This printed version inlcudes only Section 2, Spatial Management Alternatives. The entire document is available electronically.

DRAFT

Omnibus Essential Fish Habitat Amendment 2
Volume 3:
Spatial management alternatives
Environmental impacts of spatial management alternatives

Amendment 14 to the Northeast Multispecies FMP
Amendment 14 to the Atlantic Sea Scallop FMP
Amendment 4 to the Monkfish FMP
Amendment 3 to the Atlantic Herring FMP
Amendment 2 to the Red Crab FMP
Amendment 2 to the Skate FMP
Amendment 3 to the Atlantic Salmon FMP

Including a

Draft Environmental Impact Statement

Prepared by the
New England Fishery Management Council
In cooperation with the
National Marine Fisheries Service

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2 Spatial management alternatives

Essential Fish Habitat and Habitat Area of Particular Concern designations are based on species-specific distributions and life-history information, and are used primarily for analytical approaches in impact analyses and agency consultations. This section of the amendment outlines alternatives that designate spatial management areas that contain habitats of importance to multiple species, are vulnerable to impacts from fishing, and within which fishing activities would be restricted for conservation purposes on the basis of gear type (Table 1). Three types of areas are proposed: (1) year-round habitat management areas – Section 2.1, (2) seasonal spawning protection areas – Section 2.2, and (3) dedicated habitat research areas – Section 2.3. There are spatial overlaps between the three sets of areas, and there are various fishing restrictions possible within each type of area, so the final distribution of fishing effort restrictions will depend on which areas and measures are selected in combination. The impacts of those restrictions are described in Section 4 below, as well as in the Cumulative Effects Analysis in Volume 4.

The amendment includes action alternatives/areas designed to address specific goals and objectives, and related no action spatial management alternatives, which consist of combinations of current areas and measures that currently fulfill similar purposes to their corresponding action alternatives. The intent of the action alternatives in each category is explicit – either year round protection of vulnerable habitats from fishing gear effects or seasonal protection of spawning fish. However, the original rationales behind the areas that constitute the no action alternatives are often not as explicitly defined. Furthermore, the existing management areas currently produce multiple benefits, which may not link directly to the original purpose of the designations. In contrast to some past spatial management efforts, the action alternatives are not designed to reduce fishing mortality per se, but to protect fish habitats, particularly for juvenile groundfish, to minimize fishing impacts on spawning, and to facilitate research focused on links between habitat characteristics and use by managed species.

Table 1 – Types of spatial management alternatives that effect fishing activities

Alternative type	Year round or seasonal	Which areas comprise the action alternatives?	Type of restrictions (generally)	Rationale
Habitat protection	Year round, long term	Modified versions of existing habitat management areas in groundfish and scallop FMPs, new areas based upon SASI and groundfish hotspot analyses.	Mobile bottom-tending gears – prohibit their use, or allow dredges and require gear modifications for trawls only. Option to exclude hydraulic clam dredges from the restriction if all mobile bottom-tending gears are prohibited. Some areas (Eastern Maine, Ammen Rock) consider broader restrictions.	Minimize adverse effects of fishing on highly structured seafloor habitats with long recovery times to protect the areas ability to shelter fish and fish prey. Some areas focus on encompassing habitats for juvenile large mesh multispecies in particular.
Spawning protection	Seasonal, long term	Existing rolling and year round closures, redesignated as spawning areas; new area in Massachusetts Bay	Closed to gears capable of catching groundfish, with exemptions as appropriate. Options to include recreational groundfishing in the restriction.	Avoid capture of fish during their spawning season, prevent disruption of spawning activity
Habitat research	Year round, triggered sunset provision	Subsets of existing habitat management areas, or new habitat management areas	At minimum, prohibit use of mobile bottom-tending gears. Stellwagen area maintains no-action restrictions and also includes a reference area that would further restrict recreational groundfish catch.	Create opportunity for research that investigates the relationship between habitat, fishing, and fish productivity

2.1 Alternatives to minimize the adverse effects of fishing on EFH and improve protection of juvenile groundfish habitats

The alternatives in this section were designed around two sets of goals and objectives. Some candidate habitat management areas were identified through the Habitat Plan Development Team and Habitat Committee, based on the results of the Swept Area Seabed Impact (SASI) analyses and related extra-SASI information including sources of substrate data not included in SASI and bathymetric data. **The primary goal addressed with these areas was to minimize the adverse effects of fishing on vulnerable seabed habitats, across all areas managed by the Council.** Additional areas were later identified by the Closed Area Technical Team and Groundfish Committee, based on an analysis of juvenile groundfish distributions, combined with information about the current status of various stocks and their affinities for vulnerable habitat types. **The**

primary goal addressed with these areas was to improve groundfish productivity, specifically by protecting habitats used by critical life stages (i.e. juveniles). The SASI approach is detailed in Appendix D, and the results are summarized in the habitat vulnerability section of Volume 1. The groundfish distribution analysis is detailed in Appendix E, and the results are summarized in the hotspot analysis portion of the affected environment section in Volume 1. These separate, but complementary, analyses were conducted because the Council added goals and objectives specific to groundfish protection later in the amendment's development. **Regardless of the origin of a particular area, the merged sets of areas in each alternative are intended, collectively, to comply with the requirement of the MSA to minimize the adverse effects of fishing on essential fish habitats:**

> *"Fishery Management Plans must describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat" (Magnuson-Stevens Fishery Conservation and Management Act, As Amended Through January 12, 2007)*

The Secretarial EFH guidelines (67 FR 2343, January 17, 2002) define an 'adverse effect' as any impact that reduces the quality and/or quantity of essential fish habitat, but only requires that actions be take to prevent, mitigate, or minimize adverse effects from fishing, if they are both 'more than minimal' and 'not temporary'. However, determinations about what exactly is meant by minimal and temporary, and about what management measures are practicable, are left to the Council's discretion.

All of the habitat management areas described in this section would be implemented on an indefinite, year-round basis, and the fishing restriction measures focus on minimizing impacts associated with mobile bottom-tending gears. The alternatives in this section are grouped sub-regionally. A sub-regional organization was used to facilitate discussion, analysis, and decision making. Each sub-region has a unique mix of habitat types, stocks, and fisheries. Grouping management areas into alternatives at a larger spatial scale (Gulf of Maine vs. Georges Bank/Southern New England, or the full jurisdiction of the New England Council) was thought to be less practical for discussing trade-offs and local considerations.

Alternative 1 for each sub-region (the No Action alternative) consists of mobile-bottom tending gear closures first identified via Northeast Multispecies Amendment 13 as well as the year-round groundfish closures, which were implemented at various times and for various purposes, but often restrict mobile bottom-tending gears and provide some of the same benefits in terms of minimizing adverse effects on EFH, at least within areas not currently fished.

Table 2 – Measures in existing groundfish closure areas

Area	Closed to	Exemptions
Cashes Ledge and Western Gulf of Maine Closure Areas	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Charter and party vessels with a letter of authorization; • Vessels fishing with exempted gears: spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longline, single pelagic gillnets, and shrimp trawls; • Vessels participating in the mid-water trawl exempted fishery; • Vessels that are transiting, provided that gear is properly stowed
Nantucket Lightship Closure Area	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Tuna purse seine gear; review to ensure no impacts on regulated multispecies • Classified as charter, party or recreational vessel, provided that: (A) LOA, (B) Fish species managed by the NEFMC or the MAFMC are not sold, (C) no gear other than rod and reel or handline gear on board, (D) vessel does not fish outside the Nantucket Lightship Closed Area during the period specified by the LOA • Fishing with or using dredge gear designed and used to take surfclams or ocean quahogs • Fishing for scallops within the Nantucket Lightship Access Area • Vessels that are transiting, provided that gear is properly stowed
Closed Area I	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Tuna purse seine gear; review to ensure no impacts on regulated multispecies • Fishing in a Special Access Program • Fishing for scallops within the Closed Area I Access Area • Vessels that are transiting, provided that gear is properly stowed
Closed Area II	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Fishing in a Special Access Program • Tuna purse seine gear outside of the portion of CA II known as the Habitat Area of Particular Concern • Fishing in the CA II Yellowtail Flounder/Haddock SAP or the Eastern U.S./Canada Haddock SAP Program • Transiting the area, provided the vessel's fishing gear is stowed and there is a compelling safety reason • The vessel has declared into the Eastern U.S./Canada Area and is transiting CA II • Fishing for scallops within the Closed Area II Access Area • Vessels that are transiting, provided that gear is properly stowed

Alternative 2 for each sub-region is a "no closure" alternative. This means no year-round habitat management areas; however, Alternative 2 does not preclude seasonal closures for spawning, or year-round management areas employed for other purposes (e.g. research). In the eastern Gulf of Maine sub-region, where there are no current closed areas, the No Action and no closure alternatives are the same and are combined for the purpose of analysis.

Alternatives 3-8 for each sub-region (2-3 for eastern Gulf of Maine) consist of combinations of new or modified habitat management areas. In some cases, different alternatives in a sub-region include smaller and larger versions of an area. These are named "Small XX HMA and "Large XX HMA" to distinguish between them; the associated maps clarify which area is included in a given alternative. The areas included in each alternative are summarized in Table 3.

With the exception of the Ammen Rock area (see below), management measures for each area can generally be selected from the following five options. Different measures could be selected in each area. Information about what constitutes a mobile bottom-tending gear, or a gear capable of catching groundfish, is discussed later in this introduction.

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.
- Option 5, complete restriction on gears capable of catching groundfish.

The Ammen Rock area is proposed as a closure to all fishing, with the exception of lobster trapping; this is the only habitat management area that would be managed in this way. Restrictions on lobster traps are not proposed in any of the habitat management, spawning management, or research areas because, in general, lobster pot gear is not expected to result in significant adverse effects on vulnerable habitat, similar to other fixed gears. In addition, lobster pots are not currently considered gear capable of catching groundfish. Further, the Council has very limited authority to regulate lobster pot fishing to those instances when the successful management of a Council resource requires it. In this case, because of the minimal impacts to highly vulnerable habitat from lobster pots and the small, if any, amount of regulated groundfish caught in lobster pots, restrictions on that gear is not necessary to successfully achieve the goals and objectives of this amendment.

In order to develop the juvenile groundfish-oriented HMAs, the Closed Area Technical Team reviewed the weighted juvenile groundfish hotspot grids by season. The weighted grids combine hotspots weighted by four factors: B_{msy}/B (stock vulnerability), whether or not the stock has known or possible sub-populations, whether the stock is more resident (as compared to more migratory), and affinity for complex substrates. Stocks that do not have a strong affinity for coarse substrates were zeroed out of the weighted grids, such that the locations of the juvenile groundfish-oriented HMAs were based on the distribution of the following stocks only: Georges

Bank cod, Gulf of Maine cod, Georges Bank haddock, Gulf of Maine haddock, pollock, Acadian redfish, Atlantic halibut, ocean pout, and Atlantic wolffish. The hotspot weighting procedure is described fully in Volume 1.

The first step in identifying candidate management areas was to find contiguous areas with numerous hotspots in each of the seasonal weighted hotspot data layers. The result was a set of rough management area boundaries for each season. The seasonal boundaries were then compared to identify areas important to juvenile groundfish across multiple seasons. The seasonal boundaries were also overlaid onthe habitat vulnerability layer from the SASI model. Both the weighted hotspot and SASI grids were generated at the same 100 km^2 resolution to facilitate comparison of the two datasets. The final candidate management areas were thus locations with a contiguous grouping of hotspots across one or more seasons, with relatively high vulnerability values. As a last step, the candidate management areas were limited to areas in Federal waters.

Table 3 – Summary of areas included in the various habitat management alternatives

Sub-region	Alternative	Areas included	Fishing restriction options
Eastern Gulf of Maine	1 (No Action, no closure)	None	n/a
	2	Large Eastern Maine HMA, Machias HMA	1-5
	3	Small Eastern Maine HMA, Machias HMA, Toothaker Ridge HMA	1-4
Central Gulf of Maine	1 (No Action)	Jeffreys Bank Habitat Closure Area, Cashes Ledge Habitat Closure Area, Cashes Ledge Closed Area	Current measures
	2 (no closure)	None	n/a
	3	Modified Jeffreys Bank HMA, Modified Cashes Ledge HMA, Ammen Rock HMA, Fippennies Ledge HMA, Platts Bank HMA	1-4, Ammen Rock closed to all fishing
	4	Modified Jeffreys Bank HMA, Modified Cashes Ledge HMA, Ammen Rock HMA	1-4, Ammen Rock closed to all fishing
Western Gulf of Maine	1 (No Action)	Western Gulf of Maine Habitat Closure Area, Western Gulf of Maine Closed Area	Current measures
	2 (no closure)	None	n/a
	3	Large Bigelow Bight HMA, Large Stellwagen HMA	1-4
	4	Large Bigelow Bight HMA, Small Stellwagen HMA, Jeffreys Ledge HMA	1-4
	5	Small Bigelow Bight HMA, Small Stellwagen HMA, Jeffreys Ledge HMA	1-4
	6	Large Stellwagen HMA	1-4
	7a	Inshore Roller Gear Restricted Area	Trawl roller gear limited to 12 inches diameter

Sub-region	Alternative	Areas included	Fishing restriction options
	7b	Alternate Roller Gear Restricted Area	Trawl roller gear limited to 12 inches diameter
	8	WGOM Shrimp Trawl Exemption Area	Shrimp trawls exempted from mobile bottom-tending gear closure
Georges Bank	1 (No Action)	CAI and CAII EFH, CAI and CAII GF	Current measures
	2 (no closure)	None	n/a
	3	Northern Edge HMA	1-4
	4	Northern Edge HMA and Georges Shoal Gear Modified Area	NE: 1-4, GS: 3-4
	5	Georges Shoal 1 MBTG HMA and Northern Georges Gear Modified Area	GS: 1-2, NG: 3-4
	6a	EFH Expanded 1 HMA	1-4
	6b	EFH Expanded 2 HMA	1-4
	7	Georges Shoal 2 MBTG HMA and EFH South MBTG HMA	1-2
	8	Northern Georges MBTG HMA	1-2
Great South Channel /Southern New England	1 (No Action)	Nantucket Lightship Habitat Closure Area, Nantucket Lightship Closed Area	Current measures
	2 (no closure)	None	n/a
	3	Great South Channel East HMA and Cox Ledge HMA	1-4
	4	Great South Channel HMA and Cox Ledge HMA	1-4
	5	Nantucket Shoals HMA and Cox Ledge HMA	1-4
	6	Nantucket Shoals West MBTG HMA, Great South Channel Gear Modified Area, Cox Ledge HMA	NSW: 1-2, GSC: 3-4, CL: 1-4

Management Option 1 would close an area to mobile bottom-tending gears, generally trawls and dredges. More specifically, using the list of gears available for VTR reporting purposes, mobile bottom-tending gears (MBTG) include the gears listed in Table 4. If Option 2 is selected, **hydraulic** clam dredges would be exempted from the mobile bottom tending gear restriction. Toothed clam dredges used along the Maine coast to target mahogany quahogs would still be restricted.

Table 4 – VTR gear codes for mobile bottom-tending gears

Gear type	GEARCODE	NEGEAR	NEGEAR2
Fish bottom otter trawl	OTF	50	5
Scallop bottom otter trawl	OTC	52	5
Twin bottom otter trawl	OTT	53	5
Ruhle trawl	OTR	54	5
Bottom pair trawl	PTB	56	5
Haddock separator trawl	OHS	57	5
Shrimp trawl	OTS	58	5
Other bottom otter trawl	OTO	59	5
Sea scallop dredge	DRS	132	13
Sea scallop dredge with chain mat	DSC	132	13
Danish seine	SED	160	16
Beam trawl	OTB	350	35
Scottish seine	SES	360	36
Other dredge	DRO	381	38
Mussel dredge	DRM	385	38
Urchin dredge	DRU	387	38
Ocean quahog/surfclam dredge	DRC	400	40

Eastern Gulf of Maine Alternative 2 proposes closure of the Large Eastern Maine and Machias areas to "gears capable of catching groundfish", i.e. management Option 5. As a starting point for developing such area-specific lists, gears capable of catching groundfish are defined as any gears that are not on the exempted gear list in the Fisheries of the Northeastern United States regulations at 50 CFR §648.2. These exempted gears are as follows:

> *"Exempted gear, with respect to the NE multispecies fishery, means gear that is deemed to be not capable of catching NE multispecies, and includes: Pelagic hook and line, pelagic longline, spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dipnets, stop nets, pound nets, pelagic gillnets, pots and traps, shrimp trawls (with a properly configured grate as defined under this part), and surfclam and ocean quahog dredges."*

However, this regulatory language is not precisely duplicated in the Vessel Trip Report gear codes which are relied upon in many of the analyses for this amendment, so the language was mapped to the gear codes in the VTR database (Table 5). In a small number of instances, it is not possible to identify whether a VTR gear code would correspond to one of the exempted gears. Specifically, the mixed gear (MIX), other gear (OTH), and other gill net (GNO) categories are not specific enough to identify as exempted gears, so these gear codes are not listed in the tables in this section. It is important to note the distinction between exempted fisheries and exempted gears. For example, small mesh exemption areas confer an exemption from Northeast multispecies mesh size restrictions, but small mesh bottom trawls are not an exempted gear. On the other hand, the herring fishery is prosecuted in year round closed areas as an exempted fishery.

Table 5 – VTR codes for "exempted gears", based on regulatory language at 50 CFR §648.2.

Gear name	GEARCODE	NEGEAR	NEGEAR2
Harpoon	HRP	30	3
Pelagic longline	LLP	40	4
Shrimp trawl	OTS	58	5
Trap	TRP	80	8
Small mesh drift gillnet	GNT	110	11
Large mesh drift gillnet	GND	115	11
Other pots	PTO	180	18
Mixed pots	PTX	180	18
Fish pot	PTF	181	18
Conch/whelk pot	PTW	183	18
Eel pot	PTE	186	18
Hagfish pot	PTH	186	18
Shrimp pot	PTS	190	19
Lobster pot	PTL	200	20
Stop seine	STS	240	24
Hand rake	RAK	250	25
Weir	WEI	260	26
Crab pot	PTC	300	30
Fyke net	FYK	320	32
Diving gear	DIV	330	33
Cast net	CST	340	34
Ocean quahog/surfclam dredge	DRC	400	40
Runaround gillnet	GNR	500	50

Gears that are <u>not</u> exempted (Table 6) are used as a starting point to define a list of gears capable of catching groundfish. It is important to categorize the VTR gear types as capable or not capable of catching groundfish in order to facilitate impacts analyses based on VTR data. For example, an evaluation of potentially displaced revenue requires the analyst to bin all VTR effort into gear capable of catching groundfish vs. gears not capable of catching groundfish. Also, listing out the exempted and restricted gears helps the Council and the public to see which gears would be affected by any particular alternative. Of course, the Council may choose to deviate from these lists when defining restrictions for a specific management area. For example, some sector vessels have requested the ability to use fish pots to target regulated multispecies. Although the regulatory language identifies all pots as exempted, this classification may not be appropriate for fish pots and the Council could choose to put this gear into the gear capable of catching groundfish category. Conversely, other gears that are not considered exempted may in practice catch very low numbers of groundfish, e.g. specialized dredges such as urchin dredges.

Table 6 – VTR gear codes that could be considered gears capable of catching groundfish. Gears are listed in order by NEGEAR code. This list represents all gears that are not identified as "exempted gears".

Gear name	GEARCODE	NEGEAR	NEGEAR2
Bottom longline	LLB	10	1
Hand line/rod & reel	HND	20	2
Fish bottom otter trawl	OTF	50	5
Scallop bottom otter trawl	OTC	52	5
Twin bottom otter trawl	OTT	53	5
Ruhle trawl	OTR	54	5
Bottom pair trawl	PTB	56	5
Haddock separator trawl	OHS	57	5
Other bottom otter trawl	OTO	59	5
Haul seine	SEH	70	7
Sink gillnet	GNS	100	10
Purse seine	PUR	120	12
Sea scallop dredge	DRS	132	13
Sea scallop dredge with chain mat	DSC	132	13
Danish seine	SED	160	16
Midwater pair trawl	PTM	170	17
Beam trawl	OTB	350	35
Scottish seine	SES	360	36
Midwater trawl	OTM	370	37
Other dredge	DRO	381	38
Mussel dredge	DRM	385	38
Urchin dredge	DRU	387	38

If an area is closed to both mobile bottom-tending gears and gear capable of catching groundfish, the gears listed in Table 7 would be prohibited. This list is the gear capable of catching groundfish list, with the addition of shrimp trawls and clam dredges.

Table 7 – List VTR gear codes that combines mobile bottom-tending gears with gears capable of catching groundfish

Gear type	GEARCODE	NEGEAR	NEGEAR2
Bottom longline	LLB	10	1
Hand line/rod & reel	HND	20	2
Fish bottom otter trawl	OTF	50	5
Scallop bottom otter trawl	OTC	52	5
Twin bottom otter trawl	OTT	53	5
Ruhle trawl	OTR	54	5
Bottom pair trawl	PTB	56	5
Haddock separator trawl	OHS	57	5
Shrimp trawl	OTS	58	5
Other bottom otter trawl	OTO	59	5
Haul seine	SEH	70	7
Sink gillnet	GNS	100	10
Purse seine	PUR	120	12
Sea scallop dredge	DRS	132	13
Sea scallop dredge with chain mat	DSC	132	13
Danish seine	SED	160	16
Midwater pair trawl	PTM	170	17
Beam trawl	OTB	350	35
Scottish seine	SES	360	36
Midwater trawl	OTM	370	37
Other dredge	DRO	381	38
Mussel dredge	DRM	385	38
Urchin dredge	DRU	387	38
Ocean quahog/surfclam dredge	DRC	400	40

2.1.1 Eastern Gulf of Maine

The habitat management alternatives for the eastern Gulf of Maine sub-region include various combinations of four areas: Toothaker Ridge, Small Eastern Maine, Large Eastern Maine, and Machias. **Alternative 2 with Options 1 and 5 is the preferred alternative.**

Table 8 – Coordinates for habitat management areas in eastern Maine

Toothaker Ridge HMA (Alt 3)		
Point	N Latitude	W Longitude
1	43° 40.0’	69° 15.4’
2	43° 40.0’	69° 07.9’
3	43° 45.4’	69° 07.9’
4	43° 45.4’	69° 00.5’
5	43° 40.0’	69° 00.5’
6	43° 40.0’	68° 45.6’
7	43° 34.6’	68° 45.6’
8	43° 34.6’	68° 53.1’
9	43° 29.2’	68° 53.1’
10	43° 29.2’	69° 00.5’
11	43° 29.2’	69° 07.9’
12	43° 34.6’	69° 07.9’
13	43° 34.6’	69° 15.3’
Large Eastern Maine HMA, * see note B (Alt 2)		
Point	N Latitude	W Longitude
1	44° 07.1’	68° 00.2’
2	43° 51.7’	68° 00.0’
3	43° 42.2’	68° 33.1’
4	43° 42.3’	-68° 46.0’
5*	43° 49.0’	-68° 45.9’
6*	43° 55.9’	-68° 41.0’
7*	43° 56.8’	-68° 39.3’
8*	44° 07.1’	-68° 10.8’

Small Eastern Maine HMA, * see note B (Alt 3)		
Point	N Latitude	W Longitude
1	44° 02.5’	68° 06.1’
2	43° 51.0’	68° 33.9’
3*	43° 56.6’	68° 38.1’
4*	44° 07.6’	68° 10.6’
Machias HMA, see note A (Alts 2 and 3)		
Point	N Latitude	W Longitude
1	44° 27.7’	-67° 08.9’
2	44° 28.0’	-67° 27.1’
3	44° 46.0’	-66° 54.8’

A. Western boundary state waters; eastern boundary state waters/EEZ
B. Landward boundary at state waters. Only endpoints provided.

2.1.1.1 *Alternative 1 (No Action, no habitat management areas)*

Because there are currently no year-round closed areas in this sub-region, the no action habitat management alternative in the eastern Gulf of Maine region does not include any habitat management areas. If the Council prefers a no-habitat-management-area strategy in this sub-region, the No Action alternative should be selected. If the Council prefers a strategy with habitat management areas in this sub-region, Alternative 2 or 3 should be selected.

2.1.1.2 *Alternative 2 (preferred)*

This alternative (Map 1) would designate two new habitat management areas, the Large Eastern Maine Habitat Management Area and the Machias Habitat Management Area, in all FMPs. Measures for both of these areas could include:

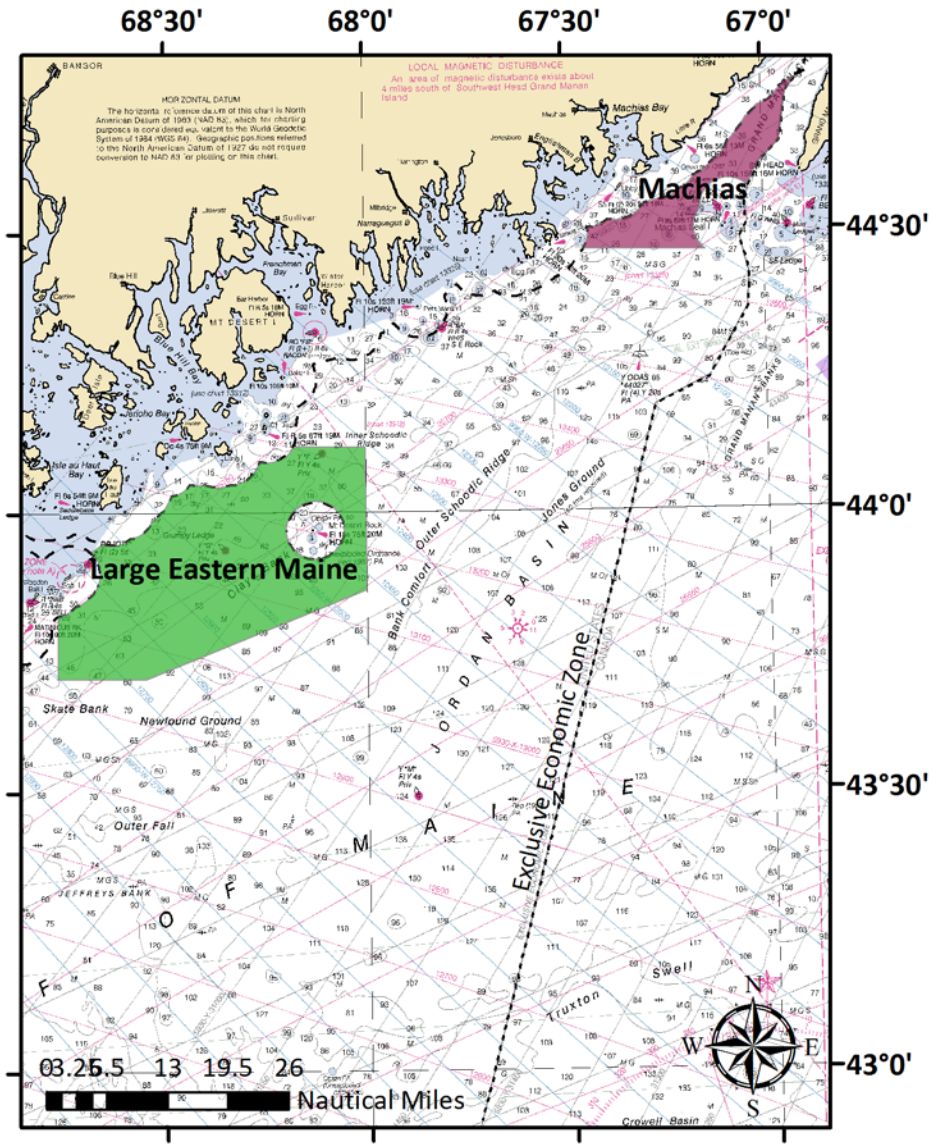
- Option 1, complete restrictions on use of mobile bottom-tending gears (per Table 4), or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.
- Option 5, complete restrictions on use of gears capable of catching groundfish (per Table 6).

The same management measure need not be applied to both areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

The Council's preferred management approach is to apply Options 1 and 5 in both the Machias and Large Eastern Maine HMAs.

Rationale: The Eastern Maine area was designed to minimize the adverse effects of fishing on habitats used by juvenile groundfish, including redfish, alewife, silver hake, white hake, windowpane flounder, winter flounder, and witch flounder. The larger version of the Eastern Maine area included in this alternative includes additional juvenile hotspots compared to the smaller area identified in Alternative 3. Habitats in the Eastern Maine area are vulnerable to fishing impacts, as indicated by the SASI spatial analysis. The Machias area was developed to minimize the adverse effects of fishing on juvenile cod, haddock, and halibut habitats.

Map 1 – Eastern Gulf of Maine Habitat Management Alternative 2



2.1.1.3 ***Alternative 3***

This alternative (Map 2) designates three new habitat management areas, the Small Eastern Maine Habitat Management Area, the Machias Habitat Management Area, and the Toothaker Ridge Habitat Management Area. All three areas would be designated in all Council FMPs. Measures for all three of these areas could include:

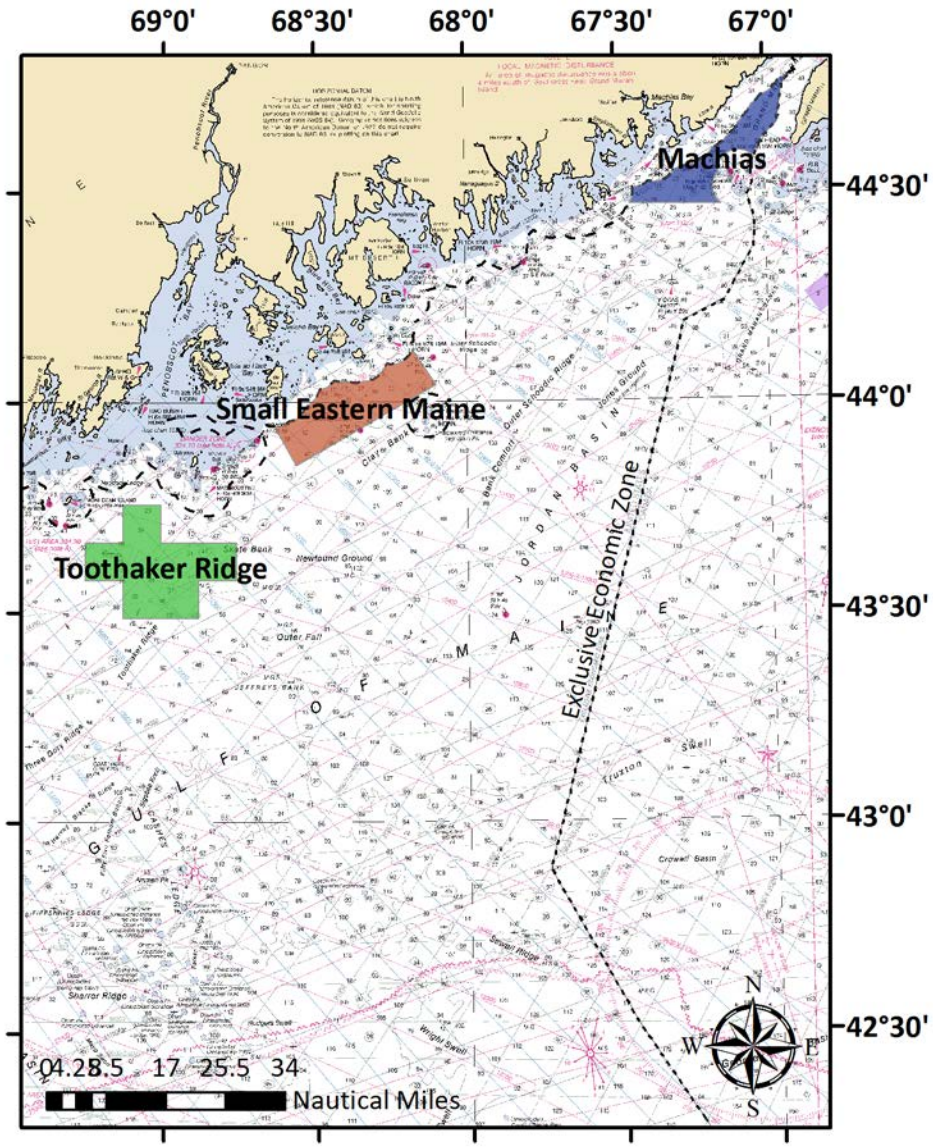
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or

- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to all three areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: The Toothaker Ridge area was developed specifically for juvenile groundfish habitat protection, and includes juvenile redfish and witch flounder habitat. The Small Eastern Maine area is expected to protect habitats of similar species as compared to the larger area (i.e. redfish, alewife, silver hake, white hake, windowpane flounder, winter flounder, and witch flounder), but with fewer impacts to industry, which is why the smaller area was combined with the nearby Toothaker Ridge area. The Machias area is the same as in Alternative 2; it was developed to minimize the adverse effects of fishing on juvenile cod, haddock, and halibut habitats.

Map 2 – Eastern Gulf of Maine/Scotian Shelf Habitat Management Alternative 3



2.1.2 Central Gulf of Maine

The habitat management alternatives for the central Gulf of Maine region include various combinations of eight areas: Jeffreys Bank (no action), Modified Jeffreys Bank, Cashes Ledge Habitat Closure Area (no action), Cashes Ledge Groundfish Closed Area (no action), Modified Cashes Ledge HMA, Ammen Rock HMA, Fippennies Ledge HMA, and Platts Bank HMA (which is comprised of two sub-areas that would be implemented together). **Alternative 4 Option 1 is the preferred alternative.**

Table 9 – Coordinates for habitat management areas in the central Gulf of Maine

Jeffreys Bank Habitat Closure Area (Alt 1)			Modified Jeffreys Bank EFH HMA (Alts 3 and 4)		
Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
JB1	43° 40′	68° 50′	1	43° 31′	68° 37′
JB2	43° 40′	68° 40′	2	43° 20′	68° 37′
JB3	43° 20′	68° 40′	3	43° 20′	68° 55′
JB4	43° 20′	68° 50′	4	43° 31′	68° 55′
Cashes Ledge Habitat Closure Area (Alt 1)			Modified Cashes Ledge EFH HMA (Alts 3 and 4)		
Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
CLH1	43° 01′	69° 03′	1	43° 01.0′	69° 00.0′
CLH2	43° 01′	68° 52′	2	43° 01.0′	68° 52.0′
CLH3	42° 45′	68° 52′	3	42° 45.0′	68° 52.0′
CLH4	42° 45′	69° 03′	4	42° 45.0′	69° 00.0′
Cashes Ledge Closure Area (Alt 1)					
Point	N Latitude	W Longitude			
CL1	43°07′	69°02′			
CL2	42°49.5′	68°46′			
CL3	42°46.5′	68°50.5′			
CL4	42°43.5′	68°58.5′			
CL5	42°42.5′	69°17.5′			
CL6	42°49.5′	69°26′			
Ammen Rock HMA (Alts 3 and 4)			Fippennies Ledge HMA (Alt 3)		
Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
1	42° 55.5′	68° 57.0′	1	42° 50.0′	69° 17.0′
2	42° 52.5′	68° 55.0′	2	42° 44.0′	69° 14.0′
3	42° 52.5′	68° 57.0′	3	42° 44.0′	69° 18.0′
4	42° 55.5′	68° 59.0′	4	42° 50.0′	69° 21.0′
Platts Bank HMA 1 (Alt 3)			Platts Bank HMA 2 (Alt 3)		
Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
1	43° 13.0′	69° 37.5′	1	43° 10.5′	69° 32.0′
2	43° 10.5′	69° 37.5′	2	43° 07.5′	69° 32.0′
3	43° 10.5′	69° 42.5′	3	43° 07.5′	69° 37.5′
4	43° 13.0′	69° 42.5′	4	43° 10.5′	69° 37.5′

2.1.2.1 ***Alternative 1 (No Action)***

The no action habitat management alternative in the central Gulf of Maine region includes the Jeffreys Bank and Cashes Ledge Habitat Closure Areas. These areas were initially implemented via Amendment 13 to the Northeast Multispecies FMP (2004) as areas closed to all mobile bottom-tending gears, regardless of the FMP or Council under which that effort was managed. The areas were subsequently implemented via Atlantic Sea Scallop Amendment 15 as a closure to all vessels fishing for scallops. This alternative also includes the Cashes Ledge Closure Area, which was closed to groundfishing year-round by Secretarial action on May 1, 2002.

Current restrictions for the three areas are summarized below. Two types of mobile bottom-tending gears, shrimp trawls and surfclam/quahog dredges, are exempted from the Cashes Ledge Closure Area. However, these gears are very unlikely to ever fish in the groundfish closure due to the distribution of their target species, so effectively all three areas have functioned as mobile bottom-tending gear closures since designation (2002 and 2004 for the groundfish and habitat closure portions, respectively).

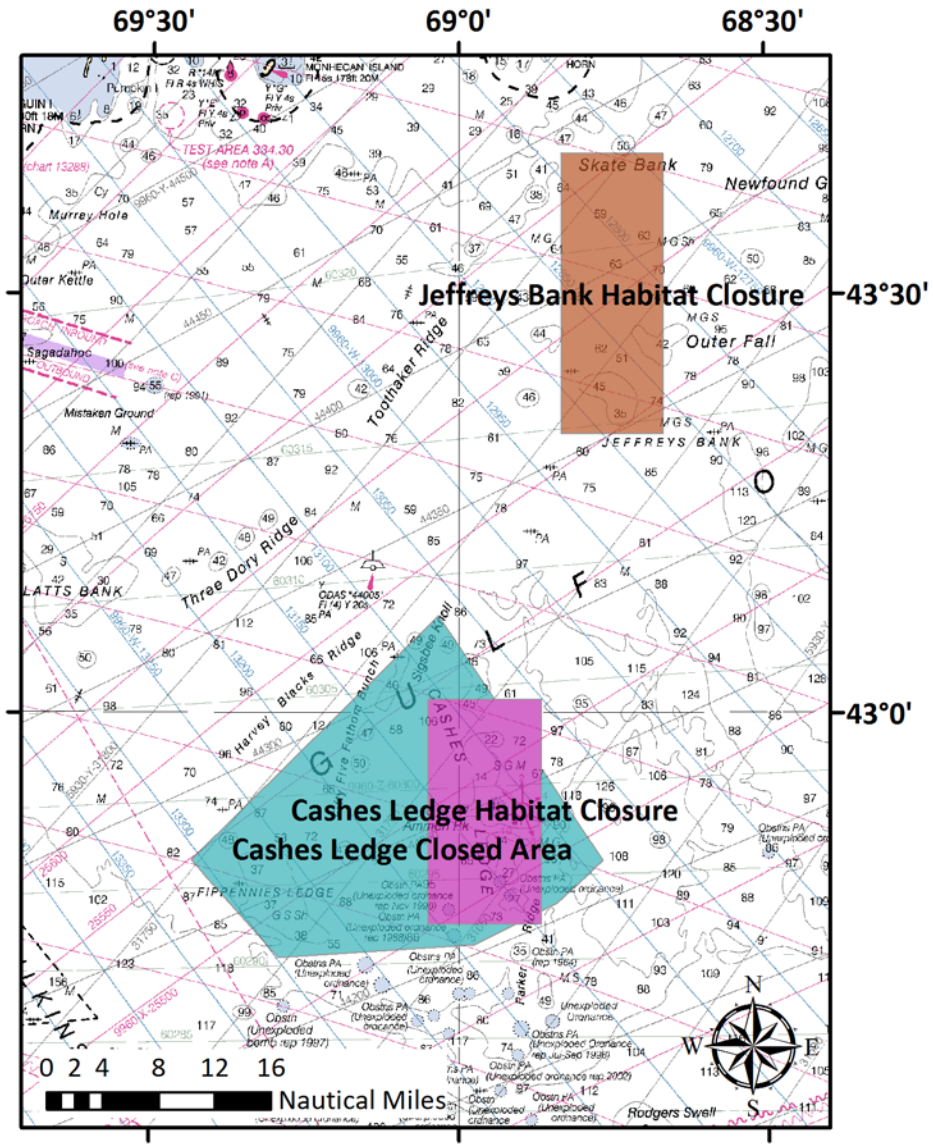
Table 10 – Fishing restrictions and exemptions associated with habitat and groundfish closures in the Central GOM sub-region.

Area name	Prohibitions	Exemptions
Cashes Ledge Habitat Closure Area, Jeffreys Bank Habitat Closure Area	Closed year round to all vessels using mobile bottom-tending gears	• Vessels that are transiting, provided that gear is properly stowed
Cashes Ledge Closure Area	Closed year round to all fishing vessels, except for:	• Charter and party vessels with a letter of authorization • Vessels fishing with exempted gears: spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longline, single pelagic gillnets, and shrimp trawls[1] • Vessels participating in the mid-water trawl exempted fishery • Vessels that are transiting, provided that gear is properly stowed

Rationale: The habitat closure areas, and also the groundfish closure area, restrict various types of fishing, including fishing with mobile gears, which reduce the adverse effects of EFH on the seabed in the central Gulf of Maine region.

[1] Note that because they are a mobile-bottom tending gear, shrimp trawls are prohibited from the habitat closure areas that overlap the Western Gulf of Maine and the Cashes Ledge Closure Areas

Map 3 – Central GOM Habitat Management Alternative 1 (No Action)



2.1.2.2 *Alternative 2 (No habitat management areas)*

This alternative would remove the current Cashes Ledge and Jeffreys Bank Habitat Closure Areas and would not designate any additional habitat management areas in the region.

Rationale: One way to reduce the impact of fishing on the seabed is to minimize area swept by bottom-tending gears. The rationale behind this alternative is that eliminating area-based restrictions on fishing activity will enable vessels to optimize fishing efficiency, given limitations imposed by Annual Catch Limits and other restrictions, which should reduce area swept and therefore impacts to the seabed.

2.1.2.3 ***Alternative 3***

This alternative (Map 4) would modify the boundaries of the current Jeffreys Bank and Cashes Ledge Habitat Closure Areas, and designate three new habitat management areas: Ammen Rock, Fippennies Ledge, and Platts Bank (Platts Bank is comprised of two sub-areas). All five of these areas would be designated in all Council FMPs. The Ammen Rock area would be closed to all fishing gears and activities, except for lobster trapping. Measures for the other four areas could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to all four areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: The current Jeffreys Bank Habitat Closure Area encompasses both shallower hard-bottom habitats on the bank (southern portion) and deeper, muddy habitats (northern portion). The modification would change the boundaries to focus on just the southern portion, with an expansion of the area to the east and to the west to incorporate the portion of Jeffreys Bank shallower than approximately 100 m. This better focuses the area on more vulnerable habitat types in order to minimize the adverse effects of fishing on EFH.

Most of the hard-bottom, shallower habitats on Cashes Ledge are included in the modified, smaller area, including all features shallower than 100 meters. The Ammen Rock pinnacle, which is the shallowest part of Cashes Ledge, represents a particularly unique and vulnerable kelp forest habitat type that would benefit from enhanced levels of protection. Although for an equal amount of area swept fixed gears were estimated to have substantially reduced adverse effects in comparison to trawls and dredges, habitat impacts due to fixed gear use could be significant and long lasting (‘adverse’ effects requiring mitigation are both ‘more than minimal’ and ‘not temporary’) for some types of benthic features, including those found on Ammen Rock.

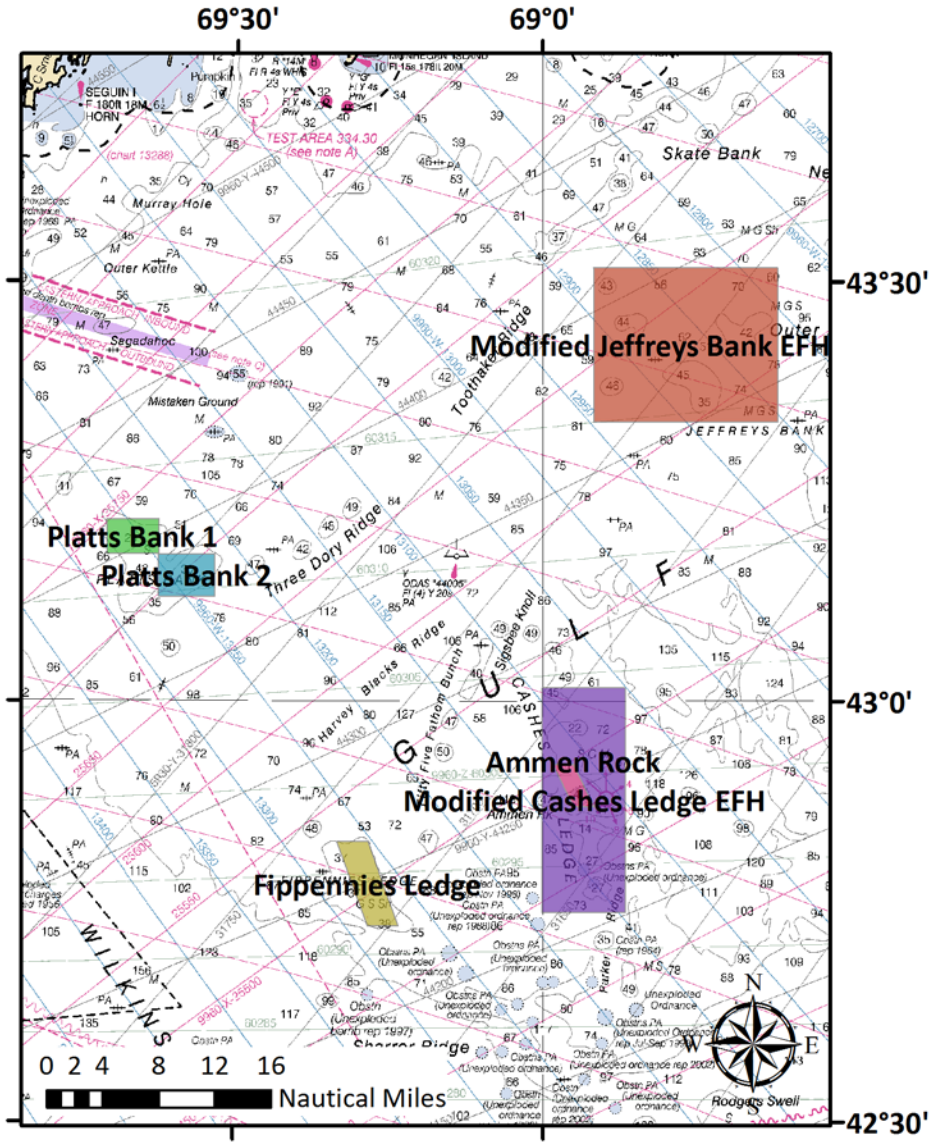
Fippennies Ledge and Platts Bank would be new habitat management areas, although Fippennies Ledge lies within the existing Cashes Ledge [Groundfish] Closure Area. Each of these areas is designed to focus on the core, shallow portions of the features. The design objective was to protect a representative array of substrate and habitat types while allowing fishing activity along the edges of the features.

None of these areas were identified through evaluation of juvenile groundfish distributions (i.e., the “hotspot analysis”), although the areas contain habitats for redfish on Platts Bank, haddock

on Fippennies Ledge, and redfish, plaice, haddock, and silver hake on Cashes Ledge. Designating these habitat management areas is expected to minimize fishing impacts on vulnerable habitats and improve groundfish productivity. Survey sampling on Cashes and Fippennies Ledges is extremely limited, so the analysis may not reflect the importance of these habitats to juvenile fish.

This alternative removes the Cashes Ledge Closure Area. Portions of the groundfish closure not overlapping with habitat area proposals generally contain mud habitat types, which are estimated to be less vulnerable to accumulating adverse effects.

Map 4 – Central GOM Habitat Management Alternative 3



2.1.2.4 ***Alternative 4 (preferred)***

This alternative (Map 5) would modify the boundaries of the current Jeffreys Bank and Cashes Ledge Habitat Closure Areas and designate a new habitat management area on Ammen Rock. All three of these areas would be designated in all Council FMPs. The Ammen Rock area would be closed to all fishing gears and activities except for lobster trapping. Measures for the modified areas could include:

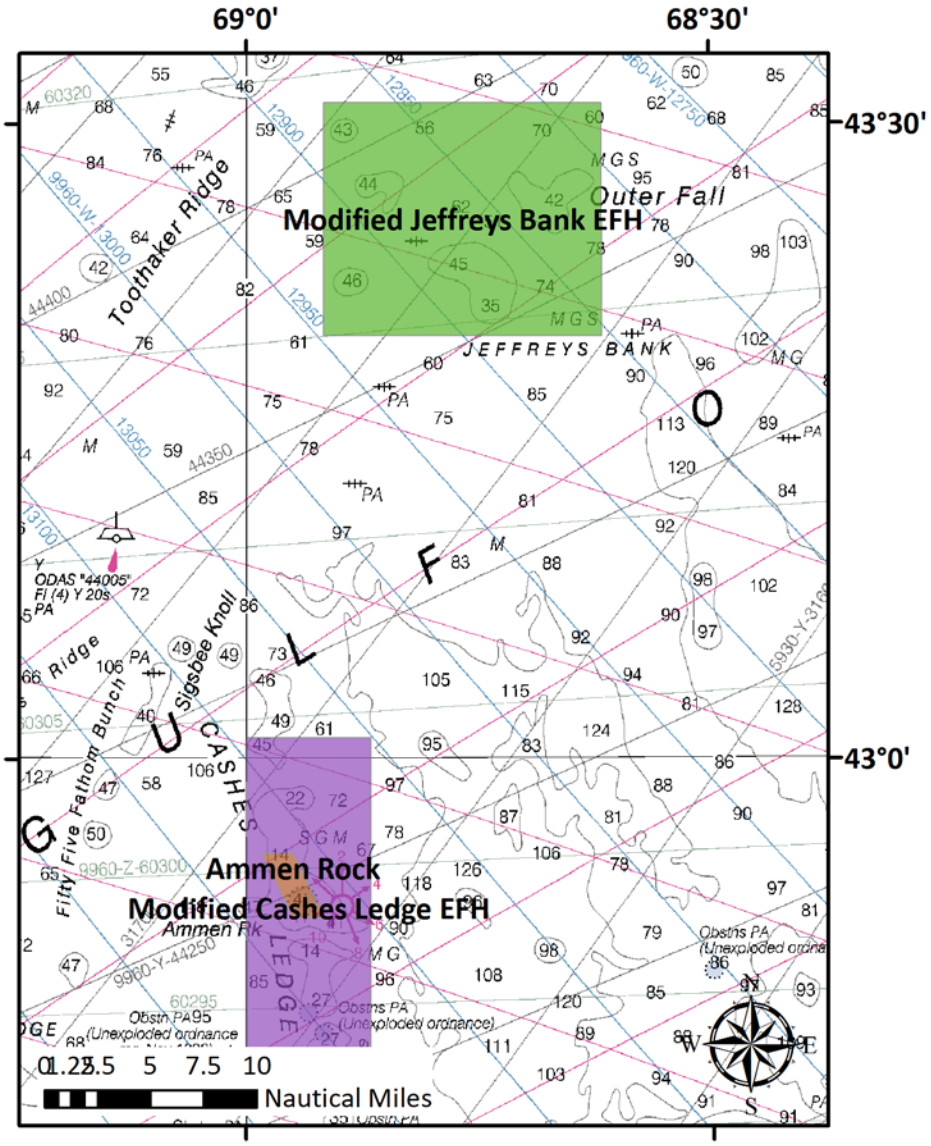
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to both areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by Council.

The Council's preferred management approach is to apply Option 1 to the Jeffreys Bank and Cashes Ledge HMAs.

Rationale: This alternative includes a subset of the areas proposed via Alternative 3, and would not designate the Platts Bank and Fippennies Ledge Habitat Management Areas. This alternative would minimize adverse effects of fishing on EFH within some features in the central Gulf of Maine region, allowing fishing on other features including Platts Bank and Fippennies Ledge. This alternative removes the Cashes Ledge Closure Area, since many portions of that area not overlapping with habitat area proposals consist of mud habitat types estimated to be less vulnerable to accumulating adverse effects.

Map 5 – Central GOM Habitat Management Alternative 4



2.1.3 Western Gulf of Maine

The habitat management alternatives for the western Gulf of Maine region include various combinations of seven areas: Western Gulf of Maine Habitat Closure Area (no action), Western Gulf of Maine Groundfish Closed Area (no action), Jeffreys Ledge HMA, Small Stellwagen HMA, Large Stellwagen HMA, Small Bigelow Bight HMA, Large Bigelow Bight HMA, and WGOM Shrimp Trawl Exemption Area. **A combination of Alternatives 1, 7A, and 8 are the preferred alternatives.**

Table 11 – Coordinates for habitat management areas in the western Gulf of Maine

Western Gulf of Maine Habitat Closure Area (Alt 1)			Western Gulf of Maine Closure Area (Alt 1)		
Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
WGM4	43° 15′	70° 15′	WGM1	42°15′	70°15′
WGM1	42° 15′	70° 15′	WGM2	42°15′	69°55′
WGM5	42° 15′	70° 00′	WGM3	43°15′	69°55′
WGM6	43° 15′	70° 15′	WGM4	43°15′	70°15′
Small Stellwagen HMA (Alt 4 and 5)			Small Bigelow Bight HMA (Alt 5)		
Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
1	42° 38.0′	70° 07.0′	1*	43° 07.1′	70° 24.4′
2	42° 31.0′	70° 07.0′	2	42° 07.1′	70° 21.6′
3	42° 31.0′	70° 02.0′	3	42° 50.9′	70° 21.1′
4	42° 15.0′	70° 02.0′	4*	42° 50.6′	70° 44.6′
5	42° 15.0′	70° 15.0′	5*	42° 57.1′	70° 41.7′
6	42° 38.0′	70° 15.0′	6*	43° 03.4′	70° 35.9′
			7*	43° 07.6′	70° 32.7′
Jeffreys Ledge HMA (Alts 4 and 5)			Large Stellwagen HMA (Alts 3 and 6)		
Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
1	43° 13.0′	70° 00.0′	1	42° 15.0′	70° 00.0′
2	42° 44.4′	70° 00.0′	2	42° 15.0′	70° 15.0′
3	42° 44.4′	70° 15.0′	3	42° 45.2′	70° 15.0′
4	42° 55.0′	70° 15.0′	4	42° 46.0′	70° 13.0′
5	42° 55.0′	70° 08.0′	5	42° 46.0′	70° 00.0′
6	43° 09.0′	70° 08.0′			
7	43° 09.0′	70° 05.0′			
8	43° 13.0′	70° 05.0′			
Large Bigelow Bight HMA (Alts 3 and 4)					
Point	N Latitude	W Longitude			
1*	43° 39.2′	69° 45.1′			
2	43° 29.1′	69° 45.0′			
3	43° 28.9′	70° 07.3′			
4	43° 18.1	70° 07.1′			
5	43° 18.0′	70° 14.4′			
6	43° 07.2′	70° 14.2′			
7	43° 07.1′	70° 21.6′			
8	42° 50.9′	70° 21.1′			
9*	42° 50.6′	70° 44.6′			
10*	42° 57.1′	70° 41.7′			
11*	43° 03.4′	70° 35.9′			
12*	43° 07.2′	70° 33.8′			
13*	43° 07.6′	70° 32.7′			
14*	43° 09.6′	70° 31.3′			
15*	43° 17.3′	70° 29.3′			

2.1.3.1 ***Alternative 1 (No Action, preferred)***

The no action habitat management alternative in the western Gulf of Maine region (Map 6) includes the Western Gulf of Maine Habitat Closure Area. This area was initially implemented via Amendment 13 to the Northeast Multispecies FMP as an area closed to all mobile bottom-tending gears, regardless of the FMP under which that effort was managed. The area was subsequently implemented via Atlantic Sea Scallop Amendment 15 as a closure to all vessels fishing for scallops. This alternative also includes the Western Gulf of Maine Closure Area, which was implemented as a year-round groundfish closure in 1998.

Current restrictions for the three areas are summarized below. As with the Cashes Ledge Closure Area, two types of mobile bottom-tending gears, shrimp trawls and surfclam/quahog dredges, are exempted from the Western Gulf of Maine [Groundfish] Closure Area. However, these gears are unlikely to fish in the eastern portion of the groundfish closure not overlapping the habitat closure due to the distribution of their target species, so effectively the entirety of the Western Gulf of Maine Closure Area has functioned as a mobile bottom-tending gear closure since designation in 1998.

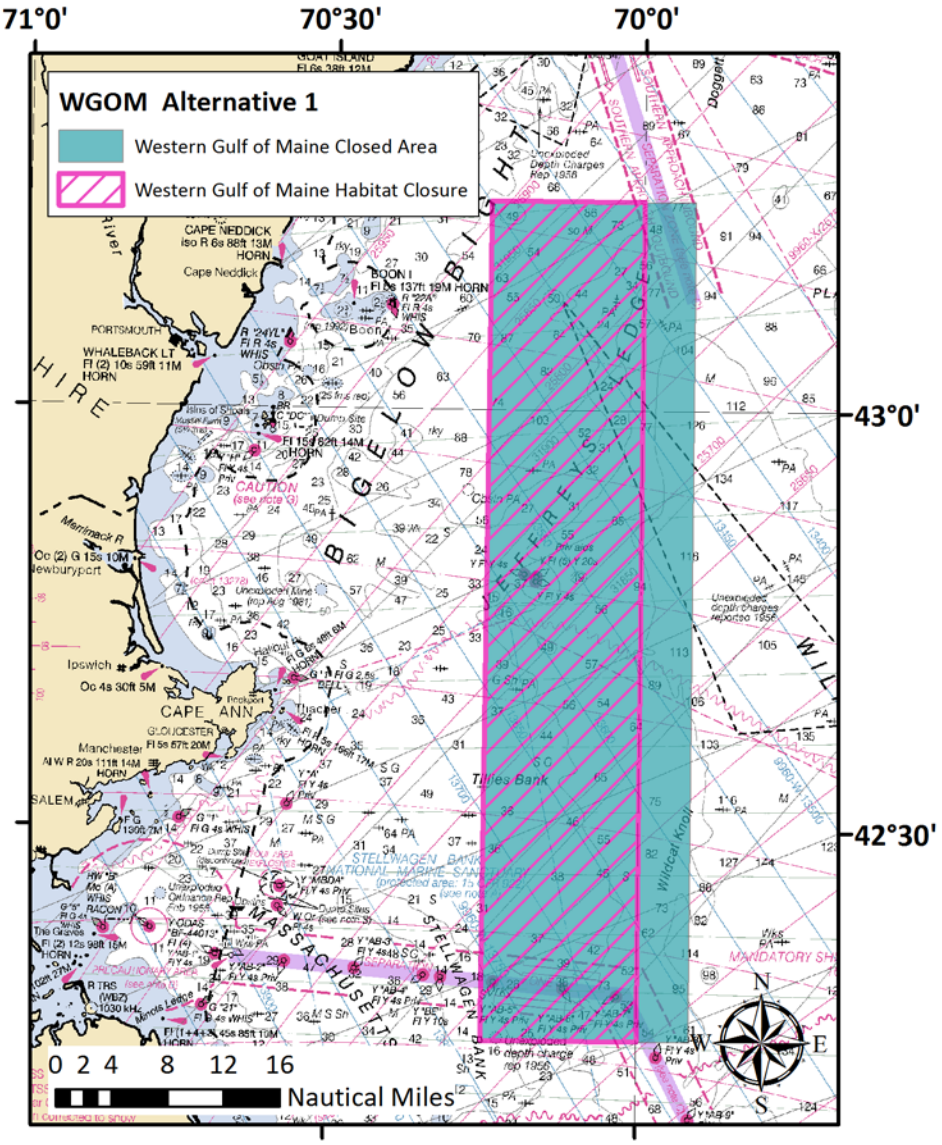
Table 12 – Fishing restrictions and exemptions associated with habitat and groundfish closures in the Western GOM sub-region.

Area name	Prohibitions	Exemptions
Western Gulf of Maine Habitat Closure Area	Closed year round to all vessels using mobile bottom-tending gears	• Vessels that are transiting, provided that gear is properly stowed
Western Gulf of Maine Closure Area	Closed year round to all fishing vessels, except for:	• Charter and party vessels with a letter of authorization • Vessels fishing with exempted gears: spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longline, single pelagic gillnets, and shrimp trawls[2] • Vessels participating in the mid-water trawl exempted fishery • Vessels that are transiting, provided that gear is properly stowed

Rationale: The habitat and groundfish closures restrict various types of fishing, including fishing with mobile gears, which reduce the adverse effects of EFH on the seabed in the western Gulf of Maine region.

[2] Note that because they are a mobile-bottom tending gear, shrimp trawls are prohibited from the habitat closure areas that overlap the WGOM and CL groundfish closures

Map 6 – Western Gulf of Maine Habitat Management Alternative 1 (No Action).



2.1.3.2 *Alternative 2 (No habitat management areas)*

This alternative would remove the current Western Gulf of Maine Habitat Closure Area and Western Gulf of Maine Closure Area, and would not designate any additional habitat management areas in the region.

Rationale: One way to reduce the impact of fishing on the seabed is to minimize area swept by bottom tending gears. The rationale behind this alternative is that eliminating area-based restrictions on fishing activity will enable vessels to optimize fishing efficiency, given limitations imposed by Annual Catch Limits and other restrictions, which should reduce area swept and therefore impacts to the seabed.

2.1.3.3 ***Alternative 3***

This alternative (Map 7) would modify the boundaries of the current Western Gulf of Maine Habitat Closure Area to create the Large Stellwagen Habitat Management Area, and designate the Large Bigelow Bight Habitat Management Area. Both of the areas would be designated in all Council FMPs. Measures for both of these areas could include:

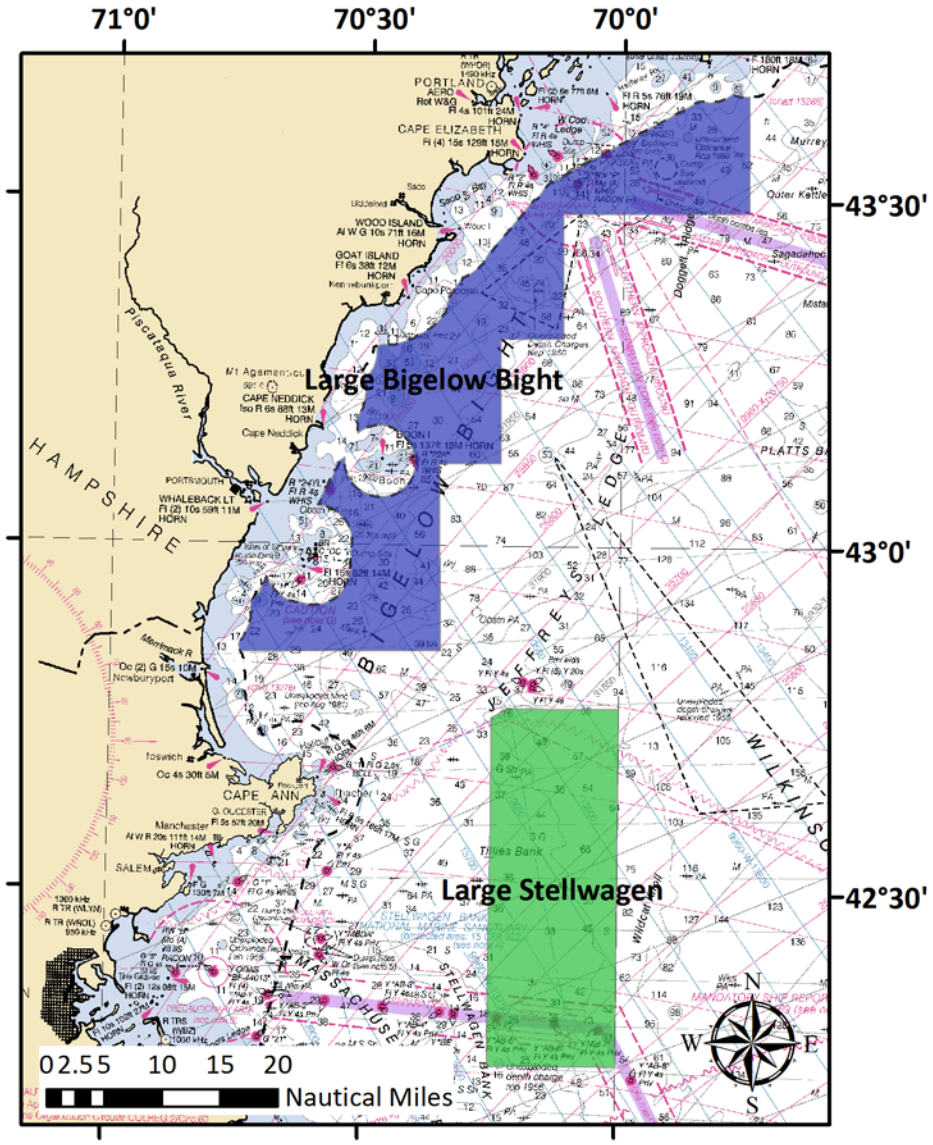
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to both areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: These areas in combination are intended to reduce the adverse effects of fishing on EFH, including EFH for juvenile groundfish, in the western Gulf of Maine region. The Stellwagen HMA was designed to encompass areas with high-intensity backscatter values from the multibeam survey, which represent coarse sand, gravelly sand, sandy gravel, gravel (including boulder ridges and piles of boulders), and bedrock outcrops (Valentine et al 2005a). Defining a habitat management area in this location and restricting the operation of mobile bottom-tending gears within it would be expected to reduce the accumulation of adverse effects in these particularly vulnerable habitats. The boulder ridges were identified using various types of information including topographic and backscatter data, terrain ruggedness index values, and thousands of video and photographic stations (Valentine et al 2005b). Some of the boulder ridges are quite large, with the largest tens of meters wide and hundreds of meters long, with a maximum height of 18 m (Valentine et al 2005b). The ridges are composed of cobbles and boulders interspersed with voids, and harbor an array of attached organisms as well as various fish species (Valentine et al 2005b, Auster and Lindholm 2005). The SASI vulnerability assessment indicates that cobble and boulder-dominated habitats and their associated geological and biological features have relatively high susceptibility to fishing gear impacts and relatively slow recovery.

The Large Bigelow Bight HMA was designed to protect habitats for juvenile redfish, alewife, plaice, cod, monkfish, haddock, pout, pollock, red hake, silver hake, white hake, winter flounder, witch flounder, and yellowtail flounder. This alternative includes the Large Stellwagen HMA only and not the Jeffreys Ledge HMA in order to balance the potential economic impacts associated with the larger version of the Bigelow Bight HMA.

Map 7 – Western Gulf of Maine Habitat Management Alternative 3.



2.1.3.4 ***Alternative 4***

This alternative (Map 8) would modify the boundaries of the current Western Gulf of Maine Habitat Closure Area to create the Small Stellwagen and Jeffreys Ledge Habitat Management Areas, and designate the Large Bigelow Bight Habitat Management Area. The three areas would be designated in all Council FMPs. Measures for all three of these areas could include:

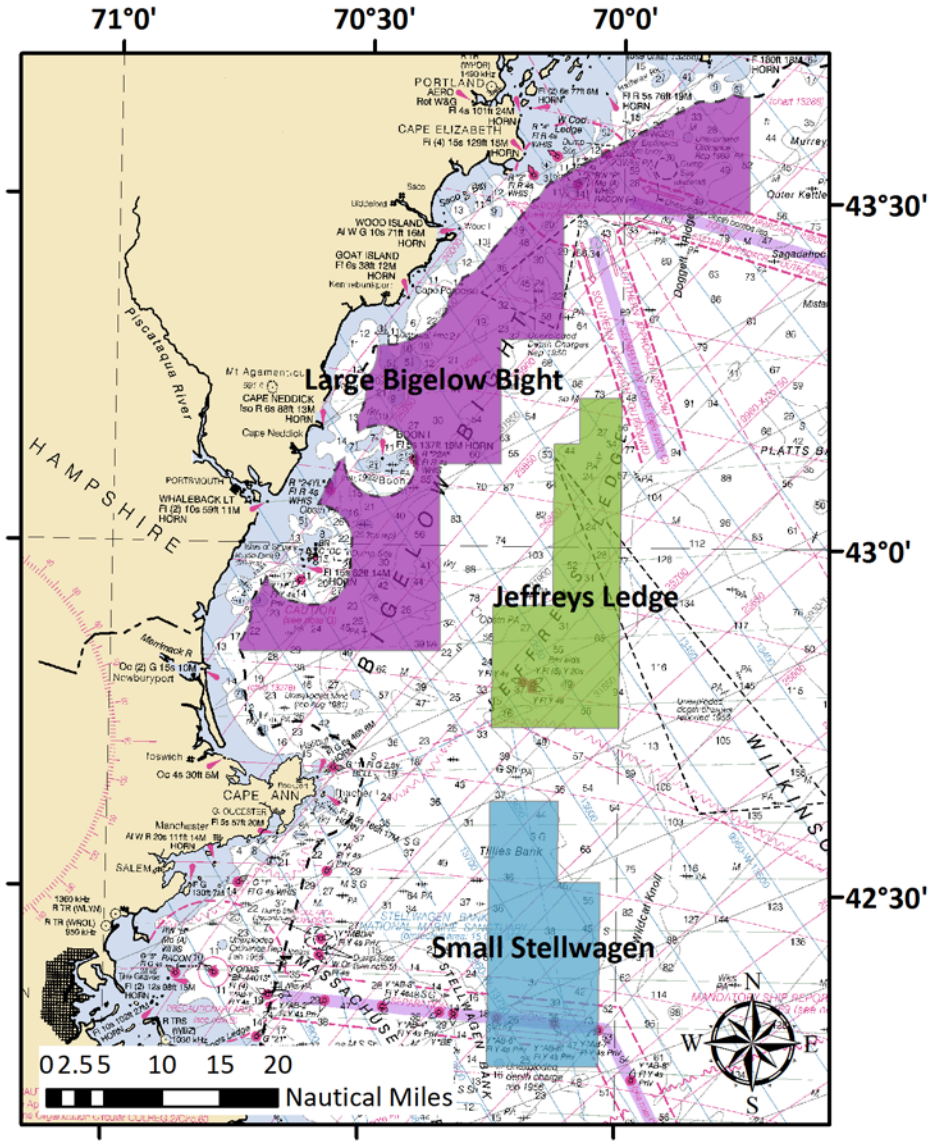
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or

- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to all three areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: These areas in combination are intended to reduce the adverse effects of fishing on EFH, including EFH for juvenile groundfish, in the western Gulf of Maine region. In this alternative, the eastern boundary of the Stellwagen area extends only to the edge of the multibeam sampling area discussed above, not to the current habitat closure boundary, because the existence of vulnerable habitat types is best documented in the areas sampled with multibeam. The northern part of the Western Gulf of Maine Habitat Closure Area was modified to remove the deeper, muddier habitats in the northwest corner to focus on protection of Jeffreys Ledge itself, which contains complex benthic habitats vulnerable to the impacts of fishing. The Bigelow Bight HMA is as described in Alternative 3.

Map 8 – Western Gulf of Maine Habitat Management Alternative 4.



2.1.3.5 ***Alternative 5***

Similar to Alternative 4, this alternative would also modify the boundaries of the current Western Gulf of Maine Habitat Closure Area to create the Small Stellwagen and Jeffreys Ledge Habitat Management Areas, and designate the Small Bigelow Bight Habitat Management Area. All three areas would be designated in all Council FMPs. Measures for all three of these areas could include:

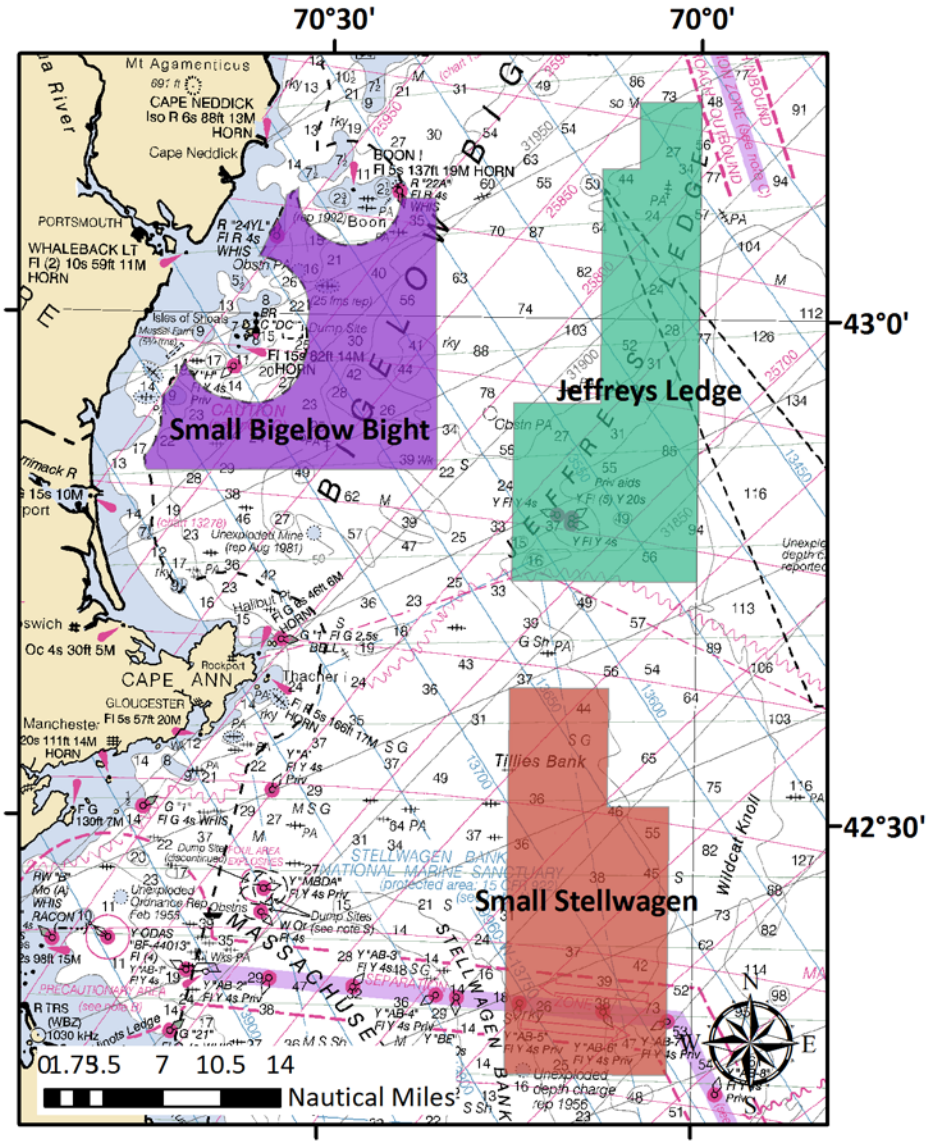
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or

- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to all three areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: These areas in combination are intended to reduce the adverse effects of fishing on EFH, including EFH for juvenile groundfish, in the western Gulf of Maine region. Due to concerns about potential economic impacts associated with the full version of the Bigelow Bight HMA, an alternative, smaller area was developed.

Map 9 – Western Gulf of Maine Habitat Management Alternative 5.



2.1.3.6 ***Alternative 6***

This alternative (Map 10) would modify the boundaries of the current Western Gulf of Maine Habitat Closure Area to create the Large Stellwagen Habitat Management Area. This area would be implemented in all Council FMPs. Measures for this area could include:

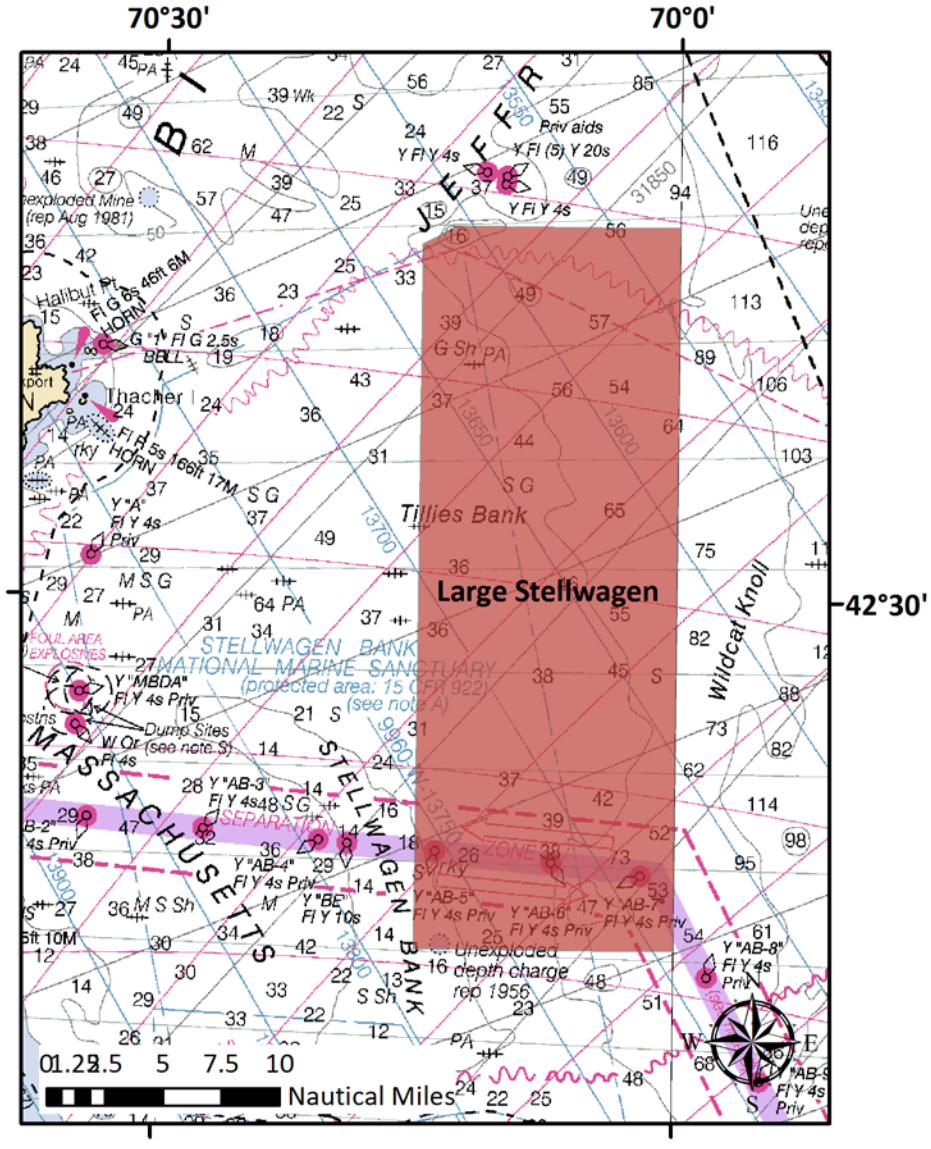
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or

- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: This alternative is a subset of the areas proposed in Alternative 3 and was proposed due to concerns about economic impacts associated with Alternatives 3, 4, and 5. This alternative would minimize adverse effects to EFH within some parts of the western Gulf of Maine region, but allow fishing in the inshore Bigelow Bight areas and on Jeffreys Ledge.

Map 10 – Western Gulf of Maine Habitat Management Alternative 6.



2.1.3.7 ***Alternative 7 (preferred)***

Alternative 7 would implement roller gear size restrictions as a habitat management measure in the western Gulf of Maine. This alternative can be implemented in addition to any of the other six alternatives.

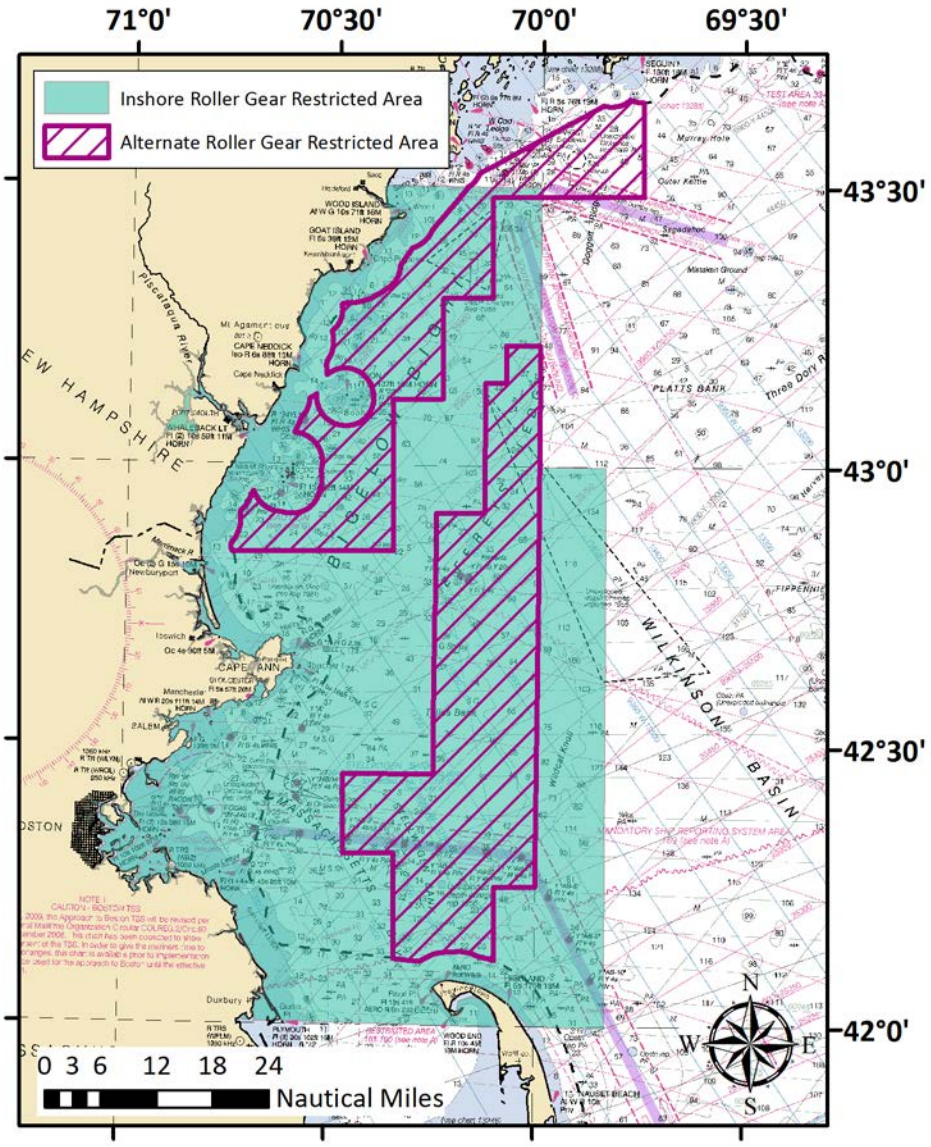
Option A would define the current Inshore Roller Gear Restricted Area, which limits trawl roller gear to a maximum diameter of 12 inches, as a habitat management measure. **This is the Council's preferred option.**

Option B would apply this same restriction to a different set of areas representing the maximum extent of all habitat management areas proposed at the June 2013 Habitat/Groundfish Committee meeting. Both sets of areas are depicted on Map 11.

Because the focus here is on minimizing the adverse effects of fishing on seabed habitats, the roller gear size limit would apply to all bottom trawl gears, even though the current Inshore Roller Gear Restricted Area regulations are limited to vessels fishing on a Northeast Multispecies Day-at-Sea or sector trip. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council under the Northeast Multispecies FMP.

Rationale: When it was implemented via Framework Adjustment 27 to the Northeast Multispecies FMP, the Council discussed the inshore roller gear restriction as limiting trawl activity over complex habitat types, although the measure was primarily discussed as a mechanism for reducing mortality on Gulf of Maine cod. Option 1 would designate this restriction as an adverse effects minimization measure. Option 2 would implement the roller gear restriction as a habitat management measure within all the various western Gulf of Maine areas identified for adverse effects minimization or juvenile groundfish habitat protection.

Map 11 – Western Gulf of Maine Habitat Management Alternative 7. Existing area option (hatched) and alternate area option (shaded) roller gear areas that could be implemented as habitat management measures in combination with any of the other WGOM alternatives.

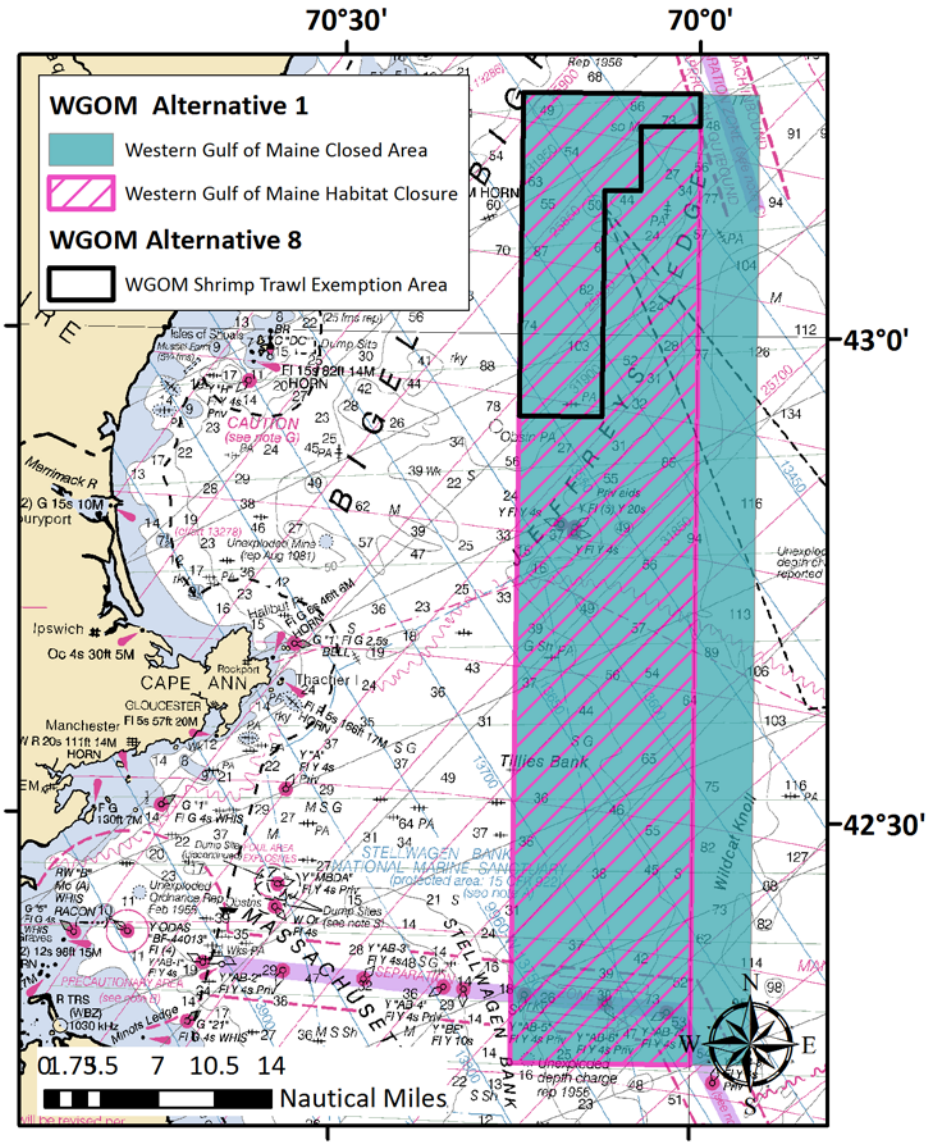


2.1.3.8 ***Alternative 8 (preferred)***

This alternative would exempt shrimp trawling from the northwestern portion of the existing Western Gulf of Maine Habitat Closure Area. The boundaries of the exemption area are derived from the Jeffreys Ledge HMA, which is shown in Alternatives 4 and 5. This alternative only makes sense as an add-on to Alternative 1/No Action, since Alternatives 2-6 would remove the exemption area from management for habitat purposes. It is listed as a separate alternative because this measure represents a change from No Action management. The shrimp trawl exemption area (black outline) is shown in combination with the No Action areas on the map below.

Rationale: Mud habitats are considered less vulnerable to fishing impact as compared to cobble- and boulder-dominated areas, and the exemption area is off of Jeffreys Ledge in a deeper, muddier, basin. If the existing Western Gulf of Maine Habitat Closure Area remains in place, this alternative would allow shrimp trawls to prosecute their fishery in these less vulnerable seabed types. Realized adverse effects from the shrimp fishery would likely be minimal as the fishery is seasonal and effort would only occur this far offshore in years when the season runs long, because the shrimp are inshore of this exemption area earlier in the winter when the season opens. In recent shrimp seasons, fishing effort has not overlapped this area.

Map 12 – Western Gulf of Maine Alternative 1 with addition of exemption area for shrimp trawl gear (black outline)



2.1.4 Georges Bank

The habitat management alternatives for the Georges Bank region include various combinations of ten areas: Closed Area II Habitat Closure Area (no action), Closed Area I N Habitat Closure Area (no action), Closed Area I S Habitat Closure Area (no action), Northern Edge HMA, Closed Area II Groundfish Closed Area (no action), Closed Area I Groundfish Closed Area (no action), Georges Shoal MBTG HMA, Small Georges Shoal Gear Modification Area, Large Georges Shoal Gear Modification Area, Closed Area II EFH South HMA, Georges Shoal 2 HMA, and Northern Georges Bank HMA. **No preferred alternative was identified for this sub-region.**

Table 13 – Coordinates for habitat management areas on Georges Bank. MBTG indicates possible closure to mobile bottom-tending gears, with or without an exemption for hydraulic clam dredges.

Closed Area II Habitat Closure Area (Alt 1)			Closed Area I Habitat Closure Area North (Alt 1)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
CIIH1	67° 20′	42° 10′	CI1	69° 23′	41° 30′
CIIH2	67° 09.3′	42° 10′	CI4	68° 30′	41° 30′
CIIH3	67° 0.5′	42° 00′	CIH1	68° 30′	41° 26′
CIIH4	67° 10′	42° 00′	CIH2	69° 01′	41° 04′
CIIH5	67°10′	41° 50′	Point	W Longitude	N Latitude
CIIH6	67° 20′	41° 50′			
Closed Area I Habitat Closure Area South (Alt 1)			Closed Area I (Groundfish Closure Area, Alt 1)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
CIH3	68° 53′	40° 55′	CI1	69˚ 23'	41˚ 30'
CIH4	68° 30′	40° 58′	CI2	68˚ 45'	40˚ 45'
CI3	68° 30′	40° 45′	CI3	68˚ 30'	40˚ 45'
CI2	68° 45′	40° 45′	CI4	68˚ 30'	41˚ 30'
Closed Area II (Groundfish Closure Area, Alt 1)					
Point	W Longitude	N Latitude			
CII1	67˚ 20'	41˚ 00'			
CII2	66˚ 35.8' (1)	41˚ 00'			
G5	66˚ 24.8' (1)	41˚ 18.6'			
CII3	67˚ 20'	42˚ 22'			
(1) US – Canada maritime boundary					
Northern Edge HMA (Alts 3 and 4)			Georges Shoal Gear Modification Area (Alt 4)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
1	67° 11.4′	42° 12.3′	1	67° 20.0′	42° 40.0′
2	67° 00.5′	42° 00.0′	2	67° 56.0′	41° 40.0′
3	67° 16.8′	42° 00.0′	3	67° 56.0′	41° 56.0′
4	67° 25.8′	42° 09.6′	4	67° 39.7′	41° 56.0′
5	67° 20.0′	42° 11.3′			
6	67° 15.2′	42° 12.2′			
Northern Georges Gear Modification Area (Alt 5)			Georges Shoal 1 MBTG HMA (Alt 5)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
1	66° 34.9′	41° 30.1′	1	67° 20.0′	41° 30.0′
2	68° 10.0′	41° 30.0′	2	67° 56.0′	41° 30.0′
3	68° 09.9′	41° 55.1′	3	67° 56.0′	41° 40.0′

4	67° 09.7′	42° 10.3′	4	67° 20.0′	42° 40.0′
EFH Expanded 1 (Alt 6A)			EFH Expanded 2 (Alt 6B)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
1 (CIIH2)	67° 09.3′	42° 10′	1	67° 22′ 16″	42° 10′
2 (CIIH3)	67° 0.5′	42° 00′	2	67°10′	41° 56′ 1″
3 (CIIH4)	67° 10′	42° 00′	3 (CIIH5)	67°10′	41° 50′
4 (CIIH5)	67°10′	41° 50′	4	67°30′	41° 50′
5	67°30′	41° 50′	5	67°30′	42° 10′
6	67°30′	42° 10′			
EFH South HMA (Alt 7)			Georges Shoal 2 MBTG HMA (Alt 7)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
1	67° 07′	41° 57′	1	67° 46′	41° 46′
2	67° 02′	41° 50′	2	67° 40′	41° 39′
3 (CIIH6)	67° 20′	41° 50′	3	67° 40′	41° 30′
4	67° 20′	41° 57′	4	68° 10′	41° 30′
			5	68° 10′	41° 41′
Northern Georges Bank MBTG HMA (Alt 8)					
Point	W Longitude	N Latitude			
1	67° 17′ 29″	42° 19′ 13″			
2	67° 57′ 21″	41° 56′ 14″			
3	68° 02′ 42″	41° 24′ 00″			
4	68° 02′ 42″	41° 57′ 54″			

2.1.4.1 ***Alternative 1 (No Action)***

The no action habitat management alternative in the Georges Bank region (Map 13) includes the Closed Area I and Closed Area II Habitat Closure Areas. These areas were initially implemented via Amendment 13 to the Northeast Multispecies FMP as areas closed to all mobile bottom-tending gears, regardless of the FMP under which that effort was managed. The same areas were subsequently implemented via Atlantic Sea Scallop Amendment 15 as a closure to all vessels fishing for scallops. Note that between the implementation of Scallop Amendment 10 in 2004 and Amendment 15, a slightly different set of scallop habitat closures was in effect. Also note that the Closed Area II Habitat Closure Area is also designated as a Habitat Area of Particular Concern, a designation which carries no restrictions on fishing. This designation was made in 1999 with the first Omnibus EFH Amendment and is a preferred alternative in this action (see Volume 2). Alternative 1 also includes Closed Area I and Closed Area II, which were implemented as year round groundfish closures in their present configuration in 1994, although a variety of fishing exemptions have been allowed in portions of these areas over time.

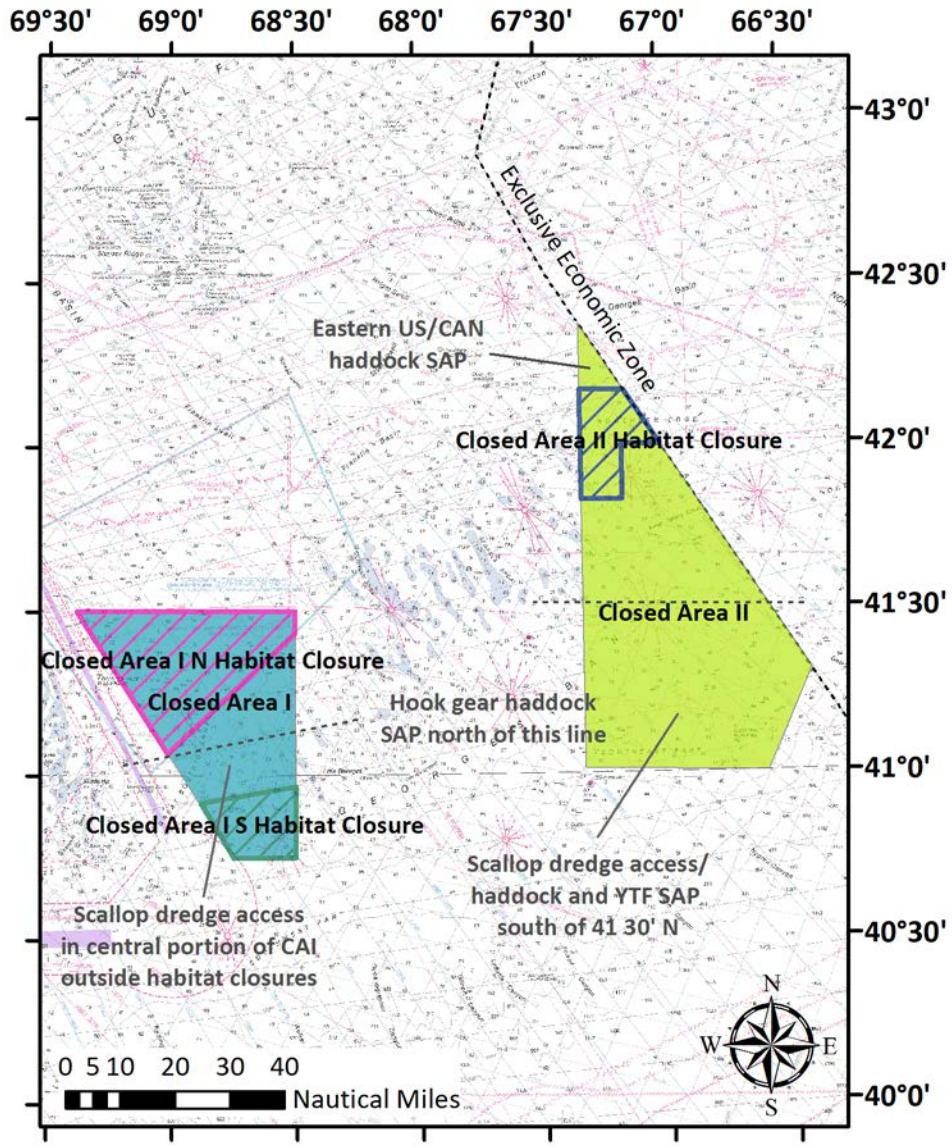
Current restrictions for the three areas are summarized below. The various exemptions mean that mobile bottom-tending gears have been used throughout many of the non-habitat closure portions of these areas, including the central portion of Closed Area I, and the northern and southern portions of Closed Area II.

Table 14 – Fishing restrictions and exemptions associated with habitat and groundfish closures in the Georges Bank sub-region.

Area name	Prohibitions	Exemptions
Closed Area I and Closed Area II Habitat Closure Areas	Closed year round to all vessels using mobile bottom-tending gears	• Vessels that are transiting, provided that gear is properly stowed
Closed Area I	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Tuna purse seine gear; review to ensure no impacts on regulated multispecies • Fishing in a Special Access Program • Fishing for scallops within the Closed Area I Access Area • Vessels that are transiting, provided that gear is properly stowed
Closed Area II	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Fishing in a Special Access Program • Tuna purse seine gear outside of the portion of CA II known as the Habitat Area of Particular Concern • Fishing in the CA II Yellowtail Flounder/Haddock SAP or the Eastern U.S./Canada Haddock SAP Program • Transiting the area, provided the vessel's fishing gear is stowed and there is a compelling safety reason • The vessel has declared into the Eastern U.S./Canada Area and is transiting CA II • Fishing for scallops within the Closed Area II Access Area • Vessels that are transiting, provided that gear is properly stowed

Rationale: The habitat closure areas, and also the groundfish closure areas, restrict various types of fishing, including fishing with mobile gears, which reduces the adverse effects of EFH on the seabed in the Georges Bank region. Note that some types of mobile gears are currently exempted from some portions of the groundfish closures.

Map 13 – Georges Bank Habitat Management Alternative 1 (No Action)



2.1.4.2 *Alternative 2 (No habitat management areas)*

This alternative would remove the current Closed Area I and Closed Area II habitat closure areas and would not designate any additional habitat management areas in the region. This alternative would not affect the HAPC designation.

Rationale: One way to reduce the impact of fishing on the seabed is to minimize area swept by bottom tending gears. The rationale behind this alternative is that eliminating area-based restrictions on fishing activity will enable vessels to optimize fishing efficiency, given limitations imposed by Annual Catch Limits and other restrictions, which should reduce area swept and therefore impacts to the seabed.

2.1.4.3 ***Alternative 3***

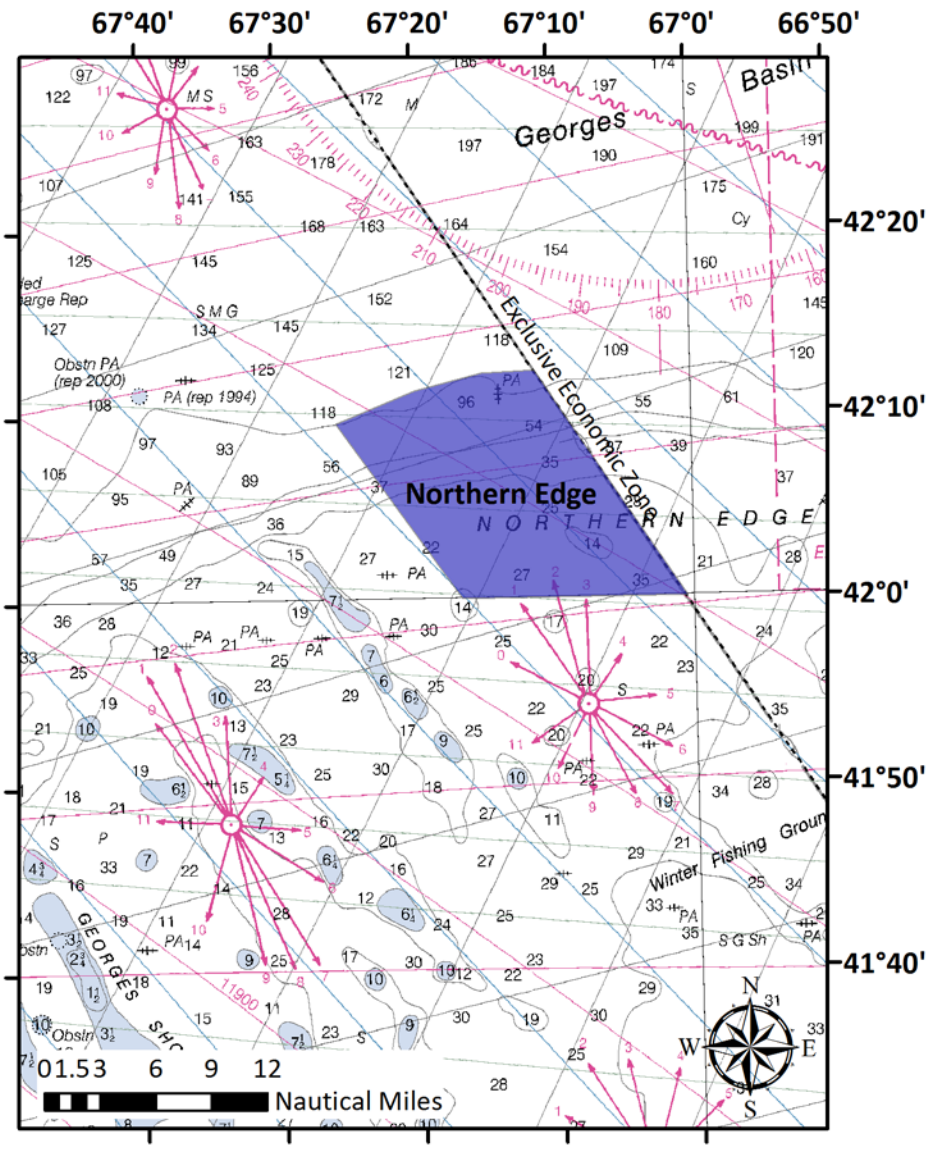
This alternative (Map 14) would remove the current Closed Area I Habitat Closure Area and would modify the Closed Area II Habitat Closure Area to create the Northern Edge Habitat Management Area, and implement it in all Council FMPs. Measures for the Northern Edge HMA could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: The Northern Edge HMA encompasses cobble habitats with associated epifauna that are vulnerable to the adverse effects of fishing, so designation of this area as a mobile bottom-tending gear closure would minimize the adverse effects of fishing on EFH. The area and adjacent areas were identified in the Swept Area Seabed Impact analysis. The northern, deeper part of the area contains juvenile haddock and cod habitats, although high cod catches per tow in the area are more historic than recent. Thus, protection would be expected to increase productivity of these stocks. The proposed area is smaller than the current habitat closure area and shifted to the north, so it could provide increased fishery access for the scallop fishery, if Closed Area II is converted to a seasonal spawning area only (see Section 2.2.2) and/or if a scallop access area is created.

Map 14 – Georges Bank Habitat Management Alternative 3.



2.1.4.4 ***Alternative 4***

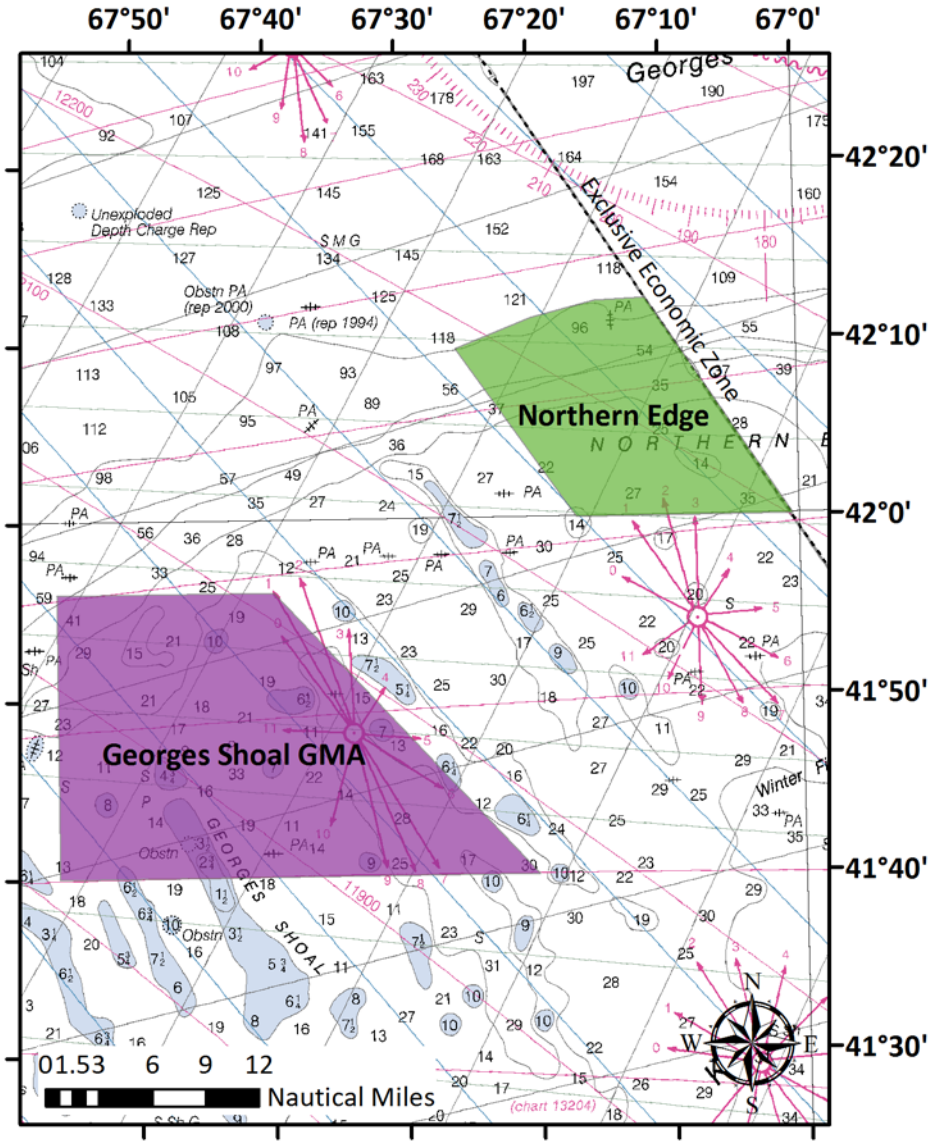
This alternative (Map 15) would remove the current Closed Area I Habitat Closure Area and would modify the Closed Area II Habitat Closure Area to create the Northern Edge Habitat Management Area, and implement it in all Council FMPs. In addition, this alternative would establish the Georges Shoal Gear Modification Area (GMA), which would mandate either the no ground cable or the raised ground cable trawl gear restrictions (Options 3 and 4, above). The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council. Measures for the Northern Edge HMA could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or

- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

Rationale: The Northern Edge HMA is discussed above. The Georges Shoal GMA could provide additional habitat benefits via reduced area swept by requiring modified ground cables, although the size of this benefit would depend on tradeoffs between decreased catch rates and increased fishing time when using the modified gear.

Map 15 – Georges Bank Habitat Management Alternative 4. The hatched Georges Shoal GMA is only being considered for ground cable modifications.



2.1.4.5 ***Alternative 5***

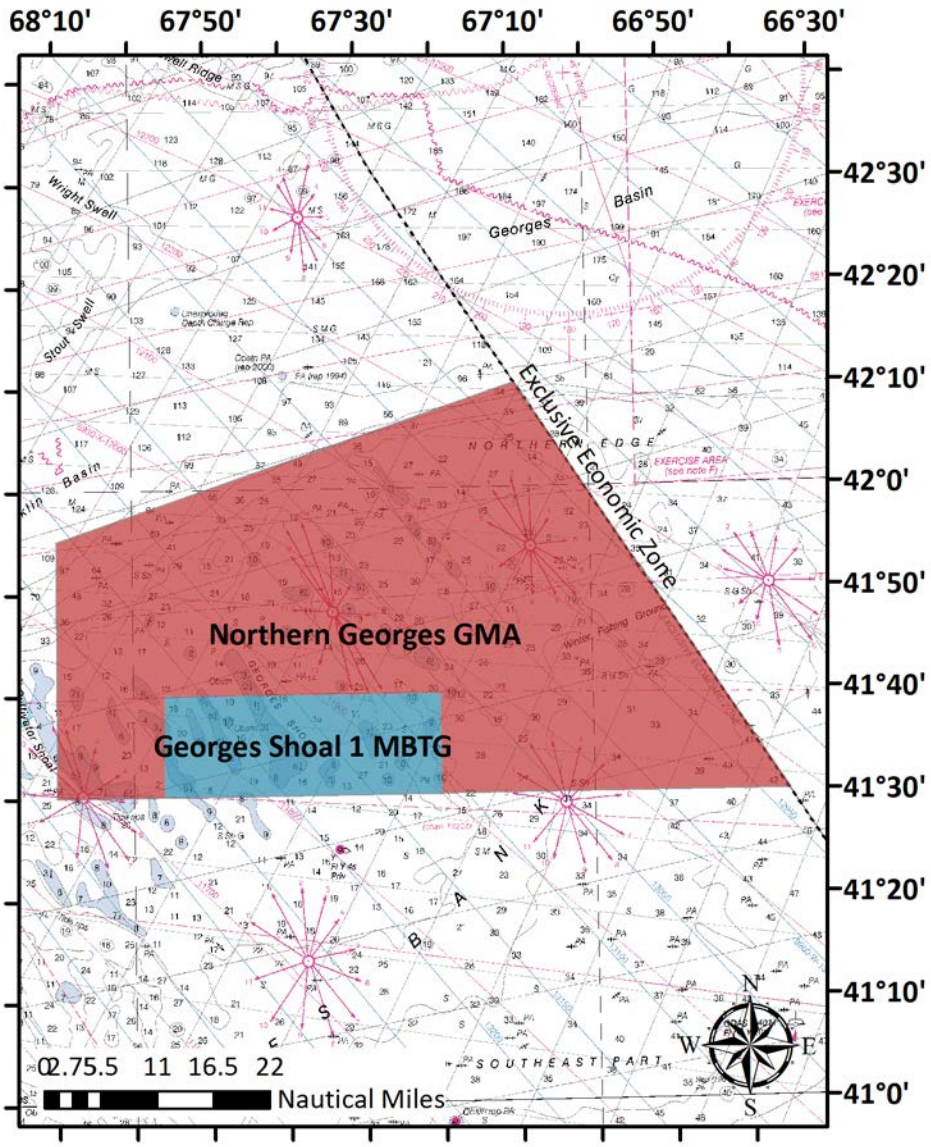
This alternative (Map 16) would remove the current Closed Area I and Closed Area II Habitat Closure Areas from the multispecies and sea scallop regulations. This alternative would establish the Georges Shoal 1 mobile-bottom tending gear HMA, and close it to mobile bottom-tending gears, with (Option 2) or without (Option 1) an exemption for hydraulic clam dredges. In addition, this alternative would establish the Northern Georges Gear Modification Area (GMA), which would mandate either the no ground cable or the raised ground cable trawl gear restrictions:

- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: This alternative does not create a smaller habitat area on the northern edge, and therefore would provide the greatest flexibility in terms of access to the northern edge scallop resource, aside from Alternative 2. The larger Northern Georges GMA could provide habitat benefits via reduced area swept by requiring modified ground cables, but as above, this size of this benefit would depend on tradeoffs between decreased catch rates and increased fishing time when using the modified gear.

Map 16 – Georges Bank Habitat Management Alternative 5.



2.1.4.6 ***Alternative 6***

This alternative (Map 14) would remove the current Closed Area I Habitat Closure Areas and create a new habitat management area based on the Closed Area II Habitat Closure Area, and implement it in all Council FMPs. There are two boundary options described below (6A and 6B). Measures for this area could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or

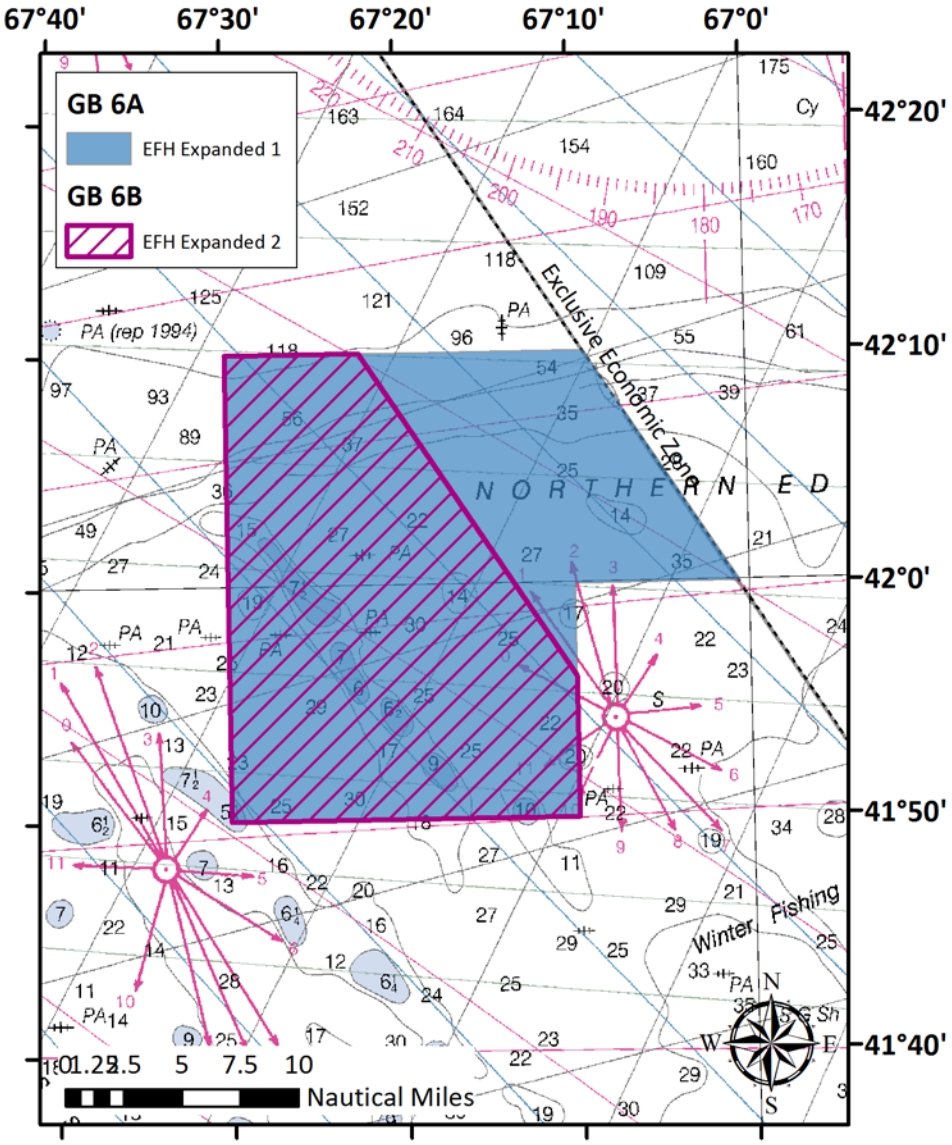
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Alternative 6A would designate an area that includes the existing CAII habitat closure extended west to 67° 30' W longitude as a habitat management area. The area is called "EFH Expanded 1".

Alternative 6B overlaps A in the west, but there would be an 8 nm open area buffer along the EEZ. This area is called "EFH Expanded 2".

Map 17 – Georges Bank Habitat Management Alternatives 6a and 6b.



2.1.4.7 ***Alternative 7***

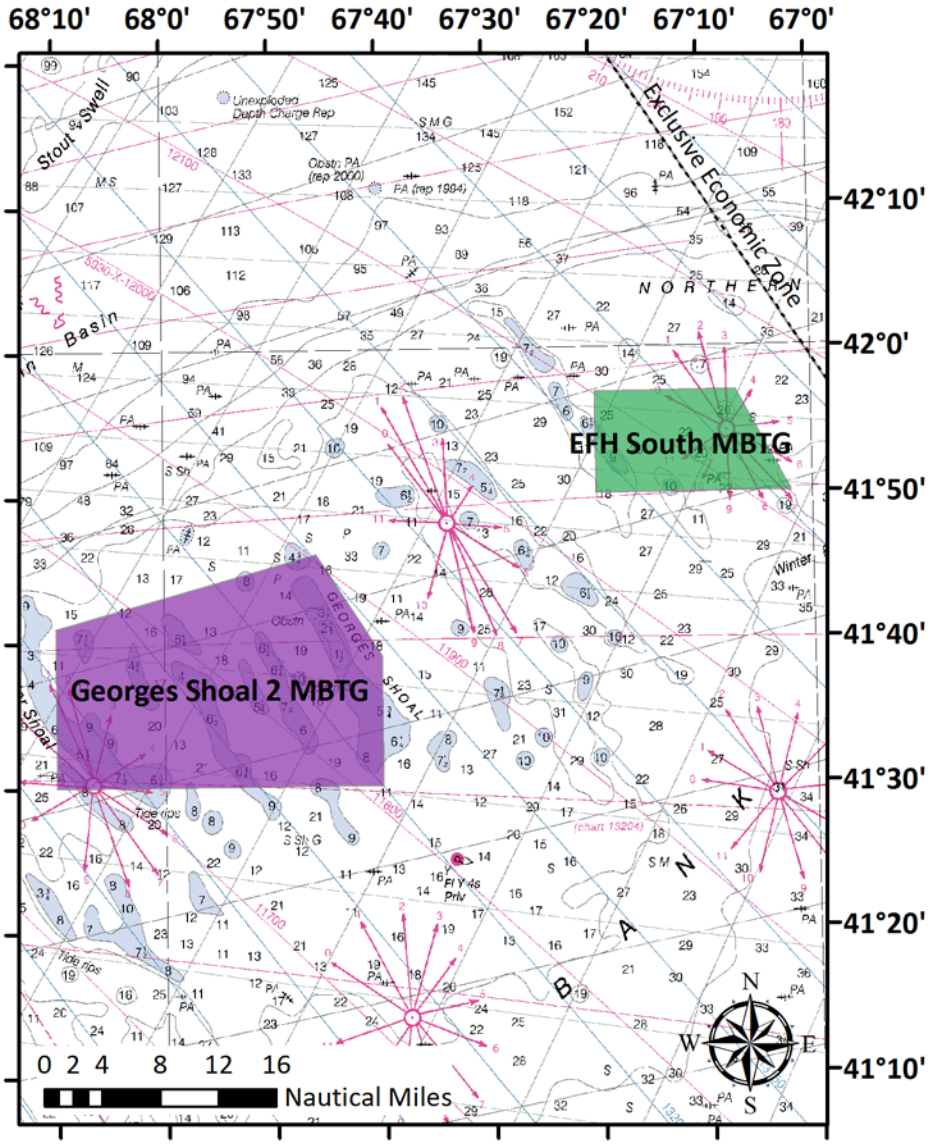
This alternative (Map 18) would remove the current Closed Area I Habitat Closure Areas and would modify the Closed Area II Habitat Closure Area to create the CAII EFH South Habitat Management Area, and implement it in all Council FMPs. This alternative would also implement the Georges Shoal 2 Habitat Management Area. Measures the areas could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges.

The same restrictions need not be applied to both areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: This alternative encompasses vulnerable habitat areas identified by the Swept Area Seabed Impact analysis while allowing access to groundfish and scallops on the northern portion of Georges Bank.

Map 18 – Georges Bank Habitat Management Alternative 7



2.1.4.8 ***Alternative 8***

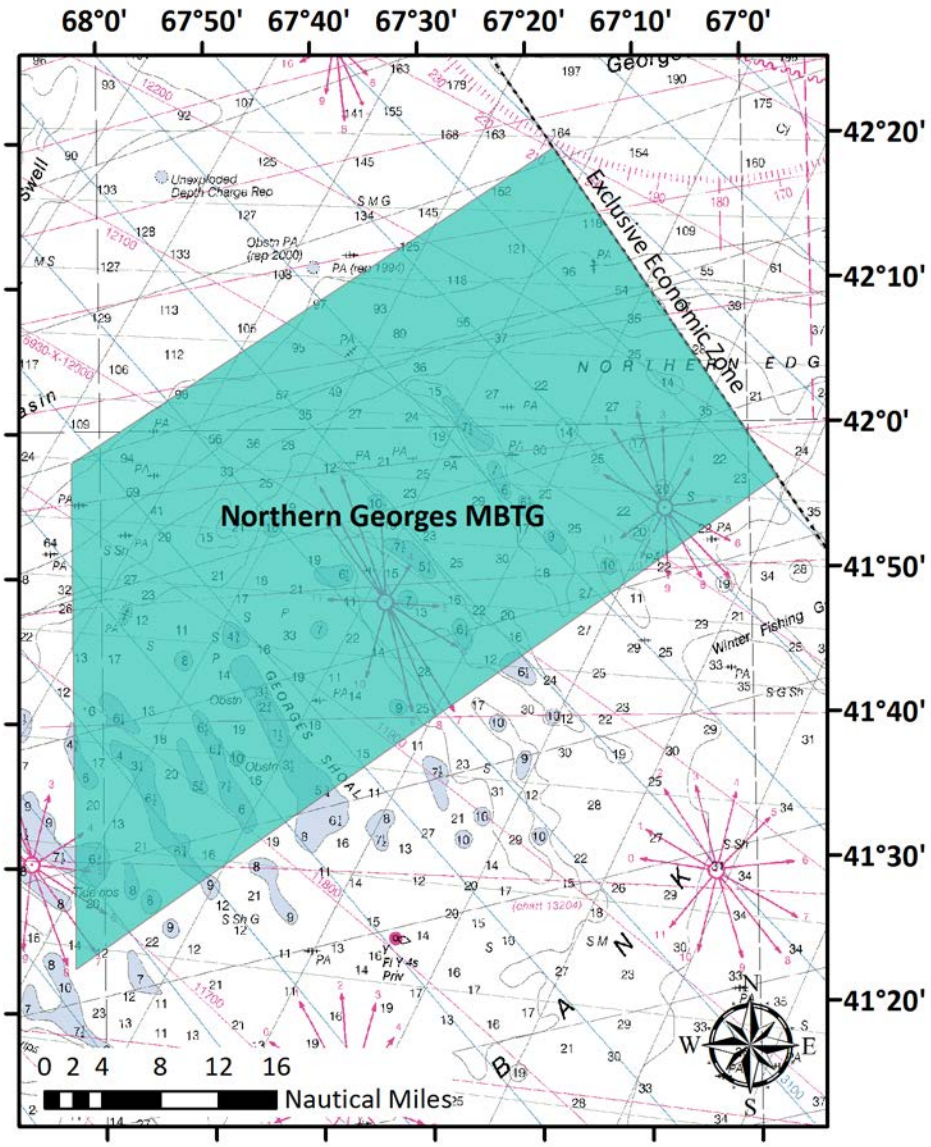
This alternative (Map 18) would replace the current habitat closures on Georges Bank with the Northern Georges Bank HMA, and implement it in all Council FMPs. Measures the area could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges.

The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: This area encompasses most of the vulnerable seabed habitats in the Georges Bank sub-region as identified by the Swept Area Seabed Impact analysis. It also encompasses a small number of juvenile groundfish hotspots as well as juvenile cod and haddock of various size classes, although not at hotspot levels of abundance.

Map 19 – Georges Bank Habitat Management Alternative 8



2.1.5 Great South Channel and Southern New England

The habitat management alternatives for the Great South Channel and Southern New England region include various combinations of seven areas: Nantucket Lightship Habitat Closure Area (no action), Great South Channel HMA, Great South Channel East HMA, Nantucket Shoals HMA, Great South Channel Gear Modification Area, Nantucket Shoals West MBTG HMA, and the Cox Ledge HMA (which is comprised of two sub-areas that would be implemented together). **No preferred alternative was identified for this sub-region.**

Table 15 – Coordinates for habitat management areas in the Great South Channel and southern New England

Nantucket Lightship Habitat Closure Area (Alt 1)			Nantucket Lightship Closed Area (Alt 1)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
NLH1	70° 00′	41° 10′	G10	69°00′	40°50′
NLH2	69° 50′	41° 10′	CN1	69°00′	40°20′
NLH3	69° 30′	40° 50′	CN2	70°20′	40°20′
NLH4	69° 30′	40° 20′	CN3	70°20′	40°50′
NLH5	70° 00′	40° 20′			
Great South Channel HMA (Alt 4)			Great South Channel East HMA (Alt 3)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
1	69° 31.0′	41° 30.3′	1	69° 49.5′	41° 44.9′
2	69° 18.5′	41° 0.00′	2	69° 31.0′	41° 30.3′
3	69° 18.5′	40° 51.7′	3	69° 25.2′	41° 30.0′
4	69° 48.9′	40° 51.6′	4	69° 12.9′	40° 58.0′
5	69° 49.3′	41° 30.2′	5	69° 18.5′	40° 58.0′
			6	69° 18.5′	40° 51.7′
			7	69° 48.9′	40° 51.6′
Nantucket Shoals HMA (Alt 5)					
Point	W Longitude	N Latitude			
1	69° 30.0′	41° 30.2′			
2	69° 30.0′	40° 51.5′			
3	69° 53.5′	40° 51.5′			
4	69° 53.5′	41° 30.2′			
Nantucket Shoals West MBTG HMA (Alt 6)			Great South Channel Gear Modified Area (Alt 6)		
Point	W Longitude	N Latitude	Point	W Longitude	N Latitude
1	70° 00.0′	40° 50.0′	1	69° 23.0′	41° 30.0′
2*	69° 60.0′	41° 11.4′	2	69° 00.0′	41° 02.9′
3*	69° 60.0′	41° 25.7′	3	69° 00.0′	40° 50.0′
4*	69° 60.0′	41° 29.3′	4	69° 30.0′	40° 50.0′
5*	69° 60.0′	41° 29.5′	5	69° 30.0′	41° 30.0′
6*	69° 57.5′	41° 30.2′			
7	69° 30.0′	41° 30.0′			
8	69° 30.0′	40° 50.0′			
**State waters boundary*					
Cox Ledge HMA 1 (Alts 3-6)			Cox Ledge HMA 2 (Alts 3-6)		
Point	W Longitude	N Latitude	Point	Longitude	Latitude
1	71° 03.0′	41° 05.0′	1	70° 55.0′	41° 12.0′
2	71° 03.0′	41° 00.0′	2	70° 55.0′	41° 07.5′
3	71° 14.0′	41° 00.0′	3	71° 01.0′	40° 07.5′
4	71° 14.0′	41° 05.0′	4	71° 01.0′	41° 12.0′

2.1.5.1 ***Alternative 1 (No Action)***

The no action habitat management alternative in the Great South Channel/southern New England region includes the Nantucket Lightship Habitat Closure Area (Map 20). This area was initially implemented via Amendment 13 to the Northeast Multispecies FMP as an area closed to all mobile bottom-tending gears, regardless of the FMP under which that effort was managed. The

same area was subsequently implemented via Atlantic Sea Scallop Amendment 15 as a closure to all vessels fishing for scallops. Note that between the implementation of Scallop Amendment 10 in 2004 and Amendment 15, a slightly different set of scallop EFH closures was in effect. This alternative also includes the Nantucket Lightship Closed Area, which was implemented year round in its current configuration in 1994 for groundfish management purposes.

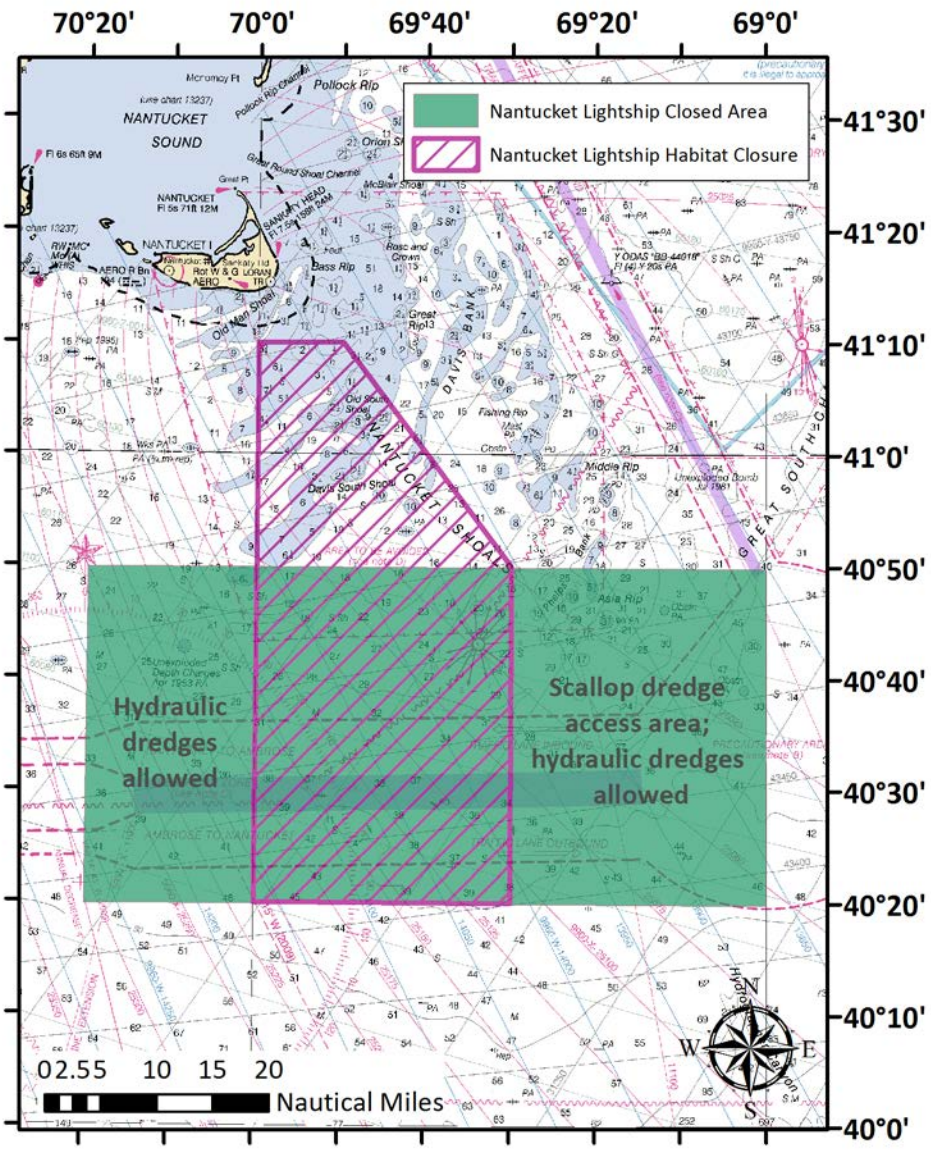
Current restrictions for both areas are summarized below. Some parts of the Nantucket Lightship [Groundfish] Closed Area have been fished by mobile bottom-tending gears. Specifically, east of the habitat closure is a scallop dredge access area, and hydraulic clam dredges are exempt from the groundfish area, so that gear may be used west and east of the habitat closure.

Table 16 – Fishing restrictions and exemptions associated with habitat and groundfish closures in the Great South Channel/Southern New England sub-region.

Area name	Prohibitions	Exemptions
Nantucket Lightship Habitat Closure Area	Closed year round to all vessels using mobile bottom-tending gears	• Vessels that are transiting, provided that gear is properly stowed
Nantucket Lightship Closure Area	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Tuna purse seine gear; review to ensure no impacts on regulated multispecies • Classified as charter, party or recreational vessel, provided that: (A) LOA, (B) Fish species managed by the NEFMC or the MAFMC are not sold, (C) no gear other than rod and reel or handline gear on board, (D) vessel does not fish outside the Nantucket Lightship Closed Area during the period specified by the LOA • Fishing with or using dredge gear designed and used to take surfclams or ocean quahogs • Fishing for scallops within the Nantucket Lightship Access Area • Vessels that are transiting, provided that gear is properly stowed

Rationale: Both areas restrict various types of fishing, including fishing with mobile gears, which reduce the adverse effects of EFH on the seabed in the Great South Channel/southern New England region. Note that some types of mobile gears are currently exempted from the groundfish closed area.

Map 20 – Great South Channel/SNE Habitat Management Alternative 1 (No Action).



2.1.5.2 *Alternative 2 (No habitat management areas)*

This alternative would remove the current Nantucket Lightship Habitat Closure Area and the Nantucket Lightship Closed Area, and would not designate any additional habitat management areas in the region.

Rationale: One way to reduce the impact of fishing on the seabed is to minimize area swept by bottom tending gears. The rationale behind this alternative is that eliminating area-based restrictions on fishing activity will enable vessels to optimize fishing efficiency, given limitations imposed by Annual Catch Limits and other restrictions, which should reduce area swept and therefore impacts to the seabed.

2.1.5.3 ***Alternative 3***

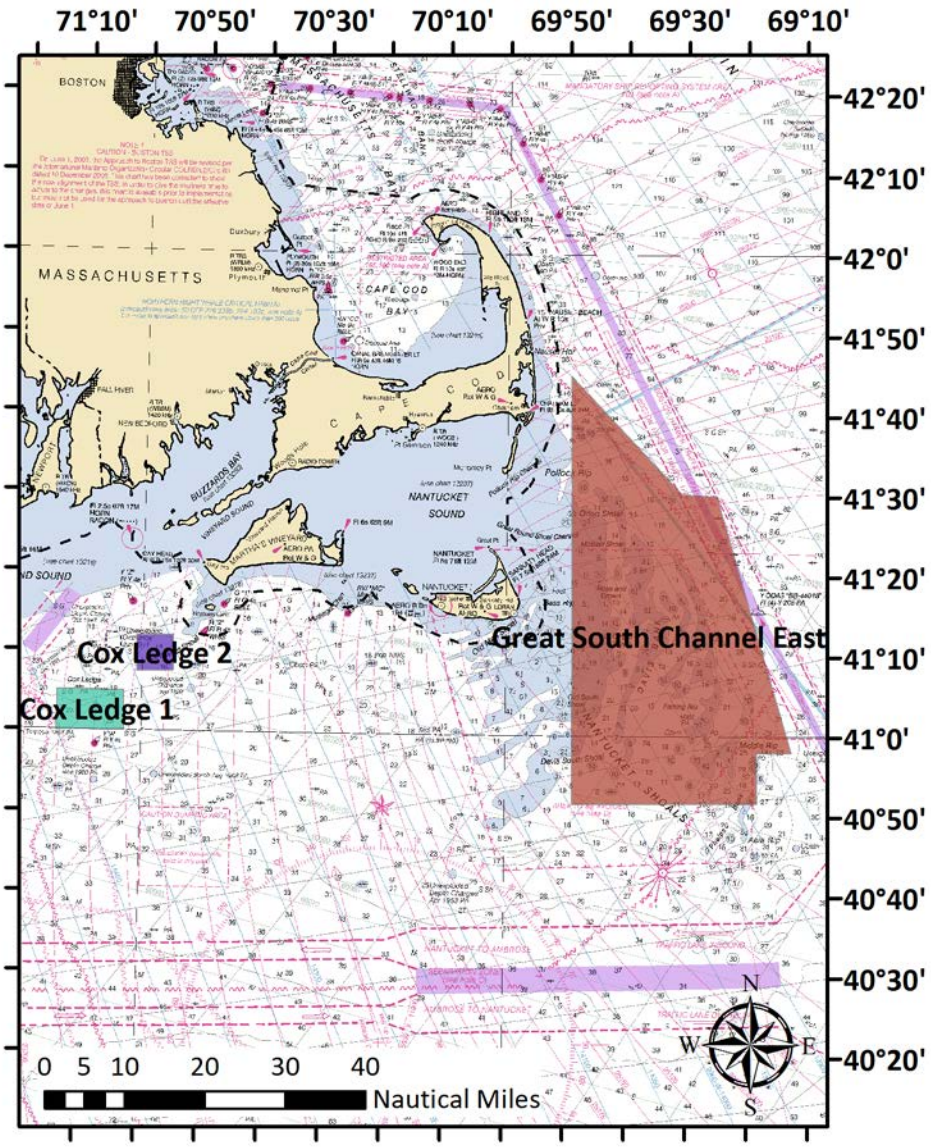
This alternative (Map 21) would remove the current Nantucket Lightship Habitat Closure Area and the Nantucket Lightship Closed Area, and would designate a new habitat management area further north and east in the Great South Channel, i.e. the Great South Channel East HMA. An additional habitat management area (consisting of two sub-areas) would also be designated on Cox Ledge. Measures for the Great South Channel East and Cox Ledge areas could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to both areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: The purpose of designating these areas is to minimize adverse fishery effects on EFH. The Great South Channel East HMA better encompasses cobble- and boulder-dominated habitat types compared to the existing habitat closure area. This version of the area in particular, which extends the furthest to the east of the any of the HMAs proposed for this region, would provide the best protection for juvenile cod. The Cox Ledge areas also include vulnerable seabed habitat types in locations previously not managed for adverse effects minimization.

Map 21 – Great South Channel/SNE Habitat Management Alternative 3.



2.1.5.4 ***Alternative 4***

This alternative (Map 22) would remove the current Nantucket Lightship Habitat Closure Area and the Nantucket Lightship Closed Area and would designate a new habitat management area further north and east in the Great South Channel. The Great South Channel HMA is a subset of the area proposed via Alternative 3. An additional habitat management area (consisting of two sub-areas) would also be designated on Cox Ledge. Measures for the Great South Channel and Cox Ledge areas could include:

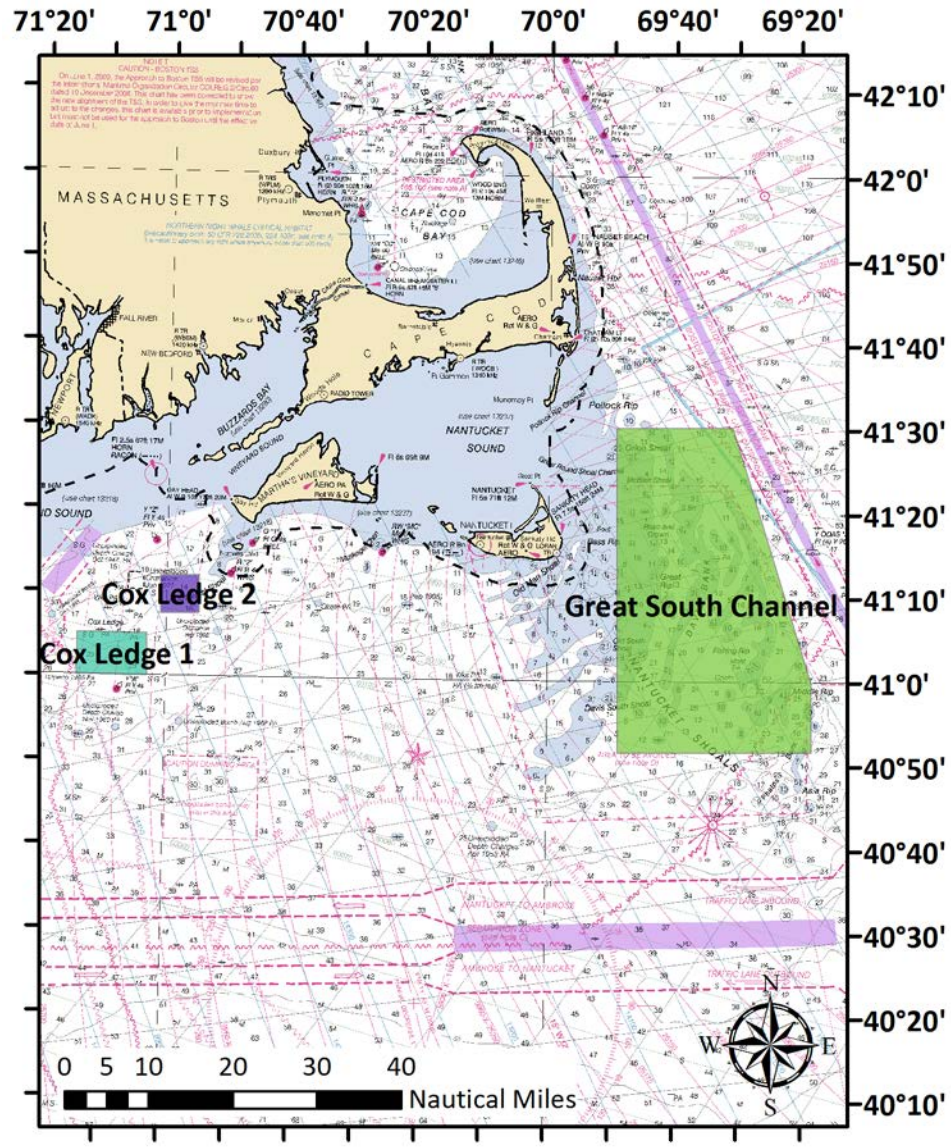
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or

- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to both areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: The purpose of designating these areas is to minimize adverse fishery effects on EFH. The Great South Channel HMA better encompasses cobble- and boulder-dominated habitat types compared to the existing habitat closure area. This version of the area does not include the northern and eastern portions of the area proposed via Alternative 3, and thus mitigates some concerns raised about fishery access. However, there is much less overlap with juvenile cod. The Cox Ledge areas include vulnerable seabed habitat types.

Map 22 – Great South Channel/SNE Habitat Management Alternative 4.



2.1.5.5 ***Alternative 5***

This alternative would remove the current Nantucket Lightship Habitat Closure Area and the Nantucket Lightship Closed Area and would designate a new habitat management area further north on Nantucket Shoals as shown in (Map 23). This Nantucket Shoals HMA overlaps with the areas proposed via Alternatives 3 and 4, but is generally further to the west. An additional habitat management area (consisting of two sub-areas) would also be designated on Cox Ledge. Measures for the Nantucket Shoals and Cox Ledge areas could include:

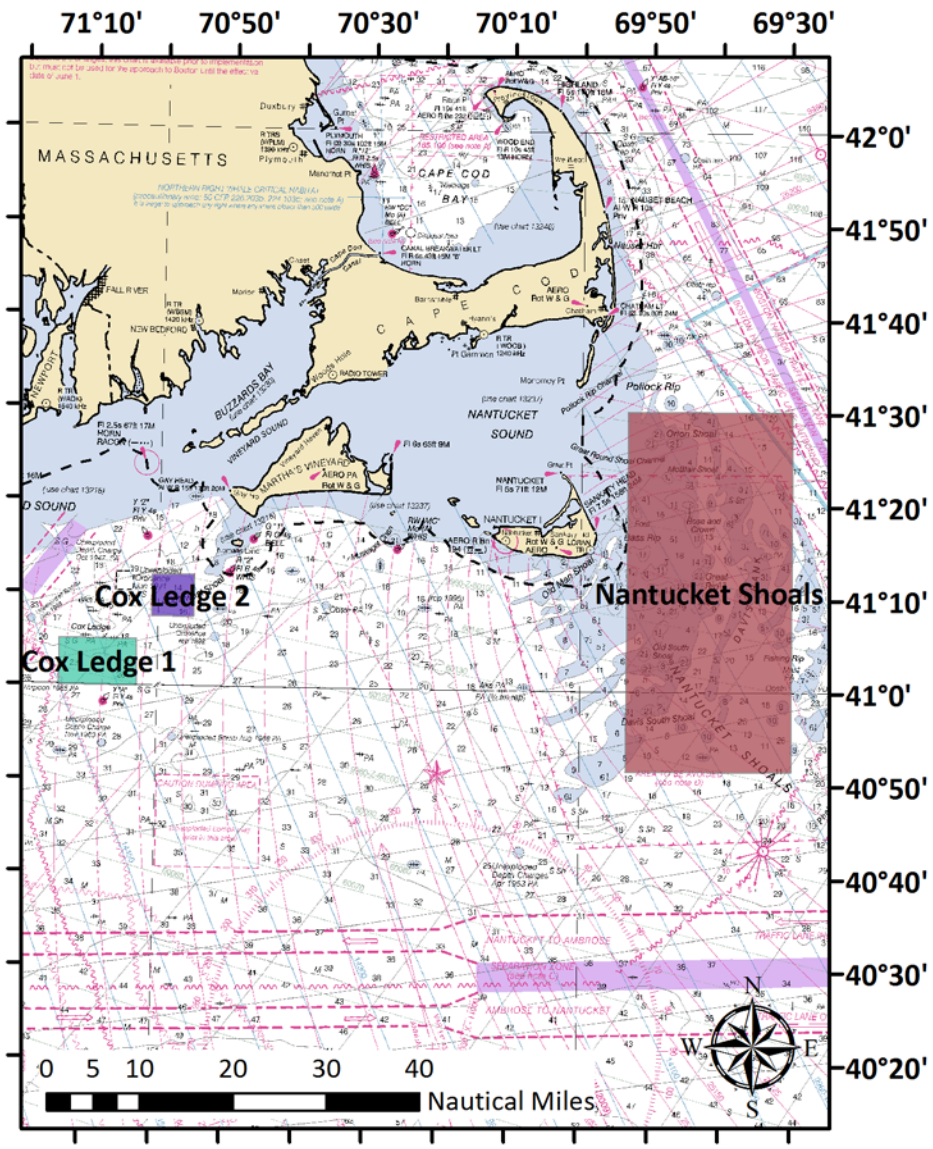
- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or

- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The same management measure need not be applied to both areas. The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: The purpose of designating these areas is to minimize adverse fishery effects on EFH. The Nantucket Shoals area better encompasses cobble- and boulder-dominated habitat types compared to the existing Nantucket Lightship habitat closure area, although the western and southern parts are generally sand dominated. This version of the area mitigates some concerns raised about fishery access, even as compared to the Great South Channel HMA in Alternative 4. The Cox Ledge areas include vulnerable seabed habitat types.

Map 23 – Great South Channel/SNE Habitat Management Alternative 5.



2.1.5.6 ***Alternative 6***

This alternative (Map 24) would remove the current Nantucket Lightship Habitat Closure Area and the Nantucket Lightship Closed Area and would designate a new habitat management area further north on Nantucket Shoals, the Nantucket Shoals West MBTG HMA, which is similar to the area proposed via Alternative 5. This area would be a mobile bottom-tending gear closure, with or without an exemption for hydraulic dredge gears (i.e., management option 1 or 2). An additional area further east in the Great South Channel would be designated as a gear modification area, with a requirement that bottom trawl vessels use ground cables modified with elevating disks with a length per side capped at 45 fathoms, or a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. An

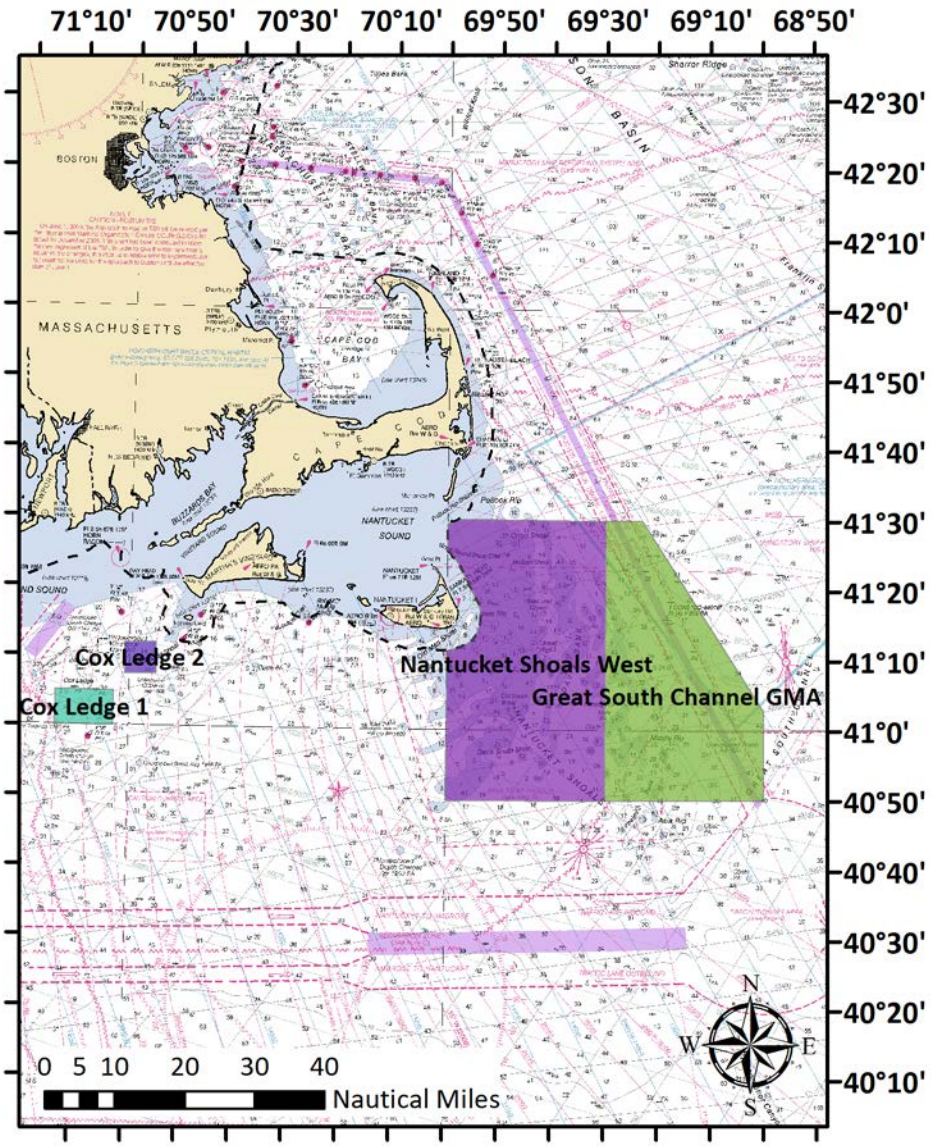
additional habitat management area (consisting of two sub-areas) would also be designated on Cox Ledge. Measures for the Cox Ledge areas could include:

- Option 1, complete restrictions on use of mobile bottom-tending gears, or
- Option 2, restrictions on the use of mobile bottom-tending gear with an exemption for hydraulic clam dredges, or
- Option 3, a requirement that bottom trawl vessels use ground cables modified with 20 centimeter diameter elevating disks spaced at 5 fathoms, with a length per side capped at 45 fathoms. Use of dredges would be permitted, or
- Option 4, a requirement that bottom trawl vessels eliminate ground cables entirely and cap bridle lengths at 30 fathoms per side. Use of dredges would be permitted.

The intent is that fishing restrictions would apply to any fishing activity conducted with the specified gear type, not only to fishing activities managed by the Council.

Rationale: The purpose of designating these areas is to minimize adverse fishery effects on EFH. The western area proposed in this alternative is very similar to the Nantucket Shoals area described in Alternative 5, but extends further west to state waters and slightly further south. It is only being considered as a closure to mobile bottom-tending gears. Most of these additional areas are likely sand dominated, although they are not especially well sampled from a habitat type or fish distribution standpoint. The eastern area, which includes deeper waters and complex cobble and boulder habitats, would be designated as a gear modification area. As with the Georges Shoal Gear Modification Areas, this area could provide additional habitat benefits via reduced area swept by requiring modified ground cables, although this would depend on tradeoffs between decreased catch rates and increased fishing time. The distribution of juvenile cod in the region overlaps mainly with the eastern gear modification area. The Cox Ledge areas include vulnerable seabed habitat types.

Map 24 – Great South Channel/SNE Habitat Management Alternative 6.



2.2 Alternative to improve groundfish spawning protection

This section describes alternatives designed to meet the following objectives:

- Improved groundfish spawning protection; including protection of localized spawning contingents or sub-populations of stocks
- Improved access to both the use and non-use benefits arising from closed area management across gear types, fisheries, and groups.

These objectives reflect the Council's intent to shift the focus of groundfish area management designations based on mortality reduction to those based on protection of specific attributes that contribute to stock productivity, such as spawning. Similarly, the habitat management spatial

alternatives focus in part on protection of habitats that contain concentrations of juvenile groundfish, in order to improve stock productivity. **All of the spawning protection areas described in this section would be defined on a seasonal basis, and the measures focus on limiting the use of gears that are capable of catching groundfish within these areas during the closed seasons, with possible exemptions for recreational groundfish fishing or other fisheries.** The no action areas are part of the Northeast Multispecies FMP, and any new areas or adjustments to the prohibited gear types or closed seasons in existing areas would also be changed in the Northeast Multispecies FMP and its corresponding regulations. Adjustment of these measures would be accomplished via an amendment or framework adjustment (as appropriate) to that FMP.

Concurrent with this action, the Council may consider additional spawning closures in Framework Adjustment 53 to the Northeast Multispecies FMP.

2.2.1 Gulf of Maine

Alternatives 1 and 3 are the preferred spawning alternatives for the Gulf of Maine.

2.2.1.1 *Alternative 1 (No Action, preferred)*

Alternative 1/No Action would retain (1) the Western Gulf of Maine Closure Area and the Cashes Ledge Closure Area, (2) the Gulf of Maine Rolling Closures Areas that apply to sector and common pool vessels, and (3) the Gulf of Maine Cod Spawning Protection Area, commonly referred to as the 'Whaleback' area (Map 25). Measures for the areas are listed in Table 17, and the coordinates for these areas are listed in Table 18.

Rationale: In addition to the original intended effects related to fishing mortality reduction, these year round and seasonal closures have incidental effects that provide protection for spawning groundfish. ~~The Western Gulf of Maine area was intended to provide incidental protection to spawning cod and haddock in the Gulf of Maine. The Cashes Ledge year round groundfish closed area was intended to provide protection to spawning and resident cod.~~ The Gulf of Maine Cod Spawning Protection Area was designed specifically to protect spring cod spawning activity.

Table 17 – Current restrictions in the year round and seasonal closed areas in the Gulf of Maine

Area name	Prohibitions	Exemptions
Western Gulf of Maine and Cashes Ledge Closure Areas	Closed year round to all fishing vessels, except for:	• Charter and party vessels with a letter of authorization • Vessels fishing with exempted gears: spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longline, single pelagic gillnets, and shrimp trawls[3] • Vessels participating in the mid-water trawl exempted fishery • Vessels that are transiting, provided that gear is properly stowed
Rolling Closure Areas I-V (Thirty minute blocks included, C=common pool, S=sector)	Closed to all fishing vessels during the following months: • I – March (121-123 C) • II – April (121-133 C; 124, 125, 132, 133 S) • III – May (124-140 C; 132, 133, 138-140 S) • IV – June (132, 133, 139-147, 152 C; 139, 140, 145-147, 152 S) • V – October/November (124, 125 C)	• Charter and party vessels with a letter of authorization • Vessels fishing with exempted gears: spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longline, single pelagic gillnets, and shrimp trawls • Vessels participating in the mid-water trawl exempted fishery • Vessels fishing under a scallop DAS or in a scallop dredge exemption area • Vessels participating in the raised footrope trawl exempted whiting fishery • Sector vessels can fish in areas I and V, and also in the offshore portions of areas II, III, and IV. • Vessels that are transiting, provided that gear is properly stowed
GOM Cod Spawning Protection Area	From April 1 through June 30 of each year, no fishing vessel or person on a fishing vessel may enter, fish in, or be in the area, and no fishing gear capable of catching NE multispecies may be used on, or be on board a vessel in the area.	• Vessels that have not been issued a NE multispecies permit and that are fishing exclusively in state waters • Vessels that are fishing with or using exempted gears • Charter/party or recreational fishing vessels, provided that pelagic hook and line gear is used, and there is no retention of regulated species (i.e. vessels targeting tuna) • Vessels that are transiting

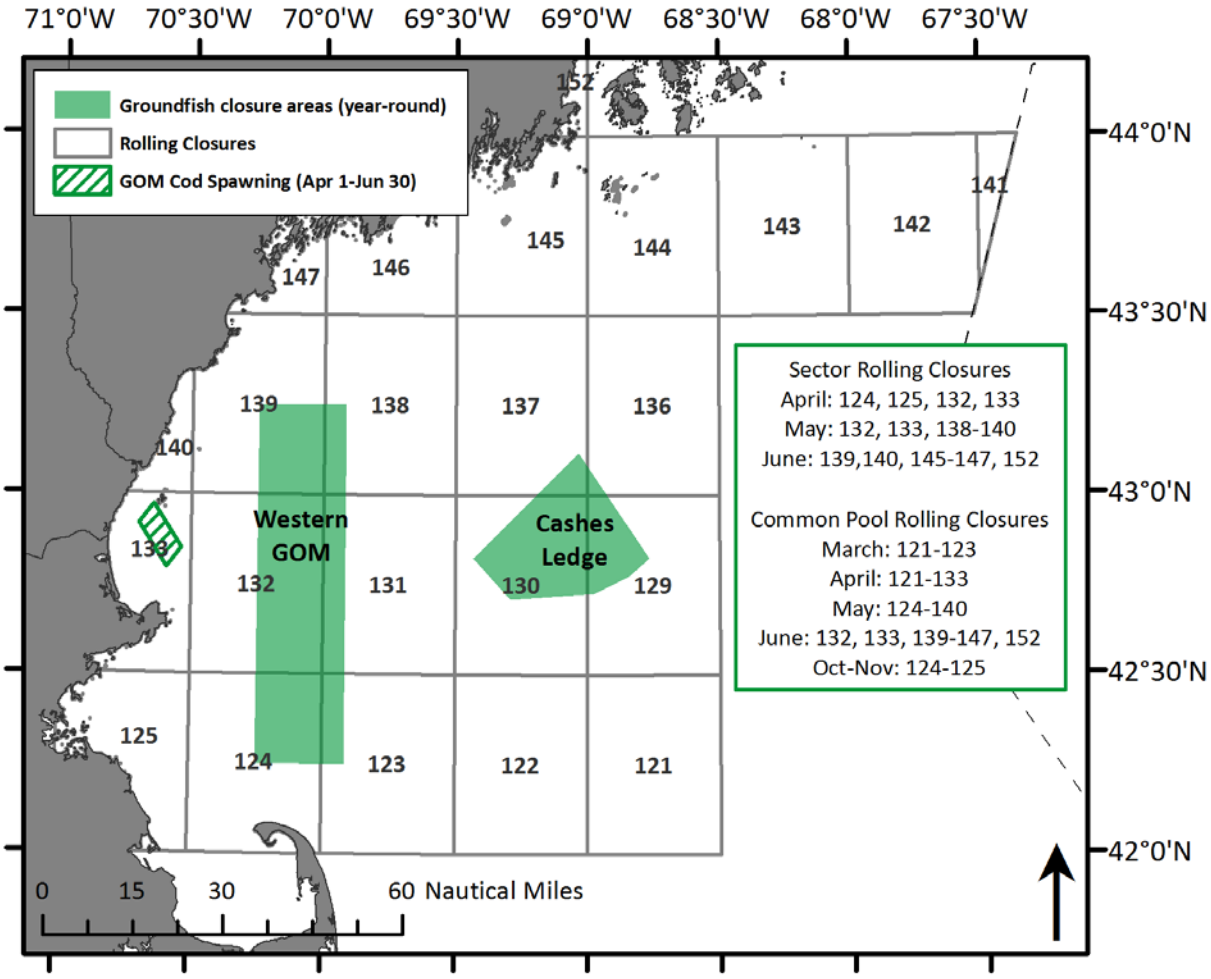
[3] Note that because they are a mobile-bottom tending gear, shrimp trawls are prohibited from the habitat closure areas that overlap the WGOM and CL groundfish closures

Table 18 – Coordinates for Gulf of Maine year round and seasonal closed areas

Area	Point	Latitude	Longitude
Western Gulf of Maine Closure Area	WGM1	42°15′	70°15′
	WGM2	42°15′	69°55′
	WGM3	43°15′	69°55′
	WGM4	43°15′	70°15′
Cashes Ledge Closure Area	CL1	43°07′	69°02′
	CL2	42°49.5′	68°46′
	CL3	42°46.5′	68°50.5′
	CL4	42°43.5′	68°58.5′
	CL5	42°42.5′	69°17.5′
	CL6	42°49.5′	69°26′
[Common Pool] Rolling closure Area I – March	GM3	42°00′	Cape Cod shoreline on the Atlantic Ocean
	GM5	42°00′	68°30′
	GM6	42°30′	68°30′
	GM23	42°30′	70°00′
[Common Pool] Rolling closure Area II - April	GM1	42°00′	Massachusetts shoreline
	GM2	42°00′	Cape Cod shoreline on Cape Cod Bay
	GM3	42°00′	Cape Cod shoreline on the Atlantic Ocean
	GM5	42°00′	68°30′
	GM13	43°00′	68°30′
	GM10	43°00′	New Hampshire shoreline
Sector Rolling Closure Area II – April	GM1	42°00′	MA shoreline
	GM2	42°00′	Cape Cod, MA shoreline on Cape Cod Bay
	GM3	42°00′	Cape Cod, MA shoreline on the Atlantic Ocean
	SGM1	42°00′	70°00′
	SGM2	43°00′	70°00′
	SGM3	43°00′	New Hampshire shoreline
[Common Pool] Rolling Closure Area III - May	GM1	42°00′	Massachusetts shoreline
	GM2	42°00′	Cape Cod shoreline on Cape Cod Bay
	GM3	42°00′	Cape Cod shoreline on the Atlantic Ocean
	GM4	42°00′	70°00′
	GM23	42°30′	70°00′
	GM6	42°30′	68°30′
	GM14	43°30′	68°30′
	GM18	43°30′	Maine shoreline
Sector Rolling Closure Area III - May	SGM4	42°30′	Massachusetts shoreline
	SGM5	42°30′	70°00′
	SGM6	43°00′	70°00′
	SGM7	43°00′	69°30′
	SGM8	43°30′	69°30′
	GM18	43°30′	Maine shoreline
[Common Pool] Rolling closure Area IV – June	GM9	42°30′	Massachusetts shoreline
	GM23	42°30′	70°00′
	GM17	43°30′	70°00′
	GM19	43°30′	67°32′ or U.S.-Canada maritime boundary
	GM20	44°00′	67°21′ or U.S.-Canada maritime boundary
	GM21	44°00′	69°00′
	GM22	Maine shoreline	69°00′
Sector Rolling Closure	SGM9	43°00′	New Hampshire shoreline

Area IV - June	SGM6	43°00′	70°00′
	SGM10	43°30′	70°00′
	SGM11	43°30′	69°00′
	GM22	Maine shoreline	69°00′
[Common Pool] Rolling closure area V – October and November	GM1	42°00′	Massachusetts shoreline
	GM2	42°00′	Cape Cod shoreline on Cape Cod Bay
	GM3	42°00′	Cape Cod shoreline on the Atlantic Ocean
	GM4	42°00′	70°00′
	GM8	42°30′	70°00′
	GM9	42°30′	Massachusetts shoreline
GOM Cod Spawning Protection Area (April, May, and June)	CSPA1	42°50.95′	70°32.22′
	CSPA2	42°47.65′	70°35.64′
	CSPA3	42°54.91′	70°41.88′
	CSPA4	42°58.27′	70°38.64′
	CSPA1	42°50.95′	70°32.22′

Map 25 – Gulf of Maine Spawning Alternative 1 (No Action)



2.2.1.2 *Alternative 2 – Sector Rolling Closures, Whaleback, and Massachusetts Bay Spawning Protection Area*

This alternative (Map 26) would maintain the existing rolling closures that currently apply to sector enrolled vessels during April, May, and June for groundfish spawning protection purposes. These closed areas would apply from April to June to all vessels capable of catching groundfish, whether the vessel is in the common pool or enrolled in a sector, with possible exemptions as identified in the options below.

This alternative would also designate the Massachusetts Bay Cod Spawning Protection Area. This area is a subset of the existing October-November common pool rolling closure area, and would be closed from November 1 through January 31 with the same restrictions as the GOM Cod Spawning Protection (Whaleback) Area.

Under this alternative, the March-June common pool rolling closures would be eliminated. The Western Gulf of Maine and the Cashes Ledge Closure Areas would also be eliminated unless

maintained for habitat protection purposes. The Gulf of Maine Cod Spawning Protection (Whaleback) Area would be maintained as is. Overlapping habitat management areas for the Gulf of Maine region are proposed in sections 2.1.1, 2.1.2 and 2.1.3.

Two options are proposed; Option A would restrict various gears that catch groundfish, but exempt recreational groundfish fishing from the April, May, and June closures, and Option B would restrict various gears that catch groundfish including recreational gears.

This alternative would not preempt or change any overlapping state closures in Massachusetts, New Hampshire, or Maine state waters.

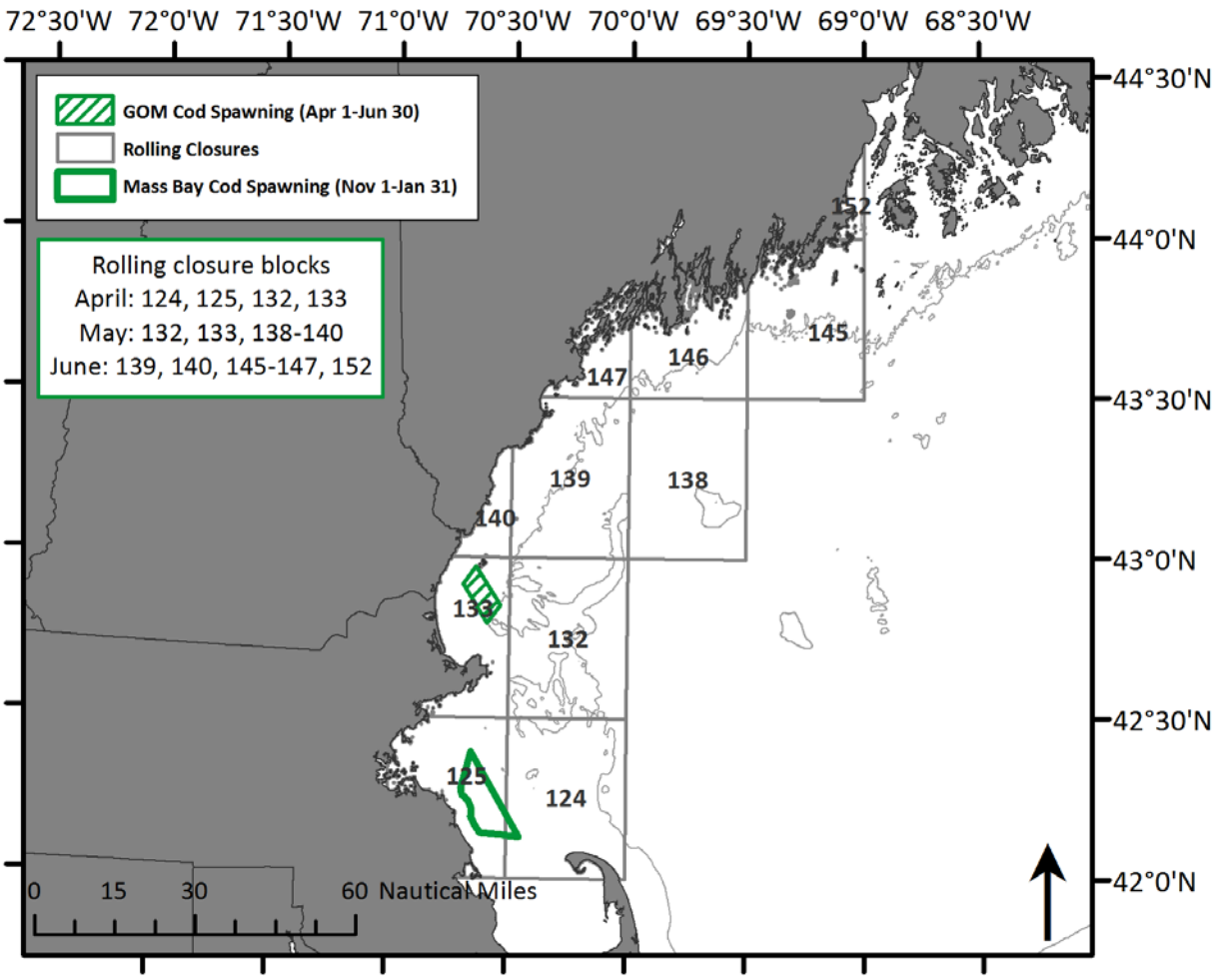
Rationale: New science and published research show a large degree of overlap between the sector rolling closures and groundfish spawning, particularly for cod and haddock. The Council had anticipated developing more precise spawning closure areas based on these data and analyses, but rejected novel area closure boundaries in favor of using a modification of the existing system of areas to meet spawning objectives in the Gulf of Maine. The rolling closures largely overlap identified concentrations of large groundfish and are appear to be sufficiently broad to capture variability in the timing and geographical range of annual spawning activity. The Massachusetts Bay Cod Spawning Protection Area would protect known aggregations of winter spawning cod, in order to improve productivity of the Gulf of Maine cod stock.

Table 19 – Coordinates for proposed Gulf of Maine groundfish spawning protection areas. The April, May, and June coordinates are identical to the existing coordinates to seasonal rolling closures that apply to sector-enrolled groundfish vessels.

Area	Point	Latitude	Longitude
April (Thirty minute squares 124, 125, 132, 133)	GM1	42°00′	MA shoreline
	GM2	42°00′	Cape Cod, MA shoreline on Cape Cod Bay
	GM3	42°00′	Cape Cod, MA shoreline on the Atlantic Ocean
	SGM1	42°00′	70°00′
	SGM2	43°00′	70°00′
	SGM3	43°00′	New Hampshire shoreline
May (Thirty minute squares 132, 133, 138-140)	SGM4	42°30′	Massachusetts shoreline
	SGM5	42°30′	70°00′
	SGM6	43°00′	70°00′
	SGM7	43°00′	69°30′
	SGM8	43°30′	69°30′
	GM18	43°30′	Maine shoreline
June (Thirty minute squares 139, 140, 145-147, 152)	SGM9	43°00′	New Hampshire shoreline
	SGM6	43°00′	70°00′
	SGM10	43°30′	70°00′
	SGM11	43°30′	69°00′
	GM22	Maine shoreline	69°00′
GOM Cod Spawning Protection Area (April 1-June 30)	CSPA1	42°50.95′	70°32.22′
	CSPA2	42°47.65′	70°35.64′
	CSPA3	42°54.91′	70°41.88′
	CSPA4	42°58.27′	70°38.64′
	CSPA1	42°50.95′	70°32.22′
Massachusetts Bay (November 1-January 31) (1)	1	42° 23.6′	70° 39.2′
	2	42° 07.7′	70° 26.8′

(1) Western boundary at Massachusetts state waters

Map 26 – Gulf of Maine Spawning Alternative 2.



2.2.1.2.1 Option A: Commercial gear restrictions

The April, May, and June rolling closure areas identified in this alternative (Map 26) would be sequentially closed for one-month periods to all fishing vessels, with the following exemptions, which are the exemptions currently in effect:

- Vessels that do not have a Federal Northeast multispecies permit and are fishing exclusively in state waters
- Vessels fishing with exempted gears (spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, shrimp trawls with properly configured grates)
- Vessels participating in the mid-water trawl exempted fishery
- Sea scallop dredge gear when under a scallop day-at-sea
- Vessels lawfully in a scallop dredge exemption area
- Vessels participating in the Raised Footrope Trawl Exempted Whiting Fishery
- Vessels that are transiting

- Charter and party vessels[4]
- Recreational vessels

The Massachusetts Bay Spawning Protection Area and the Gulf of Maine Cod Spawning Protection Area (Whaleback) would be closed seasonally to all fishing vessels with the following exemptions (these are the exemptions currently associated with the Gulf of Maine Cod Spawning Protection Area):

- Vessels that do not have a Federal Northeast multispecies permit and are fishing exclusively in state waters
- Vessels fishing with exempted gears (spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, shrimp trawls with properly configured grates)
- Charter/party or recreational fishing vessels, provided that pelagic hook and line gear is used, and there is no retention of regulated species or ocean pout
- Vessels that are transiting

Rationale: Specific concentrations of spawning cod have been identified in Massachusetts Bay and Gulf of Maine Cod Spawning Protection Areas, and spawning activities in these areas would be disrupted if they are open to recreational groundfishing. While other portions of the rolling closures encompass groundfish spawning activity, specific areas have not yet been identified and it is not clear that recreational fishing would disturb more widely distributed spawning activity. Therefore, recreational groundfishing would be allowed in the larger April, May, and June closures.

2.2.1.2.2 Option B: Commercial and recreational gear restrictions

The April, May, and June rolling closure areas identified in this alternative would be sequentially closed for one-month periods to all fishing vessels, with the following exemptions, which are the exemptions currently in effect except that recreational vessels would not be exempted:

- Vessels that do not have a Federal Northeast multispecies permit and are fishing exclusively in state waters
- Vessels fishing with exempted gears (spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, shrimp trawls with properly configured grates)
- Vessels participating in the mid-water trawl exempted fishery
- Sea scallop dredge gear when under a scallop day-at-sea
- Vessels lawfully in a scallop dredge exemption area
- Vessels participating in the Raised Footrope Trawl Exempted Whiting Fishery
- Vessels that are transiting

[4] Currently, charter and party vessels may fish in the rolling closures provided they have a Letter of Authorization from the Regional Administrator to enter or fish in these areas (additional requirements also apply).

The Massachusetts Bay Spawning Protection Area and the Gulf of Maine Cod Spawning Protection Area (Whaleback) would be closed seasonally to all fishing vessels with the following exemptions (these are the exemptions currently associated with the Gulf of Maine Cod Spawning Protection Area):

- Vessels that do not have a Federal Northeast multispecies permit and are fishing exclusively in state waters
- Vessels fishing with exempted gears (spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, shrimp trawls with properly configured grates)
- Charter/party or recreational fishing vessels, provided that pelagic hook and line gear is used, and there is no retention of regulated species or ocean pout
- Vessels that are transiting

Rationale: Groundfish spawning protection areas should be closed to all gears and fisheries capable of catching and in particular targeting groundfish. In addition to commercial vessels, recreational fishermen can quickly target concentrations of spawning cod and haddock, which if there are enough vessels is likely to disrupt spawning and remove actively spawning fish before they have had the opportunity to successfully reproduce.

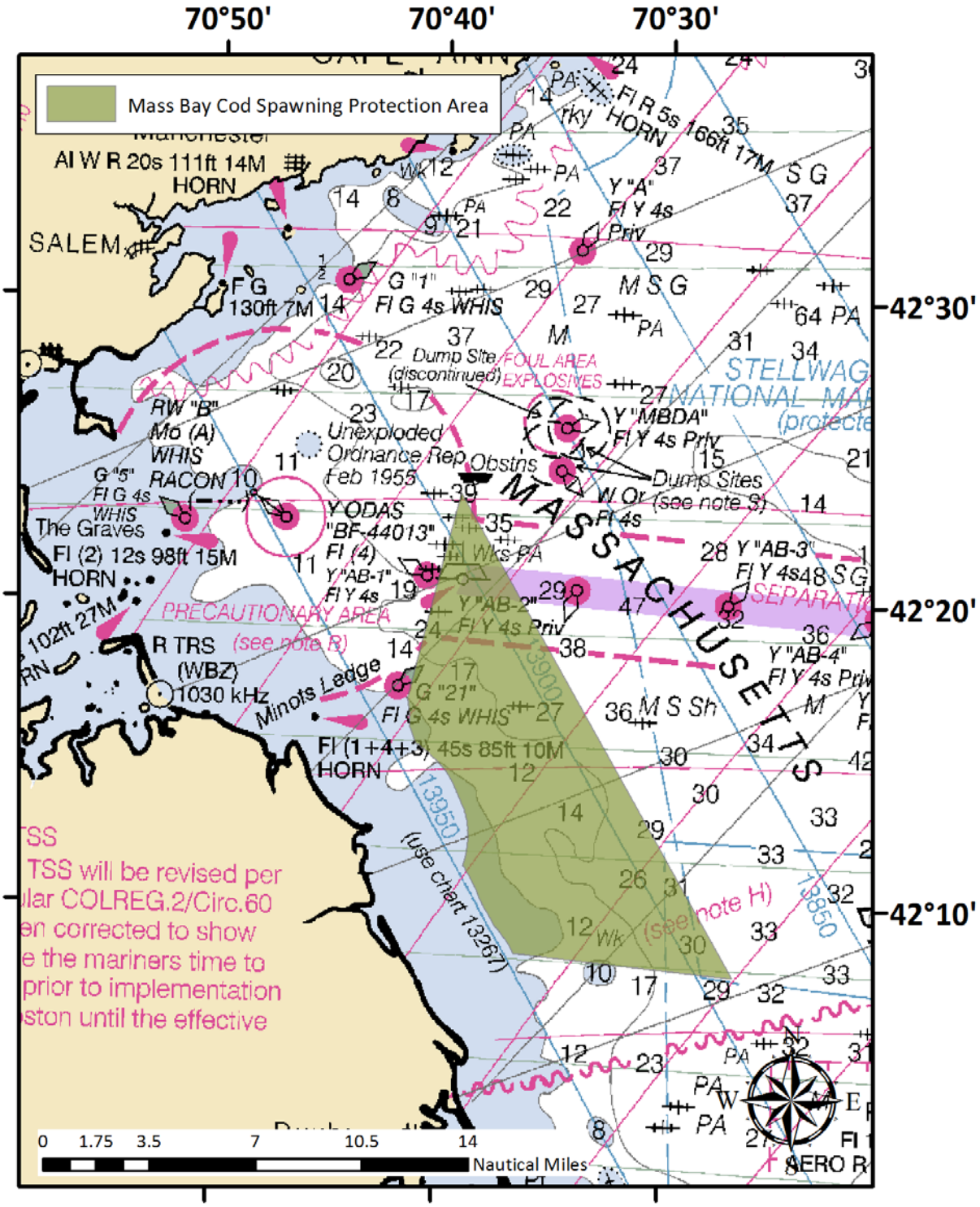
2.2.1.3 ***Alternative 3 – Massachusetts Bay Spawning Protection Area (preferred)***

This alternative would designate the Massachusetts Bay Spawning Protection Area as described under Alternative 2A/2B (see lower right panel in Map 26). The Council's intent was that this designation could be combined with Alternative 1/No Action. The area would be closed to all fishing vessels from November 1 to January 31 with the following exemptions (these are the exemptions currently associated with the Gulf of Maine Cod Spawning Protection Area):

- Vessels that do not have a Federal Northeast multispecies permit and are fishing exclusively in state waters
- Vessels fishing with exempted gears (spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surf clam/quahog dredge gear, pelagic hook and line, pelagic longlines, single pelagic gillnets, shrimp trawls with properly configured grates)
- Charter/party or recreational fishing vessels, provided that pelagic hook and line gear is used, and there is no retention of regulated species or ocean pout
- Vessels that are transiting

Rationale: This area is being studied by the Massachusetts Division of Marine Fisheries and their research partners for the presence and duration of cod spawning behavior. It has been identified by fishermen as a unique site that often supports winter cod spawning and is consistent with industry-based survey catches and survey catch hotspot analysis of large spawning groundfish, particularly cod.

Map 27 – Gulf of Maine Spawning Alternative 3



2.2.2 Georges Bank and Southern New England

Alternative 2B is the preferred spawning alternative for Georges Bank and Southern New England.

2.2.2.1 *Alternative 1 (No Action)*

No Action would retain the existing year round closed areas on Georges Bank and in southern New England, specifically Closed Area I, Closed Area II, the Nantucket Lightship Closed Area, and the Georges Bank Seasonal Closure Area (Map 28). Measures for these areas are summarized in Table 20 and coordinates for these areas are shown in Table 21.

Rationale: In addition to their original intended effects related to fishing mortality reduction, these year round and seasonal closures have incidental effects that provide protection for spawning groundfish. Closed Area I and Closed Area II, in particular, were originally designed to protect cod and haddock spawning activity.

Table 20 – Restrictions in the year round and seasonal closed areas on Georges Bank and in Southern New England

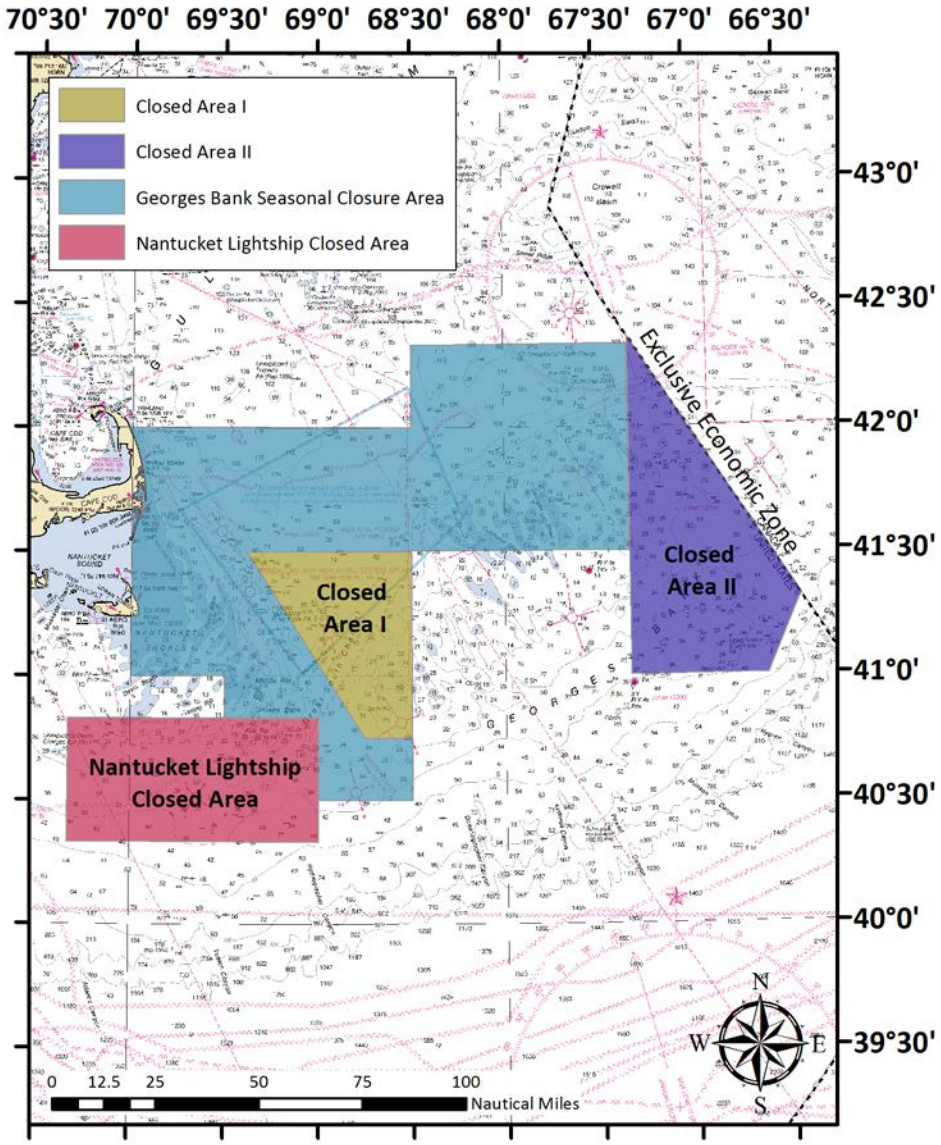
Area name	Prohibitions	Exemptions
Nantucket Lightship Closed Area	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Tuna purse seine gear; review to ensure no impacts on regulated multispecies • Classified as charter, party or recreational vessel, provided that: (A) LOA, (B) Fish species managed by the NEFMC or the MAFMC are not sold, (C) no gear other than rod and reel or handline gear on board, (D) vessel does not fish outside the Nantucket Lightship Closed Area during the period specified by the LOA • Fishing with or using dredge gear designed and used to take surfclams or ocean quahogs • Fishing for scallops within the Nantucket Lightship Access Area • Vessels that are transiting, provided that gear is properly stowed
Closed Area I	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Tuna purse seine gear; review to ensure no impacts on regulated multispecies • Fishing in a Special Access Program • Fishing for scallops within the Closed Area I Access Area • Vessels that are transiting, provided that gear is properly stowed
Closed Area II	No fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Pot gear for lobsters or hagfish • Pelagic longline gear or pelagic hook-and-line gear, or harpoon gear • Pelagic midwater trawl gear, with bycatch limits • Fishing in a Special Access Program • Tuna purse seine gear outside of the portion of CA II known as the Habitat Area of Particular Concern • Fishing in the CA II Yellowtail Flounder/Haddock SAP or the Eastern U.S./Canada Haddock SAP Program • Transiting the area, provided the vessel's fishing gear is stowed and there is a compelling safety reason • The vessel has declared into the Eastern U.S./Canada Area and is transiting CA II • Fishing for scallops within the Closed Area II Access Area • Vessels that are transiting, provided that gear is properly stowed
Georges Bank Seasonal Closure Area	From May 1-May 31, no fishing vessel or person on a fishing vessel may enter, fish, or be in the area, except for:	• Exempted gears - spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets pound nets, pots and traps, purse seines, midwater trawls, surfclam/quahog dredge gear, pelagic hook and line, pelagic longline, single pelagic gillnets, shrimp trawls • Charter/party or recreational vessels; • Fishing with dredge gear under a scallop DAS, and provided that the vessel complies with the NE multispecies possession restrictions for scallop vessels, or when lawfully fishing in the Scallop Dredge Fishery Exemption Areas • Fishing in the CA I Hook Gear Haddock Access Area • Fishing under the restrictions and conditions of an approved sector

Area name	Prohibitions	Exemptions
		operations plan • Fishing under the provisions of a Northeast multispecies Handgear A or B permit • Vessels that are transiting, provided that gear is properly stowed

Table 21 - Latitude and longitude coordinates of areas included in the no action Georges Bank groundfish spawning alternative

Closed Area I (year-round)			Closed Area II (year-round)		
Point	N. Lat.	W. Long.	Point	N. Lat.	W. Long.
CI1	41˚ 30'	69˚ 23'	CII1	41˚ 00'	67˚ 20'
CI2	40˚ 45'	68˚ 45'	CII2	41˚ 00'	66˚ 35.8' (1)
CI3	40˚ 45'	68˚ 30'	G5	41˚ 18.6'	66˚ 24.8' (1)
CI4	41˚ 30'	68˚ 30'	CII3	42˚ 22'	67˚ 20'
Nantucket Lightship Closed Area - Year round			Georges Bank Seasonal Closure - May 1 – May 31		
Point	N. lat.	W. long.	Point	N. Lat.	W. Long.
G10	40°50′	69°00′	1	42˚ 00'	(2)
CN1	40°20′	69°00′	2	42˚ 00'	68˚ 30'
CN2	40°20′	70°20′	3	42˚ 20'	68˚ 30'
CN3	40°50′	70°20′	4	42˚ 20'	67˚ 20'
			5	41˚ 30'	67˚ 20'
			6	41˚ 30'	69˚ 23'
			7	40˚ 45'	68˚ 45'
			8	40˚ 45'	68˚ 30'
(1) US – Canada maritime boundary			9	40˚ 30'	68˚ 30'
			10	40˚ 30'	69˚ 00'
(2) Northward to its intersection with the shoreline of Massachusetts			11	40˚ 50'	69˚ 00'
			12	40˚ 50'	69˚ 30'
			13	41˚ 00'	69˚ 30'
			14	41˚ 00'	70˚ 00'
			15	(2)	70˚ 00'

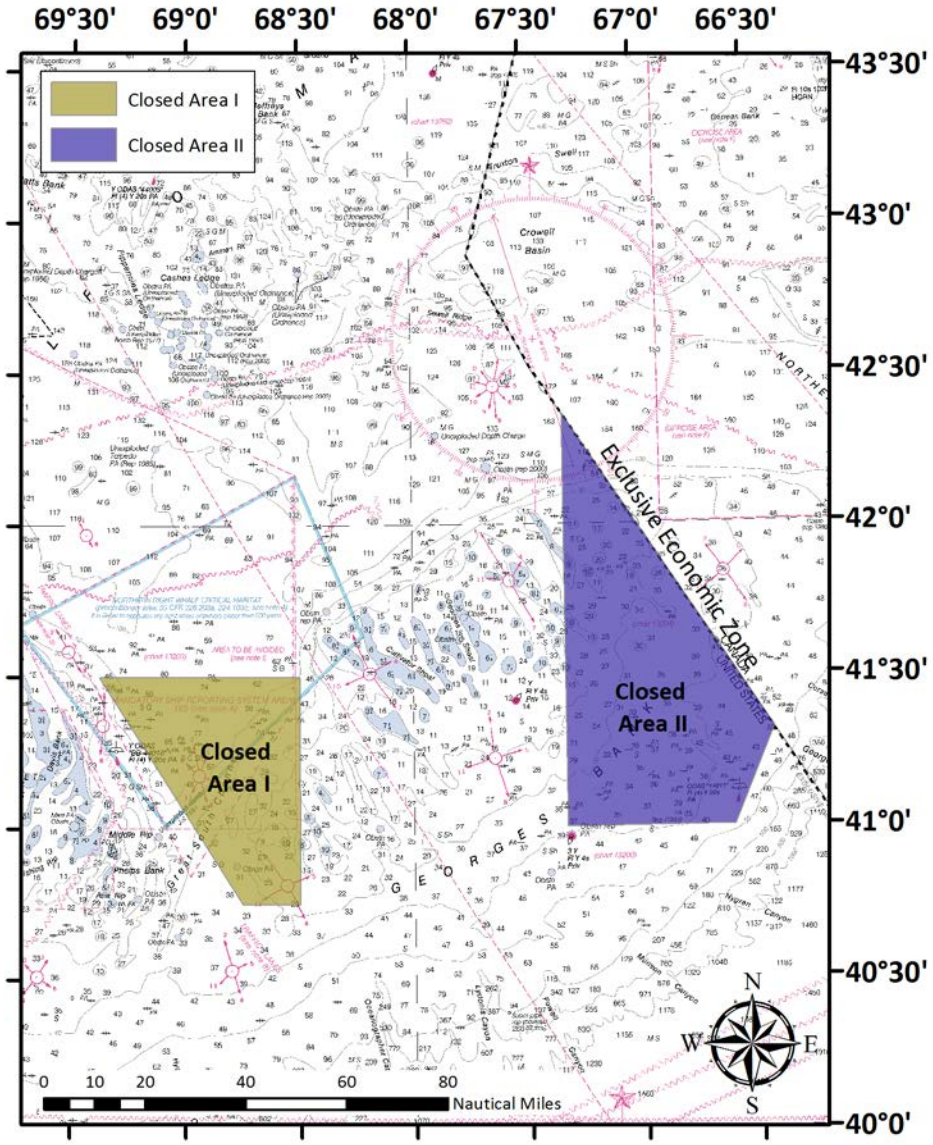
Map 28 – Georges Bank Spawning Alternative 1 (No Action).



2.2.2.2 *Alternative 2 – Seasonal Implementation of Closed Area I and Closed Area II*

This alternative (Map 29) would retain as spawning closures Closed Area I and Closed Area II during the months of February, March, and the first half of April. The Nantucket Lightship Closed Area and the Georges Bank Seasonal Closure Area would be eliminated. The options consider closures to just commercial gears (Option A) or commercial and recreational gears (Option B). Coordinates for Closed Areas I and II are given above.

Map 29 – Georges Bank Spawning Alternative 2. Areas closed February 1-April 15 to vessels using gears capable of catching groundfish.



2.2.2.2.1 Option A: Commercial gear restrictions

Closed Areas I and II would be closed February 1-April 15 to all fishing vessels with the following exemptions:

- Vessels fishing with spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longlines, or single pelagic gillnets
- Vessels participating in the mid-water trawl exempted fishery
- Charter and party vessels
- Recreational vessels

- Vessels that are transiting

Rationale: This alternative would exempt charter, party, and recreational vessels. Although cod spawn in these areas, specific locations have not yet been identified and it is not clear that recreational fishing would disturb more widely distributed spawning activity. Scallop dredge vessels would be restricted under this alternative as they catch various species of groundfish and could disrupt spawning activity.

2.2.2.2.2 Option B: Commercial and recreational gear restrictions (preferred)

Closed Areas I and II would be closed February 1-April 15 to all fishing vessels with the following exemptions:

- Vessels fishing with spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longlines, or single pelagic gillnets
- Vessels participating in the mid-water trawl exempted fishery
- Vessels that are transiting

Rationale: Groundfish spawning protection areas should be closed to all gears and fisheries capable of catching and in particular targeting groundfish. In addition to commercial vessels, recreational fishermen can quickly target concentrations of spawning cod and haddock, which if there are enough vessels is likely to disrupt spawning and remove actively spawning fish before they have had the opportunity to successfully reproduce. Scallop dredge vessels would be restricted under this alternative as they catch various species of groundfish and could disrupt spawning activity.

2.2.2.2.3 Option C: Exempt sea scallop dredges from gear restrictions

Option C would exempt scallop dredge vessels from the February 1 to April 15 spawning closures in Closed Areas I and II. Option C could be selected independently of whether the spawning closure allows recreational fishing (Option A) or does not allow recreational fishing (Option B). If Option C is not chosen, then trailing framework adjustments in the Scallop FMP would exclude scallop fishing during the proposed spawning closure, otherwise scallop fishing could occur at any time of year in Closed Area I and II, subject to restrictions imposed by the Scallop FMP.

Rationale: Scallop dredge vessels do not target groundfish and are limited by sub-Annual Catch Limits for certain stocks. Scallop access area measures currently do not allow scallop fishing in the southern half of Closed Area II during August 15 to November 15, when bycatch rates of yellowtail flounder are high relative to scallop yield. Cod and haddock spawning occur in spring (February to April) and yellowtail flounder spawning takes place in June to August, however.

2.2.2.3 ***Alternative 3 – Seasonal implementation of Closed Area I North and Closed Area II***

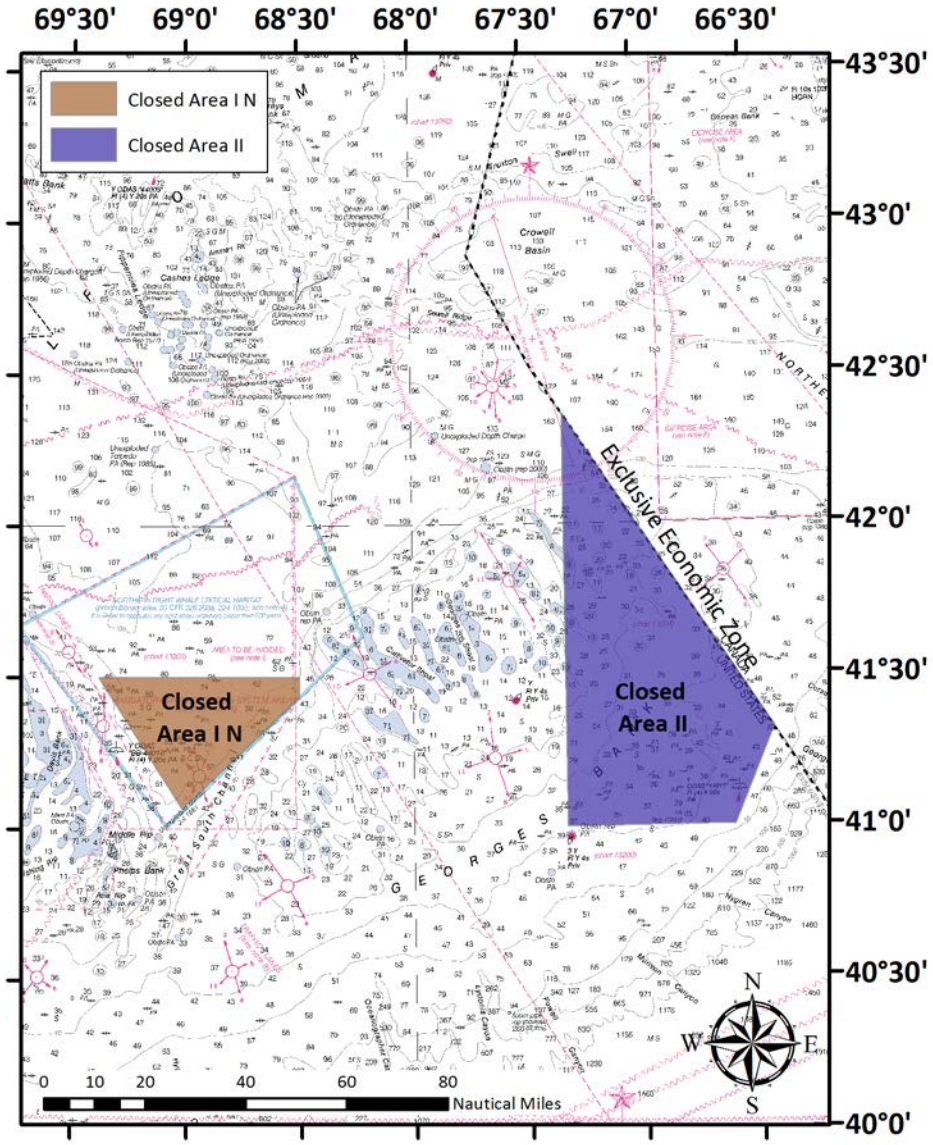
This alternative (Map 30) would retain as spawning closures the northern part of Closed Area I and Closed Area II during the months of February, March, and the first half of April. The

Nantucket Lightship Closed Area and the Georges Bank Seasonal Closure Area would be eliminated. The options consider closures to just commercial gears (Option A) or commercial and recreational gears (Option B). The coordinates for the northern part of Closed Area I are provided below.

Table 22 – Coordinates for the Closed Area I North spawning closure in Alternative 3. These are identical to the existing coordinates for the CAIN Habitat Closure Area.

Closed Area I		
Point	W. Long.	N. Lat.
1	69˚ 23'	41˚ 30'
2	68˚ 30'	41˚ 30'
3	69˚ 30'	41˚ 26'
4	69˚ 01'	41˚ 04'
5	69˚ 23'	41˚ 30'

Map 30 – Georges Bank Spawning Alternative 3. Areas closed February 1-April 15 to vessels using gears capable of catching groundfish.



2.2.2.3.1 Option A: Commercial gear restrictions

The northern part of Closed Area I and all of Closed Area II would be closed February 1-April 15 to all fishing vessels with the following exemptions:

- Vessels fishing with spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longlines, or single pelagic gillnets
- Vessels participating in the mid-water trawl exempted fishery
- Charter and party vessels
- Recreational vessels

- Vessels that are transiting

Rationale: This alternative would exempt charter, party, and recreational vessels. Although cod spawn in these areas, specific locations have not yet been identified and it is not clear that recreational fishing would disturb more widely distributed spawning activity. Scallop dredge vessels would be restricted under this alternative as they catch various species of groundfish and could disrupt spawning activity. The northern portion of Closed Area I was identified by the Council as an area that might contain the majority of Closed Area I spawning activity.

2.2.2.3.2 Option B: Commercial and recreational gear restrictions

The northern part of Closed Area I and all of Closed Area II would be closed February 1-April 15 to all fishing vessels with the following exemptions:

- Vessels that are transiting
- Vessels fishing with exempted gears (spears, rakes, diving gear, cast nets, tongs, harpoons, weirs, dip nets, stop nets, pound nets, pots and traps, purse seines, surfclam/quahog dredge gear, pelagic hook and line, pelagic longlines, or single pelagic gillnets)
- Vessels participating in the mid-water trawl exempted fishery

Rationale: Groundfish spawning protection areas should be closed to all gears and fisheries capable of catching and in particular targeting groundfish. In addition to commercial vessels, recreational fishermen can quickly target concentrations of spawning cod and haddock, which if there are enough vessels is likely to disrupt spawning and remove actively spawning fish before they have had the opportunity to successfully reproduce. Scallop dredge vessels would be restricted under this alternative as they catch various species of groundfish and could disrupt spawning activity. The northern portion of Closed Area I was identified by the Council as an area that might contain the majority of Closed Area I spawning activity.

2.2.2.3.3 Option C: Exempt sea scallop dredges from gear restrictions

Option C would exempt scallop dredge vessels from the February 1 to April 15 spawning closures in Closed Areas I and II. Option C could be selected independently of whether the spawning closure allows recreational fishing (Option A) or does not allow recreational fishing (Option B). If Option C is not chosen, then trailing framework adjustments in the Scallop FMP would exclude scallop fishing during the proposed spawning closure, otherwise scallop fishing could occur at any time of year in Closed Area I and II, subject to restrictions imposed by the Scallop FMP.

Rationale: Scallop dredge vessels do not target groundfish and are limited by sub-Annual Catch Limits for certain stocks. Scallop access area measures currently do not allow scallop fishing in the southern half of Closed Area II during August 15 to November 15, when bycatch rates of yellowtail flounder are high relative to scallop yield. Cod and haddock spawning occur in spring (February to April) and yellowtail flounder spawning takes place in June to August, however.

2.3 Alternatives to designate Dedicated Habitat Research Areas

The Council has identified Dedicated Habitat Research Area Alternatives 2, 3B, 4, and 5 as preferred.

One goal of this amendment is to minimize the adverse effects of fishing on essential fish habitat to the extent practicable. In order to better inform managers about trade-offs associated with minimization of adverse effects, the Habitat PDT developed the Swept Area Seabed Impact (SASI) approach, including a spatial model combining habitat maps, habitat vulnerability estimates, and fishing effort data. This approach was intended to aid in identifying areas throughout the region that are most vulnerable to each type of commercial fishing gear. While a clear step beyond previous efforts, the model rests on a set of general assumptions that are not necessarily equally applicable in all habitats and in all sub-regions. There is a need to test these assumptions and to improve the utility of the model with empirical studies from across the region. Further, there is a critical need to improve our understanding of the linkages between habitat and the productivity of managed species (and their prey) in order to better target management and conservation actions.

One approach to address information needs is to designate Dedicated Habitat Research Areas (DHRAs) in concert with Habitat Management Areas. These DHRAs would be the focus of research activities to provide information to managers, improve understanding of the ecological effects of fishing across a range of habitats, and ultimately improve model forecasts and inform future habitat management. An important aspect about DHRAs is that they would allow coordinated research and build upon past studies and baselines. The current ad hoc nature of fish habitat and gear effects research has minimized potential synergies and potentially reduced the amount of information of use to managers.

There are five management alternatives in this section. Under DHRA Alternative 1 (No Action), no DHRAs would be designated. If one or more of the action alternatives in this section (Alternatives 2, 3, and 4) are selected, the Council would designate up to three separate DHRAs in Gulf of Maine and Georges Bank locations. Any combination of these alternatives could be selected. In all cases, the DHRAs overlap with other management areas that currently exist or are proposed in this amendment. All of the dedicated habitat research areas described in this section would be defined on a year-round basis. Alternative 5, if selected, would implement a sunset provision for all of the designated DHRAs. The measures for each DHRA restrict certain types of fishing to create appropriate reference conditions in the research area, in order to facilitate scientific study.

The structure of the alternatives in this document implies that DHRA designations would be considered as separate but overlapping management area designations, potentially with different restrictions on fishing activity than the habitat and/or spawning areas that they overlap with.

Research agenda for designated DHRAs

The Council identified a set of priority research questions that the DHRAs should address. Identifying the questions is a critical first step in designing research areas in appropriate habitats

with a statistically valid range of treatments. The questions are based on four broad focus areas: gear impacts, habitat recovery, natural disturbance, and productivity.

- **Impacts:** These questions address the differential susceptibility and recovery of habitats by gear type, and gear contact with the seabed.
- **Recovery:** These questions focus on recovery models, patch size effects, and effort-response issues.
- **Natural disturbance**: These questions address the difference between natural and fishing disturbance.
- **Productivity:** These questions address productivity by habitat type.

Gear impacts

How do different types of bottom tending fishing gear (e.g., trawl nets, dredges, hook and line, traps, gillnets, longlines) affect the susceptibility and recovery of physical and biological characteristics of seabed habitat, and how do these impacts collectively influence key elements of habitat including spatial complexity, functional groups, community state, and recovery rates and dynamics?

In order to study the impact of different fishing gears and variable intensities of fishing on biological and geologic characteristics of habitat, it is necessary to design management experiments. The potential redesign of the existing closures in the region provides an ideal opportunity to examine this question because the existing habitat closures most likely approach habitat undisturbed by fishing impacts in the region. Thus, allowing prescriptive fishing efforts inside a portion of these closures and comparing effects to undisturbed control areas will provide insight into how each gear type impacts the susceptibility and recovery of habitat features.

These questions aim in part to address some key assumptions in the SASI model and outstanding questions about habitat impacts:

- How accurate are the susceptibility and recovery scores for biological and geological components derived in the SASI model?
- How accurate are the assumptions in SASI model about the cumulative impacts of each gear type (e.g. multiple passes)?
- Has SASI correctly identified the most vulnerable habitats?
- Are the differences in magnitude of impact among gear types correct?
- Have we significantly over- or under-estimated the impacts of particular gear types?

Are our estimates of gear contact with the bottom accurate? Can we develop trawl gear that minimizes contact on the bottom, thereby reducing the potential for gear impacts?

SASI 'rewards' fishing gear types that have less contact with the seabed by assigning a lower contact index value to those gear types. This results in lower area swept estimates that enter the model in each time step and thus lower estimates of adverse effects that result from that type of fishing. For example, imagine two vessels fishing with the same size trawl and doors but one fishes with a raised footrope sweep and the other fishes with a rockhopper sweep. While the contact of the doors and ground cables are assumed to be similar for both types of gear, seabed contact of the sweep was assumed to be much lower for the raised footrope gear. Thus, if the vessels fish for the same amount of time/distance in the same area, the adverse effects associated with the raised footrope are estimated to be less by the model.

Clearly, this example is an oversimplification, and different types of fish occur on different habitats with varying vulnerability to fishing gear. However, if contact indices can be better specified, SASI provides a way to estimate the magnitude reduction in adverse effects to EFH that would be associated with substitution of reduced impact gears for those gears currently in use. Further research in this subject area could also improve estimates of fixed gear seabed contact, which are presently highly uncertain.

Evaluating gear contact with the seabed and developing lower impact gears will require gear technology scientists to work with fishermen.

Habitat Recovery

What recovery models (e.g., successional vs. multiple-stable states) are operant in the region and how resilient are seafloor habitats to disturbance? In other words, how do seafloor habitats recover, and are there thresholds after which habitats have achieved an alternate state and are no longer capable of recovering to their previous undisturbed condition?

This critical question addresses our underlying assumptions about fishing effects. We often assume that seafloor communities recover in a successional manner; i.e., if we stop the impacts, the habitat recovers to a previously unimpacted state. Although we know this happens in some areas, there are research results that suggest that other community models are at play in other areas. In terms of measuring 'success' of management measures intended to promote habitat recovery, it is important to be able to distinguish between habitats that have experienced some recovery but require more time to achieve full recovery, vs. habitats that have experienced some recovery, but look different ecologically than they did prior to disturbance. Habitats that have recovered to a different state than they were in originally may nonetheless provide similar functional value for managed and ecosystem component species.

Do "small" fishing-caused disturbances surrounded by unimpacted habitat recover more quickly and exhibit greater resilience in contrast to "large" fishing-caused disturbances embedded with small unimpacted patches?

In other words, how does the size of a habitat management area vs. the intensity of fishing influence habitat recovery and resilience?[5] Answers to this question relate directly to understanding how management strategies focused on maximizing CPUE relate to habitat impacts.

When a particular area is fished for the first time vs. subsequent efforts, are these impacts equal per unit effort? Or, is the first pass over an area much more detrimental? Conversely, is there a tipping point beyond which the habitat is no longer capable of recovering?

Answers to this question can help define management strategies for the region. If first pass impacts are most critical in some habitat types, there is a stronger argument for setting areas aside entirely in order to protect habitats from damage. If long-term, cumulative effects are the bigger issue, than the management strategy might be different, and be aimed at controlling but not eliminating fishing in vulnerable habitats. This question will require setting up research areas in the closures and controlling the level of fishing allowed in each to examine the impacts of the first versus subsequent units of effort on the susceptibility and recovery of key habitat components.

Natural Disturbance

In the absence of fishing, what are the dynamics of natural disturbance (e.g., major storm events) on seafloor habitat (especially biological components) across five major grain size classes (mud, sand, coarse sand-granule, pebble-cobble, boulder) and across oceanographic regimes? In areas where natural disturbance is high, are signals of the impacts of fishing masked?

We need to know what seafloor habitat and communities look like in the absence of fishing impacts in order to evaluate the role of natural disturbance combined with fishing effects.

Productivity

How does the productivity of managed species (and prey species) vary across habitat types nested within the range of oceanographic and regional settings? And how does this productivity change when habitats are impacted by fishing gear? Do durable mobile bottom tending gear closures increase fish production? Why are highly productive areas so productive?

This is probably the most important habitat-related question from a fisheries management standpoint. This question extends beyond the current modeling capacity of SASI, but addresses a key limitation of SASI, specifically that addresses impacts to habitat in a generic way without and assuming that one area is more important than another from a productivity standpoint. Integrating SASI-derived habitat vulnerability with a better understanding of which habitats influence the productivity of managed species will greatly enhance management efforts. Without

[5] See Auster and Langton 1999 for a discussion of this issue.

this integrated effort, management actions based solely on reducing impacts may actually focus efforts on habitats that are more vulnerable but less important as EFH.

A gradient of impacts to particular habitat types, focused in impact treatment areas, allows assessment of variation in the role of habitat in population responses. In other words, comparisons of fished to unfished areas will reveal how fished species respond to changes in biological and geological components of habitat. Addressing these questions requires comparisons of closed areas that are opened vs. closed areas that remain closed.

Design and implementation elements common to all DHRAs

Dedicated Habitat Research Areas would be a new type of management area designation for the Council, so there are a number of design and implementation elements to think through.

Area design and fishing impact treatments

While a before-after control-impact design was recommended as the ideal, the three DHRAs proposed in this amendment would be control-impact designs. These two approaches are contrasted in Table 23.

Table 23 – Comparison between before-after control-impact and control-impact designs

A before-after control-impact design could produce results that:	**A control-impact design will:**
• Will separate the effects of fishing from environmental variability and species interactions. • Address effects of timing (season) and size (spatial footprint) of impacts. • Address the potential for multiple states of recovery • Identify the effects of particular types of gear and levels of effort on habitats in multiple states of recovery. • Determine how fish production is affected by seafloor habitats in multiple states and different trajectories of recovery.	• Limit all comparisons of recovery to the single state existing within the current closed areas • Address effects of timing (season) and size (spatial footprint) of impacts • Identify the effects of particular types of gear and levels of effort • Determine how fish production is affected by seafloor habitats • The control-impact approach would fail to take advantage of a unique opportunity to advance our knowledge of the potential benefits of closed areas (recovery dynamics, gear specific impacts and relationships to fish productivity).

Another consideration related to DHRA design is how fishing impacts treatments will be implemented. Three approaches were discussed during development of the amendment:

1. General closure of research areas with all impact treatments as research fishing,
2. General closure of research areas with impacts coming from some kind of limited access fishery in specified fishing treatment areas, or
3. Open fishery access specified fishing treatment areas.

All three DHRAs in this amendment follow the first approach. Specifically, fishing effort would be contracted or arranged specifically by project scientists to occur in particular areas using specific gears. This decision means that the Council would not need to specify treatment areas within a particular DHRA at the time of DHRA designation, but rather, that the location of study sites and treatments would be determined by researchers using the DHRA. This approach also helps to ensure that fishing effort occurs in the locations desired and at the magnitude desired. There would be lower administrative costs at the front end because specification of levels of fishing activity is left to the researchers. However, this requires researchers to invest the greatest amount of resources in designing the fishing impact.

One potential cost of a research fishing approach is that it might be hard to generate effort that is of sufficient magnitude to replicate a commercial fishery impacts. There might be gaps in impacts if funding is limited, which could be an issue in long-term impacts studies. Also, researchers would need to figure out how to fund the activities and, working through the Regional Office's exempted fishing program, whether the fish could be landed and if so they would need to come out of the fishery's overall allocation, or if vessels would need to agree to use DAS or quota to cover the trips.

It will be important for the Council to understand how the DHRAs are being used. Coordination and oversight will probably need to happen at the Council level on an ongoing basis, perhaps through the Council's Research Steering Committee or the Habitat Committee and Plan Development Team. The Greater Atlantic Regional Fisheries Office will also be involved with coordination and oversight to determine where research treatment sites are located and to assure there are no conflicts that would bias results. Researchers may need to obtain letters of acknowledgement, exempted fishing permits, and/or letters of authorization (under the Marine Mammal Protection Act) before conducting research in a DHRA. Researchers should coordinate with the Regional Office prior to conducting research.

2.3.1 Alternative 1 (No Action) – No DHRA designations

Currently there are no DHRAs designated in the region. Under No Action, this would continue and DHRAs would not be designated as part of this amendment.

2.3.2 Alternative 2 – Eastern Maine Dedicated Habitat Research Area (preferred)

This alternative would designate a Dedicated Habitat Research Area in the eastern Gulf of Maine as shown in Map 31. Measures for this area would be closure to all mobile bottom-tending gear on a year round basis. If the DHRA overlaps with a habitat management area with less restrictive measures (i.e., either the Large or Small Eastern Maine HMA), the DHRA measures would take precedence.

Rationale: The purpose of this alternative is to establish a management regime in the eastern Gulf of Maine region that will facilitate the study of:

- fishing gear impacts on benthic habitats,
- habitat recovery,

- the effects of natural vs. anthropogenic disturbance on fish habitats, and
- the effects of fishing and habitat type on the productivity of managed resources.

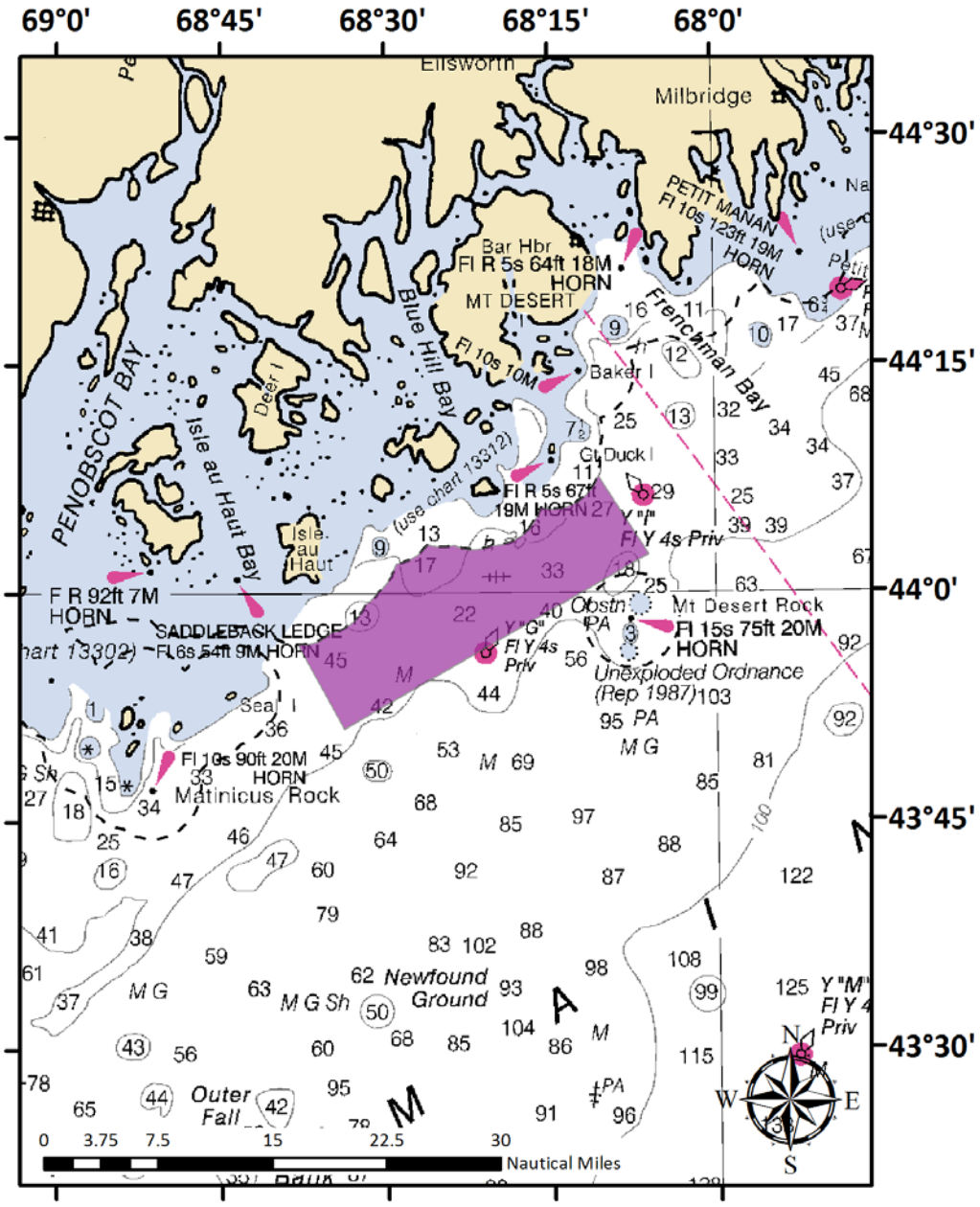
Designation of the DHRA should help to focus research efforts on this location, and facilitate the permitting process for those projects. Relative to present conditions, where groundfish resources are relatively depleted, this region previously supported additional groundfish resources and groundfish fisheries. Dam removal inshore of this area may lead to recovery of prey resources and improved production of managed species via an increase in feeding opportunities. Routine sampling of fishery and prey species in this area could help to identify these ecological linkages.

Table 24 – Coordinates for Eastern Maine DHRA

Eastern Maine DHRA (Same as Small Eastern Maine HMA)		
Point	N Latitude	W Longitude
1	44° 02.5’	68° 06.1’
2	43° 51.0’	68° 33.9’
3*	43° 56.6’	68° 38.1’
4*	44° 07.6’	68° 10.6’

A. Western boundary state waters; eastern boundary state waters/EEZ
B. Landward boundary at state waters. Only endpoints provided.

Map 31 – Eastern Maine Dedicated Habitat Research Area



2.3.3 Alternative 3 – Stellwagen Dedicated Habitat Research Area (preferred)

This alternative would designate a Dedicated Habitat Research Area in the western Gulf of Maine as shown in Map 32. Measures for the entire area would be closure to mobile bottom-tending gear, sink gillnet gear, and demersal longline gear on a year round basis (not including mobile bottom tending gear deployed by scientific research vessels conducting scientific research, outside of the authority of the Magnuson-Stevens Act). Mid-water and pelagic gears would be permitted throughout. This alternative includes an optional reference area that would additionally be closed to recreational and party/charter groundfish fishing if selected. If the

DHRA overlaps with a habitat management area with less restrictive measures, the DHRA measures would take precedence.

This DHRA would represent a control-impact style design as it lies completely within the existing Western Gulf of Maine habitat closed area. The specific boundaries identified for the area were recommended by an independent ad-hoc working group of fishermen and scientists that are involved with both Stellwagen Bank National Marine Sanctuary and the Council's Habitat Omnibus process, although the boundaries and fishing restrictions would be adopted as a Council management alternative under the Magnuson Stevens Act.

Rationale: The purpose of this alternative is to establish a management regime in the western Gulf of Maine region that will facilitate the study of:

- fishing gear impacts on benthic habitats,
- habitat recovery,
- the effects of natural vs. anthropogenic disturbance on fish habitats, and
- the effects of fishing and habitat type on the productivity of managed resources.

Designation of the DHRA should help to focus research efforts on this location, and facilitate the permitting process. The DHRA area contains a wide array of habitat types and species, and there are numerous baseline studies of the area that could be built upon in the future. Stellwagen Bank in general is a highly productive area, and a better understanding as to why this is could improve fisheries management in the Western Gulf of Maine.

The purpose of the reference area is to create a site where removals of groundfish are limited, in order to be able to study how the ecology of the reference area may change under such conditions. The two reference area options sub-divide an area of relatively high recreational fishing effort. Siting the reference area in a location with relatively large amounts of recreational fishing will best ensure a contrast in before vs. after conditions. If there are significant ecosystem effects of limiting groundfish removals from the major sources, they will be more likely to be detected with a substantial before/after contrast.

2.3.3.1 *Option A – Southern reference area*

Option A includes the southern reference area.

2.3.3.2 *Option B – Northern reference area (preferred)*

Option B includes the northern reference area.

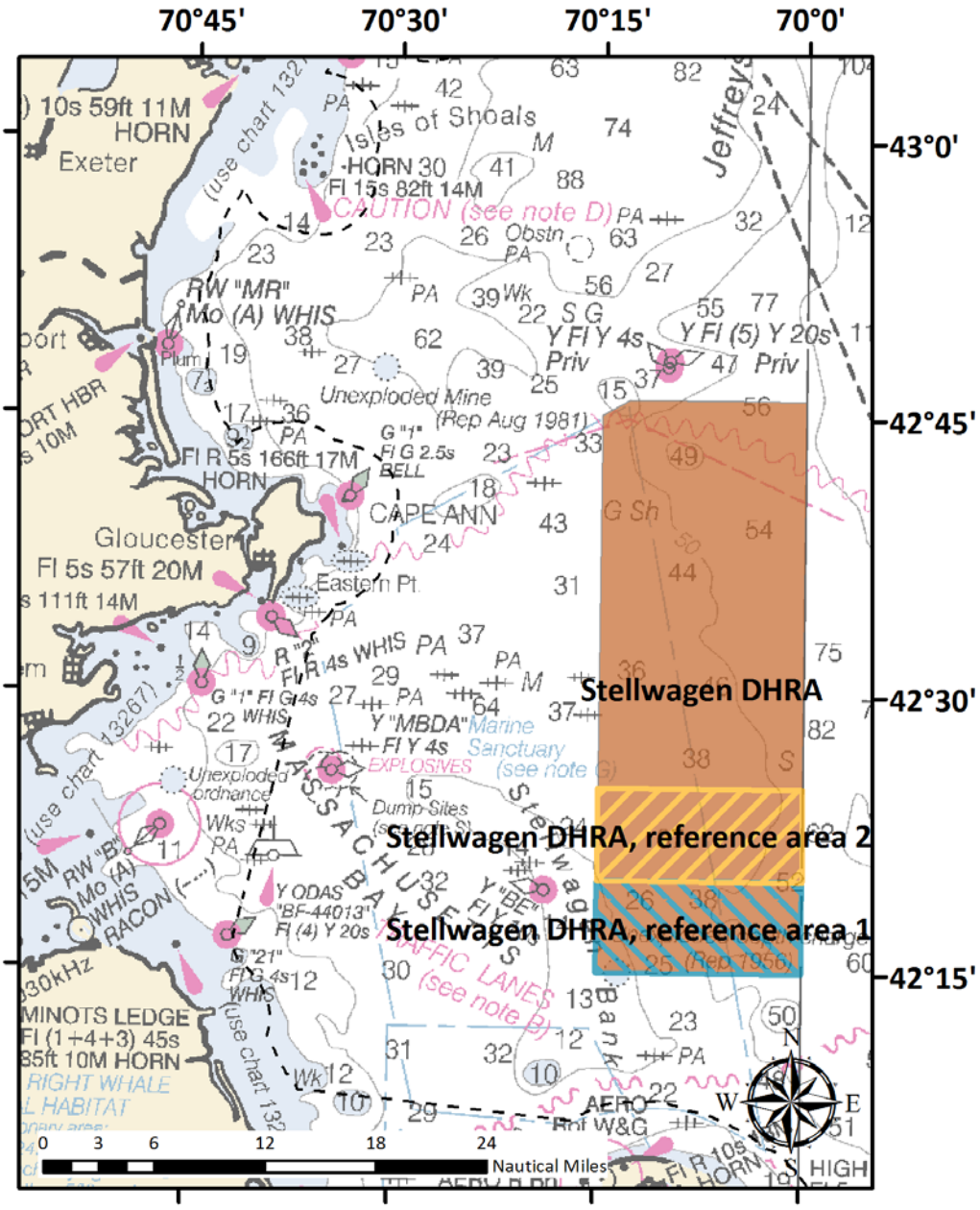
2.3.3.3 *Option C – No reference area*

Option C would designate the DHRA without the reference area.

Table 25 – Coordinates for Stellwagen DHRA and reference areas

Stellwagen DHRA (Same as Large Stellwagen HMA)		
Point	N Latitude	W Longitude
1	42° 15.0’	70° 00.0’
2	42° 15.0’	70° 15.0’
3	42° 45.2’	70° 15.0’
4	42° 46.0’	70° 13.0’
5	42° 46.0’	70° 00.0’
Southern reference area (A)		
1	42° 20’	70° 00’
2	42° 15’	70° 00’
3	42° 15’	70° 15’
4	42° 20’	70° 15’
Northern reference area (B)		
1	42° 25’	70° 00’
2	42° 20’	70° 00’
3	42° 20’	70° 15’
4	42° 25’	70° 15’

Map 32 – Stellwagen Dedicated Habitat Research Area with two possible reference area options.



2.3.4 Alternative 4 – Georges Bank Dedicated Habitat Research Area (preferred)

This alternative would designate a Dedicated Habitat Research Area on Georges Bank as shown in Map 33. Measures for this area would be closure to all mobile bottom-tending gear on a year round basis (not including mobile bottom tending gear deployed by scientific research vessels conducting scientific research, outside of the authority of the Magnuson-Stevens Act. If the DHRA overlaps with a habitat management area with less restrictive measures, the DHRA measures would take precedence.

Rationale: The purpose of this alternative is to establish a management regime in the Georges Bank region that will facilitate the study of:

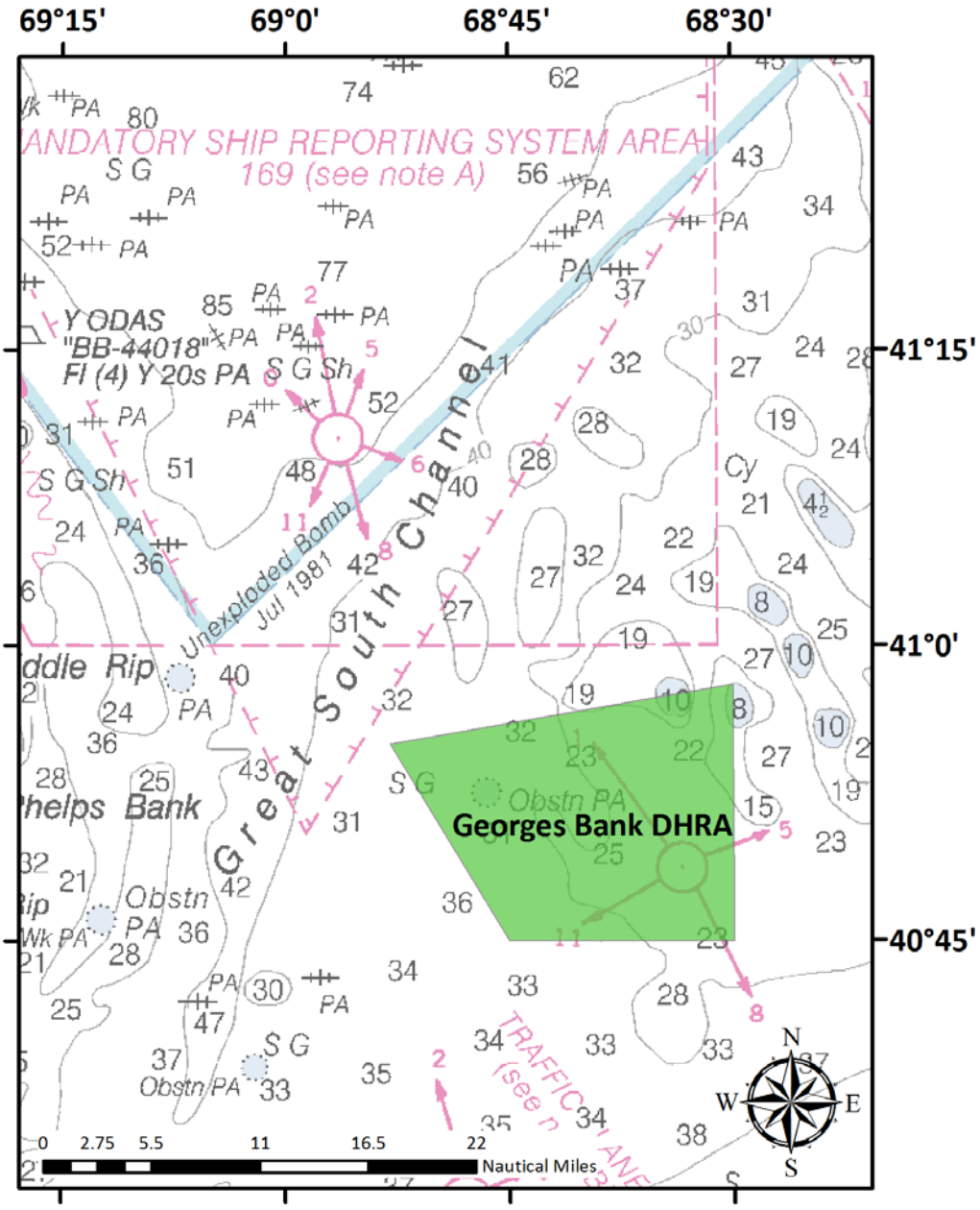
- fishing gear impacts on benthic habitats,
- habitat recovery,
- the effects of natural vs. anthropogenic disturbance on fish habitats, and
- the effects of fishing and habitat type on the productivity of managed resources, especially the relationships between scallop distribution, abundance, growth, and seabed type.

Designation of the DHRA should help to focus research efforts on this location, and facilitate the permitting process.

Table 26 – Coordinates for Georges Bank DHRA

Georges Bank DHRA (Same as Closed Area I South EFH Closure Area)		
Point	N Latitude	W Longitude
CIH3	40° 55′	68° 53′
CIH4	40° 58′	68° 30′
CI3	40° 45′	68° 30′
CI2	40° 45′	68° 45′

Map 33 – Georges Bank Dedicated Habitat Research Area



2.3.5 Alternative 5 – DHRA sunset provision (preferred)

This alternative would create a sunset provision for DHRAs that would allow administrative removal without further Council action three years after implementation, if no research that is designed to evaluate habitat effects of fishing had been initiated (see introduction to section 2.3 for a list of possible research topics). This alternative would apply to all DHRAs designated via this action. Removal would be accomplished by NMFS via rulemaking or some kind of notice, and would be coordinated by the Greater Atlantic Regional Fisheries Office. The following criteria must be met in order for the DHRA to continue after the three-year review:

- ***Documentation of active and ongoing research in the DHRA area, in the form of data records, cruise reports or inventory of samples with analytical objectives focused on DHRA topics outlined in the introduction to section 2.3.***
- ***Documentation of pending or approved proposals or funding requests (including ship time requests) with objectives focused on DHRA topics.***

These criteria would be evaluated using the following approach:

Figure 1 - Flowchart - DHRA evaluation procedure.

1. Is there active research being conducted in the DHRA?

   Yes--> see #2. No --> see #3.

2. Is it anticipated that it will continue beyond this fishing year? *This assumes that NOAA will publish a notice and the change of status would be effective at the start of the next fishing year. This may require a verbal commitment on the part of researchers, rather than letters of support/funding from the funding agency, as agencies are sometime reluctant to make commitments for the next year until their own funding allocations are more certain.*

   Yes --> DHRA remains classified as such. No --> See #3.

3. Is there potential research currently in the permitting process at GARFO or other entities, e.g. Stellwagen Bank National Marine Sanctuary? *Note that many types of research can be conducted without a permit or letter of acknowledgment.*

   Yes --> See #6. No --> see #4.

4. Is there potential research currently in the funding process? *Note that in some cases, outside funding may not be required, as the project could be part of an organization's routine operations. Ship time allocation requests could also be used as a marker.*

   Yes --> See #5. No --> see #7.

5. Is there a high likelihood that the project will be funded? *This assessment will be very subjective and is probably not a good indicator, unless for some reason it appears that funding is very unlikely or very likely.*

   Yes --> See #6. No --> see #8.

6. Are the fishing restrictions associated with the DRHA designation an explicit part of the design of the project?

Yes --> DHRA remains classified as such. No --> see #8.

7. Is there potential research [at some other critical stage in the idea-->funding process]? I.e., is there a coherent research plan or proposal in the pre-submission process? This plan should be responding to a current research funding process or planning process such as ship time allocations, and it should have an actionable timeline.

   Yes-->See #5. No--> See #8.

8. DHRA classification is removed.

Rationale: This alternative responds to Council and stakeholder concerns that DHRAs might be designated but remain unused, thereby causing economic hardship to the fishing industry without improving habitat science. This scenario is possible because although the Council has the ability to designate DHRAs and enact fishing restrictions within them, as well as the ability to set research priorities, it does not directly conduct or fund research activities. The intent is that the three year review would evaluate whether appropriate research activities were either ongoing or imminent. Allowing for research activities to be in the planning stage but not yet on the water at the three year mark acknowledges the fact that proposal development, submission, review, and allocation of funds can be a lengthy process.

2.4 Framework adjustments and monitoring

The Council has identified Alternative 2 as preferred.

2.4.1 Alternative 1 (No action) – Current list of frameworkable measures and monitoring activities; ad-hoc initiation of framework adjustments

There is extensive language in the fishery management plans developed by the Council, and in their implementing regulations, related to framework adjustments and measures that can be implemented or changed via framework adjustment. Generally speaking, the framework-related regulations document procedures for analyzing and implementing annual/biennial/triennial fishery specifications, but other measures are specifically identified in the regulations as candidates for implementation via framework (Table 27). Specifically, the existing regulations allow the Council to initiate a framework adjustment to modify, add, or eliminate various management measures used to regulate the groundfish fishery, including area closures and gear restrictions.

The decision to initiate an area-management-oriented framework adjustment or amendment is currently made on an ad-hoc basis, responding to specific issues, and there is no schedule for evaluating or updating spatial management measures.

Currently, Council-specified research priorities related to spatial management are embedded within plan-by-plan research priority documents, which are updated periodically by Plan Development Teams, Oversight Committees, Advisory Panels, and the Scientific and Statistical

Committee. Existing data collection from areas closed to fishing includes regular resource surveys by government vessels, ad hoc tagging programs and other research, and observed fishing trips surrounding closed areas.

Under Alternative 1/No Action, there would be no changes made to the lists of frameworkable items in the Council's FMPs, or to the procedures for reviewing the effectiveness of spatial management measures. No additional recommendations would be made regarding research priorities specifically intended to improve the development and evaluation of spatial management measures.

Rationale: The Council can use the existing framework adjustment procedures to respond to new fish habitat science or changing circumstances. According to current policies, a Council decision to initiate a framework adjustment would be weighed against other management priorities. Existing survey and fishery data collection programs provide some information that can be used to monitor the performance of area-based management, although currently conducted research is highly unlikely to sufficiently monitor smaller proposed closed areas. More targeted scientific research may or may not be conducted, depending on scientific interest and available funding.

Table 27 – Spatial management-oriented measures that may be implemented via framework action, by fishery management plan. All citations are from 50 CFR Part 648.

Fishery Management Plan and CFR section	Frameworkable measures (only the subset of measures relevant to measures discussed in OA2 are included in this table)
Northeast multispecies (§648.90)	As part of biennial review, the groundfish PDT may include **any of the management measures in the FMP**, including but not limited to: **gear restrictions**, **closed areas**, recreational fishing measures, **describing and identifying EFH, fishing gear management measures to protect EFH, and designating HAPCs within EFH**. In addition, the following conditions and measures may be adjusted through future framework adjustments: **gear requirements to reduce impacts of the fishery on EFH**.
Atlantic sea scallop (§648.55)	The Council's recommendations on adjustments or additions to management measures must include measures to prevent overfishing of the available biomass of scallops and ensure that OY is achieved on a continuing basis, and must come from one of the following categories: modifications to the opening dates of closed areas, size and configuration of rotational management areas, controlled access seasons to minimize bycatch and maximize yield, limits on number of area closures, area specific gear limits and specifications, **adjusting EFH closed area management boundaries or other associated measures**, and **any other management measures currently included in the FMP**.
Atlantic herring (§648.206)	Measures that may be changed or implemented through framework action include: gear restrictions or requirements, **measures to describe and identify EFH, fishing gear management measures to protect EFH, and designation of HAPCs within EFH**, and **any other measure currently included in the FMP**.
Skate complex (§648.321)	Measures that may be changed or implemented through framework action, provided that any corresponding management adjustments can also be implemented through a framework adjustment, include **description and identification of EFH, description and identification of HAPCs, measures to protect EFH**.
Monkfish (§648.96) and deep-sea red crab (§648.261)	No measures in framework regulations specifically related to OA2 issues.

2.4.2 Alternative 2 – Planned, strategic framework adjustment and monitoring (preferred)

This alternative would do three things:

- Specify additional spatial management measures as frameworkable in various Council FMPs,
- Develop a regular, strategic process to review the effectiveness of spatial management measures, and
- Define a series of research priorities related to the review and development of spatial management measures.

First, this alternative would add the following items to the list of frameworkable measures in all Council FMPs:

- Designation or removal of habitat management areas, and
- Changes to fishing restrictions within habitat management areas.

Second, a strategic process would be established that will routinely evaluate the boundaries, scope, characteristics, and timing of habitat and spawning protection areas. The foundation of this process would be a technical review that evaluates the performance of habitat and spawning protection areas. This review will be completed at **10 year intervals** following implementation of area management measures proposed by this amendment. The review and associated written report will be prepared using relevant available science and data to show whether or not the areas are meeting the objectives and advise the Council whether changes are warranted. Development of this technical review and report may be aided through:

- Review of new research and data (Council's Research Steering Committee),
- Independent evaluation (e.g. Gulf of Maine Research Institute, University of Massachusetts School for Marine Science and Technology),
- A workshop convened by the Council,
- Consultation with Council technical teams, and/or
- Peer review by the Council's Scientific and Statistical Committee or the Center for Independent Experts.

This review should consider but is not limited to the following questions:

Habitat protection

- Is juvenile abundance increasing in habitat management areas, compared with adjacent open fishing areas?
- Is overall stock-wide recruitment increasing due to better survival of juvenile fish in closed areas?
- Is growth of juveniles faster inside the closed areas than elsewhere?
- Are biotic factors (stomach contents, size at age, prey abundance) of juvenile fish different inside closed areas than elsewhere?
- Are there stronger associations with habitat types in closed areas than elsewhere?
- Is natural mortality for juvenile fish different inside closed areas than elsewhere?
- How long do juvenile fish remain in closed fishing areas?
- Does performance relative to the metrics listed above vary with closed area size?

Spawning protection

- How well does the timing of spawning coincide with the spawning closures?
- Does fishing actually disrupt spawning activity (apart from the effect of removing spawners)?
- Have the closed areas actually improved stock-wide recruitment?
- What is the variability of spawning activity (location and timing) over time? Are spawning closures as configured able to protect spawning activity, given this variability?
- Have new sub-populations of spawners been identified that require specific protection?

Based on this review, the Council may choose to initiate a framework adjustment to change spatial management measures.

Third, building on what the Council learned during the review of the performance of existing closed areas and the development of new EFH management in this amendment, the Council would identify and periodically revise research priorities to improve habitat and spawning area monitoring. New types of data to enable a satisfactory review of area management performance include:

- Spawning condition and other life history characteristics (stomach content, size at age, robustness)
- Juvenile fish condition, distribution, and movement
- Changes in prey availability
- Habitat quality (type, structure, cover, and size) associated with high abundance of juvenile fish
- Observation of fish spawning behavior within closed and open fishing areas
- Movement and migration
    - Telemetry tagging
    - Acoustic tagging
- Before-After-Control-Impact comparison of changes in fish biomass and characteristics before and after a closure inside a closed area and in surrounding fished areas
- More intensive egg and larval surveys at various times throughout the year
- Oceanographic information that affects egg and larval dispersion

Many of these data are critical to answering the questions posed above. One concern is that lethal sampling could undermine population improvements in very small management areas. Funding sources could be developed or promoted by a future management action that include, but are not limited to:

- Research set-asides from annual groundfish ACLs and/or extra landings allocations while conducting fishery impact research in habitat or spawning management areas
- Sector set-asides to fund research that collects information that sectors would use to justify closed or restricted area exemptions
- Experimental fisheries
- Cooperative research
- Enhancement of observer coverage in specific areas (e.g. modify Standardized Bycatch Reporting Methodology sampling allocations)
- More intensive survey sampling in and around closed or gear restricted areas.

Rationale: Management areas and measures may require reconsideration for a variety of reasons. Some habitat and groundfish area restrictions may not produce the results that had been expected, or may require modification to achieve the intended results. Or, habitat and spawning areas may have achieved the intended results, and the area-based fishing restrictions are no longer needed. Alternatively, areas that have achieved the intended results may be deemed as vital and possibly expanded upon. In other cases, new management areas may be warranted.

A regular review process would ensure that reevaluation of spatial management performance and effects on groundfish productivity would be conducted in a holistic rather than piecemeal fashion. Regulators, researchers, and fishermen would be on notice that a regular review is planned and that relevant information may be submitted to the Council in a timely manner for review. It also establishes the expectation that habitat and groundfish spawning management via area-based fishery restriction will be periodically reviewed so that the restricted areas that are selected are those areas that provide the greatest potential for protecting essential fish habitat and helping stocks rebuild.

The proposed review process is not intended to replace the authority for the Council to initiate an ad hoc review of a specific management issue at any time, or to respond to relevant new science that becomes available. It is also not intended as a substitute for the sunset evaluation process that would apply to Dedicated Habitat Research Areas (see Section 2.3.5) which is intended to promote habitat research in unfished areas for a period not less than three years.

Current sources of data will likely not be sufficient to monitor the proposed closed areas due to their small sizes. Identification of monitoring and research needs specific to spatial management issues would promote and enhance collection of data and scientific analyses that would inform future decisions. New data would address scientific and information gaps that were encountered during the development of Framework Adjustment 48 to the Northeast Multispecies FMP, when the Council reviewed the performance of existing year round groundfish closed areas, and during the development of this amendment.

The ten year review is suggested because enough time needs to pass to gather sufficient data and information to analyze the effects of area closures and expect statistically significant changes in fish populations. Recent research has suggested that a minimum of three generation times are needed to see population changes due to closed areas (Moffitt et al. 2013), which would be more than 15 years for Atlantic cod. Many types of data used to evaluate of the effectiveness of current closed areas will not be usable for future reviews after implementation of this action due to the relatively small sizes of the proposed closed areas and spatial pattern of current sampling. The current closed area evaluation is heavily based on the NEFSC bottom trawl surveys, which are effective at detecting total population trends, but are unlikely to have sufficient samples at appropriate time scales in the proposed closed areas due to the current stratification and random sampling design of the survey. Thus most questions are likely to not be answerable unless dedicated research is funded and implemented in a timely manner. It is highly unadvisable to open habitat or spawning areas within a few years based on partial data or insufficient sampling. If additional research is conducted with sufficient sampling, some metrics could be evaluated in a shorter time frame, but population level changes will take at least three generation times or more to be detectable for any given species of interest. Caution in including lethal sampling into additional research and monitoring would need to be taken since this sampling itself could impact the effectiveness of the area closures especially in the smaller proposed regions. Visual census approaches (i.e., camera sled, ROV) are applicable for this type of monitoring and there is a rich literature on sampling design and analytical approaches.

3 Considered and rejected spatial management options and alternatives

This section discusses alternatives developed by the technical teams and Committees that were not formally included by the Council for analysis in the amendment.

3.1 Alternatives to minimize the adverse effects of fishing on EFH and improve protection of juvenile groundfish habitats

The Habitat Committee, and later in the process, the jointly convened Habitat and Groundfish Committees, considered a large range of area management options to minimize the adverse effects of fishing on EFH and protect juvenile groundfish habitats before arriving at the set of areas analyzed in this document, as described in Section 2. This section briefly describes the areas considered but ultimately rejected. Map 34 depicts the areas developed mainly within the Habitat PDT and Committee process as adverse effects minimization areas. Map 35 depicts the areas developed by the CATT as juvenile groundfish habitat protection areas.

Eastern/Central Gulf of Maine

Habitat areas on offshore banks and ledges in the Gulf of Maine (Cashes, Fippennies, Platts, Jeffreys Bank, Jeffreys Ledge) were identified based on the presence of complex seabed habitats, but boundaries were generally defined using the 100 m contour. This was done because the entirety of the features was not mapped with a sampling device capable of detecting cobble and boulder substrates, so 100 meters and shallower was used a proxy for areas expected to contain more complex and vulnerable seabed habitat types. The Committee requested that the Fippennies Ledge and Platts Bank areas be made smaller to allow for fishing opportunities other than on the most complex habitat areas on the tops of the features.

Based on the juvenile groundfish hotspot analysis, the CATT initially identified a somewhat different set of 100 km^2 grids in the Eastern Maine region, specifically additional areas further east. As development of this area continued, the Committees focused on the eastern parts of the area that had been identified in the SASI LISA analysis and discussed as a dedicated habitat research area.

Western Gulf of Maine

In February 2012, the PDT developed a range of proposals covering complex habitat areas in the western Gulf of Maine. Four options were presented from which the Committee selected the smaller of the two Stellwagen areas. The original options (SWGOM 2-4) included an extension off the northwestern corner to include Tillies Bank, and an eastern extension to cover Wildcat Knoll. The PDT also identified Gloucester Bank and New Scantum off Jeffreys Ledge. Earlier, in August 2011, the PDT recommended extending the Jeffreys Ledge area to the southwest to cover the part of the ledge feature outside of the existing Western Gulf of Maine closure. In general, the Committee preferred to work with refinements to areas already managed, as opposed to additional areas.