

7. Habitat – Dec 16-18, 2013

#9

Omnibus Essential Fish Habitat Draft Amendment 2

1

**New England Fishery
Management Council
December 18, 2013
Danvers, MA**

Introduction

2

- ❖ **Goals and objectives of OHA2**
- ❖ **Overview of document structure**
- ❖ **Overview of today's discussion plan**
 - ❖ **Brief summary of approach to impacts analysis**

EFH-driven goals and objectives

3

- Identify and implement mechanisms to protect, conserve, and enhance the EFH of those species managed by the Council to the extent practicable.
- Integrate and optimize measures to minimize the adverse impacts to EFH across all Council managed FMPs:
 - Develop analytical tools for designation of EFH, minimization of adverse impacts, and monitoring the effectiveness of measures designed to protect habitat.
 - Modify fishing methods and create incentives to reduce the impacts on habitat associated with fishing.
 - Develop criteria for establishing and implementing dedicated habitat research areas. Design a system for monitoring and evaluating the benefits of EFH management actions including DHRAs.

Groundfish-driven goals and objectives

4

- Enhance groundfish fishery productivity.
- Maximize societal net benefits from the groundfish stocks while addressing current management needs:
 - Improved groundfish spawning protection; including protection of localized spawning contingents or sub-populations of stocks.
 - Improved protection of critical groundfish habitats.
 - Improved refuge for critical life history stages.
 - Improved access to both the use and non-use benefits arising from closed area management across gear types, fisheries, and groups. These benefits may arise from areas designed to address the other three groundfish closed area objectives.

Document structure

Volume 1:

1. Executive summary
2. Contents
3. Background and purpose
4. Affected environment

- Need & purpose linked to goals & objectives; some elements more general, some linked specifically to large mesh groundfish issues
- Affected environment describes four Valued Ecosystem Components (VECs):
 - Physical and biological environment/benthic habitats
 - Managed species
 - Human communities and the fishery
 - Protected resources

Document structure

Volume 2:

1. Contents
2. EFH and HAPC designation alternatives
3. EFH and HAPC env. impacts

Not planning to take any action today

- EFH Designations were approved by Council as final preferred alts following spring 2007 public hearings
- Habitat Areas of Particular Concern
 - Overlap with some existing and potential spatial management areas described in Volume 3
 - Meet various criteria defined in EFH regulations and by NEFMC
- Largely administrative, few impacts

Document structure

Volume 3:

1. Contents
2. Spatial management alternatives
3. Considered and rejected alternatives
4. Environmental impacts
5. Cumulative effects

- Alternatives are grouped by topic
 - Habitat management
 - Groundfish spawning
 - Dedicated Habitat Research Areas
 - Framework adjustments and monitoring
- Organized by region, and in some cases sub-region (habitat alts)
 - Gulf of Maine
 - Georges Bank/Southern New England
- Impacts organized by topic and then by VEC

Document structure

Volume 4:

1. Contents
2. Compliance with MSA
3. Compliance with NEPA
4. Other applicable law
5. References

- Most of the analysis in this volume is pending and will be written for FEIS
- Of possible interest at this stage:
 - MSA section lists EFH requirements of FMPs
 - NEPA section summarizes various notices of intent and public meetings held
 - Glossary of terms (acronyms are in Volume 1)

Document structure

Volume 5

Appendices

- EFH designation methods
- EFH supplementary tables
- EFH designation maps as approved in 2007
- Swept Area Seabed Impact approach methods and results
- Groundfish hotspot analysis methods
- Modeling juvenile cod and yellowtail flounder distribution

Discussion plan:

1. Spatial management alternatives
 1. Habitat
 2. Spawning
 3. Research
 2. Frameworks and monitoring
 3. EFH and HAPC designations
 4. Other issues to consider
- Goal: select preferred alternatives
 - Staff will review alternatives and completed impacts analysis by type of alternative (habitat, spawning, research) and sub-region or region
 - For habitat management and spawning alternatives, select a preferred set of areas and fishing restrictions for each area

Analytical approaches by Valued Ecosystem Component

11

- ❖ **Physical and biological habitats**
 - ❖ **Managed species (groundfish, scallops)**
- ❖ **Human communities and the fishery**
 - ❖ **Protected resources**

Physical and biological habitats

12

- **Approach to analysis – focus on seabed habitats:**
 - Describe habitat types within areas
 - Compare seabed vulnerability between areas and alternatives
 - Evaluate historical realized adverse effects by gear type for areas currently fished
 - Assess redistribution of fishing effort and potential changes in area swept

Managed species – large mesh groundfish

13

- **Approach to analysis:**
 - Compare number of hotspots between areas for different species and groups of species
 - ✦ Age 0/1 juveniles focus for analysis of habitat alternatives
 - ✦ Large fish (top 20% biomass) focus for spawning alternatives
 - Assess potential for redistribution of fishing effort and how this might affect fish concentrated outside of the areas included in a particular alternative

Managed species - scallops

14

- **Approach to analysis:**
 - Evaluate short-term and long-term potential scallop yield by management area
 - Evaluate specific area closure scenarios using Scallop Area Management Simulator model
 - Evaluate seasonal variation in meat weight to evaluate impacts of spawning closures

Economic impacts analysis

15

- Potential displacement of fishing effort by area and alternative
 - VTR analysis of revenue distribution; VMS used where possible
 - Analysis is at the gear and individual (i.e. permit) level
- Will qualitatively estimate the potential costs and benefits of fishing in any reopened areas

Social impacts analysis

16

- **Approach to analysis:**
 - Determine affected communities based on economic analysis
 - Qualitative discussion of impacts considering:
 - ✦ Sustained participation
 - ✦ Community vulnerability
 - ✦ Attitudes, beliefs, and values of fishermen and other stakeholders

Protected resource impacts analysis

17

- **Qualitative evaluation of redistributed effort on protected resources (turtles, marine mammals, and Atlantic sturgeon):**
 - Evaluated species distributions relative to management areas
 - Identified fishing gears that have interactions with protected resources
 - Discussed relationship to other management approaches (e.g. pingers)

To be completed before initial submission

18

- **Impacts to seabed habitats**
 - Refine or draft discussion based on data currently presented in document
- **Impacts to managed species**
 - Finalize scallop analyses
 - Impacts on species other than scallops and groundfish, e.g. lobster, skates, monkfish, squid, etc.

To be completed before initial submission

19

- **Economic impacts**
 - Qualitative analysis of areas currently closed
 - Additional discussion at fishery level (vs. individual level)
- **Economic and social impacts**
 - Refine concluding statements
- **Cumulative effects**
- **Refine impacts of EFH and HAPC alternatives sections**

Review of management alternatives by topic

20

- ❖ **Habitat management**
- ❖ **Groundfish spawning management**
- ❖ **Dedicated Habitat Research Areas**
- ❖ **Framework and monitoring issues**
 - ❖ **EFH and HAPC designations**

Habitat Management Alternatives

21

Eastern GOM

Central GOM

Western GOM

Georges Bank

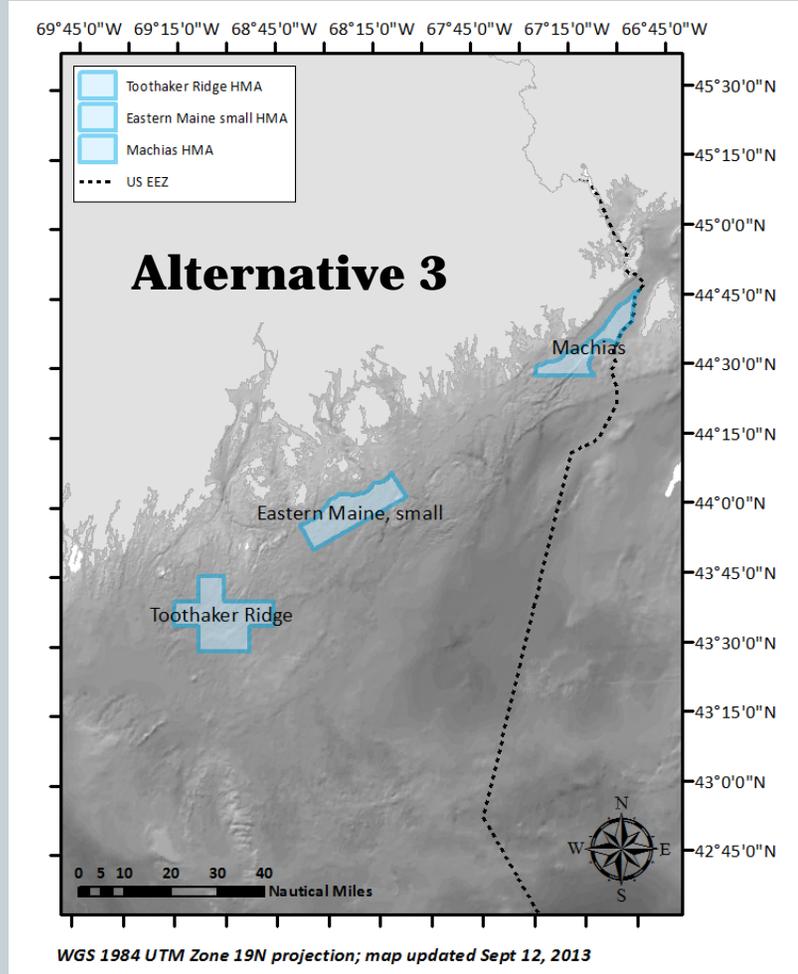
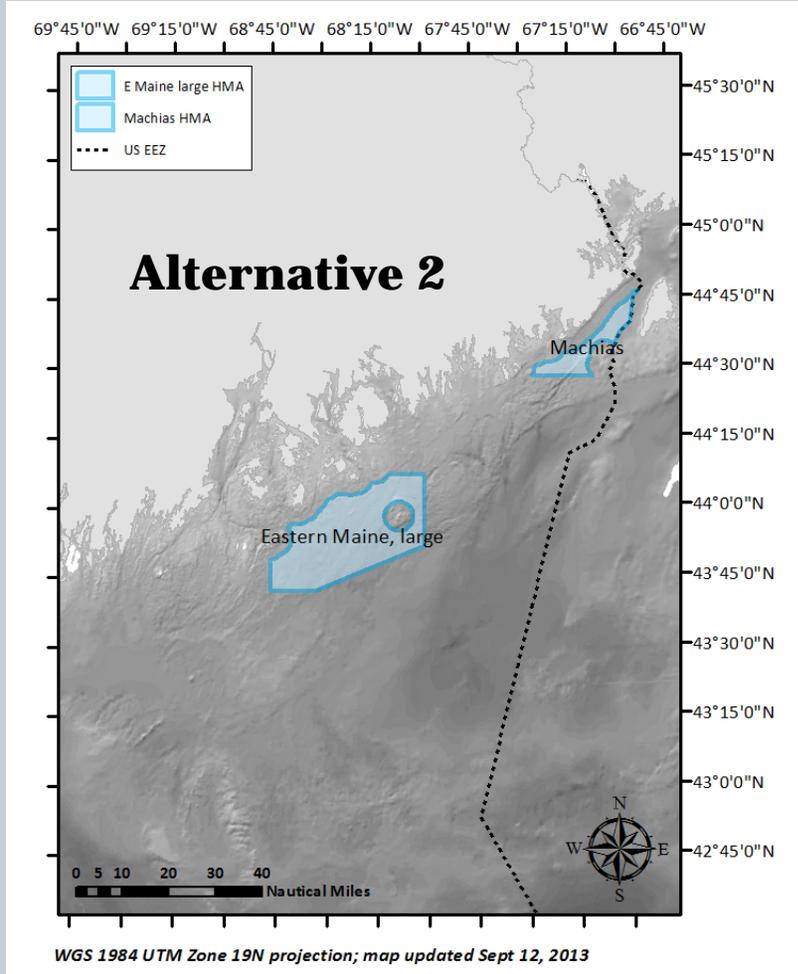
Great South Channel/S. New England

Management options for HMAs

22

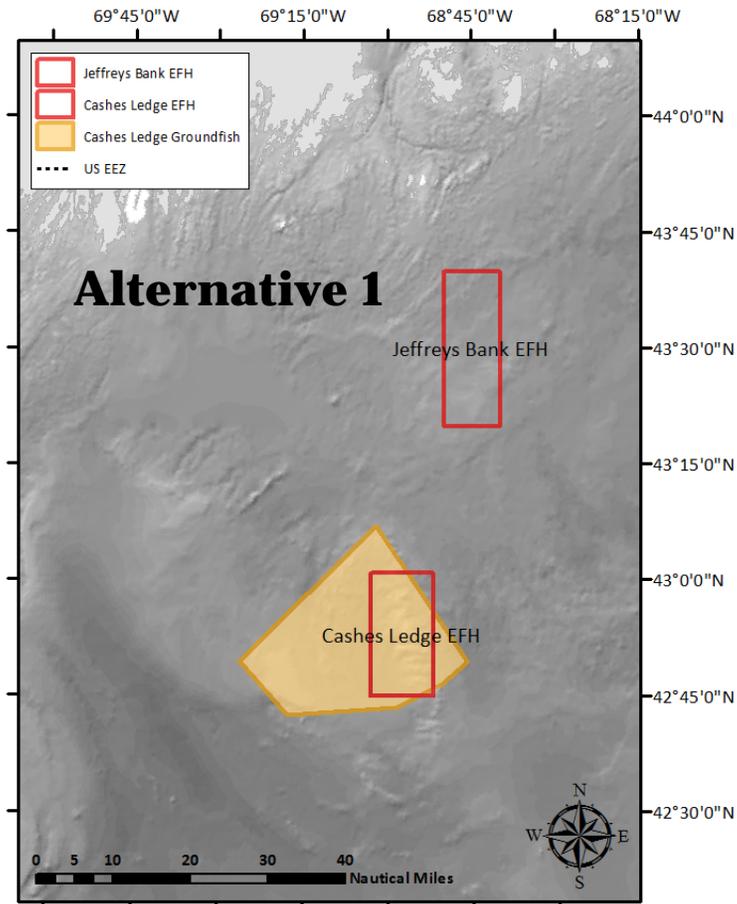
- No action measures for existing groundfish closure areas and habitat closure areas; latter is closure to MBTG
- Options for action alternatives:
 1. Closed to mobile bottom tending gears
 2. Closed to mobile bottom tending gears, except hydraulic clam dredges
 3. Maximum ground cable length of 45 fathoms per side with elevating disks
 4. No ground cables, maximum bridle length of 30 fathoms per side

Eastern GOM Habitat Management

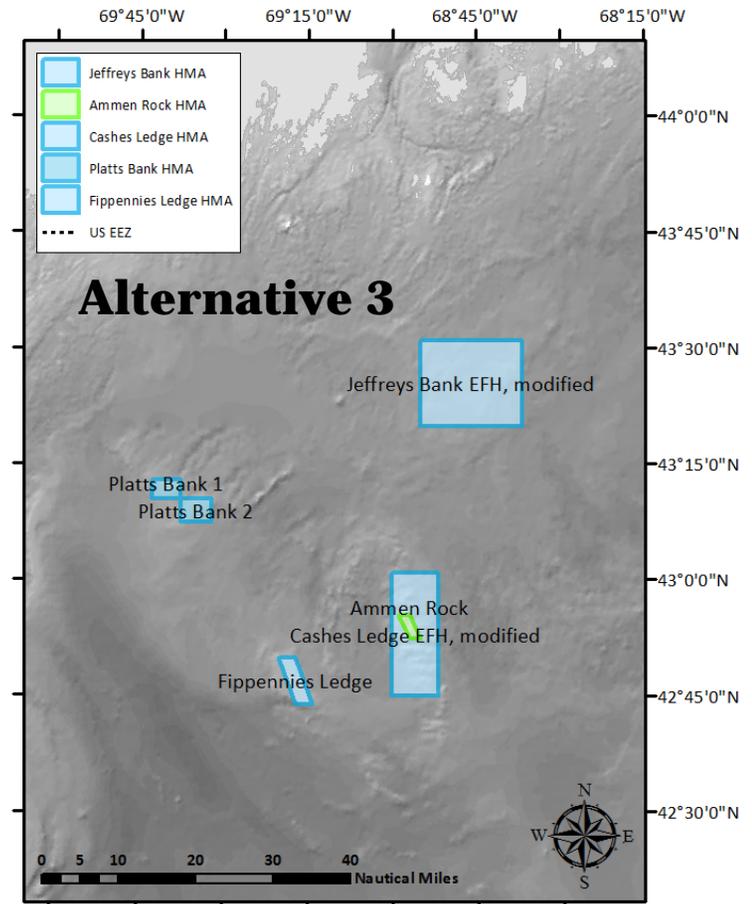


Central GOM Habitat Management

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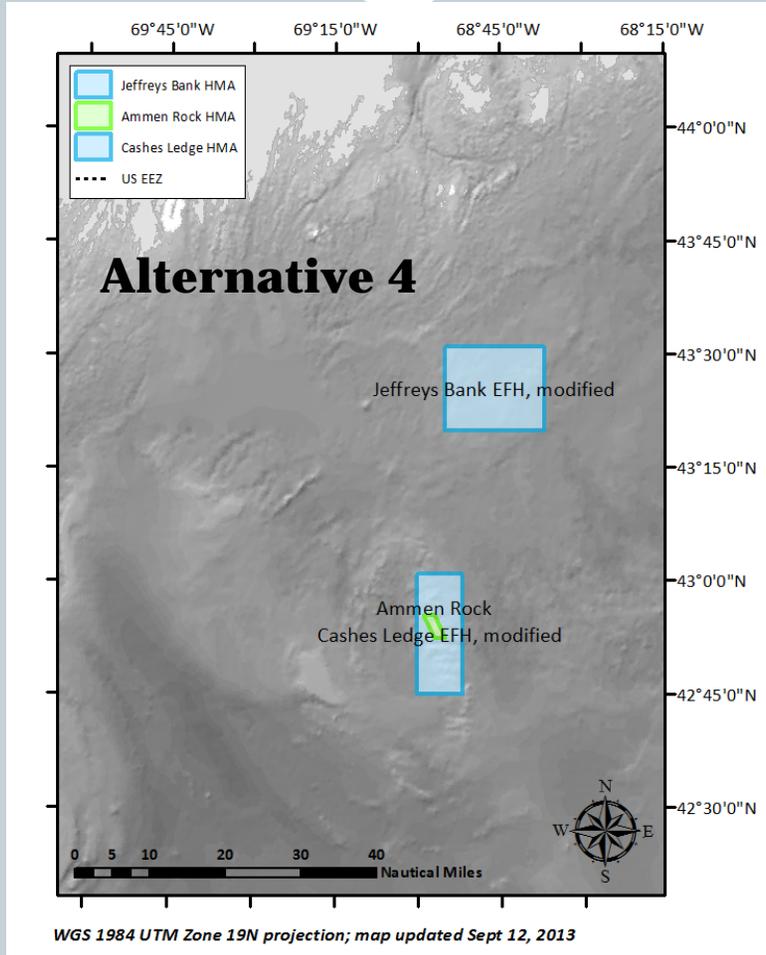
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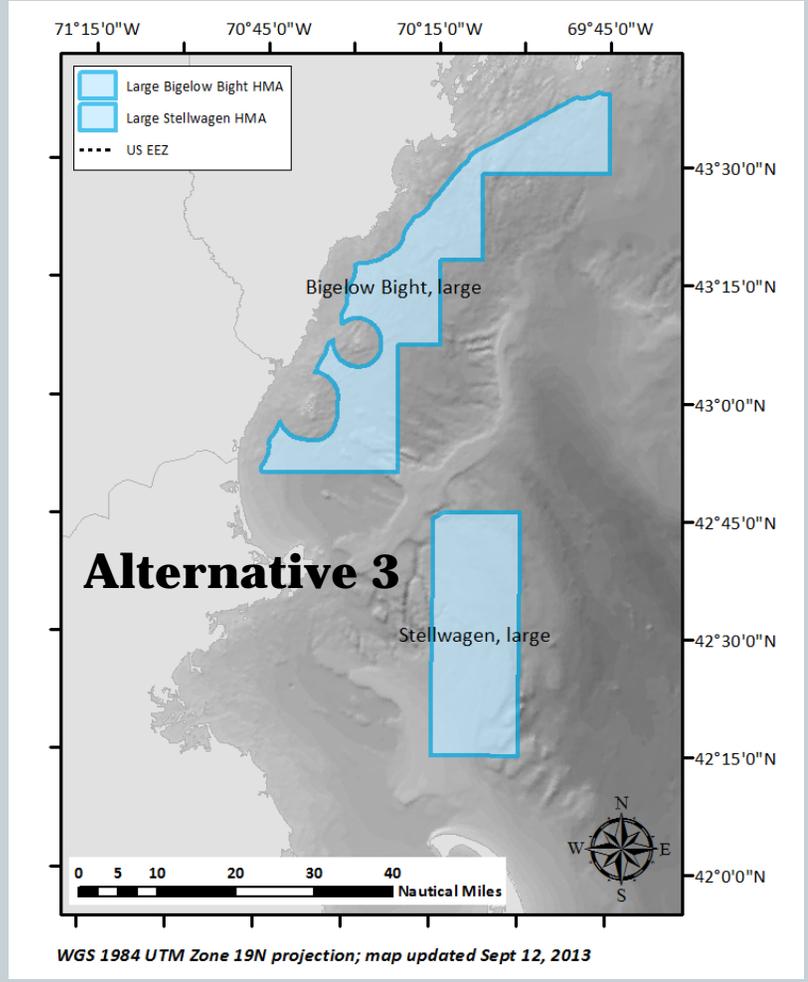
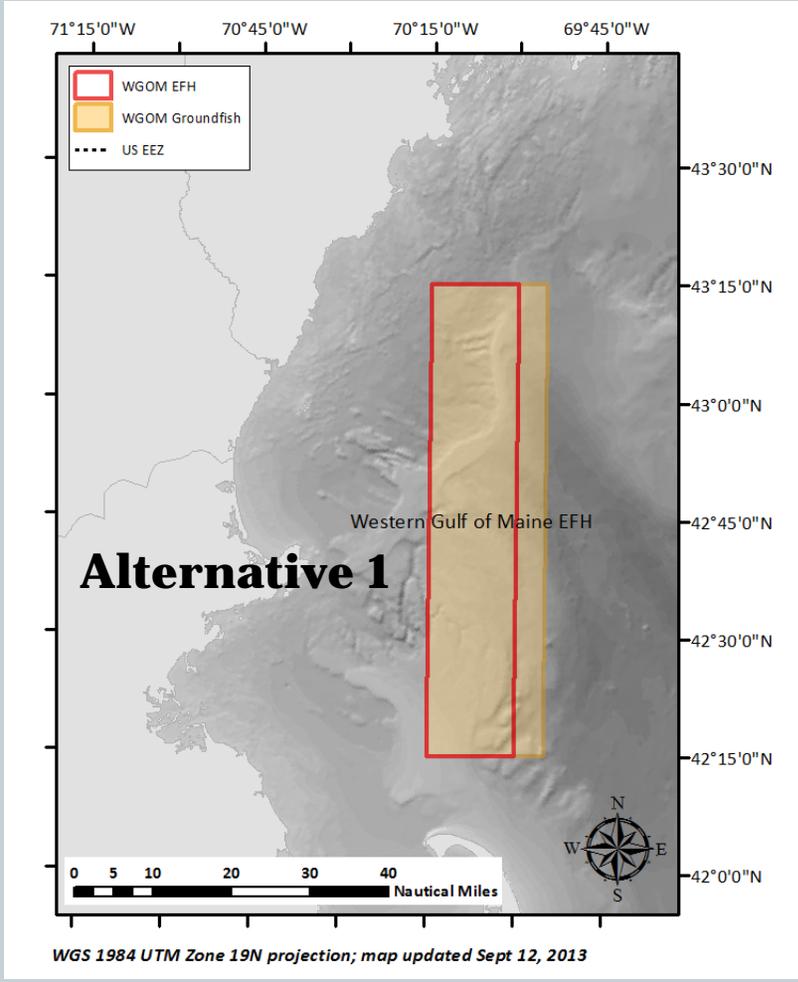
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Central GOM Habitat Management

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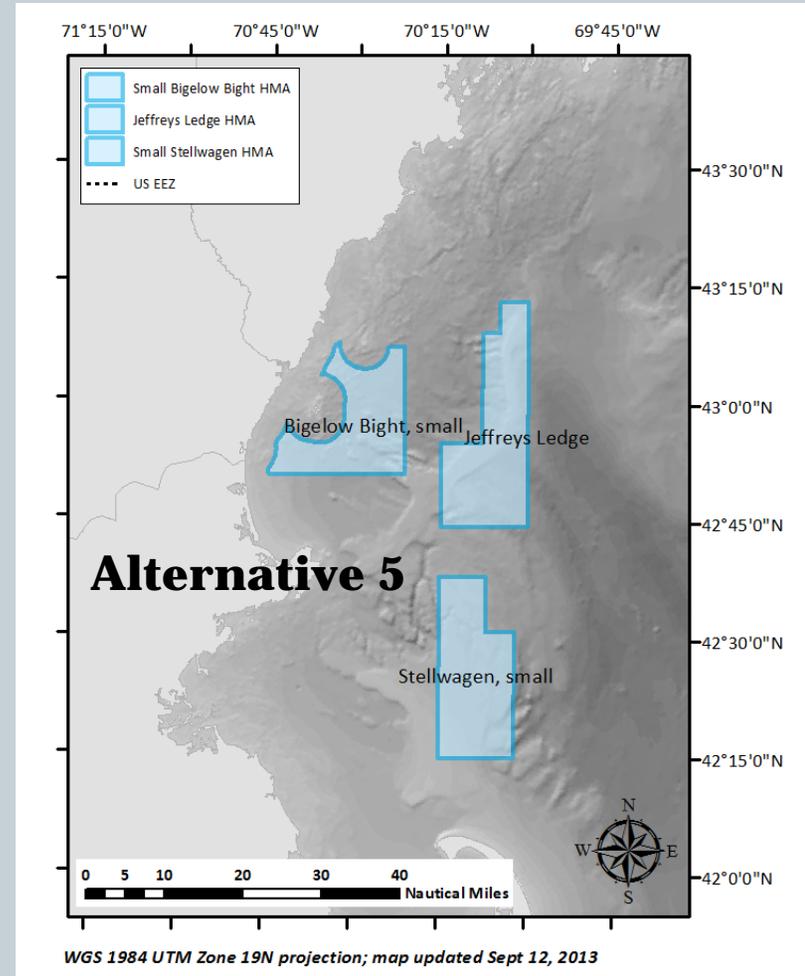
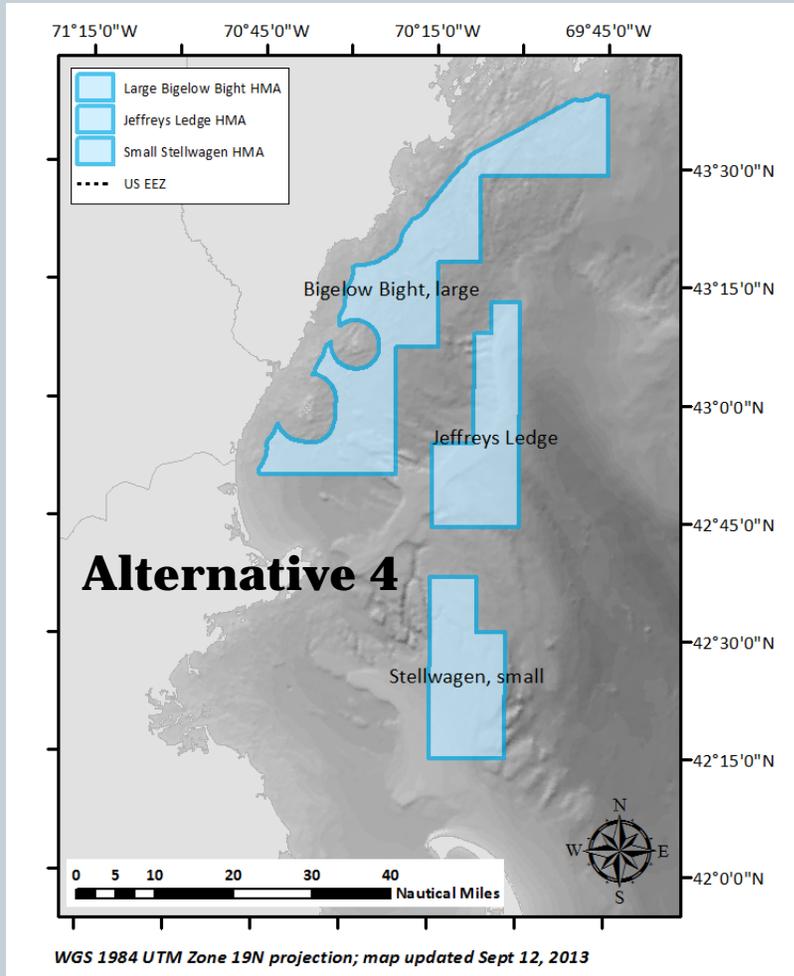


Western GOM Habitat Management



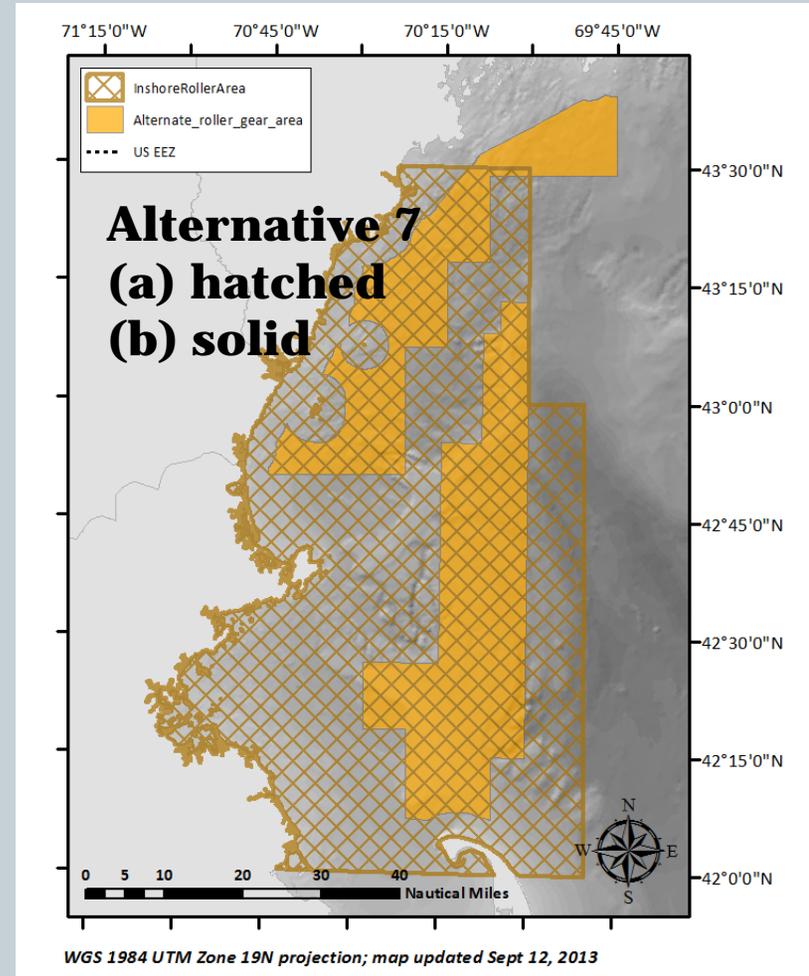
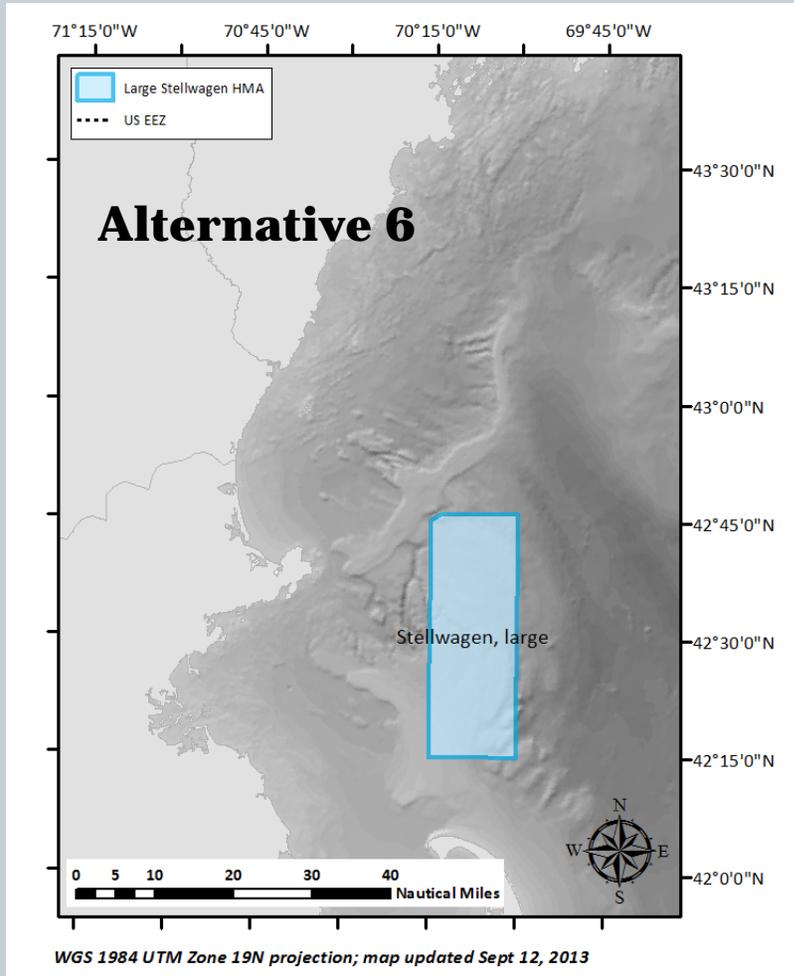
Western GOM Habitat Management

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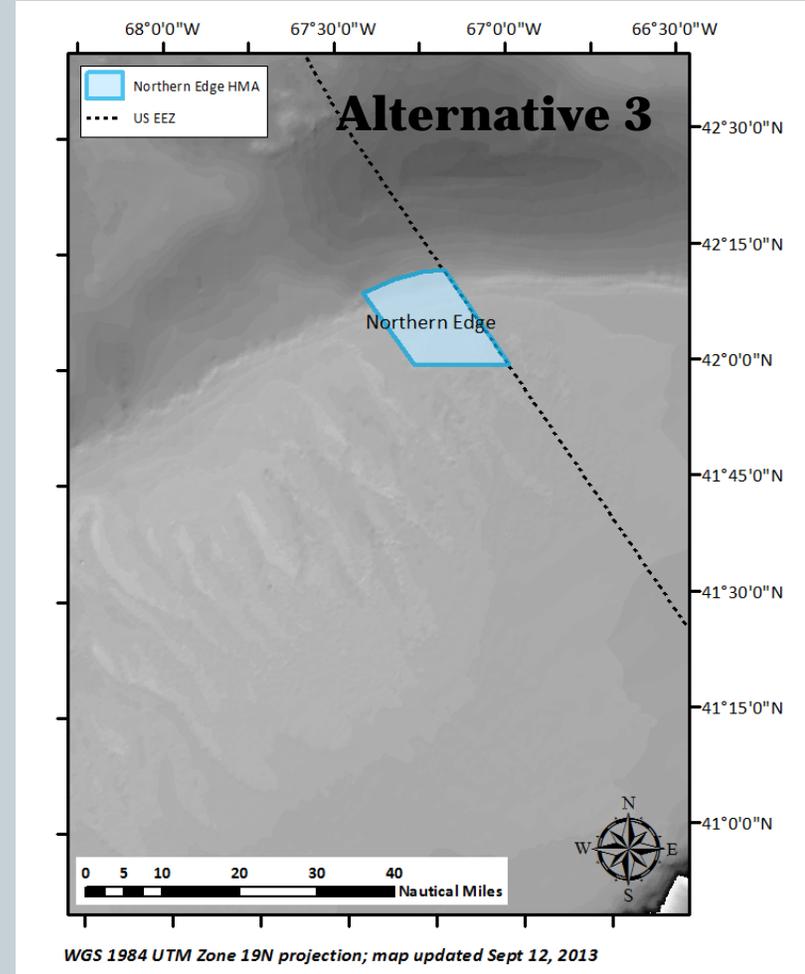
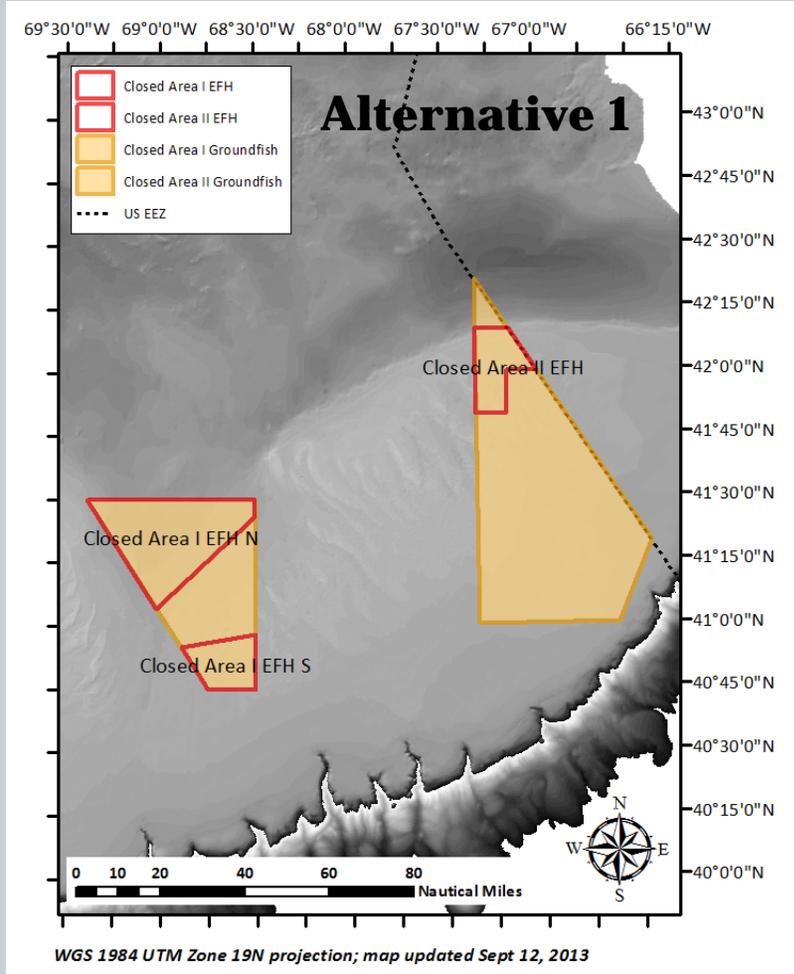
Western GOM Habitat Management

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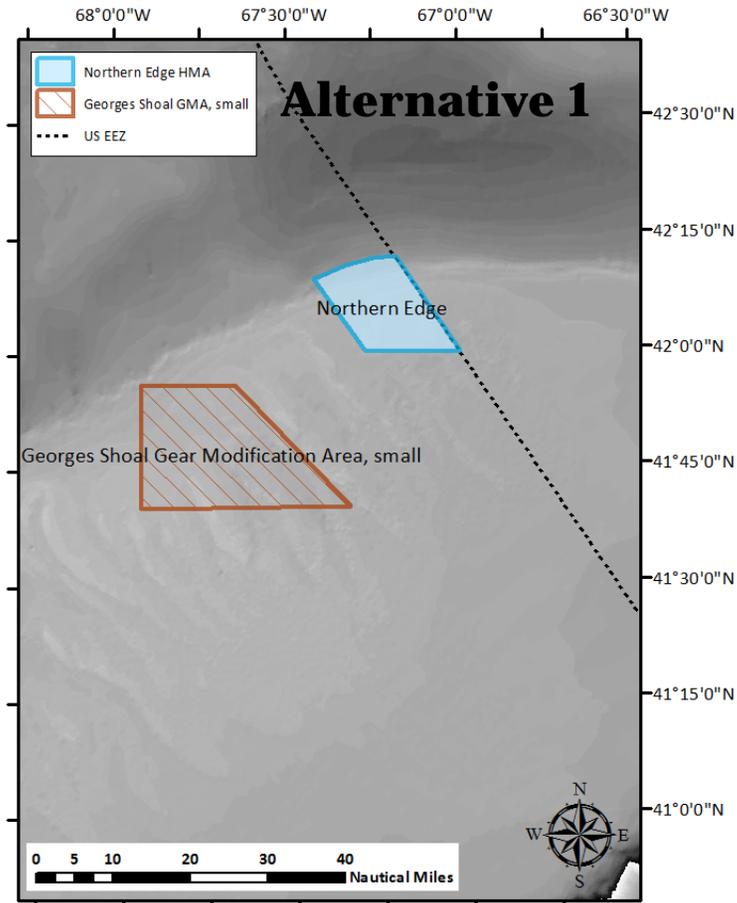
Georges Bank habitat management

29

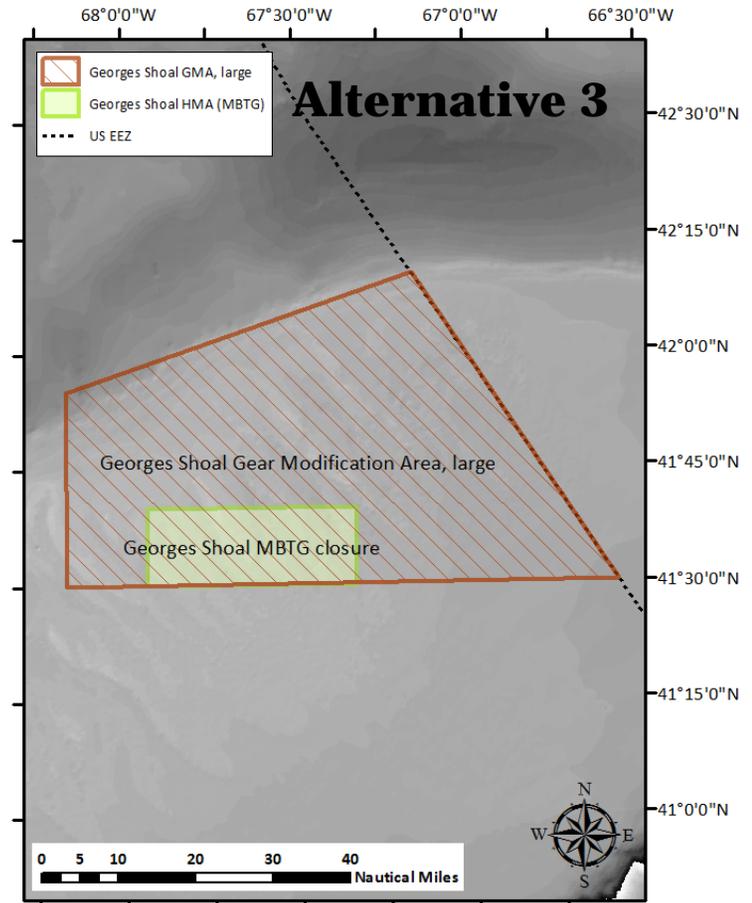


Georges Bank habitat management

30



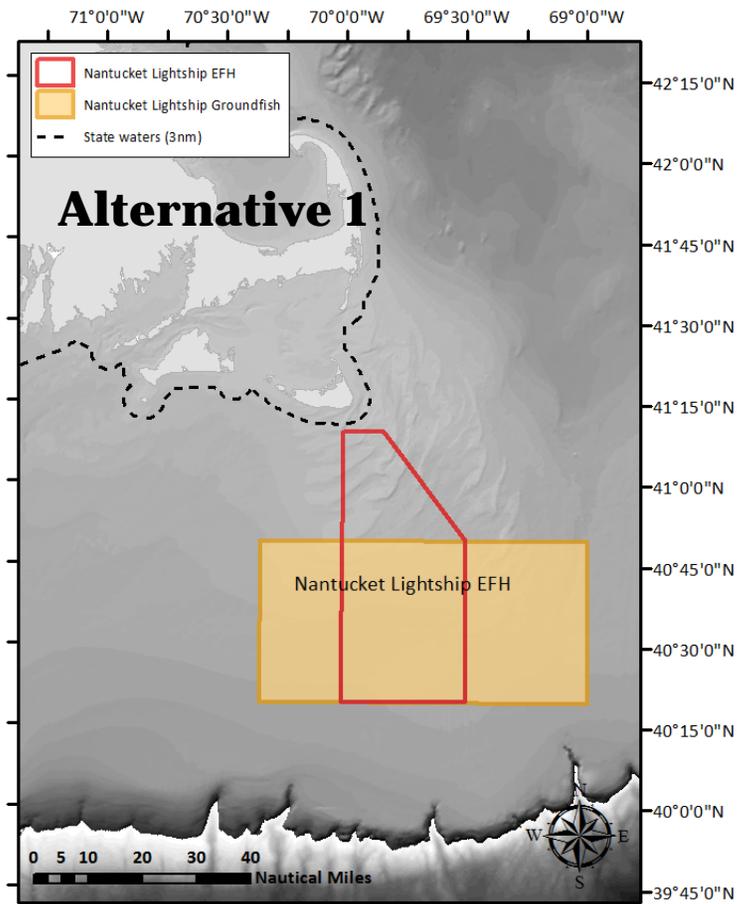
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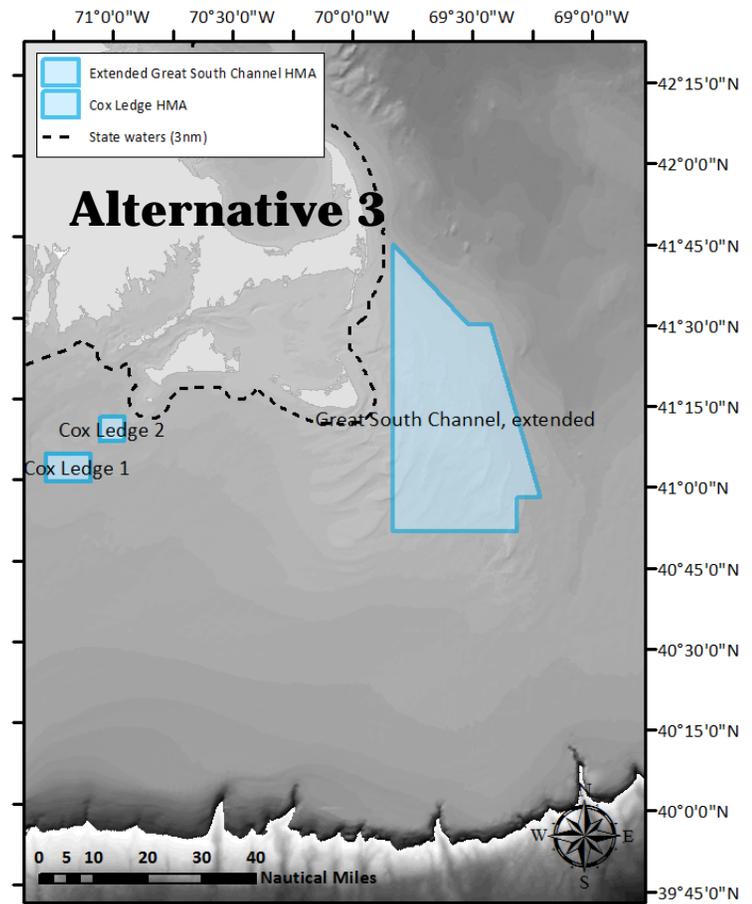
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GSC/SNE habitat management

31



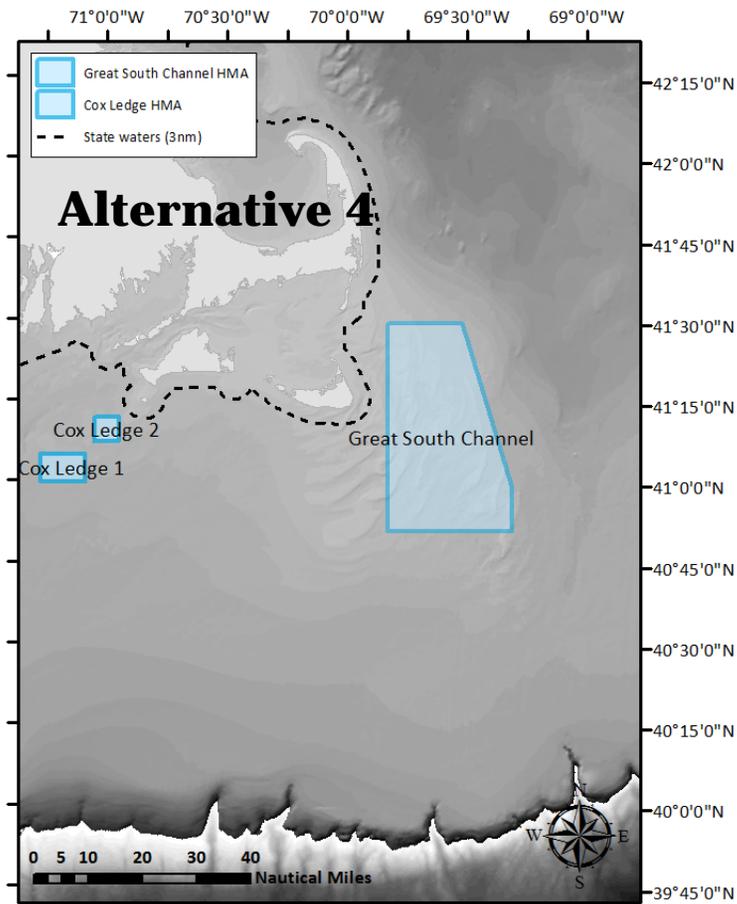
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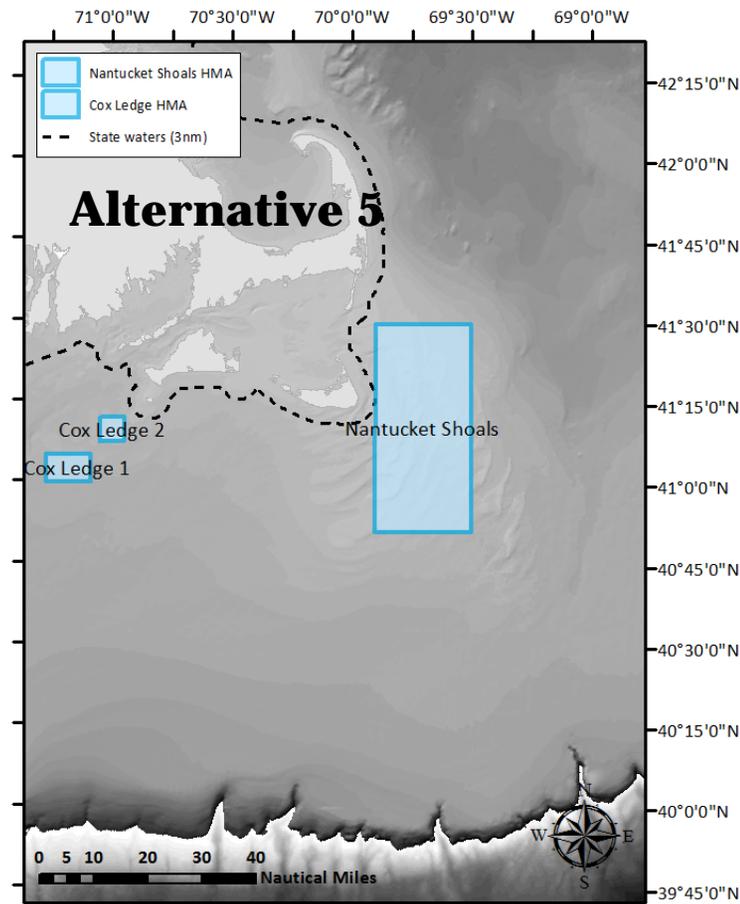
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GSC/SNE habitat management

32



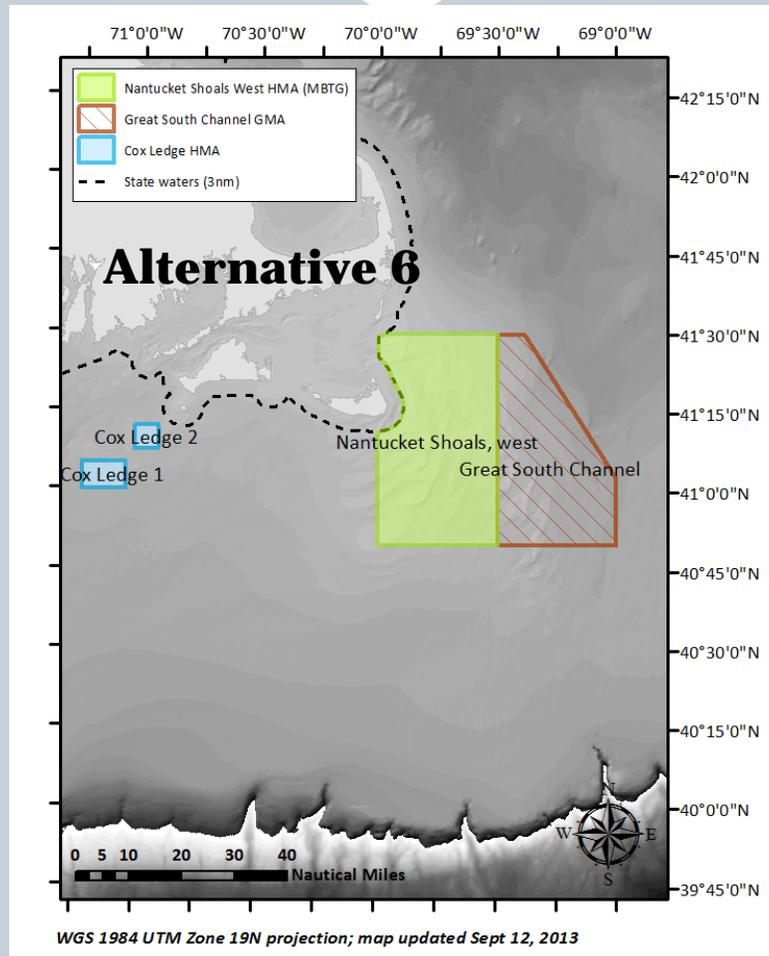
WGS 1984 UTM Zone 19N projection; map updated Sept 12, 2013



WGS 1984 UTM Zone 19N projection; map updated Sept 12, 2013

GSC/SNE habitat management

33



Groundfish Spawning Management Alternatives

34

- ❖ **Gulf of Maine**
- ❖ **Georges Bank/Southern
New England**

Gulf of Maine Groundfish Spawning

35

Alternative 1 (no action)

- Year-round Cashes Ledge, WGOM groundfish areas
- Sector rolling closures
- Common pool rolling closures
- GOM Cod Spawning Protection Area

Alternative 2

- Sector rolling closures
- GOM Cod Spawning Protection Area
- Massachusetts Bay Spawning Area (new)

Georges Bank Groundfish Spawning

36

Alternative 1 (no action)

- CAI, CAII, NLCA year round
- May seasonal closed area

Alternatives 2 and 3

- CAI (Alternative 2)
- CAI North (Alternative 3)
- CAII (Alternatives 2 and 3)
- All areas Feb, Mar, Apr

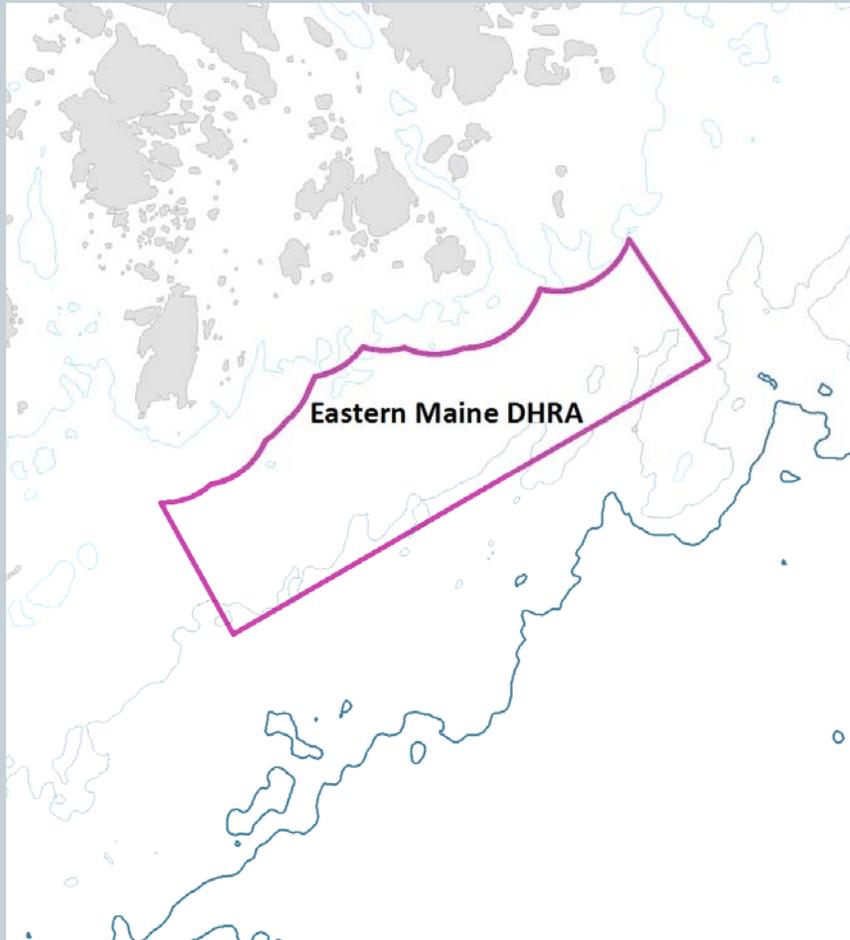
Dedicated Habitat Research Area Alternatives

37

- 1. No Action (No DHRAs designated)**
- 2. Eastern Maine DHRA**
- 3. Stellwagen DHRA**
- 4. Georges Bank DHRA**
- 5. Sunset provision for all DHRAs**

Alternative 2: Eastern Maine DHRA

38

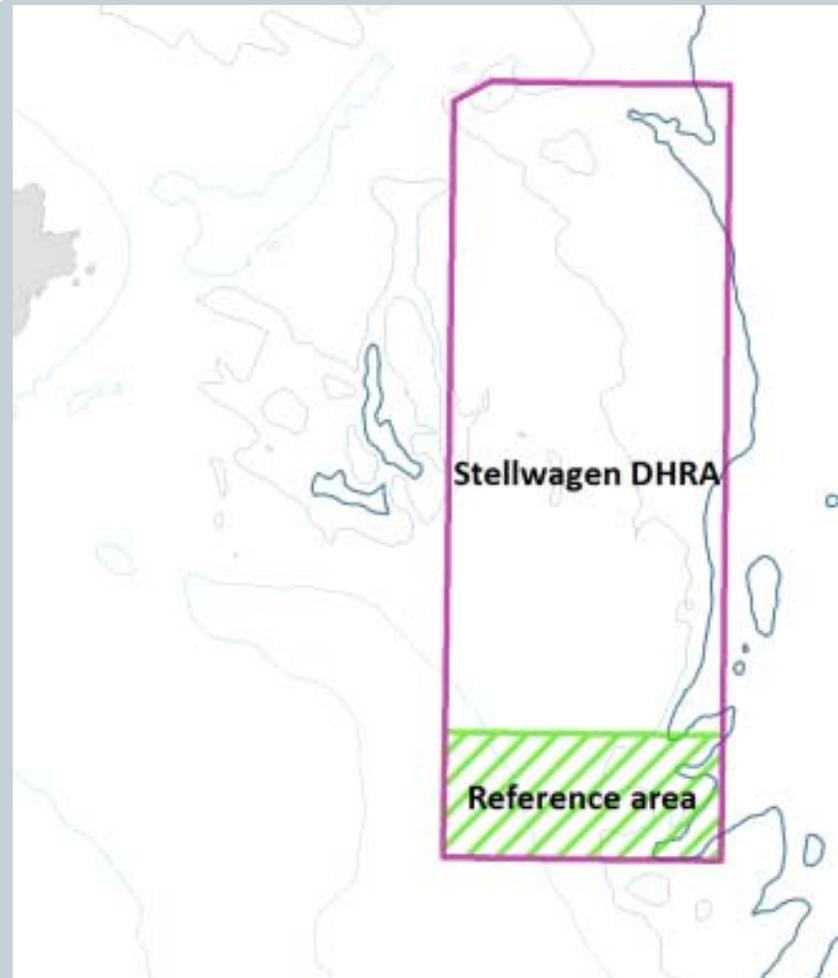


- Same boundaries as Eastern Maine Small HMA
- Closed to MBTG as a DHRA
- Sunset provision would apply if also approved

Alternative 3: Stellwagen DHRA

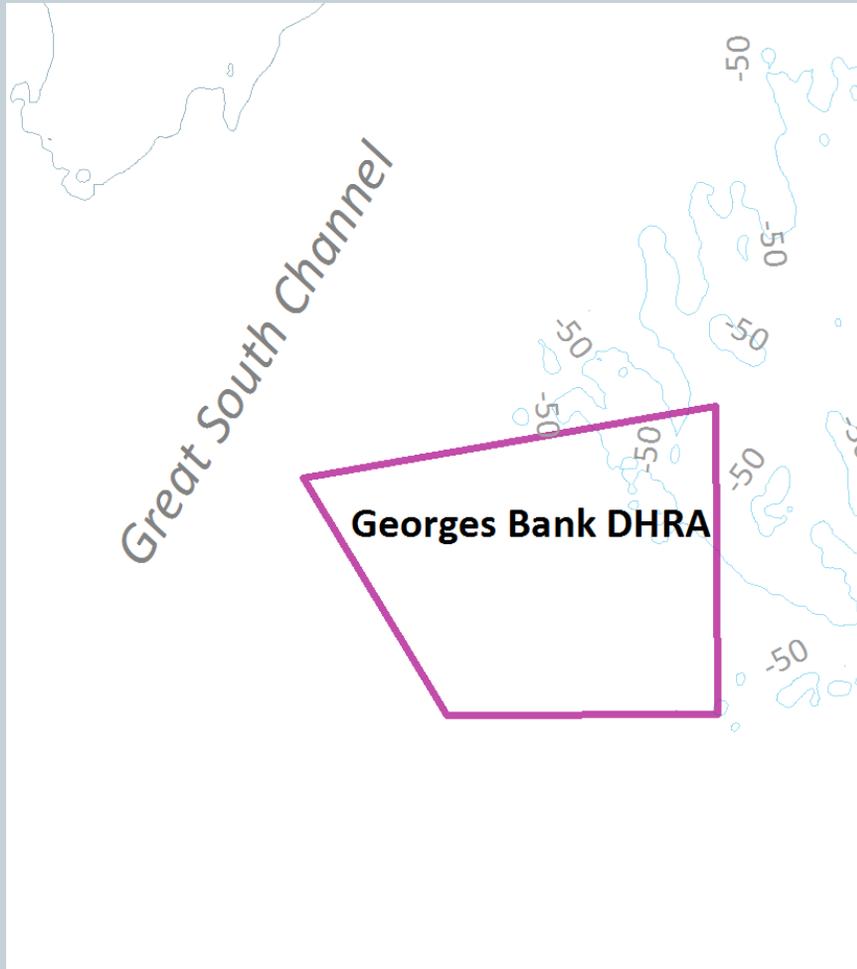
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- Same boundaries as Stellwagen Large HMA, subset of WGOM Habitat Closure
- No action measures throughout that are associated with overlapping WGOM groundfish closure (i.e. no fishing vessels, with various exemptions)
- Southern 5 x 10 nm area as reference area – also closed to recreational groundfishing
- Sunset provision (Alternative 5) would apply if also approved



Alternative 4: Georges Bank DHRA

40



- Same boundaries as existing Closed Area I South Habitat Closure
- Closed to MBTG as a DHRA
- Sunset provision would apply if also approved

Alternative 5: DHRA sunset provision

41

- **Allows administrative removal of a DHRA designation after three years if specific criteria are not satisfied**
- **Criteria relate to active or immediately pending use for specific types of research**
 - See Volume 2, introduction to section 2.4, for research agenda
- **Habitat Management Area or Spawning Area designations and associated restrictions would not be affected if the DHRA is removed**

Framework adjustments and monitoring

42

Alternative 1 (no action)

- Ad-hoc approach to area management revisions in terms of strategy and timing
- No additional monitoring data requested

Alternative 2

- Planned approach to area management revisions
- Additional monitoring data requests identified
- Specific additional frameworkable items identified

Essential Fish Habitat Designations

43

Alternative 1 (no action)

- Designations from OHA1 or initial FMP
- Mostly based on survey data binned by TMS*

** Ten minute square of latitude/longitude*

Updated designations – alternatives selected in 2007

- Mostly based on survey data binned by TMS and limited to appropriate depth and temperature limits
- Additional years of federal survey data, plus state survey data inshore

Habitat Areas of Particular Concern

44

No action alternatives

- Atlantic salmon HAPC – Maine rivers
- Atlantic Cod HAPC – northern edge of GB

Preferred alternatives – selected in 2007

- Inshore juvenile cod
- GSC juvenile cod
- Cashes Ledge
- Jeffrey's Ledge/Stellwagen
- Seamounts, canyon and slope areas

Additional slides: analytical approaches by Valued Ecosystem Component

45

- ❖ **Data used in seabed impacts evaluation**
 - ❖ **Groundfish hotspot analysis**
 - ❖ **Economic analysis**

**(Provided for background, will not be
presented at Council meeting)**

Physical and biological habitats

46

- **Data and information developed/reviewed:**
 - Distribution of dominant substrate (data used in SASI and other sources)
 - High/low energy characterization
 - Habitat impacts literature → SASI vulnerability assessment
 - Habitat vulnerability maps by gear type and habitat vulnerability by management area
 - Realized adverse effects maps by gear type
 - Literature describing fish associations with habitat, especially seabed habitats, and how habitat contributes to fish survival and growth
 - Published literature and results of a NE region pilot study related to gear modifications as they relate to habitat conservation

Data used: groundfish hotspots

47

Surveys	Characteristics
NMFS spring, fall, and winter trawl	2002-2012
NMFS summer dredge	All good tows, random and non-random
NMFS summer shrimp	Size threshold based on aggregate age-length key by species
MADMF spring and fall trawl	
ME-NH spring and fall trawl	
Industry based survey for cod, yellowtail flounder, and monkfish	

Age 0/1 groundfish hotspots

48

- **Youngest fish represent a critical life stage that relies on quality habitat**
 - Older juvenile fish may not be mature, but are generally less reliant on habitat structure
 - Age 0/1 groundfish are generally not captured by commercial fishing gears
- **Hotspot analysis to identify clusters of tows with significantly above average number per tow**
 - Standard GIS procedures
 - Hurdle model adjustment to account for tows with no catch, proportions within strata
 - Hotspots identified for each species and survey type
 - Hotspots summed across species and survey type in 10 km grids

Age 0/1 groundfish hotspots

49

- **Weights assigned to each stock:**
 - Stock status, ratio of biomass to B_{msy} (0.46-28.82)
 - Formation of sub-populations (scale of 1-3)
 - Evidence of resident populations (scale of 1-2)
 - Degree of affinity for coarse and hard substrates (scale of 1-3)
 - Means across stocks substituted for unknown data

Age 0/1 hotspot weights by stock

50

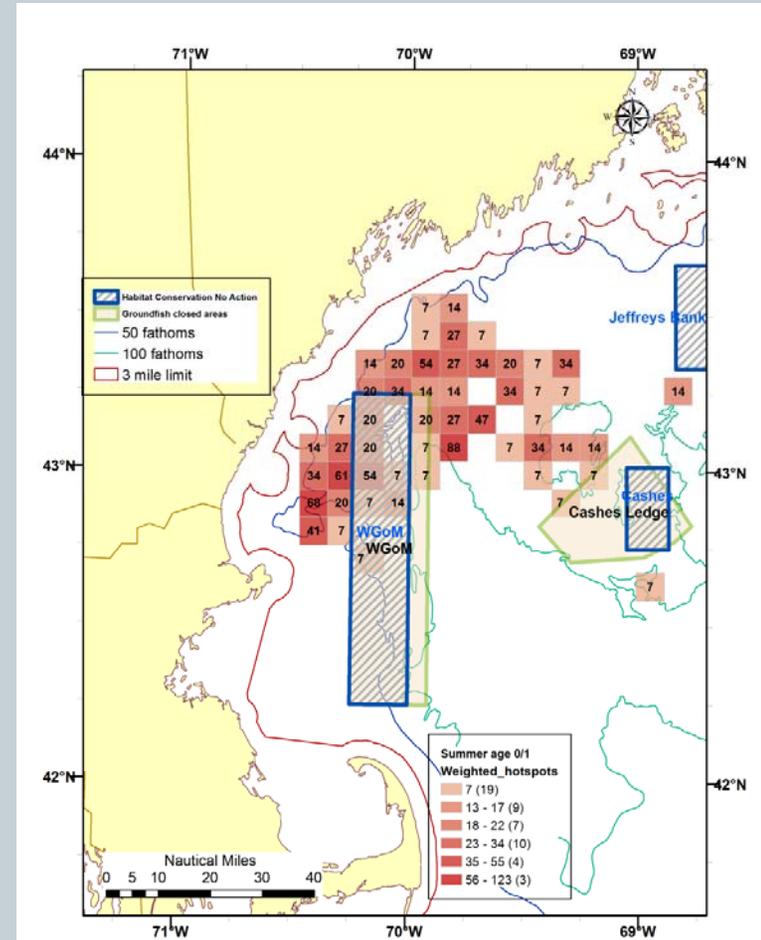
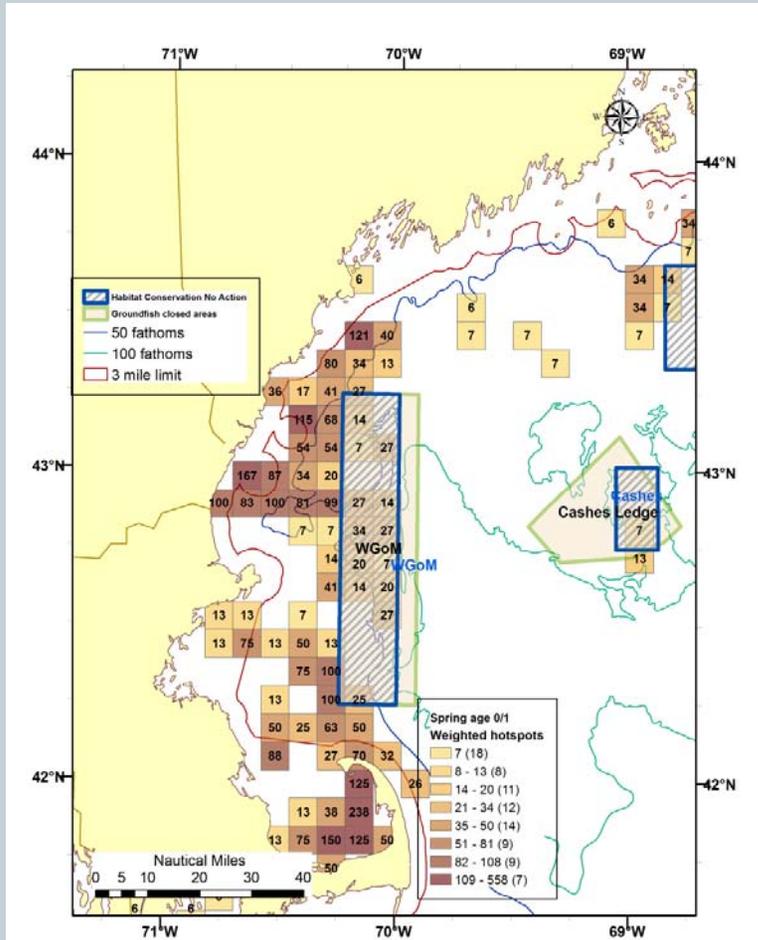
Atlantic halibut (34.66)	Ocean pout (16.88)
GB cod (20.11)	GB yellowtail flounder (13.39)
GOM cod (12.53)	SNE/MA winter flounder (12.17)
GOM winter flounder (10.04)	Atlantic wolffish (8.99)
Witch flounder (8.45)	Northern windowpane flounder (8.31)
CC/GOM yellowtail flounder (8.21)	GB winter flounder (7.22)
Redfish (6.76)	GOM haddock (6.71)
Pollock (6.46)	White hake (6.04)
GB haddock (5.75)	American plaice (5.54)
Southern windowpane (5.52)	SNE/MA yellowtail flounder (4.77)

All large-mesh juveniles – weighted hotspots

Spring

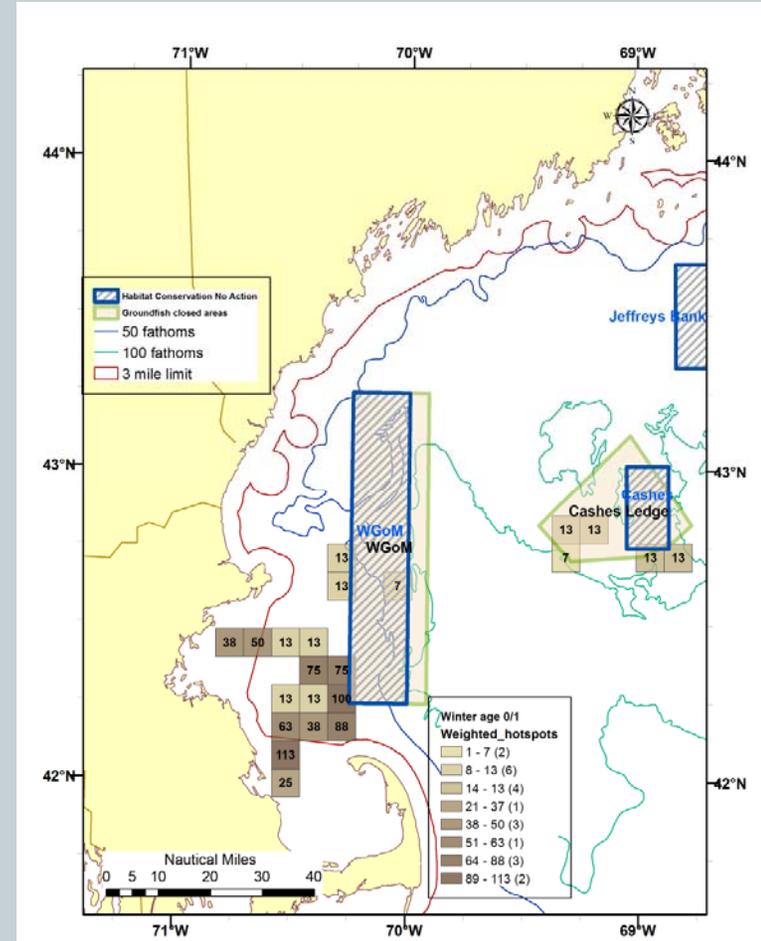
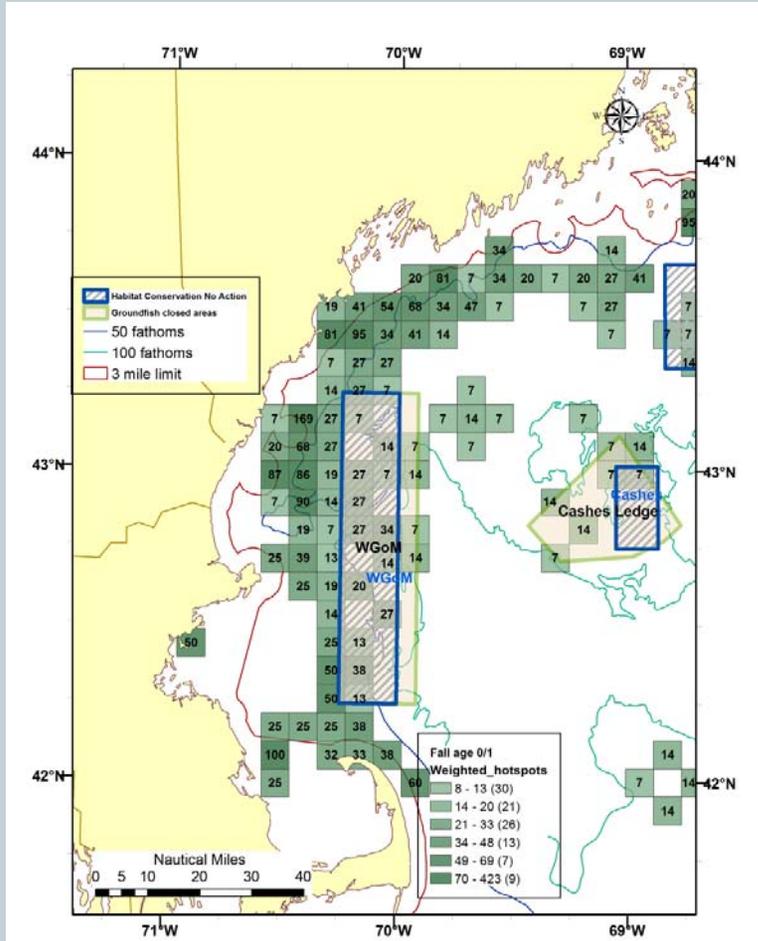
Summer

51



Fall

Winter

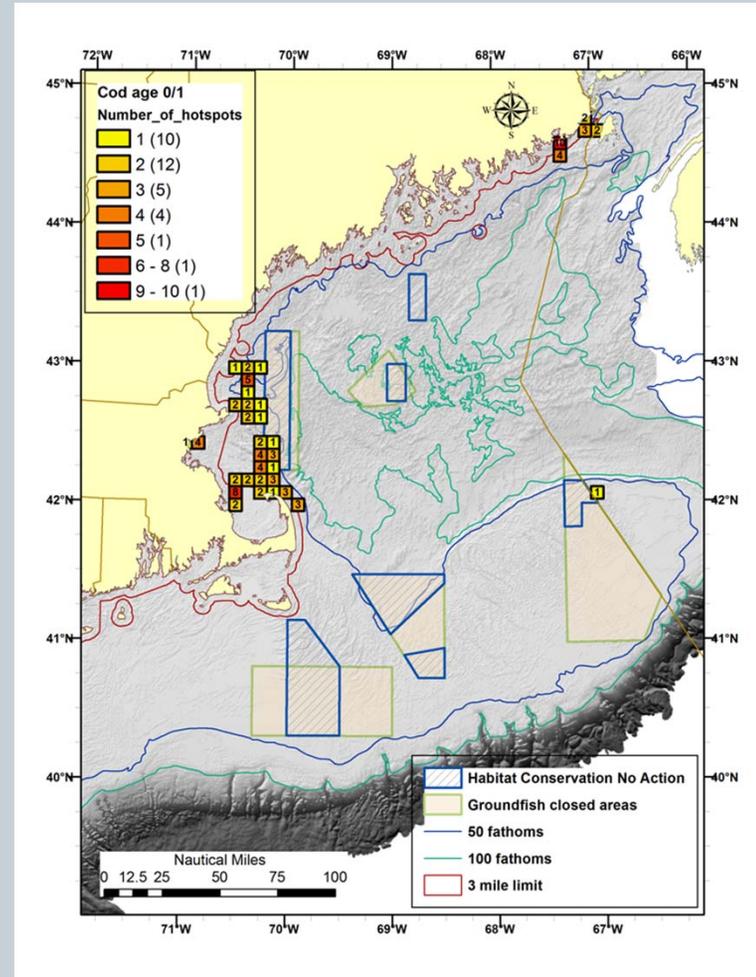
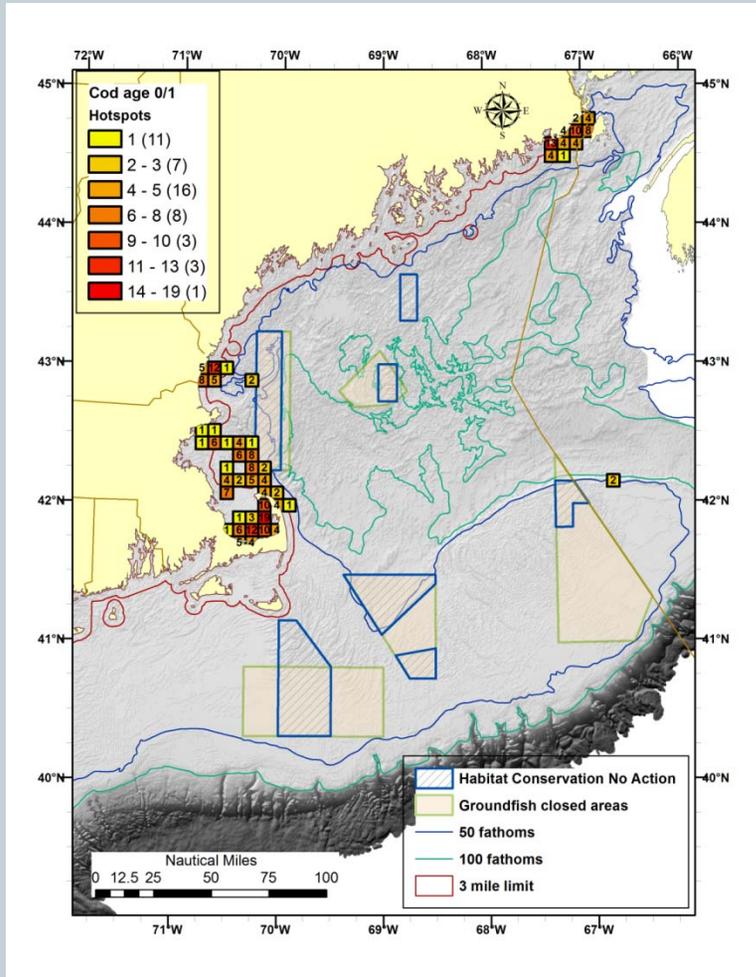


Cod hotspots only – no weighting

53

Spring

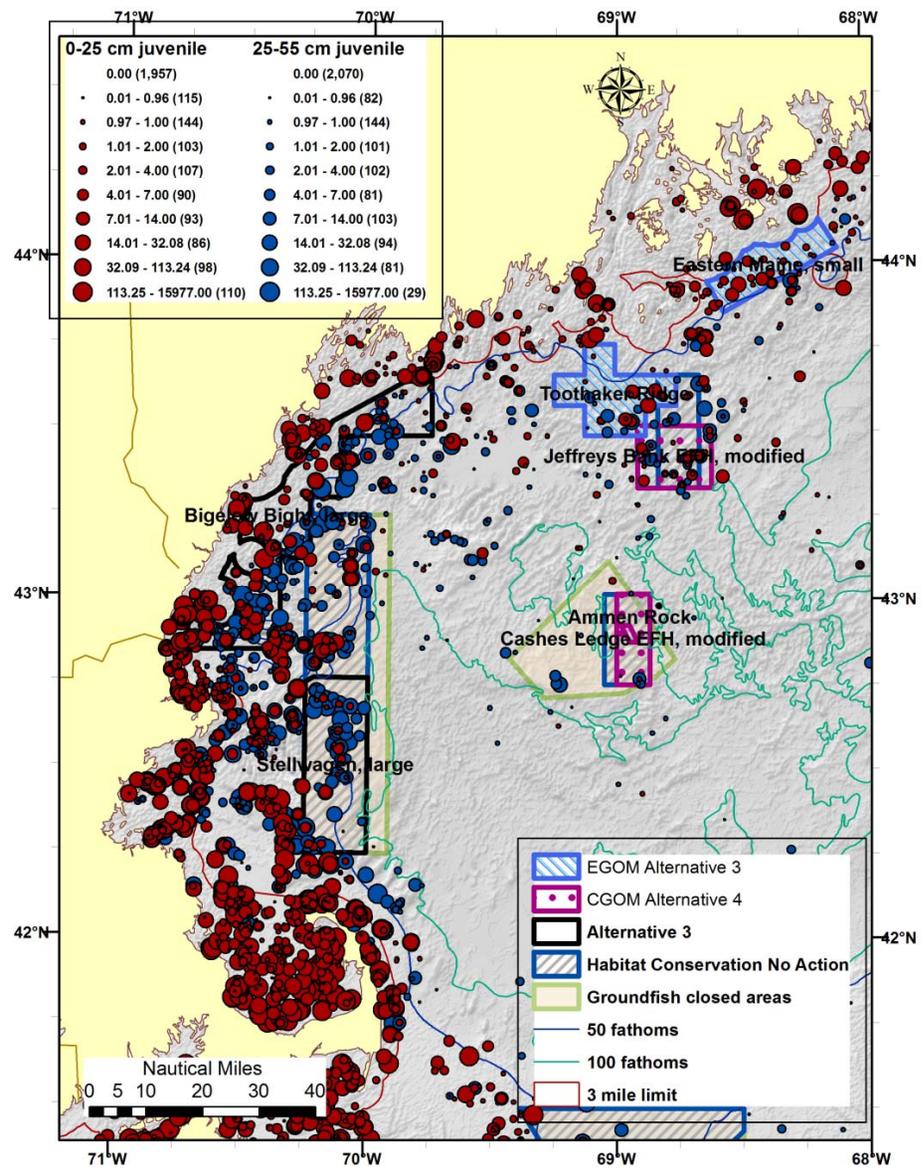
Fall



Cod distribution

Red = smaller juveniles

Blue = larger juveniles



Large spawner groundfish hotspots

55

- **Consideration of timing and location of spawning events**
 - Short period when fish are ripe; survey window mismatches
 - Maturity data
 - Acoustic tagging (MADMF) existing and ongoing studies
 - Industry based surveys (cod, yellowtail flounder)
 - Spawning grounds identified in published research; historic cod spawning areas
 - Commercial data not available in closed areas; no biological data other than lengths
- **Oldest mature fish are highly fecund and exhibit mature spawning behavior**
 - Largest fish representing 20% of 2002-2012 biomass
 - Some smaller fish are also mature

Large spawner groundfish hotspots

56

- **Hotspot analysis to identify clusters of tows with significantly above average number per tow**
 - Standard GIS procedures
 - Hurdle model adjustment to account for tows with no catch, proportions within strata
 - Hotspots identified for each species and survey type
 - Hotspots summed across species and survey type in 10 km grids
- **Stock weights assigned, equal weights to following factors**
 - Stock status, ratio of biomass to B_{msy} (0.46-28.82)
 - Formation of sub-populations (1-3)
 - Evidence of resident populations (1-2)
 - Season(s) when spawning occurs
 - Means across stocks substituted for unknown data

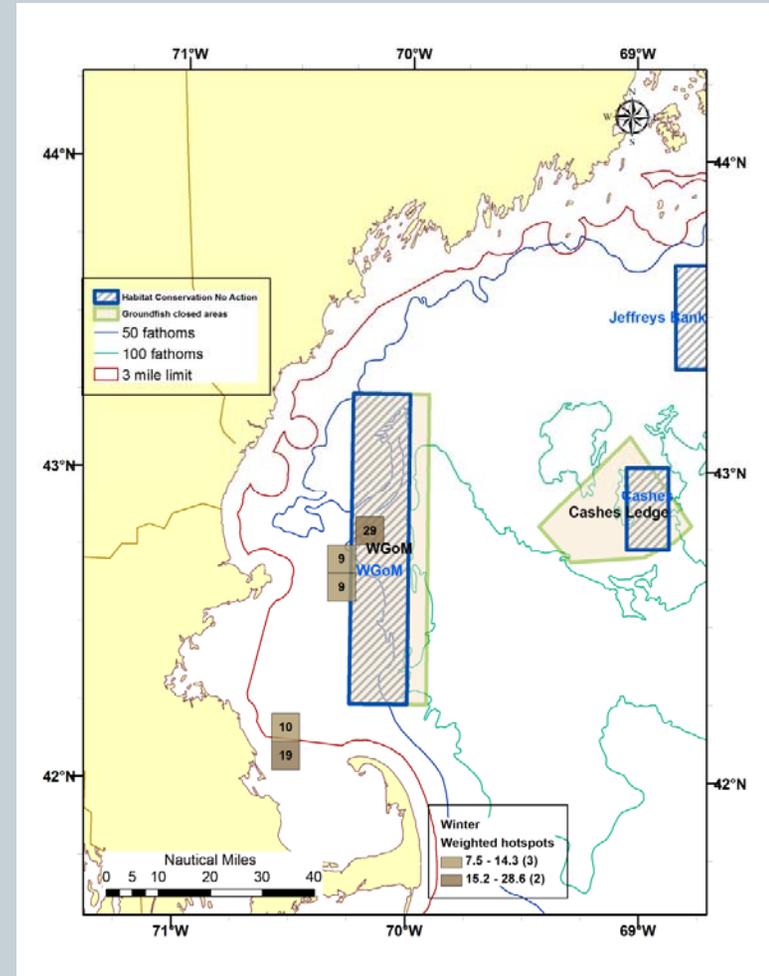
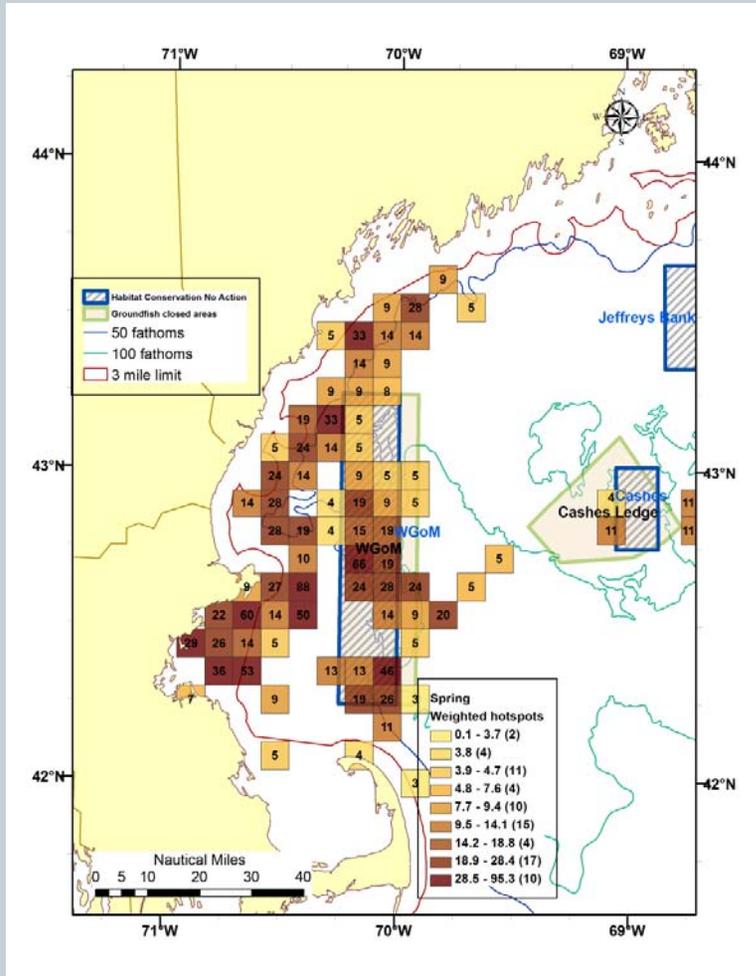
Stock weights

57

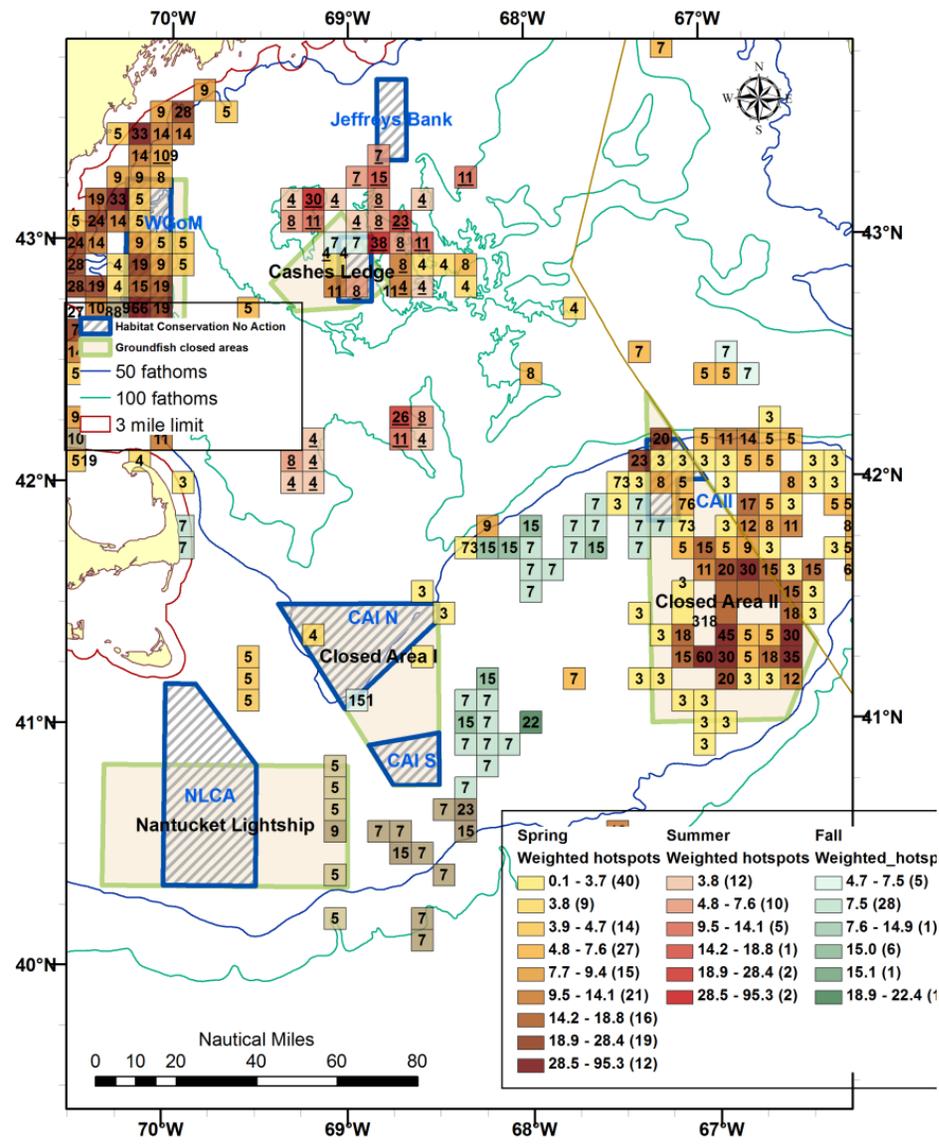
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CC/GOM yellowtail flounder (7.2)	Pollock (6.46)
GB winter flounder (6.2)	White hake (5.0)
American plaice (4.5)	Southern windowpane (4.5)
Redfish (3.8)	SNE/MA yellowtail flounder (3.8)
GOM haddock (3.7)	GB haddock (2.7)

Spring

Winter



Georges Bank
 Spring – brown
 Summer – red
 Fall - green



Additional economic impact analysis slides

60

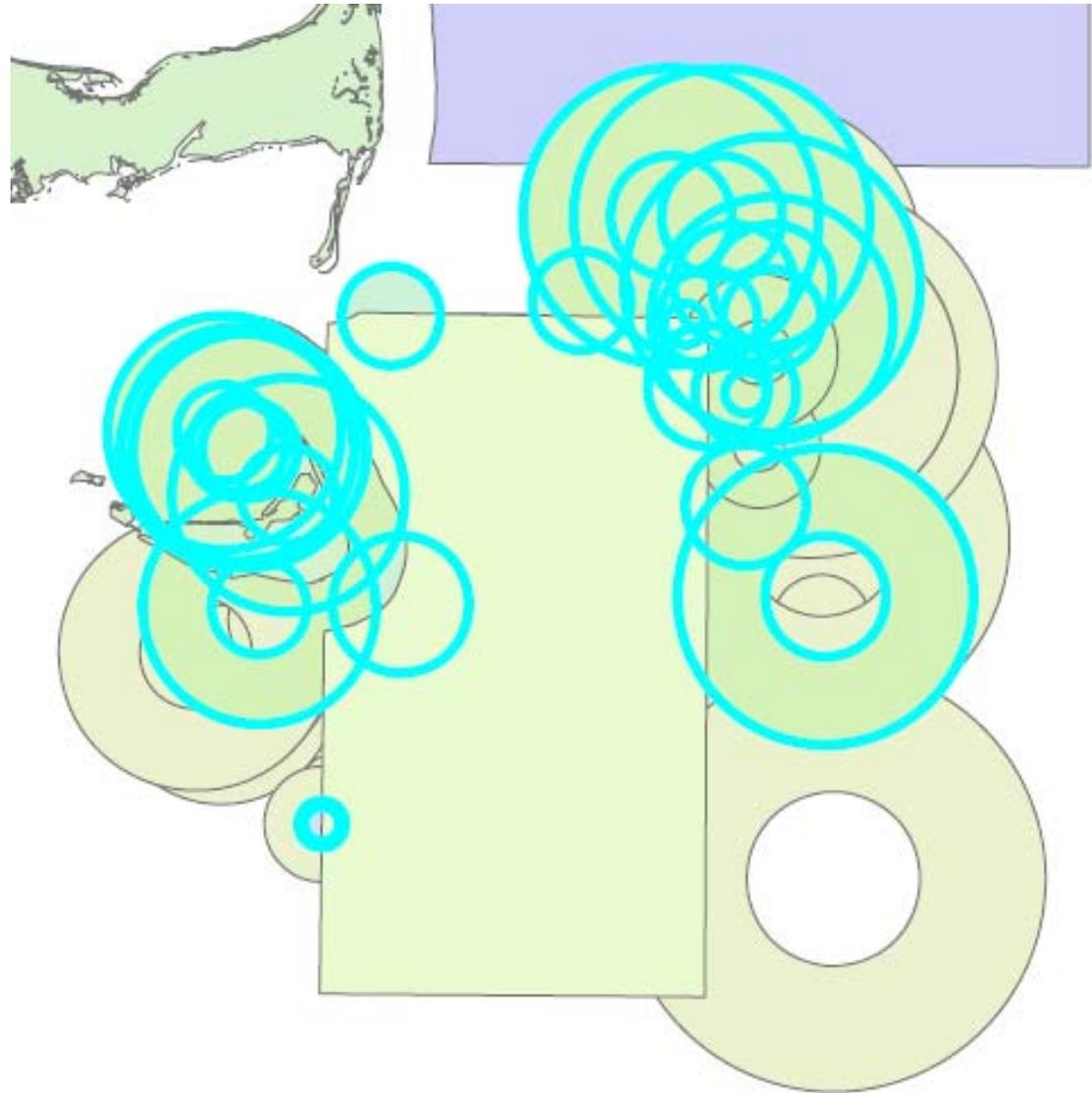
- ❖ VTR approach
- ❖ Sample VTR results
- ❖ Sample VMS results
- ❖ Sample recreational fishery results

VTR analysis

Rather than a single point per trip, infer revenue to confidence bands

Bands developed by comparing VTR data to observer data

Example:
confidence bands for Nantucket west



VTR example average annual revenue by gear: Large Eastern Maine

2005 - 2012

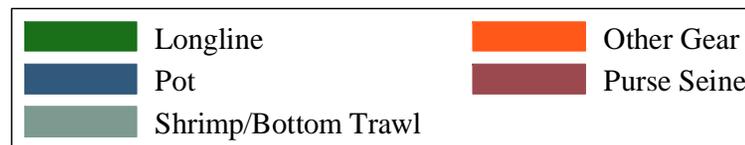
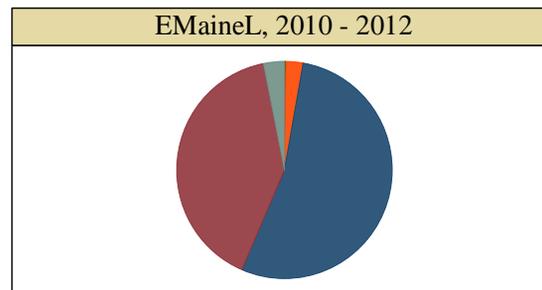
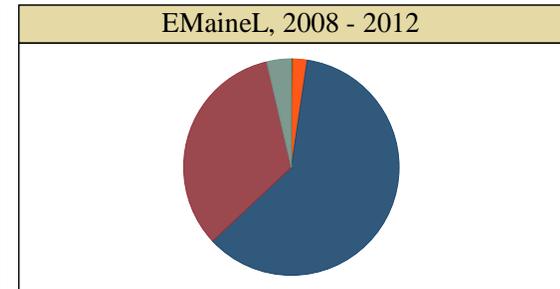
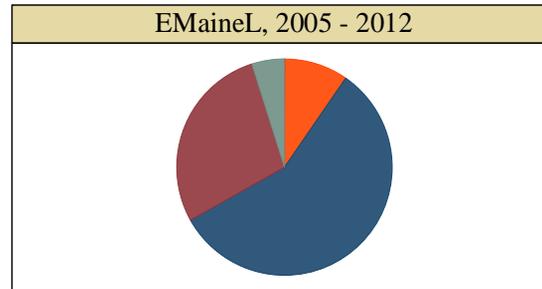
\$ 2,076,300;

2008 - 2012

\$ 2,059,535;

2010 - 2012

\$ 2,719,470



Graphs by Area and years

Example VTR table: MBTG in Large E. Maine

63

Gear	Vessel Size	Mean Revenue	Median Revenue	SD Revenue	Max Revenue	Min Revenue	Individ.	Trips	Years
Shrimp/Bottom Trawl	L	20,136	23,112	11,945	41,552	6,027	11	45	2005 - 2012
Shrimp/Bottom Trawl	L	17,546	8,548	15,037	41,552	6,027	11	44	2008 - 2012
Shrimp/Bottom Trawl	L	24,385	23,164	16,590	41,552	8,439	14	57	2010 - 2012
Shrimp/Bottom Trawl	M	49,066	40,277	21,732	81,638	23,883	17	107	2005 - 2012
Shrimp/Bottom Trawl	M	34,236	36,280	7,183	42,249	23,883	11	71	2008 - 2012
Shrimp/Bottom Trawl	M	30,884	30,463	7,221	38,306	23,883	10	68	2010 - 2012
Shrimp/Bottom Trawl	S/U	31,899	26,100	20,205	74,381	12,686	15	135	2005 - 2012
Shrimp/Bottom Trawl	S/U	23,183	18,738	12,598	44,442	12,686	14	126	2008 - 2012
Shrimp/Bottom Trawl	S/U	28,164	24,087	14,671	44,442	15,962	14	142	2010 - 2012

Example VMS table: Large E. Maine

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Gear	Years	Total Effort	Individ uals	Mean Effort	Median Effort	SD Effort
Bottom Trawl	2005 - 2012	19.30	11.88	1.63	0.12	5.12
Bottom Trawl	2008 - 2012	12.21	9.20	1.33	0.20	2.80
Bottom Trawl	2010 - 2012	3.42	6.67	0.51	0.04	1.01
LA Scallop	2005 - 2012	0.04	0.75	0.05	0.01	0.08

Example recreational revenue: Large E. Maine

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Years	Annual Revenue	Individuals	Anglers	Mean Revenue	Median Revenue	SD Revenue
2006 - 2012	1249.76	0.57	7.86	2187.09	1970.98	2206.69
2008 - 2012	1719.84	0.60	10.80	2866.40	3430.45	2129.65
2010 - 2012	1722.92	0.67	10.33	2584.38	2584.38	2931.49