



New England Fishery Management Council

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MEMORANDUM

DATE: November 22, 2017
TO: Groundfish PDT
FROM: Scallop PDT
SUBJECT: **Scallop Fishery Catch Projections for FY 2018**

This memo is intended to provide the Groundfish PDT with projected scallop fishery catch estimates for the four flatfish stocks that the scallop fishery has sub-ACLs for: GB yellowtail flounder, SNE/MA yellowtail flounder, GOM/GB windowpane flounder, and SNE/MA windowpane flounder. The Scallop PDT met on November 9, 2017, and reviewed bycatch projections of these four stocks. A description of how scallop fishery sub-ACLs were developed, and how they are calculated is contained in Table 1.

Table 1 - Details around the development of scallop fishery sub-ACLs

Stock	Action	Approach	Percentage or recurring estimate?	Details
SNE/MA Windowpane	FW48	Catch history (10 year period)	<u>Fixed</u> percentage at 36%	90 th percentile of estimated catch from 2001-2010
GB Yellowtail	FW48	Catch history	<u>Fixed</u> percentage at 16%	Council considered a range (8%-16%)
SNE/MA Yellowtail	Multiple (FW44, FW55)	Percentage of estimated catch (90% - 100% in past actions)	<u>Recurring estimate of catch.</u>	Estimated catch completed by Scallop PDT
GOM/GB Windowpane Flounder	FW56	Catch history (10 year period)	<u>Fixed</u> percentage at 21%	90 th percentile of estimated catch from 2005-2014

Framework 29 Overview:

Scallop Framework 29 is considering a range of allocations for FY 2018, which include scenarios where measures in OHA2 are approved (Table 2). The Council may select a provisional preferred alternative for each scenario. A description of the anticipated scallop

landings and spatial management configuration for each measure (under each OHA2 scenario) is described in Table 8. It is worth noting that the spatial management configuration varies substantially between some measures, which is expected to drive swings in bycatch estimates for each stock. For example, if NMFS approves OHA2 measures for the Great South Channel and Southern New England, some allocation alternatives shift effort from Closed Area II, where the fishery interacts with GB yellowtail and Northern windowpane, to the Nantucket Lightship “West” area, which is considered part of the SNE/MA yellowtail and Southern windowpane stock areas. A series of figures outlining the spatial management under each alternative are included to provide context. Scallop landings may increase next year (52 mil. lbs – 60 mil. lbs), based on the 2018 projected landings estimates (Table 8).

Table 2 - Range of specification scenarios under consideration in Scallop FW 29.

#	OHA2 Specification Scenarios	Council’s preferred alternative
1	Status Quo – No change to current habitat and groundfish closures.	TBD
2	Approval and implementation of both Georges Bank measures (Alternative 10 in 2.3.4 of OHA2) and Great South Channel and Southern New England (Alternative 4 in Section 2.3.5 of OHA2)	TBD
3	Approval and implementation of only Great South Channel and Southern New England measures through OHA2	TBD
4	Approval and implementation of only Georges Bank measures through OHA2	TBD

Methods:

Since bycatch sub-ACLs were first allocated to the scallop fishery in 2010, the Scallop PDT has calculated a projection of catch for the decision making process and evaluation of potential impacts. The methods have evolved slightly over time but in general there are three steps. First, a discard to kept ratio (D:K) is estimated from the most recent observer data available and applied to updated estimates of scallop and groundfish biomass. The estimates this year include a D:K ratio (fish catch / scallop retained) for all SAMS areas using observer data from 2016 – 2017, except in the CAII-Ext where 2015 data was used, and areas with no history of fishing (EFH area, NLS-S, NLS-Ext). The baseline D:K ratio was adjusted to calculate estimates for 2018 – 2021 using the formula:

$$D:K_y = \text{Baseline } D:K \left(\frac{EBms_{16-17}}{EBms_y} \right)$$

where y is the year of the estimate. Bycatch was calculated in each area using the formula:

$$\text{Projected Catch} * (D:K_y)$$

Dr. Dvora Hart developed GAM models for yellowtail and windowpane flounder to estimate bycatch in areas where there has been little or no history of fishing. These models provide an estimate of relative abundance for each flatfish stock. For Closed Area I, the GAM models used observer data from Georges Bank, while GAM models for the NLS-West, NLS-S, and NLS-ext

use data from Long Island, southern New England, and the NLS-N. Data from 2000 – 2017 were used in both cases. Predictors of catch included haul duration, year, depth, longitude, and closed area (NLS/CAI/CAII/Open). A month variable was also used for windowpane. The predicted bycatch rate for each of the candidate areas in 2018 was compared to the predicted bycatch rate for a nearby fished area (CAI in 2011/12 and NLS in 2017). The observed D:K ratio in the fished areas was then adjusted for the predicted difference in bycatch, and for the difference in scallop exploitable biomass. The monthly landings pattern was assumed to be like the 2017 NLS fishery, with remaining landings spread evenly over November and March.

Bycatch estimates for each of the four flatfish stocks for FY 2018 were calculated for each run (Table 3). The Scallop PDT also calculated bycatch estimates for FY 2019 – 2021 to be consistent with the approach used in Scallop Framework 27/Groundfish Framework 55. The scallop PDT updates these bycatch estimates as part of the annual specifications process.

Table 3 - Overview of FY 2018 projected scallop fishery bycatch estimates for each specification run under consideration in FW 29.

Scenario (Table 2)	SAMS Run/Alternative	NWP	GBYT	SNEYT	SWP
No Action	na	44.96	6.06	4.47	33.73
Status Quo	sq	74.79	67.95	5.96	236.53
1	Base36	57.18	36.46	4.16	236.53
	Base40	60.54	36.92	4.51	250.57
	Base44	63.74	37.36	4.84	263.5
2	NLSW36	46.69	5.57	4.89	294.1
	NLSW40	50.64	6.04	5.25	308.23
3	5BOTH36	57.59	12.55	4.64	264.14
	5BOTH40	61.54	13.02	5	278.27
	6BOTH295	50.68	11.72	4.2	261.74
	6BOTH26	46.72	11.25	3.84	246.34
4	CA136	68.08	43.44	4.15	228.6

Scallop PDT Discussion:

1. The flatfish bycatch projections are forecasts (with error) and should not be interpreted as precise estimates. Out-year projections (FY 2019 – FY 2021) should be viewed with additional skepticism because the underlying scallop fishery assumptions that drive bycatch estimates (ex: total DAS, which access areas are open and closed) are likely to change. This is further exacerbated by the uncertainty of where the scallop fishery may fish in the future depending on the outcome of OHA2.
2. In general, the PDT feels that estimates represent a reasonable approximation of catch that may occur. Review of past estimates has shown the projections have both over-estimated and under-estimated catches. It is important to note that the methods and underlying assumptions used for in-season catch accounting may vary from the methods used by the Scallop PDT to project catch.
3. Several scenarios and alternatives consider access to areas that have been closed as EFH or have not been traditionally fished. The Scallop PDT attempted to address data

deficiencies in these areas by developing GAM models and expanding on the methods that have been used to project bycatch in the past. However, there is considerable uncertainty around the estimates for these EFH and NLS areas.

4. Compared to OHA2 Scenario 1, Scenarios 2, 3, and 4 (Table 2) are anticipated to minimize impacts on all flatfish stocks for which the fishery has sub-ACLs because OHA2 scenarios generally direct fishing effort out of Closed Area II, where the fishery interacts with GB yellowtail and Northern windowpane. Instead, the fishery would work on high densities of scallops in the NLS-West where bycatch of SNE/MA yellowtail is anticipated to be very low. In some specification scenarios, the PDT projects that 5 access area trips (~30 million lbs of scallop meats) in the SNE/MA yellowtail stock area would result in ~6 mt of bycatch of that stock, while easing pressure on GB yellowtail and Northern windowpane. Because the bycatch of SNE/MA yellowtail flounder is anticipated to be ~6 mt or less in all specification scenarios, which is ~8.6% of what might be a 52 mt ABC for the stock, the scallop PDT is not recommending additional proactive measures (beyond maintaining closures) to reduce catches at this time.
5. The PDT also discussed the principles of rotational management, such as closing areas for multiple years to improve yield-per-recruit. In practice, F is reduced to zero in the years prior to an opening of an area. On the temporal scale of fishing years, effort in CAII AA could be considered periodic and is reflected by intermittently high catches of GB yellowtail, N. windowpane, and scallops in this area; in years when CAII AA is not fished, bycatch of GB yellowtail and N. windowpane decreases considerably, and scallops are caught elsewhere. This seesaw effect of opening and closing access areas is exemplified by projected bycatch estimates for FY2018; fishing both CAII AA and Georges Bank open areas (i.e. BASE runs) is projected to result in ~36 mt of GB yellowtail bycatch, while closing CAII AA is anticipated to result in ~6 mt of GB yellowtail bycatch from Georges Bank open areas (Table 6). This trend is also evident in projected bycatch of N. windowpane when CAII AA is fished compared to when it is not.
6. The Council has taken several steps in recent years to reduce/eliminate incentives for the scallop fishery to catch yellowtail, including the prohibition of possession/landing yellowtail. In addition to the use of a 10" twine top and maximum 7-row dredge apron, there is a seasonal closure of CAII AA from Aug. 15 – Nov. 15 to reduce yellowtail bycatch. FW29, like FW28, contains measures to prohibit RSA compensation fishing in CAII AA to reduce potential impacts on Northern windowpane flounder and GB yellowtail flounder.

Additional Information:

The Scallop PDT reviewed projected catch estimates relative to the overall ABC and scallop sub-ACLs under consideration in Groundfish Framework 57 for Northern Windowpane flounder, Southern windowpane flounder, and Georges Bank yellowtail. The PDT also looked at the projected catch of SNE/YT flounder as a percentage of the 52 mt ABC, and what "90%" of the SNE/MA yellowtail projected catch would be. As sub-ACLs decline, what may have been considered small or modest overages in the past balloon into 300+% overages. It is important to consider the potential starting value for the sub-ACL relative to projected catch, but also past catches of a particular stock. For example, the 2018 projected catch of Northern windowpane are roughly half of what the PDT projected the 2017 catches would be, but projection as a percentage of the sub-ACL is higher in 2018 than 2017 in some cases.

Table 4 - Summary of Northern windowpane bycatch estimates, and comparison of projection to overall ABC and scallop fishery sub-ACL values.

Scallop FW 29 Bycatch Estimates									
Scenario	SAMS Run	NWP bycatch estimate	NWP US ABC (mt))	Scallop Allocation (% of ABC)	Scallop ABC	Scallop ACL	bycatch estimate as % of ABC	bycatch estimate as % of sub-ACL	
	a	b	c	d	e	f	g	h	
							(b/c)*100	(b/f)*100	
No Action	na	44.96	92	21%	19	18	49%	250%	
Status Quo	sq	74.79	92	21%	19	18	81%	416%	
1	Base36	57.18	92	21%	19	18	62%	318%	
	Base40	60.54	92	21%	19	18	66%	336%	
	Base44	63.74	92	21%	19	18	69%	354%	
2	NLSW36	46.69	92	21%	19	18	51%	259%	
	NLSW40	50.64	92	21%	19	18	55%	281%	
3	5BOTH36	57.59	92	21%	19	18	63%	320%	
	5BOTH40	61.54	92	21%	19	18	67%	342%	
	6BOTH295	50.68	92	21%	19	18	55%	282%	
	6BOTH26	46.72	92	21%	19	18	51%	260%	
4	CA136	68.08	92	21%	19	18	74%	378%	

Table 5 - Summary of Southern windowpane bycatch estimates, and comparison of projection to overall ABC and scallop fishery sub-ACL values

Scallop FW 29 Bycatch Estimates									
Scenario	SAMS Run	SWP bycatch estimate	SWP US ABC (mt)	Scallop Allocation (% of ABC)	Scallop ABC	Scallop ACL	bycatch estimate as % of ABC	bycatch estimate as % of sub-ACL	
	a	b	c	d	e	f	g	h	
							(b/c)*100	(b/f)*100	
No Action	na	33.73	473	36%	170	158	7%	21%	
Status Quo	sq	236.53	473	36%	170	158	50%	150%	
1	Base36	236.53	473	36%	170	158	50%	150%	
	Base40	250.57	473	36%	170	158	53%	159%	
	Base44	263.5	473	36%	170	158	56%	167%	
2	NLSW36	294.1	473	36%	170	158	62%	186%	
	NLSW40	308.23	473	36%	170	158	65%	195%	
3	5BOTH36	264.14	473	36%	170	158	56%	167%	
	5BOTH40	278.27	473	36%	170	158	59%	176%	
	6BOTH295	261.74	473	36%	170	158	55%	166%	
	6BOTH26	246.34	473	36%	170	158	52%	156%	
4	CA136	228.6	473	36%	170	158	48%	145%	

Table 6 - Summary of GB yellowtail bycatch estimates, and comparison of projection to overall ABC and scallop fishery sub-ACL values

Scallop FW 29 Bycatch Estimates									
Scenario	SAMS Run	GBYT bycatch estimate	GBYT US ABC (mt)	Scallop Allocation (% of ABC)	Scallop ABC	Scallop ACL	bycatch estimate as % of ABC	bycatch estimate as % of sub-ACL	
	a	b	c	d	e	f	g	h	
							(b/c)*100	(b/f)*100	
No Action	na	6.06	213	16%	34	33	3%	18%	
Status Quo	sq	67.95	213	16%	34	33	32%	206%	
1	Base36	36.46	213	16%	34	33	17%	110%	
	Base40	36.92	213	16%	34	33	17%	112%	
	Base44	37.36	213	16%	34	33	18%	113%	
2	NLSW36	5.57	213	16%	34	33	3%	17%	
	NLSW40	6.04	213	16%	34	33	3%	18%	
3	5BOTH36	12.55	213	16%	34	33	6%	38%	
	5BOTH40	13.02	213	16%	34	33	6%	39%	
	6BOTH295	11.72	213	16%	34	33	6%	36%	
	6BOTH26	11.25	213	16%	34	33	5%	34%	
4	CA136	43.44	213	16%	34	33	20%	132%	

Table 7 - Summary of Southern New England yellowtail bycatch estimates, with bycatch projection as a percentage of the overall ABC

Scallop FW 29 Bycatch Estimates					
Scenario	SAMS Run	SNEYT bycatch estimate	SNEYT US ABC (mt)	bycatch estimate as % of ABC	90% of SNEYT estimate
	a	b	c	g	h
				(b/c)*100	b*0.90
No Action	na	4.47	52	9%	4.02
Status Quo	sq	5.96	52	11%	5.36
1	Base36	4.16	52	8%	3.74
	Base40	4.51	52	9%	4.06
	Base44	4.84	52	9%	4.36
2	NLSW36	4.89	52	9%	4.40
	NLSW40	5.25	52	10%	4.73
3	5BOTH36	4.64	52	9%	4.18
	5BOTH40	5	52	10%	4.50
	6BOTH295	4.2	52	8%	3.78
	6BOTH26	3.84	52	7%	3.46
4	CA136	4.15	52	8%	3.74

Table 8 - Preliminary Scallop Fishery Specifications under consideration in FW29.

	FW 29 Measure	Status Quo FW 28 preferred applied in 2018	Alternative 1 No Action (FW 28 Def.)	Alternative 2 Base Runs		Alternative 3 Both CAI and NLS-W open, 5 trip option		Alternative 4 Both CAI and NLS-W open, 6 trip option		Alternative 5 Only NLS West opens		Alternative 6 Only CAI Opens
a	Section in FW29	4.4.7	4.4.1	4.4.2.1	4.4.2.2	4.4.3.1	4.4.3.2	4.4.4.1	4.4.4.2	4.4.5.1	4.4.5.2	4.4.6
b	Open Area F	F=0.44	F=0.39	F=0.36	F=0.4	F=0.36	F=0.4	F=0.26	F=0.295	F=0.36	F=0.4	F=0.36
c	Run Title	sq	na	BASE36	BASE40	5BOTH36	5BOTH40	6BOTH26	6BOTH295	NLSW36	NLSW40	CAIF36
d	Landings w/ CAI carryover					57.7 mil	59.9 mil	57.9 mil	60 mil	57.8 mil	59.9 mil	53.0 mil
e	APL after set-asides	41.7 mil	22.3 mil	49.6 mil	51.5 mil	53.8 mil	57.6 mil	53.9 mil	56.1 mil	53.9 mil	55.9 mil	49.0 mil
f	FT LA DAS	25	21.75	23	26	28	31	21	24	28	31	23
g	FT Access Area Allocation	72,000	18,000	90,000	90,000	90,000	90,000	108,000	108,000	90,000	90,000	90,000
h	FT trips at 18,000 lbs	4	1	5	5	5	5	6	6	5	5	5
i	LAGC IFQ Only (5%) Quota	2.08 mil	1.1 mil	2.48 mil	2.57 mil	2.69 mil	2.8 mil	2.7 mil	2.8 mil	2.7 mil	2.8 mil	2.45 mil
j	Projected Open Area LPUE	2,178	2,221	2,508	2,476	2,531	2,500	2,607	2,581	2,531	2,500	2,508
k	Area Swept Est. (sqnm)	4,214	2,581	2,852	3,095	2,673	2,941	2,050	2,271	2,584	2,941	2,777
l	Spatial Management Configuration for Each Framework 29 Specifications Alternative											
m	Georges Bank Area											
n	CL1ACC	Closed	Closed	Closed	Closed	Closed	Closed	1 trip CA I AA	1 trip CA I AA (CL1ACC & CL1NA)	1 trip CA I AA	1 trip CA I AA (CL1ACC & CL1NA)	1 trip CA I AA (CL1ACC & CL1NA)
o	CL1NA	Closed	Closed	Closed	Closed	Closed	Closed	(CL1ACC & CL1NA)	(CL1ACC & CL1NA)	(CL1ACC & CL1NA)	(CL1ACC & CL1NA)	(CL1ACC & CL1NA)
p	CL-2(N)	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
q	CL-2(S)	CA II AA	Closed	1 trip CA II AA	1 trip CA II AA	Closed	Closed	Closed	Closed	Closed	Closed	1 trip CA II AA (CL-2(S) & CL2Ext)
r	CL2Ext	Closed	Closed	(CL-2(S) & CL2Ext)	(CL-2(S) & CL2Ext)	Open	Open	Open	Open	Open	Open	Open
s	NLSAccN	NLS AA	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
t	NLSAccS	NLS AA	Closed	1 Trip in NLS-South	1 Trip in NLS-South	1 Trip in NLS-South	1 Trip in NLS- South	Closed	Closed	1 Trip in NLS-South	1 Trip in NLS- South	1 Trip in NLS- South
u	NLSNA	Closed	Closed	Closed	Closed	2 Trips in NLS-West	2 Trips in NLS- West	2 Trips in NLS-West	2 Trips in NLS- West	2 Trips in NLS-West	2 Trips in NLS- West	Closed
v	NLSExt	NLS AA	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
w	NF	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
x	SCH	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
y	SF	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
z	MidAtlantic											
aa	Block Island	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
bb	Long Island	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
cc	NYB	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
dd	MA inshore	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
ee	HCSAA	MAAA	MAAA	3 Trips MAAA	3 Trips MAAA	2 Trips MAAA	2 Trips MAAA	2 Trips MAAA	2 Trips MAAA	2 Trips MAAA	2 Trips MAAA	2 Trips MAAA
ff	ET Open	MAAA	MAAA									
gg	ET Flex	ET-Flex	Closed									
hh	DMV	MAAA	MAAA	Open, DMV@F=0	Open, DMV@F=0	Open, DMV@F=0	Open, DMV@F=0	Open, DMV@F=0	Open, DMV@F=0	Open, DMV@F=0	Open, DMV@F=0	Open, DMV@F=0
ii	Virginia	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open

Figure 1 - Spatial management under Scenario 1 - No changes made through OHA2, status quo (BASE36, BASE40 in Table 8)

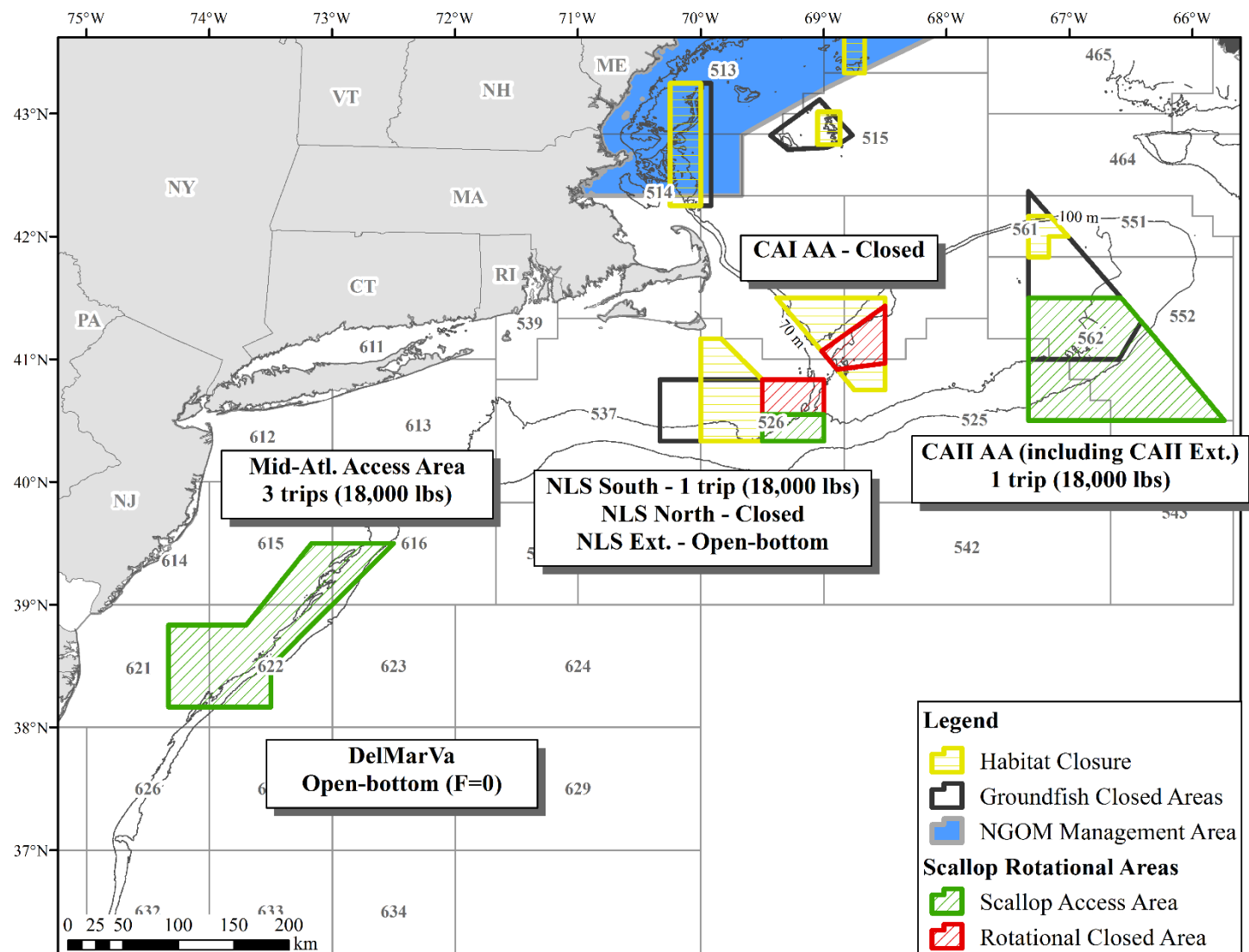


Figure 2 - Spatial management under Scenario 2 – Both NLS-West and CAI available (5BOTH36, 5BOTH40 in Table 8)

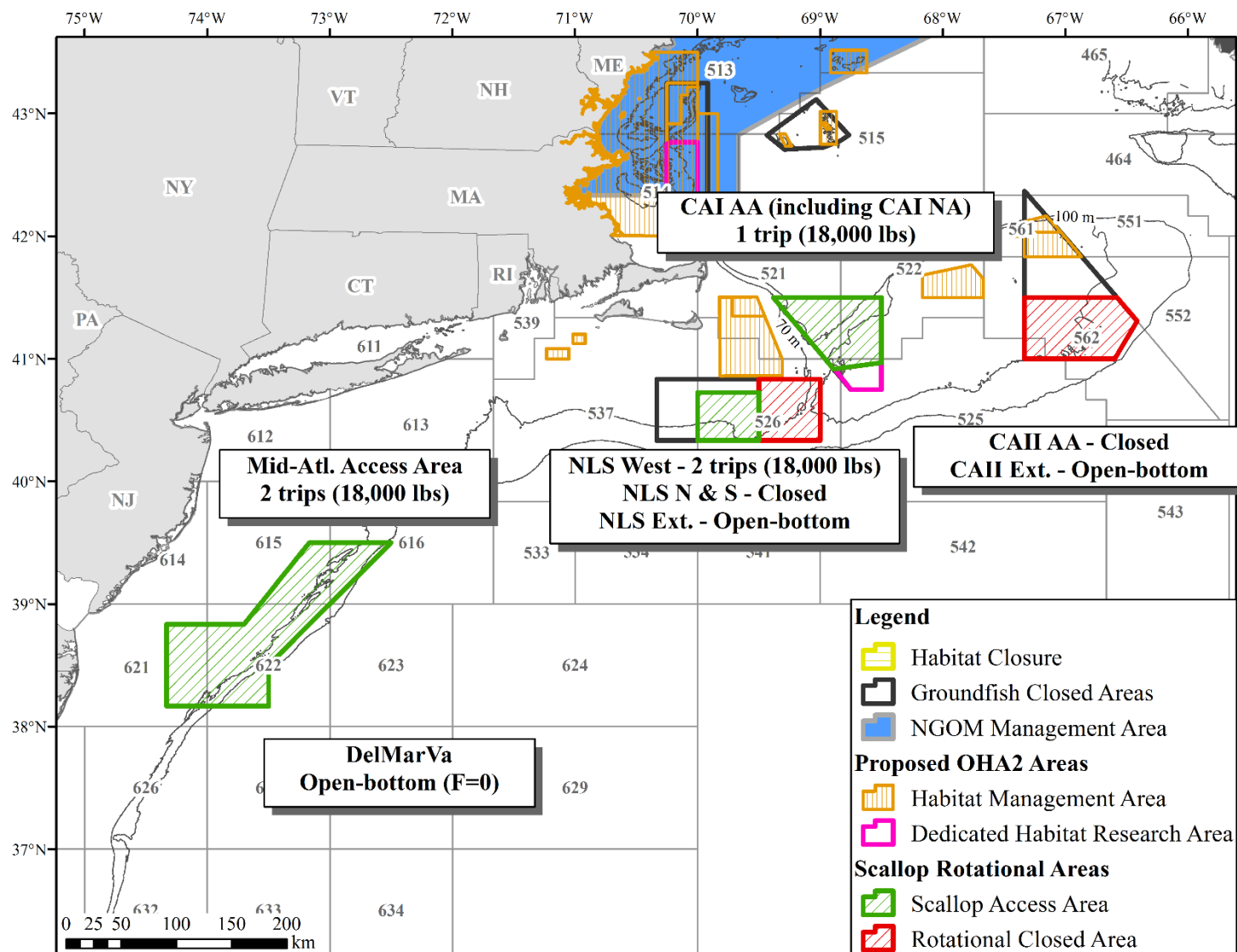


Figure 3 – Spatial management under Scenario 3 – Only NLS-West opens (NLSW36 and NLSW40 in Table 8)

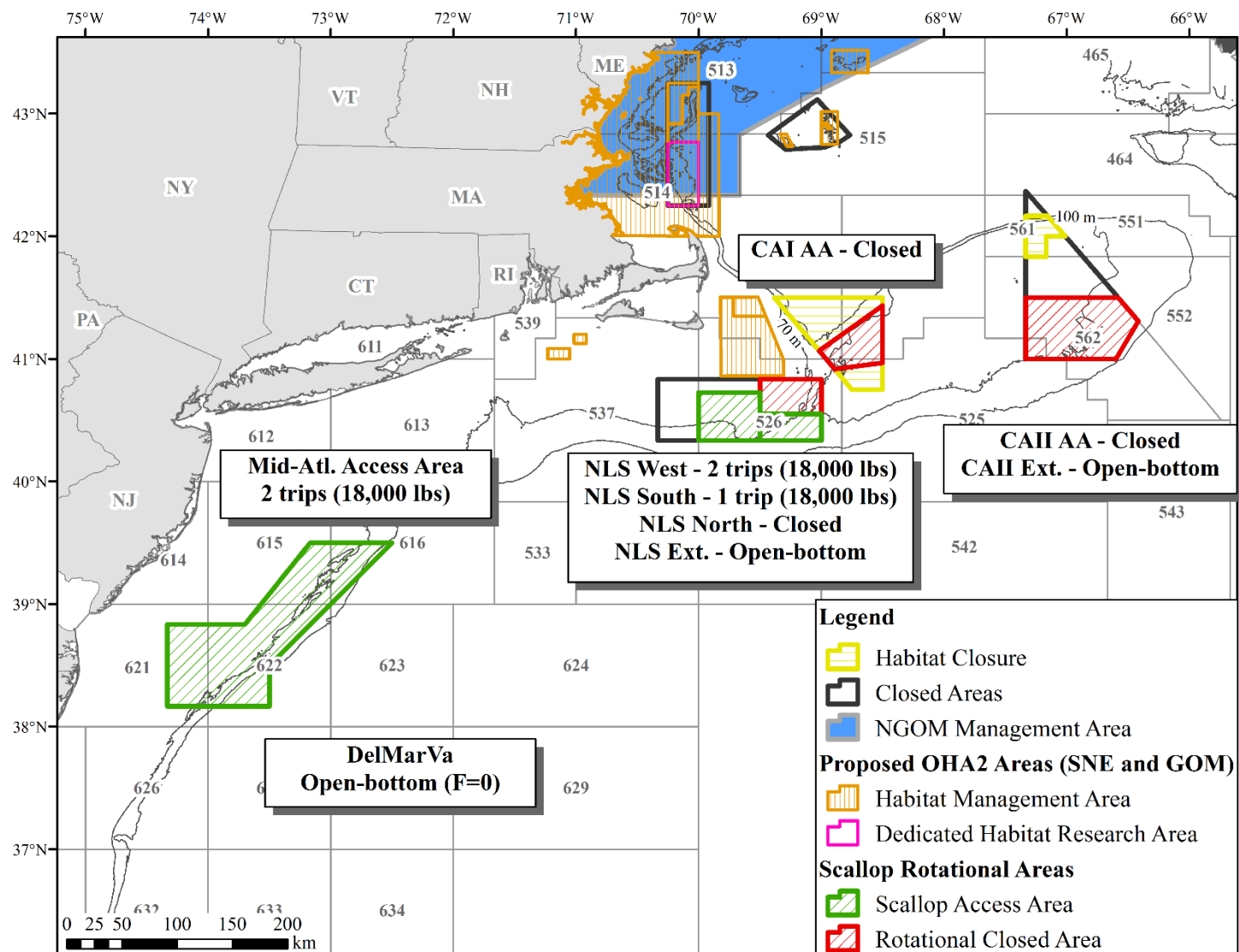


Figure 4 - Spatial management under Scenario 4 – Only Closed Area I available (C1F36 in Table 8)

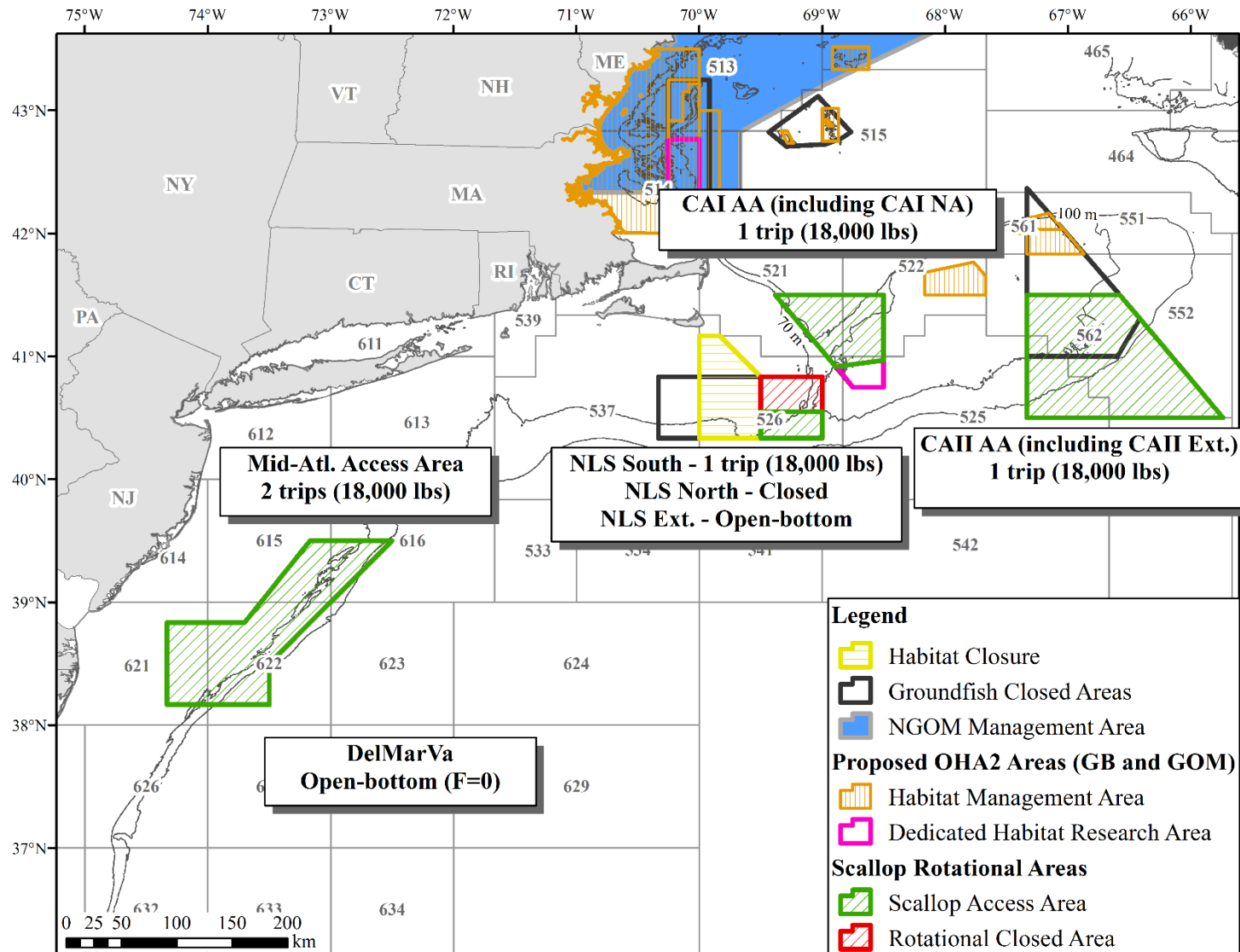


Figure 5 – Outputs from GAM models showing year effects (with confidence intervals).

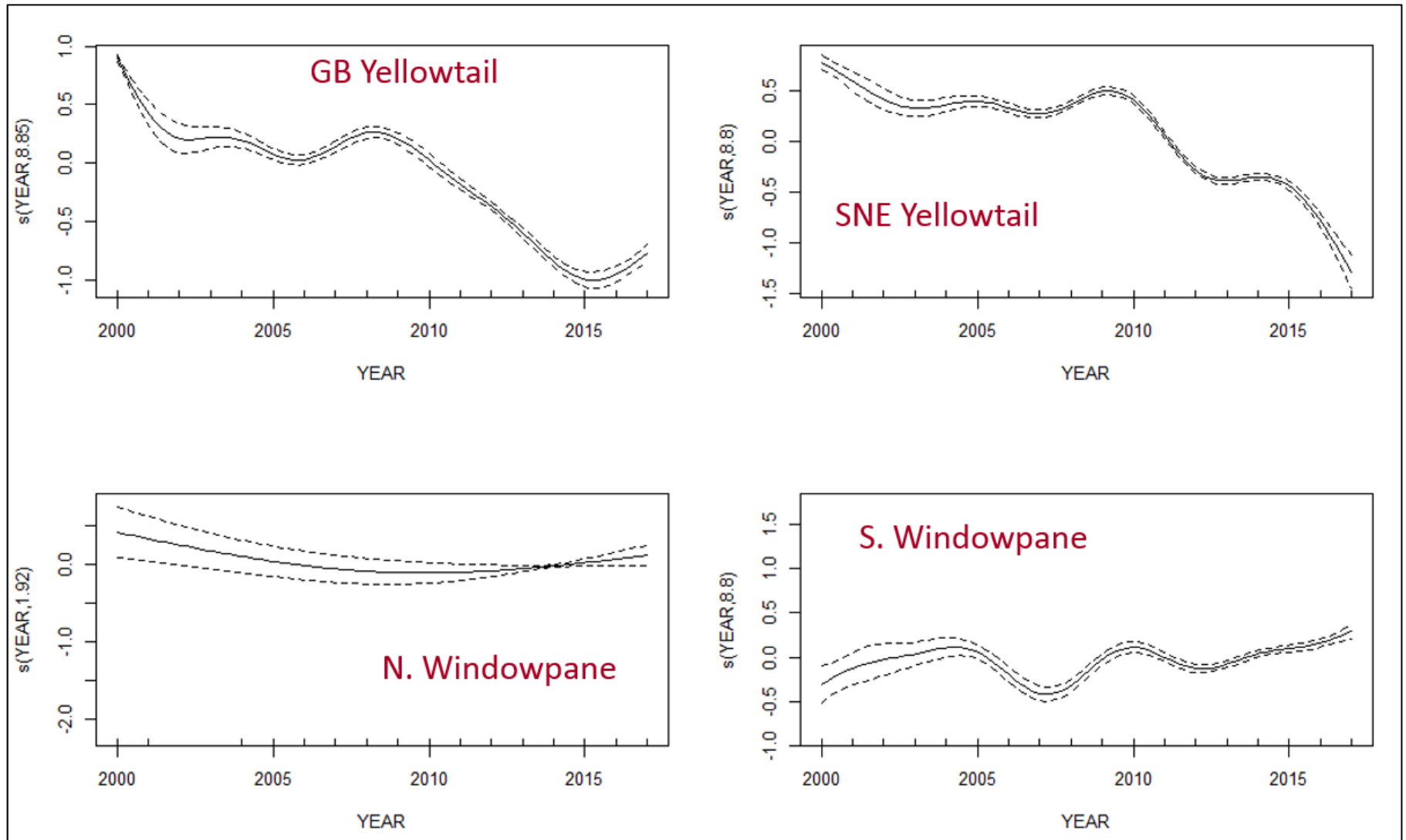


Figure 6 - GAM month effects for Northern windowpane flounder at 70 meters and 100 meters.

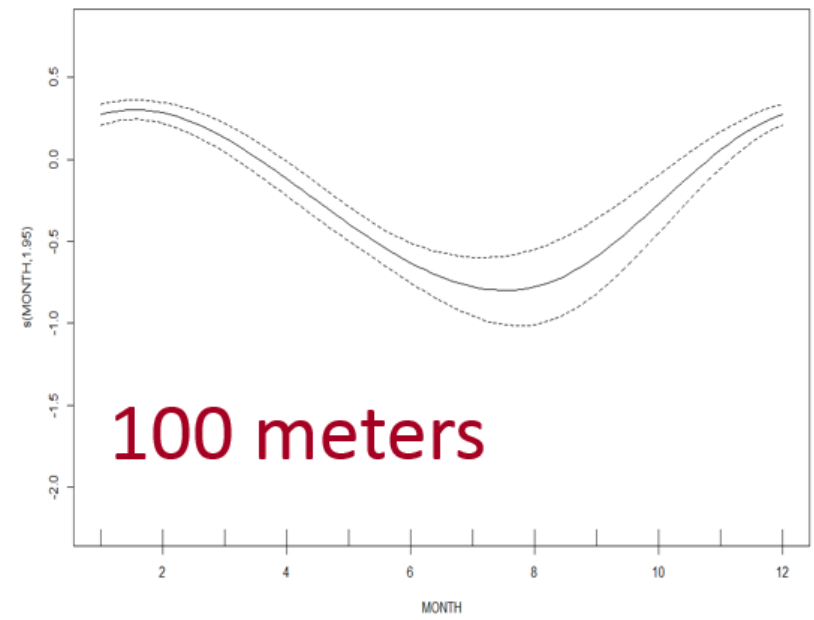
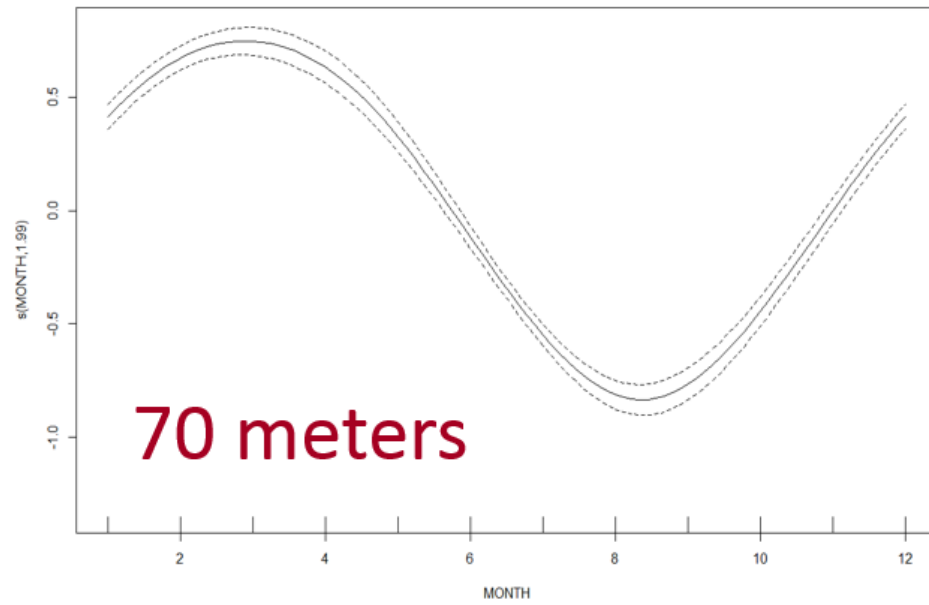


Figure 7 - Predicted D:K relationship for CA-I North for 2018, with observed D/K ratios from 2011/2012 (red dots)

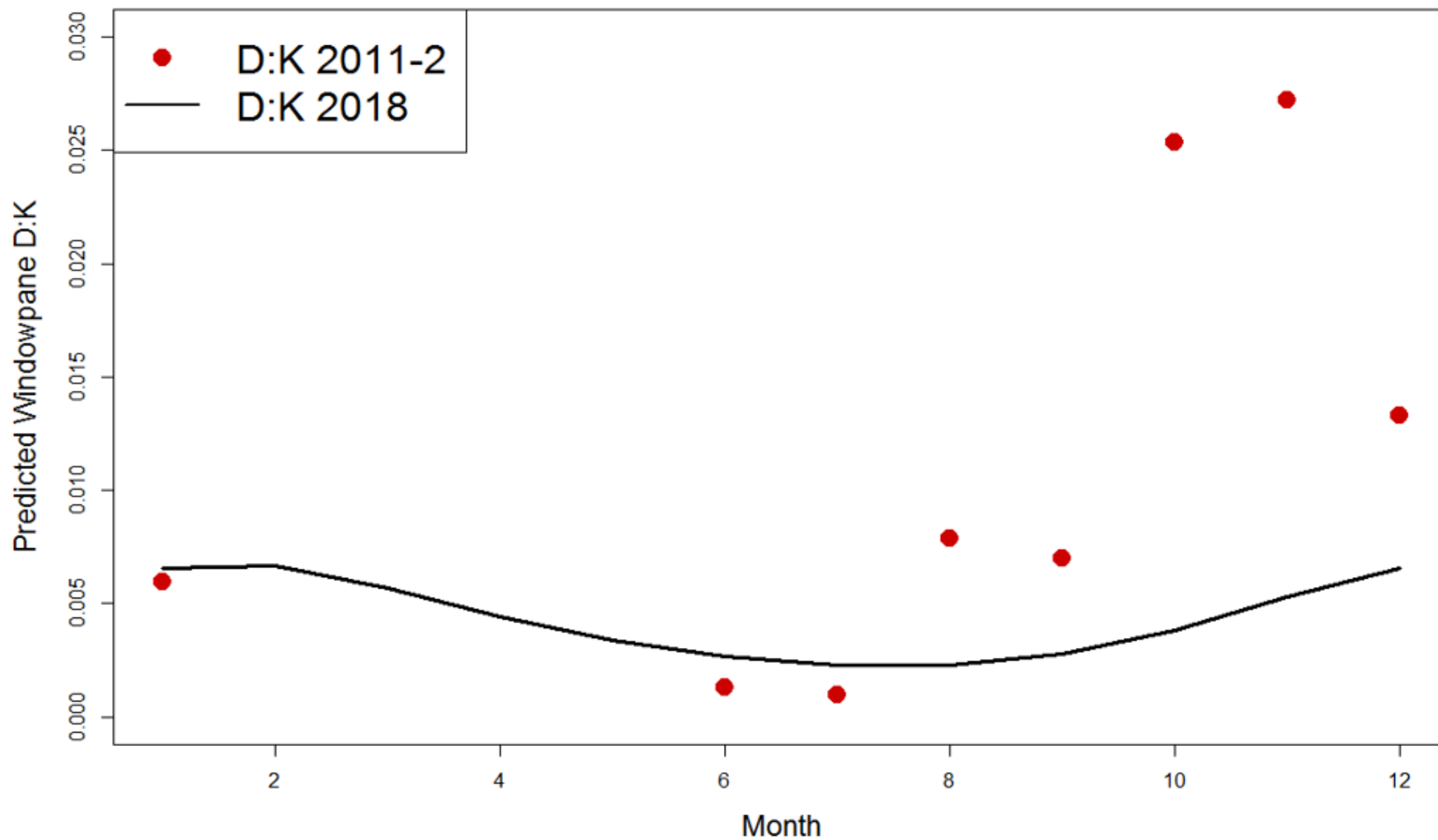


Table 9 - Scallop bycatch estimates for Northern and Southern windowpane flounder for FY 2018 - FY 2021.

NWP				
	FY 2018	FY 2019	FY 2020	FY 2021
na	44.96	77.64	73.6	69.82
sq	74.79	66.46	74.34	70.39
Base36	57.18	67.06	73.91	69.99
Base40	60.54	67.46	74.17	70.07
Base44	63.74	67.86	74.41	70.17
nlsefh36	46.69	67.16	73.77	69.67
nlsefh40	50.64	67.58	74.08	69.77
nlc136	57.59	67.16	78.76	74.69
nlc140	61.54	67.58	79.06	74.79
nlc1295	50.68	66.48	78.28	74.53
nlc126	46.72	66.12	78	74.44
c136	68.08	67.06	78.9	74.86

SWP				
	FY 2018	FY 2019	FY 2020	FY 2021
na	33.73	530.74	462.07	454.03
sq	236.53	366.73	463.5	454.81
Base36	236.53	531.47	464.21	454.05
Base40	250.57	532.79	464.95	453.89
Base44	263.5	534.14	465.67	453.71
nlsefh36	294.1	575.52	498.34	486.27
nlsefh40	308.23	576.91	499.21	486.09
nlc136	264.14	575.3	498.22	486.2
nlc140	278.27	576.69	499.09	486.02
nlc1295	261.74	573.27	496.93	486.36
nlc126	246.34	572.1	496.13	486.33
c136	228.6	531.12	463.93	453.41

Table 10 - Scallop bycatch estimates for GB and SNE yellowtail flounder for FY 2018 - FY 2021.

GBYT				
	FY 2018	FY 2019	FY 2020	FY 2021
na	6.06	34.55	22.95	22.9
sq	67.95	7.35	24.07	24.01
Base36	36.46	7.45	22.89	22.8
Base40	36.92	7.48	22.9	22.8
Base44	37.36	7.52	22.92	22.8
nlsefh36	5.57	7.45	22.36	22.21
nlsefh40	6.04	7.49	22.38	22.21
nlc136	12.55	7.45	25.55	25.42
nlc140	13.02	7.49	25.57	25.42
nlc1295	11.72	7.4	25.52	25.42
nlc126	11.25	7.37	25.5	25.42
c136	43.44	7.45	26.08	26

SNEYT				
	FY 2018	FY 2019	FY 2020	FY 2021
na	4.47	18.2	17.91	17.29
sq	5.96	17.35	17.95	17.31
Base36	4.16	16.45	17.94	17.31
Base40	4.51	16.5	17.97	17.32
Base44	4.84	16.54	18	17.33
nlsefh36	4.89	16.88	18.27	17.61
nlsefh40	5.25	16.92	18.31	17.62
nlc136	4.64	16.87	18.27	17.61
nlc140	5	16.92	18.31	17.62
nlc1295	4.2	16.8	18.21	17.59
nlc126	3.84	16.76	18.18	17.58
c136	4.15	16.45	17.94	17.29