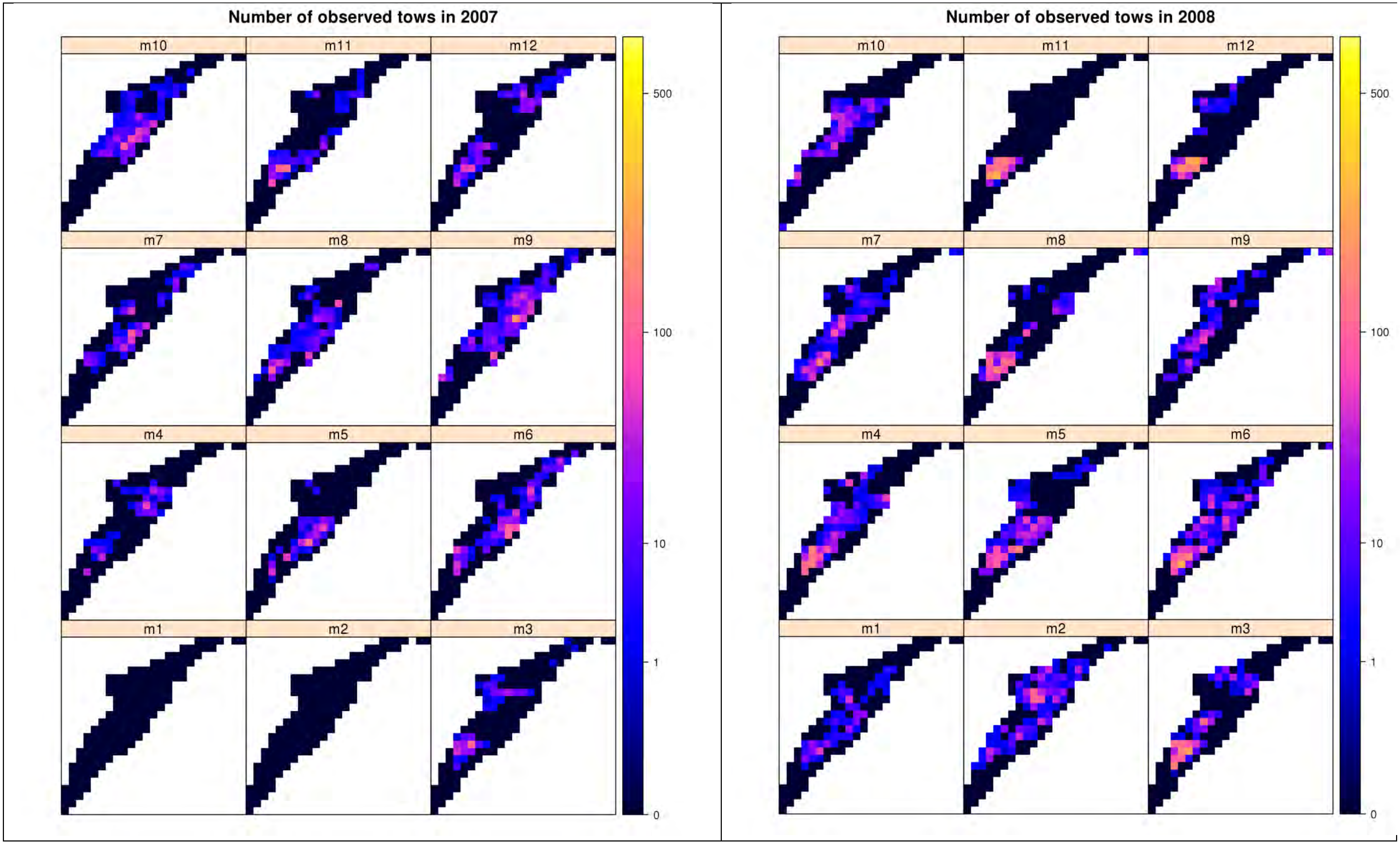
				Effort displacement							
5% Scenario		WP Catch									
	Year	Reduction		LA_Open	LAGC_AA	LAGC_Open	LAGC_UnClass	RSA_AA	RSA_Open	RSA_UnClass	SAA_AA
	2007	1.6%		4.0%	0.3%	0.0%	6.4%	0.0%	0.0%	0.0%	0.0%
	2008	0.1%		0.6%	0.0%	6.5%	0.0%	1.7%	0.1%	0.0%	0.7%
	2009	1.1%		0.6%	0.0%	2.2%	0.0%	0.3%	0.0%	0.0%	0.0%
	2010	19.9%		4.7%	0.0%	7.7%	0.0%	0.0%	30.3%	0.0%	0.0%
	2011	3.1%		1.0%	0.0%	11.7%	0.0%	0.0%	47.0%	0.0%	0.0%
	2012	1.6%		2.0%	0.0%	4.1%	0.0%	12.5%	35.7%	0.0%	0.1%
	mean	4.6%		2.1%	0.1%	5.4%	1.1%	2.4%	18.9%	0.0%	0.1%
10% Scenario											
	Year	Reduction		LA_Open	LAGC_AA	LAGC_Open	LAGC_UnClass	RSA_AA	RSA_Open	RSA_UnClass	SAA_AA
	2007	27.4%		5.6%	0.6%	0.0%	12.5%	0.0%	0.0%	0.0%	0.0%
	2008	3.3%		1.6%	0.0%	14.3%	0.0%	1.7%	0.1%	0.0%	0.7%
	2009	8.1%		2.8%	0.0%	4.0%	0.0%	0.3%	0.0%	0.0%	0.0%
	2010	20.1%		5.0%	0.0%	10.5%	0.0%	1.0%	30.3%	0.0%	0.0%
	2011	3.1%		1.0%	0.2%	12.1%	0.0%	0.0%	47.0%	0.0%	0.0%
	2012	1.7%		2.1%	0.0%	5.6%	0.0%	12.5%	35.7%	0.0%	0.1%
	mean	10.6%		3.0%	0.1%	7.8%	2.1%	2.6%	18.9%	0.0%	0.2%
20% Scenario											
	Year	Reduction		LA_Open	LAGC_AA	LAGC_Open	LAGC_UnClass	RSA_AA	RSA_Open	RSA_UnClass	SAA_AA
	2007	28.2%		6.1%	2.1%	0.0%	14.9%	0.0%	0.0%	0.0%	0.0%
	2008	6.1%		5.7%	1.7%	14.3%	8.4%	1.7%	0.9%	0.0%	0.7%
	2009	14.0%		4.4%	0.4%	5.4%	0.0%	0.3%	0.0%	0.0%	0.1%
	2010	31.8%		6.8%	0.0%	11.0%	0.0%	1.0%	30.3%	0.0%	0.0%
	2011	9.1%		6.0%	0.3%	17.3%	0.0%	0.0%	47.0%	0.0%	0.1%
	2012	7.8%		4.3%	0.1%	7.9%	0.0%	12.5%	36.4%	0.0%	0.1%
	mean	16.2%		5.6%	0.8%	9.3%	3.9%	2.6%	19.1%	0.0%	0.2%

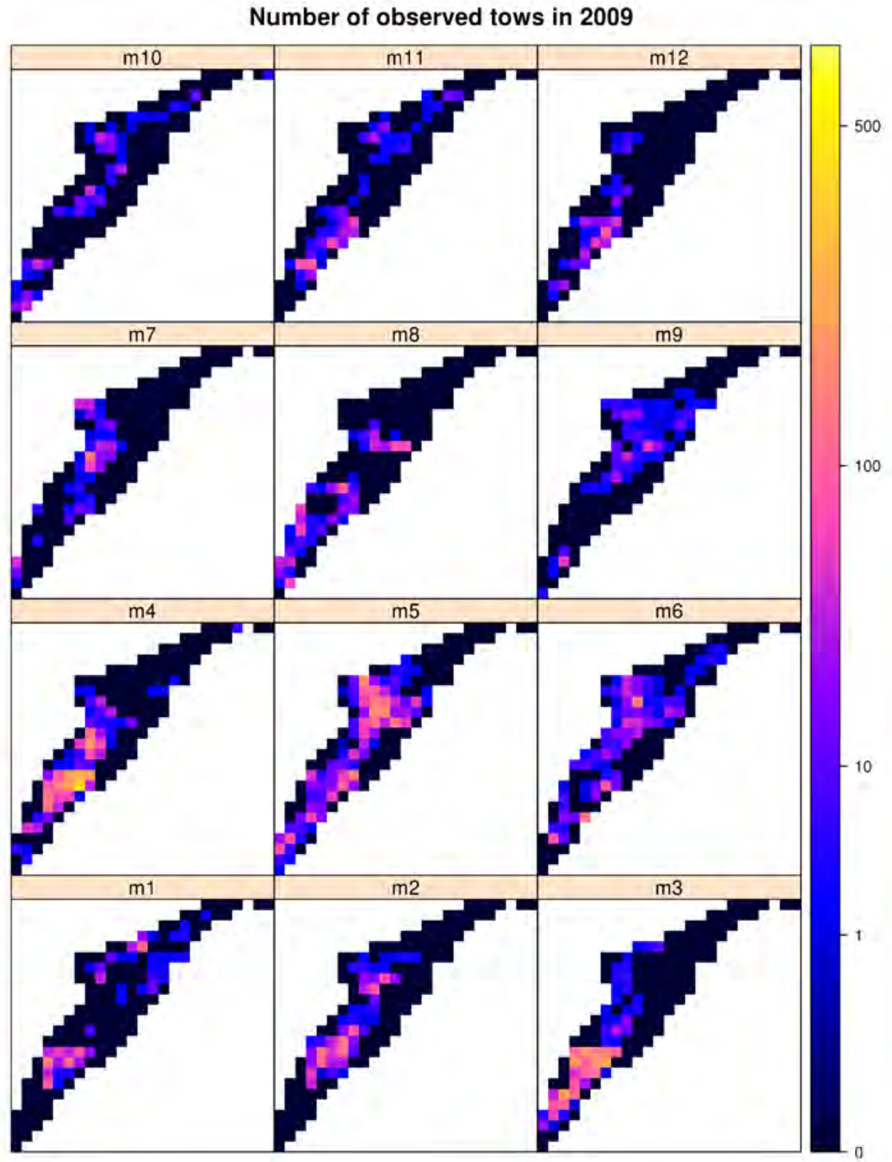
2.0 DETAILED RESULTS RELATED TO THE MODEL FOR SPATIAL AND TEMPORAL VARIATIONS IN WINDOWPANE D/K RATIOS

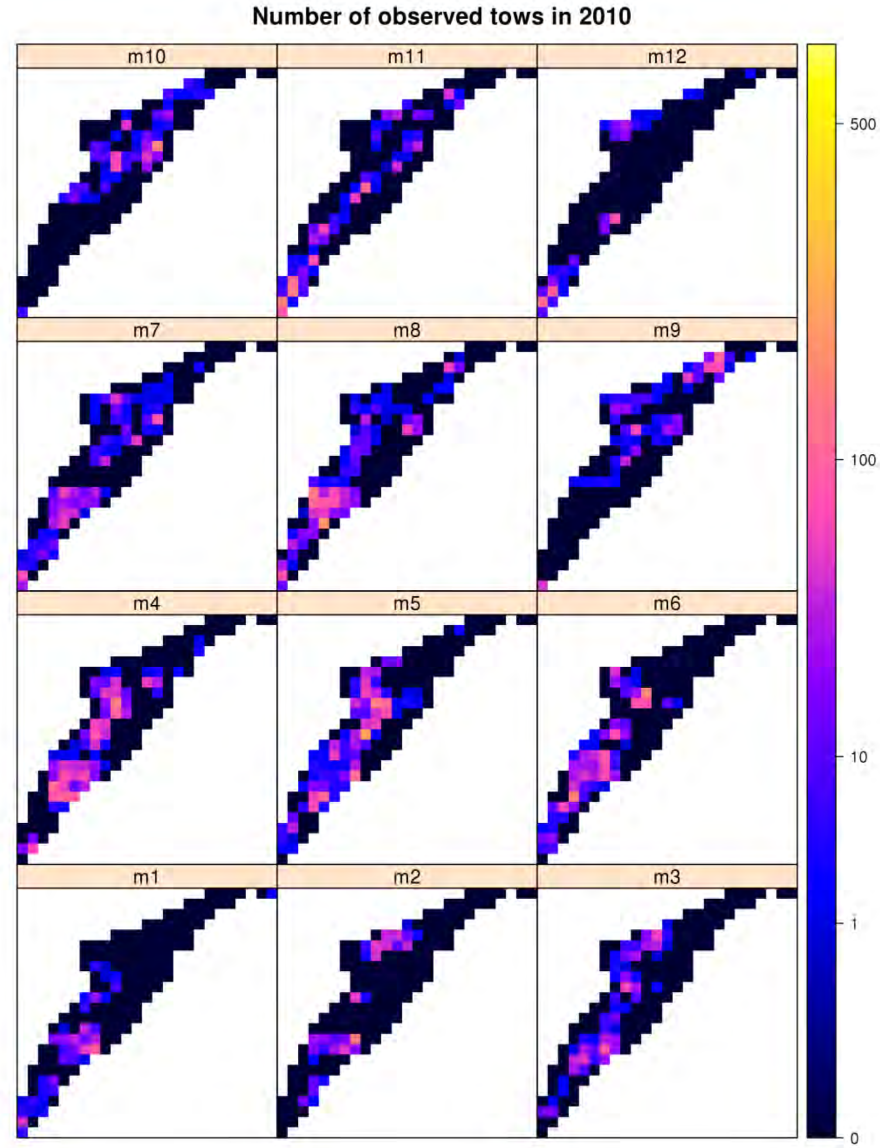
This section includes the plots for the phases involved in the first step of this process: modelling spatial and temporal variations in WP d/k ratios. The final product from this step is a mean d/k ratio per TMS (Figure 1). In order to get to that step there is a number of analyses that were completed and this section includes the outputs for the major stages. Specifically, the number of observed tows per TMS, modeled WP and sea scallop catch rates per TMS, and the resulting modeled d/k ratios. In addition, an overall histogram of all d/k ratios from the observer database were plotted (Figure 14). The vast majority of d/k ratios per tow is less than 0.001.

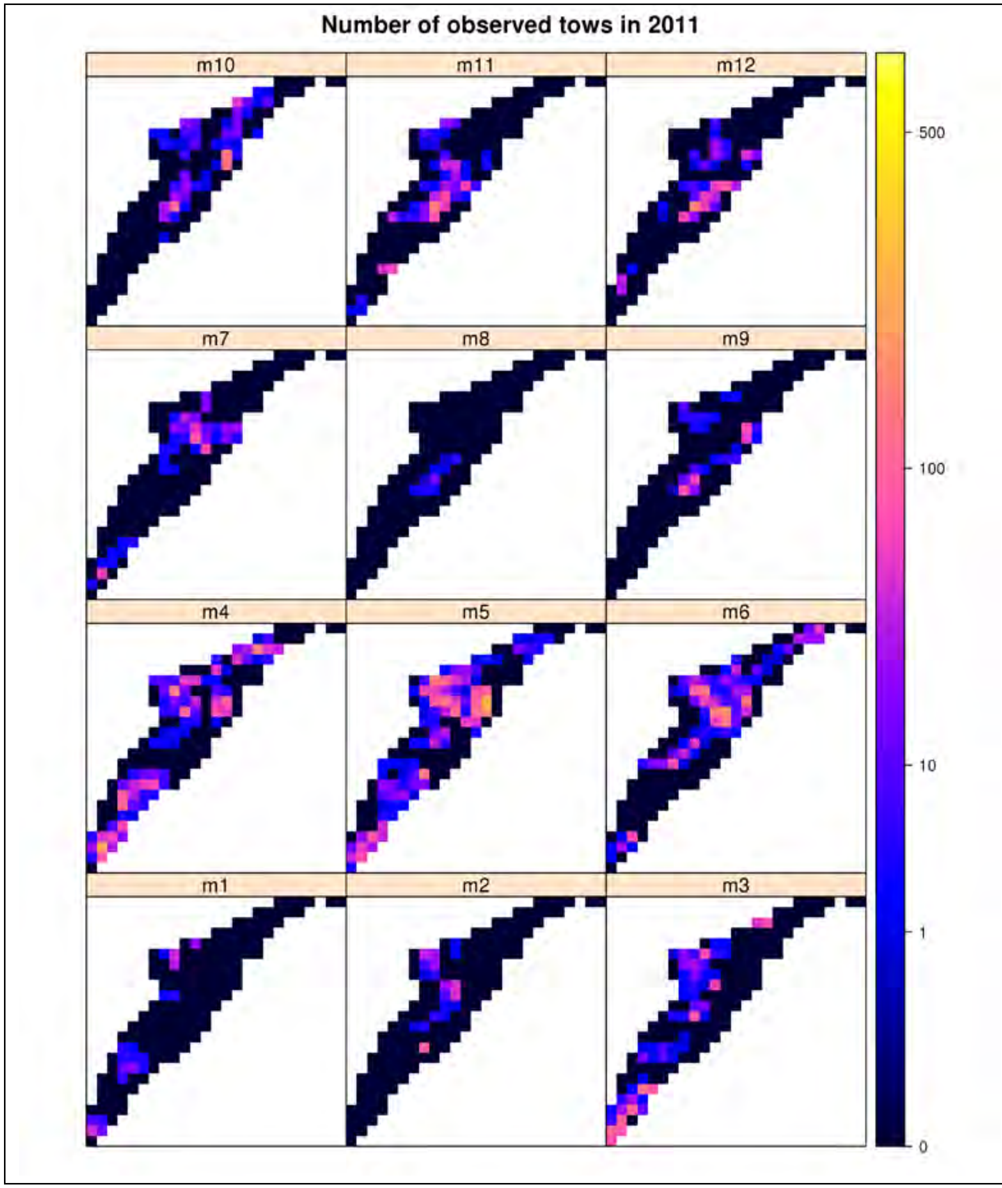
The PDT also include maps of fishing effort, based on VMS coverage, that were used for reallocating effort in the second phase of the process (Section 1.2).

Figure 9 – Number of observed tows per TMS with WP catch by month and year

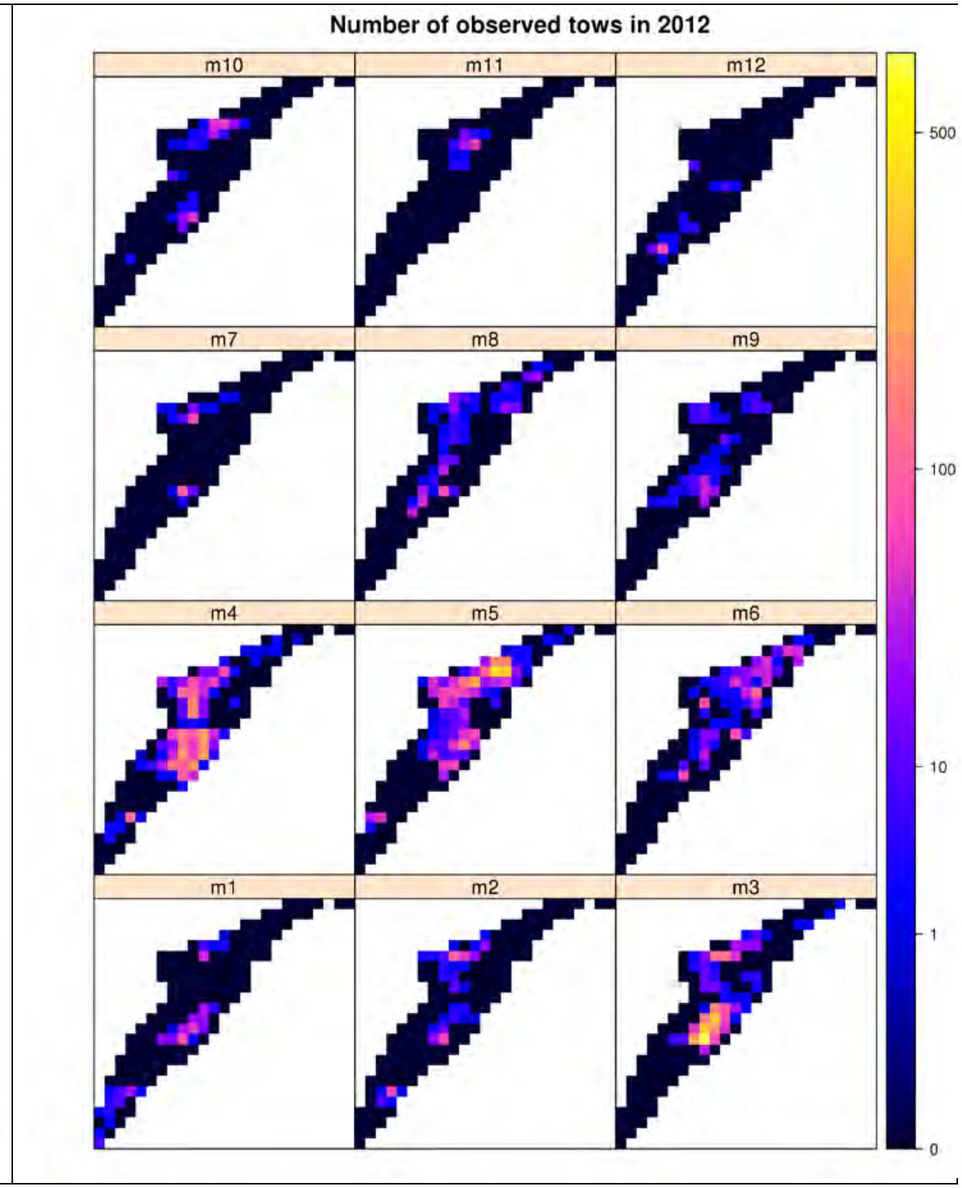



Number of observed tows in 2009
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
500
100
10
1
0


Number of observed tows in 2010
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
500
100
10
1
0

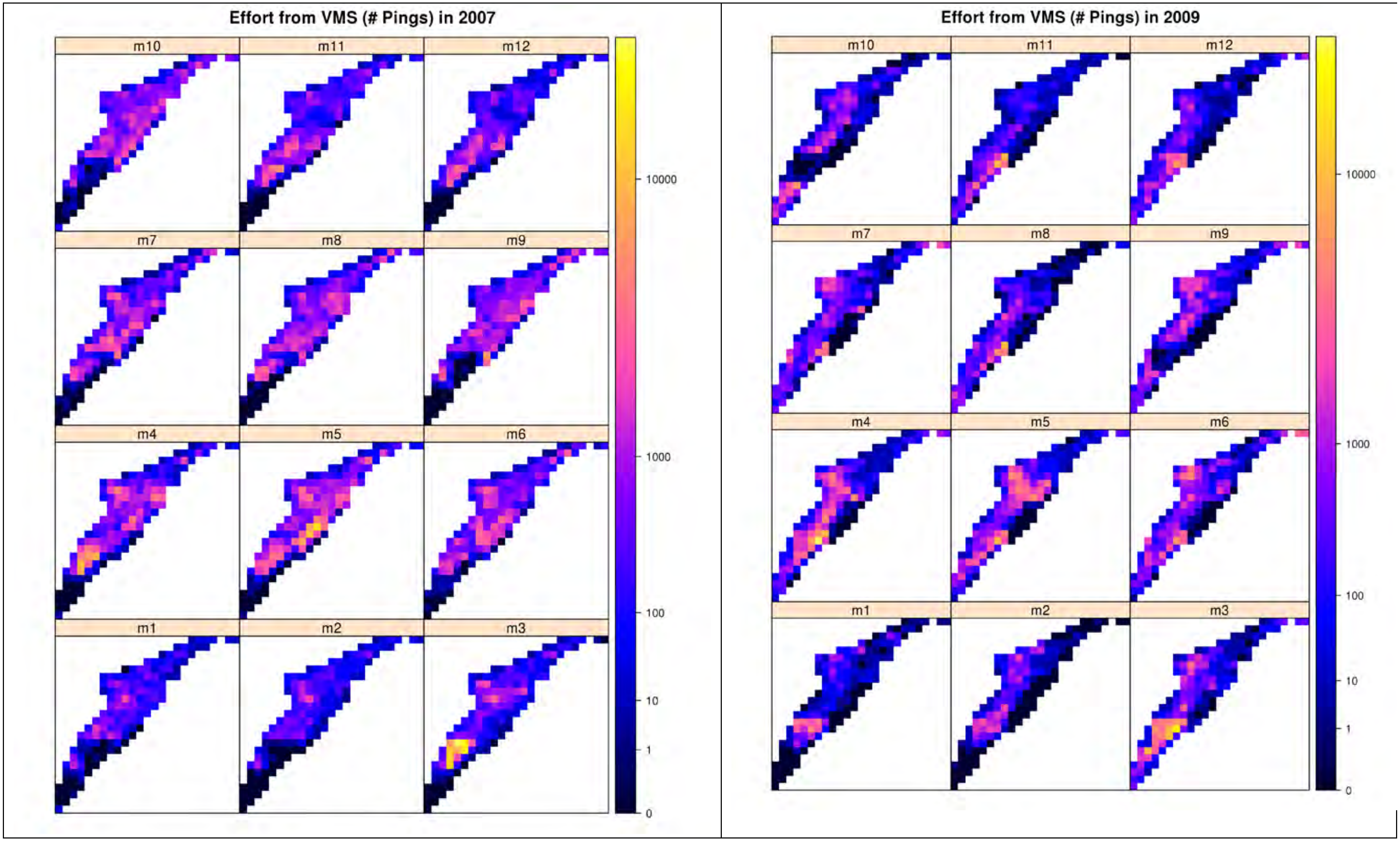


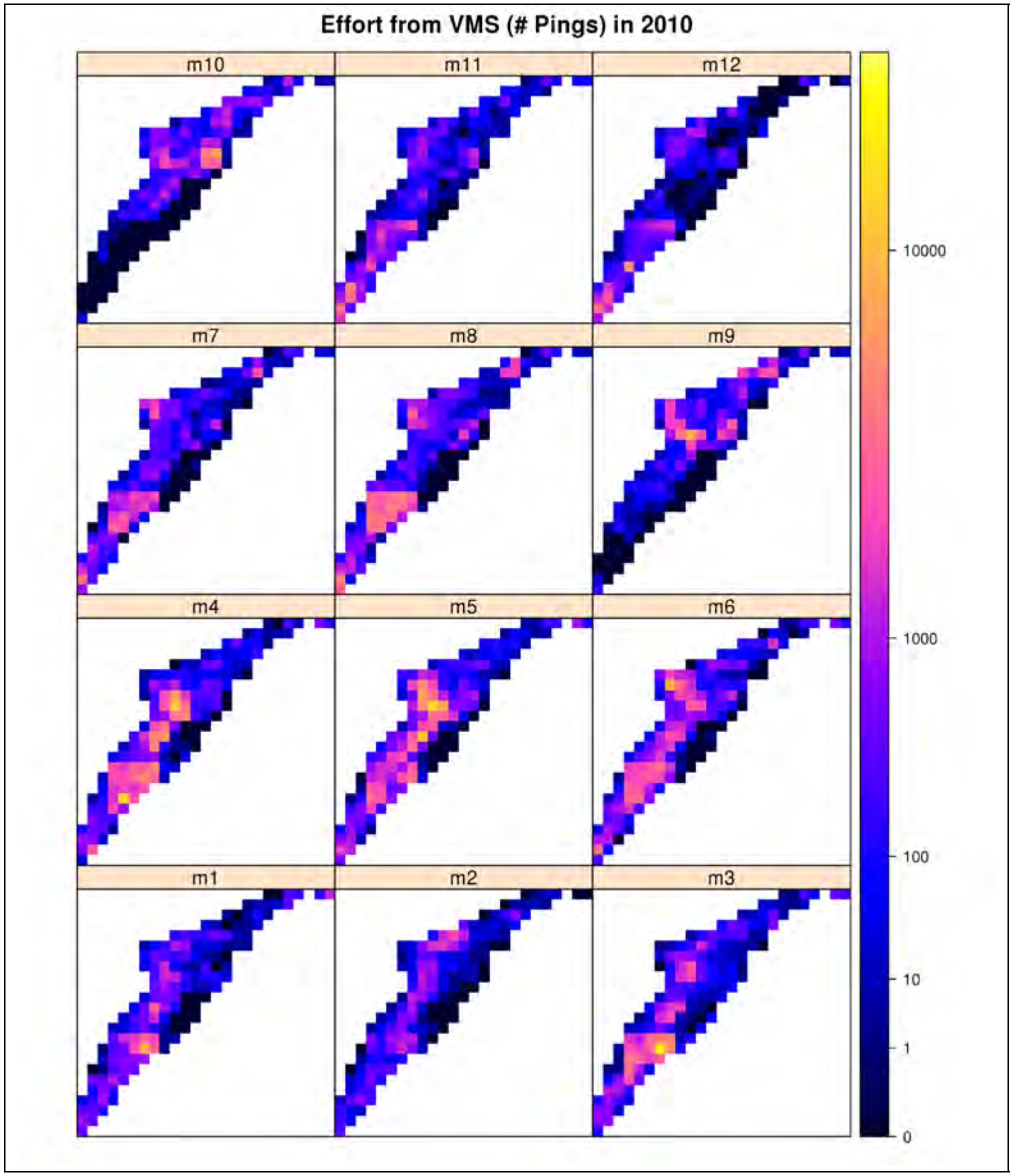
Number of observed tows in 2011
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
500
100
10
1
0

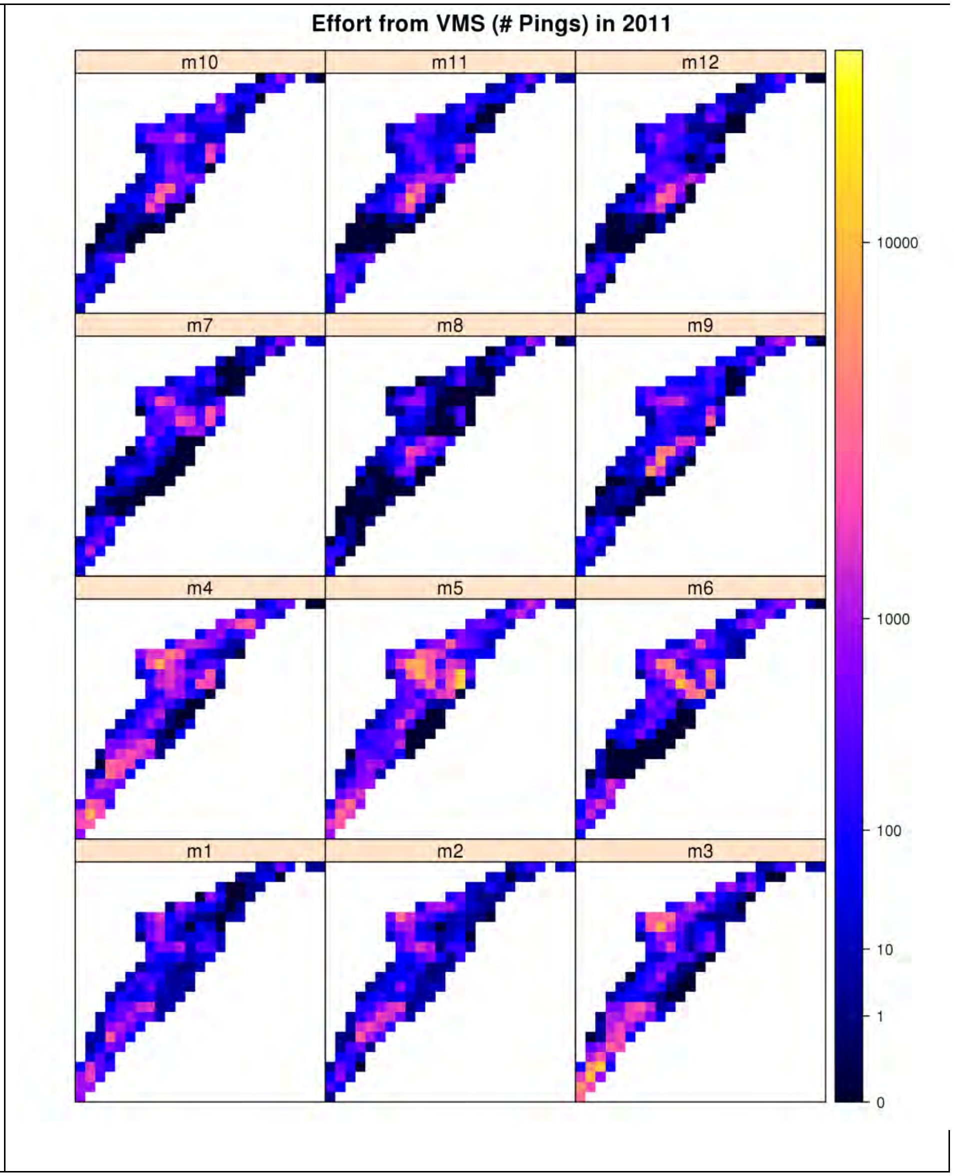


Number of observed tows in 2012
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
500
100
10
1
0

Figure 10 – Number of VMS pings per TMS by month and year (note that VMS plots for 2006 and 2008 are not available for the full year, so not included)




Effort from VMS (# Pings) in 2010
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
10000
1000
100
10
1
0


Effort from VMS (# Pings) in 2011
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
10000
1000
100
10
1
0

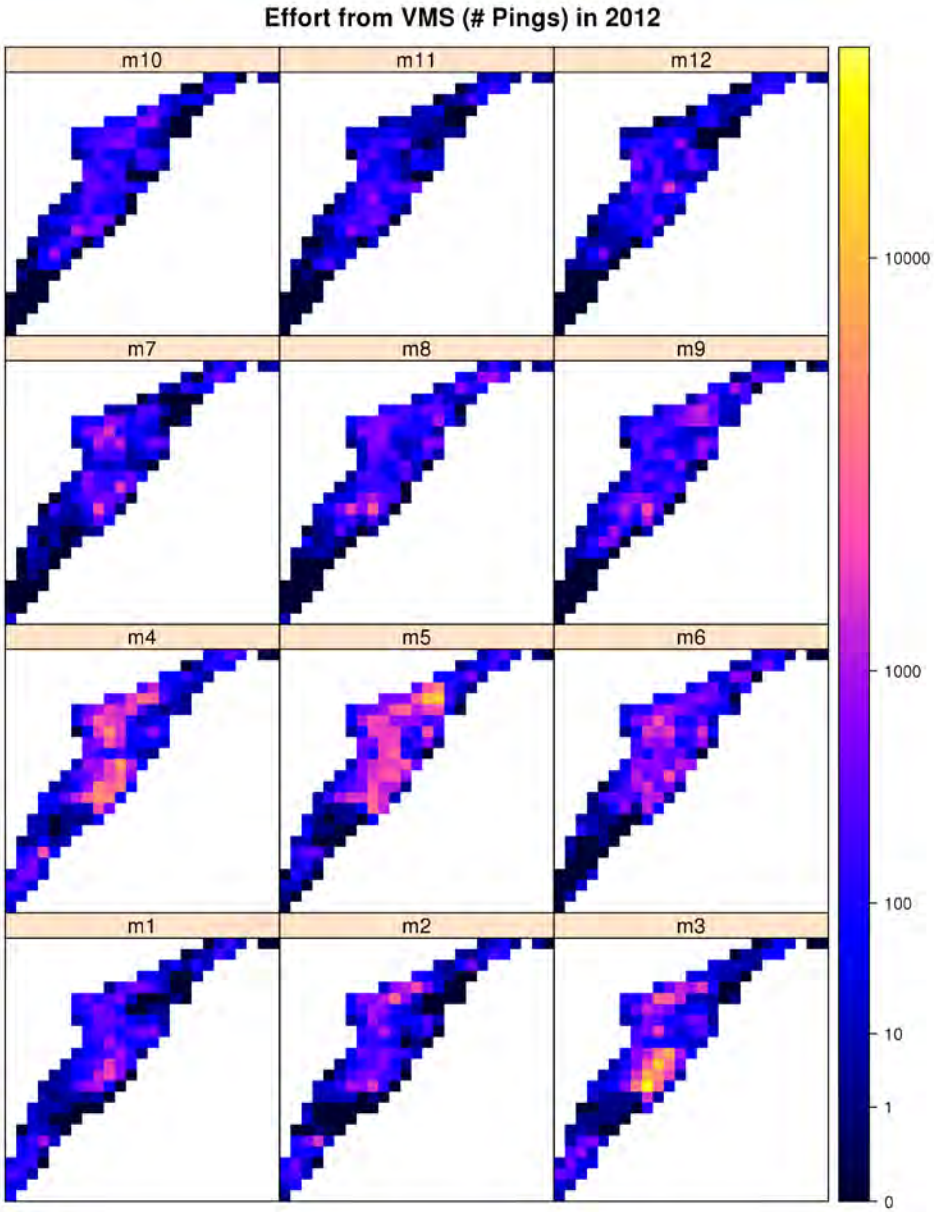
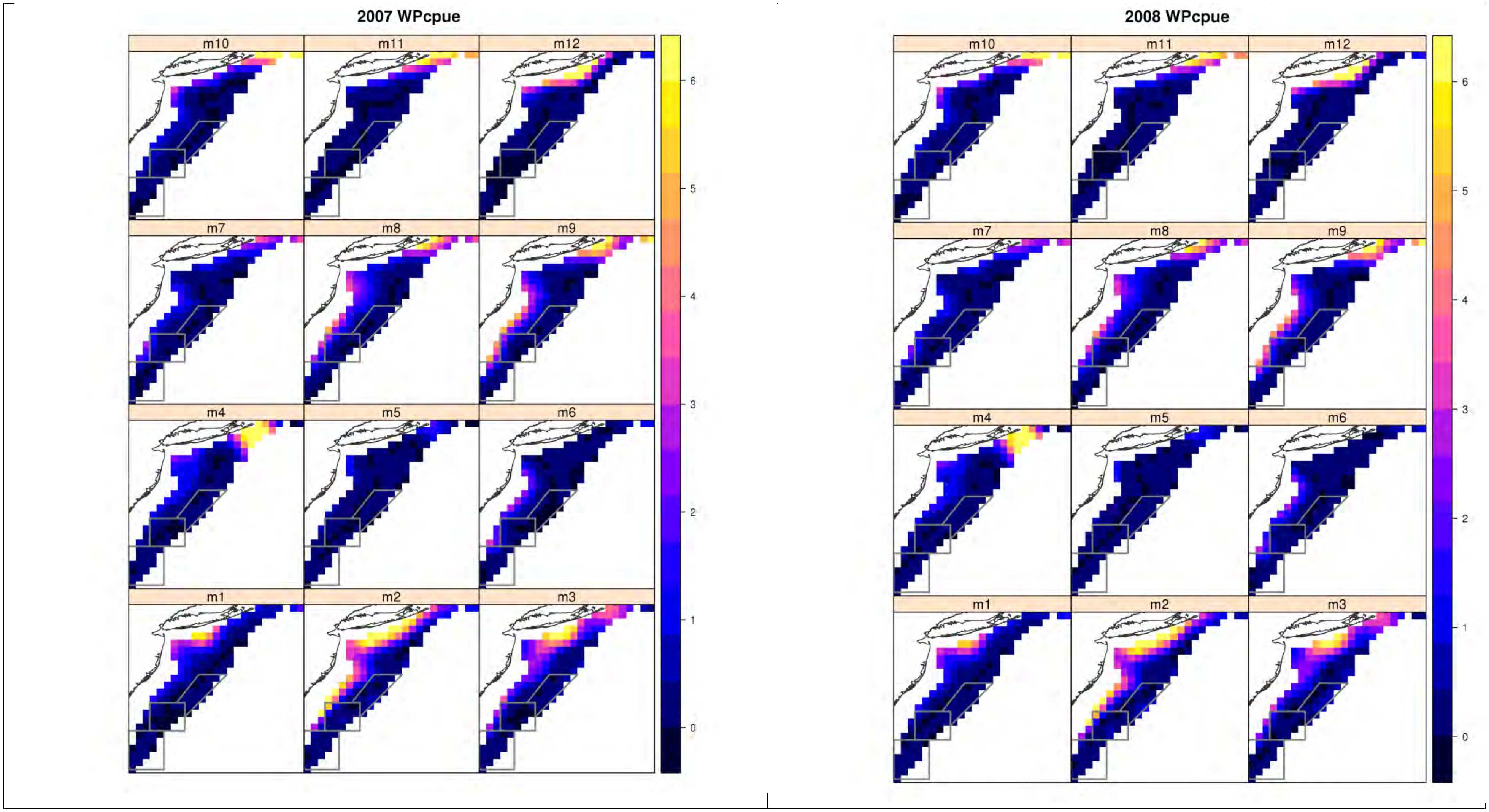
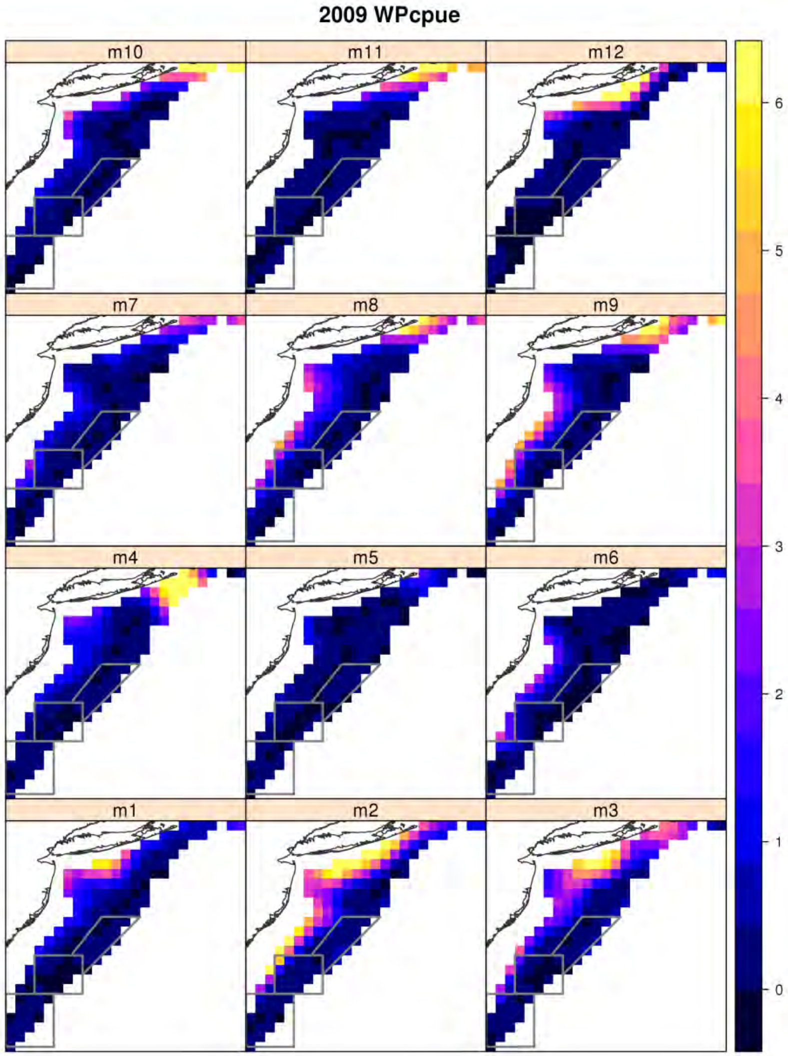
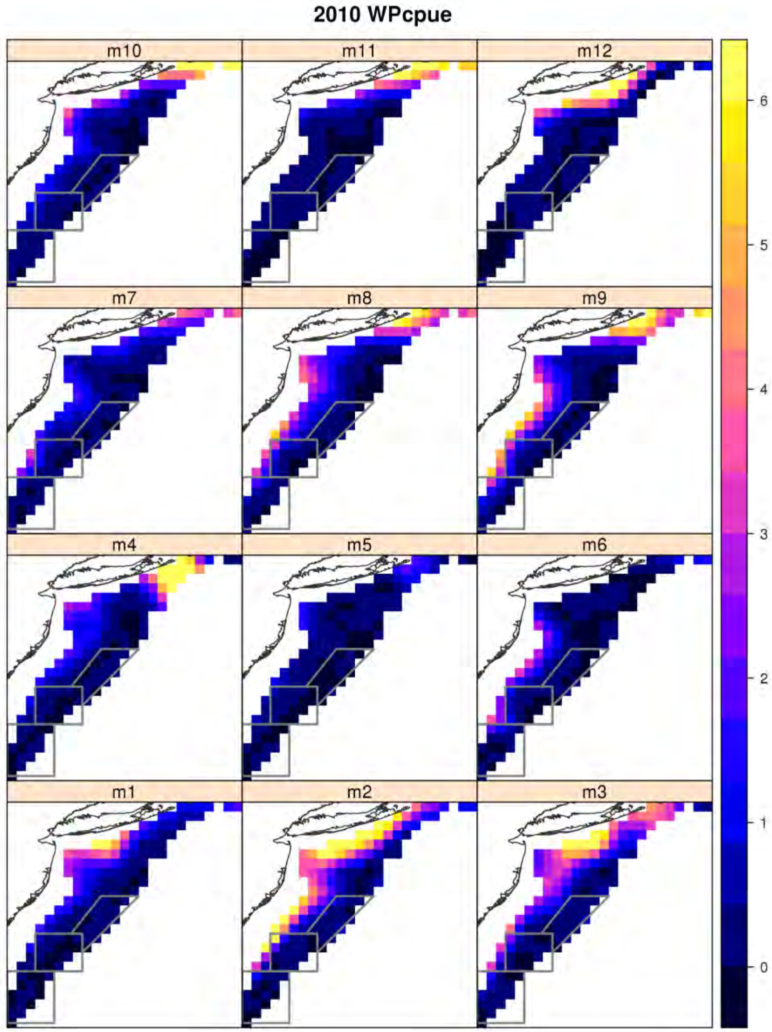
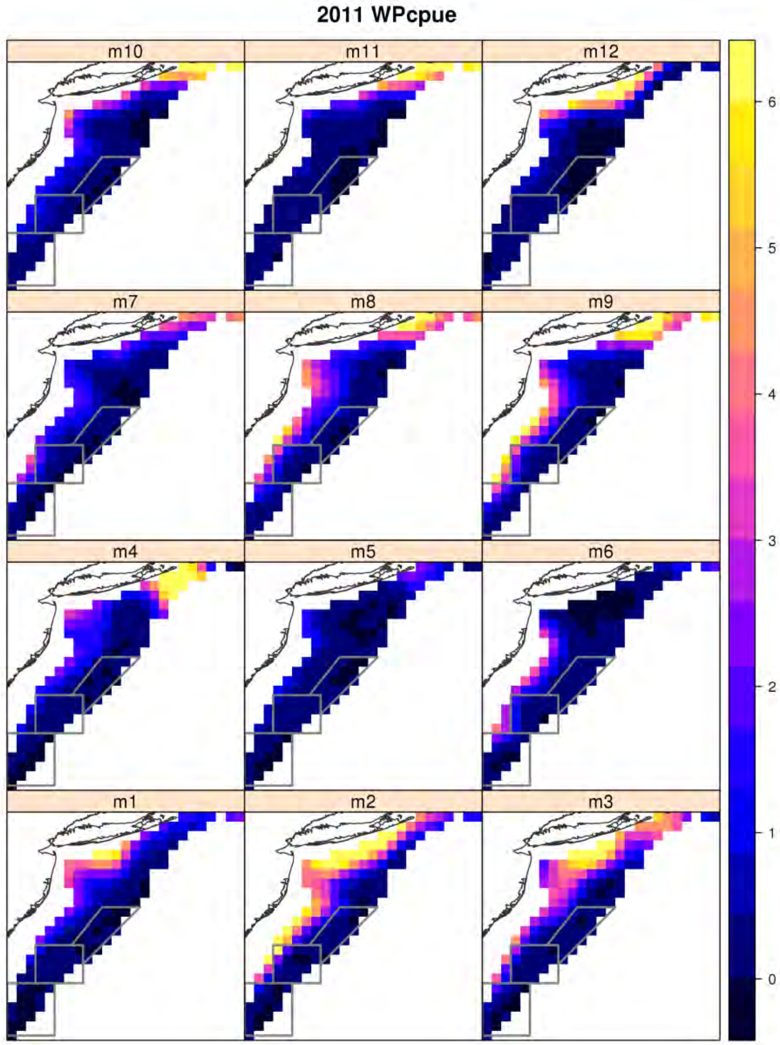

Effort from VMS (# Pings) in 2012
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
10000
1000
100
10
1
0

Figure 11 – Model predicted WP catch by month and year




2009 WPcpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
6
5
4
3
2
1
0


2010 WPcpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
6
5
4
3
2
1
0


2011 WPcpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
6
5
4
3
2
1
0

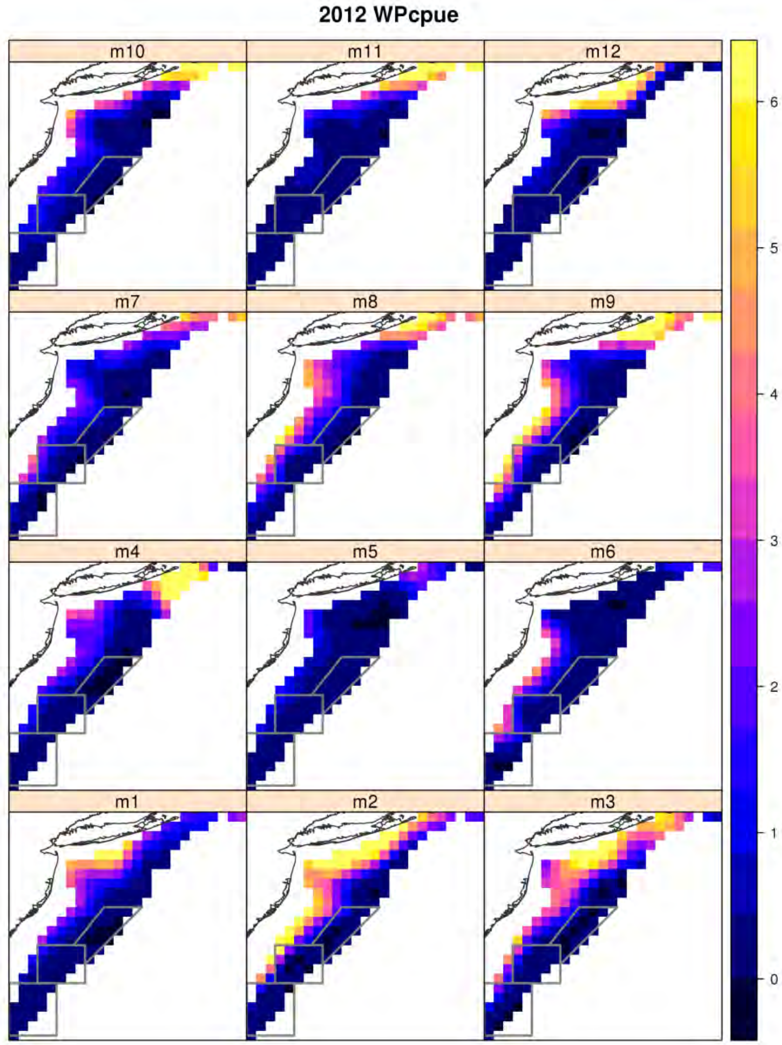
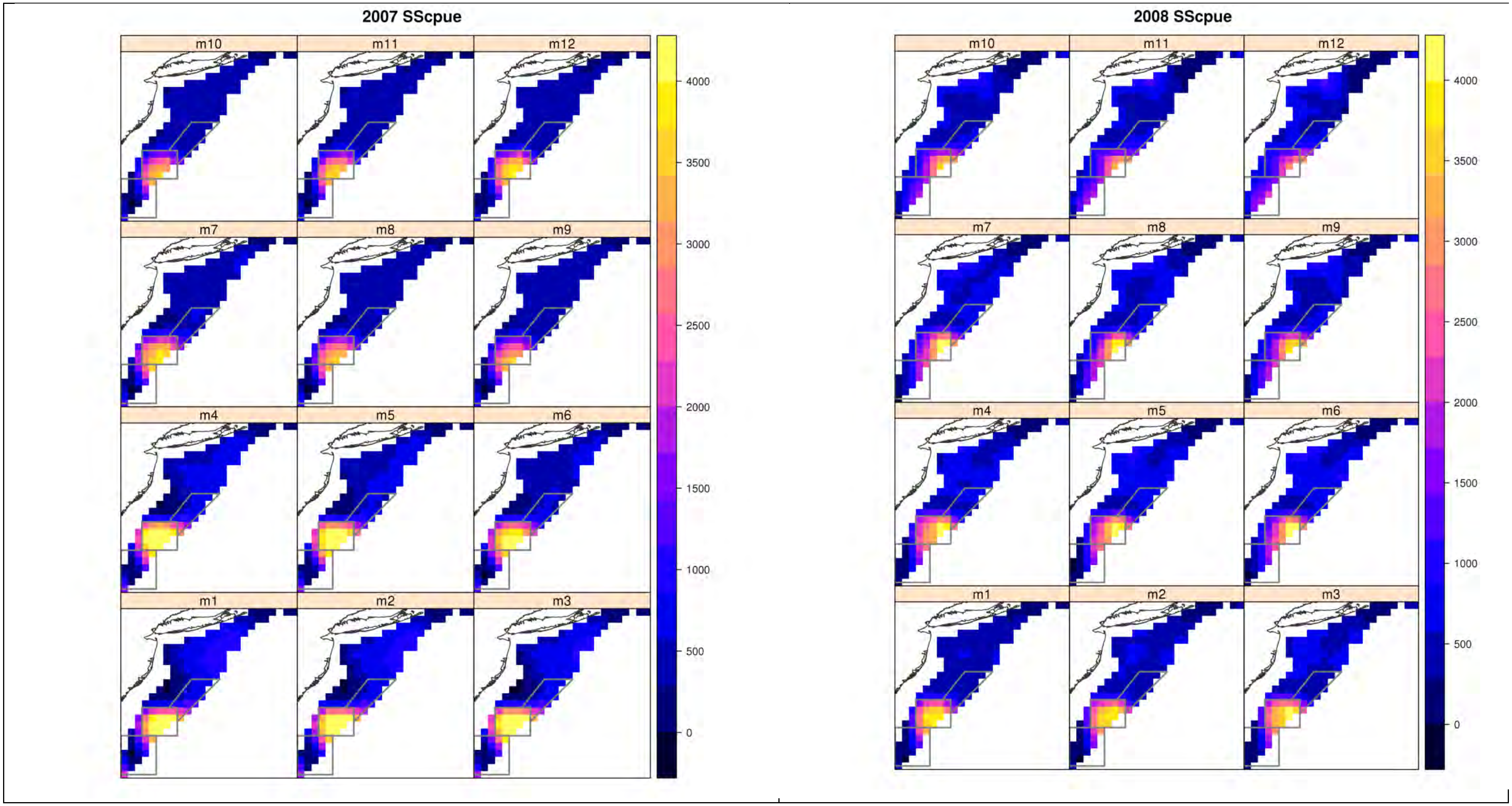
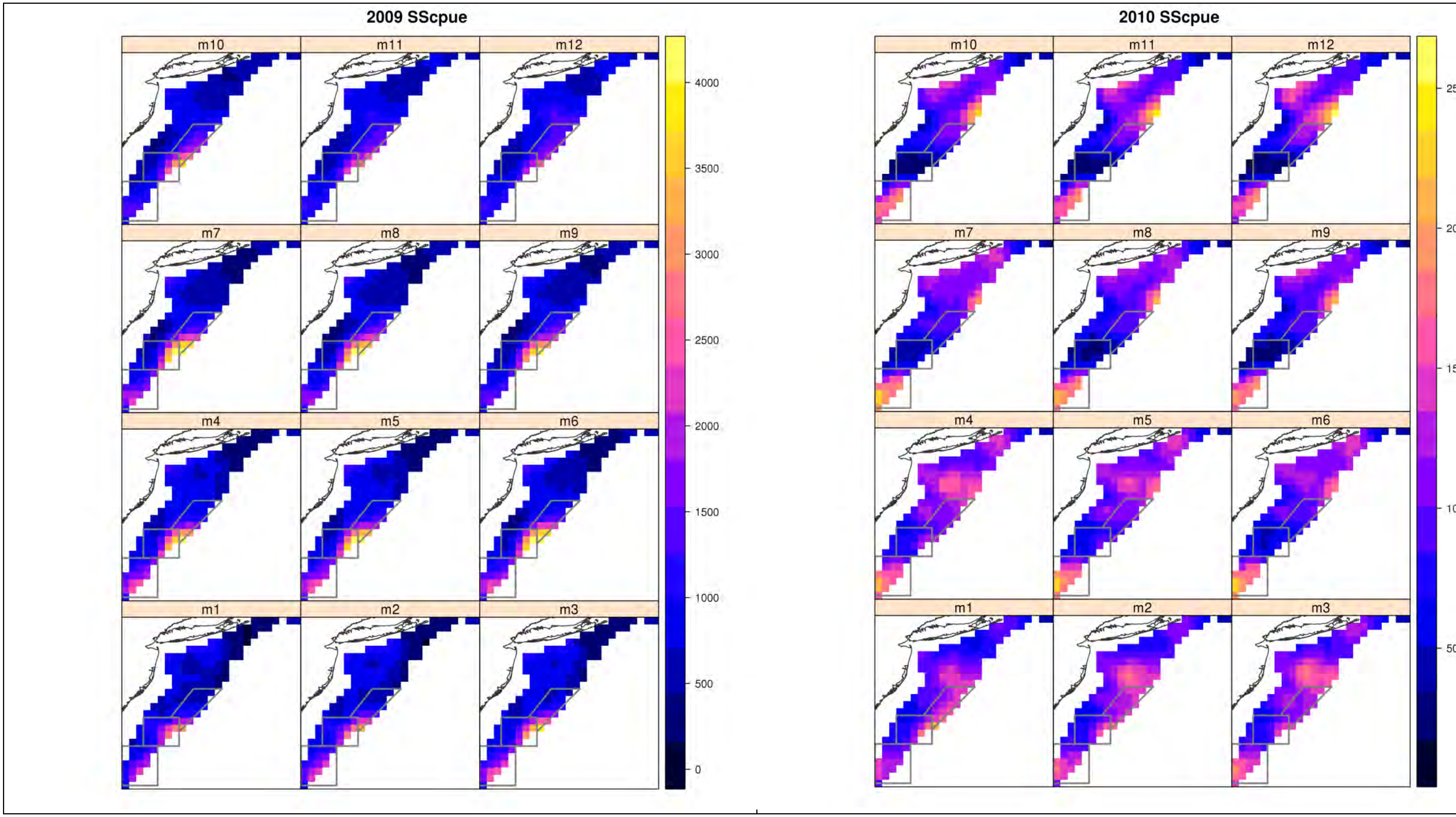

2012 WPcpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
6
5
4
3
2
1
0

Figure 12 – Model predicted Scallop catch by month and year




2009 SScpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
4000
3500
3000
2500
2000
1500
1000
500
0
2010 SScpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
2500
2000
1500
1000
500

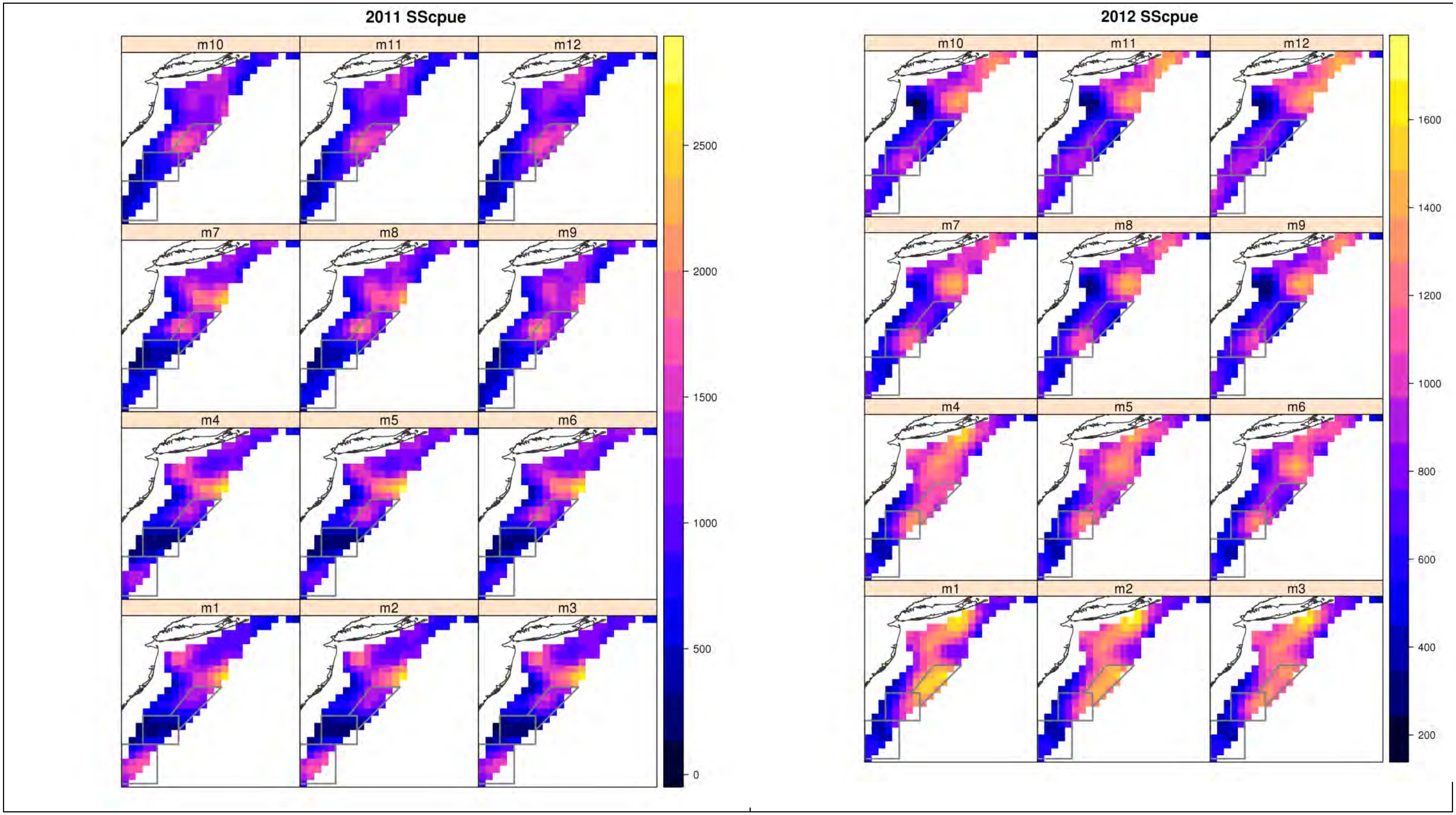
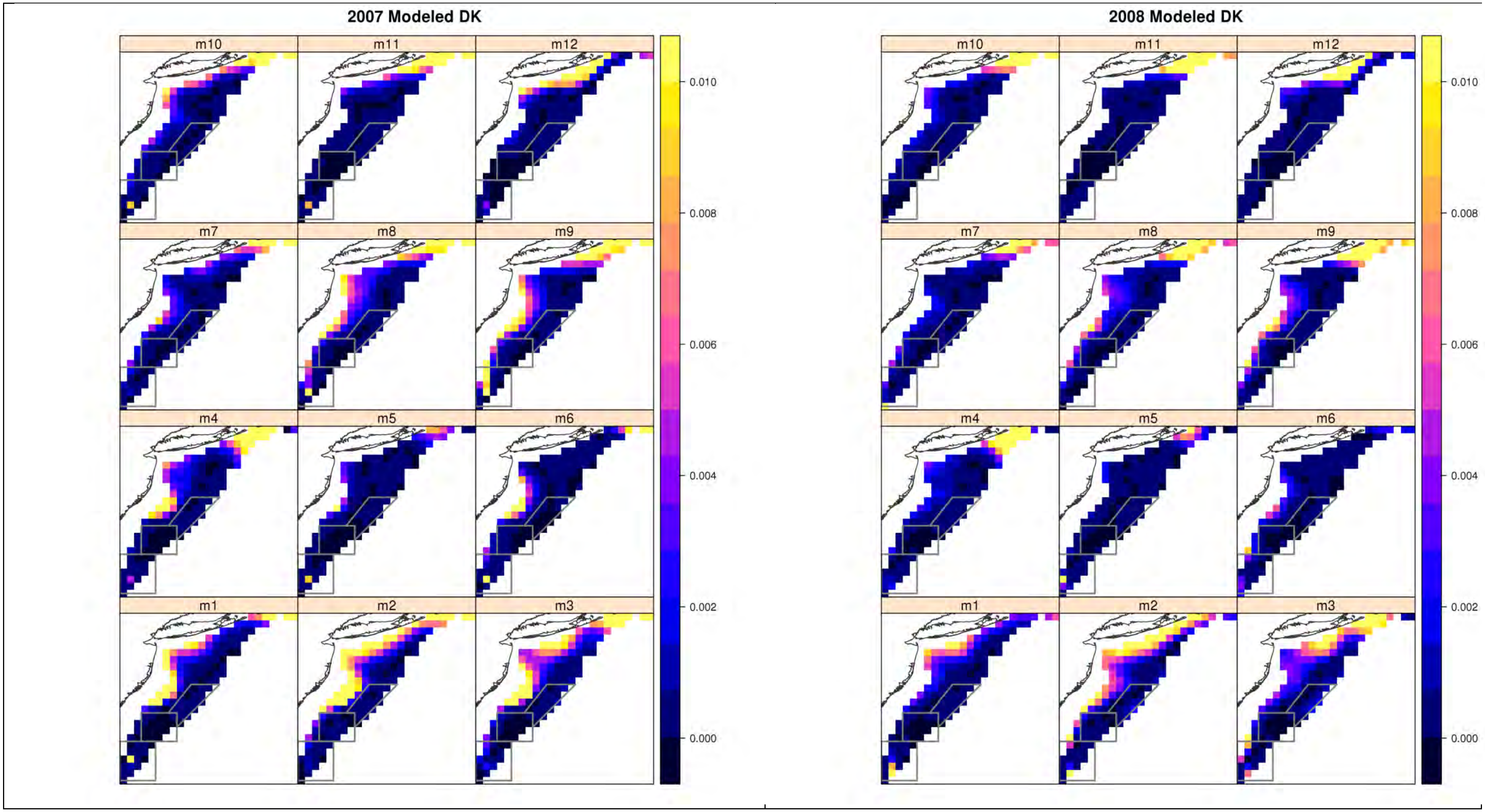
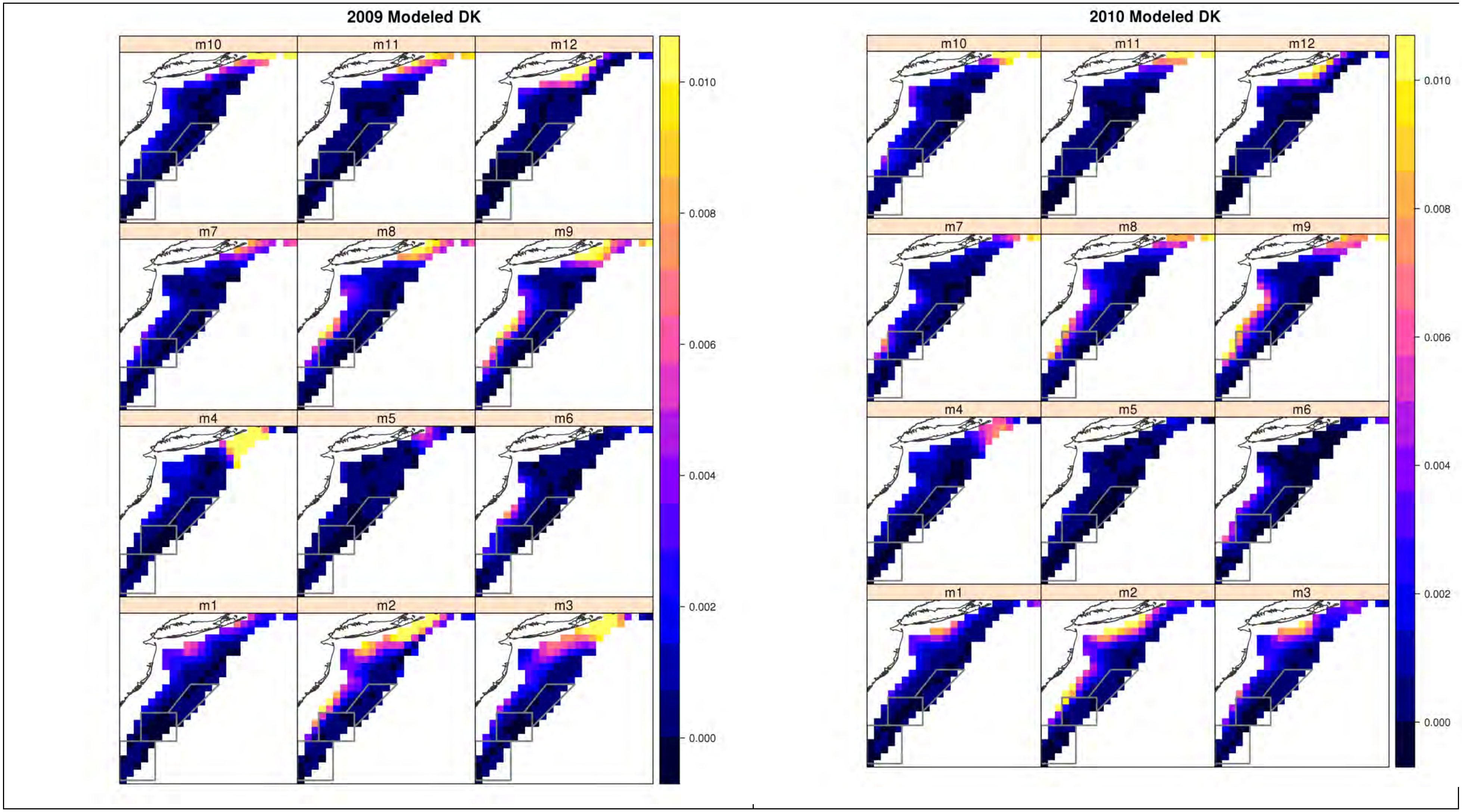

2011 SScpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
0
500
1000
1500
2000
2500
2012 SScpue
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
200
400
600
800
1000
1200
1400
1600

Figure 13 – Model predicted WP discards / scallop kept ratio per TMS by month and year




2009 Modeled DK
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
0.010
0.008
0.006
0.004
0.002
0.000
2010 Modeled DK
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
0.010
0.008
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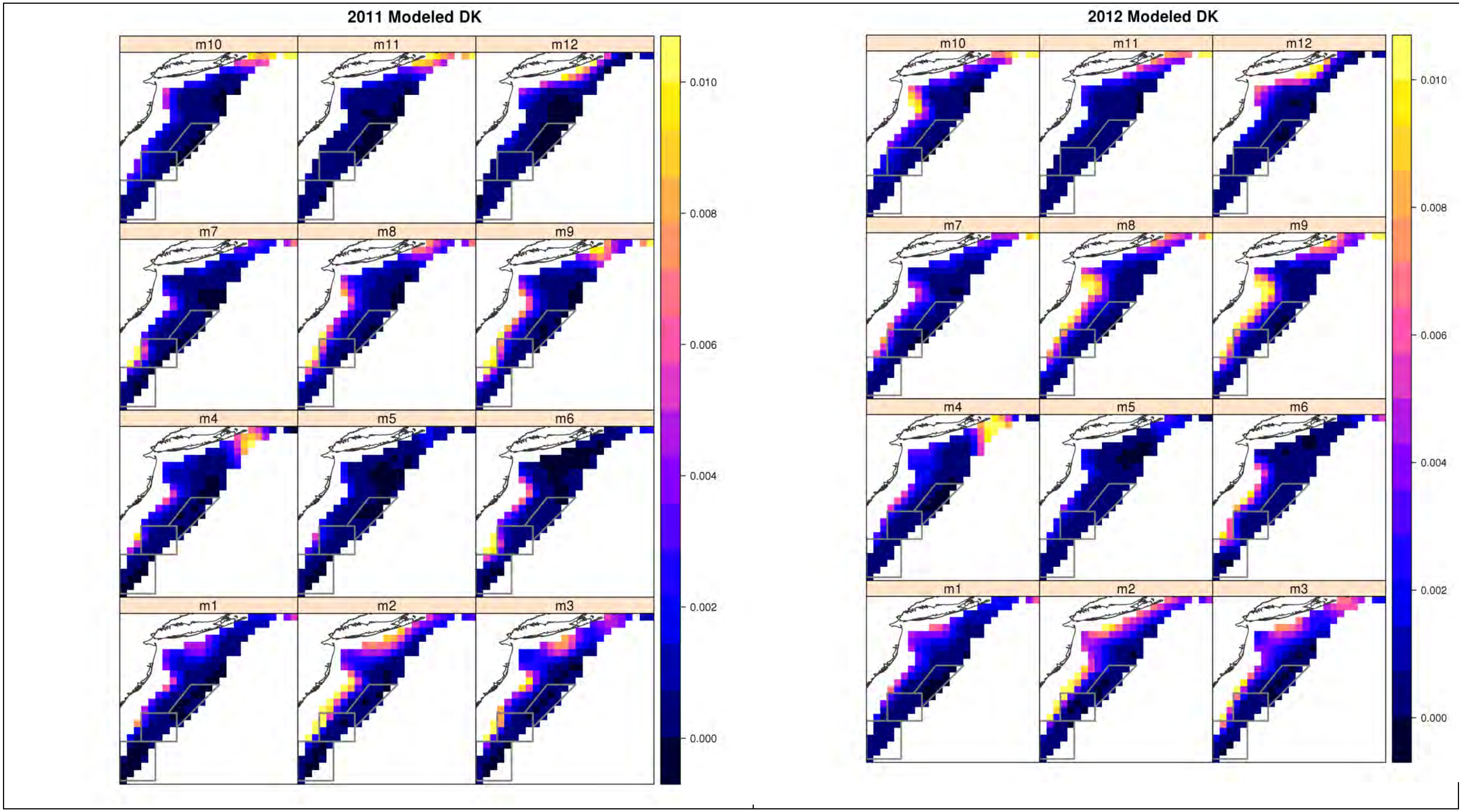
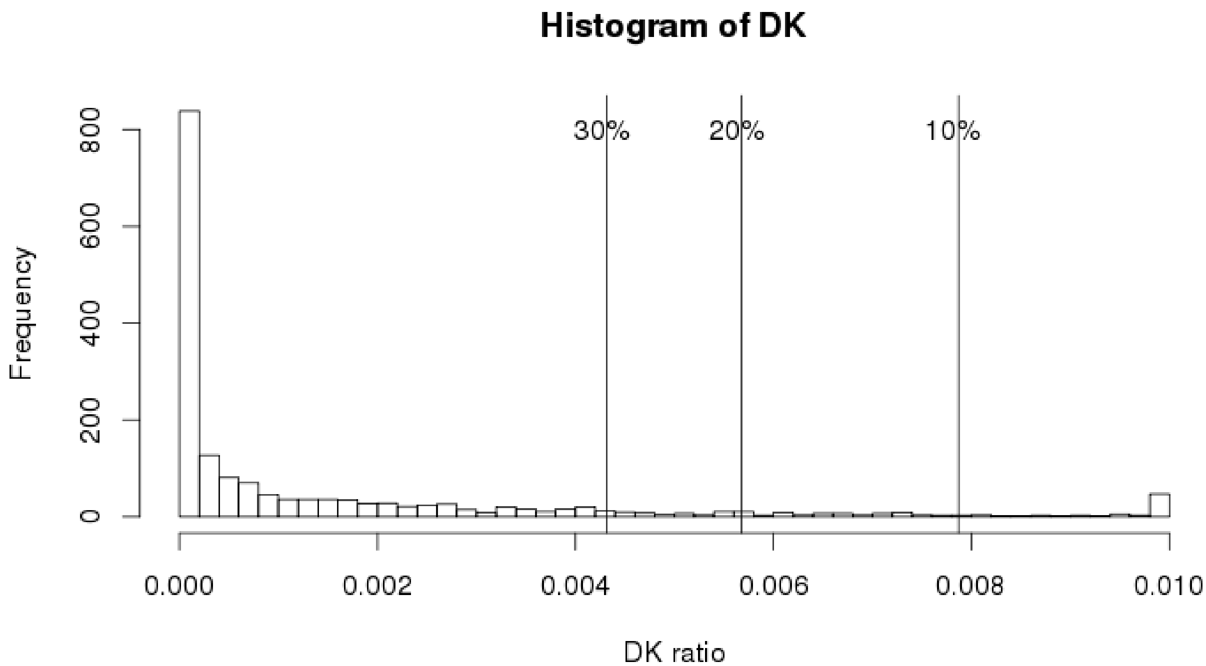

2011 Modeled DK
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
0.010
0.008
0.006
0.004
0.002
0.000
2012 Modeled DK
m10
m11
m12
m7
m8
m9
m4
m5
m6
m1
m2
m3
0.010
0.008
0.006
0.004
0.002
0.000

Figure 14 – Histogram of d/k ratio from all observed hauls



3.0 METHODS AND RESULTS USED TO DEVELOP AND ANLAYZE THE GEAR MODIFICATION AM ALTERNATIVES

The Scallop PDT also explored the use of gear modifications as an AM in FW25. The primary source of information the PDT used is results from a 2012 RSA project titled, "Testing of Scallop Dredge Bag Design Changes for Flatfish Bycatch Reduction" (See Appendix II for the Final Report). This project included four separate research trips on different scallop dredge vessels testing the standard turtle deflector dredge (TDD) and an experimental dredge with two primary gear modifications: a shorter apron and reduced hanging ratio for the twine top.

The four cruises took place between August 2012 and May 2013. A total of about 300 paired tows were completed on four different commercial vessels, about 80 paired tows on each vessel (F/V Concordia, F/V Freedom, F/V Diligence, and F/V Westport). All four trips tested the same two gear modifications (5 ring apron and 1.5:1 hanging ratio for the twine top) and all other aspects of the gear were the same except two vessels used the standard TDD dredge frame configuration, and two vessels used a low profile dredge configuration (LPD). The specific gear specifications are described in Table 2. All trips were conducted on GB and SNE. General tow locations were selected based on known areas with high abundances of fish and scallops (Figure 15).

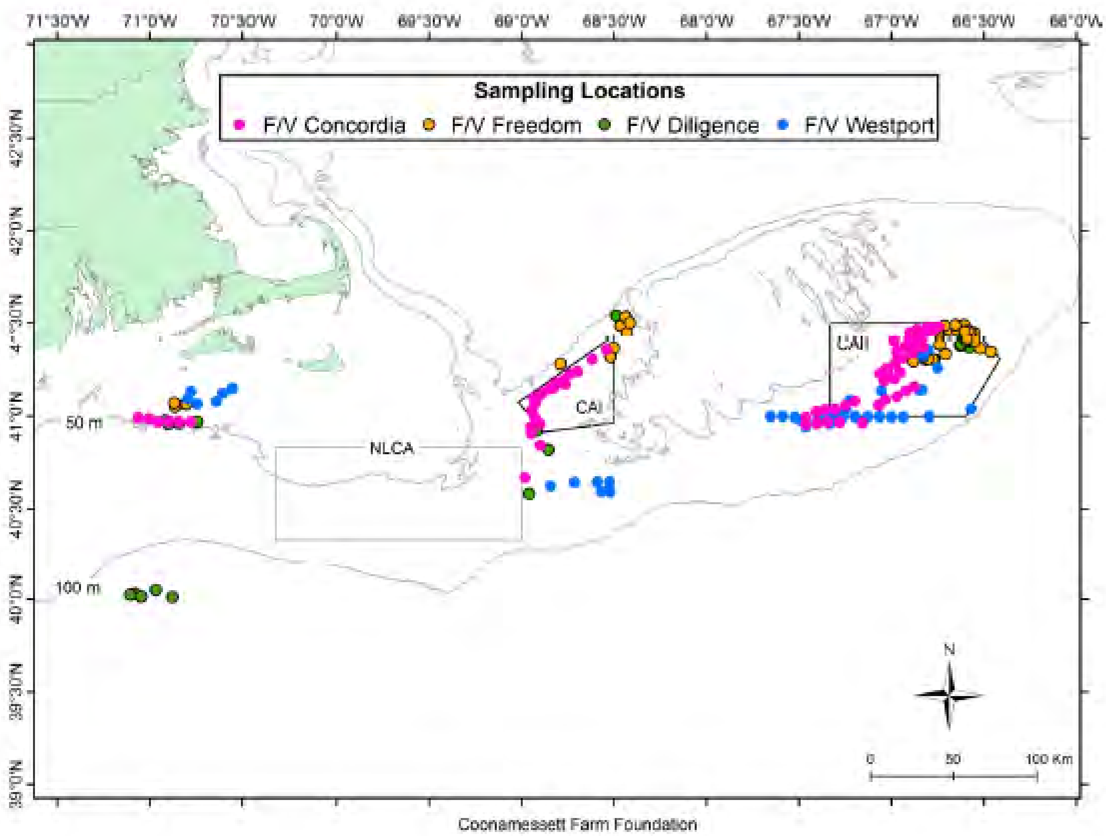
For each paired tow, the catch was separated by species and counted. Scallop catch was recorded in bushels, and at each station scallop length frequencies were recorded for each subsampled bushel. The size frequency of the entire catch was estimated by expanding the catch at each shell height of the subsample by the total number of baskets sampled. All fish were measured to the nearest centimeter, but only counts of winter and little skates.

Catch weights and bycatch rates of both gears were compared for each trip and tested for a significant difference using SigmaPlot. In addition, a Generalized Linear Mixed Model (GLMM) was used to analyze the paired catch data and test for differences in both the pooled length catch data as well as test for differences in the length composition of the catch. The model accounted for multiple vessels used in this experiment and slight variations in gear handing and design.

Table 2 – Gear specifications of the Experimental and control dredges

Dredge Designation	Control	Experimental
Frame	CFTDD	CFTDD and LPD
Type of Chain for Turtle Mat	3/8" Grade 70	3/8" Grade 70
Up and Downs	13	13
Tickler Chain	9	9
Type of Chain for Sweep	Long Link Grade 80	Long Link Grade 80
Number of Links in Sweep	121 long links	121 long links
Chain Sweep Hanging	(6,4,4,2,4...every two links in the bag), 12 link dog chain for the first diamond, 9 link dog chain for the remainder of the rings in the diamond, 11 link dog chain in corners	(6,4,4,2,4...every two links in the bag), 12 link dog chain for the first diamond, 9 link dog chain for the remainder of the rings in the diamond, 11 link dog chain in corners
Twine Top	2:1 with two in the sides (60 Meshes)	1.5:1 with two in the sides (45 Meshes)
Diamonds	14	14
Skirt	2X28 or 2X40	2X28 or 2X40
Sides	6X18 or 6X20	6X18 or 6X20
Apron	8 X 40	5 X 40
Bag	10 X 40	10 X 40
Chaffing Gear	Sewn in three rows down from the sweep for the bag and on the diamonds	Sewn in three rows down from the sweep for the bag and on the diamonds
Club Stick	20 link dog chains	20 link dog chains

Figure 15 – Tow locations for all four RSA trips



3.1 RESULTS

Preliminary results were presented to the PDT in May 2013 and several follow-up conference calls over the summer. Overall the combined gear modifications reduce flatfish bycatch substantially. For the raw catch weights and bycatch rate results the PDT focused on just the results from the two trips that compared the control dredge and the experimental dredge, not the low-profile dredge and the dredge with the escape window. In terms of catch volume, fish represented a greater proportion of the total catch for the control dredge vs. the experimental (5% vs. 3% of the total catch). Overall, there was a significant difference in catch weight between dredges (control vs. experiment) for YT flounder (33% reduction), winter (40%) and windowpane (46%). The differences in scallop and summer flounder catch weights did not test significant (10% and 19% decreases respectively). (Table 3 - Table 5)

Table 3 - Total catch of YT, winter, windowpane, summer flounder, sea scallops and benthos in experimental vs. control dredge (scallop and benthos in bushels and fish in lbs.)

	Benthos (bu)	Yellowtail	Winter	Windowpane	Summer	Scallops (bu)
Experimental (5R)	278	1061	149	314	75	769
Control	374	1621	223	570	135	822
Difference	-96	-560	-74	-256	-60	-53
% Difference	-25.67%	-34.55%	-33.18%	-44.91%	-44.44%	-6.45%
N	148	110	100	75	45	145

Table 4 – Mean weight (lbs.) of fish per tow and standard deviation for the experimental dredge and control dredge with P values

	Yellowtail (SD)	Winter (SD)	Windowpane (SD)	Summer (SD)	Sea Scallops (SD)
Experimental (5R)	10.73 (17.27)	2.13 (2.73)	1.95 (2.22)	6.39 (7.19)	39.56 (42.13)
Control	15.99 (23.56)	3.55 (4.00)	3.58 (3.92)	7.90 (9.56)	44.12 (44.98)
Difference of Means	-5.26	-1.42	-1.63	-1.50	-4.56
% Difference	-32.89%	-40.05%	-45.57%	-19.05%	-10.34%
N	110	100	75	45	145
U Statistic	5018	3692	2100	935	9279
P-Value	0.029*	0.001*	.007*	0.526	0.084

* Denotes significiant difference ($p < 0.05$)

Table 5 – Total YT, winter, windowpane, and scallop weights (lbs) and bycatch rates for the experimental and control dredges

Gear Type		Yellowtail	Winter	Windowpane	Summer	Scallops
Experimental	Fish Weight (lbs)	1169.3	212.90	6.43	287.65	5735.84
(5R)	Bycatch Rate	0.20	0.04	0.001	0.05	
Control	Fish Weight (lbs)	1751.85	355.05	11.70	355.30	6397.05
	Bycatch Rate	0.27	0.06	0.002	0.06	

The final report also evaluated if there were differences in the catch numbers using a GLMM, which combined the results from all survey tows, except the ones with the window escapement panel. The analyses attempted to develop a model that would predict the relative efficiency of the experimental dredge relative to the control dredge based on a variety of covariates, or variables that impact the results. It was found that fish length was not a significant predictor of relative efficiency, except for sea scallops and summer flounder. In addition, it was determined that dredge frame was not a significant predictor, except for sea scallops. Therefore, the model used pooled data for most fish species since neither length or dredge type were significant, or unpooled data for sea scallops and summer flounder since length, and dredge frame for scallops, was a significant variable for those species.

The experimental dredge reduced the catch of YT, winter, and windowpane flounder compared to the control dredge. The average percent change in the catch of the experimental dredge to the control was between 37% and 46% for these three flounder species (Table 6 and Figure 16). In addition, there was an overall reduction in relative efficiency for the experimental dredge versus the control dredge for monkfish, barndoor, and unclassified skates. Average percent change for monkfish was about 12%, 8% for barndoor, and 25% for unclassified skates (Table 7 and Figure 17).

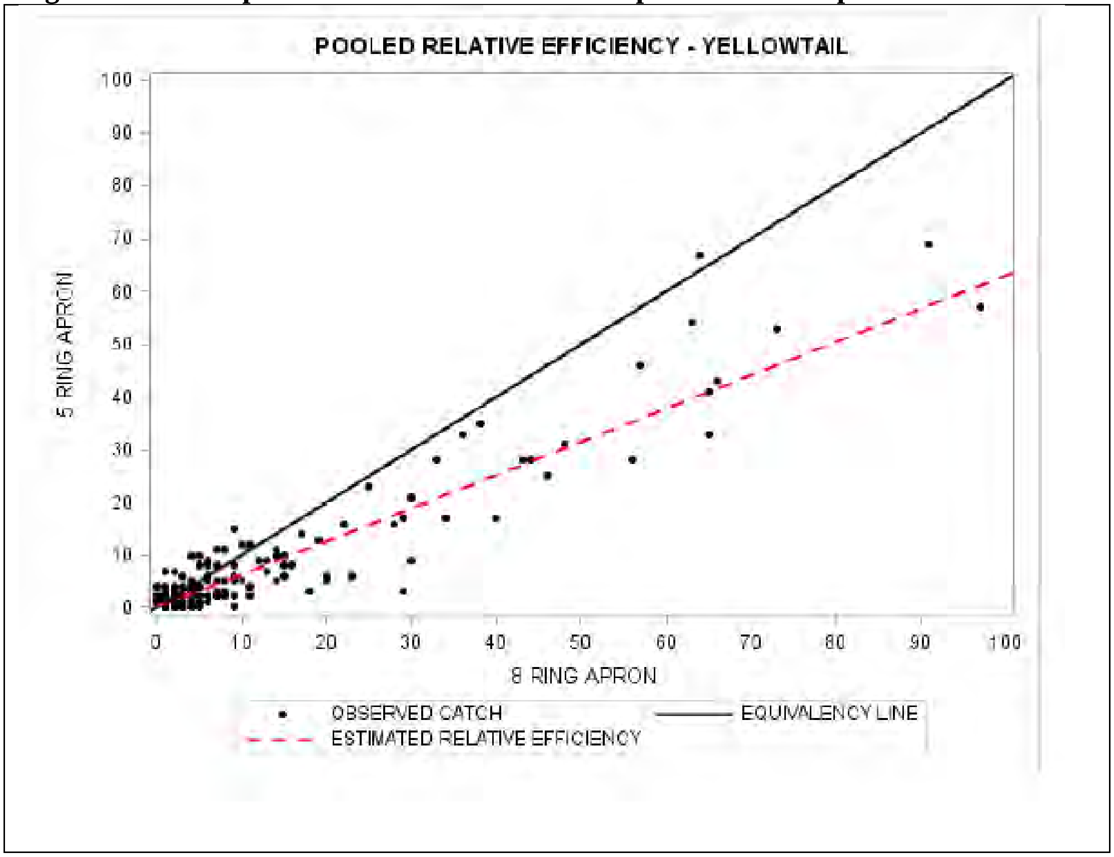
Table 6 – Mixed effects model using pooled catch data from best fit (intercept only) for several fish species. Percent change is the average percent change in catch of experimental versus control dredge

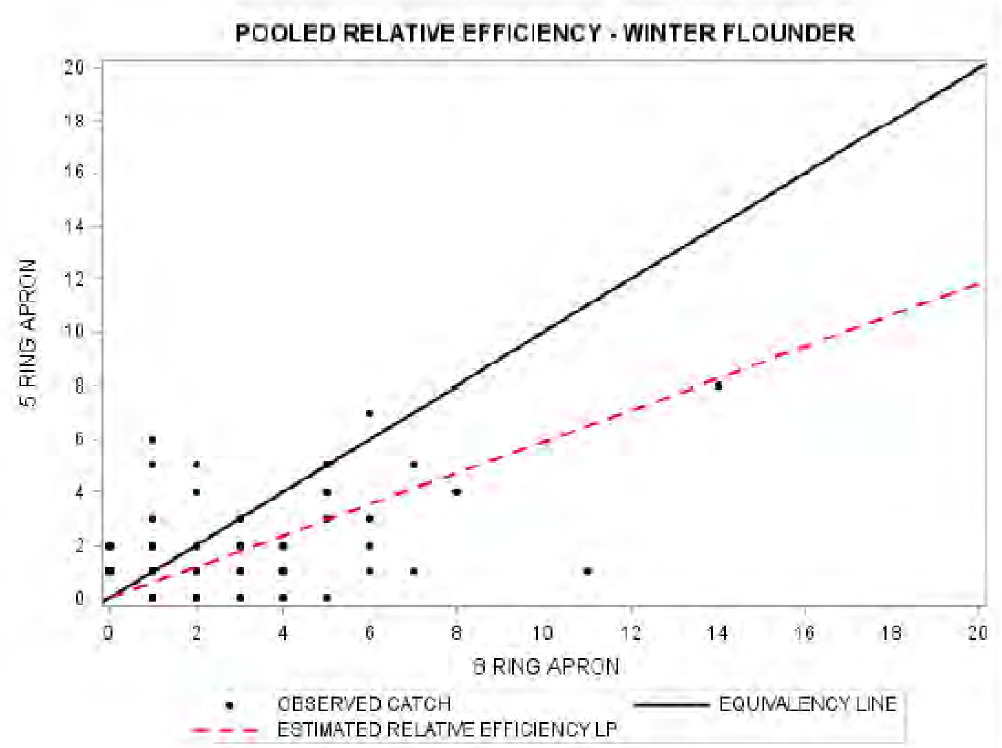
Species	Effect	Estimate	SE	DF	t-value	p-value	LCI	UCI	Exp(Est)	% Change
Yellowtail Flounder	Intercept	-0.463	0.051	189	-9.147	<0.0001	-0.563	-0.363	0.629	-37.1%
Winter Flounder	Intercept	-0.526	0.107	132	-4.932	<0.0001	-0.737	-0.315	0.591	-40.9%
Windowpane Flounder	Intercept	-0.610	0.066	201	-9.259	<0.0001	-0.740	-0.480	0.543	-45.7%
Monkfish	Intercept	-0.131	0.047	228	-2.755	0.0063	-0.224	-0.037	0.877	-12.3%

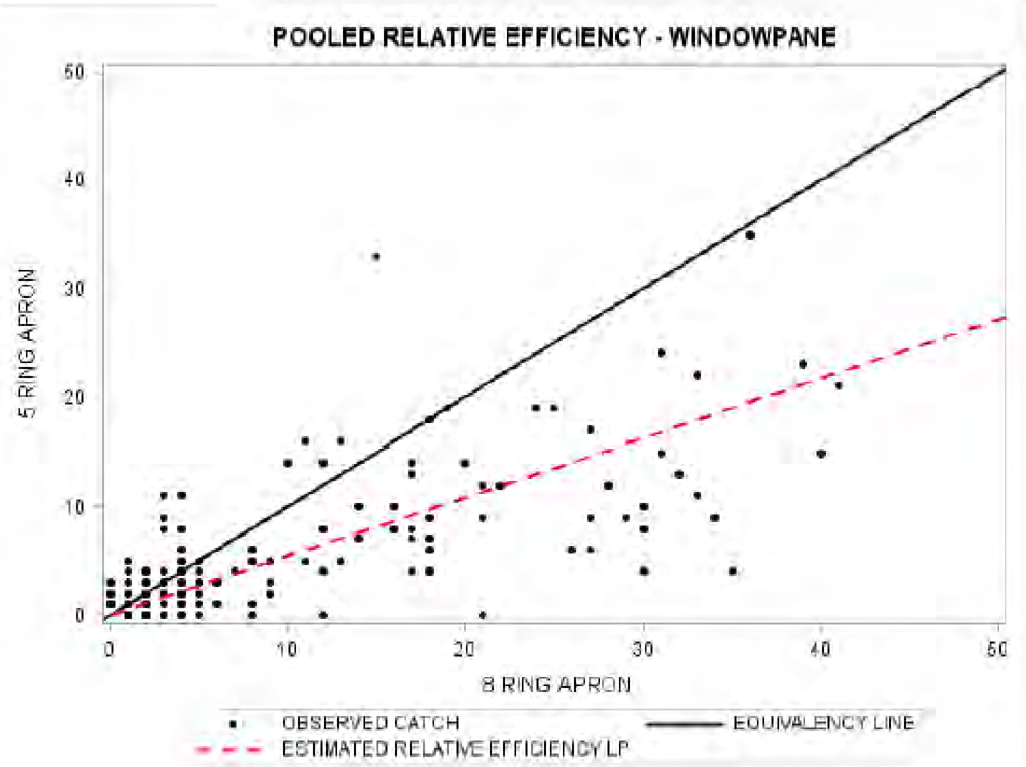
Table 7 – Mixed effects model using pooled catch data from best fit (intercept only) for barndoor and unclassified skates. Percent change is the average percent change in catch of experimental versus control dredge

Species	Effect	Frame	Estimate	SE	DF	t-value	p-value	LCI	UCI	Exp(Est)	% Change
Barndoor Skate	Intercept		-0.078	0.084	167	-0.925	0.356	-0.245	0.089		
	Frame	LPD	-0.557	0.135	167	-4.112	<0.001	-0.825	-0.290	0.530	-47.0%
	Frame	CFTDD	0.000							0.925	-7.5%
Unclassified Skate	Intercept		-0.290	0.039	301	-7.38	<0.001	-0.368	-0.213		
	Frame	LPD	-0.183	0.057	301	-3.17	0.001	-0.296	-0.069	0.623	-37.7%
	Frame	CFTDD	0.000							0.749	-25.1%

Figure 16 – Total pooled catches for several fish species for the experimental vs control dredge




POOLED RELATIVE EFFICIENCY - WINTER FLOUNDER
5 RING APRON
8 RING APRON
OBSERVED CATCH
EQUIVALENCY LINE
ESTIMATED RELATIVE EFFICIENCY LP


POOLED RELATIVE EFFICIENCY - WINDOWPANE
5 RING APRON
8 RING APRON
OBSERVED CATCH
EQUIVALENCY LINE
ESTIMATED RELATIVE EFFICIENCY LP

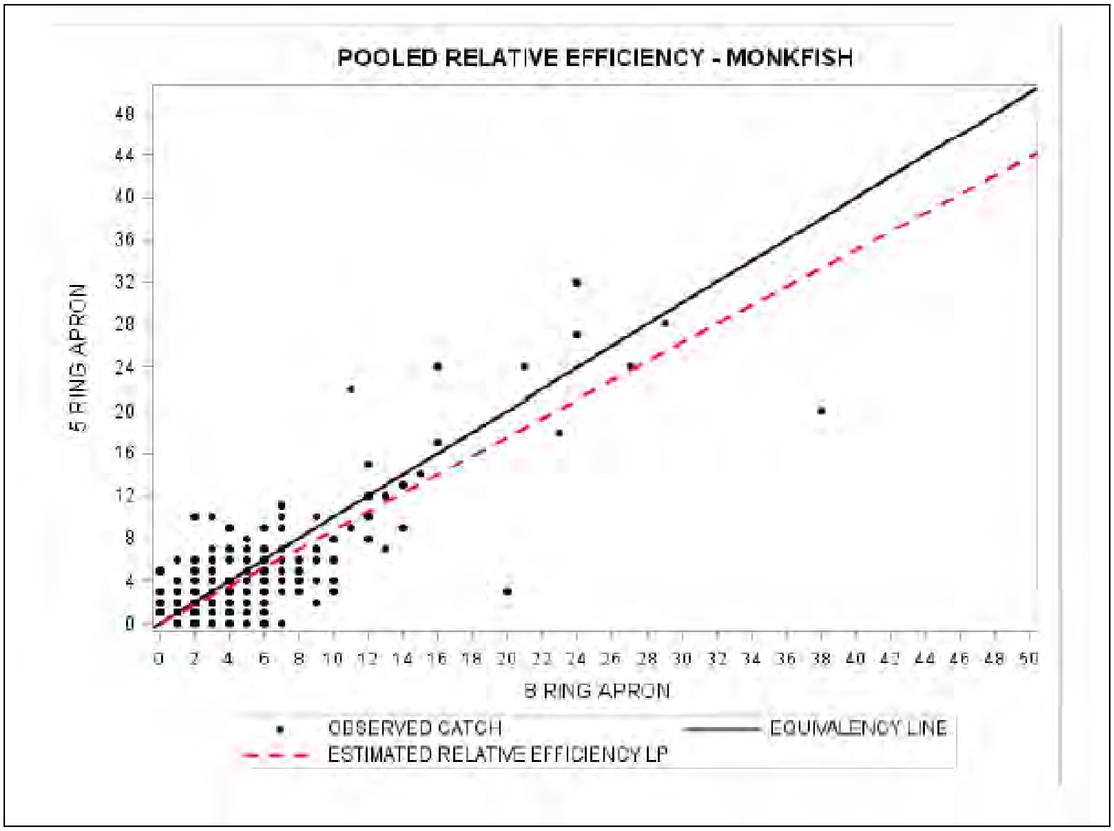
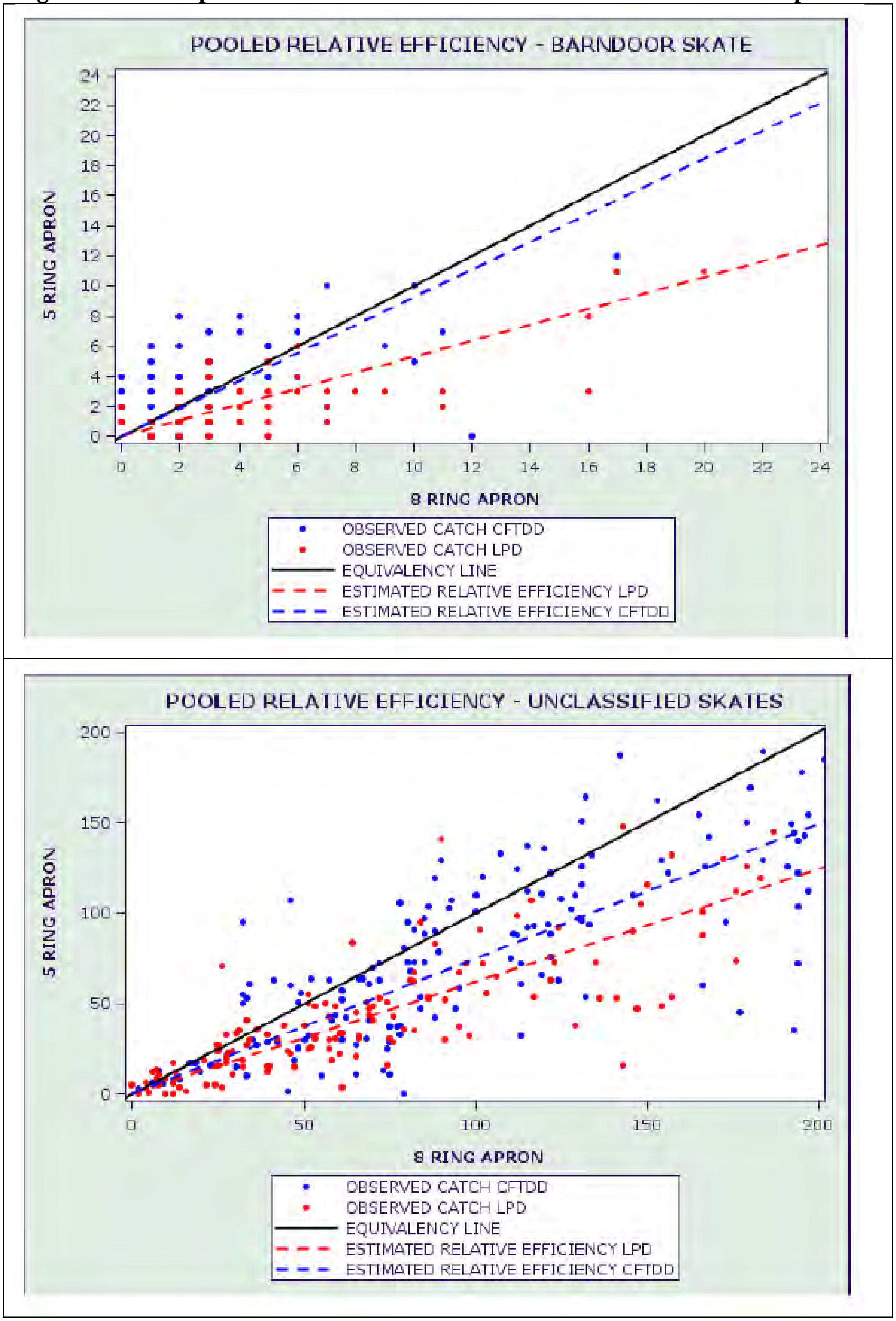

POOLED RELATIVE EFFICIENCY - MONKFISH
5 RING APRON
8 RING APRON
0 4 8 12 16 20 24 28 32 36 40 44 48
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
OBSERVED CATCH
EQUIVALENCY LINE
ESTIMATED RELATIVE EFFICIENCY LP

Figure 17 – Total pooled catches for barndoor and unclassified skates for experimental vs control dredge.

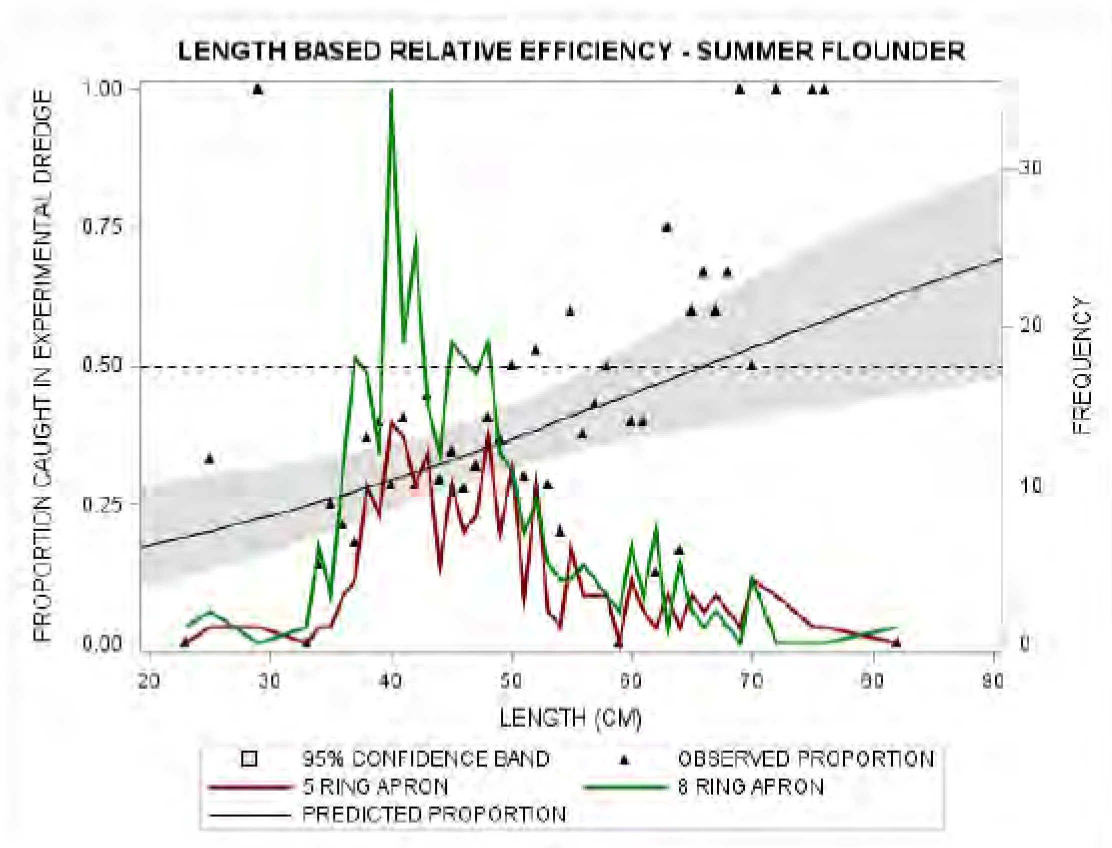


Summer flounder is the only fish species that demonstrated a significant length based effect; lower efficiency in experimental dredge versus the control and efficiency increased with length (Table 8 and Figure 7).

Table 8 – Mixed effects model for summer flounder catch using unpooled catch data

Species	Effect	Estimate	SE	DF	t-value	p-value	LCI	UCI
Summer Flounder	Intercept	-2.205	0.520	411	-4.241	<0.001	-3.227	-1.183
	Length	0.033	0.011	411	3.148	0.002	0.013	0.054

Figure 18 – Relative summer flounder catch for experimental and control dredge



3.1.1 Sea scallops

Overall, there was a reduction in relative scallop catch efficiency using the experimental gear compared to the control. The overall reduction in terms of catch weights is estimated to be about 10% for the experimental dredge (Table 4). Furthermore, the experimental dredge was less efficient at catching smaller scallops than the control (Table 5). This has important impacts on the scallop resource because discard mortality is reduced if fewer small scallops are caught in the gear.

Results from catch weight analysis indicated that there was no significant difference in scallop meat weight between the experimental and the control dredges, whereas GLMM analysis yielded a difference in numbers of scallops. This can be explained by greater size selectivity of the experimental dredge that caught fewer, but larger scallops on average, resulting in a difference in numbers of scallops but no difference in meat weight between dredges.

Table 9 - Mixed effects model for sea scallops using unpooled catch data

Species	Effect	Frame	Estimate	SE	DF	t-value	p-value	LCI	UCI
Sea Scallop	Intercept		-0.770	0.105	3662	-7.326	<0.001	-0.976	-0.564
	Size		0.004	0.001	3662	6.133	<0.001	0.003	0.006
	Frame	LPD	-0.285	0.058	3662	-4.921	<0.001	-0.399	-0.172
	Frame	CFTDD	0.000						

Figure 19 – Relative sea scallop catch for the experimental gear compared to the control dredge

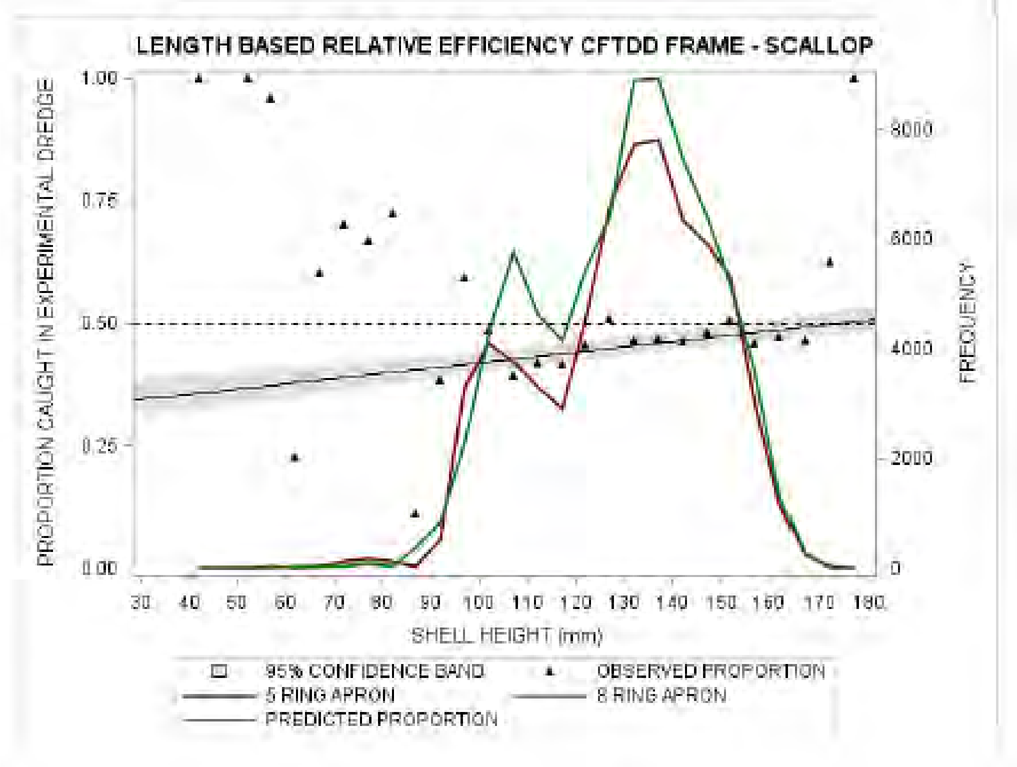


Figure 20 - Size frequency distribution of scallops in the experimental and control dredges. Mean number of scallop per tow with standard error bars

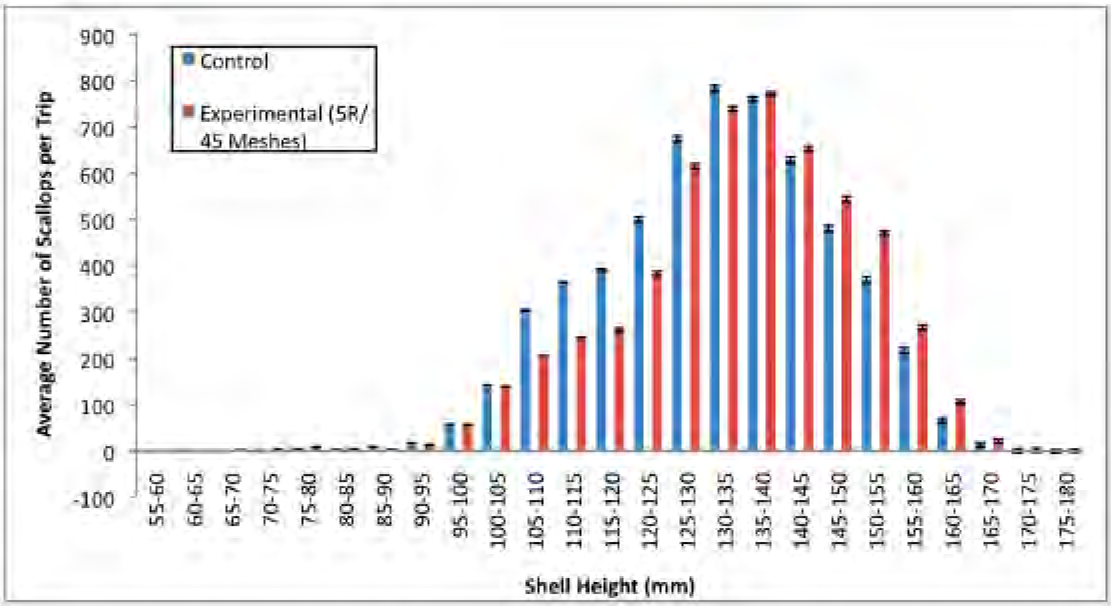


Table 10 – Estimated and percent difference in scallop catch weights at various cull points in commercial size selectivity for the experimental compared to control dredge

Cull Point	Class	5R CFTDD (lbs)	Control (lbs)	Difference	% Difference	P-Value
< 90 mm	Discard	9.53	13.53	-4.00	-29.58%	0.544
> 90 mm	Retain	5726.31	6383.52	-657.21	-10.30%	0.602
< 100 mm	Discard	143.73	120.42	23.31	19.35%	0.643
> 100 mm	Retain	5592.11	6276.63	-684.52	-10.91%	0.534
< 110 mm	Discard	489.77	571.04	-81.27	-14.23%	0.782
> 110 mm	Retain	5246.07	5826.01	-579.94	-9.95%	0.629
< 120 mm	Discard	847.33	1065.83	-218.50	-20.50%	0.94
> 120 mm	Retain	4888.50	5331.22	-442.715	-8.30%	0.707

4.0 BACKGROUND INFO RELATED TO SCALLOP FISHERY CATCH OF SNE/MA WP

When GF FW48 considered a sub-ACL for the scallop fishery for SNE/MA WP the historical estimates of catch by scallop permit type were evaluated. GARM III and the 2012 updated assessment only included catches from LA vessels, which was estimated to be about 32% of the total SNE/MA WP catch. Before 2004, there was limited observer coverage of LAGC vessels. Therefore, for FW48 the GF PDT estimated the total catch of SNE/MA WP by LAGC vessels (dredge and trawl combined) so it could be combined with the estimate of catch for LA vessels. Using the same discard estimation methodology that was used for the 2012 GARM and 2004-2010 observer data, the average catch of LAGC vessels was 21.85mt for dredge and trawl gears combined.

FW48 used the average catch estimate of 22 mt for LAGC vessels and combined that with the data for LA vessels for 2001-2010. In some years the estimate for the LAGC fishery is a substantial proportion of the total scallop fishery catch, even higher than the estimate of LA catch. Assuming the 22 mt estimate is accurate, the LAGC fishery WP catch may be about 30% of the total scallop fishery WP catch. This may not be unreasonable since WP is more concentrated in shallow waters for most of the year. There are several years when LA catches are higher than other years (2005 and 2010). This is likely due to LA vessels fishing in more shallow areas than normal, where WP are more abundant.

The sub-ACL adopted is based on the 90th percentile of scallop fishery catches (LA and LAGC combined as a percentage of the total WP catch) for the time period 2001-2010. That is equivalent to 36% of the total ACL.

Table 11 - Limited access scallop fishery discards of SNE/MAB windowpane flounder, 2001-2010. Landings were less than 1 metric ton in all years.

Calendar Year	Catch	Limited Access Scallop Dredge/Trawl Discards	Limited Access Scallop Fishery Catches as Percent of Total	General Category (Trawl/Dredge) Scallop Fishery Catch Assumption	Total Scallop Fishery Catch As Percent of Total
2001	184	7	3.8%	22	14.1%
2002	339	50	14.7%	22	19.9%
2003	522	73	14.0%	22	17.5%
2004	400	44	11.0%	22	15.6%
2005	330	103	31.2%	22	35.5%
2006	431	63	14.6%	22	18.8%
2007	349	41	11.7%	22	17.0%
2008	321	53	16.5%	22	21.9%
2009	463	55	11.9%	22	15.9%
2010	490	187	38.2%	22	40.8%
		Average, 2001-2010	16.8%		21.7%
		90th percentile, 2001-2010	31.9%		36.0%

Table 12 – Estimate of LA and LAGC scallop fishery WP catch

Calendar Year	Est of LA Discards	Assumption of LAGC Discards	Total scallop fishery catch	% LAGC
2001	7	22	29	75.9%
2002	50	22	72	30.6%
2003	73	22	95	23.2%
2004	44	22	66	33.3%
2005	103	22	125	17.6%
2006	63	22	85	25.9%
2007	41	22	63	34.9%
2008	53	22	75	29.3%
2009	55	22	77	28.6%
2010	187	22	209	10.5%

Note: LAGC estimate is based on the average WP catch from observed trips in 2004-2010 and applied for all years

The current estimate of SNE/MA WP catch by the scallop fishery is provided below. To date, the estimate of catch is about 200,000 pounds or 91 mt, about 50% of the sub-ACL. In 2013 the LAGC fishery current estimate of SNE WP catch is about 20% of the total scallop fishery catch (5% for LAGC trawl fishery and 15% for LAGC dredge)

Windowpane Flounder Sub-ACL for the Directed Scallop Fishery
Southern New England/Mid-Atlantic Stock Area

Report run on:	December 26, 2013
For data reported	December 24, 2013
Quota period:	2013
Quota period dates:	03/01/13 to 02/28/14

	Limited Access Fleet*						Limited Access General Category IFQ Fleet								
	Nantucket Lightship		Southern New England		Mid-Atlantic		Nantucket Lightship		Southern New England		Mid-Atlantic				
Date	Kept (lb)	Discards (lb)	Kept (lb)	Discards (lb)	Kept (lb)	Discards (lb)	Dredge discards (lb)	Trawl discards (lb)	Dredge discards (lb)	Trawl discards (lb)	Dredge discards (lb)	Trawl discards (lb)	Monthly total catch (lb)	Cumulative catch (lb)	Percent of sub-ACL (403,446 lb)
March-13	-	-	-	3,582	-	3,217	-	-	616	336	2,915	-	10,667	10,667	2.6
April-13	-	-	-	14,792	-	6,729	-	-	1,118	907	4,372	77	27,995	38,662	9.6
May-13	-	2,005	-	21,856	-	4,156	-	-	1,803	1,119	3,402		34,341	73,003	18.1
June-13	-	9,236	-	8,474	-	995	60	-	1,151	1,551	3,401	25	24,892	97,894	24.3
July-13	-	8,605	-	11,745	-	1,295		-	1,261	1,517	3,712		28,135	126,030	31.2
August-13	-	6,027	-	12,840	-	1,593	26	-	1,447	489	3,292	-	25,713	151,743	37.6
September-13	-	3,836	-	12,480	-	1,835		-	1,000	655	3,125	34	22,966	174,709	43.3
October-13	-	2,683	-	5,428	-	961		-	1,090	794	2,178		13,135	187,844	46.6
November-13	-	2,704	-	697	-	324	-	-	420	234	823		5,202	193,046	47.8
December-13	-	756	-	995	-	279	-	-	199	26	472	-	2,727	195,773	48.5
Total	**0**	**35,851**	**0**	**92,889**	**0**	**21,384**	**85**	**0**	**10,106**	**7,629**	**27,693**	**137**	**195,773**		

*The limited access fleet is not split into dredge and trawl components because there is insufficient observer coverage for such a stratification.

In order to comply with data confidentiality requirements, discards for areas and/or gear types that only have 1 - 2 vessels in a month will be aggregated with discards from preceding month(s) until the 3 vessel minimum is met.

NOTE: This report uses audited observer data (May - October 2011; March 2012; June 2012 - July 2012) for limited access general category IFQ trawl trips in Mid-Atlantic; and the most recent 12 months of audited observer data (September 2012 - August 2013) for both fleets in Southern New England, Mid-Atlantic and Nantucket Lightship.

NOAA FISHERIES

These data are the best available to NOAA's National Marine Fishery Service (NMFS) when this report was compiled. Data for this report are supplied to NMFS from vessels via Vessel Trip Reporting and the Vessel Monitoring System, and dealers via Dealer Electronic Reporting. Data may be preliminary. Discrepancies with previous reports are due to corrections made to the database.

5.0 BACKGROUND ON LAGC EFFORT IN SNE/MA (FROM FW24)

This section has been included from FW24 because it has information about LAGC catch by area and month that is useful when considering the potential impacts of the WP AM measures. These analyses will be updated to reflect the areas currently under consideration for FW25, but many are the same as FW24.

5.1 LAGC TRAWL

A substantial proportion (67.1%) of the scallop landings by these vessels took place in areas 612 and 613 in years 2010-2011 (**Table 14**). As Table 13 shows, the seasonal distribution of scallop landings by OTF+OTC vessels varied, but in 2010 and 2011 the majority of landings occurred from May-July.

Table 13. Percentage composition of Scallop Landings by Trawls (OTF+OTC) by month from areas 612 and 613 (VTR data for 2010-2011 calendar years, vessels with LAGC-IFQ permits)

MONTH	612	613	Grand Total
1	0.71%	4.94%	5.65%
2	2.31%	1.18%	3.50%
3	0.61%	3.33%	3.94%
4	0.66%	6.66%	7.32%
5	9.05%	4.03%	13.08%
6	16.16%	4.47%	20.63%
7	9.96%	2.14%	12.10%
8	5.34%	4.12%	9.46%
9	4.73%	2.37%	7.10%
10	3.81%	3.76%	7.57%
11	0.67%	3.37%	4.04%
12	0.43%	5.18%	5.61%
Grand Total	54.45%	45.55%	100.00%

Note: The trips with more than 1200lb. of scallop landings are excluded.

Table 14. The 2010-2011 landings in closed periods for SNE/MA AM schedule (3 Digit Areas 612+613, LAGC-IFQ vessels using trawl gear, i.e., OTF+OTC)

Schedule for Closure					
Overage	**LAGC Trawl Closure**	**Sum of scallop landings for 2010+2011 in 612+613**	**Sum of scallop landings from all areas**	**Landings in 612+613 as % of scallop landings from all areas during the closure period**	**Landings in 612+613 in the closure period as a % of all scallop landings from all areas during the whole year**
2% or less	Mar-Apr	71,977	125,075	57.5%	11.3%
2.1-3%	Mar-Apr, and Feb	94,329	150,168	62.8%	14.8%
3.1-7%	Mar-May, and Feb	177,957	280,472	63.4%	27.8%
7.1-9%	Mar-May, and Jan-Feb	214,064	331,588	64.6%	33.5%
9.1-12%	Mar-May, and Dec-Feb	249,921	377,580	66.2%	39.1%
12.1-15%	Mar-June, and Dec-Feb	381,760	580,169	65.8%	59.7%
Open Period	July to November	257,388	372,522	69.1%	40.3%
	All Year	639,148	952,691	67.1%	100.0%

Although, the impacts on the overall LAGC fishery may be small at the low overage rates, there could be some distributional impacts on vessels from different states and ports. The closures will impact vessels home ported in New York and New Jersey most. LAGC vessels that are home-ported in those states landed majority of scallops in 612 and 613 (Table 15).

Table 15. Number of OTF+OTC vessels and Scallop landings by homeport and area (VTR data for 2010-2011, vessels with LAGC-IFQ permits, all trips including the ones>1200)

			Home state			
year	Area	Data	MA+RI	NY+NJ	Oth.MidAt	Grand Total
2010	612	Number of vessels		21	6	27
		Scallop lb.		33,133	74,396	107,529
	613	Number of vessels		11	NA	13
		Scallop lb.		114,695	NA	NA
	other	Number of vessels	NA	6	20	35
		Scallop lb.	NA	>15000	179,436	>185,000
Total Scallop lb.			NA	165,886	254,632	421,943
2011	612	Number of vessels		14	15	29
		Scallop lb.		20,580	212,019	232,599
	613	Number of vessels	NA	11	NA	NA
		Scallop lb.	NA	174,829	NA	175,629
	other	Number of vessels	12	10	14	36
		Scallop lb.	NA	>25000	73,379	108,557
Total Scallop lb.			4,170	226,417	286,198	516,785

5.2 LAGC DREDGE

Table 16 – SNE/MA YT AM schedule for LAGC dredge vessels if scallop fishery AM is triggered and LAGC dredge catch is more than 3% of total catch

	AM closure area and duration		
Overage	539	537	613
2% or less	Mar-Apr	Mar-Apr	Mar-Apr
2.1% - 7%	Mar-May, Feb	Mar-May, Feb	Mar-May, Feb
7.1% - 12%	Mar-May, Dec-Feb	Mar-May, Dec-Feb	Mar-May, Feb
12.1% - 16%	Mar-Jun, Nov-Feb	Mar-Jun, Nov-Feb	Mar-May, Feb
16.1% or greater	All year	Mar-Jun, Nov-Feb	Mar-May, Feb

Table 17. Percentage composition of Scallop landings by scallop dredge vessels (DRS) by month and area (VTR data for 2010-2011, vessels with LAGC-IFQ permits)

Monthlanded	537	539	612	613	Other	Grand Total
1	0.3%	0.3%	0.6%	0.1%	6.6%	7.8%
2	0.1%	0.1%	0.7%	0.1%	2.1%	3.2%
3	0.3%	0.2%	0.8%	0.2%	4.2%	5.7%
4	0.3%	0.4%	0.8%	0.2%	6.1%	7.8%
5	0.6%	0.5%	1.7%	0.4%	7.6%	10.7%
6	0.4%	0.7%	1.9%	0.2%	7.7%	11.0%
7	0.3%	0.7%	2.1%	0.3%	8.6%	11.9%
8	0.3%	0.6%	1.3%	0.4%	8.7%	11.3%
9	0.2%	0.8%	1.3%	0.3%	6.9%	9.4%
10	0.1%	0.5%	0.9%	0.2%	6.4%	8.0%
11	0.1%	0.4%	0.5%	0.1%	5.1%	6.2%
12	0.1%	0.3%	1.4%	0.0%	5.0%	6.8%
Grand Total	3.0%	5.4%	14.0%	2.5%	75.2%	100.0%

Note: The trips with more than 1200lb. of scallop landings are excluded.

Table 18. Scallop landings by LAGC-IFQ vessels by gear code and permit as a % of total landings in areas 537+539+613 (VTR data, including trips (all trips).

LAGC category	GEAR	LA Permit	LAGC Permit	2010	2011	Grand Total
IFQ	**DRC**			0.1%	0.0%	0.07%
	DRS	YES	YES	2.7%	5.0%	3.97%
		NO	YES	5.0%	7.4%	6.35%
	DRS Total			**7.8%**	**12.4%**	**10.31%**
	DSC			0.0%	0.6%	0.36%
	OTC			0.0%	0.1%	0.07%
	OTF			3.5%	4.2%	3.85%
IFQ Total				**11.4%**	**17.3%**	**14.66%**
NGOM				9.2%	13.1%	11.35%
INCIDENTAL				28.4%	13.8%	20.31%
LA Permit only				51.0%	55.8%	53.68%
Grand Total				**100.0%**	**100.0%**	**100.00%**

6.0 WP AM FOR GF FMP (SECTION 4.2.5.2 AND APPENDIX 4 OF FW47)

This section has been included as background information

The groundfish fishery AM for windowpane flounder will be implemented if the total ACL (as opposed to the groundfish sub-ACL) is exceeded. Should a sub-ACL be allocated to another fishery and AMs developed for that fishery, the AMs for both fisheries will be implemented only if the total ACL for the stock is exceeded.

If the AM is implemented trawl vessels would be required to use approved selective trawl gear that reduces the catch of demersal species. Approved gears include the separator trawl, Ruhle trawl, mini-Ruhle trawl, rope trawl, and other gear authorized by the Council in a management action or approved for use consistent with the process defined in 50 CFR 648.85 (b)(6). There would be no restrictions on longline or gillnet gear.

Areas: The applicable areas where gear restrictions would apply are shown in Figure 2. The areas are designed to be stock specific – the areas on GB are implemented only if the ACL for northern windowpane flounder is exceeded; the areas in SNE are implemented only if the southern windowpane flounder ACL is exceeded. Both areas would be implemented if the ACL for ocean pout is exceeded. The size of the areas for the restrictions is based on the amount of the overage. In each case the smaller area is implemented for ACL overages that are between the management uncertainty buffer and up to 20 percent; both the smaller and larger areas area implemented for overages of more than 20 percent.

Figure 2 - AM areas (small) for Northern and Southern Windowpane and Ocean Pout

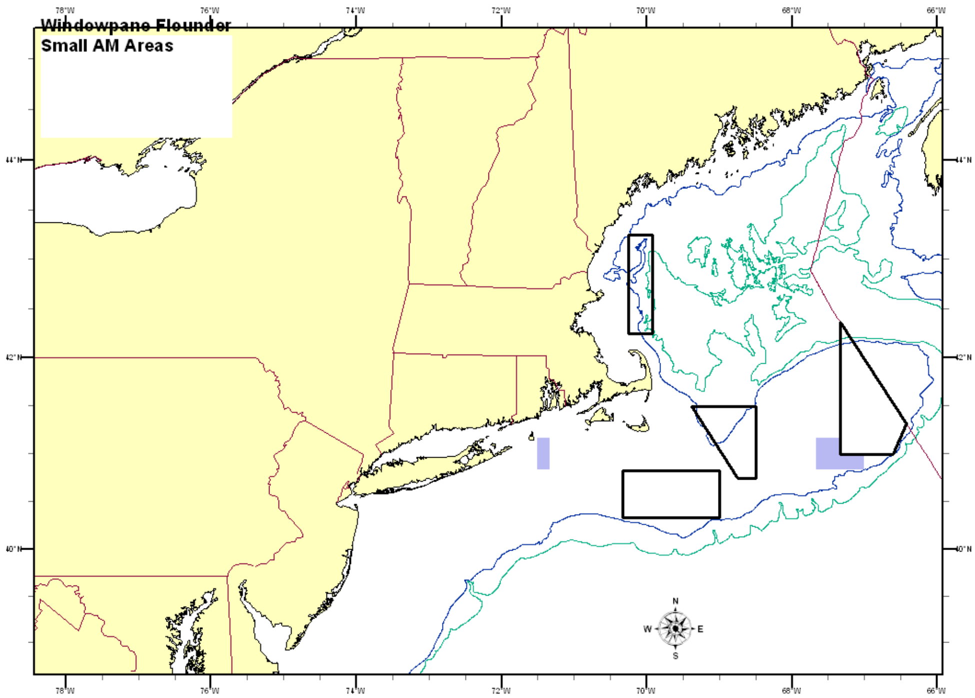
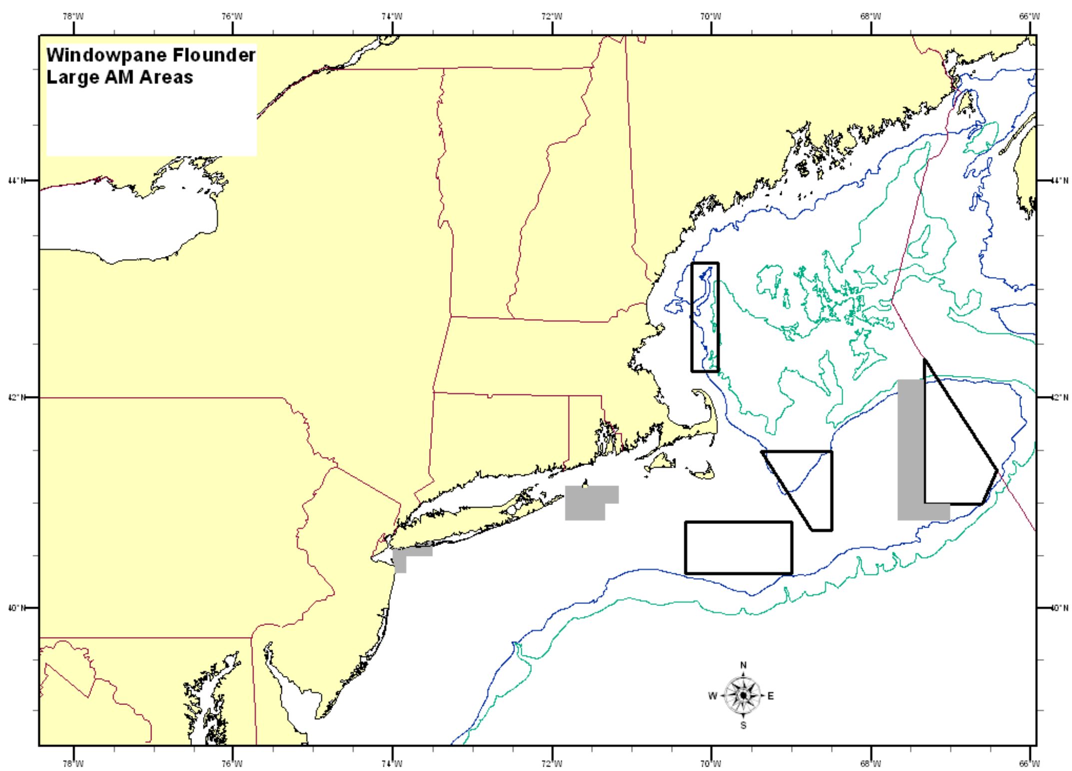


Figure 3 – AM area (large) for windowpane flounder and ocean pout



Potential Economic Impacts of Windowpane flounder AMs described in FW47

If adopted, this option would implement trawl gear restrictions in certain areas during either year 2 or year 3 based on ACL overages that occurred in year 1.

If this option were triggered, both common pool and sector-based vessels would have the choice of either using an approved selective gear or not fishing in the area. Two sub-options are considered, the first with smaller areas and the second with larger areas.

Sub-option 1: Smaller areas

Nearly $7 million dollars of total revenues by groundfish fishing vessels are estimated from trips in these areas. The majority of these revenues (93%) were reported on trips hailing from New Bedford, MA (Table 75). Note also that $6 million dollars in gross revenue from vessels hailing from New Bedford is not insignificant—it is nearly 10% of the $65 million landed in that port by permitted groundfish vessels in FY 2010.

Table 76 – Gross revenues from VTR trips reported inside Sub-option 1 (smaller areas) during FY 2010

PORT	**GROSS REVENUE**
Boston, MA	$ 169,802
Gloucester, MA	$ 82,521
New Bedford, MA	$ 6,136,129
Nantucket, MA	$ 357
Montauk, NY	$ 138,882
Newport, RI	$ 13,887
Pt Judith, RI	$ 410,124
Grand Total	$ 6,951,702

Only a portion of these revenues will be affected by this option, as vessels may still elect to fish inside these areas with selective gear. Selective gears have not been used extensively in these areas thus far, indicating that it is generally more profitable to fish with traditional gears than selective gears. Whether it will be more profitable to fish in other areas or to continue fishing inside these areas with selective gears depends on the profitability of other fishing options. Given the relatively small size of these areas, the additional trip costs (steaming time, etc.) are likely negligible. The true cost will be the difference between the profitability of fishing inside these areas and the profitability of making those trips in the next best outside area.

The use of selective gear does substantially change the composition of the catch inside the windowpane and ocean pout (small) areas. Both VTR reported and observer data collected from tows inside the areas show a much higher proportion of haddock and lower proportion of flatfish relative to traditional trawl gears.

Table 77 – Proportion of kept catch on observed and VTR-reported trips using selective (separator, Rhule) and traditional (otter) trawl gears inside the small windowpane AM option areas

	Observer				VTR			
	selective		**traditional**		**selective**		**traditional**	
cod	$ 23,194	4.1%	$ 155,022	13.5%	$ -	0.00%	$ 525,406	7.6%
haddock	$ 510,581	91.1%	$ 656,658	57.3%	$ 64,553	100.00%	$ 3,128,320	45.4%
flats	$ 24,012	4.3%	$ 259,142	22.6%	$ -	0.00%	$ 1,624,265	23.6%
pollock	$ 117	0.0%	$ 9	0.0%	$ -	0.00%	$ 3,522	0.1%
white hake	$ -	0.0%	$ 6	0.0%	$ -	0.00%	$ 5,591	0.1%
skates	$ 1,688	0.3%	$ 32,881	2.9%	$ -	0.00%	$ 1,377,939	20.0%
other	$ 783	0.1%	$ 36,106	3.2%	$ -	0.00%	$ 10,601	3.1%
squids	$ -	0.0%	$ 5,255	0.5%	$ -	0.00%	$ 211,506	0.2%
Grand Total	$ 560,376		$ 1,145,079		$ 64,553		$ 6,887,148	

Average revenues per tow for the selective gears in these areas were approximately 31% higher than per-tow revenues using traditional gears on observed trips, though fewer tows were observed. Whether or not fisherman will chose to use the selective gear in these areas remains to be seen, but while this option appears to affect $7 million in revenues it appears that nearly all of that revenue can be made up for at relatively low cost by using the approved selective gears or moving to a different fishing location.

Table 78 – Revenue per tow by two types of trawl gears from tows observed inside windowpane small areas

Trawl net	**Revenue per tow**	**number tows**
selective	$ 2,536	223
traditional	$ 1,918	597

Sub-option 2: Larger areas

Approximately $15 million in estimated gross revenues is estimated to have come from these areas, with 75% of these revenues coming from New Bedford, MA. Pt. Judith is the next-most affected port, with almost $1.7 million in estimated gross revenues coming from these areas.

Table 79 - Gross revenues from VTR trips reported inside Sub-option 2 (larger areas) during FY 2010

Port	Gross revenue
Stonington, CT	$ 42,178
Boston, MA	$ 299,027
Gloucester, MA	$ 256,697
New Bedford, MA	$ 11,717,014
Nantucket, MA	$ 26,708
Pt Pleasant, NJ	$ 44,777
Cape May, NJ	$ 11,698
Monmouth, NJ	$ 15,571
Belford, NJ	$ 517,276
Belmar, NJ	$ 5,630
Freeport, NY	$ 139,899
Greenport, NY	$ 20,750
Montauk, NY	$ 605,159
Point Lookout, NY	$ 242,128
Newport, RI	$ 59,075
Pt Judith, RI	$ 1,670,090
Grand Total	$ 15,685,911

Selective gears again substantially change the composition of the catch inside the windowpane and ocean pout large areas. Both VTR reported and observer data collected from tows inside the areas show a much higher proportion of haddock and lower proportion of flatfish relative to traditional trawl gears.

As with the small windowpane areas, catch rates per observed tow were about 33% higher with the selective gears than with traditional gear for observed tows in the large areas. As with the smaller areas, it is not clear that all revenues from these areas will be lost if the AMs are triggered, as vessel operators may choose to use selective gear, or may fish in other areas.

Table 80 - Proportion of kept catch on observed trips using selective (separator, Ruhle) and traditional (otter) trawl gears inside the large windowpane AM option areas

	Observer				VTR			
	selective		**traditional**		**selective**		**traditional**	
cod	$ 75,181	7.4%	$ 294,954	12.5%	$ 59,338	11.80%	$ 984,926	6.5%
haddock	$ 818,668	80.6%	$ 880,722	37.3%	$ 347,798	69.00%	$ 4,970,878	32.7%
flats	$ 48,349	4.8%	$ 581,598	24.6%	$ 66,019	13.10%	$ 4,373,327	28.8%
pollock	$ 56,472	5.6%	$ 4,783	0.2%	$ 2,925	0.60%	$ 35,403	0.2%
white hake	$ 38	0.0%	$ 2,054	0.1%	$ -	0.00%	$ 61,362	0.4%
skates	$ 4,450	0.4%	$ 266,161	11.3%	$ 1,217	0.20%	$ 2,615,678	17.2%
other	$ 11,972	1.2%	$ 229,621	9.7%	$ -	5.30%	$ 519,877	10.7%
squids	$ -	0.0%	$ 101,112	4.3%	$ 26,745	0.00%	$ 1,620,419	3.4%
Grand Total	$ 1,015,131		$ 2,361,006		$ 504,042		$ 15,181,869	

Table 81 - Revenue per tow by two types of trawl gears from tows observed inside windowpane large areas

Trawl net	**Revenue per tow**	**number tows**
selective	$ 2,452	417
traditional	$ 1,804	1309

In summary, implementing the small windowpane flounder and ocean pout AM area could affect $7 million in groundfish revenue; while the larger area could affect $15 million in revenue. Not all of these revenues are likely to be foregone, as fishermen can choose to fish in the areas with selective gear or could fish in other areas. The delay in implementation of the restriction will give fishermen some time to plan their operations to mitigate the economic impacts of the measure. This AM will have negative economic impacts compared to the Option 1/No Action AMs for these stocks because it will actually affect fishing behavior and the AM applies to all groundfish fishing vessels, not just common pool vessels. At a minimum, fishermen will have to alter their behavior which may impose additional costs; while at a maximum, it could reduce revenues by $15 million if the larger areas are implemented simultaneously. This option cannot be compared to Options 3, 4 or 5 because they address different stocks.