

# Deep-Sea Coral Amendment

## Adjustments to Broad Zone Option 7

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**NEFMC Staff, Habitat PDT Chair**

**NEFMC Habitat Committee**  
**January 9, 2018**  
**Wakefield, MA**



# Broad zones motion from June meeting

Commit the following to the Habitat Committee for further analysis and consideration so that it can be brought back to the Council for a final decision as soon as the analyses are complete.

- Option 6 (boundary of 600m minimum depth) as a broad coral protection zone. The use of all bottom tending gear will be prohibited within the zone (Section 4.3, Option 1). The use of pot gear for red crab (Section 4.3, Sub-Option A) shall be exempt from these restrictions.
- In addition, Option 7, a broad zone management area (Section 4.2.1), as revised consistent with the June 14, 2017 PDT Memorandum recommendations (pp. 4-5). This area will be closed to all mobile bottom-tending gear (Section 4.3, Option 2).

# Option 7 criteria

During workshop in March 2017, participants agreed that 500 m was the maximum depth fished by mobile bottom-tending gears along the shelf/slope break

Contour	Criteria	Rationale
550 m	Evidence of MBTG fishing, but no evidence of coral habitat	Provides an additional buffer beyond what was identified as the deepest current fishing during the New Bedford workshop.
500 m	Evidence of MBTG fishing <u>and</u> coral habitat - or - No evidence of MBTG fishing <u>or</u> coral habitat	Accommodates what the mobile bottom fishing industry identified as the maximum depth of current fishing
Coral footprint, min of 300 m	No evidence of MBTG fishing, but evidence of coral habitat	Would protect shallower water coral habitats in locations where impacts to MBTG fishing activity are unlikely to occur

# Data to support ID of fishing footprint

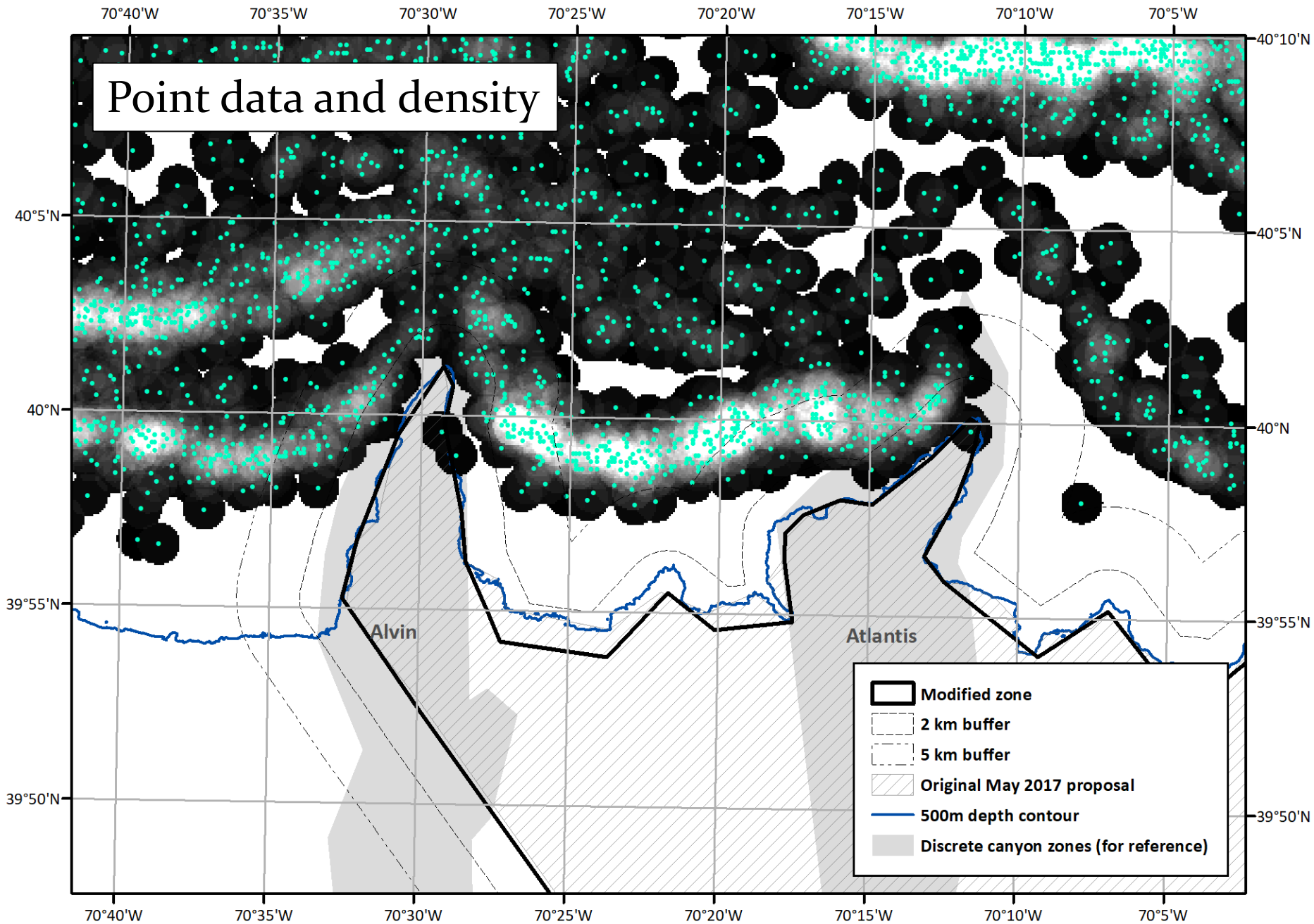
- Model-based VMS from 2005-2012
  - **Method:** Estimate probability that a given poll represents fishing by comparing VMS, VTR, observer data using generalized linear models (working paper by Records and Demarest, published in CJFAS as Muench et al 2017)
  - **Gears:** Otter trawl, squid trawl (other gears modeled but not used for Option 7 development)
  - **Maps:** filter out polls where probability is  $< 20\%$ ; interpolate using point density tool in ArcMap (adapted from Northeast Ocean Data Portal method)

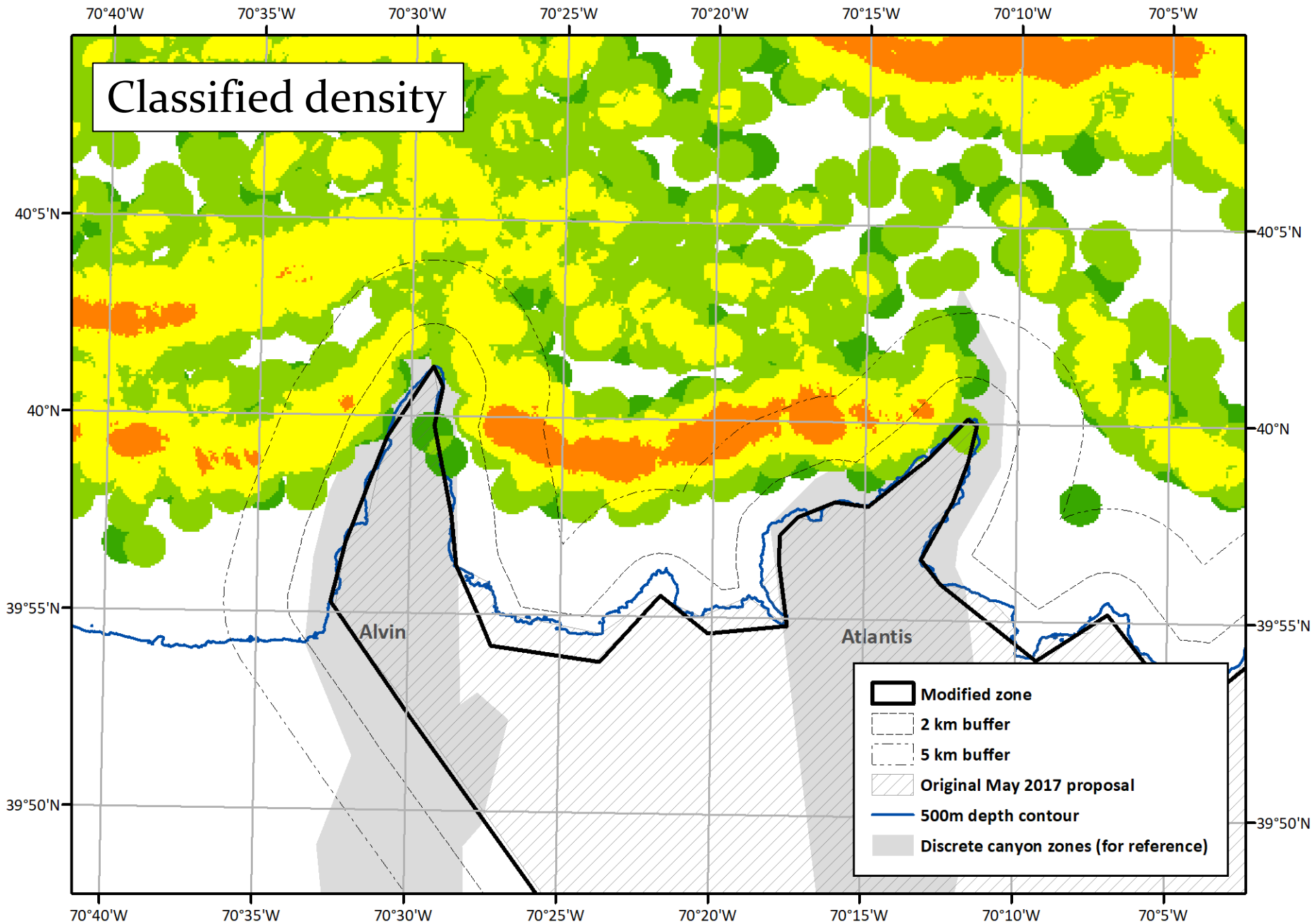
# Data to support ID of fishing footprint

- Speed-filtered VMS from 2010-2016
  - **Methods:** Palmer and Wigley 2009
    - Includes all polls regardless of VMS declaration, based on VTR match
    - Fishing indicated by polls between 2 and 4 knots
  - **Gear:** All trawl gears where VTR indicated catch of silver hake, offshore hake, unclassified hake, red hake, longfin squid, *Illex* squid, butterfish, summer flounder, scup, black seabass, and monkfish
  - **Maps:** Interpolate polls using point density tool in ArcMap (same as model-based VMS)

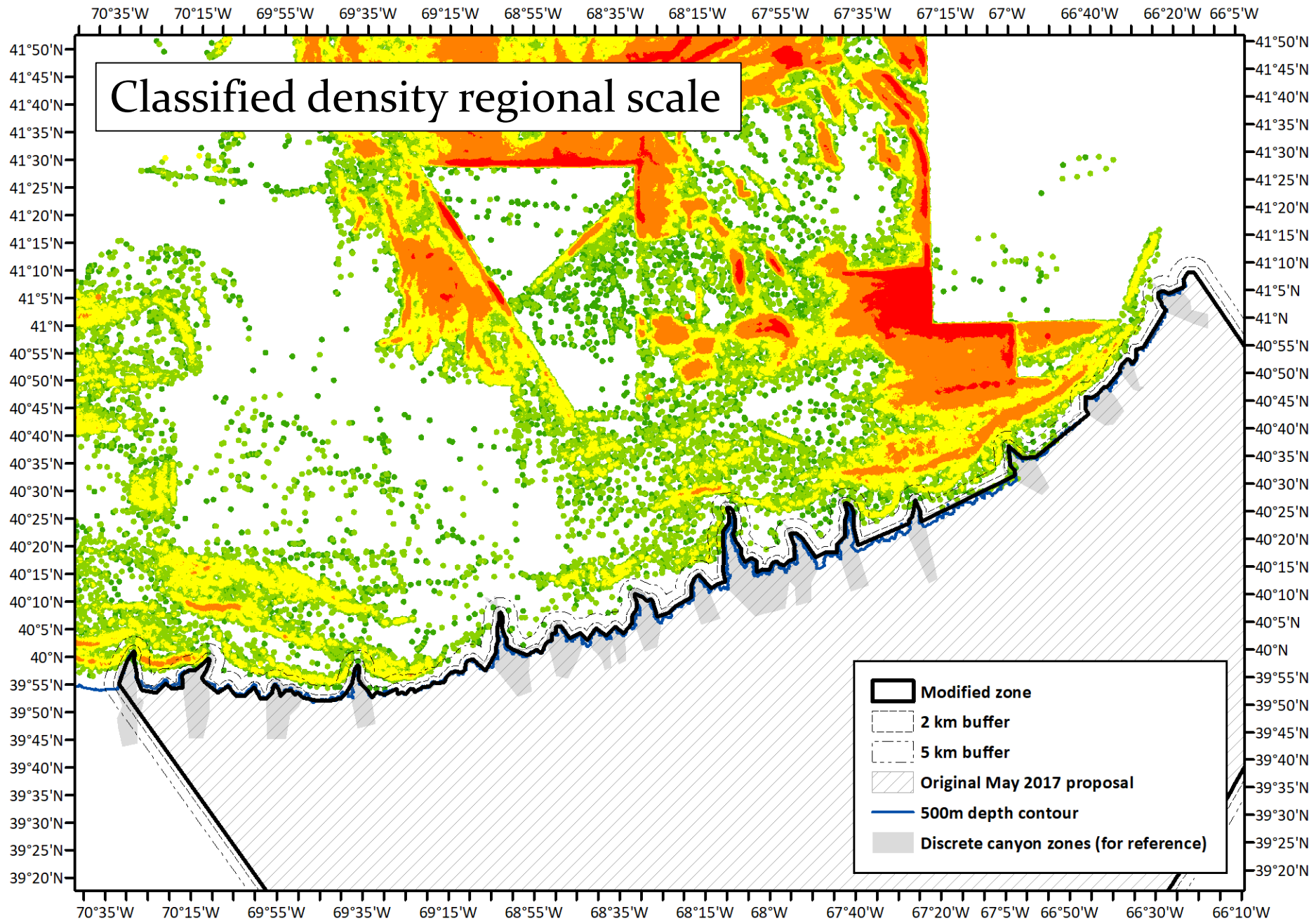
# Also used in the analysis in memo

- Model-based VTR from 2010-2015
  - **Method:** DePiper 2014 (used for OHA2 as well)
    - Analysis compares VTR and observer data to assess how far fishery revenues are likely to be generated from the reported VTR point
    - Each trip is represented as a circular footprint, with more revenue or catch attributed to areas closer to point
  - **Gears:** Gillnet, longline, otter trawl, raised footrope trawl, scallop limited access, scallop general category, shrimp trawl, squid trawl, trap



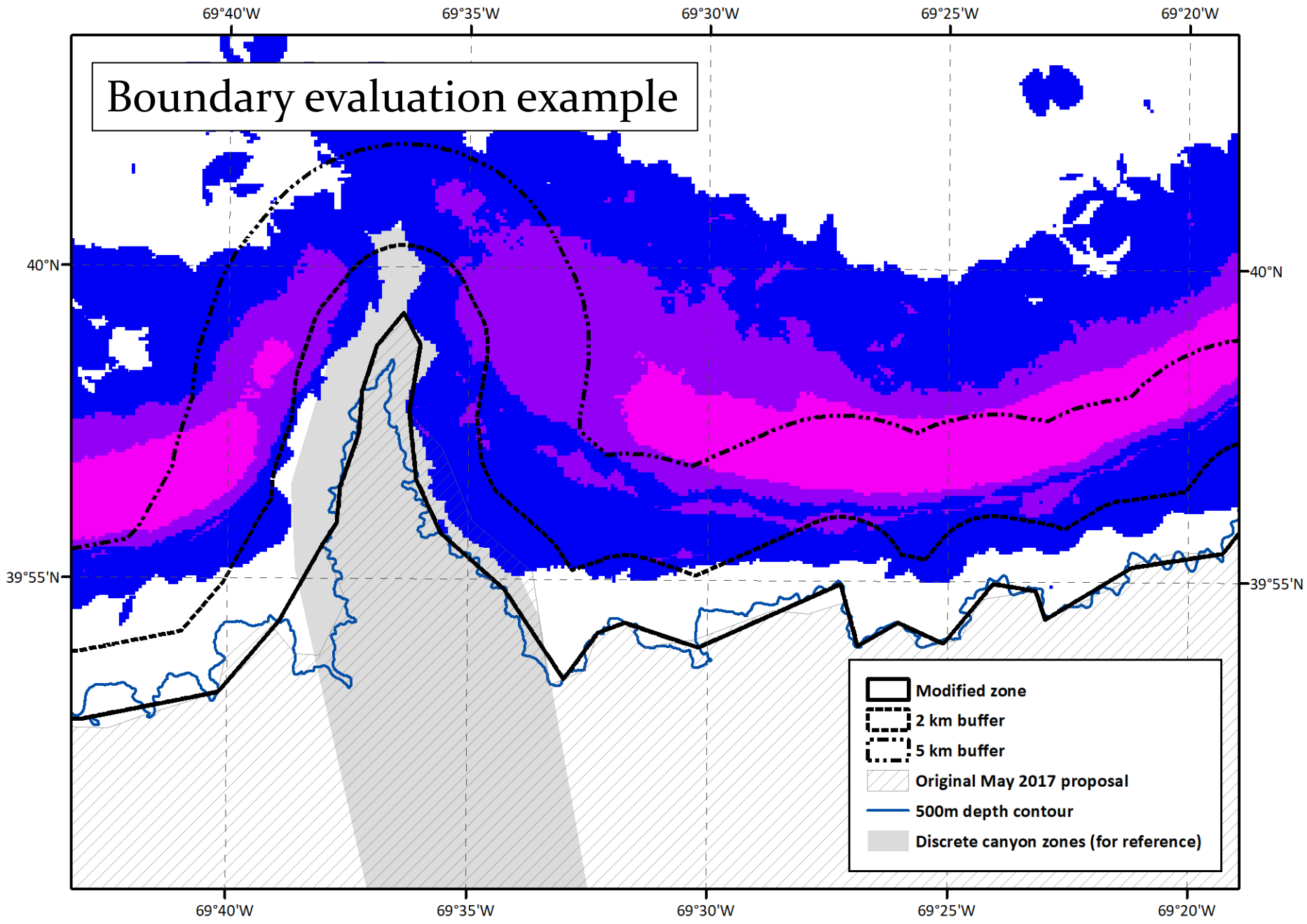






# Boundary evaluation

Code	Description
x	<i>No data for that dataset and year</i>
1	No VMS polls near boundary
2	Only low density of polls near boundary (low is defined as $< -1$ std deviations or $-1-0$ std deviations from mean density). Near is within 5 km.
3	Dense, but inshore of the boundary (dense is defined as $0-1$ or $1-2$ standard deviations from mean density). Inshore of is within 2-5 km.
4	Very dense, but inshore of the boundary (very dense is defined as $>2$ standard deviations from mean density). Inshore of is 2-5 km.
5	Dense, and tight to the boundary (dense is defined as $0-1$ or $1-2$ standard deviations from mean density). Tight is within 2 km of boundary.
6	Very dense, and tight to the boundary (very dense is defined as $> 2$ standard deviations from the mean density). Tight is within 2 km of boundary.



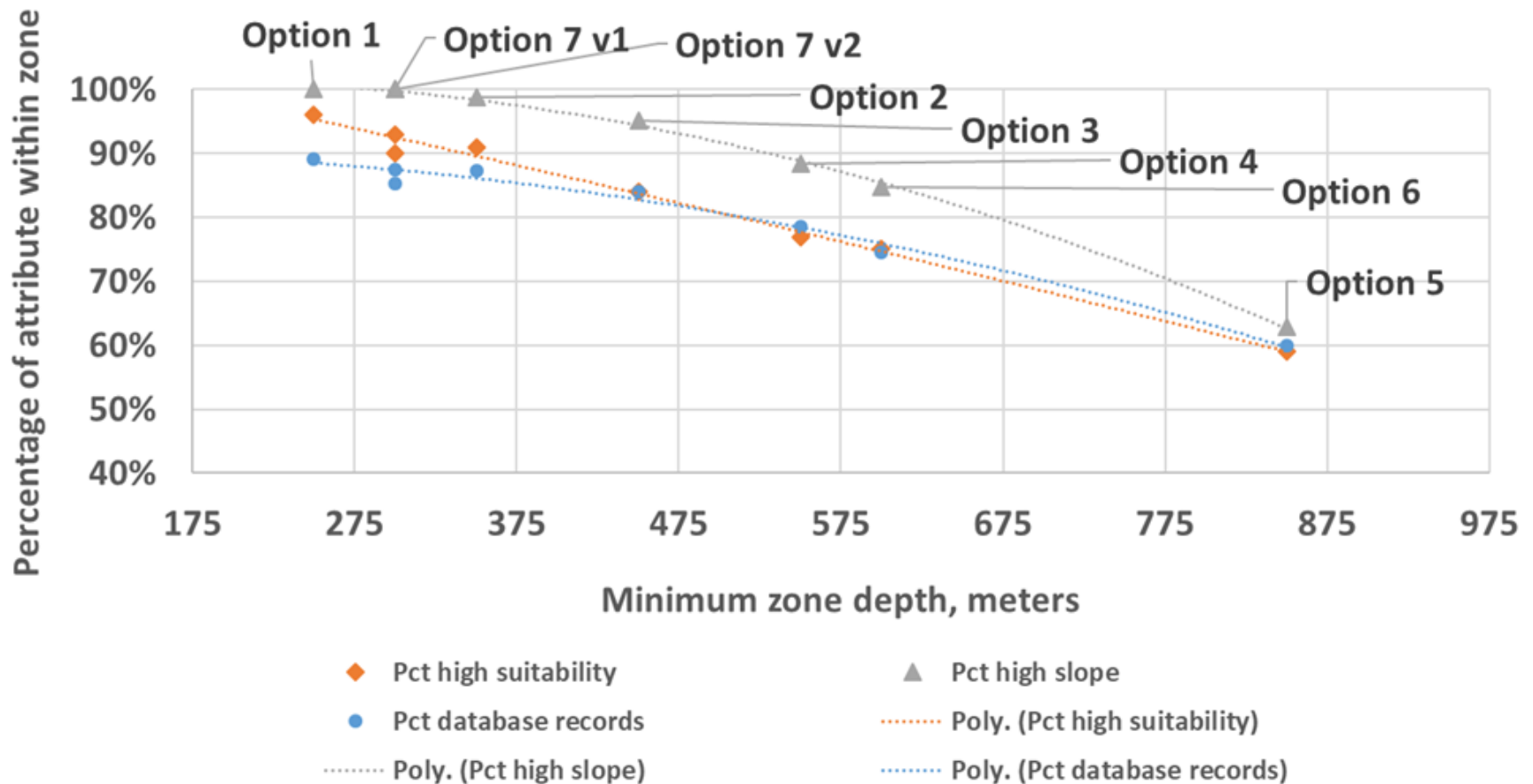
# Boundary evaluation results

Area	Data set	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Veatch Canyon	Model-based bottom trawl	3	3	5	5	2	5	3	2	x	x	x	x
	Model-based squid trawl	4	5	5	5	5	2	5	3	x	x	x	x
	Speed-filtered bottom trawl	x	x	x	x	x	2	2	2	5	3	5	3
Veatch to Hydrographer intercanyon 1	Model-based bottom trawl	3	3	3	5	3	3	5	2	x	x	x	x
	Model-based squid trawl	4	5	4	5	6	3	5	3	x	x	x	x
	Speed-filtered bottom trawl	x	x	x	x	x	2	2	1	4	3	3	3
Veatch to Hydrographer intercanyon 2	Model-based bottom trawl	2	3	3	5	2	3	2	1	x	x	x	x
	Model-based squid trawl	4	5	3	3	3	3	5	3	x	x	x	x
	Speed-filtered bottom trawl	x	x	x	x	x	1	1	1	3	3	2	2

# Impacts to deep-sea corals

Min. depth	Option#	# Coral records in zone	% Coral records on continental margin	Area highly likely to be suitable habitat for soft corals in zone, km <sup>2</sup>	% High suitability habitat on continental margin	Area of high slope in zone, km <sup>2</sup>	% High slope on continental margin
250	Option 1 "300 m zone"	627	89%	4,582	96%	164	100%
<b>300</b>	<b>Option 7, May 2017</b>	<b>616</b>	<b>88%</b>	<b>4,458</b>	<b>93%</b>	<b>164</b>	<b>100%</b>
350	Option 2 "400 m zone"	615	87%	4,354	91%	162	99%
<b>300</b>	<b>Option 7, Dec 2017</b>	<b>601</b>	<b>85%</b>	<b>4,320</b>	<b>90%</b>	<b>164</b>	<b>100%</b>
450	Option 3 "500 m zone"	592	84%	4,042	84%	156	95%
550	Option 4 "600 m zone"	553	79%	3,700	77%	145	88%
600	Option 6 "600 m minimum zone"	525	75%	3,587	75%	139	85%
850	Option 5 "900 m zone"	422	60%	2,821	59%	103	63%

# Impacts to deep-sea corals

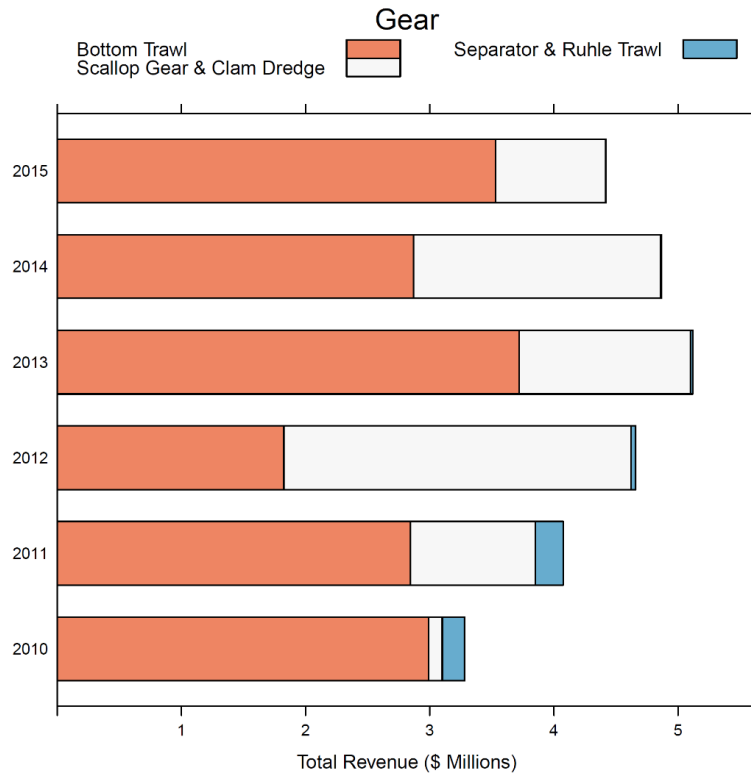


# Impacts to deep-sea corals

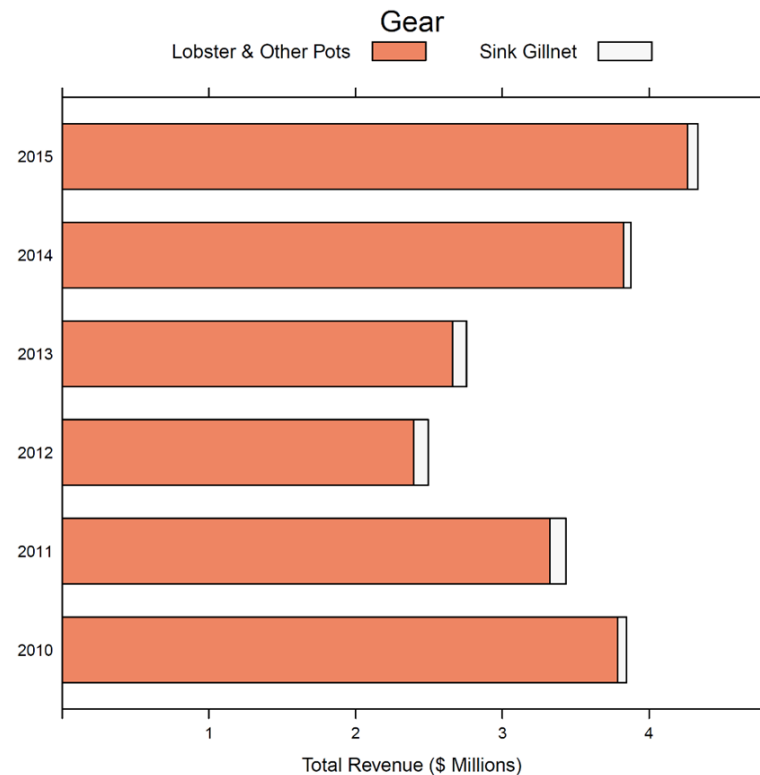
- Option 7 as modified falls between the 300 m zone (Option 1) and the 500 m zone (Option 3).
- The original version of Option 7 was between Option 1 and Option 2, the 400 m zone.
- Overall, Option 7 would protect more coral habitat than Options 4, 5, or 6, and protect similar amounts of coral habitat compared to Options 1, 2, and 3.
- Habitat suitability and coral records percentages are slightly lower than Option 1, Option 2, or the May version of Option 7, which is reasonable to expect as the modified version of Option 7 is smaller.

# VTR-based revenue associated with combined alternative

## Option 7 MBTG gear



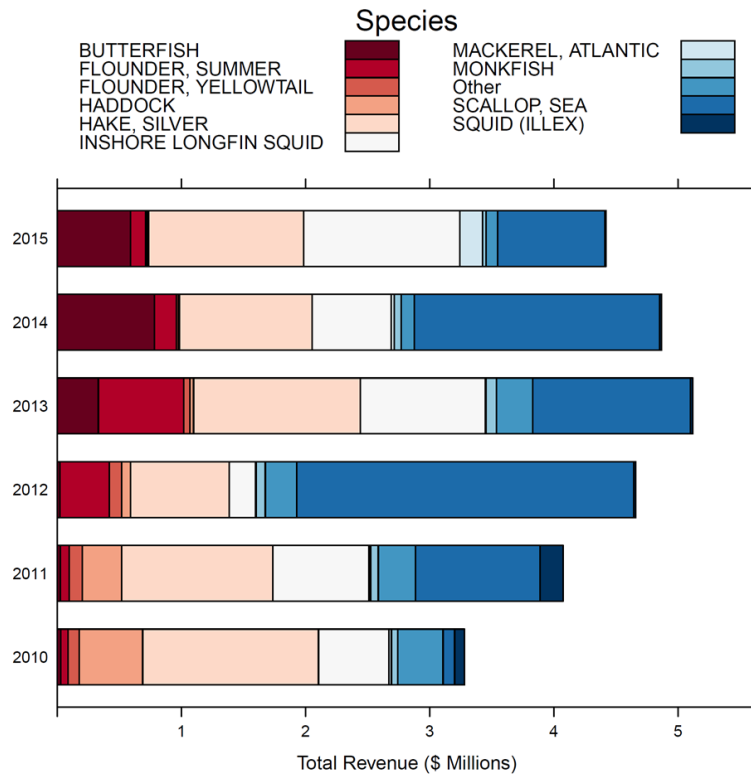
## Option 6 Fixed gear, except DSRC



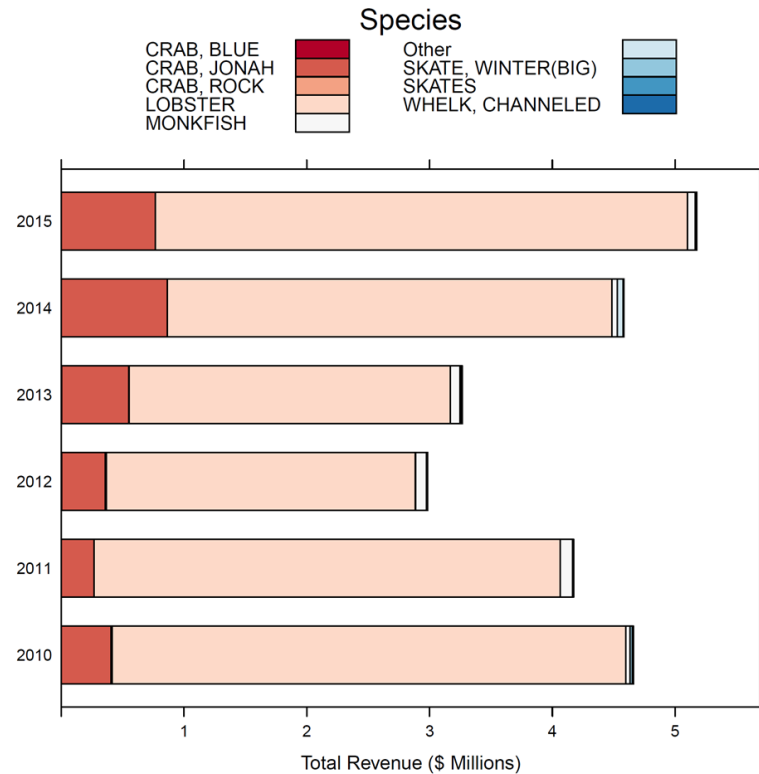


# VTR-based revenue associated with combined alternative

## Option 7 MBTG gear



## Option 6 Fixed gear, except DSRC

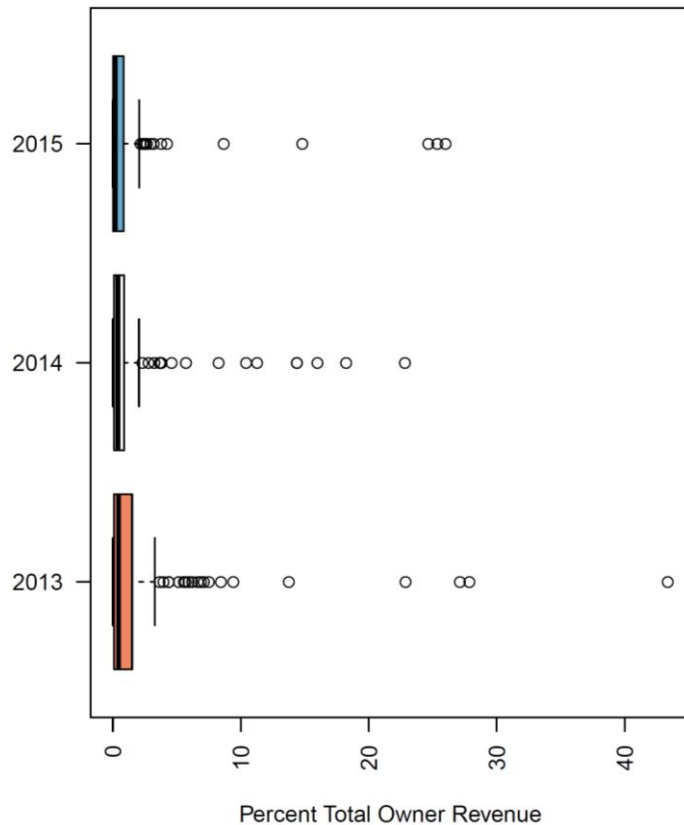


# Option 6 vs. Option 7 - VTR

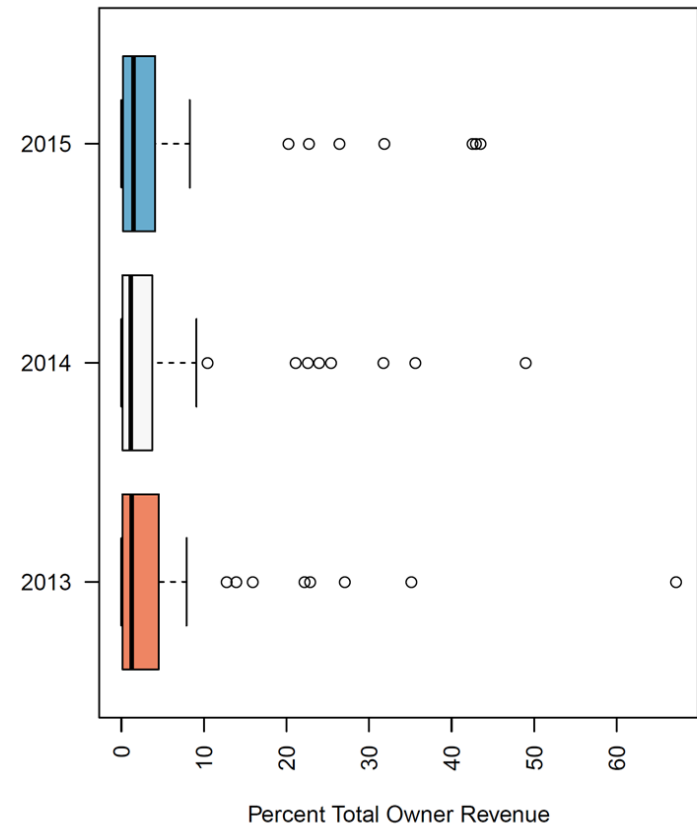
Species	Preferred Alternative	Option 7	Percentage Increase
BUTTERFISH	0.3	0.3	9%
FLOUNDER, SUMMER	0.2	0.3	9%
FLOUNDER, YELLOWTAIL	0.1	0.1	14%
HADDOCK	0.1	0.2	14%
HAKE, SILVER	1.1	1.2	11%
INSHORE LONGFIN SQUID	0.7	0.7	10%
MONKFISH	0.1	0.1	16%
Other	0.2	0.2	11%
SCALLOP, SEA	1.1	1.3	15%
SKATES	0.0	Not Top 10	
SQUID (ILLEX)	0.1	0.1	9%
MACKEREL, ATLANTIC	Not Top 10	0.0	

# VTR-based percent owner revenue

## Option 7 MBTG gear



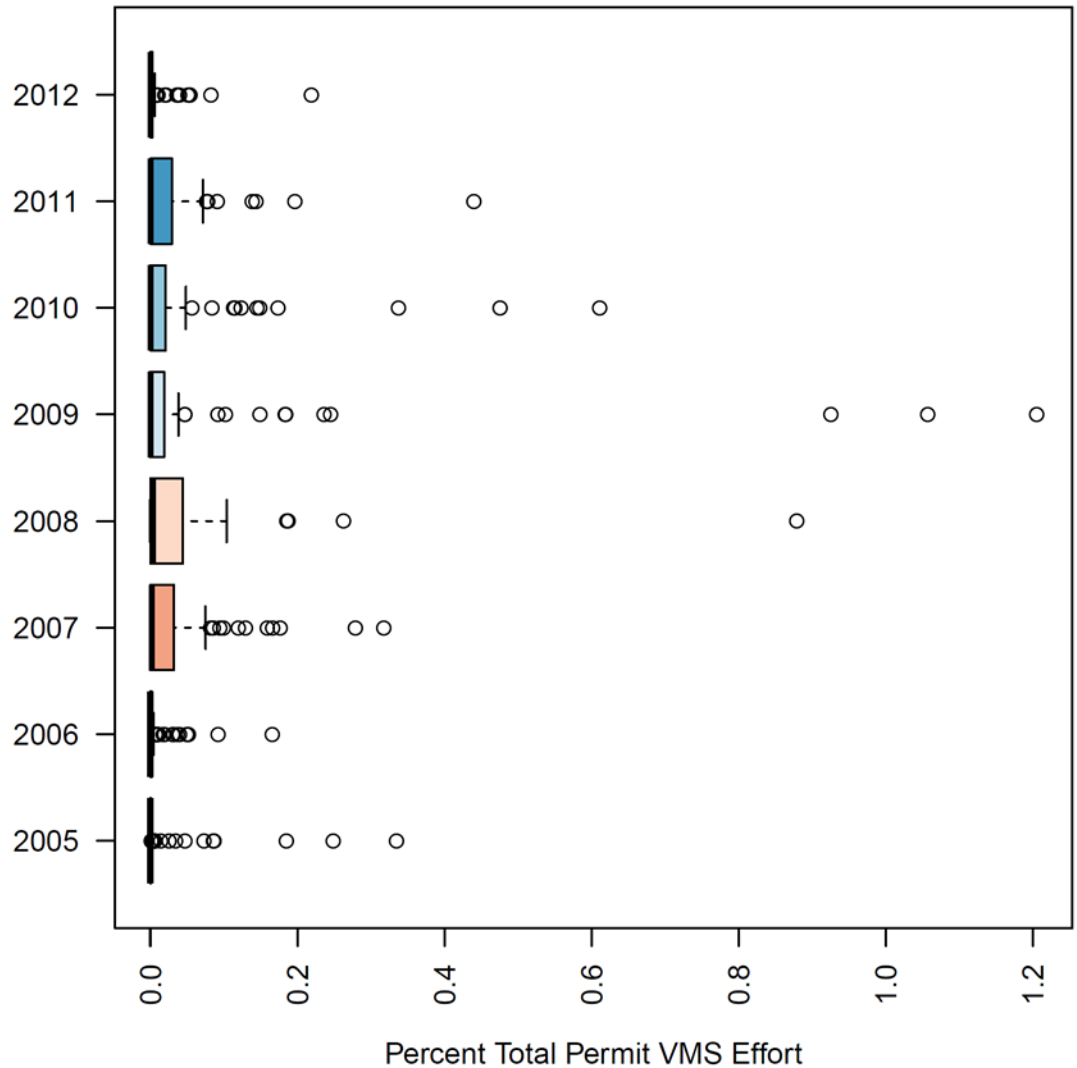
## Option 6 Fixed gear, except DSRC



# VMS-based hours fished – Option 7 modified vs. Option 6

Gear	Year	Broad Zone Alternative 7			Broad Zone Alternative 6		
		Hours Fished	Trips	Permits	Hours Fished	Trips	Permits
Bottom Trawl	2005	18.88	27	19	1.84	11	9
Bottom Trawl	2006	6.74	37	21	0.48	13	11
Bottom Trawl	2007	16.41	48	26	8.78	18	12
Bottom Trawl	2008	34.85	68	32	3.88	30	19
Bottom Trawl	2009	45.03	70	29	10.25	24	16
Bottom Trawl	2010	41.48	87	31	20.57	47	19
Bottom Trawl	2011	23.62	54	20	12.31	28	14
Bottom Trawl	2012	8.74	58	30	5.29	28	18
Squid Trawl	2005	3.03	35	20	1.44	21	15
Squid Trawl	2006	4.06	60	29	1.27	33	21
Squid Trawl	2007	16.34	90	37	5.73	45	22
Squid Trawl	2008	0.28	13	9	0.14	11	8
Squid Trawl	2009	7.75	22	6	2.74	17	5
Squid Trawl	2010	1.67	19	9	0.20	13	7
Squid Trawl	2011	5.37	19	10	2.09	15	7
Squid Trawl	2012	0.53	8	6	0.18	4	4

# VMS-based percent owner revenue – Option 7 modified



# Impacts to fisheries

- High VMS coverage for MBTG trips with VTR locations overlapping the Option 7 area
- VMS analysis suggests very low levels of overlap by MBTG with Option 7, and suggests that the VTR analysis overestimates exposure
- As expected because it encompasses additional area, Option 7 has more MBTG revenue and effort attributed to it than Option 6
- Annual MBTG revenue attributed to Option 7 averages 12% higher than Option 6 and is dominated by bottom trawl (67%)

# Impacts to fisheries

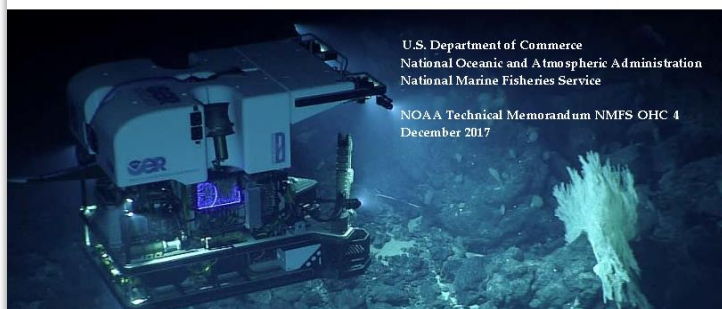
- Option 7, when applied to only MBTG, is expected to have neutral to slightly negative impacts to fishermen.
- Selecting Option 6 in combination with Option 7 is expected to add slightly to the impacts, primarily due to the additional impacts on the lobster and Jonah crab pot fishery.
- For both alternatives, the impacts accrue primarily to a very small number of individuals.
- Fishing communities that could be impacted by the revised zone are primarily located in MA, with lesser activity attributed to ports in RI, NY, VA and other states

# State of DSC ecosystems report



## The State of Deep-Sea Coral and Sponge Ecosystems of the United States

Thomas F. Hourigan, Peter J. Etnoyer, and Stephen D. Cairns



STATE OF DEEP-SEA CORAL AND SPONGE ECOSYSTEMS OF THE NORTHEAST UNITED STATES

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## STATE OF DEEP-SEA CORAL AND SPONGE ECOSYSTEMS OF THE NORTHEAST UNITED STATES

### I. Introduction

The Northeast region extends from Maine to North Carolina ends at the U.S. Exclusive Economic Zone (EEZ). It encompasses the continental shelf and slope of Georges Bank, southern New England, and the Mid-Atlantic Bight to Cape Hatteras as well as four New England Seamounts (Bear, Physalia, Mytilus, and Retriever) located off the continental shelf near Georges Bank (Fig. 1). Of particular interest in the region is the Gulf of Maine, a semi-enclosed, separate "sea within a sea" bounded by the Scotian Shelf to the north (U.S. jurisdiction ends at the Hague Line), Georges Bank to the south, and Cape Cod to the southwest. Diverse benthic habitats are found on the rocky ledges, soft sediment banks, and within the 21 deep basins (the largest and deepest being Jordan, Wilkinson, and Georges) of the Gulf. Georges Bank, another prominent feature in the region, is a shallow elongate extension of the continental shelf bounded by the Gulf of Maine to the north, Great South Channel and Nantucket Shoals to the west and south, and the Northeast Channel/Scotian Shelf to the east and north (U.S. jurisdiction ending at the Hague Line). The central portion is shallow, consisting mostly of larger grain-sized sediments, ranging from sand to gravel to boulders depending on location. Numerous submarine canyons, found near the shelf break from Georges Bank down to Cape Hatteras (Fig. 1), cut into the slope and occasionally into the shelf. They were formed by erosion of sediments and

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237