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Regional Administrator
National Marine Fisheries Service
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Submitted via email to: nmfs.gar.OA2.DEIS@noaa.gov

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RE: OA2 DEIS Comments

Dear Regional Administrator Bullard:

We are writing to provide comments to the National Marine Fisheries Service (NOAA Fisheries) on the Draft Environmental Impact Statement (DEIS) and associated alternatives for the Omnibus Essential Fish Habitat Amendment 2 (Amendment). These comments are pursuant to NOAA Fisheries Notice of Public Hearing published in the Federal Register on October 10, 2014.

I. INTRODUCTION

The New England Fishery Management Council (NEFMC) adopted its first Omnibus Habitat fishery management plan in 1998, amending various fishery management plans under its jurisdiction including groundfish and sea scallops. In a lawsuit challenging the adequacy of the 1998 Plan, the U.S. District Court for the District of Columbia in September 2000 found the Plan to be legally inadequate, on the basis that there was an inadequate alternatives analysis of the federal action.¹ The current Amendment, some fourteen years in the making and after much delay, comprises the effort by the NEFMC to finally meet its legal obligations under section 303(a)(7) of the Magnuson-Stevens Fisheries Conservation and Management Act, 16 U.S.C. § 1801 *et seq.* (MSA).

The purpose of this Amendment, as with its predecessor, is to “describe and identify essential fish habitat ..., minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of

¹ *American Oceans Campaign v. Daley*, 181 F. Supp. 2d 1 (D.D.C. 2000).

such habitat.” 16 U.S.C. § 1853(a)(7). “Essential fish habitat” (EFH) is a statutorily defined term that refers to “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.”² Unfortunately, the Amendment again fails to examine a reasonable range of alternatives and suffers from additional major substantive deficiencies. Conservation Law Foundation (CLF) remains concerned these issues will not be addressed appropriately before the Amendment is submitted to NOAA Fisheries for final action.

It would be difficult to overstate the critical importance of successfully tackling EFH protection in New England at this time. Numerous groundfish stocks with very strong habitat affinities including both Georges Bank and Gulf of Maine cod and yellowtail flounder are in a time of reproductive and population crisis. The NEFMC has the dubious distinction of maintaining the largest number of overfished stocks and stocks subject to overfishing of any regional fishery management council. Stock assessments exhibit significant retrospective patterns and there is no certainty with respect to the cause of these retrospective patterns and uncertainties. The productivity of some stocks of cod and flounder has significantly declined from their historical metrics. The Amendment and DEIS proposes to openly vastly more square mileage of known cod areas to fishing, perhaps exacerbating the risks of increased underreporting of caught, but discarded, cod, a potential factor in the retrospective patterns that are now characteristic of those stocks. Assessment scientists, moreover, routinely caution that their assessments may be optimistic in terms of predicting the actual condition of those stocks. With cod, age structure is significantly truncated and weights at age are low. Cod populations may be in a dispensating mode for which extended habitat protections and expanded refuges may be the only viable recovery option.³

Ocean acidification and the effects of climate change on the temperature, salinity, plankton densities and timing, and the patterns of movement of our ocean waters has never been more evident and their implications more uncertain. Ecosystems are in a state of flux with the introduction of new species and changed environmental conditions. At no time in the management of our oceans has there been a greater need for precaution to mitigate this ecological uncertainty. Habitat protection has been explicitly recognized by the federal government as the highest priority goal for positioning the nation for the inevitable adaptations

² 16 U.S.C. § 1802(10).

³ *E.g.*, NRC, Committee on Evaluating the Effectiveness of Stock Rebuilding Plans of the 2006 Fishery Conservation and Management Reauthorization Act, *Evaluating the Effectiveness of Fish Stock Rebuilding Plans in the United States* (NAS 2014) at 5.

that climate change will drive. As a partner in the National Fish, Wildlife and Plants Climate Adaptation Partnership, NOAA Fisheries has identified conservation of “habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate” as the number one goal among seven “goals to help fish, wildlife, plants, and ecosystems cope with the impacts of climate change.”⁴

Rather than deliver on the promise improved definition of EFH and enhanced protection of EFH through measures that would provide stability and resilience in the face of these present and future challenges, the NEFMC has developed an Amendment that proposes to drastically reduce defined EFH in New England, drastically reduce the extent of EFH protected, and forego taking any management actions that would further limit allowed trawling and other fishing in areas of the New England waters that have served for nearly twenty years as refuges for numerous commercial fish and other protected marine species. Such a course of action would be both completely inappropriate as a legal matter and, perhaps more importantly, would put the region’s goal of producing valuable, diverse, and sustainable fisheries producing consistently at optimum yield even further from reach. As a group of marine scientists has warned in comments filed during this public comment process: “Plans that may have appeared appropriate a decade ago when the Amendment was initiated must be rigorously re-evaluated with a context that includes a changing climate and the associated stresses on marine ecosystems. The rapid deterioration of some critical fish stocks, combined with the rising stress from environmental change, **makes reductions in habitat protection highly unwise and unsupportable by today’s scientific understanding.**”⁵

A. The Beneficial Relationship Between Habitat Protection and Resource Health and Productivity is Scientifically Established and the Foundation of the Magnuson-Stevens Act’s EFH Requirements.

The positive, beneficial relationship between effective habitat protection and a healthy ocean producing optimum yields from sustainable fish stocks is recognized and has been emphasized by Congress, NOAA, and the science community here in the U.S. and worldwide. For its part, Congress unanimously enacted substantial changes to the Magnuson-Stevens Act in

⁴ National Fish, Wildlife and Plants Climate Adaptation Partnership (2012). Chapter 3: Climate Adaptation Goals, Strategies & Actions. <http://www.wildlifeadaptationstrategy.gov/strategy.php>

⁵ Letter from Dr. Les Kaufman *et al.* submitted to Regional Director John Bullard for the public record in the Amendment on December 4, 2014 (147 Scientists Letter) at 9 (emphasis added)(Attachment 3).

1996, in part, to emphasize the importance of EFH and to mandate its protection. As noted above, the Sustainable Fisheries Act⁶ added section 303(a)(7) to the mandatory provisions required for all fishery management plans. “One of the main thrusts of the SFA was the long-term protection of essential fish habitat.”⁷ Congress properly recognized EFH protections as an economic and social issue: “One of the greatest long-term threats to the viability of commercial and recreational fisheries is the continued loss of marine, estuarine, and other aquatic habitats.”⁸

It is relevant to note that EFH is broadly defined by the Magnuson-Stevens Act to include “water *and* substrate.”⁹ It is not just the ocean floor and features of the ocean’s floor—the predominant focus of the DEIS/Amendment—that constitute EFH; the water column is essential habitat as well. In NOAA Fisheries’ implementing guidelines, moreover, all forms of substrate are included within the definition of EFH: “sediment, hard bottom, structures underlying the waters, and associated biological communities.”¹⁰ As has been repeatedly pointed out to the NEFMC and staff over the course of this Amendment, the narrow focus of management attention and analytical approaches on the most highly vulnerable complex rocky habitats and the virtually uniform failure to acknowledge the potential for adverse effects to sandy or mud bottoms is a major deficiency of the Amendment/DEIS and is precisely the sort of risk *prone*, not *adverse*, management style that has unfortunately characterized the NEFMC from its beginnings.

The goal of EFH protection is fisheries that sustainably and predictably produce optimum yield, a goal that is only achievable by managing for **healthy marine ecosystems**. NOAA Fisheries defines such an ecosystem to be one “where ecological productive capacity is maintained, diversity of the flora and fauna is preserved, and the ecosystem retains the ability to regulate itself. Such an ecosystem should be similar to comparable, undisturbed ecosystems with regard to standing crop, productivity, nutrient dynamics, trophic structure, species richness, stability, resilience, contamination levels, and the frequency of diseased organisms.”¹¹ The significance of benthic habitats as EFH is not driven solely by the grain size of the sediments.

The adverse affects that are to be minimized to the extent practicable in the Amendment are any that would interfere with the restoration and maintenance of a healthy marine ecosystem

⁶ Pub. L. No. 104-297 (1996)

⁷ *American Oceans Campaign*, 183 F. Supp. at 5.

⁸ 16 U.S.C. § 1801(a)(9).

⁹ 16 U.S.C. § 1802(10).

¹⁰ 50 C.F.R. § 600.10.

¹¹ 50 C.F.R. § 600.810(a).

in New England, including fishing and non-fishing activities that adversely affect the ecological productivity of an area, the biodiversity of an area, or the capacity of an area to self-regulate in an ecological sense. It is *not* just about minimizing the physical impacts of fishing gears on hard, complex benthic areas to which much of the focus in the Amendment/DEIS has been limited and that drives virtually all of the habitat management alternatives analysis.

NOAA Fisheries also recognizes that the quality of data and scientific understanding of the roles many of these EFH habitat types play on maintaining productivity and biodiversity is often not well known.¹² The EFH Guidelines specifically call for “risk adversity” when specifying a council’s approach to analyzing EFH because of the limitations of existing scientific knowledge.¹³ As is discussed in more detail below, this is an approach that has been used in the North Pacific and the Pacific Fishery Management Councils in their EFH management planning and has been approved there by NOAA Fisheries.¹⁴ It is not an approach, however, taken by the NEFMC in the Amendment/DEIS where data uncertainty or data gaps have been used to eliminate substrate types from EFH protection and is the polar opposite of a risk adverse approach based on principles of precaution.

The threshold for adverse impact analysis in a management plan is “evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature.”¹⁵ As NOAA Fisheries has explained in its introduction to the EFH regulations, “It is not *appropriate* to require definitive proof of a link between fishing impacts to EFH and reduced stock productivity before Councils can take action to minimize adverse fishing impacts to EFH to the extent practicable.”¹⁶

The importance of EFH to fisheries productivity and marine ecosystem health is widely recognized by the scientific community. One hundred fifty-seven marine scientists submitted extensive comments in the public comment period on the Amendment/DEIS, raising “deep concerns” that the Amendment falls “far short” of its goals.¹⁷ CLF adopts their concerns and conclusions here by reference. Their letter provides detailed citation to the scientific literature

¹² See, e.g., 50 C.F.R. § 600.815(a)(iii) & (iv).

¹³ 50 C.F.R. § 600.815(a)(iv).

¹⁴ See pp. 18 – 21 below.

¹⁵ 50 C.F.R. § 600.810(a)(2)(ii).

¹⁶ NOAA FISHERIES Final EFH Regulations, Supp. Information, 67 Fed. Reg. 2354 (1/17/02).

¹⁷ Letter from Dr. Les Kaufman *et al.* submitted to Regional Director John Bullard for the public record in the Amendment on December 4, 2014 (Attachment 3).

supporting the importance of habitat protection. Given the small and restricted areas of many of the Habitat Management Areas (HMAs) and Habitat Areas of Particular Concern (HAPCs) proposed in the Amendment, CLF would draw particular attention in their comments to the recent global literature review of indices of successful habitat protection done by Graham, J. *et al.* in *Nature*.¹⁸

Among the five key features identified in that *Nature* literature review that produce “exponential” conservation benefits that particularly relate in New England’s experience of closed areas are the levels of fishing allowed in the conservation area, the duration of the protections, and the size of the protected area. None of the current closed areas in New England have the benefit of all of the key features identified by the authors of that survey and very few even have one or two of the features. It should come as little surprise, therefore, that the biomass and diversity benefits that should be predicted from effective closed areas are to some degree missing from the New England experience with its current closed areas. The Amendment, however, is focused on *reducing* the benefits those existing closed areas provide rather than *enhancing* them, by advancing what can be charitably called “postage stamps” of symbolic protection. With the limited exception of the eastern Gulf of Maine, there are no significant alternatives expanding the scope of existing protections within current closed areas or expanding the sizes of currently protected areas. A whole domain of alternatives has been ruled out of the Amendment out of hand without any practicability analysis.

The adverse productivity consequences of the Amendment’s failure to appropriately protect and enhance EFH is perhaps most apparent with cod stocks where the age structure of the population has been systematically truncated and most of the older, large and reproductively-superior females have been removed from the population.¹⁹ This truncated age structure is particularly problematic for cod productivity with the additional effects of climate change. Noted scientists have directly pointed to the importance of the relationship between a healthy age structure and the ability of a stock to cope with climate change effects.²⁰ It is only in the closed areas that there are any signs of recovery of a more natural age structure with cod and that phenomenon seems to have emerged only recently, reflecting the relatively short duration of the

¹⁸ Graham, J. *et al.*, Global conservation outcomes depend on marine protected areas with five key features, *Nature* 506: 216-220 (2014).

¹⁹ *E.g.*, Gulf of Maine Atlantic Cod 2014 Assessment Update Report at Table , http://www.nefsc.noaa.gov/saw/cod/pdfs/GoM_cod_2014_update_20140822.pdf 5.

²⁰ *E.g.*, NRC, *supra*, at 92. 93-94. Gulf of Maine Atlantic Cod 2014 Assessment Update Report at Table , http://www.nefsc.noaa.gov/saw/cod/pdfs/GoM_cod_2014_update_20140822.pdf 5.

New England closed areas. Dr. Graham Sherwood of the Gulf of Maine Research Institute has reviewed data comparing closed areas to open areas in New England and has found that (1) fish older than five years old are eight times more likely to be found in closed areas than in the open areas he studied and that (2) the cod in the closed areas tend to be healthier.²¹

If there is any hope to halting the further decline of cod spawning stock biomass, approaches to rebuilding age structure of the stocks fish through expansion of no-take cod EFH HMAs and other management measures focused on increasing productivity should have been analyzed in the Amendment and proposed as an alternative in the DEIS as the only viable management tool suitable for that purpose. Instead, the primary focus of the Amendment on the currently “closed” areas of known cod presence such as Georges Bank and Cashes Ledge is on reducing the limited existing protections even further.

The treatment of cod EFH in the Amendment/DEIS is just one example of the ways in which the effort here falls well short of both what is legally required and what is needed to restore productivity to many of New England’s fisheries and to meet the Magnuson-Stevens Act requirements for minimizing adverse impacts *caused by* fishing, not just by fishing gears. The following comments will provide more detail with respect to CLF’s specific concerns.

B. The DEIS Must Identify a Broad Range of Feasible Alternatives

The National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321-4370h, requires federal agencies to fully consider the environmental effects of proposed major actions such as the Amendment.²² The central purpose of NEPA is to ensure that both decision-makers and the public are well-informed about the potential adverse environmental effects of proposed action before any action is taken.²³ The NEPA process requires a federal agency such as NOAA Fisheries to take a “hard look” at the potential environmental impacts associated with its proposed action as well as fully investigating alternative actions that might reduce or mitigate those impacts.²⁴

²¹ <http://www.gmri.org/news/waypoints/role-closed-areas-maintaining-cod-health>.

²² *Delaware Riverkeeper Network v. FERC*, 753 F.3d 1304, 1309 (D.C. Cir. 2014).

²³ *See, Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989)(NEPA ensures that the agency will “carefully consider detailed information concerning significant environmental impacts” and that such information is available to the public); *accord, Baltimore Gas & Electric Co. v. NRDC*, 462 U.S. 87, 97 (1983)..

²⁴ *See, e.g., Flaherty v. Bryson*, 850 F. Supp 2d 38, 43-44 (D.D.C. 2013).

If a proposed action is likely to have a significant impact on the environment, then the agency must prepare an environmental impact statement (EIS) in which the environmental impacts of the proposed action and a comprehensive range of feasible alternatives must be presented in comparative form, “sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public.”²⁵ NOAA Fisheries must “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.”²⁶ An EIS is prepared in two stages – a draft EIS (DEIS) and a final EIS. A DEIS “must fulfill and satisfy to the fullest extent possible the requirements established for final statements in section 102(2)(C) of the Act.”²⁷ NEPA’s alternatives analysis component is “the heart of the [EIS].”²⁸ That analysis must in part “[r]igorously explore and objectively evaluate all reasonable alternatives . . . and [i]nclude the alternative of no action.”²⁹ While “[r]easonable forecasting and speculation is . . . implicit in NEPA,” it does not demand alternatives that are “not meaningfully possible.”³⁰

The DEIS for this Amendment fails to meet these fundamental NEPA requirements. Many of the alternatives that were discussed by Council staff and are in the record of this DEIS have simply been discarded out of hand for analysis by the NEFMC without explanation.³¹ The Council has allowed its process to be overly influenced by members of the industry, including Council members themselves, whose self-interested and anecdotal input in the process of developing alternatives rendered alternatives that are a mere shadow of what the science and staff advisors originally put forth, not to mention current conditions. These significant modifications to proposed alternatives occurred prior to, and without the guidance of, any analysis of the potential impacts or the practicability of the proposed alternatives.

²⁵ 40 C.F.R. § 1502.14.

²⁶ 42 U.S.C. § 4332(2)(E). NOAA Fisheries’ regulations emphasize its duty to prepare an EIS that adequately informs the public of the environmental impacts of the proposed action: “An EIS must provide a full and fair discussion of significant environmental impacts.” (National Oceanic and Atmospheric Administration Administrative Order 216-6, hereafter “AO 216-6”) AO216-6 § 5.04.a.1

²⁷ 40 C.F.R. § 1502.9(a).

²⁸ 40 C.F.R. § 1502.14; 42 U.S.C. § 4332(2)(c)(iii).

²⁹ 40 C.F.R. § 1502.14.

³⁰ *Scientists’ Inst. for Pub. Info, Inc. v. Atomic Energy Comm’n*, 481 F.2d 1079, 1082 (D.C. Cir. 1973).

³¹ See DEIS, Vol. 3, pp. 137-44.

The result of that process is that several alternatives are inherently at odds with the purpose, intent and requirements of the MSA's EFH provisions, including the "no closure," gear modification alternatives and the surf clam dredge options. The "no closure" alternative is not only legally infeasible and therefore inappropriate for the DEIS, but it also has the effect of skewing the starting range of alternatives at such an extreme end of the scale that the breadth of the remaining alternatives is severely narrowed to the point of failing to comply with NEPA mandates. With the range narrowed by the extreme polarity of the "no closure" alternative, the postage stamp industry-driven alternatives are put forth as a "reasonable" and "feasible" alternative to this unreasonable beginning. The consequence of this destined-to-fail process is a series of proposed alternatives, particularly in the CGOM and Georges Bank sub-regions, that so severely reduce the size and extent of protection from HMAs that they are not feasible relative to accomplishing the purposes and objectives of the Amendment and cannot comply with NEPA.

The alternatives analysis in the DEIS is further flawed by its lack of consistency in comparing alternatives. As discussed in more detail below, in certain sections alternatives are combined in groups of "no action" alternatives or "preferred" alternatives and their collective impacts compared to other alternatives, rather than providing the ability to compare and contrast individual alternatives against each another specifically. Similarly, in certain sections alternatives are compared to an undisclosed "baseline," while in others new alternatives are compared against the existing "no action" alternatives. In yet other sections' alternatives are each compared against others within the sub-region.

We will provide two examples here. In the discussion of the Alternative 1/No Action for the Cashes Ledge for the Central Gulf of Maine, the DEIS indicates the following:

Alternative 1/No Action has highly positive impacts on seabed habitats relative to Alternative 2 and relative to Alternatives 3 and 4 Options 3 and 4 (see discussion in the following sections). **Alternative 1/No Action has slightly negative impacts relative to Alternative 3 Options 1 and 2, and neutral impacts relative to Alternative 4 Options 1 and 2, assuming the objective is to protect the most vulnerable seabed habitat types (see additional discussion below).**³²

³² DEIS, Vol 3, p. 221 (emphasis added).

In the following discussion of Alternative 4, Options 1 and 2, the DEIS provides the following:

Alternative 4 areas also efficiently encompass vulnerable seabed types, but the alternative does not provide any protection for Fippennies Ledge or Platts Bank. **Alternative 4, Options 1 and 2 would have a moderately positive impact on seabed habitats overall, and a slightly negative impact relative to Alternative 1/No Action or Alternative 3** because these areas are not included.³³

One section indicates that Alternative 1 has neutral impacts to Alternative 4 Options 1 and 2 and the other section indicates that Alternative 1 has slightly positive impacts to Alternative 4 Options 1 and 2. The internal inconsistency we raise here by way of example does not even begin to explain how Alternative 4 Options 1 and 2--an alternative that opens up 70% of another alternative to active mobile fishing gears without restriction--would only have either neutral or slightly negative benthics impacts in comparison to Alternative 1, the more restrictive alternative. The only explanations, a fundamental flaw in the entire DEIS/Amendment, are the dual assumptions that there can be no adverse effects in any of the alternatives that call for opening those mud or sandy habitats, regardless of the adequacy of the underlying analytical data base or the science, and that by opening up those habitats other unspecified “more vulnerable” habitats would be protected from effort displacement.³⁴ This is isn’t a credible analysis.

The second example we offer to demonstrate how impossible it is to understand the choices that are being compared in the DEIS again relates to the Cashes Ledge Area. The DEIS identifies Alternative 4 Options 1 as the preferred alternative.³⁵ That alternative opens virtually all of the Jeffreys Bank and the Cashes Ledge Closed Areas to all fishing and creates an HMA on Cashes Ledge that restricts bottom-tending mobile gear. Later in the DEIS, in the discussion of spawning closure alternatives, the preferred alternative for the CGOM is the No Action/Alternative 1 that keeps the Cashes Ledge Closed Areas in place and in effect year-round.³⁶ As conflicting and confusing as these two different preferred alternatives for the Cashes Ledge Closed Area may be, the issue is

³³ DEIS, Vol. 3, p. 223 (emphasis added)

³⁴ See DEIS, Vol. 4, p. 13.

³⁵ DEIS, Vol. 3, p. 56.

³⁶ DEIS, Vol. 3, p. 101 and Table 17.

further clouded by an earlier statement in the spawning alternatives sections that “[a]ll of the spawning protection areas described in this section would be defined on a seasonal basis,”³⁷ even though the alternative indicates it is a year-round closure.

The “fate” of the Cashes Ledge Closed Area, i.e. whether it is a preferred alternative to protect spawning fish or whether it is to be opened up despite the negative impacts on spawning fish, is summarized at still a third place in the DEIS, where it is concluded:

No Action [the preferred alternative for spawning protection] ... would also retain the year-round Western Gulf of Maine Closure Area and the Cashes Ledge Closure Area, assuming one or both of these areas is not removed via selection of an alternative set of habitat [STET] management areas. Currently an alternative set of management areas in the central Gulf of Maine is the preferred habitat management alternative for that sub-region, which implies removal of the Cashes Ledge Closure Area.³⁸

While recognizing the challenges of this Amendment, CLF would suggest that as a decision-making tool, this document is in many respects incomprehensible. The lack of consistency and internal contradictions makes the EFH analysis and the range of choices difficult, if not impossible to understand, let alone compare in a clear manner, even for people who have been closely following this process for a decade. The general public is sure to be completely in the dark as to the preferred alternatives and the rationale for their selection. The DEIS should be revised to ensure that every section of the alternatives analysis contains a comparison of the existing conditions (which in most instances is the “no action” alternative) to each proposed new alternative, as well as an ability to compare each new alternative to other new proposed alternatives.

C. Specific Concerns With the DEIS

1. Cashes Ledge Alternatives

³⁷ DEIS, Vol. 3, p. 97 (emphasis added).

³⁸ DEIS, Vol. 3, p. 503.

The DEIS indicates the Council’s selection of Alternative 4 as the “preferred” alternative for the Central Gulf of Maine sub-region. One of the principal implications of Alternative 4 is that it will result in the removal of protection from over 70% of the Cashes Ledge Groundfish Closed Area (Cashes Ledge GCA). The selection of this alternative as the “preferred” alternative is inconsistent with meeting the goals and objectives of the Amendment and is contrary to the substantial record evidence that supports the “no action” Alternative 1 for this sub-region. The Council and NOAA Fisheries must maintain the status quo, including the continued closure of the entirety of the existing Cashes Ledge GCA, or provide a compelling rationale for rejecting Alternative 1/No Action that isn’t in the current analysis or document.

Retaining the existing protections for the Cashes Ledge GCA would also be the appropriate precautionary approach to take in light of the lack of survey data available for this area and the current depleted status of Gulf of Maine cod which demands protection of Gulf of Maine cod EFH within the Cashes Ledge GCA, areas that will benefit cod and other species in their spawning, larval and juvenile stages and that must be a component of any effort to restore resilience to struggling cod populations.³⁹ The Amendment/DEIS recognizes the Cashes Ledge GCA as an important spawning ground.⁴⁰ This is a known cod abundance area as recently as the early 1980’s based on direct observations of scientists like Drs. Robert Steneck and Jon Witman, who did extensive research in the area at that time and there continue to be remnant populations of resident and migratory cod in the Cashes Ledge GCA based on recent research trips by Dr. Witman.⁴¹ This area additionally represents EFH for a wide range of commercial species including haddock, pollock, American plaice and others.

Cashes Ledge GCA is also an area well known for its ability to support a uniquely abundant variety of species and a diverse selection of habitats including steep, kelp-covered ledges, muddy basins and boulder and cobble areas. The DEIS supports these characterizations of Cashes Ledge GCA and reinforces the benefits of these attributes. Any action to remove protections from this area that has benefitted from over a decade of limited benthic disturbance from fishing would be irresponsible and inconsistent with the substance, the goals and the objectives of the Amendment.

³⁹ See *e.g.*, Pershing A et. al., (2013) The future of cod in the Gulf of Maine. Gulf of Maine Research Institute, pp 11-12; Moland E et. al., (2013) Lobster and cod benefit from small-scale northern marine protected areas: inference from an empirical before–after control-impact study. *Proc R Soc B* 280: 20122679.

⁴⁰ DEIS, Vol. 3, p. 101 and Table 17.

⁴¹ Personal communications with Dr. Robert Stenick and Dr. Jon Witman.

a. The Alternative 1/No Action has more positive impacts than all other CGOM Alternatives.

The DEIS provides a detailed analysis of the impacts of the habitat management alternatives proposed for the CGOM and concludes that Alternative 1/No Action that would retain the existing Cashes Ledge GCA and Jeffrey’s Bank Habitat Closed Area (Jeffrey’s Bank HCA) has the most positive cumulative impacts of any of the alternatives proposed in the CGOM sub-region.⁴² Similarly, the cost-benefit assessment in the practicability analysis indicates that Alternative 1 “generally appears to be practicable” as compared to Alternatives 3 and 4 that are only moderately practicable and Alternative 2 which is not practicable.

i. Physical and Biological Environment

The CGOM is characterized generally in the Amendment/DEIS as a sub-region that has higher vulnerability than other areas of the GOM with the ledge and bank features in the existing closed areas of Alternative 1 being among the most highly vulnerable in the sub-region.⁴³ This factors favorably into the need for EFH protection in this sub-region and fully justifies, if not compels, maintaining existing protections that have been in place for more than a decade. The comparison of the vulnerability of the Alternative 1 Cashes Ledge GCA (42.1-62.1) and the preferred Alternative 4 Modified Cashes Ledge (49.7-62.1) indicates erroneously that they are similar.⁴⁴ This comparison fails to account for the fact that data support associated with both of these areas is poor, with 68% of Alternative 1 in the lowest quartile of data support.⁴⁵

Moreover, the estimates of vulnerability for the Cashes Ledge GCA are more likely to be underestimated because the data support within the Modified Cashes Ledge area is better than in the remainder of the Cashes Ledge GCA, and the data sampling from the relatively complex bottom associated with Sigsbee Ridge, the Five Fathom Bunch and the areas off the shelf of Fippennies Ledge is not only limited in scope but also of the less reliable grab sample

⁴² *Omnibus Essential Fish Habitat Amendment 2 Volume 4: EFH and HAPC Designation Alternatives and Environmental Impacts, Draft Environmental Impact Statement*, p. 51, Table 16 and p. 56, Table 18 (Oct. 1, 2014) (DEIS); *Magnuson-Stevens Act Provisions; Essential Fish Habitat (EFH); Final Rule*, 67 Fed. Reg. 2343, 2348 (Jan. 17, 2002).

⁴³ DEIS, Vol 3, p. 216.

⁴⁴ DEIS, Vol 3, p. 218, Table 40 and p. 222.

⁴⁵ DEIS, Vol 3, pp. 217, Table 39. The text of the DEIS appears inconsistent with Table 39 as it indicates that the Modified Cashes Ledge has 65% of its substrate within the “high” data support category. DEIS, Vol 3, p. 221.

methodology.⁴⁶ The bias that results from this lack of data relative to the Cashes Ledge GCA alternative is borne out in the DEIS in various areas including the maps that indicate that data-poor areas are not vulnerable to otter trawls⁴⁷ and the explanations that Cashes Ledge and Fippennies Ledge (two significant geological features within the Cashes Ledge GCA) were not highlighted in the critical LISA analysis that has largely dictated the location of HMAs because they are “relatively small features.”⁴⁸

As to the accuracy of the DEIS maps that depict much of these areas as muddy, the DEIS asserts, without data or record support, that they are based on “general knowledge of sediment distributions in the Gulf of Maine.” Such reliance on unspecified “general knowledge” is misplaced and inappropriate in the context of a DEIS. The DEIS further indicates that the Habitat PDT “identified” 100 meters as the transition point where these rocky substrates become less vulnerable mud, little more than guesswork. To the extent that the model is inadequately populated with sediment data to support an accurate characterization of these areas, the DEIS should indicate as such and a precautionary approach should be taken by the Council and NOAA Fisheries to retain protection of these under-studied areas until further information can appropriately inform any EFH management action associated with them.

Even with these notable data limitations, the DEIS indicates that Alternative 1/No Action reduces the effects of fishing and produces a “highly positive impact on seabed habitats.”⁴⁹ Relative to the other proposed alternatives within the sub-region, the DEIS similarly finds Alternative 1 “highly positive” for seabed impacts while the preferred Alternative 4 is merely neutral.⁵⁰ This contrast is significant given that the purpose of the Amendment is to protect the most vulnerable seabed habitat types and reflects a profound and patently arbitrary inconsistency between the Council’s selection of Alternative 4 for its CGOM preferred alternative and the purposes of this action.

⁴⁶ DEIS, Vol 3, pp. 221, 222 and p. 220, Map 45 includes a small map of the substrates in the Cashes Ledge GCA that inaccurately depicts these hard bottom areas as mud or silt. Another small map on this page depicts data support in these areas as particularly poor.

⁴⁷ DEIS, Vol 1, p. 138, Map 34.

⁴⁸ DEIS, Vol 1, p. 135.

⁴⁹ DEIS, Vol 3, p. 221.

⁵⁰ DEIS, Vol 3, p. 221. Note discussion above relative to the inconsistency as to whether the two alternatives are neutral with respect to each other or Alternative 1/No Action is more positive than Alternative 4.

Alternative 1/No Action also has greater species diversity than the other CGOM alternatives. The DEIS acknowledges but understates the value of species diversity within an HMA when it states that “an area with higher diversity could have positive benefits for more species than management of an area with lower diversity.”⁵¹ Species diversity and richness within a given area are widely-recognized indicators of the existing health of the ecosystem and the functions and values that it serves. It also reflects the number of commercial species that will benefit from the habitat management measures associated with an HMA. Consequently, the HMA selection process should prioritize areas within a sub-region that support the highest species diversity among all species as well as among the commercial species subset. Within the CGOM sub-region, the DEIS identifies the Alternative 1/No Action as having the highest diversity values for all of the groundfish, regulated fish and all species indices for the spring, summer and fall surveys.⁵² It further notes that Alternative 1/No Action has a high diversity across all species, suggesting that it would protect a broad array of resources.⁵³

ii. Large Mesh Groundfish

Support for retention of the full Cashes Ledge GCA can also be found in the Large Mesh Groundfish impacts section of the DEIS, which concludes that Alternative 1 and the existing WGOM GCA could improve the potential for local groundfish stock recovery as a compliment to habitat protection measures,⁵⁴ are likely to have a positive impact on the groundfish resource⁵⁵ and currently appear to provide an “edge-fishing” benefit that would continue if the existing closures were retained.⁵⁶ It concludes that the no action alternatives for the GOM would have slightly positive impacts on large mesh groundfish, but are unlikely to substantially improve habitat quality associated with juveniles.⁵⁷ CGOM Alternative 1/No Action compares favorably

⁵¹ DEIS, Vol 1, p. 162.

⁵² DEIS, Vol 3, p. 226.

⁵³ DEIS, Vol 3, p. 226.

⁵⁴ DEIS, Vol 3, p. 278.

⁵⁵ DEIS, Vol 3, p. 279.

⁵⁶ DEIS, Vol 3, p. 279. The approach of considering the effect of no action alternatives in all GOM sub-regions collectively is flawed and limits the ability to disaggregate the respective negative and positive contributions of each alternative separately. For example, the collective no action alternative includes the no action alternative for the EGOM (resulting in no new HMAs in the EGOM), which the DEIS specifically recommends against as being unlikely to substantially improve juvenile habitat quality. DEIS, Vol 3, p. 279. Were this EGOM no action alternative excluded from the collective analysis, it would appear that the WGOM and CGOM no action alternatives would be recommended without caveat.

⁵⁷ DEIS, Vol 3, p. 280.

with all of the other alternatives proposed for the CGOM, as the DEIS finds that all three other alternatives have negative impacts on large mesh groundfish relative to Alternative 1, including the preferred Alternative 4 which is expected to have neutral to slightly negative impacts relative to the Alternative 1/No Action.⁵⁸

Though the DEIS findings as to impacts on large mesh groundfish are appropriately favorable to maintaining the existing closures on Cashes Ledge, the approach used in the DEIS to assess the impacts of the no action alternatives in the GOM is flawed for several reasons. First, it assesses the impacts of all of the no action alternatives in the GOM in the aggregate without separate consideration of each alternative within these categories. This makes it difficult to compare the large mesh groundfish impacts of each proposed alternative to the “no action” alternative within each sub-region. This is particularly problematic in the CGOM, the only GOM sub-region in which the no action alternative constitutes an existing closure and is not the preferred alternative.⁵⁹ It is also complicated by its inclusion of the no action alternative for the EGOM, an alternative that the DEIS specifically recommends against because it would fail to incorporate new HMAs that would benefit the large mesh groundfish. This same aggregating approach is used for the preferred alternatives, with similar complications and difficulties. The approach results in a complete lack of clarity for both the reviewing public and the decisionmakers about the like-kind comparisons that are the heart of a legitimate NEPA analysis.

The analysis is also one-dimensional and therefore biased in its assessment of the role and effectiveness to date of the existing closures in the GOM (the no action alternatives for WGOM and CGOM), referring to the lack of “detectable changes” in productivity, a lack of “population level impacts” and a lack of notable changes in biomass of species within existing closures.⁶⁰ The DEIS suggests certainty where there have been only limited comparative surveys undertaken and fails to reflect the fact that gears capable of catching juveniles and adult groundfish in the closed area, including recreational fishing, are allowed in the closed area, providing a significant confounding factor when trying to assess the productivity benefits of the closed area. While the phenomenon of “edge fishing” along these existing closures is mentioned, it is not explored or quantified in any detail. In fact, substantial edge fishing along the perimeter

⁵⁸ DEIS, Vol 3, p. 291.

⁵⁹ There is not a “no action” alternative in the EGOM.

⁶⁰ DEIS, Vol 3, p. 279.

of the Cashes Ledge GCA and WGOM GCA provides compelling data that these existing closures are in fact contributing to the productivity of commercial species today.⁶¹

The DEIS merely alludes to the timeframe within which such benefits from closures would be likely to have become apparent and provides no reference to studies in the literature undertaken within the WGOM that reflect the slow, but steady improvement to habitat that has been decimated by trawl gear for centuries.⁶² Perhaps more important, the DEIS fails to account for the role that historic overfishing and lack of habitat management may have played in slowing or otherwise limiting the accrual of benefits from the closed areas in New England's waters, including the effect of allowing significant fishing within closures (targeting the largest, most productive fish as well as the prey and food sources of the species sought to be benefitted by the closure) and the role that overly aggressive catch levels outside the closed areas may have played.

There is only passing reference made to the juvenile and spawning data limitations associated with accurately characterizing the current conditions of Cashes Ledge GCA that substantially compromises the DEIS's speculation with respect to the low benefits that accrue to large mesh groundfish from this important closed area.⁶³ This closure was originally established to protect Gulf of Maine cod and is known to benefit juvenile fish of various species and to harbor productive female fish,⁶⁴ yet the lack of survey data associated with this area misleadingly suggests that it does not serve these roles for the central Gulf of Maine sub-region.⁶⁵ The DEIS must better reflect the analytical limitations and potential range of consequences associated with the limitations to ensure that the decision making process is fully informed. Further, it is particularly appropriate to be restrained when assessing longitudinal impacts of this type given the relatively short duration of the closure.

Finally, this section of the DEIS erroneously suggests that the preferred alternative for the CGOM is designed to make the existing closed areas more practicable.⁶⁶ As discussed above, the practicability analysis for the proposed CGOM alternatives indicates that the **Alternative 1/No**

⁶¹ Murawski S et al (2005) Effort distribution and catch patterns adjacent to temperate MPAs. ICES J. Mar. Sci. 62(6):1150-1167.

⁶² E.g., Grizzle, R. *et al.*, Effects of a large fishing closure on benthic communities in the western Gulf of Maine: recovery from the effects of gillnets and otter trawls, (2009).

⁶³ DEIS, Vol 3, p. 279.

⁶⁴ See, DEIS, Vol 3, pp. 217, 228.

⁶⁵ DEIS, Vol. 1, p.332, 337 Map 127 and 370.

⁶⁶ DEIS, Vol 3, p. 272.

Action is more practicable than the proposed preferred alternative. This section should note that fact and indicate that the PDT’s attempt to design the preferred alternative to be more practicable than the existing Cashes Ledge GCA failed. This EFH Amendment is about protecting EFH to the extent practicable, not about protecting short-term fishing to the extent practicable.

iii. Social and Economic Impacts

The social and economic impacts conclusions of the DEIS—limited as they are--effectively dispense with the claims of the very few fishermen who are claiming economic harm for lack of access to fish in the Cashes Ledge GCA. While the DEIS identifies costs to the industry due to the existing CGOM closures, in the form of displaced fishing effort, it finds nonetheless that their existing role in protecting juvenile groundfish is more valuable than any such losses to the fleet and, as a consequence, that the long-term and short-term economic impacts are expected to be slightly positive.⁶⁷ In doing so, the DEIS cites to benefits to groundfish that have accrued due to the past years of protection from groundfish fishing and reflects an informed expectation that those benefits will continue to accumulate in the future if these closures are retained. As Alternative 1/No Action maintains the status quo, the social impacts of this alternative are expected to be neutral. However, the DEIS states that given that benefits to groundfish are being currently realized by the status quo, there may be moderate positive social impacts associated with Alternative 1/No Action.⁶⁸

In contrast, mainly negative social and economic impacts on the fleet based in mid-coast Maine are associated with the proposal in preferred Alternative 4 to modify both the Cashes Ledge and Jeffrey’s Bank closures.⁶⁹ These impacts, that include the purported benefits to the fleet of opening approximately 70% of the Cashes Ledge GCA renders a paltry “slightly positive” economic impact only in the short term relative to the no action alternative, yet slightly negative long term effects.⁷⁰ When the slightly negative social impacts of the preferred Alternative 4 compared to Alternative 1/No Action are added to this equation, the overall analysis conclusively favors Alternative 1/No Action.

2. The “no closure” Alternative 2 is not a valid alternative.

⁶⁷ DEIS, Vol 3, p. 380.

⁶⁸ DEIS, Vol 3, p. 380.

⁶⁹ DEIS, Vol 3, p. 383-384.

⁷⁰ DEIS, Vol 3, p. 384.

An alternative (identified as Alternative 2) is proposed for every sub-region in the Amendment/DEIS that would eliminate all existing groundfish and habitat closures. This alternative would not implement any future closures or other management measures to protect EFH. This alternative is inconsistent with the goals and objectives of the Amendment and any use of this approach as a “habitat management measure” would violate the MSA’s requirement to mitigate the effects of fishing on essential fish habitat to the extent practicable. For these reasons, and as outlined in the comments above related to the requirements of NEPA, the “no closure” alternatives should be categorically removed from the Amendment/DEIS.

This alternative is grounded in the fallacious argument that reductions in fishing effort and associated “swept area” from fishing gear over the past years has reduced the impact on EFH and that this can be considered an MSA-compliant measure undertaken by the Council and NOAA Fisheries to mitigate the effects of fishing gear on EFH as required by the MSA. There is no information, data or even anecdotal evidence that supports this argument. The DEIS should be explicit in finding that there are no data that demonstrate that reductions in fishing effort have resulted, or could result, in any benefit or protection to EFH in New England. Less fishing may reduce the statistical likelihood and frequency of interactions between gear and habitats, but that does not equate with meaningful habitat protection. Habitat damage does not typically scale linearly with fishing effort as initial impacts sometimes cause the most harm.⁷¹ To the extent that closed areas are opened to fishing, even under a reduced effort scenario, they are still susceptible to the impacts of fishing, whether that amounts to a single pass from a trawl, dredge, or mid-water net or to repeated gear impacts in a given area. Equally important, reductions in fishing have occurred due to efforts to rebuild overfished and diminished stocks, not as a result of any habitat-related action of the Council. Considering that the Council is legally required to rebuild overfished stocks, allowable catch will increase as a stock rebuilds along with fishing effort. As this occurs, any of this postulated habitat protection by way of effort reduction will be reduced, if not eliminated.

The analysis contained in the DEIS indicates that this Alternative 2 fails in each sub-region as to virtually every Valued Ecosystem Component [VEC], with the exception of certain

⁷¹ See, DEIS, Vol. 5, App. D: The Swept Area Seabed Approach (SASI), p.190, conceding the possibility of a “first pass” impact and the SASI model’s failure to account for this possibility; Effects of Bottom Trawling on Seafloor Habitats, National Research Council 2002; Watling L, Norse EA (1998) Disturbance of the seabed by mobile fishing gear: A comparison to forest clearcutting. *Conservation Biology* 12(6):1180-1197; Rieser A, Watling L, Guinotte J (2013). Trawl fisheries, catch shares and the protection of benthic marine ecosystems: has ownership generated incentives for seafloor stewardship? *Marine Policy* 40:75–83.

short-term economic and short-term social impacts. With respect to the critical VECs, the “no closures” alternatives impacts range from highly negative for habitat to moderately negative for large mesh groundfish to slightly negative for long term economic and social, protected resources and small mesh fishery.⁷² Pursuant to NEPA, the DEIS is required to include a range of *reasonable* and *feasible* alternatives.⁷³ The DEIS identifies five primary purposes of this Amendment, three of which are directed at the protection of habitat and the other two at improving groundfish productivity.⁷⁴ The inclusion of an alternative that has highly negative impacts on habitat and moderately negative impacts on groundfish cannot be considered reasonable or feasible in this context where it is antithetical to the very purposes of the Amendment. The inclusion of this “no habitat protection” alternative reflects a bias inherent in the Council’s selection of alternatives that favors less habitat protection over more. This bias is further reflected in the list of alternatives that were considered but rejected by the NEFMC, as these rejected alternatives tend to be more protective of habitat than the selected alternatives.⁷⁵ The “considered but rejected” alternatives included habitat areas that had been identified as being important for juvenile groundfish, spawning groundfish, and designated habitat research areas.⁷⁶ In place of those highly germane and important alternatives for the stated purposes of this action, the NEFMC provides analysis of a “no closure” alternative throughout the document. NOAA Fisheries should require removal of the no closure alternative from the proposed alternatives to be considered by the NEFMC.

3. The Analysis Fails to Take a Risk Adverse Precautionary Approach to Determining Adverse Effects.

The generic assumption in the Amendment/DEIS is that mud and sand bottoms are rarely EFH and do not suffer from adverse effects associated with fishing gear. As far as CLF can tell, this categorical stance is supported by little empirical data or literature. The SASI model was used to identify relative vulnerabilities of various bottom types and then the LISA model was used to aggregate areas with similar high vulnerabilities. Based on limited data and literature, the SASI analysis rated most sand and mud bottoms as having low vulnerabilities to adverse effects from fishing gears.

⁷² DEIS, Vol 4, p 61 Table 20.

⁷³ 40 C.F.R. § 1502.14.

⁷⁴ DEIS, Vol. 1, p.3-4, Table 1.

⁷⁵ DEIS, Vol 3, p. 137-144.

⁷⁶ *Id.*

As far as they go, these tools were important contributions of fisheries management, but they do not go all that far. The NEFMC’s Science and Statistical Committee after reviewing the tools specifically issued the following limitation:

In general, the SSC concludes that the PDT’s general approach provides the best available approach to assessing the impacts of fishing on habitat. However, critical elements of the analysis need to be revised and the method needs to incorporate biological components before the methodology can be used to evaluate fishery management decisions. A revised methodology should be reviewed by the SSC or an external peer review before being applied as the analytical tool for the EFH Omnibus 2, Phase II.⁷⁷

In a follow-up comprehensive review several years later, the cautions expressed by the SSC for using SASI for the purposes for which it was used in the Amendment are again expressed:

The SASI model deals with many, but not all, of the key elements pertaining to EFH. For example, it provides a means of synthesizing the available peer reviewed literature about the effects of fishing on benthic habitat features. In this respect, the model is filling an information gap. However, it may not be useful to inform other important questions such as:

- What might happen to EFH in the water column as result of ghost gear, noise, and/or prey displacement?
- What is the effect of fishing on prey species such as pelagic fish like herring and benthic organisms like polychaetes?
- How can one fully or realistically characterize changes in fishing behavior?
- What approach might best be used to implement marine spatial planning?

Also, the SASI model may not be fully adequate for examining the impact of opening areas that have previously been closed because of the habitat types that might be expected to develop in such areas and how effort is likely to be applied in such areas.

* * * * *

⁷⁷ Letter from SSC to Paul Howard, entitled “Review of EFH Omnibus 2, Phase II, Analytical Tool (FiGSI)” (March 26, 2009).

Although the SASI model itself provides useful information for fishery managers and stakeholders, the practicability analyses presented in the document are not ready for use in their present form and in particular with regard to predicting impacts of opening and closing areas (particularly with reopening areas).

It is recommended that continued evolution and development of the approach be encouraged. In particular, the areas of biogenic characterization of the habitat, model refinement to include representative functional responses and uncertainty, and expanded characterizations of economic, behavioral and social consequences should all be further developed and explored.⁷⁸

For the most part, SASI was used in the Amendment/DEIS to draw the very conclusions the SSC cautioned the NEFMC against. This raises the important question of exactly how uncertainly is to be addressed in the sort of a “risk adverse” analytic approach that NOAA Fisheries prescribed in the EFH Guidelines. As a federal agency implementing policies nationally, it is important that NOAA Fisheries should seek consistency in the manner in which it implements federal policy. Accordingly, it is instructive to consider how the agency has interpreted the question of approaching limited data and science for adverse effects analysis in other regions.

a. The Pacific Fishery Management Council

The *2005 Pacific Coast Groundfish Fishery Management Plan, Essential Fish Habitat Designation and Minimization of Adverse Impacts, Final Environmental Impact Statement*, and the subsequent Record Of Decision (ROD) approving the FMP in 2006, sheds light on how the Pacific Council and NOAA Fisheries interpreted approached uncertainties in the context of its EFH FMPs.⁷⁹ The Environmental Impact Statement (Pacific EIS) considered 14 alternatives to minimize the adverse effects from fishing on EFH. The selected alternative combined gear restrictions and gear specific area closures.”⁸⁰ The area closure component of the preferred alternative created certain closures where bottom trawling would be prohibited and others where bottom-contacting gears would be prohibited.⁸¹ In assessing the alternative, NOAA Fisheries and

⁷⁸ Sullivan, P. *et al.*, “Swept Area Seabed Impact (SASI) Model Peer Review On Behalf of the New England Fisheries Management Council” (February 15-17, 2011).

⁷⁹ *Record of Decision: Final Environmental Impact Statement for Essential Fish Habitat Designation and Minimization of Adverse Impacts*, NMFS NORTHWEST REGION (Mar. 8, 2006),

http://www.westcoast.fisheries.noaa.gov/publications/nepa/groundfish/groundfish_efh_eis/efh_feis_rod_small.pdf.

⁸⁰ *Id.* at 5-7, 12 (descriptions of the referenced alternatives are reflected in this citation).

⁸¹ *Id.* at 14-15.

the Pacific Council stressed that “[i]t is not known if or to what extent [physical alteration to habitat and changes in biodiversity] alter the dynamics of fish stocks,” and because of this, “management measures cannot be quantitatively constructed to increase production of groundfish or enhance ecosystem function.” Despite these conclusions, NOAA Fisheries and the Pacific Council noted that because of the uncertainties and lack of available information, management measures should be made based “on the potential adverse effects of fishing on EFH.”

In explaining its decision to implement the preferred alternative, the Pacific Council and NOAA Fisheries noted that while “the best available information is not sufficient to support a definitive determination of adverse effects on EFH from fishing,” the Council and NOAA Fisheries highlighted the need for “*precautionary* action to protect EFH from the *possible* adverse impacts of fishing.”⁸² Thus, in its approval of the Pacific Fishery Management Council’s EFH action, NOAA Fisheries adopted a prudent and precautionary approach towards determining the risk of adverse effects to various benthic EFH in developing EFH protections in FMPs.

b. The North Pacific Fishery Management Council

A similar regulatory approach characterized NOAA Fisheries interactions with the North Pacific Fishery Management Council (NPFMC). In 2005, NOAA Fisheries issued an ROD selecting a series of alternatives for the NPFMC’s EFH FMP.⁸³ In the EIS, NOAA Fisheries looked at FMP “alternatives” for three actions, among which was “minimizing to the extent practicable the adverse effects of Council-managed fishing on EFH.”⁸⁴ The EIS concluded that “despite persistent disturbance to certain habitats, the effects on EFH are minimal because the analysis finds no indication that continued fishing activities at the current rate and intensity would alter the capacity of EFH to support healthy populations of managed species over the long term” and that “no Council-managed fishing activities have more than minimal and temporary

⁸² *Id.* at 12 (“NMFS has concluded that there is a potential for adverse impacts from fishing activities although the impacts cannot be specifically identified for EFH for groundfish.”)(emphasis added).

⁸³ *Record of Decision: Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska*, NOAA (February, 2005), <http://alaskafisheries.noaa.gov/habitat/seis/efheis.htm>.

⁸⁴ *Id.* at 1 (requiring that the EIS evaluate alternatives for “(1) describing and identifying EFH for fisheries managed by the Council; (2) adopting an approach for the Council to identify Habitat Areas of Particular Concern (HAPCs) within EFH; and (3) minimizing to the extent practicable the adverse effects of Council-managed fishing on EFH.”).

adverse effects on EFH for any FMP species.”⁸⁵

Despite these conclusions, because the EIS determined that the impact of fishing activities collectively has “minimal, *but not necessarily temporary*, effects on EFH,” and “[e]ven though the available information does not identify adverse effects of fishing that are more than minimal and temporary in nature, that finding does not necessarily mean that no such effects exist.”⁸⁶ Accordingly, the North Pacific Council and NOAA Fisheries utilized a precautionary approach⁸⁷ and adopted what were considered “environmentally preferred alternatives” that included amending the FMP “to prohibit the use of certain bottom contact fishing gear in designated areas...[and] reduce the effects of fishing on corals, sponges, and hard bottom habitats,”⁸⁸ heavily curbing bottom trawling in the Aleutian Islands (AI) and Gulf of Alaska (GOA), and enhancing protective measures for coral reef by prohibiting “all bottom contact fishing within six coral garden areas [in the AI]” and implemented “closures to bottom trawling in ten areas on the GOA slope.”⁸⁹ These measures were intended to supplement existing protections in the area such as closures, gear restrictions, and limits on fishing.⁹⁰ It is noteworthy that NOAA Fisheries and the North Pacific Council in this action adopted fishing restrictions despite the EIS analysis indicating that such measures were not strictly necessary based on their existing science of adverse effects. NOAA Fisheries and the Council reasoned that they were taking such measures “*to be precautionary*.”⁹¹

In April 2010, the North Pacific Council and NOAA Fisheries conducted a 5-year review of the 2005 EFH FMP.⁹² The review looked at new data to determine whether the 2005 EIS warranted revision. In reevaluating the adverse effects of fishing on EFH, the review looked at the fishing effects model used in the 2005 EIS, which considered “among other things, the

⁸⁵ *Id.* at 10-11. This is a rather stunning statement in its own right. Any ecosystem that has been “persistently disturbed” can hardly serve as the baseline for that same ecosystem in its natural, undisturbed condition. Ecosystems adjust to persistent disturbances in ways that would continue to support disturbance-resistant species that might comprise the current fish stocks but that would not support a conclusion that it was a “healthy” marine ecosystem with the disturbance.

⁸⁶ *Id.*

⁸⁷ *Id.* at 6-7, 10-11.

⁸⁸ *Id.* at 5.

⁸⁹ *Id.* at 5-6, 11.

⁹⁰ *Id.*

⁹¹ *Id.* (emphasis added)

⁹² *Essential Fish Habitat: 5-Year Review for 2010, Final Summary Report*, NORTH PACIFIC FISHERY MGMT. COUNCIL, NAT’L MARINE FISHERIES SERVICE, ALASKA REGION (April, 2010), http://alaskafisheries.noaa.gov/habitat/efh/review/efh_5yr_review_sumrpt.pdf.

distribution and intensity of trawl fishing activities and habitat recovery rates...the distribution of fishing intensity for each gear type, spatial habitat classifications, classification of habitat features, habitat- and feature-specific recovery rates, and gear- and habitat-specific sensitivity (proportional reduction by one gear exposure) of habitat features.”⁹³ The review supported the 2005 findings and subsequent decisions with respect to minimizing the adverse effects of fishing.⁹⁴ The report also suggested that wider usage of Vessel Monitoring Systems would help researchers better understand the effects of fishing on EFH.⁹⁵

The management decisions that followed from the EIS suggest that the North Pacific Council emphasized a precautionary approach to minimizing the adverse effects of fishing on EFH. Indeed, based on current scientific proof, the EIS “concluded that no Council-managed fishing activities have more than minimal and temporary adverse effects on EFH” and yet the North Pacific Council initiated a variety of practicable management actions and precautionary measures to conserve and protect EFH.⁹⁶

In implementing policies to meet the MSA’s EFH protection mandates, NOAA Fisheries has utilized approaches with other regions, including both the PFMC and NPFMC, that utilize and recognize the value in taking a precautionary approach to EFH policies and that interpret “practicability” in a way that gives priority to conservation and environmentally preferable alternatives. The NEFMC DEIS and the alternatives proposed to date, on the other hand, do not reflect a similar perspective on EFH. In the same manner, the Amendment/DEIS uses the SASI/LISA analytical tools to attach a much higher level of certainty and *faux* rigor to the vulnerability of certain habitat types to different gears and rates of fishing than they can bear and mask the current gaps in scientific understanding that the SSC warned about. The DEIS should be revised to take a more precautionary approach to preventing potential adverse affects to “low vulnerability” benthic areas.

4. The Practicability Analysis is Flawed.

⁹³ *Id.* at 8, 57.

⁹⁴ *Id.* at 66-67; *Final Environmental Assessment for Essential Fish Habitat Omnibus Amendments*, NMFS & NORTH PACIFIC FISHERY MGMT. COUNCIL, 9 (2012) (“The 5-year EFH review concludes that recent research results are consistent with the habitat sensitivity and recovery parameters and distributions of habitat types used in the prior analysis of fishing effects for the 2005 EFH EIS. Fishing intensity has decreased overall, gear regulations have been designated to reduce habitat damage, and area closures have limited the expansion of effort into areas of concern. Consequently, the Council did not initiate a general re-evaluation of the effects of fishing activities on EFH, including re-running the model, based on the information synthesized in the EFH 5-year review summary report.”).

⁹⁵ *Id.* at 67.

⁹⁶ NP 5-Year Review of 2005 ROD, *supra* note 43 at 2.

In developing measures to minimize the effects of fishing on EFH, the NEFMC and NOAA Fisheries are required by the Magnuson-Stevens Act to consider the practicability of the proposed and final management measures.⁹⁷ “Practicability” is not defined in the Magnuson-Stevens Act but the EFH regulations provide some minimal guidance stating that councils should consider the nature and extent of the adverse effect on EFH and the long and short-term costs and benefits of potential management measures to EFH, associated fisheries and the nation, consistent with National Standard 7.⁹⁸ Though a formal cost-benefit analysis is not required by the EFH regulations, the analysis in the DEIS is a modified form of this that attempts to weigh the social and economic impacts of a given alternative against its environmental benefits. In doing so, the analysis misses the target in a number of fundamental ways that should be acknowledged explicitly and corrected.

Primary among the concerns with the NEFMC’s practicability analysis is its failure to even define practicability for itself, making it not only unclear as to how the NEFMC will weigh the practicability of various alternatives but also giving the public no direction as to how it should understand and consider the practicability of various alternatives. As discussed above, the most glaring example of the failure of the DEIS to approach practicability with any rigor is its inclusion of an alternative in each sub-region that would eliminate all closures. Management measures that provide no protection for habitat are contrary to the legal obligations imposed by the MSA, are inherently impracticable, and are the epitome of incautious management that has no place among serious HMA alternatives.

Further examples demonstrating the arbitrary quality of the NEFMC’s work in its practicability analysis are numerous. For example, the Cashes Ledge Alternative 1/No Action has the highest combined ranking of habitat benefits, economic and social benefits and is determined to be practicable and yet it does not become the preferred alternative in favor of Alternative 4/Options 1 and 2 which ranks lower or the same as Alternative 1/No Action in every category except its modest benefits for the skate fishery and non-existent scallop fishery and is identified as lacking in practicality.⁹⁹ This simply makes no sense and makes a mockery of the Amendment’s stated goals and objectives, not to mention the EFH statutory requirement.

Second, the practicability analysis fails to adequately account for the role that areas protected against the impacts of fishing play in hedging against the numerous forms of

⁹⁷ 16 U.S.C. § 1853(a)(7).

⁹⁸ 50 CFR 600.815(a)(2)(iii).

⁹⁹ DEIS, Vol. 4, pp. 13-14.

uncertainty inherent in both the marine environment and in attempting to manage an extractive industry within that natural environment. These uncertainties arise from a number of factors including the rapid physical and ecological changes to our New England ocean waters as a result of climate change, the precarious state of the numerous overfished stocks that have varying prospects and timeframes for becoming rebuilt and sustainable, the broader ecosystem-level impacts of fishery resource depletion and habitat degradation caused by bottom-tending mobile gear, the impacts of single species management of fisheries and the short and long term economic self-interests of the fishing industry. The individual and cumulative effects of the countless forms of uncertainty associated with managing fisheries demands that precautionary strategies be employed to guard against scientific uncertainty. While the DEIS credits closed areas with playing a role in reducing risk, such credit does not extend to the assessment of the practicability of the various proposed actions, especially those that involve modifying or eliminating existing closed areas. For this reason CLF urges that the DEIS should, as recommended by Professor Guillermo Herrera in his January 5, 2015 comments on the DEIS,¹⁰⁰ give preference to policies and alternatives, such as closures, that provide a precautionary benefit.

Finally, the Amendment/DEIS's practicability assessment fails to provide for a model or other meaningful support for its assumptions related to the likely human behavioral response to management measures. Assumptions are made as to shifts in effort and location of fishing that could occur as a result of the opening or closing of areas to fishing and as to the resilience of the industry and its members to react to regulatory changes. As Professor Herrera points out in his comments that CLF adopts here, generally "the behavioral response of harvesters to regulations, at a range of time horizons, seeks to minimize the negative impacts of constraints place upon them."¹⁰¹ Professor Herrera goes on to note that any analysis that fails to take this fundamental survivalist response into account will significantly overestimate the adverse impacts of regulatory changes and fail to account fully for the benefits that might accrue in the long term.¹⁰² The heavy reliance in the DEIS analysis upon a simplistic lost revenues impact upon the fleet without consideration of human behaviors that might mitigate against potential short term loss leaves its estimate of practicability of a given measure grossly unreliable. More concerning, this analysis ignores the reality of New England fisheries where gross revenues for the groundfish fleet have increased dramatically in the past two decades despite ever-escalating regulatory limits. The DEIS should be modified to incorporate some form of model that better and more

¹⁰⁰ A copy of Professor Herrera's comments are attached (Attachment 2) and incorporated here by reference.

¹⁰¹ Herrera Comment Letter at 12.

¹⁰² *Id.*

accurately predicts likely fleet market behaviors in response to regulatory changes to EFH protection.

CLF further references and incorporates here the excellent points made by Professor Herrera’s observations that “[t]he process whereby the discrete set of options was developed is not immediately clear from the DEIS.[A] significant number of options were eliminated from the analysis *a priori*, implying that significant amount of regulatory judgment has been made in advance of the more detailed discussion in the DEIS of regulatory tradeoffs. In particular, while the removal of closed areas is considered for several of the regions, more aggressive, or conservative, sets of closures seem to have been preemptively eliminated from the set of candidate policies ... These [listed vague] reasons seem unscientific, *ad hoc*, and strongly at risk of privileging short-term economic considerations over sustainability and long-term socioeconomic benefits.”¹⁰³

5. Clam Dredge Exemption

Among the proposed management measures examined in the DEIS is an option to allow, in every sub-region, fishing with an hydraulic clam dredge within each protected area, including those from which all other bottom tending mobile gear would otherwise be prohibited. The DEIS’s assessment of hydraulic clam dredges indicates that they are among the fishing gears with the greatest impacts on EFH.¹⁰⁴ It specifically finds that these dredges “have a more severe immediate impact on surface and sub-surface habitat features than other fishing gears used in the Northeast region.”¹⁰⁵ In spite of these findings, the DEIS fails to highlight the negative impacts that the gear could have within closures designed to protect vulnerable habitat and instead includes management measures that would allow them to use their damaging tows in areas containing the region’s most sensitive habitat. This counterintuitive allowance is the function of an unfounded assumption, perpetuated by the DEIS, that hydraulic clam dredges will be operated only on sandy ocean bottom that are universally highly dynamic and never in muddy or rocky habitats.¹⁰⁶ An implicit assumption here is that all sandy bottoms are alike and that the vulnerable marine life in all sandy bottoms is either extremely low in abundance or uniformly capable of adapting to storm- or wave-driven sediment re-suspension events. The DEIS specifically states that, within the SASI model, an “assumption was made that hydraulic dredges

¹⁰³ Dr. Herrera public comment at 3-4 (Attachment 2)

¹⁰⁴ DEIS, Appendix D, pp.107-109, 126, 130, 182.

¹⁰⁵ *Id.*

¹⁰⁶ *Id.* at p. 107.

can only operate on sand and granule-pebble substrates, so the model ignores other substrate types when they occur in a particular grid cell.”¹⁰⁷

This approach to identifying areas suitable for hydraulic clam dredging inappropriately assumes that this gear will not cause long-term adverse impacts in sandy substrate with lower dynamic oceanographic forces or will not intentionally or accidentally interact with other forms of more vulnerable substrate. Sandy sediments are not uniform and many are very productive. Recent work done by The Nature Conservancy documents that there is a wealth of marine life on sandy sediments¹⁰⁸ that would be significantly disturbed, if not destroyed, by hydraulic clam dredges. Videography and sonar work done in some near-shore environments off Cape Cod dramatically belie this assumption.¹⁰⁹ While this video footage is of one particular area and can't be used to assess how persistent the damage might be over time, it is reasonable to expect that similar impacts should be assumed in many offshore sandy environments, including important flounder spawning areas. Many of these sandy bottoms are known by fishermen to support substantial communities of bryozoa and other invertebrates that serve as egg-attachment structures for a variety of animals, which in turn are consumed by cod and other managed species.¹¹⁰ Sandy bottoms also serve as egg beds for sea herring.¹¹¹ Sandy gravel bottoms support an abundance of anemones, lobster, sponges and other sea life¹¹² that would be destroyed by hydraulic dredging. The presence of bryozoa, herring eggs, sponges, lobster, anemones, and other important elements of marine life in many sandy habitats in Massachusetts Bay and elsewhere belies the assumption that all sandy and sandy gravel bottoms are unproductive, highly dynamic, subject to continual resuspension events, and, therefore, impervious to gear impacts.

The assumption that clam dredge operators will avoid certain benthic habitats where they might damage EFH because they will rationally act to prevent dredge or equipment damage is no more valid than allowing otter trawls to fish on rocky habitat based on an assumption that

¹⁰⁷ DEIS, Vol.1, p.135; p. 137 Fig 5 and p.140, Map 36.

¹⁰⁸ The Nature Conservancy, “Northwest Atlantic Marine Ecoregional Assessment • Phase 1 Report,” Benthic Habitats, M. Anderson *et al.*, Chapter 3 at 3-29 to 3-31
<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/Documents/Chapter-3-Benthic-Habitats-20100329.pdf>.

¹⁰⁹ See, e.g. <http://youtu.be/MdvQxIC-htA> off Provincetown, MA.

¹¹⁰ Personal communications with fishermen who report that bryozoa were often found in cod stomachs caught on sandy bottoms.

¹¹¹ E.g., <http://woodshole.er.usgs.gov/project-pages/stellwagen/photos/jpegs/18030085.JPG>

¹¹² <http://woodshole.er.usgs.gov/project-pages/stellwagen/photos/habitats/sndygrvl.htm>

voluntary operator avoidance of the risk of gear damage will ensure that contact and EFH damage will never occur. Rather than base hydraulic clam dredge management measures on assumptions as to how fishermen will behave within vulnerable habitats, the DEIS should identify specific areas where there is empirical evidence that the hydraulic clam dredges will not damage habitat and limit their usage to those areas. Based upon the substantial evidence in the record as to the damage that can be caused by hydraulic clam dredging, the Amendment/DEIS should recommend against an exemption that allows them within any proposed habitat protected areas. There should be additional analysis in the DEIS and Amendment to identify low-dynamic sandy bottom substrates that should also be protected from hydraulic dredging until better scientific support exists regarding their true impacts.

6. Gear Modification Areas

The DEIS analyzes habitat protection alternatives that would allow modifications to trawl fishing gear (i.e., gear modification) to serve as the sole means of protecting vulnerable habitat. The theory of such modifications is that these modifications reduce impacts on benthic habitat by limiting the contact between components of the fishing gear and the benthic habitat, but limit economic impacts on the industry by allowing dragging in areas of vulnerable habitat from which they would otherwise be precluded. The DEIS includes two gear modification management measures, each of which could be applied to proposed habitat alternatives. Each allows for fishing within a habitat protected area, one using trawls with ground cables modified with elevating disks and a length per side capped at 45 fathoms, the other requiring that ground cables be eliminated entirely and cap bridle lengths limited to 30 fathoms per side. For certain of the proposed habitat alternatives, a gear modification is the only proposed management measure.¹¹³

The DEIS fails to adequately and accurately characterize the process by which the gear modification management measures were selected by the Council for inclusion in the DEIS and to explicate fully the very limited empirical support related to this option. The Amendment/DEIS also seems to ignore the fact that the Council's science advisors found insufficient scientific support to support the notion that gear modifications are protective of habitat. The Council staff and the Habitat PDT recommended against the use of gear modification options because

¹¹³ These include WGOM Alternative 7 (roller gear size restrictions), Georges Bank Alternative 4 (no ground cable or raised ground cable restrictions), Georges Bank Alternative 5 (no ground cable or raised ground cable restrictions, elevated disks and bridle length caps), and Great South Channel Alternative 6 (ground cable modifications).

available information was inconclusive as to whether such gear modifications would reduce the adverse effects of fishing on EFH.¹¹⁴ The analysis in the DEIS should also reflect the fact that the Habitat PDT found the science at best uncertain on the question of whether modifying gear to reduce linear effective gear width would lead to increases in number or duration of trawls. They also identified significant scientific uncertainty as to whether there would be a net benefit from use of gear modifications to reduce total area swept and therefore reduce impacts on vulnerable habitats.¹¹⁵

It is essential that the DEIS be accurate and explicit in its characterization of the lack of support in the scientific literature for this gear modification form of habitat protection as National Standard 2 of the Magnuson-Stevens Act requires that all fishery management measures must be based upon the “best scientific information available.”¹¹⁶ While the information upon which management decisions are based need not be perfect or based entirely upon consistent data, the measures must have *some* support in the data.¹¹⁷ Where there is “no discernible, substantive scientific evidence” supporting gear regulations, courts have found that the regulations violate National Standard 2.¹¹⁸ The DEIS must make clear that the proposed gear modification approaches proposed in the Amendment/DEIS are not based on the best available science and that they violate National Standard 2.

7. The DEIS Fails to Include Alternatives Protective of Prey Species

The availability of prey species is an important component of EFH and the MSA identifies feeding and growth as essential elements of EFH. Indeed, the goals of the MSA cannot be met if the food sources of the target stocks are themselves depleted. These food sources include small fish, crustaceans, mollusks, and other benthic invertebrates as well as macroalgae and other vegetation on which these fish seem to graze. Many of these prey populations occupy places in the water column; others are on the bottom. Collectively, they must be protected as part of the EFH for the managed species. The EFH regulations recognize this as they note that the

¹¹⁴ See, Notes of Habitat Committee August 2012 meeting. See also, New England Fishery Management Council, *DRAFT: 03 October 2012: Gear modification options – ground cable length limits discussion/working document*, p. 8-9.

¹¹⁵ *Id.*

¹¹⁶ 16 U.S.C. § 1851(a)(1).

¹¹⁷ *Ocean Conservancy v. Gutierrez*, 394 F. Supp.2d 147, 157.

¹¹⁸ See *Hall v. Evans*, 165 F. Supp. 2d 114, 134 (D.R.I. 2001) *Parravano v. Babbitt*, 837 F. Supp 1034, 1046 (N.D. Cal. 1993).

presence of these species makes the waters and substrate function as feeding habitat.¹¹⁹ For this reason, the EFH regulations require a discussion of prey species in the FMP and recognize that a loss of prey may be an adverse effect on EFH if the loss will reduce the capacity of the habitat to support the managed species.¹²⁰ Because the FMP must include a discussion of potential adverse effects of fishing activities on EFH, the potential impacts of fishing on prey populations should be discussed.¹²¹ To the extent that catch or bycatch of prey could affect the abundance of commercial species, this represents a potential adverse effect on EFH that is not addressed by the DEIS.

The DEIS reflects that the NEFMC has largely ignored this requirement of the MSA. While the DEIS does include a compendium of prey-species, maps are not included and no alternatives are advanced in the DEIS to address the specific food needs of the managed species.¹²² The DEIS must be supplemented to resolve this deficiency. This can be accomplished by following the lead of other regions such as the North Pacific, Pacific, and Mid-Atlantic and utilizing data that NOAA Fisheries and the Council already have before them.

To meet the requirement that the FMP discuss possible adverse impacts of fishing on the prey component of EFH, the FMP would need to include information in following four general areas:

1. Identification of the major prey species for each managed species
2. Information on the geographic distribution and habitat requirements of prey species
3. Data on the impacts of fishing activities on abundance and diversity of prey species
4. Analysis of the effects these prey impacts have on managed species.

If available, these data would provide the framework for determining possible adverse effects to EFH.

¹¹⁹ 50 CFR 600.815(a)(7) Prey species. Loss of prey may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat, and the definition of EFH includes waters and substrate necessary to fish for feeding.

¹²⁰ 50 CFR § 600.810(a)(7).

¹²¹ 50 CFR § 600.810(a)(2). In EFH guidance documents, NOAA Fisheries has taken the position that prey itself is not EFH but that the availability of prey within an EFH area is a component of EFH. NMFS Instruction 03-201-15 (2006). This does not and cannot limit the effect of the language of the MSA itself or the EFH regulations' requirement that loss of prey may be an adverse effect and that loss of prey due to fishing activities is an adverse effect to EFH caused by fishing that must be discussed in the FMP.

¹²² DEIS Vol. 5, Appendix B: *EFH supplementary tables, prey species information, and spawning information.* .

The Amendment/DEIS currently identify and discuss only some of the possible impacts commercial fishing may have on prey species and recommends no management measures to minimize such impacts. The DEIS currently identifies prey species for each managed species at each stage of its life cycle.¹²³ In addition, stomach content data for each managed species is available, showing the relative reliance of managed species on various prey species.¹²⁴ Overall, the identification of important prey species is reasonably comprehensive.

The DEIS does not include any data on prey distribution. It would appear that the exclusion of this data is used as a justification for the DEIS' failure to address the adverse effects of fishing on the prey component of EFH and to instead discuss prey only in the most general terms. This failure to include any distribution data apparently also led the Council to exclude prey from SASI, its primary habitat model.¹²⁵ An approximation of prey distribution could have been inferred from substrate data, but the Council declined to take this step because of potential uncertainty in the model. However, several managed species, including herring, are also prey species for other managed species. Distribution data for these managed species at a minimum should be made available in the DEIS and used in the EFH analysis and alternatives development process.

The discussion of impacts on prey from fishing activities is currently limited to a brief summary of studies evaluating the effects of bottom-tending gear (otter trawls, scallop dredges, and hydraulic dredges) on benthic invertebrates.¹²⁶ These studies generally compared the abundance of selected species between test and control sites. The studies collectively evaluated impacts on a variety of substrates over both short-term and long-term periods. In general, the studies concluded that, at least in some cases, fishing gear had significant effects on the abundance and diversity of benthic invertebrates.¹²⁷ The DEIS, however, contains no discussion of whether fishing impacts on prey may have an effect on managed species. Even where impacts on prey have been identified, such as long-term impacts from repeated trawling, there is little or no analysis of whether these changes in prey availability could adversely affect managed species.

In order for the DEIS to be complete, it must be supplemented to address these categorical limitations and failures to comply with the MSA and EFH regulation requirements related to prey species. The inescapable conclusion of any such analysis will be that fishing

¹²³ *Id.*.

¹²⁴ *Id.*

¹²⁵ DEIS, Vol. 5, p. 18.

¹²⁶ DEIS, Vol. 5, Appendix D, pp. 91-136.

¹²⁷ *Id.*

adversely affects the prey component of EFH which, in turn, impacts managed species. Management measures must be implemented to address these impacts. These should include a prohibition on fishing with mobile gear, and any gear capable of catching Atlantic herring, in areas where herring aggregate for spawning and where egg mats develop on the seabed including the Northern Edge and Fingers region of Georges Bank, Nantucket Shoals, Great South Channel, Jeffrey's Ledge, and Penobscot Bay and other areas in Down East Maine. Fishing with mobile gear that adversely affects the habitat and any gear capable of catching sand lance should also be prohibited in areas densely populated by sand lance, including portions of Stellwagen Bank. New fisheries should be expressly prohibited for prey species that are not currently supporting commercial fisheries such as sand lance, river herring, shad, krill, and copepods.

8. Spawning protections are not consistent with the best available science.

Essential fish habitat includes marine areas, both on the ocean floor and in the water column, that are important for spawning. 16 U.S.C. § 1802(10). The NOAA Fisheries Guidelines emphasize that councils should explore options for managing adverse effects on spawning. Finally, the NEFMC has identified protection of spawning groundfish as one of the stated objectives of the Amendment.¹²⁸ The current alternatives proposed in the DEIS are inconsistent with these legal requirements and policy objectives due to their failure to address spawning protections for all stocks covered by the analysis. While the Amendment/DEIS identifies protection of spawning EFH for all stocks within the scope of the Amendment,¹²⁹ the alternatives identified in the DEIS are limited expressly to management actions designed to reduce adverse impacts exclusively on groundfish, ignoring all other stocks. This is a major deficiency in the document that must be addressed before the any approval.

The Amendment's analysis of groundfish spawning protection areas is seriously deficient as well. First, the focus for spawning protection is almost exclusively on protecting spawning behaviors, that is, protecting fish during the act of spawning. It is just as critical to identify and protect sub-populations of important spawners in stocks, particularly those stocks that are overfished and in trouble. Protection of such sub-populations or contingents of spawning fish--including large, productive females—is necessary to ensure that they are being protected from adverse impacts of fishing to the extent practicable. A particularly compelling case can be made in this regard for Atlantic cod stocks, whose age structure has been severely truncated and older,

¹²⁸ DEIS, Vol. 1 at 4 & 74.

¹²⁹ *Id.*

large, reproductively successful females seem to be concentrated now in existing closed areas. The proposed alternatives fail to adequately address that issue in any of the spatial or temporal management actions considered and analyzed in the DEIS.

An extensive effort designed to focus on spawning hotspots was undertaken by the Closed Area Technical Team in 2013, resulting in a synopsis report in 2013 to the NEFMC's Science and Statistical Committee. That analysis is also included as Appendix E in the OHA2/DEIS. This work constitutes the best available science on spawning groundfish available to the NEFMC. The importance of this work to the groundfish disaster currently declared in New England was recognized by the NEFMC: "The information was integrated over all regulated groundfish species based on several relevant factors, heavily weighted toward those species that were at low abundance, overfished, and therefore deemed to be vulnerable to reductions in productivity through fishing on spawning fish."¹³⁰

The importance of the Council and NOAA Fisheries taking a hard look at minimizing adverse effects on spawning subpopulations of groundfish like cod was reiterated directly to the NEFMC in a February 2, 2014 letter from Regional Director Bullard to the NEFMC, with an implied conclusion that the Amendment's analysis on that score was deficient. In that letter, Director Bullard indicated that "the Council should *ensure* that the alternatives that are related to spawning protection in this amendment are an improvement over the *status quo*."¹³¹ He went on to indicate that "the Council should ensure that the seasons associated with these closures are the most appropriate by considering updated information on which species would be protected during the proposed seasons and *which species would benefit from spawning protection at other times of the year*. In addition, the Council should strongly consider the potential benefits from prohibiting recreational fishing in the spawning closures, given the increasing proportion of cod and haddock landings from that sector."¹³²

Notwithstanding the CATT's science, the importance of the issue, and the forewarnings of the Regional Director, the NEFMC summarily rejected virtually all the best science it had before it on management opportunities for improved spawning protections¹³³ and developed no alternatives analyzing those opportunities. As described in Volume III of the DEIS, these

¹³⁰ OHA2/DEIS, Vol. III at 142.

¹³¹ http://s3.amazonaws.com/nefmc.org/9_CorrespondenceRecd_atCouncilMtg..pdf (emphasis added).

¹³² *Id.* (emphasis added).

¹³³ See Map 36 in Volume III OHA2/DEIS at 143.

opportunities were rejected because of undocumented and unanalyzed practicability concerns and a “belief” that the CATT’s analysis was flawed. An existing seasonal closure on Georges Bank was removed “at the request of the Habitat and Groundfish Committee.”¹³⁴ No justification for such action is provided by the DEIS.

Those are not decisions that should have been swept under the rug by the NEFMC or deferred to another day in the unspecified future. They are at the heart of the Amendment and it is the role of the DEIS to analyze whether the set of alternatives presented is sufficiently broad, reasonable and practicable. In doing so, it must consider the alternatives that were considered and rejected and determine whether such rejected alternatives were appropriate to have been included in the final set of alternatives. As a well-established legal necessity, a reasonable range of alternatives as developed by the CATT should have been proposed, the practicability issues should have been identified, and opportunities for public comment should have been provided. They were not and, as a result, the DEIS is incomplete and the Amendment’s spawning protection alternatives do not represent the best available science.

9. The DEIS Mischaracterizes the Purpose of the HAPC Designation

In developing FMPs, the Council is tasked with identifying HAPCs within EFH.¹³⁵ Such designations are based on the ecological importance, sensitivity, and rarity of the habitat.¹³⁶ Yet while the DEIS identifies several HAPCs, labeling these habitats as ecologically important, rare, sensitive to anthropogenic stress, or some combination thereof, the DEIS expressly diminishes the role and significance of HAPCs by claiming the purpose of the HAPC designation is largely for consultation purposes.¹³⁷ The interpretation of the HAPC designation in the DEIS is flawed and should be revised to reflect the intent of the MSA.

The DEIS states that while HAPC status “should lead to more careful evaluations of the impacts of fishing in the area...[,] management measures such as gear restrictions have not been associated with the HAPC designation itself in the past, and are not proposed as part of the HAPC designations in this Amendment,” adding further that “the EFH and HAPC designations themselves are not associated with any restrictions on the timing or methods of fishing.”¹³⁸ This

¹³⁴ *Id.* at 142.

¹³⁵ 50 C.F.R. 600.815(a)(8).

¹³⁶ *Id.*

¹³⁷ DEIS, Vol. 2, pp. 380-400.

¹³⁸ DEIS, Vol. 2, pp. 379, 342.

interpretation of HAPC designation is fundamentally flawed and any approval of such an approach would represent an abdication of NOAA Fisheries' responsibility to ensure that these areas are afforded full protection under federal law to the extent practicable.

Under the MSA, fishery management councils are directed “to address the degradation and loss of EFH *from both fishing and non-fishing activities* through conservation and enhancement measures” and “need to make risk-averse decisions” because of “uncertainties inherent to [ecosystem] management.”¹³⁹ Not only must an FMP under MSA evaluate the potential adverse effects of fishing on EFH, but FMP impact evaluations must also give “special attention” to the adverse effects of fishing in HAPCs.¹⁴⁰ HAPCs are some of the most valuable, sensitive, and ecologically important regions within EFH, and councils should accordingly exercise their discretion to impose more stringent management measures in these areas.

The HAPC section of this DEIS contains a series of maps demarcating each HAPC and a brief summary of the rationale and justification for each designation.¹⁴¹ These maps and summaries appear to represent the full extent to which the Council interprets its HAPC obligations under MSA, making the designation little more than a superficial procedural exercise.¹⁴² This misguided interpretation leaves HAPC designation bereft of any regulatory significance. In the justification summaries, the stated purpose of nearly all HAPC designations listed was to “recognize” the ecological importance and unique character of the particular habitat.¹⁴³ Yet such recognition rings hollow without accompanying management protections for these areas. Indeed, three candidate HAPCs (WGOM, Cashes Ledge and the Northern Edge) are simultaneously recognized for their unique characteristics and qualification for HAPC status, while the area within the proposed HAPC is proposed in various alternatives within this DEIS to be trawled or dredged by fishing gears.

The characterization and treatment of HAPCs in the DEIS is legally deficient and undermines the significance of this designation. Before approval, the DEIS should be

¹³⁹ *Essential Fish Habitat: Final Rule*, 67 Fed. Reg. 2349 (Jan. 17, 2002)(emphasis added).

¹⁴⁰ 50 C.F.R. 600.815(a)(2)(i) (“The evaluation should give special attention to adverse effects on habitat areas of particular concern and should identify for possible designation as habitat areas of particular concern any EFH that is particularly vulnerable to fishing activities.”)

¹⁴¹ Draft EIS at 380-400.

¹⁴² *Id.*

¹⁴³ *Id.*

supplemented to provide management measures that limit any potential destructive fishing activities within each HAPC.

10. Dedicated Habitat Research Areas are an Essential Tool for Future Habitat Management.

The Amendment/DEIS's approach to designing DHRAs was to identify priority research questions that are fundamental to the critical areas of gear impacts, habitat recovery, natural disturbance and productivity.¹⁴⁴ This is a sound approach. By bringing definition and a common focus to the research that is to be obtained from these areas, the Council has increased the likelihood that these areas and the research associated with them will help to guide the Council's and NOAA Fisheries' future action to protect EFH and be used for their intended purposes. However, the sunset provision that allows the DHRAs to lapse after three years if no habitat research is undertaken is completely unrealistic. The process of developing a research proposal, obtaining funding and completing all necessary planning can take well more than three years and some longitudinal studies have great value even if actual on-site research is spaced out longer than three years. In order to ensure that these areas have not been fruitlessly identified and set aside as part of this action, the exercise of any sunset provision associated with the DHRAs should be based on an explicit finding by the NEFMC and NOAA Fisheries, after consultation with known interested scientists, that the research value of the DHRA is no longer significant or necessary. In any event, the EFH management plan must be revised every five years¹⁴⁵ so that requirement adds an automatic sunset review to the DHRAs as well as other EFH protections. Consequently, to the extent that the DEIS provides an alternative associated with sunsets for DHRAs, it must provide a range of alternative sunset provisions that allows the Council and Agency to assess the relative merits of different time frames for lapsing unused research areas.

11. The Proposal to Allow Habitat Management Measures to be Modified through a Framework Adjustment Mechanism is Flawed.

This proposed alternative feeds directly into the industry-driven frenzy surrounding this Amendment to reduce the number, size and role of HMAs. The DEIS includes a proposal that would provide for a review of HMAs every ten years to determine their effectiveness. Research into the role, effectiveness and best design for HMAs is of critical importance, as is a mechanism

¹⁴⁴ DEIS Vol. 1, p.27.

¹⁴⁵ 50 C.F.R. § 600.815(a)(10).

for assessing and monitoring HMAs. However, any such process must be within a reasonable timeframe, based upon scientifically defensible criteria and reviewed by an independent third-party reviewer. The framework proposal in the DEIS meets none of those essential criteria.

This Amendment involves the use of numerous approaches to HMA identification and design that are unprecedented in New England and not widely used elsewhere, including but not limited to the use of the SASI model and LISA analysis. As discussed in these comments, the Council's actions to date indicate an intent to accede to industry demands to reduce the number and size of closed areas regardless of their EFH merit or practicability, and to impose or retain existing half-measure management limitations that allow fishing and other habitat impacting activities within these areas. A growing body of research has indicated such exemptions directly limit the effectiveness of HMAs.¹⁴⁶ Given the Council's risk tolerant approach to rebuilding its many overfished stocks, management attention should be focused even more directly realizing the productivity contributions of effective EFH closures.

Despite this combination of new, untested approaches to evaluate the adverse impacts of fishing gears on bottom habitats and the retention of the same risky management methods that have failed to stop overfishing on many stocks in New England, this proposal seeks to impose exacting performance standards that HMAs must meet, in an unrealistic timeframe, in order to remain in place. This is a management strategy that is designed to fail; this framework proposal is the mechanism that opponents of HMAs will use to advance their agendas to open more protected areas despite the best available and emergent science on the importance of large closed areas.

The DEIS discusses the two principal flaws with this proposed framework approach but fails to identify either of them as problematic. First, it notes as to the performance standards that "most of the questions are not likely to be answerable unless dedicated research is funded and implemented in a timely manner."¹⁴⁷ While the DEIS recognizes that the functionality of this framework review proposal hinges almost entirely on very uncertain funding for research, the DEIS does not require that the use of the framework mechanism be contingent on the empirical results of new research or new information. Consequently, as proposed, this review process could find a lack of evidence that HMAs are achieving one or more of the standards (even if due

¹⁴⁶ Graham, J. *et al.*, Global conservation outcomes depend on marine protected areas with five key features, *Nature* 506: 216-20 (2014)

¹⁴⁷ DEIS Vol. 3, p.136.

to a lack of sufficient research) and could modify or eliminate them on that basis out of the limelight of the very public process achieved in this EFH amendment process.

Second, the proposal calls for reviews of the HMAs performance every 10 years, despite an acknowledgement within the DEIS that recent research suggests that “a *minimum* of three generation times are needed to see population changes due to closed areas.”¹⁴⁸ This finding is supported by research within the existing WGOM closed area which suggests that 12 years after closure to groundfish gear, signs of recovery from the damage wrought by fishing gear is only just becoming apparent, let alone affecting productivity.¹⁴⁹ Finally, the review of HMAs contemplated by the proposal is not required to be reviewed by an independent third party reviewer, and as such, the review is discretionary.¹⁵⁰

D. The Management Alternatives

The following is an explanation of concerns associated with preferred alternatives identified by the Council and, as to those sub-regions where no preferred alternative has been identified, a discussion of CLF’s preferences in those sub-regions. In this context, CLF notes that it has previously submit a package of EFH actions that we believe better comply with the MSA, EFH Guidelines, and the Council’s own goals and objectives with a number of other organizations. The proposal is attached to these comments as Attachment 1.

1. Central Gulf of Maine Sub-region

As discussed more fully in the section above related to the Cashes Ledge alternatives, the Council’s selection of Alternative 4 as its preferred alternative is nothing less than an arbitrary and capricious decision that ignores substantial evidence in the record that uniformly and significantly favors Alternative 1/No Action. The DEIS is unequivocal in its support for the status quo in the CGOM as it indicates that the Alternative 1/No Action outscores Alternative 4 as to virtually every relevant VEC, often substantially. Importantly, Alternative 1/No Action has more positive impacts for groundfish and is highly positive for habitat benefits, the two areas of

¹⁴⁸ DEIS Vol. 3, p. 136.

¹⁴⁹ Tamsett, A., K.B. Heinonen, P.J. Auster and J. Lindholm, 2010, Dynamics of hard substratum communities inside and outside of a fisheries habitat closed area in Stellwagen Bank National Marine Sanctuary (Gulf of Maine, NW Atlantic), p. 1. Marine Sanctuaries Conservation Series ONMS-10-05, U.S> Department of Commerce, NOAA, Office of Marine Sanctuaries (Maryland).

¹⁵⁰ DEIS Vol. 3, p.134.

foremost concerns and of primary objective of this Amendment. Alternative 1/No Action is more practicable than the preferred Alternative 4 as it is preferable across the board on social impacts, is equally positive to Alternative 4 with regard to short term economic impacts, and has positive long term economic impacts while Alternative 4 has negative long-term impacts. Alternative 1/No Action is also the preferred alternative for spawning protection and protects both spawning behaviors and sub-populations of Atlantic cod. Alternative 4 Option 1 simply does not meet the primary goals and objectives of the Amendment. The management measures for Alternative 1/No Action should be modified to prohibit all gears capable of catching groundfish or disturbing groundfish behavior, including mid-waters trawls, and gill nets. The DEIS and Amendment should be changed to identify Alternative 1/No Action as the preferred alternative.

2. Western Gulf of Maine Sub-region

The preferred Alternative 1/No Action retains the existing WGOM GCA and is an appropriate preferred alternative that will meet the goals and objectives of the Amendment and maintain the economic and habitat stability associated with the existing closed area. Exemptions associated with hydraulic surf clam dredging (see discussion above related to this exemption) and shrimp trawling should be eliminated from the entirety of the closure due to the damaging nature of the hydraulic clam gear and the combination of low shrimp stocks and the distance of this area from traditional inshore shrimp grounds. A year-round spawning closure should extend the boundaries of this closure to provide protection to the entirety of Jeffrey's Ledge and to known and ongoing aggregations of spawning GOM cod and habitat associated with such spawning.¹⁵¹

The Alternative 1/No Action encompasses a closure that has been in place since 1998 to gear capable of catching groundfish. The DEIS supports retention of this closure as it reflects a CATT analysis that identified groundfish hot spots for numerous species including GOM cod, haddock, plaice, yellowtail flounder, pollock, white hake and witch flounder. Perhaps more than any other area under consideration in the Amendment, the WGOM GCA provides the potential to facilitate any recovery of GOM cod in the near term, as numerous studies indicate the presence of aggregations of both spawning cod and large female cod that will serve to meet the goal of increased productivity.

¹⁵¹ See preferred alternatives proposal of CLF, Pew, NRDC, Oceana and Earth Justice dated February 20, 2014(Attachment 1).

3. Eastern Gulf of Maine Sub-region

The preferred Alternative 2 for the Eastern Gulf of Maine sub-region, with two new EFH areas proposed in the waters of Penobscot Bay and off of Machias, is an appropriate and practicable HMA. These are important and distinct ecological areas supported by the SASI/LISA analysis, data showing presence of juvenile ground fish, and documented important spawning areas for herring and other fish.¹⁵² These waters are EFH for a number of species, including redfish, alewife, silver hake, white hake, windowpane flounder, winter flounder and witch flounder.¹⁵³ The Machias area is particularly important due to its support of habitat for juvenile halibut, cod and haddock.¹⁵⁴ The DEIS finds Alternative 2 to be practicable and to result in slightly positive benefits for EFH and positive impacts for large mesh groundfish.¹⁵⁵ It is expected to reduce the adverse effects of fishing on EFH and to improve habitat.¹⁵⁶ Species diversity within Alternative 2 for all species was high.¹⁵⁷

Establishing a new HMA in this sub-region will serve an important role in rebuilding stocks of forage fish in the Down East region that will, in turn, benefit the groundfish species that are struggling to re-establish themselves in this area. It is noteworthy that the DEIS finds that the no action alternative, which would result in no HMAs in this sub-region, has negative impacts upon seabed habitat and groundfish.¹⁵⁸ The habitat impacts of taking no HMA action in this sub-region are also negative relative to the preferred Alternative 2.¹⁵⁹ While the DEIS finds that the Alternative 1/No Action is practicable as well, this is simply because it would have neutral social and economic impacts. Given that the two primary goals of this Amendment are to improve groundfish productivity and to protect EFH, Alternative 1 does not advance these critical goals and objectives and would be inconsistent with the weight of the EFH evidence in this Amendment's record.

4. Georges Bank Sub-region

¹⁵² DEIS, Vol. 3, p.47.

¹⁵³ DEIS, Vol. 3, p.47.

¹⁵⁴ DEIS, Vol. 3, p.47.

¹⁵⁵ DEIS, Vol. 1, p.11-12.

¹⁵⁶ DEIS, Vol. 3, p.212.

¹⁵⁷ DEIS, Vol. 3, p.215

¹⁵⁸ DEIS, Vol. 1, p.11.

¹⁵⁹ DEIS, Vol. 3, p. 211.

As discussed above, the two primary goals of this Amendment are to meet the EFH protection requirements of the MSA and to improve protection of habitats associated with spawning and juvenile groundfish. As a result of the unreasonable and infeasible range of alternatives proposed in this Georges Bank sub-region, only the Alternative 1/No Action and Alternative 8 are capable of meeting these goals and objectives. The alternatives for this region are dominated by proposed gear modification areas, a “no closure” alternative and a host of alternatives that either eliminate Closed Area II, the Northern Edge HAPC or both and propose significantly smaller closures in their stead. In reaching its recommendations and decision, the Council and NOAA Fisheries must exercise precaution in face of significant uncertainty in this region associated with the chronic poor productivity of a number of Georges Bank stocks as well as the uncertain impacts of climate change by choosing the Alternative 1/No Action or must institute a significant new closure with Alternative 8 for this sub-region. These are the only alternatives identified in the DEIS for Georges Bank that meet the goals and objectives of the Amendment and will not drastically reduce the quantity of EFH protected.

Alternative 1/No Action is considered to have lower vulnerability areas than Alternative 8, but because scallop dredges and special access trawls can access to the sandy and higher energy areas in the southern part of the closure, the DEIS finds this alternative to have positive impacts for EFH overall, but slightly negative impacts as compared to Alternative 8.¹⁶⁰ Alternative 1 has greater groundfish diversity than Alternative 8, but Alternative 8 has greater all species and regulated species diversity.¹⁶¹ The no action alternative is highly positive for groundfish, with the DEIS acknowledging the benefits in particular to haddock and winter flounder from closures and to the industry that “edge fishes” along the western side of the existing CAII GCA, as well as significant spawning hotspots within the closure.¹⁶²

The justification for Alternative 8, on the other hand, is overwhelming. It incorporates more vulnerable habitat identified through the SASI and LISA analysis than any other alternative in the DEIS. Due to this extensive coverage of vulnerable habitat, the DEIS indicates that it is very unlikely that this alternative will displace fishing onto more vulnerable habitat.¹⁶³ Alternative 8 is expected to have neutral to slightly negative impact on juvenile groundfish compared to Alternative 1, with cod and haddock benefitting from this closure whereas

¹⁶⁰ DEIS, Vol. 3, p.251.

¹⁶¹ DEIS, Vol. 3, p.259.

¹⁶² DEIS, Vol. 3, p.311.

¹⁶³ DEIS, Vol. 3, p.256.

yellowtail would not and might be harmed by the resulting opening of the southern part of CAII GCA.¹⁶⁴ This observation in the DEIS appears inconsistent with the fact that scallop dredge and special access trawl fishing already occurs in the areas of yellowtail EFH and abundance, so the impact on yellowtail of an Alternative 8 closure may be overstated in the DEIS. Yellowtail presence and absence in the southern part of CAII may also be seasonal and able to be protected by seasonal, dynamic habitat closures. Alternative 8 also includes known winter flounder EFH and abundance and winter flounder is known to benefit from closed areas.¹⁶⁵ It also includes herring spawning and larval aggregations.

The remaining alternatives, other than Alternative 1, either reduce the area of protected EFH to a fraction of the existing CAII, or utilize management measures that are unlikely to protect EFH (e.g. protections limited to gear modifications that the Council's technical advisors have recommended against) and therefore fail to meet the goals and objectives of the Amendment.

The economic impact of both the Alternative 1/No Action and Alternative 8 are identified by the DEIS as highly negative, due largely to their impacts on the scallop industry and its inability to access scallops in the Northern Edge HAPC.¹⁶⁶ The DEIS considers the groundfish benefits of Alternative 1 to offset the costs to the scallop industry and thus rates the social impact of Alternative 1 as neutral, whereas the social impact of Alternative 8 is moderately negative.¹⁶⁷ In estimating these social and economic impacts, the DEIS does not appear to take into consideration the additional revenues associated with opening CAI GCA and CAII GCA in the event that Alternative 8 were instituted as an HMA. The analysis and the practicability analysis also fails to consider the status of the scallop stock distribution as represented in its last assessment, which indicated substantial abundance in the southern portions of Georges Bank in recent assessments, which would greatly reduce the economic impacts of Alternative 8 on the scallop fishery. The DEIS ultimately is inconclusive as to the practicability of all of the alternatives proposed for Georges Bank.¹⁶⁸

5. Great South Channel and Southern New England.

¹⁶⁴ DEIS, Vol. 3, p. 336.

¹⁶⁵ DEIS, Vol. 3, p.311.

¹⁶⁶ DEIS, Vol. 3, p. 429.

¹⁶⁷ DEIS, Vol. 3, p.429.

¹⁶⁸ DEIS, Vol. 4, p. 123.

The Great South Channel is an ecologically important area for many species, including fish, marine mammals, and other species. This area is important for spawning of Atlantic herring and serves as a migration route for river herring, shad, and other species moving in and out of the Gulf of Maine and Georges Bank.¹⁶⁹ Although considerable vulnerable habitat has been identified here through the Council's SASI/LISA analysis, only a portion of that identified area is included among the EFH alternatives contemplated by the Council. The only alternative that proximately serves the goals and objectives of the Amendment is Alternative 1/No Action. All other proposed alterations compromise spawning hotspots, important EFH and fail to meet the goals and objectives.

If the Closed Area I Groundfish Closed Area (CAI) is eliminated, it is essential that a new closed area be established in this area. Alternative 3/Option1 comprises more vulnerable habitat identified by the SASI and LISA analyses than any of the other alternatives in this area and its impact of seabed habitat is moderately positive relative to existing closures in the sub-region.¹⁷⁰ The area also includes the Cox Ledge areas that have been identified as important ecological areas in this process as well as by Rhode Island's SAMP. Any ability to accurately analyze Alternative 3 for groundfish impacts is limited to that large portion of the Nantucket Shoals that is not surveyed.

But it is patently inadequate by not including all the vulnerable hard bottom habitats identified by the SASI and LISA process. It is not apparent from the DEIS what criteria were used by the NEFMC for including some SASI/LISA highlighted areas for protection and for excluding others, presenting a picture of a blatantly arbitrary decision-making process. Again, there is a significant disconnect between the scientific analysis undertaken by the NEFMC and the scope of the alternatives that have been presented for analysis and public review. This is completely inconsistent with NEPA's purposes.

III. Closing comments

The DEIS states that the premise of the Amendment is that "there are habitats linked to higher survival and/or growth rates of juveniles which are vulnerable to the adverse effects of fishing. By protecting these habitats, recruitment rates will increase. By increasing recruitment

¹⁶⁹ See preferred alternatives proposal of CLF, Pew, NRDC, Oceana and Earth Justice dated February 20, 2014 (attached as Attachment 1).

¹⁷⁰ DEIS, Vol. 3, p. 344.

rates, the productivity of managed species with life stages that rely on those vulnerable habitats will increase.”¹⁷¹ The protection of habitat is essential to maintaining productive and resilient marine ecosystems, allowing these systems to be capable of providing abundant fish to support fisheries and coastal communities. As described in the DEIS, the intent of the EFH provisions of the MSA is to ensure that this goal is met as part of the mission of sustaining fisheries and producing optimum yields for the United States. This Amendment presents an opportunity to meet these goals and objectives, and yet it appears this opportunity has been lost through an over-politicized and short-term-economic-gain-dominated process has rendered alternatives that will reduce habitat protection and further jeopardize productivity in New England rather than improve upon it.

CLF strongly urges that the Council and NOAA Fisheries consider modifying the Amendment/DEIS extensively consistent with the comments contained here as well as those comments provided by numerous others to the same effect in order that the numerous issues and concerns associated with the Amendment and the DEIS and the underlying alternatives are made more consistent with the administrative record of this proceeding and best available science. While it is the end of a long process, most, if not all, of the issues raised by CLF in these comments have been made—often repeatedly—during the EFH process and were ignored.

This inadequate effort was not inevitable. It is telling to review similar efforts by the North Pacific Fishery Management Council and the Pacific Fishery Management Council and see the more thoughtful and cautionary approaches they adopted for their analysis and decision making. Such precaution is not to be found in the NEFMC’s Amendment or DEIS. If the New England Fishery Management Council had established a more successful track record in achieving optimum yield for all its fish stocks over the past several decades, more deference to their judgment on managing EFH for sustainably, healthy fisheries might be appropriate. The fact that they have not been as successful as other councils in their management approaches should, at a minimum, invoke a cautionary response in NOAA Fisheries in its review of this inadequate Amendment.

Sincerely,



¹⁷¹ DEIS, Vol. 1, p. 88.



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February 20, 2014

Thomas J. Nies, Executive Director
New England Fisheries Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Mr. Nies:

We are writing to provide preliminary comments to the New England Fisheries Management Council (Council) and the National Marine Fisheries Service (NOAA Fisheries) on the Draft Environmental Impact Statement (DEIS) and associated alternatives for the Omnibus Essential Fish Habitat (EFH) Amendment (Amendment).

I. INTRODUCTION

After years of development and much delay, this Amendment is being finalized at a time when numerous groundfish stocks including both Georges Bank and Gulf of Maine cod, Gulf of Maine haddock, and yellowtail flounder are in a time of crisis. Stock assessments exhibit significant retrospective patterns and scientists have already cautioned that their assessments may be optimistic in terms of predicting the actual condition of those stocks. With cod, age structure is significantly truncated and weights at age are low. The effect of climate change on the temperature, chemical composition and movement of our ocean waters has never been more evident and its implications more uncertain. Ecosystems are in a state of flux with the introduction of new species and changed environmental conditions. At no time in the management of our oceans has there been a greater need for precaution to help mitigate against this ecological and commercial uncertainty. Rather than promise enhanced protection of EFH and measures that will provide stability and resilience in the face of these challenges, the Council and NOAA Fisheries appear poised to approve an Amendment that will drastically reduce the extent of EFH protected and allow trawls and other fishing in areas of the New England waters that have served for nearly twenty years as refuges for innumerable species.

The Council will select preferred alternatives at its February meeting. This letter identifies some of our concerns with the Amendment and its approval process. In summary, we request that the Council take the following actions:

A. Requested Actions

- 1. The Council should methodically assess each proposed alternative and management measure to determine whether it advances the specific goals and objectives of the Amendment and the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA);¹**

¹ Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801-1884 (2007) ; 50 CFR § 600.815 (a) (10) Review and revision of EFH components of FMPs. NOAA Fisheries is intended to be an active participant in this process, providing written recommendations for the EFH components of the relevant fishery management plans. § 600.815 (b) Development of EFH recommendations for Councils.

2. **The Council should include alternatives that protect prey species as EFH for regulated species;²**
3. **The Council should select preferred alternatives that best achieve the goals and objectives of the Amendment and the EFH provisions of the MSA, and identify the specific scientific basis for each selection in order to inform NOAA Fisheries' and the public's review of the DEIS;**
4. **The Council should identify any goal or objective that will not be met through this amendment and explain how it will be addressed in the future; and**
5. **The Council should request that the Science and Statistical Committee (SSC) review the Amendment's goals and objectives and offer its guidance on how best to meet them, based on the available alternatives and information.**

B. The MSA and the Relationship Between Habitat and Fisheries

The MSA defines EFH in broad terms that are fundamentally grounded in ecological science and oriented toward species needs, requiring that the focus of the Council's EFH management efforts be upon "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."³ The term "substrate" is further defined in the MSA's implementing regulations to include "sediment, hard bottom, structures underlying the waters, and associated biological communities."⁴

The MSA requires NOAA Fisheries and regional councils to develop and implement fishery management plans that minimize adverse impacts to essential fish habitat in the marine environment including places where young fish can find refuge, food, and other conditions promoting growth to maturity, places that protect key prey species and the habitat needed to support these prey, especially those prey needed by pre-spawning adult fish essential to spawning migrations, the production of eggs and milt, and successful courtship and spawning, and the places where spawning fish and their spawn aggregate.⁵ All of these key aspects of the behavioral ecology of fish must be considered when developing and selecting alternatives. Periodic updates and improvements to the EFH program should occur no less than once in five years.⁶

NOAA Fisheries and the Council are charged with stewardship of living marine resources through management of wild-capture fisheries of the Gulf of Maine/Georges Bank region. These fish and shellfish resources are available as products of intricate marine ecosystems that depend upon many factors including: the population structure of individual species, the relative mix of species and ecological community types, predator-prey dynamics, and the diversity of habitat types needed to support not only the fish that are harvested directly but the myriad of interconnected species that form the fabric of functional ecosystems and are thus integral to their survival and health.

² 50 CFR § 600.815(a)(7).

³ 16 U.S.C. § 1823(10).

⁴ 50 CFR § 600.10.

⁵ 16 U.S.C. § 1853(a)(7): Every fishery management plan must "describe and identify essential fish habitat for the fishery . . . and 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."

⁶ 50 CFR § 600.815 (a) (10): Review and revision of EFH components of FMPs.

The relationship between the integrity of habitat and the health of wild animal populations is indisputable; habitat loss through degradation is prominent among factors leading to the extinction of animal populations and consequently is a key focus of both the Endangered Species Act and the MSA.⁷ The marine ecosystems and the fish that they yield have been in decline for decades due to fishery management practices that have not been adequately informed by ecosystem science, unintended mortality of non-target species, or adequate data on fishing impacts and habitat degradation. The transformation of marine ecosystems to a new state offering fewer benefits and less predictability is expected considering information from a diversity of ecosystems around the world.⁸ With our fish stocks in their current state, and the effects of climate change already being felt in the region, it is urgent that meaningful habitat protection is implemented in New England.

II. Critical Actions to Ensure Compliance with Legal Requirements

A. The Council must methodically assess each proposed alternative and management measure to determine whether it advances the specific goals and objectives of the Amendment and the EFH provisions of the MSA.

The MSA and the National Environmental Policy Act (NEPA) require a considered process, based on the best scientific information available, to conserve and restore ocean ecosystems and sustain fisheries into the future. A comparative analysis of alternatives must be developed to facilitate objective decision making within a scientific and quantitative framework.

The MSA requires an EFH Amendment to both (1) enhance EFH and (2) minimize the adverse effects of fishing to such habitat to the extent practicable and in this case the goals are to be attained through a review of available data and evaluation of existing EFH management areas, including habitat areas, groundfish closed areas, and Habitat Areas of Particular Concern.

NEPA requires that the EFH Amendment incorporate a broad range of EFH management alternatives. The central purpose of NEPA is to ensure that both decision-makers and the public are well-informed about the potential adverse environmental effects of proposed actions and the range of available alternatives and mitigation measures that could reduce those adverse effects.⁹ This is best accomplished through an EIS. The NEPA requirement that a comprehensive range of the reasonable alternatives be analyzed is “the heart of the [EIS].”¹⁰ The Council and NOAA Fisheries must “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.”¹¹ The environmental impacts of the proposed action and any alternatives must be presented in comparative form, “sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public.”¹² The central purpose of NEPA “is to ensure that agencies are fully aware of any adverse environmental effects of their actions, and of all feasible alternatives which may

⁷ 16 U.S.C. §§ 1531-1544 (1973) and 16 U.S.C. §§ 1801-1884 (2007).

⁸ Travis et al 2013. Integrating the invisible fabric of nature into fisheries management. PNAS. Available at: www.pnas.org/cgi/doi/10.1073/pnas.1305853111

⁹ See, *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989) (NEPA ensures that the agency will “carefully consider detailed information concerning significant environmental impacts” and that such information is available to the public); accord, *Baltimore Gas & Electric Co. v. NRDC*, 462 U.S. 87, 97 (1983). NOAA Fisheries’ regulations emphasize its duty to prepare an EIS that adequately informs the public of the environmental impacts of the proposed action: “An EIS must provide a full and fair discussion of significant environmental impacts.” (National Oceanic and Atmospheric Administration Administrative Order 216-6, hereafter “AO 216-6”) AO216-6 § 5.04.a.1.

¹⁰ 40 C.F.R. § 1502.14; 42 U.S.C. § 4332(2)(c)(iii).

¹¹ 42 U.S.C. § 4332(2)(E).

¹² 40 C.F.R. § 1502.14.

have lesser adverse effects on the environment, so that final decision-making will be informed by a full understanding of relevant environmental impacts.”¹³

The record of debate and comment letters on the Council’s EFH DEIS demonstrate the unresolved conflicts over uses of the available resources in New England.¹⁴ Thus it is incumbent upon the Council to carefully describe appropriate alternatives to recommended courses of action based upon transparent analyses that show the environmental impacts of fishing on EFH along with the cost and benefits associated with each alternative. In the particular case where the Council will be selecting habitat protection areas and management measures throughout an ecologically diverse region with identified sub-areas, the analysis must illuminate the cumulative benefits associated with ensembles of areas within and among sub-areas. It is not sufficient to consider individual component alternatives as if the overall ecological performance of the region did not depend upon interactions among the various sets of areas considered in the DEIS.

Substantive technical work has been completed by the Council and NOAA Fisheries to inform the development of the EFH alternatives. Nonetheless, the systematic relationship between this scientific information and the specific alternatives has not yet been made sufficiently clear. The available information must be laid out in a systematic decision framework, thus allowing all concerned stakeholders the opportunity to evaluate each alternative as compared to the others, and as measured against the goals and objectives of the Amendment.

B. The Council must select a set of preferred alternatives that best achieves the goals and objectives of the Amendment and meets the MSA’s EFH requirements, and identify the specific scientific basis for each selection in order to inform NOAA Fisheries’ and the public’s review of the DEIS.

The Council must adhere to the established goals and objectives of this Amendment as well as the EFH requirements of the MSA, and ensure that the best available scientific information is relied upon to guide and direct the preferred alternative selection process. These goals and objectives clearly signal the Council’s intent for the Amendment and closely follow the EFH requirements specified in the MSA.

The significant work of the Council’s Habitat Plan Development Team (PDT) and Closed Area Technical Team (CATT) has identified new areas that could be important additions to the region’s EFH portfolio. The Council’s utilization of the analysis, however, has been haphazard. The resulting alternatives are not simply based on the technical analysis but also rest on anecdotal information provided by individual users about the commercial import of particular places. In most cases, these anecdotal views were provided without scientific support or further analysis by the Council.

The discussions at the Council over the past several years indicate that this management body approaches the new EFH amendment with two foregone conclusions: (1) the existing system of groundfish closed areas and associated habitat areas (*status quo*), spanning over six thousand square nautical miles, is no longer needed and should be replaced by new areas, and (2) the overall area devoted to EFH protection should be substantially reduced. With respect to the first assumption, there has been little discussion of how the existing areas, with or without management changes (e.g., more gear restrictions), would perform against the goals and objectives of the amendment when compared with the proposed alternatives. Regarding the second assumption, the Council

¹³ American Oceans Campaign v. Daley, 183 F. Supp. 2d 1, 21(D.D.C. 2000).

¹⁴ Letter to Council Executive Director, Thomas Nies, from CLF et al, dated June 8, 2013; Letter and appendix to NOAA Fisheries Regional Administrator John K. Bullard, April 9, 2013 from The Pew Charitable Trusts; Public comments, NEFMC meeting, December 18, 2013 available at: www.nefmc.org/habitat/council_mtg_docs/Dec%202013/council_habitat_dec_2013.html

has introduced alternatives for every sub-region that would eliminate all EFH areas if selected and implemented. In most regions, except for the Gulf of Maine, every alternative other than the *status quo* alternative would lead to substantially less area protected. Although some have suggested that more focused protection of better habitat might provide more benefit than the larger areas, there have been no rigorous analyses to support this contention.

The Council's interest in scaling back the total area devoted to EFH protection is apparent from Council deliberations and the range of alternatives included in the DEIS. Thus, this Amendment will very likely add protection in new smaller areas, simultaneously remove protection from substantially larger areas, with a substantial net loss for habitat protection. Reducing EFH protection is difficult to reconcile with the Amendment's goals and objectives (e.g., goal 9, objectives F and L; see Appendix I), which call for protection, restoration, and rehabilitation of degraded fish habitat and enhancing groundfish productivity. While it is theoretically possible that smaller areas would perform better, this is not well supported by the science presented in the DEIS. These important goals and objectives are best met by enhancing protection of existing habitat areas and building the portfolio of key habitat areas by adding additional large areas.¹⁵

The question of what the final ensemble of EFH areas must achieve for the region has not been addressed adequately. If the Council ultimately chooses to change the overall extent of EFH, will the ensemble of EFH be enough to meet the biological goals specified in the Amendment and the MSA? These are complicated scientific questions on which the Council must seek guidance from its SSC.

When the SSC evaluates the status of a stock, it uses the best available science to determine how much can be taken each year without jeopardizing the future of that resource. Because the science is inherently uncertain, precaution is taken in establishing an Acceptable Biological Catch (ABC) that is more precautionary than the estimated maximum sustainable yield. Similarly, ecological science must be brought to bear on the question of how much habitat can be exploited by fisheries without compromising the ecosystem's capacity to deliver fish and other ecosystem services. How much of each type of EFH is needed and what biological risks are attendant to erring on the side of less EFH protection? The Council's Habitat Committee spent years developing the Swept Area Seabed Impact (SASI) model¹⁶ and applying the Local Indicators of Spatial Association (LISA)¹⁷ cluster analysis for identification of seabed areas that are vulnerable to fishing impacts, yet the alternatives present in the DEIS capture only a small fraction of these vulnerable areas. What is the scientific basis for deciding that only a fraction of these areas shall be protected from some gear, and what are the associated risks? These questions have not been answered adequately and must be directed to the SSC. Without further analysis and guidance, the Council, NOAA Fisheries, and the public will be unable to make responsible decisions on issues of significant importance.

Amendment Objective M and the MSA's own definition of EFH both seek to improve refuge for the critical life history stages of managed fish. The combined efforts of the Habitat PDT and the CATT have provided a strong basis from which the Council could have developed alternatives to improve the protection of habitat areas needed at critical life history stages such as juveniles, eggs of substrate spawners such as Atlantic herring (an important forage fish), and expanded protection for the largest individual fish which contribute the most to future generations. Proposals put forward by the CATT and PDT that would have helped achieve this objective, however, have been consistently rejected for inclusion in the DEIS, particularly in near-shore areas. If the

¹⁵ Edgar GJ et. al., (2014) Global conservation outcomes depend on marine protected areas with five key features. *Nature* **506**:216-220.

¹⁶ Summary of SASI and LISA available at: www.nefmc.org/habitat/sasi_info/110624_SASI_Summary_v2.pdf; DEIS, Vol. 5, App. D

¹⁷ Anselin L (1995) Local Indicators of Spatial Association – LISA. *Geographical Analysis* **27**(2):93-115.

principal goal of increased productivity is to be achieved, habitat for critical life stages must be protected through this Amendment.

The DEIS includes discussion of the importance of spawning areas and presents alternatives intended to meet the Amendment's Objective K pertaining to spawning protection. However, these provisions essentially call for a continuation of the *status quo* system of rolling or short-term seasonal closures to protect spawning aggregations. Moreover, the DEIS contains an alternative that would allow measures to protect spawning fish to be implemented outside of the EFH amendment through a future action. In the final analysis, the DEIS fails to develop serious spawning alternatives that could improve over *status quo* and defers action to a future policy decision.

The DEIS fails to provide EFH management alternatives for, or to otherwise even address, areas of the water column vital for spawning, breeding, feeding, or growth to maturity. Despite the definition of EFH in the MSA and Federal regulations, the Council and NOAA Fisheries have adopted an overly narrow interpretation of habitat in developing this DEIS – one that includes the seafloor substrates but neither the water column nor other marine life (e.g., forage fish, sponges or other epibenthic fauna are not addressed directly) that are essential for spawning, feeding and growth to maturity. There are no alternatives that specifically define areas of the water column as EFH (e.g., for spawning, or areas where larvae or juveniles may aggregate in the water column). Thus important portions of the MSA's definition of EFH are neglected entirely.

C. Discussion of alternatives for specific sub-regions

There are deficiencies in the alternatives that the Council has included in the DEIS, most conspicuously in the Georges Banks and Southern New England sub-regions. The overall extent of EFH protection will likely be substantially reduced if the current alternatives remain the only ones from which the Amendment is ultimately crafted. The Council has signaled its interest in opening some areas that have been closed for decades. Additionally, much of what the Council's technical teams (i.e., CATT and Habitat PDT) have identified as candidate EFH areas is likely not to be protected as they are not even included among the alternatives. We strongly urge that the Council and NOAA Fisheries use the public comment period as an opportunity to improve the range and quality of the alternatives in the DEIS, relying upon new information and analysis developed through the comment process as intended by NEPA. The Amendment has been a decade in the making and in that context the additional work needed will not impose a significant delay.

All sub-regions: no closure alternatives. For every sub-region identified in the DEIS, an alternative is proposed that would eliminate all existing groundfish and habitat closures. These alternatives would not implement any future closures or other management measures to protect EFH. These alternatives do not meet any of the goals or objectives of the amendment nor do they comport with the MSA.

The theory behind these alternatives is that reductions in fishing effort and associated "swept area" from fishing gear over the past years has reduced the impact on EFH. Thus, it is suggested that the reduced effort itself can be considered a measure undertaken by the Council and NOAA Fisheries to mitigate the effects of fishing gear on EFH as required by the MSA.

We believe this theory to be flawed for two reasons. First and foremost, there are no data demonstrating that reductions in fishing effort have resulted, or could result, in any benefit or protection to EFH in New England. Less fishing may reduce the statistical likelihood of interactions between gear and habitats, but that does not necessarily equate with meaningful habitat protection. Habitat damage does not necessarily scale linearly with

fishing effort, as initial impacts sometimes cause the most harm.¹⁸ To the extent that closed areas are opened to fishing, even under a reduced effort scenario, they are still susceptible to the impacts of fishing, whether that amounts to a single pass from a trawl, dredge, or mid-water net or to repeated gear impacts in a given area. Second, reductions in fishing have occurred due to efforts to rebuild overfished and diminished stocks, not as a result of any habitat-related action of the Council. Considering that the Council is legally required to rebuild overfished stocks, allowable catch will increase as a stock rebuilds along with fishing effort. As this occurs, any of this postulated habitat protection by way of effort reduction will be reduced.

Gulf of Maine. The existing Western Gulf of Maine Groundfish Closed Area (WGOMCA), Cashes Ledge Groundfish Closed Area and Jeffrey’s Bank Habitat Closed Area are longstanding closures that comprise a network of protected EFH spanning the Gulf of Maine. These areas are known to benefit juvenile fish of various species and to harbor productive female fish.¹⁹ Protection of Gulf of Maine cod EFH in these areas, particularly the WGOMCA and Cashes Ledge, will benefit the spawning, larval and juvenile fish and will help to restore resilience to struggling cod populations.²⁰ These areas represent EFH for a wide range of commercial species including cod, haddock, pollock, American plaice and others. Both Cashes Ledge and the WGOMCA comprise spawning areas, and all three provide protection for critical groundfish habitat and refugia for critical life history stages, consistent with the goals and objectives of the Amendment. Edge fishing along the perimeter of these areas suggests that these existing closures are contributing to the productivity of commercial species today.²¹

The DEIS, and the SASI model documentation itself, note the relative paucity of data pertaining to geological and biological features in the Gulf of Maine. Despite the sparse data for this sub-region, each of these areas was identified as supporting vulnerable habitat through SASI and LISA analyses. Though data-limited, Cashes Ledge is nonetheless an area well known for its ability to support a uniquely abundant variety of species, a diverse selection of habitats including steep, kelp-covered ledges, muddy basins and boulder and cobble areas. Any action to remove protections from these areas that have benefitted from nearly twenty years of limited benthic disturbance from fishing would be irresponsible and inconsistent with the goals and objectives of the Amendment.

In Downeast Maine, new EFH areas are contemplated in the waters of Penobscot Bay and off of Machias. These are important and distinct ecological area as shown by SASI/LISA, data showing presence of juvenile groundfish, and documented important spawning areas for herring (Appendix II) and other fish. The Council and NOAA Fisheries should add this area to the portfolio of protected EFH in the Gulf of Maine.

Georges Bank. Absent new alternatives for the northeastern end of Georges Bank, the existing Closed Area II Groundfish Closure (CAII) must be selected as a preferred alternative so that it will continue to protect EFH on Georges Bank. It is currently the only alternative identified in the DEIS for this part of Georges Bank that meets the goals and objectives of the Amendment and will not drastically reduce the quantity of EFH protected.

¹⁸ See, DEIS, Vol. 5, App. D: The Swept Area Seabed Approach (SASI), p.190, conceding the possibility of a “first pass” impact and the SASI model’s failure to account for this possibility; Effects of Bottom Trawling on Seafloor Habitats, National Research Council 2002; Watling L, Norse EA (1998) Disturbance of the seabed by mobile fishing gear: A comparison to forest clearcutting. *Conservation Biology* 12(6):1180-1197; Rieser A, Watling L, Guinotte J (2013). Trawl fisheries, catch shares and the protection of benthic marine ecosystems: has ownership generated incentives for seafloor stewardship? *Marine Policy* 40:75–83.

¹⁹ See, DEIS, Vol 3, pp. 217, 228.

²⁰ See e.g., Pershing A et. al., (2013) The future of cod in the Gulf of Maine. Gulf of Maine Research Institute, pp 11-12; Moland E et. al., (2013) Lobster and cod benefit from small-scale northern marine protected areas: inference from an empirical before–after control-impact study. *Proc R Soc B* 280: 20122679.

²¹ Murawski S et al (2005) Effort distribution and catch patterns adjacent to temperate MPAs. *ICES J. Mar. Sci.* 62(6):1150-1167.

The Council's own analyses clearly point to the development of an alternative to the *status quo* which would encompass an area along the Northern edge extending from the existing Habitat Area of Particular Concern (HAPC) West through the area known as "The Fingers." No such alternative, however, is included in the DEIS. Although this deficiency has been noted in NOAA Fisheries correspondence and debated at the Council, proposals for new alternatives to address this deficiency have been rejected.²² The justification for such an alternative is overwhelming, including results from the SASI and LISA analysis, as well as herring spawning and larval aggregations (see part II E below, and Appendix II). Despite this, and without having completed any analysis of the practicability of such an alternative, the Council has favored alternatives that either shrink the area of protected EFH to a fraction of the existing CAII, or that provide somewhat more area but with management measures that are unlikely to protect EFH (i.e., protections limited to gear modifications that the Council's technical advisors have recommended against). We request that one or more new alternatives consistent with the analysis referenced here be introduced for the Northeastern part of the bank. In the absence of such an alternative, the Council should select CAII as the preferred alternative. The other alternatives for this sub-region fail to meet the goals and objectives of the Amendment.

Great South Channel and Southern New England. Sitting at the intersection of three ecological regions, the Great South Channel is an ecologically important area for many species, including fish, marine mammals, and other species. Together with Nantucket Shoals, this area is important for spawning of Atlantic herring (see Appendix II) and serves as a migration route for river herring, shad, and other species moving in and out of the Gulf of Maine and Georges Bank. Although considerable vulnerable habitat has been identified here through the Council's SASI/LISA analysis, only a portion of the area is included among the EFH alternatives contemplated by the Council. All indications are that the Council will eliminate Closed Area I. Thus, we request that the Council and NOAA Fisheries review the available scientific information together with new information provided by the public and develop one or more alternatives for this area that encompass herring spawning grounds and the vulnerable habitat areas identified through SASI/LISA. Special consideration should also be given to EFH protection for the biologically rich shallows of Nantucket Shoals.

Preferred alternatives. Based upon the information that is available now, we recommend the following as preferred habitat alternatives for the purposes of public comment and further analysis (see map, Appendix III at the end of this letter). We believe these areas will bring the Council closer to meeting the Amendment's goals and objectives than other combinations of areas now contemplated, except for *status quo*. With further analysis addressing the issues raised in this letter, and through the public comment period, additional alternatives should be put forward that better meet the EFH requirements of the MSA.

- **Gulf of Maine:** *status quo areas* (groundfish and habitat areas) together with two new Downeast areas (Machias, Large Eastern Maine), and an eastern extension of WGOMCA to encompass all of Jeffrey's Ledge and Lower Jeffrey's and to include Tillie's Bank.
- **Georges Bank:** an area extending from the current HAPC along the Northern Edge to the west capturing the LISA trawl clusters as well as herring spawning areas to the north and providing a buffer to the north and south sides of the area.
- **Great South Channel/Southern New England:** Great South Channel East alternative expanded to include the northern part of the Nantucket Lightship Habitat Area, and Cox Ledge 1 and 2 combined. This area is comprised of a combination of proposed Great South Channel Alternatives 3 and 6 and a more comprehensive protected area around Cox Ledge including a buffer area.

²² Letter from NOAA Fisheries Regional Administrator John Bullard to NEFMC Chairman Ernest F. Stockwell, III, dated August 30, 2013; Motions to introduce new alternatives for Georges Bank (6 a-c), NEFMC meeting, Hyannis, MA, Tuesday, September 24, 2013.

D. The Council must choose management measures that will not undermine the intended purpose of EFH designations.

The benefits to the region of a well-designed EFH program can be substantial but will only accrue if there is effective management of the EFH areas.²³ Designation of EFH alone is not enough. The Council and NOAA Fisheries cannot expect great returns on habitat areas where there are limitations on the use of certain kinds of fishing gear, but other gear such as clam and scallop dredges are allowed, or where the fish themselves or their prey are intensely impacted by gear that may not appear to damage bottom structure (e.g., mid-water herring trawls or other gear not typically considered to be bottom tending).

Clam Dredge Exemption. The suite of proposed management measures that the Council can choose to implement in any given habitat protected area includes, in every instance, an option to allow hydraulic clam dredging within the protected area from which all other bottom tending mobile gear would be prohibited. The clam dredge exemptions must not be chosen as preferred alternatives.

This singular exemption for hydraulic dredges is inconsistent with the findings of the Council’s technical and science advisors and the outputs of the relevant models utilized to develop this Amendment, as reflected by data contained within the DEIS. These data reflect that hydraulic clam dredges are among the fishing gears with the greatest impacts of those analyzed by the Habitat PDT.²⁴ Moreover, the analysis assumes that hydraulic clam dredges will not be operated in muddy or rocky habitats.²⁵ The technical and science staff specifically found that these dredges “have a more severe immediate impact on surface and sub-surface habitat features than other fishing gears used in the Northeast region.”²⁶ Based upon this substantial evidence in the record that hydraulic clam dredges have greater impacts than any other gear used in New England, the inclusion of an exemption in the DEIS that would allow them within any and all proposed habitat protected areas is inconsistent with the goals for these areas.

Gear Modification Areas. Because there is no scientific evidence supporting the use of gear modification strategies as a means of protecting EFH, any alternative that proposes such an approach fails to comply with National Standard 2 and thus should not be selected as a preferred alternative by the Council.

The DEIS contains habitat protection alternatives with management based only upon modifications to trawl fishing gear (i.e., gear modification). Such modifications are designed to reduce impacts on benthic habitat but would continue to allow harmful dragging in areas that have been identified as vulnerable habitat. The DEIS includes two gear modification management measures, each of which could be applied to proposed habitat alternatives. Each allows for fishing within a habitat protected area, one using trawls with ground cables modified with elevating disks and a length per side capped at 45 fathoms, the other requiring that ground cables be eliminated entirely and cap bridle lengths limited to 30 fathoms per side. Additionally, in certain of the proposed habitat alternatives, a gear modification is the only proposed management measure. These include WGOM Alternative 7 (roller gear size restrictions), Georges Bank Alternative 4 (no ground cable or raised ground cable restrictions), Georges Bank Alternative 5 (no ground cable or raised ground cable restrictions, elevated disks and bridle length caps), and Great South Channel Alternative 6 (ground cable modifications).

²³ Edgar GJ et. al., (2014) Global conservation outcomes depend on marine protected areas with five key features. *Nature* **506**:216-220.

²⁴ DEIS, Appendix D, pp.107-109, 126, 130, 182.

²⁵ Id. at p. 107.

²⁶ Id.

These gear modification management measures were selected by the Council for inclusion in the DEIS against the repeated recommendations of its science advisors who found that these approaches were not known to be protective of habitat. Council staff and the Habitat PDT recommended against the use of gear modification options because available information was inconclusive as to whether such gear modifications would reduce the adverse effects of fishing on EFH.²⁷ The Habitat PDT has also specifically questioned whether reductions in linear effective gear width would lead to increases in number or duration of trawls and identified information gaps that need to be satisfied before a determination can be made whether there would be a net benefit from use of gear modifications to reduce total area swept.²⁸

National Standard 2 of the Magnuson-Stevens Act requires that fisheries management measures be based upon the “best scientific information available.”²⁹ While the information upon which management decisions are based need not be perfect or based entirely upon consistent data, it must have *some* support in the data.³⁰ Where there is “no discernible, substantive scientific evidence” supporting gear regulations, courts have found that the regulations violate National Standard 2.³¹

E. The Council must protect prey species.

The MSA clearly identifies feeding and growth as essential elements of EFH. This is not surprising as the essential goals of the MSA, and fisheries management broadly, cannot be met if the food sources of the target stocks are themselves depleted. With few exceptions, the relevant food sources are animal populations such as small fish, crustaceans, mollusks and other benthic invertebrates. These populations occupy places in the water column and on the bottom that must be protected as part of the EFH for the managed species. As explained in the DEIS Appendix B, the presence of these species “makes the waters and substrate function as feeding habitat.”³²

To date NOAA Fisheries and the New England Fisheries Management Council have largely ignored this requirement of the MSA. The DEIS does include a compendium of prey-species but maps are not included and no alternatives are advanced in the DEIS to address the specific food needs of the managed species.³³ This deficiency can be addressed by taking several common sense steps, following examples from other regions (e.g., North Pacific, Pacific, and Mid-Atlantic), and utilizing data that NOAA Fisheries and the Council already have before them.

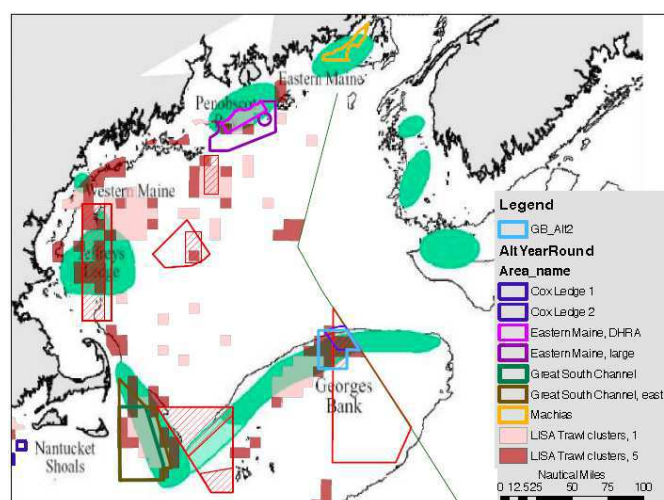


Figure 1. Spawning areas of Atlantic herring (green) shown together with SASI/LISA areas, existing EFH areas, and some of the DEIS alternatives. Spawning areas reproduced from the most recent stock assessment (SAW/SARC 54, 2012).

²⁷ See, Notes of Habitat Committee August 2012 meeting. See also, New England Fishery Management Council, *DRAFT: 03 October 2012: Gear modification options – ground cable length limits discussion/working document*, p. 8-9.

²⁸ *Id.*

²⁹ 16 USC § 1851(a)(1).

³⁰ *Ocean Conservancy v. Gutierrez*, 394 F. Supp.2d 147, 157.

³¹ See *Hall v. Evans*, 165 F. Supp. 2d 114, 134; *Parravano* at 1046.

³² 50 CFR 600.815(a)(7): Prey species. Loss of prey may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat, and the definition of EFH includes waters and substrate necessary to fish for feeding.

³³ DEIS Appendix B: *EFH supplementary tables, prey species information, and spawning information*. November 25, 2013.

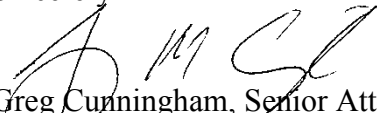
In brief, NOAA Fisheries and the Council should take the following steps to address these legal defects (for additional details see Appendix II: Forage Fish at the end of this letter):

- Prohibit fishing with mobile gear, and any gear capable of catching Atlantic herring, in areas where herring aggregate for spawning and where egg mats develop on the seabed (e.g., Northern Edge and Fingers region of Georges Bank, Nantucket Shoals, Great South Channel, Jeffrey's Ledge, and Penobscot Bay and other areas in Downeast Maine);
- Prohibit fishing with mobile gear, and any gear capable of catching sand lance, in areas densely populated by sand lance (e.g., portions of Stellwagen Bank);
- Prohibit new fisheries for forage species not currently supporting fisheries (e.g., sand lance, river herrings, shads, krill, and copepods).

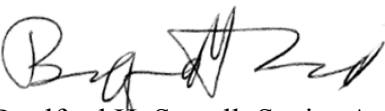
III. Closing comment

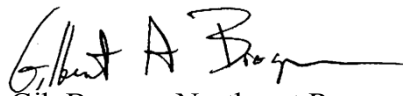
Habitat conservation is a vital part of maintaining productive and resilient marine ecosystems, allowing these systems to be capable of providing abundant fish to support fisheries and coastal communities. It is the intent of the EFH provisions of the MSA to ensure that this goal is met as part of the mission of sustaining fisheries for the United States. This EFH amendment offers New England an opportunity to improve its habitat protection program and in so doing increase future opportunities for fisheries and other uses of marine resources. The Council and NOAA Fisheries, as responsible stewards of public resources, must identify the best EFH alternatives available now in order to facilitate public comment. The Council and NOAA Fisheries must also carefully consider the new information brought forward through the public comment process, consistent with the requirements of the MSA and the goals and objectives of the amendment, and improve the range and quality of the current alternatives for final decision-making and approval of this amendment.

Sincerely


Greg Cunningham, Senior Attorney
Conservation Law Foundation


Roger Fleming, Attorney
Earthjustice


Bradford H. Sewell, Senior Attorney
Natural Resources Defense Council


Gib Brogan, Northeast Representative
Oceana


John D. Crawford PhD
The Pew Charitable Trusts

APPENDICES

Appendix I: Goals and Objectives

Goals and Objectives for EFH Amendment (from DEIS Volume I)

The goals and objective of the amendment must be met based on best available scientific information. The majority of the Goals (8 of 10) and Objectives (10 of 14) for the current EFH amendment were adopted by the Council in 2004, with several additions adopted in 2012 in response to the Council's wise decision to evaluate the existing groundfish closed areas through this amendment within the context of the EFH program. These goals and objectives clearly signal the Council's intent for the amendment and closely follow the EFH requirements specified in the MSA. Several of the key goals and objectives focused on what to do about EFH include the following:

- Identify and implement mechanisms to protect, conserve, and enhance the EFH of those species managed by the Council to the extent practicable (Goal 4);
 - Support restoration and rehabilitation of fish habitat which have already been degraded (by fishing and non-fishing activities) (Objective F);
- Enhance groundfish fishery productivity (Goal 9);
 - Improved groundfish spawning protection; including protection of localized spawning contingents or sub-populations of stocks (Objective K);
 - Improved protection of critical groundfish habitats (Objective L);
 - Improved refuge for critical life history stages (Objective M);
 - 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 (Objective N);
 - Design a system for monitoring and evaluating the benefits of EFH management actions including dedicated habitat research areas (Objective J);

Appendix II: Forage Fish

Food: Atlantic herring EFH. Atlantic herring, their spawning grounds and other critical areas, must be protected as EFH. Herring is a keystone species within the Northeast U.S. Continental Shelf large marine ecosystem,³⁴ serving a vital role as food for many of the region's most prized fish including Atlantic cod, haddock, and bluefin tuna. Herring also provide essential sustenance for other species under the stewardship of NOAA Fisheries, including whales and other mammals protected by both the ESA and the Marine Mammal Protection Act (MMPA). The influence of herring and a second major food source, sand lance, on the spatial distribution of cod was a focal point for a new analysis during the recent cod stock assessment. These two forage fish can represent over half of the adult cod diet and thus the places where these two forage species occur drive the spatial and temporal distributions of cod and other predators. When sand lance is in high abundance on Stellwagen Bank, cod concentrate there in places referred to as *forage hotspots* in the Gulf of Maine cod stock assessment.³⁵ At other times, cod redistribute themselves in the Western Gulf of Maine when feeding on herring. A recent peer reviewed study in the Proceedings of the National Academy of Sciences showed that not only are adult herring vital as food for cod and other groundfish, but their eggs and larvae are a major source of food for haddock.³⁶

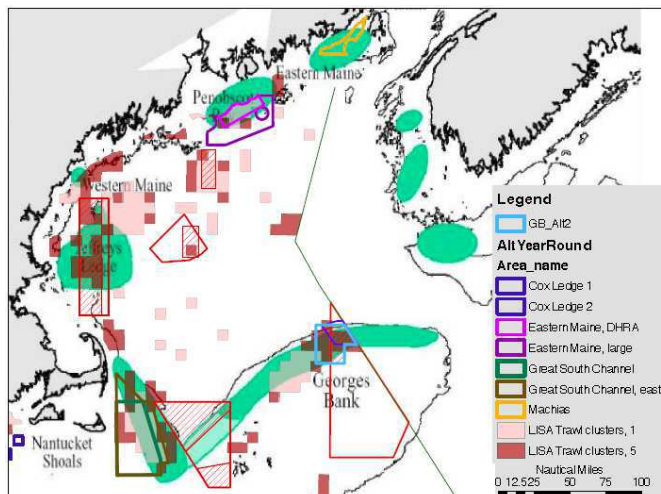


Figure A1. Spawning areas of Atlantic herring (green) shown together with SASI/LISA areas, existing EFH areas, and some of the DEIS alternatives. Spawning areas reproduced from the most recent stock assessment (SAW/SARC 54, 2012).

³⁴ Overholtz; Richardson DE et al (2010) ICES; Read and Brownstein, 2003; Brandt and McEvoy, 2006; Overholtz and Link, 2007.

³⁵ Gulf of Maine Atlantic Cod (*Gadus Morhua*) Stock Assessment For 2012, Updated Through 2011. 55th SAW Assessment Report. Northeast Fisheries Science Center Reference Document 13-11

³⁶ Richardson DE et al (2011) Role of egg predation by haddock in the decline of an Atlantic herring population. Proceedings of the National Academy of Sciences, 108 (33):13606–13611

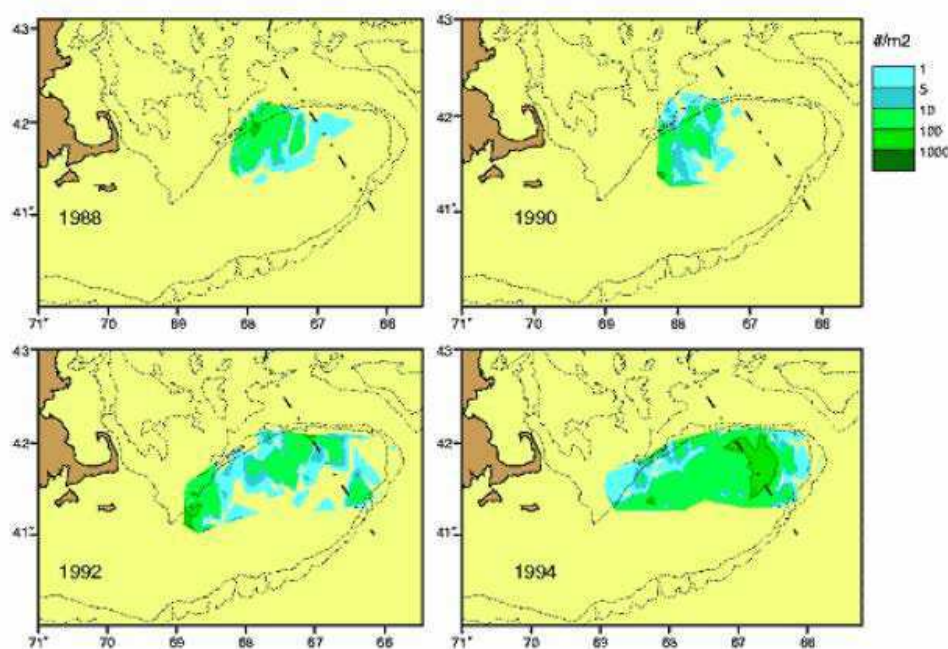


Figure A2. Distribution of recently hatched Atlantic herring on Georges Bank. Reproduced from EFH source document, NOAA Technical Memorandum NMFS-NE-192 (2005)

Atlantic herring form shoals during site-specific spawning behavior. In some cases, these shoals are vast (e.g., 250 million herring on the Northern Edge of Georges Bank at one time),³⁷ making the fish especially vulnerable to fishing at this critical life stage. Herring eggs are adhesive, sinking to the bottom where they adhere to rocks, pebbles, gravel, or shell beds selected for spawning, and form dense egg-mats.³⁸ Thus, not only are aggregated adults vulnerable to fishing during spawning but so too are the eggs on the bottom. Any gear contacting the bottom will disturb the eggs, particularly mobile gears such as otter trawls, clam dredges, and mid-water herring trawls. Herring spawning in a given locality may have a dominant time in the year, but spawning can occur at many different times year, from early spring through late fall in the Northeast. Management should be designed to ensure that even small spawning contingents are not inadvertently extirpated by fishing, which makes the population as a whole more vulnerable, and reduces the availability of herring as food (i.e., eggs, larvae, juveniles and adults) in space and time.

Distinct spawning groups of Atlantic herring have been documented over the past century as illustrated in the map above, reproduced from the most recent herring stock assessment (Figure A1).³⁹ This map does not capture

³⁷ Makris NC et al (2009) Critical Population Density Triggers Rapid Formation of Vast Oceanic Fish Shoals. *Science* **323**: 1734-1737.

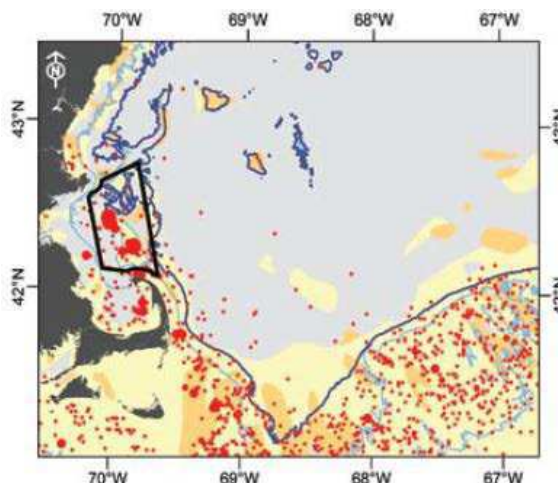
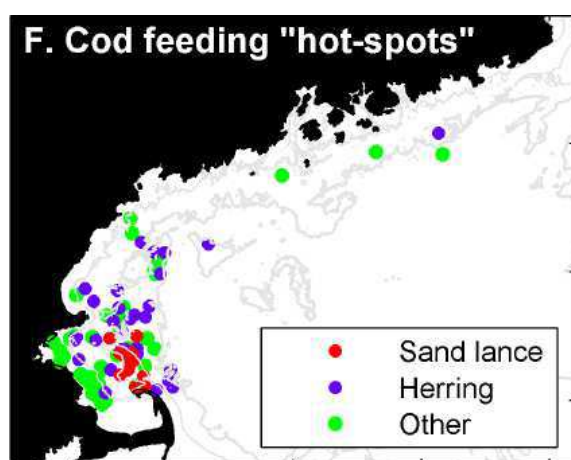
³⁸ Reviewed in Collette and Klein-MacPhee 2002

³⁹ Figure A4- 3 reproduced from SAW/SARC 54 Stock Assessment of Atlantic Herring – Gulf of Maine/Georges Bank For 2012, Updated through 2011: *Generalized view of the current major herring spawning areas in the Gulf of Maine and on George Bank*; an identical map is included as Figure 3 of the Essential Fish Habitat Source Document: Atlantic Herring, *Clupea harengus*, Life History and Habitat Characteristics. Second Edition, 2005. NOAA Technical Memorandum NMFS-NE-192.

a number of small near shore spawning localities, some of which may no longer exist, nor the spawning areas documented along the southern edge of Georges Bank.⁴⁰

Both the EFH management areas and the measures adopted for them must ensure that the spawning grounds for Atlantic herring are afforded sufficient protection to ensure spawning success for herring throughout the year. Herring spawning is driven by specific conditions of the substrate and water flow and use of particular places has waxed and waned throughout recent history. Management should allow for reestablishing spawning in areas where spawning may be minimal today.

Food: Sand lance as EFH. Sand lance is widely recognized as another vital forage species in the region, supporting marine mammals, seabirds, cod and other fish important to commercial and recreational fisheries. As noted in the discussion of Atlantic herring above, studies done for



the Gulf of Maine cod stock assessment indicate that cod aggregate on Stellwagen Bank to feed on sand lance when abundant.⁴¹ With other historically

Figure A3. The left panel shows data on cod feeding based on stomach contents and the right panel depicts the distribution of sand lance, an important forage fish; abundance is proportional to the diameter of each red point (1975-2000).

important forage fishes diminished in the region (e.g., river herring and shad), the role of Atlantic herring and sand lance are particularly important. Analysis of the stomachs of cod has revealed that Stellwagen Bank is a foraging hotspot for sand lance consumption (Figure A3 left).⁴² The map above (Figure A3 right) shows the distribution of sand lance in Southern New England including Massachusetts Bay, Stellwagen and Georges Banks and the Nantucket Shoals area.⁴³ Areas within Massachusetts and Cape Cod Bays, Georges Bank and points south which support high abundances of sand lance should be integral to an effective EFH management plan, including protection from mobile bottom tending gear, and any gear capable of catching sand lance.

⁴⁰ See Overholtz et al (2004) Stock Assessment of the Gulf of Maine - Georges Bank Atlantic Herring Complex, 2003. Northeast Fisheries Science Center Reference Document 04-06.

⁴¹ Gulf of Maine Atlantic Cod (*Gadus Morhua*) Stock Assessment For 2012, Updated Through 2011. 55th SAW Assessment Report. Northeast Fisheries Science Center Reference Document 13-11; Richardson, DE, Palmer MC, Smith B. 2012. The relationship of forage fish abundance to aggregations of Gulf of Maine Atlantic cod (*Gadus morhua*) and possible implications for catch-per-unit-effort indices. SAW 55 Data Meeting. August 27-31, 2012. Working Paper 4. 41 p.

⁴² Slide from Presentation by Michael Palmer, March 4, 2013. *Gulf of Maine Cod: From Bankers' Hours to Bankruptcy and the Role of Fine Scale Spatial Dynamics on Stellwagen Bank*

⁴³ Figure 50, page 102, Stellwagen Bank National Marine Sanctuary Final Management Plan and Environmental Assessment (2010).

Food: River herring and shad as EFH. The fate of the once abundant river herring and shad species (alosines) has received considerable attention at all the East Coast management bodies including Atlantic States Marine Fisheries Commission (ASMFC), Mid-Atlantic Fishery Management Council (MAFMC) and the NEFMC, and in a recent ESA listing decision by NOAA. Extensive work has been carried out examining the incidental catch of these forage species in ocean fisheries, including examination of places and times when at-sea mortality is highest.⁴⁴ Although this work has revealed discrete areas where large incidental catch events occur, there is no consideration of these alosine fishes within the context of the regional forage mosaic and the EFH DEIS. With adequate protection, alosines could again become a more important part of the regional forage base.

Food: Protecting forage species for which directed fisheries do not yet exist. Recognizing the keystone role of forage species in ocean ecosystems, the North Pacific Fishery Management Council began establishing policies regulating the development of new fisheries for forage species in 1998 with additional amendments in 2010.⁴⁵ The Pacific Council is following this example with its [*Unmanaged Forage Fish Protection Initiative*](#) and is in the process of establishing similar regulations, which represents a forward looking step to ensure a future for its fisheries.⁴⁶ New England and the Mid-Atlantic managers must follow suit. The MAFMC is already developing approaches for addressing this important issue.⁴⁷ Along with sand lance discussed above, there are other species that should be put off limits to directed fishing through the EFH amendment. These include river herring and shad, krill, shrimp, and copepods, all vital food sources in the regional ecosystems.

⁴⁴ Courneane JM et al (2013) Spatial and temporal patterns of anadromous alosine bycatch in the US Atlantic herring fishery. *Fisheries Research* **141**:88– 94.

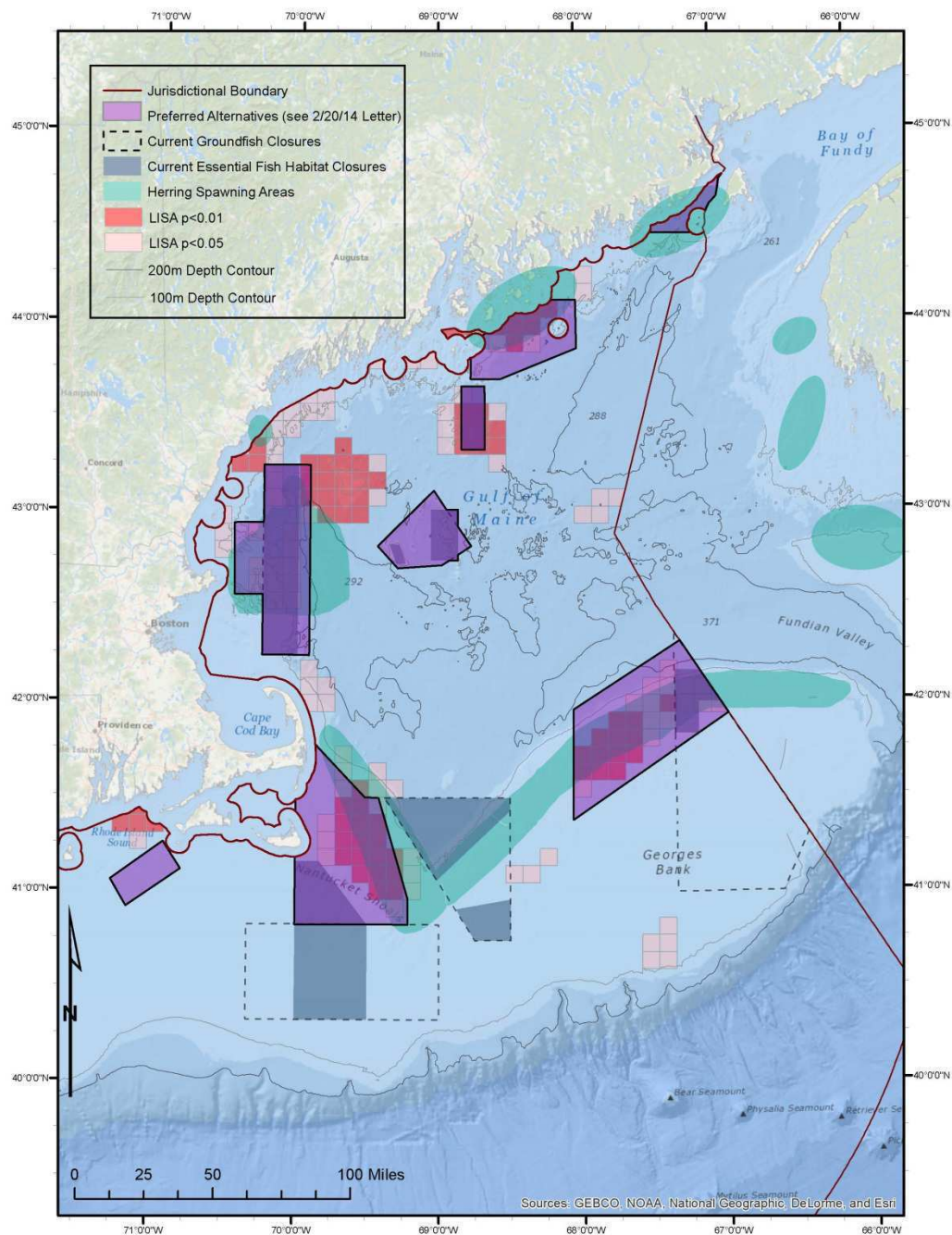
⁴⁵ See Final Rule implementing Amendments 36/39 to the NPFMC Groundfish FMP's at www.fakr.noaa.gov/frules/3639fr.pdf. This action identified and protected over 20 important forage species in 9 scientific families by prohibiting directed fishing on those species; 30 CFR 679; June 2004 PFMC Meeting. Exhibit G.4.a Situation Summary; Final Environmental Assessment for Amendments 87/96 to the NPFMC Groundfish FMP's at http://alaskafisheries.noaa.gov/sustainablefisheries/amds/95-96-87/final_ea_amd96-87_0910.pdf; Final Rule implementing the Arctic FMP at www.fakr.noaa.gov/frules/74fr56734.pdf

⁴⁶ Ecosystem Plan Development Team Report on Authorities to Protect Unfished Species from Future Directed Fisheries. EPDT Report, June 2012 (Agenda Item G.1.b); Situation summary: Unmanaged Forage Fish Protection Initiative (I2_SITSUM_SEPT2013BB); Decision Summary Document Pacific Fishery Management Council September 12-17, 2013: *Unmanaged Forage Fish Protection Initiative*, available at www.pcouncil.org/wp-content/uploads/0913decisions.pdf; Supplemental Ecosystem Workgroup Report: Ecosystem Workgroup Report on Unmanaged Forage Fish Protection Initiative (Agenda Item I. 2.b), PFMC, September 2013 (I2b_SUP_EWG_SEPT2013BB);

⁴⁷ Approaches for Unmanaged Forage Species. Staff Memorandum to Executive Director Moore, MAFMC, February 3, 2014, Executive Director's Report, MAFMC Meeting, Briefing Materials (Tab 10), New Bern, NC February 11-14.

Appendix III: Preferred Habitat Alternatives

Based upon the information that is available now, the eight areas shown in purple on the map below are recommended as preferred habitat alternatives for the purposes of public comment and further analysis.



**Review of the Draft Environment Impact Statement of the
Omnibus Essential Fish Habitat Amendment 2 (EFH DEIS)
January 6, 2014**

Prepared by:

Dr. Guillermo E. Herrera

Fisheries Economist¹

A.B., Biology; M.Sc., Quantitative Ecology and Resource Mgmt.; M.A., Ph.D., Economics

Please find below a review of Volumes 1-4 of the Draft Environmental Impact Statement of the National Marine Fisheries Service's Omnibus Essential Fish Habitat Amendment 2 (henceforth "DEIS"). The main conclusions of this review are as follows:

- The amendment (as described in the DEIS) embodies a huge effort on the biological side; **conclusions about social impacts seem to have less theoretical foundation**
- **Closed areas and other spatial management have been shown to be a critical tool in achieving NMFS mandates** of joint maximization of biological and economic benefits.
- The **GoM Region's resource system is characterized by a high degree of uncertainty**, which is amplified by climate change
- The **DEIS places too little emphasis on our *uncertainty* regarding biological processes and their dependence on habitat**. As a result, the **precautionary benefits of closed areas that hedge against this uncertainty are underemphasized** in the "practicability" analysis of the DEIS, the design of potential regulatory approaches, and the selection of preferred approaches from those considered.
- **More aggressive spatial controls should be considered**; the given set of candidate alternatives embodies a lot of regulatory judgment and in general falls short of the limits of "practicability." Some such policy alternatives seem to have been considered by the Council, then summarily removed from consideration prior to in-depth analysis in the DEIS. Given the other issues raised in this review, some of these **more conservative options may be preferable to those highlighted in the DEIS**.
- Where resource benefits and long-term social benefits are in conflict with short-term social benefits, **"practicability" should be foresightfully applied; in essence, a relatively low discount rate should be applied in cases where intertemporal tradeoffs are required**.

¹ ¹ Dr. Herrera is also Associate Professor of Economics, and Chair of the Department of Economics, Bowdoin College, Brunswick, ME. His involvement with the EFH DEIS review process falls outside the scope of his responsibilities in this academic position.

- Human actors in a regulated system will act so as to mitigate adverse welfare impacts of regulations, and to amplify positive effects. The **current analysis should more explicitly consider these dynamics to more credibly characterize the expected economic and social impacts of regulations**. That is, an impact statement should include a plausible model of harvester behavior to make more credible predictions of the eventual effects of policies and their welfare impacts.
- For nearshore fishery resources, **restoration of anadromous fish stocks** (alewives etc.) via improved fish passage can significantly impact population growth of predatory commercial stocks, and **augment the impact of explicit improvements to geophysical habitat**. System-wide management of the Gulf of Maine Region's resource stocks would be more effective if such measures were considered jointly with the regulations currently being proposed in the DEIS.
- The **location of fishing effort and the aggregate intensity of fishing effort need to be simultaneously optimized**. That is, closure of an area need not result in increased intensity of fishing effort elsewhere if the total amount of fishing effort is adjusted at the same time.
- Apparent "**impracticability**" of some options due to short-term impacts can be **mitigated by extension of other complementary types of policy actions**, such as alterations to the total amounts of fishing effort, or the total harvest quotas, in different fisheries; restoration of anadromous fish stocks that serve as prey for commercial stocks in inshore regions; government financing to facilitate changes in employment; collaborative research that makes use of fishery capital displaced from the industry; or job training. There is **little or no mention in the DEIS of the role of these other regulations** and the role they might play in a well-designed system of spatially structured controls.
- The DEIS does not consider *alternative regulatory paradigms*, i.e., partial changes to governance structures within the system.

Brief distillation of the methodology and conclusions of the EFH DEIS

The EFH DEIS describes the current state of Omnibus Essential Fish Habitat Amendment 2. In accordance with the Magnuson Act, this amendment seeks to:

- a) Define and identify three kinds of "special habitat": Essential Fish Habitat (EFH), which is generally important to a particular species or set of species; Habitat Areas of Particular Concern (HAPC) that are particularly important to (i) juvenile organisms and (ii) spawning stocks of one or more species; and Dedicated Habitat Research Areas (DHRA), which promise to yield scientific information to guide future policymaking.

- b) Subsequent to the habitat designations (a), evaluate the relative merits of an array of policy (regulatory) options in terms of their service to the NMFS mandate to (i) ensure the sustainability of national fishery resources and (ii) maximize human benefits deriving from the resource.

As a partner in the *National Fish, Wildlife and Plants Climate Adaptation Partnership*, NOAA itself has also produced valuable guidance on climate adaptation for marine ecosystems². The number one goal identified among seven “goals to help fish, wildlife, plants, and ecosystems cope with the impacts of climate change” is to “conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate”³.

At least in the short run, objectives (i) and (ii) in (b) above can be in conflict; especially in the case of overharvested resources, the achievement of sustainability, and of long-term social and economic benefit, requires making short-term sacrifices. Acknowledging this inherent conflict, the Magnuson Act stipulates pursuit of sustainability “to the extent practicable,” which highlights these tradeoffs but adds room for subjectivity.

The report divides the Gulf of Maine region into five management sub-regions: Eastern Gulf of Maine (EGOM), Central Gulf of Maine (CGOM), and Western Gulf of Maine (WGOM); Georges Bank (GB); and Great South Channel/Southern New England (GSC-SNE). In each of these areas, the report sets out an array of potential policy “Alternatives” for spatial management, i.e., a set of areas within the sub-region that would be the focus of spatially structured fishing controls. Within each of these management alternatives, a range of “Options” correspond to different constraints on fishing activity, ranging from prohibition of fishing altogether to prohibition of certain activities, to modifications of fishing gear or practices. For each region, the newly proposed Alternatives can be more or less stringent than the *status quo* regulation (also “Alternative 1”, or “No Action”). The DEIS in essence provides an opportunity for evaluation and revision of current regulatory approach.

The process whereby the discrete set of options was developed is not immediately clear from the DEIS. As discussed in section 3.1 of vol. 3 of the DEIS, a significant number of options were eliminated from the analysis *a priori*, implying that significant amount of regulatory judgment has been made in advance of the more detailed discussion in the DEIS of regulatory tradeoffs. In particular, while the removal of closed areas is considered for several of the regions, **more aggressive, or conservative, sets of closures seem to have been preemptively eliminated from the set of candidate policies.** The following reasons are given for removing these more conservative policies from consideration:

² National Fish, Wildlife and Plants Climate Adaptation Strategy, National Fish, Wildlife and Plants Climate Adaptation Partnership. 2012. Association of Fish and Wildlife Agencies, Council on Environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service. Washington, DC, ISBN: 978-1-938956-00-3, DOI: 10.3996/082012-FWSReport-1. <http://www.wildlifeadaptationstrategy.gov/pdf/NFWPCAS-Final.pdf>

³ *National Fish, Wildlife and Plants Climate Adaptation Partnership* (2012). Chapter 3: Climate Adaptation Goals, Strategies & Actions. <http://www.wildlifeadaptationstrategy.gov/strategy.php>

- “In general, the Committee preferred to work with refinements to areas already managed, as opposed to additional areas”
- “A larger area ... was suggested, but it was probably too large in size to be practicable”;
- “[t]here were concerns about the economic impacts of such an area, and the Committee determined not to recommend year round habitat area management recommendations in state waters as a general rule”

These reasons seem unscientific, *ad hoc*, and strongly at risk of privileging short-term economic considerations over sustainability and long-term socioeconomic benefits.

For each management Alternative, and within those each suite of regulatory “Options”, the impacts of regulation on the “Valuable Ecosystem Components” (VEC) is summarized (detailed analysis of these impacts is in volume 3 of the DEIS and a summary in vol. 4). VECs comprise habitat, the biological stocks, and the anthropocentric flows from the system. The latter are divided into “economic” (corresponding roughly to net revenue emerging from the resource) and “social” impacts that reflect impact of regulations on communities and the distributional consequences of policy.

The temporal impacts on economic and social outcomes are divided into “Short-term” and “Long-term.” Short-term impacts manifest themselves within two years⁴, while long-term effects are those that arise over a period of 5-10 years (pp. 9-10, v. 4, DEIS). The choice of the time horizon is critical, especially when the impacts of a particular policy option vary across species. Time horizon impacts the assessment of “long term” benefits because scientific uncertainty is greater for longer time horizons, and because **the implicit choice of discount rate matters more as the time horizon lengthens**. For example, groundfish are in a state of overexploitation, and it is reasonable to expect that any biological or economic benefits emerging in these fisheries will take quite a while – very possible longer than 10 years – to emerge. Canadian cod stocks, for example, have exhibited a much slower recovery than expected when the current moratorium was imposed⁵. Especially with an ecologically and culturally critical species such as cod, **slow recovery of a given species should not be a reason to favor policy options that benefit other VECs** at the expense of groundfish. This is acknowledged in the DEIS:

“Many groundfish resources are overfished, with rebuilding necessary and rebuilding timelines that extend rather far into the future. Alternatives that are expected to have positive biological impacts on these stocks are important, and would hopefully improve the stock status trajectory. On the

⁴ “...within a one to two year timeframe, i.e. before fishery participants would have the ability to adjust their capital investment to compensate for management changes.” (p. 9, v. 4, EFH DEIS)

⁵ Cochrane, K., 2000. Reconciling sustainability, economic efficiency and equity in fisheries: the one that got away. *Fish and Fisheries* 1:3-21.

other hand, economic impacts on the groundfish fishery are often dominated by impacts in higher value fisheries including scallops and clams, such that net economic impact determinations do not always reflect anticipated long- term benefits that may be achieved in the groundfish fishery. “(p. 65, v. 4)

It is not clear how this difference in time trajectory – in particular the longer time horizon that will likely be needed to achieve sustainability in groundfish resources – affects the “practicability analysis” used to compare different policies. This issue of time horizon, or implicit discount rate, is not explicitly revisited in any of the subsequent comparisons of regulatory options.

Practicability should reflect economic and social constraints on achieving sustainability

The “practicability analysis” of Section 2, vol. 4 of the DEIS addresses the inherent tradeoffs involved in different policy options. The language of this section seems to conflate the attribute of “practicability” with an overall assessment of the *desirability* of different policies. Given the language of the MSA, it seems that the primary mandate of NMFS is to “minimize the adverse effects on habitat caused by fishing,” but that the pursuit of this objective is constrained/qualified by whether the policy is “practicable.” The economic and social ramifications of a given policy determine its “practicability”; negative impacts in this dimension can lead to political opposition to policies, or to undesirable redistributions of wealth.

Practicability is an amalgam of effects at different points in time (short-term vs. long-term, or some continuum of effects through time). If these effects are not uniformly positive or negative across time, the aggregate practicability of a policy depends on the weights assigned to positive and negative impacts at different time horizons. In a quantitative assessment of practicability, this aggregation would depend critically upon the choice of discount rate; the imposition of a high discount rate would render more practicable policies that yield benefits in the present and costs in the future, while a low discount rate would make policies with small short-term costs and larger long-term benefits seem more practicable.

The practicability of an improvement to habitat protection and stock recovery should be held up against the biological (or “sustainability”) benefits of the policy to arrive at an overall determination of its desirability – or, in the language of the DEIS, whether it is to be “preferred” to other policies with different expected sustainability and practicability outcomes. **This judgment of “preferability” is therefore the locus of the normative decision at the core of the regulatory process – i.e., the relative weighting of biological vs. economic/social outcomes, or equivalently, the degree to which practicability considerations constrain the pursuit of the MSA’s mandate of sustainable stewardship of the resource.**

In an ideal situation, “sustainability” and “practicability” need not be in conflict; that is, sustainable policies can and should be compatible with resource harvest that is

economically beneficial and supportive of social systems. But it is very common for a policy to have positive expected biological benefits, somewhat negative economic and social impacts in the short-run, and larger positive economic and social impacts in the long term. The desirability of such a policy therefore depends on the relative weighting of those positive and negative human impacts, or more specifically on the implicit discount rate applied to the policy assessment.

Making a clear distinction between “sustainability,” “practicability,” and “preferability” in turn clarifies the key points of comparison between different policies with impacts along different dimensions. Furthermore a clear distinction between these attributes allows for identification of potential policy actions that can improve the desirability of a given policy action. For example, consider a policy that has highly positive biological benefits and substantial economic and social benefits in the long term, but also requires significant economic losses in the short term due to curtailment of fishing. This policy may initially be deemed “impracticable” due to the negative short-run impacts, and more so if a high discount rate is applied. But – as discussed further below – it might be very feasible to implement some other policies (loan programs, vessel buybacks, job retraining, collaborative research, etc.) that can mitigate the short-term impacts, rendering the policy both practicable and highly desirable/preferable.

The DEIS makes an effort to assess the “practicability” of each of the candidate policies. But some of the language of the practicability analysis in vol. 4 is ambiguous. For example, in reference to Alternative 4, Option 1/2 (prohibition of bottom-tending gear) for the Western GoM, the DEIS states that

“... the policy has lower productivity in the short term but becomes more practicable over a longer time horizon due to ... increased stock productivity and increased economic benefits.” (EFH DEIS vol. 4, p. 15-16)

But **“practicability” is an *a priori*, composite/holistic attribute of a policy that describes whether its (adverse) economic and social impacts, aggregated over time, allow it to be (politically) feasible.** Practicability therefore does not change over time (although we might receive new information that allows us to better judge “practicability”). The quoted passage above suggests that – given the countervailing short- vs. long-term economic/ social impacts – this policy would be deemed “practicable” if a low discount rate is applied, or if the future benefits are sufficiently large compared to the short-term costs. Or alternatively, short-term costs could be addressed, and therefore practicability enhanced, through one of the ancillary policies described above, e.g., buybacks, preferential loan programs, etc.

Clearly no policy option is going to benefit all dimensions of the system; there are inevitable tradeoffs between impacts on habitat of different kinds, resource stocks, and on short-term and long-term economic and social (community) impacts. Thus NOAA Fisheries finds itself in the role of arbiter, or as allocator of welfare impacts of regulatory policies, to a wide array of natural and human stakeholder groups. **The question, therefore, is what the priorities of regulation should be.** Though this is a challenging position to be in, it is

important in this process to place sufficient weighting on the wellbeing of the easily disenfranchised stakeholders in this system: the biological resources themselves and the future recipients of economic and social flows which could emerge from this system over medium and longer time horizons. It is also critical to note that the **long-term health of ocean ecosystems may have significant benefits that transcend commercial fishery harvest**. For example, recreational fisheries could become more important; there may be unforeseen aspects of ecosystem function; and the ocean system could yield more extractive benefits (new plant and animal products for which markets do not currently exist) and information (for example pharmaceutical benefits commonly associated with biodiversity).

Due to qualitative and quantitative impacts that differ in both sign and magnitude, the decision between management alternatives is inherently subjective and contentious. The job of NOAA Fisheries is ultimately to achieve Congressional intent while attempting to reflect the collective priorities of its stakeholders.

“The practicability of alternatives relative to one another (within a sub-region or across sub-regions) is not explicitly ranked because both **benefits and costs are expected to be highly heterogeneous across biological resources and fisheries**. Rather, this section attempts to summarize key findings of the impacts analysis and highlight the **issues that seem to be most important when evaluating the tradeoffs associated with particular alternatives**. Obviously, both decision makers and members of the public will rank the alternatives given the considerations they value most highly.” (EFH DEIS, v. 4, p. 10)

Section 2 of vol. 3 (pp. 46-95) elaborates upon the different spatial management alternatives in the sub-regions of the GoM Region. For each sub-region, the alternatives are described, including No Action (status quo), the preferred alternative, and the other (non-preferred) alternatives. The impacts of these policies on the VECs are then summarized in the two tables (#18, 19) in vol. 4.

Importantly, as highlighted in vol. 1 on the DEIS (particularly p. 14 as well as Table 2 on pp. 15-16), **one of the management alternatives considered for each of the five sub-regions is a removal of all closed areas**; for all sub-regions but the EGoM – in which there are currently no closures, so the “No Action” Alternative 1 is the no-closure scenario – the no-closure policy option is denoted as “Alternative 2.” Given that the goal of this Omnibus Amendment, and the associated DEIS, is to promote the protection of habitat, it is **surprising that policy options that remove all explicit protection of habitat from fishing should make the “final cut” of possible regulations in all of the sub-regions**, while (as discussed below) **numerous policies that more assertively protect habitat were not eventually given serious consideration**.

In brief, the No action and Preferred Alternatives for each area are as follows:

EGoM:

- No Action: At present, there are is no area management implemented in this region
- Preferred: Alternative 2 (“Large Eastern GOM” + Machias habitat mgmt. areas), using Options 1 (mobile bottom-tending gear prohibition) and 5 (prohibition on other gear capable of catching groundfish).

CGoM:

- No Action: Cashes Ledge Habitat Closure Area, Jeffrey’s Bank Habitat Closure Area closed to all bottom-tending mobile gears; separate Cashes Ledge Closure Area closed to all fishing except list of exempted gear and an exempted midwater trawl fishery.
- Preferred: Alternative 4: Modified Jeffrey’s Bank, Cashes Ledge closure areas, and introduction of new Ammen Rock Habitat Management Area, which would be closed to fishing other than lobstering. In existing closures, Options 1-4 (some combination of bottom-tending gear exclusion, exemption of certain clam dredges, and/or modification of trawl gear). The Cashes Ledge Closure are would be removed (because its mud habitat is “less vulnerable to accumulating adverse effects”). The preferred option for this area is projected to have positive short-term economic benefits and ostensibly positive habitat benefits, although these benefits are critically dependent on assumptions regarding the redistribution of fishing effort and the associated impacts on habitat; strong reservations about these assumptions are provided below. The proposed reopening of Cashes ledge is also projected negative long-term economic benefits, negative social impacts in the short and long terms, and negative impacts on several resource stocks.

Is Alternative 4 really the best option available for this sub-region? Why is it preferable to the “No Action” Alternative 1, which seems to dominate the “preferred” alternative pretty much uniformly across the VECs, as indicated in Table 2, p. 13, vol. 4 of the DEIS? Are these tradeoffs we want to make? Would a set of closures that is instead *more* conservative than the No Action scenario yield more uniformly positive benefits to resource stocks? To what extent would such a more conservative option be constrained by short-term economic costs, as opposed to longer-term ones?

WGoM:

- No Action: Maintenance of the WGoM Habitat Closure Area. Closed to all bottom-tending mobile gears (including scallop dredges, as per scallop FMP) with exemptions granted to shrimp trawls and surf clam/quahog dredges.
- Preferred: Three of the 8 Alternatives presented are designated as “preferred”; presumably what is implemented could be some combination of these, as they are not mutually exclusive.
 - Alternative 1: No Action, as described above, is one of the preferred alternatives.

- Alternative 7: A roller gear restriction applied to either (Option 1) an additional WGoM area (the “Inshore Roller Gear Restricted Area”) or (Option 2) to a larger collection of areas. This gear restriction would to be employed in conjunction with the other options (e.g., Alt. 1).
- Alternative 8: Would maintain the current Habitat Closure Area, but would exempt shrimp fishing from the exclusion. The idea is that this would allow economic benefits while not sacrificing a significant amount of the habitat benefit of the closure.

GB:

- No Action: Habitat Closure Areas I and II are currently closed to all bottom-tending mobile gear as well as scallop fishing. Numerous other fishing activities are exempted from the closure.
- *No Preferred Alternative* was identified for this area. None of the alternatives 2 – 8 are designated as “preferred,” so it is unclear what the Council will recommend implementing in this region. Some of the alternatives presented involve replacing the current management areas with new ones (e.g., the Northern Edge Habitat Management Area, in which bottom-tending gear would be prohibited, and the Northern Georges Gear Modification Area, in which cable lengths on gear would be constrained). As mentioned above, Alternative 2 for this sub-region involves removal of one or both of the Closed Areas.

GSC/SNE:

- No Action: Area management in the GNC-SNE region currently consist of the Nantucket Lightship Habitat Closure Area and the Nantucket Lightship Closed Area, in which bottom-tending mobile gears are prohibited with some exemptions for scallop and hydraulic clam dredges.
- *No Preferred Alternative* was identified for this area. Some of the proposed options involve shifting the habitat closure and fishing constraints (with exemptions) to other areas (e.g., the Great South Channel East HMA and the Cox Ledge. But importantly here, one of the alternatives under consideration for this region, Alternative 2, consists merely of removal of the current closure areas. The rationale given is similar to that for prospective removal of closures in the Georges Bank area.

Responses to the EFH DEIS analysis

The DEIS embodies a great deal of work and expertise in the areas of fisheries science and regulatory design. Pragmatic decisions need to be made when choosing a course of action in regulating the GoM and Northwest Atlantic ecosystem. But the EFH DEIS analysis seems to be lacking in six important dimensions:

- Insufficient acknowledgment of our **uncertainty** regarding biological processes, and of the **precautionary benefits** of closed areas in allowing these processes to occur. That is, **closed areas serve as a hedge, or insurance mechanism, against scientific uncertainty and irreducible random shocks** to system dynamics.
- Seeming absence of a model of **human behavioral dynamics** across space and time, and of related labor markets
- No explicit mention of **how aggregate harvest controls will be adjusted** to complement the imposition (or removal, as the case may be) of closed and otherwise regulated fishing areas.
- Little or no mention of **complementary regulatory actions**, i.e., those other than spatial fishing controls.
- No discussion of **alternative regulatory paradigms**, i.e., partial changes to the governance structures within the system
- **Policy alternatives that remove closed areas are poorly justified, and run counter to the desire for a precautionary approach** to management

A brief expansion on each of these issues follows here. But each one of these issues, in turn, implies that the current analysis puts too little priority on the ecological benefits of more stringent spatial control on fishing in the Gulf of Maine region, that the adverse economic and social consequences of some policies are likely to be overstated, and that the potential benefits to human communities – especially in the long-term – of some regulations are likely to be underrepresented.

Scientific uncertainty, precaution, and the designation of preferred alternatives

There is a great deal of scientific uncertainty regarding biogeophysical processes (individual and joint population dynamics of constituent species), as well as the economic and social components of the system. In particular, we are poorly informed about the following:

- Dependence of individual species on habitat
- Interactions between species (aka “ecosystem function”), and their dependence on habitat
- Spatial dynamics of resources; in particular how local abundance, say in a closed area, translates into proximal and system-wide stock dynamics
- The response of human actors to regulations
- Future economic parameters: wages in labor markets, prices for outputs from the seafood industry, technological changes that affect harvest costs, etc.

Uncertainty is especially important for species exhibiting population thresholds (“critical depensation”), i.e., tipping points where declines in abundance become much more difficult

to reverse. It follows that uncertainty is also especially important for severely depleted resources (e.g., cod and other overfished groundfish stocks), as they are much more likely to be near these tipping points, and to undergo irreversible change as a result of negative shocks. Unfortunately, **it is precisely in these overexploited fisheries that regulations intended to enhance the prospects for resource stocks are likely to require negative economic and social impacts in the short term**; such fisheries are economically as well as ecologically stressed. Federal law mandates a precautionary use of scientific information in the establishment of policy: “Councils should interpret ... information [about habitat value] in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species”⁶

Climate change in particular has amplified uncertainty surrounding resource dynamics, especially as the spatial distributions of numerous species in the Gulf of Maine seem to be migrating northward.⁷ Scientific consensus surrounding the nature and rate of these changes is hard to achieve, and shifts in abundance have heightened antagonism between regulators and harvesters in these industries.

The prose of the DEIS acknowledges this uncertainty, and the role that closed areas and other spatial restrictions on fishing effort can play in managing resources with uncertain population dynamics: [protected areas] “may help to buffer the stock against negative conditions by reducing risk... Management of risk may be especially important for stocks at low abundance” (p. 9 of vol. 4, DEIS). But the **policy alternatives presented in the DEIS, and the selection of “preferred” policy options within this set of options, does not explicitly account for the precautionary benefits of closed areas**. The report does not contain any model of (stochastic) population dynamics in response to habitat quality and fishing mortality; such a model would allow for a more nuanced understanding of the circumstances in which (i.e., for which species) closed or otherwise protected areas are especially important.

The fact is that we do not know with much precision how depleted stocks will recover in response to changes in fishing pressure, and climate change is exacerbating this uncertainty. To achieve the MSA’s mandate of sustainability with any confidence, **there should be a strong bias in favor of regulations which hedge against this uncertainty**, i.e., in favor of a more extensive system of protected areas, at least until populations recover to a point where stock dynamics are more robust and predictable. **We recommend that NOAA Fisheries consider additional regulatory options that include more extensive closed areas – especially those that protect the EFH of species whose depleted stocks make them vulnerable to irreversible negative fluctuations**. Of course, too many closed areas will defeat the NMFS mandate of optimizing yield from these fisheries, and may at *some level* become “impracticable,” but the language of the MSA clearly implies that sustainability should be pushed as far as possible *until the limits of practicability are reached*, however “practicability” is ultimately determined. This is a challenging, multidimensional problem to solve, but the overall impression of this review is

⁶ 50 CFR § 600.815 (a) (iv)

⁷ Wines, M. and J. Bidgood. “Waters Warm, and Cod Catch Ebbs in Maine”. *New York Times*, Dec. 14, 2014

that the policy options on the menu currently presented in the DEIS are not precautionary enough.

Human behavioral dynamics and implications for “economic and social costs”

The EFH DEIS description of the “practicability analysis” of different policies (Sec. 2 (pp. 8-20), vol. 4) contains very little detail on the characterization of impacts on human communities. Other than the statement that displaced revenues from an area serve as an upper bound on economic costs, it is not immediately clear what sort of underlying model and/or empirical evidence is used to assess economic and social impacts in the short- and long-terms. In fact, the impacts of regulations on human stakeholders are critically dependent on the *behavioral response* of these actors to policy changes. More specifically, the welfare impacts of constraining the location and nature of fishing behavior depend on

- Fleet dynamics (location choices and entry-exit decisions of harvesters)
- Specifics of the labor market (alternative employment and wages, i.e., the elasticity of labor supply within the fishery sector and between fishing and other sectors)
- Technological resilience: how quickly harvesters are able to change the way they fish, and to redeploy capital from one type of activity to another. In particular, regulations will have more adverse effects if investments in equipment and other types of fishery capital is fishery-specific, or “nonmalleable”; socioeconomic impacts of regulations will be less objectionable if fishery equipment can be easily moved between fishing activities, or converted from some non-fishery use.

In general, however, the behavioral response of harvesters to regulations, at a range of time horizons, seeks to minimize the negative impacts of constraints place upon them. **As a result, analysis – whether formal benefit-cost analysis or otherwise – that ignores this behavioral response (i.e., “exogenizes harvester behavior”) will significantly overstate the adverse impact of regulations on harvesters, and understate any potentially positive impacts, especially in the longer term.** It is disconcerting that there seems to be virtually no model of harvester behavior formally incorporated into the EFH DEIS or the assessment of regulatory impacts, especially as the estimated qualitative impacts of regulations on human communities seems to feature prominently in the determination of “practicability” of different regulatory changes and the selection of the Council’s preferred alternatives.

Adjustments to aggregate level of fishing activity

One of the often-voiced concerns about implementing spatial restrictions on fishing activity is that – in addition to direct short-term losses in revenue resulting from the preclusion of fishing – the effort in an new area subject to closure will be redistributed throughout the system, perhaps leading to adverse impacts on habitat in other sensitive areas. This phenomenon need only arise if the aggregate level of fishing activity (measured either in inputs, i.e., fishing effort or in outputs, i.e., harvest) remains constant. Instead,

complementary adjustments to the aggregate level of fishing activity should be simultaneously imposed in order to protect the stock of habitat in areas outside the new closure. This could involve a tightening of access to the fishery, other control on fishing effort (days at sea, traps, etc.) or temporary reductions in harvest quota. Note that these reductions in effort or quota need not be permanent; it has been shown theoretically that a system that is optimally regulated with spatial controls can end up employing more people, at the yield-maximizing pattern and intensity of harvest than will be in the system under open-access. **Thus medium- to long-term employment/access outside closed areas eventually be higher than before the regulation,** if the closed areas are structured properly⁸. But in any case, **the impact of closed areas should not be evaluated with an rigid assumption of a strict maintenance of current aggregate harvest levels.**

Complementary regulatory actions

Consideration is needed of the suite of regulatory actions available beyond spatial controls on fishing. In particular, the possibility of government-facilitated financing and other measures that would mitigate adverse economic impacts of policies that enhance biological sustainability and long-term economic benefits must be taken into account. Such ancillary measures are critical for improving the practicability – i.e., the political feasibility – of foresightful regulations that will lead to more robust resource stocks and long-term economic and social benefits for human stakeholders.

Where short-term negative economic and social impacts compromise the “practicability” of a regulatory approach, this need not be a reason to abandon the approach. A wide range of **complementary policy options** – from creative financing, to training programs, to extensions of compensated collaborative interactions between harvesters and NMFS to further scientific understanding of the resource –**can mitigate the short-run negatives of policies.** This would free up NMFS to more aggressively pursue regulations that exploit the precautionary benefits of spatial controls and yield significant longer-term benefits to human stakeholders.

Alternative regulatory paradigms

No consideration seems to be given to alternative types of regulatory instruments, or to shifts in the underlying system of governance, e.g., the possibility of comanagement regimes or the control of nearshore resources by small-scale operators who possess fine-scale knowledge of the magnitude and distribution of resource stocks. For example, nearshore groundfish harvest in the Eastern Gulf of Maine may be far more amenable to local governance than it is to the current regulatory framework. Separately, tradable spatial fishing rights regimes (TURFs) may allow for more fine-tuned control of the location and intensity of fishing effort, and might substantially reduce the economic costs of regulation.

⁸ Neubert, M.G. and G.E. Herrera, 2007. Triple benefits from spatial resource management. *Theoretical Ecology* **1**(1):5-12.

While recognizing that such options are “outside the box” of the current policy analysis described in this DEIS, it is also important to note that **quantitative changes in regulations (changing the size and location of management areas, adjusting the intensity of fishing effort allowed in different places) may not be the best pathway toward achieving the multifaceted mandates of the Magnuson Act.** At least for part of the Gulf of Maine, a *qualitative* shift in governance structure may allow for greater biological sustainability, increased economic yield, and robust and otherwise desirable community outcomes. This is a parallel regulatory discussion, but one that has significant bearing on the EFH DEIS topic of “optimal” spatial regulation.

Policy alternatives that remove closed areas should be viewed skeptically

At various points in the DEIS, serious consideration is given to removal of currently existing closures. The rationale given for these closure removals is that they will actually mitigate habitat impact by causing harvesters to “optimally” redistribute the effort required to harvest their quotas. The idea is that the ability to fish where catches are highest will require less surface area to be swept by gear (in particular bottom-tending gear). Such a rationale incorrectly presumes a great deal about (a) **how harvesters will respond** to changes in area management; (b) **how stock dynamics inside currently closed areas will respond** to changes in fishing patterns; and (c) **how habitat itself is affected by fishing activity.**

As discussed above, the DEIS contains very little information about how harvesters will reallocate their effort in response to changing regulatory constraints. **We do not know how rapidly harvesters will adjust their spatial patterns of fishing effort when closures are removed.** They may drastically reallocate their effort from currently open areas to currently closed ones, or they might smooth their effort over space so as to equalize returns to effort across space. These dynamics are likely to differ across fisheries, and across different time horizons. **But it is important to understand these dynamics before recommending removal of closures.**

When a currently closed area is re-opened, abundance of stock inside this area will initially be high. Therefore effort reallocated to this area will initially enjoy higher catch per unit effort, and it will require less swept area to meet a given harvest quota. But **this initial increase in CPUE cannot be seen as a sustainable justification for removal of the closure.** Once significant amount of effort is directed to the newly opened area, and its habitat is affected by this new effort, the local stock abundance will decline, causing a reduction in CPUE. Therefore the “swept area” benefits of opening an area to fishing are at best transient.

Finally, the DEIS contains very little detail as to the **functional relationship of fishing intensity in a given area and its impact on habitat quality.** The implication of the DEIS is that spreading effort over a wider area (i.e., following a removal of a closure) will cause less intense effort in each fished area, and that this will mitigate habitat impacts. But it is

often argued – in what is termed a “first pass phenomenon” – that **most of the damage to habitat from fishing effort occurs with the first few encounters of gear with the habitat**, and that subsequent units of fishing effort have less of an impact on the margin⁹. With this sort of impact on habitat, a given amount of fishing effort can have far less impact if it is focused on a subset of the habitat, while the rest of the habitat is off limits to fishing and therefore protected from the “first pass.” Figure 1 shows the habitat impact of a given fixed amount of fishing effort E_{tot} . In panel (a) habitat impacts start low on the margin in each area, and then rise on the margin as intensity is increased. In panel (b), there is a “first pass” range of effort levels over which habitat impacts increase sharply, followed by much lower incremental impacts for effort levels beyond some threshold (i.e., once the habitat has been fundamentally altered by the presence of fishing). In the first case, it is best to spread effort over the areas, but in the second – highly plausible – “first pass” scenario, it is far better to leave Area 2 closed and exert all effort E_{tot} in Area 1. As with the human dynamics, the “dose-response” relationship between fishing effort and habitat is likely to vary across habitat types, species, and technology. **But the DEIS seems to assume that we are in scenario (a) of Figure 1 when recommending reopening of closed areas to fishing. This core assumption is at best poorly justified – at least by an empirical evidence in the DEIS itself – and the recommendation of closures otherwise runs counter to the precautionary approach advocated above.**

Conclusions

A great deal of effort has clearly been devoted to the development of the EFH DEIS, which represents an effort to better understand the habitat inventory of the Gulf of Maine across its many constituent species, and the subsequent implications of different policy approaches. The DEIS analysis seeks to summarize the prospective impacts of different regulations on the relationship between the biological and human VECs of the Gulf of Maine region. The decisions that NOAA Fisheries needs to make about stewardship of fishery resources in the Gulf of Maine region are challenging: impacts of regulation are uncertain, multidimensional, and almost inevitably involve conflict between the objectives of a diverse set of stakeholders. The balance between biological sustainability and human welfare is not easy to achieve.

In several of the sub-regions – in particular the Georges’ Bank and GSC-SNE regions, there are no clear-cut policy recommendations. In these cases, very careful consideration should be given to the regulatory options that are more conservative, i.e., those that exploit the precautionary benefits of protected areas.

In summary, I offer the following specific recommendations to NOAA Fisheries as it moves forward with this Omnibus Amendment:

⁹ p. 147 of Holland, D.S. *Economic Analysis for Ecosystem-based Management: Applications to Marine and Coastal Environments*. Routledge, 2010.

- Explicitly **address the uncertainty inherent in resource dynamics**, and give **preferential consideration to policies that provide a precautionary benefit** in addition to the mean, or expected, benefit to the biological resource stocks. Closed areas guard against stock collapse, and against unforeseen impacts of fishing on stock dynamics.
- Develop and **consider some additional, more conservative management alternatives that involve more extensive use of closed areas**, particularly in those locations containing habitat critical to depleted resource stocks. This should be done in the spirit of pursuing sustainable resource use within the limits of practicability; many of the currently offered regulatory options set forth in the DEIS fall well short of this limit.
- **Create more closed areas that are truly closed.** Granting exemptions to closures – especially to technologies that disturb benthic habitat – seems to be the rule in the current policy recommendations of the DEIS. While such concessions are made in the spirit of “practicability,” they deprive the system of many of the ecological benefits of no-take areas. Recent evidence supports the conclusion that **“protected areas” that continue to allow “detrimental harvesting activities” do not fulfill their potential** for stock augmentation and long-term increases in fishery yields¹⁰.
- **Be very cautious about the impacts of the re-opening of currently closed areas.** NOAA Fisheries should acknowledge (i) the possibility that fishing effort has “first-pass” impact on habitat, i.e., that the first units of effort exerted in a given area impose a disproportionately large share of the adverse habitat impact; and (ii) that projected revenue gains from opening areas previously closed to fishing are likely to be dissipated in the medium- to long-term as stocks are depleted. Both of these considerations dramatically reduce the appeal of removing closures currently in place.
- **Explicitly acknowledge the potential of complementary regulatory actions (financing, training, buybacks, etc.) to mitigate short-run welfare impacts of regulations.** These complementary approaches can make regulations with substantial biological and long-term economic/social benefits more “practicable” and therefore elevate them on the spectrum of “preferability”
- **Introduce at least a rudimentary model of fleet dynamics or fishery labor market responses to regulations.** This will allow the practicability analysis to move beyond the simplistic “upper bound” on economic impacts captured by revenue displacement, towards a more precise (and likely optimistic) estimate of economic and social impacts. Simple economics suggests that self-interested response (“elasticity”) of resource harvesters to changing incentives will go a long way toward mitigating any adverse consequences of regulation. Similarly, it is reasonable to assume that the long-term benefits of effective and sustainable

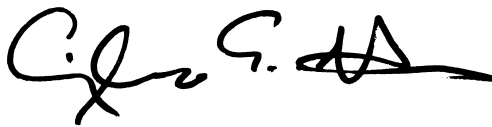
p. 147 of Holland, D.S. *Economic Analysis for Ecosystem-based Management: Applications to Marine and Coastal Environments*. Routledge, 2

regulation might be substantially larger than suggested by current mean estimates that assume harvesters will not adapt to regulations.

- **Acknowledge the possibility of alternative types of regulatory instruments, in particular changes in governance structure** for some subset(s) of the resource system. While it might not be feasible to introduce these changes during the current round of regulatory reform, they should certainly be discussed now as part of the DEIS, and then considered seriously as part of the portfolio of regulatory approaches at the time of the next review – i.e., the five-year period mandated by federal law¹¹.

In the spirit of contributing to the Council's efforts to more effectively manage our nation's fishery resources, I appreciate the opportunity to review and comment upon this Draft Environmental Impact Statement. If it would helpful, I would be happy to elaborate further upon any of the issues raised above.

With many thanks for your consideration,

A handwritten signature in black ink, appearing to read 'G. E. Herrera', with a stylized flourish at the end.

Guillermo E. Herrera, M.Sc., Ph.D.
gherrera@bowdoin.edu

¹¹010.
CFR § 600.815 (a) (10)

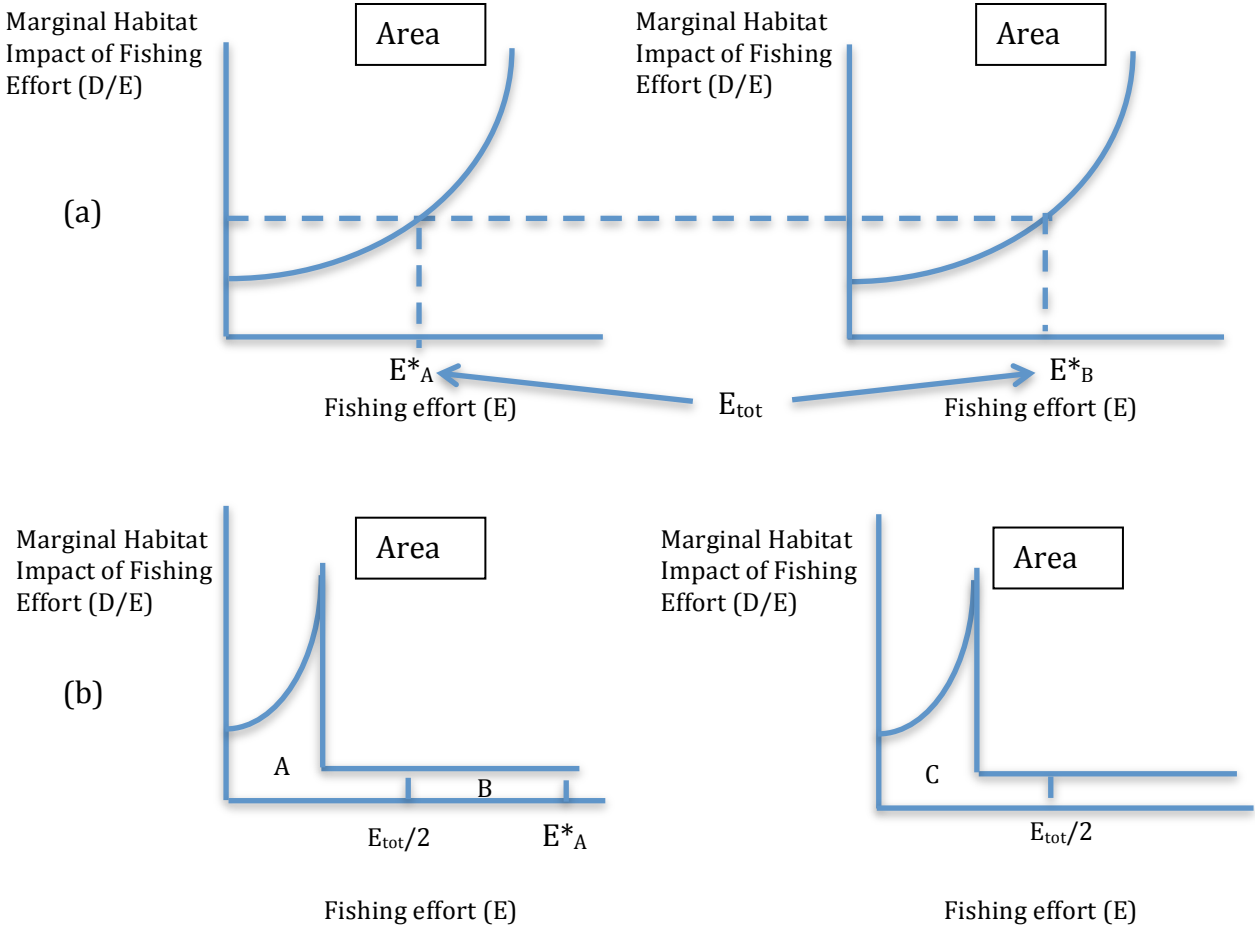


Figure 1: In panel (a), habitat damage is strictly convex, or accelerating, function of fishing effort E in a given area. In this case, habitat impacts of a total amount of effort E_{tot} are minimized when effort is equally spread across areas, i.e., when $E^*_A = E^*_B = E_{tot}/2$. In panel (b), there is a “first-pass” habitat impact of fishing effort in each area, followed by lower marginal damages. In this case, the same total effort E_{tot} will have smaller overall habitat impact if all effort is exerted in one area (e.g., $E^*_A = E_{tot}$) and the other area is closed to fishing ($E^*_B = 0$). This spatial distribution of fishing activity will lead to habitat impacts $(A + B)$, which are smaller than the impact $(A + C)$ that would result from equally distributed fishing effort.

January 8, 2015

Mr. John Bullard, Regional Administrator
NOAA Fisheries Service, Northeast Regional Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Dear Mr. Bullard:

We, the 147 undersigned scientists, are writing to provide comments on the proposal to revise the ensemble of Essential Fish Habitat (EFH) areas in New England through the Omnibus Essential Fish Habitat Amendment 2 (Amendment).¹ The scientific community has followed this EFH discussion closely, cautioning NOAA Fisheries and the New England Fisheries Management Council (Council) about the risks associated with opening closed areas to relieve short-term fish shortages at the expense of future ecosystem recovery.² The Amendment, with the Draft Environmental Impact Statement (DEIS), presents a critically important vehicle for improving the network of EFH areas at a time when threats to the ocean are increasing and ecosystem states are changing, likely affecting ecological resilience and the potential for recovery of important goods and services.

The Magnuson-Stevens Fishery Conservation and Management Act (statute) appropriately dictates a broad approach to identifying and protecting the diversity of habitats needed by managed fishes through all their life history stages. This includes prey and prey habitat, and areas of the benthos and water column needed for all aspects of reproduction, including courtship, spawning, and the successful development of eggs, larvae, and young. Moreover, the statute mandates a schedule for continued improvements for the long-term conservation of EFH.

As scientists we remain deeply concerned that this Amendment will fall far short of providing the EFH protection needed to support the region's marine ecosystems, including its dependent fisheries. Wild-capture fisheries are the products of resilient natural ecosystems, and the EFH programs should be designed to support such ecosystems. In completing the Amendment, we strongly advise NOAA Fisheries to ensure that all of the following major goals are attained through the EFH Amendment:

- Enhance spawning of target species and other key components of the ecosystem, including prey species.
- Enhance survival and growth of juvenile fish (i.e., pre-recruit fish).
- Enhance growth of managed species through the protection of prey species and the habitats **they** require.

¹ Draft Environmental Impact Statement (DEIS), dated October 1, 2014, available at:
www.greateratlantic.fisheries.noaa.gov/regs/2014/October/14habo2anoa.html.

² See appended letters to NOAA Fisheries dated November 7, 2012, and April 9, 2013.

- Enhance habitat and biological diversity, the elements of the ecosystem that support and sustain managed species, represented within the selection of EFH areas, including robust representation within each of the subregions encompassed by this Amendment.
- Protect remaining areas that continue to support cold-water corals.
- Enhance habitat research by establishing a network of Dedicated Habitat Research Areas (DHRAs), including reference areas protected from all fishing and other local human disturbance. We view these areas as **essential** elements of adaptive and Ecosystem-Based Fishery Management (EBFM).
- Enhance approaches to integrate EFH elements within EBFM.

The statute does not develop a detailed scientific discussion of EFH. However, the definition of EFH is suitably comprehensive: *Essential fish habitat means those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.* Under Findings, Purposes and Policy (Section 2) the statute indicates that a ***national program for the conservation and management of the fishery resources of the United States is necessary to prevent overfishing, to rebuild overfished stocks, to insure conservation, to facilitate long-term protection of essential fish habitats, and to realize the full potential of the Nation's fishery resources.*** Further, within Other Requirements and Authority (Section 305), it is specified that the *Secretary [of Commerce], in consultation with participants in the fishery, shall provide each Council with recommendations and information regarding each fishery under that Council's authority to **assist it in the identification of essential fish habitat, the adverse impacts on that habitat, and the actions that should be considered to ensure the conservation and enhancement of that habitat*** (emphasis added).³

The Amendment offers a range of alternatives for reducing habitat protection.

In every subregion, the Amendment includes a range of alternatives that span from the current EFH protections (*status quo*) to no protection for EFH whatsoever (no habitat management areas, or HMAs). With the exception of one subregion that has no protected EFHs (i.e., eastern Maine), each of the other alternatives to *status quo* represents a reduction in the overall area that is protected now—that is, a net decrease in area protected, in some scenarios by as much as 70%. In terms of area alone, the Amendment offers no alternatives to *status quo* that would enhance habitat protection through an expansion of the overall area protected in the region. Given the current state of some of the managed fish populations, protecting more, not less, habitat would seem to be an alternative worthy of consideration.

With the exception of a few small areas dedicated to research, the Amendment will likely permit significant fishing activity within new HMAs, including midwater trawls, gill nets, and possibly hydraulic clam dredges. Protection from mobile bottom-tending gear is a likely outcome of the Amendment and is clearly significant. However, this is by no means complete protection, especially at the spatial scale of the HMAs. In the context of EFH conservation, the goals delineated above, and an ongoing ecological crisis complete with a declared fisheries disaster, this Amendment must offer more comprehensive protection of habitat. The region was recently advised by NOAA Fisheries that Atlantic cod, once the mainstay of regional fisheries and an apex predator in the ecosystem, has been reduced to just 3-4% of the spawning biomass (SSB) thought to be associated with maximum sustainable yield (MSY), or SSB_{MSY}, the lowest SSB ever recorded for the Gulf of Maine stock.⁴ The situation for cod on Georges Bank is similar. The loss of apex predators is well-known to

³ Magnuson-Stevens Fishery Conservation and Management Act, as Amended Through January 12, 2007: Section 3 Definitions 16 U.S.C. 1802 MSA § 3104-297 (10); *Id* Section 2 Findings, Purposes, and Policy 16 U.S.C. 1801 104-297 (6); *Id* Section 305. Other Requirements and Authority 16 U.S.C. 1855, MSA § 305 104-297, (b) Fish Habitat 1B.

⁴ 2014 Assessment Update of Gulf of Maine Atlantic Cod—Draft Working Paper for Peer Review Only.

produce cascading effects, shifting ecosystems to new states that may lack attributes valued by human users.⁵ The situation with cod in New England must be heeded as a significant indicator of systemic ecological changes that extend well beyond this species alone.

Arguments for diminished habitat protection are not compelling.

It has been argued that less habitat area will be needed if the “right” areas are targeted as identified through the Swept Area Seabed Impact (SASI) model. This modeling effort was focused exclusively on hard-substratum habitats due to their high vulnerability to disturbance, leaving the role of other bottom types in supporting managed species unaccounted for. However, chronic disturbance of other bottom types still yields a deficit of habitat attributes that enhance survival and growth. We concede that under certain scenarios, a smaller amount of diverse habitat may in fact have greater ecological benefit than a larger amount of lower value. But we are not persuaded by the DEIS, or the extant scientific literature for the region, that there is sufficient evidence that this scenario can be applied here with a high degree of safety or certainty. Habitat protection must capture a diversity of habitat types if the Amendment is to enhance ecosystem resilience and meet all of the goals for EFH as indicated above. The *status quo* areas do capture a diversity of habitat types in a complex matrix. The SASI approach nominally used to identify the smallest areas of vulnerable EFH does not meet this important requirement. In fact, it only identifies the high-density patches of the most vulnerable habitat (LISA cluster analysis), leaving much unprotected when maximal protection is needed to recover depleted populations. The Council’s technical teams have also analyzed the distribution of key biological variables, including some forage fishes, and juvenile and spawning groundfish, but the utilization of this important information in guiding the development of alternatives has been poor. In short, the DEIS does not make a strong case that a new network of HMAs built of the alternatives will be a net gain or even maintain the ecological *status quo* for the region as a whole.

The general tendency to define habitat only in terms of the physical structure of the seabed is overly narrow and is likely to miss areas of the bottom and water column that are vital habitat, due to a variety of factors the analyses have not considered. During peer review of the SASI approach, the Council was advised that this methodology was not, by itself, sufficient for deciding which areas to close or which to open.⁶ Overall, the Amendment does not rely enough on the distribution of marine life as a guide to important habitat.⁷ The Amendment fails to meaningfully advance protection for spawning fish, looking instead to future policy changes and repackaging the *status quo* system of seasonal closures.

⁵ Frank KT et al. (2007) The ups and downs of trophic control in continental shelf ecosystems. *Trends in Ecology and Evolution* 22(5):236-242; Frank KT et al. (2006) Reconciling differences in trophic control in mid-latitude marine ecosystems. *Ecology Letters* 9: 1–10; Frank KT et al. (2005) Trophic Cascades in a Formerly Cod-Dominated Ecosystem. *Science* 308:1621-3; Estes JA (2011) Trophic Downgrading of Planet Earth. *Science* 333 (6040): 301–306; Terborgh and Estes (2010) *Trophic Cascades*, 488 pages, Island Press, Washington, DC.

⁶ The Council’s Scientific and Statistical Committee advised that the SASI model be peer reviewed during 2011 (February 15–17); in brief, the peer reviewers advised that SASI should not be used to evaluate the practicability of opening or closing particular areas, generally characterizing SASI as preliminary—most useful for exploring ideas and stimulating discussion; see Sullivan PJ et al. (2011) Swept Area Seabed Impact (SASI) Model Peer Review on Behalf of the New England Fisheries Management Council, Final Report, April 14, 2011, and presentation to the Council, Mystic, Connecticut, April 26, 2011, available at: http://archive.nefmc.org/actions/council_audio/april2011/april2011audio.htm.

⁷ Auster PJ et al. (2001) Fish species and community distributions as proxies for seafloor habitat distributions: The Stellwagen Bank National Marine Sanctuary example (northwest Atlantic, Gulf of Maine). *Environmental Biology of Fishes* 60: 331–346; Cook RR, Auster PJ (2005) Use of simulated annealing for identifying Essential Fish Habitat in a multi-species context. *Conservation Biology* 9: 876–886; Cook RR, Auster PJ (2013) The biodiversity value of marine protected areas for multi-species fishery management in the Gulf of Maine. *Aquatic Conservation: Marine and Freshwater Ecosystems*. 23: 429–440.

Some of the largest existing closure areas (e.g., on Georges Bank) were originally chosen based upon the presence of spawning and/or juvenile groundfish and have been tallied satisfying EFH requirements in the past. With some revision of history, the same places are now called *groundfish mortality areas* by some, because they were redesigned so as to reduce fishing mortality during an emergency. It has subsequently been suggested that these *status quo* areas are no longer needed because the fishery, as of 2010, operates under hard Annual Catch Limits (i.e., quota-based management with ACLs). This contention is not supported by science and experience in other regions.⁸ Even with catch limits in place, areas that are protected from fishing gear will be needed to support ecosystem function and the goals for EFH envisioned when the language in the statute was drafted. Regardless of the language used when designating these areas, their current ecological functions, some protected for 20 years, must be carefully considered in revising plans for EFH conservation.

Ecosystem trouble demands enhanced habitat protection.

In 2009 NOAA Fisheries reported that the Northeast U.S. Continental Shelf Large Marine Ecosystem was subject to *ecosystem overfishing*,⁹ as manifested by a host of indicators that signal ecosystem deterioration and conditions which undermine the yield of fish and other ecosystem services.¹⁰ Among the main findings of the Ecosystem Status Report was:

The Northeast U.S. Continental Shelf Large Marine Ecosystem (NES LME) has undergone sustained perturbations due to environmental and anthropogenic impacts over the last four decades, resulting in fundamental changes in system structure.

Regrettably, there are few signs that things have improved over the intervening years despite a successful transition to management grounded on science-based catch limits (i.e., ACLs). Fish growth, condition, and recruitment have deteriorated, and as of 2014 half of the 20 stocks in the Northeast Multispecies Fishery remain in a depleted state (i.e., overfished). Rebuilding programs have failed for Gulf of Maine cod and other important stocks. In the future, catch limits must be determined within an ecosystem framework wherein multiple factors are considered, including species interactions and system-level productivity.¹¹ However,

⁸ Melnychuk MC et al. (2012) Can catch share fisheries better track management targets? *Fish and Fisheries*, 13: 267–290. doi: 10.1111/j.1467-2979.2011.00429.x; Essington TE et al. (2012) Catch shares, fisheries, and ecological stewardship: A comparative analysis of resource responses to a rights-based policy instrument. *Conservation Letters* 5: 186–195; Steneck RS, Wilson JA (2010) A fisheries play in an ecosystem theater: Challenges of managing ecological and social drivers of marine fisheries at multiple spatial scales. *Bulletin of Marine Science*, 86(2): 387–411; Murawski S et al. (2005) Effort distribution and catch patterns adjacent to temperate MPAs. *ICES Journal of Marine Science*, 62: 1150–1167; Brown BK et al. (2010) Effects of excluding bottom-disturbing mobile fishing gear on abundance and biomass of groundfishes in the Stellwagen Bank National Marine Sanctuary, USA. *Current Zoology* 56(1): 134–43; Roberts CM, Hawkins JP (2012) Establishment of fish stock recovery areas. Prepared for the European Parliament's Committee on Fisheries; Svedäng H (2010) Long-term impact of different fishing methods on the ecosystem in the Kattegat and Öresund. Prepared for the European Parliament's Committee on Fisheries.

⁹ Murawski SA (2000) Definitions of overfishing from an ecosystem perspective. *ICES Journal of Marine Science*. 57(3): 649-658.

¹⁰ Ecosystem Assessment Program (2009) Ecosystem Assessment Report for the Northeast U.S. Continental Shelf Large Marine Ecosystem. U.S. Department of Commerce, Northeast Fisheries Science Center Reference Document 09-11: 61 pp.

¹¹ Balch WM et al. (2012) Step-changes in the physical, chemical and biological characteristics of the Gulf of Maine, as documented by the GNATS time series. *Marine Ecology Progress Series* 450: 11–35; McManus MC et al. (2014) The Western Maine Coastal Current reduces primary production rates, zooplankton abundance and benthic nutrient fluxes in Massachusetts Bay. *ICES Journal of Marine Science* 71(5): 1158–69; Fogarty MJ (2014) The art of ecosystem-based fishery management. *Canadian Journal of Fisheries and Aquatic Sciences* 71: 479–490.

habitat protection must also be recognized as a vital tool for improving ecosystem resilience and the chances for depleted stocks to recover. The region's approach to habitat protection, as reflected in Council discussions and the alternatives developed for the DEIS, do not meet these challenges, particularly when considering the new threats posed by climate change.

Unprecedented threats posed by climate change demand an unparalleled EFH program.

The EFH Amendment has been more than a decade in the making, a decade during which the ecological landscape within which the fisheries operate has changed rapidly and extensively. The Northwest Atlantic, including the Gulf of Maine, has seen steady manifestations of climate change and witnessed record-breaking temperatures in 2012. Awareness that the region is a global hot spot for oceanic climate change has grown through experiences on the water and with the emergence of new science.¹² NOAA and the global scientific community have recognized that habitat protection is a crucial tool for resilience and adaptation in the face of these and others problems exacerbated by climate change.¹³ Even if the human-induced causes of climate change were eliminated today, the need for enhanced habitat protection and other steps to increase ecosystem resilience would continue for decades because greenhouse gases will remain elevated for centuries. The imperative for protecting marine habitat in the Northeast has never been greater.

Areas that continue to support cold-water coral must be protected now before the corals are lost.

Cold-water corals (of multiple taxa) represent a component of regional biological diversity as well as EFH that has been seriously compromised throughout New England over the last half-century, essentially eradicated from most of their historic range on the continental shelf by bottom-contact fishing gear. Recent expeditions to the eastern Gulf of Maine have revealed localized areas where cold-water corals have escaped damage due to the complexity of the seafloor.¹⁴ With pressure to explore new areas for alternative fisheries resources, the risk of losing these remaining coral communities and the functions they serve is higher than ever. Scientific information made available in the summer of 2014 should be used to design and implement coral protection measures in eastern Maine, as highly vulnerable EFH, through this Amendment. These coral areas should be included in a new HMA and clearly meet the criteria for Habitat Areas of Particular Concern (discussed further below).

Habitat research areas are essential.

We support designation of the network of DHRAs, and associated *reference areas* in the Amendment. These areas should support well-designed observational and experimental programs on the effects of fishing and

¹² Mills KE et al. (2013) Fisheries Management in a Changing Climate: Lessons from the 2012 Ocean Heat Wave in the Northwest Atlantic. *Oceanography* 26(2SI): 191–195; IPCC AR5 WG II [Chapter 6](#). Ocean Systems; [Union of Concerned Scientists](#); [Northeast Climate Impacts Assessment](#); Third [National Climate Assessment](#), 2014; Mooney H et al. (2009) Biodiversity, climate change, and ecosystem services. *Current Opinion in Environmental Sustainability* 1(1): 46–54; Friedland KD et al. (2013) Thermal habitat constraints on zooplankton species associated with Atlantic cod (*Gadus morhua*) on the US Northeast Continental Shelf. *Progress in Oceanography* 116: 1–13; Hollowed AB et al. (2013) Projected impacts of climate change on marine fish and fisheries. *ICES Journal of Marine Science* 70 (5): 1023–1037.

¹³ National Fish, Wildlife and Plants Climate Adaptation Strategy, National Fish, Wildlife and Plants Climate Adaptation Partnership. 2012. Association of Fish and Wildlife Agencies, Council on Environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service. Washington, DC, ISBN: 978-1-938956-00-3, DOI: 10.3996/082012-FWSReport-1: <http://www.wildlifeadaptationstrategy.gov/pdf/NFWPCAS-Final.pdf>.

¹⁴ Auster PJ et al. (2014) Imaging Surveys of Select Areas in the Northern Gulf of Maine for Deep-sea Corals and Sponges during 2013-2014. Submitted to the New England Fisheries Management Council, October 30, 2014; Hanging Coral Gardens in Gulf of Maine Add to Excitement of Summer Full of Deep-Sea Coral Discoveries. Northeast Fisheries Science Center Newsroom, SS14.08, September 2, 2014: www.nefsc.noaa.gov/press_release/pr2014/scispot/ss1408.

other activities. Furthermore, these areas must be sufficiently large that they can be observed and sampled in order to extract management-critical data without being compromised or destroyed in the process. This is a critical step to improve information linking attributes of marine habitats and the impacts of fishing to the characteristics of EFH and, ultimately, to the core principles of EBFM. A changing climate and shifting oceanographic variables add further complications to management. A concerted effort is needed to understand the role that seafloor habitats play, in concert with other ecosystem attributes, in the long-term sustainability of managed species. New research in this area will improve decision-making at multiple points in the management process, reducing uncertainty and improving accountability.

Dedicated Habitat Research Areas. We strongly recommend DHRAs in all five subregions of the Northeast Shelf Large Marine Ecosystem. Determining which management actions, in particular environmental settings, produce the desired effects is fundamental to managing human activities within complex ecosystems. As one example, the effects of particular types of EFH closures on reproduction, growth, recruitment, and food-web relationships of managed species must be understood to evaluate the function of current EFH areas and to guide future decisions. Distinguishing the ecological consequences of management actions from effects that are part of background (non-anthropogenic) ecological variation requires long-term observations in areas where human impacts are controlled through experimental design. The proposed establishment of DHRAs in three of the five subregions (Alternatives 2, 3, and 4) is an important step forward that will foster synergies among researchers, the fishing community, and fisheries management by answering critical questions.

We note that the Amendment also includes the possibility of a relatively short sunset for the system of DHRAs (i.e., Alternative 5, three-year sunset). In the context of today's research-funding world, and also considering the lengthy temporal scale at which one can expect to see habitat responses to experimental manipulations, this sunset is unrealistic and could undermine the long-term success of this important part of the Amendment. We therefore recommend that NOAA Fisheries either eliminate the sunset provision as now outlined in the Amendment or make the time frame substantially longer.

Fully protected reference areas. Fully protected reference areas should also be established in all of the subregions. Fishing and other human disturbance must be minimized to the degree possible within the reference areas at all times to allow these areas to serve their intended function as indicators of the state that the broader ecosystem would likely assume without proximate direct or indirect human-caused disturbance. The proposed reference area within the Stellwagen Bank DHRA (Alternative 3, Option A) is of particular importance because it is in an area with significant levels of recreational fishing. As a result, this area will allow scientists and the community to begin distinguishing the effects of (1) direct removals of fish predators from (2) those produced by fishing gear that directly impacts the ecology of seafloor communities through contact (e.g., trawls).

Improve on the existing network of habitat management areas.

The New England Fishery Management Council manages a zone of approximately 232,156 square kilometers, which extends from 3 to 200 nautical miles offshore, and from the boundary with maritime Canada to the waters off Connecticut. The existing suite of habitat management areas made up of the combination of groundfish and habitat closures (i.e., *no action alternative*, or *status quo*) has a spatial extent of 24,812 km², or about 10% of the entire management zone. This suite includes a substantial diversity of habitat types. Improving habitat protections by reducing impacts through changes to the applicable management measures, and by adding new habitat management areas (e.g., Eastern Maine: Alternative 2, Option 1; Great South Channel: Alternative 3, Option 1), will benefit the region's ecology and dependent fisheries. However, a compelling case has not been presented to support the notion that substitution of smaller, new areas as

defined in many of the alternatives offers any improvement over the *status quo* in terms of ecosystem support or the goals outlined above for EFH.

Gulf of Maine. In the Gulf of Maine, the Western Gulf of Maine (WGOM) Closure (3,030 km²), Cashes Ledge (1,373 km²), and Jeffreys Bank (499 km²) are important areas that have been protected for an extended period and support a diversity of habitats and associated seafloor communities, including many of the remaining large Atlantic cod.¹⁵ All of these areas are widely recognized as ecologically important and containing a mosaic of habitat types, important for animals to carry out their life histories.¹⁶ Two of these areas (WGOM and Cashes) include Habitat Areas of Particular Concern (HAPC), discussed below. Cashes Ledge has a unique deep-water kelp forest and relatively high biological diversity, including a distinct resident cod population. Due to complex seafloor topography, distance from shore, and current protection, these sites are in comparatively good condition, and have served as important sites for marine ecosystem research.¹⁷

The ensemble of three areas in the western and central Gulf of Maine should be kept intact, absent a very well-developed scientific foundation for a new network that will perform better than these areas, which this DEIS does not provide. New protected habitat management areas should be added in the northeastern part of the Gulf of Maine (e.g., Eastern Maine: Alternative 2, Option 1). An HMA to encompass newly discovered cold-water coral should be incorporated here; the coral areas would clearly meet the criteria for an HAPC. Nearshore protection farther south in the Gulf of Maine remains inadequate and should also be improved as indicated by the analyses performed by the Council's Closed Area Technical Team on spawning and juvenile fishes.

Georges Bank. On Georges Bank, Closed Area I (3,939 km²) and Closed Area II (6,862 km²) inclusive of an existing HAPC are substantial, have been in place over decades, and have documented recovery of seafloor habitats. These areas were sited originally to protect juvenile and spawning groundfish.¹⁸ The DEIS includes

¹⁵ Pershing AJ et al. (2013) The Future of Cod in the Gulf of Maine. Gulf of Maine Research Institute: [www.gmri.org/sites/default/files/resource/gmri - the future of cod in the gulf of maine.pdf](http://www.gmri.org/sites/default/files/resource/gmri_-_the_future_of_cod_in_the_gulf_of_maine.pdf); Gulf of Maine Research Institute (2012) *The Role of Closed Areas in Maintaining Cod Health*, Waypoints—Gulf of Maine Fishing Industry Newsletter, Gulf of Maine Research Institute: www.gmri.org/news/waypoints/role-closed-areas-maintaining-cod-health; Brown BK et al. (2010) Effects of excluding bottom-disturbing mobile fishing gear on abundance and biomass of groundfishes in the Stellwagen Bank National Marine Sanctuary, USA, *Current Zoology* 56(1): 134–143.

¹⁶ Ryan MR (2012) Predators and distance between habitat patches modify gap crossing behaviour of juvenile Atlantic cod (*Gadus morhua*, L. 1758). *Journal of Experimental Marine Biology and Ecology* 422–423: 81–87.

¹⁷ McGonigle C et al. (2011) Detection of deep water benthic macroalgae using image-based classification techniques on multibeam backscatter at Cashes Ledge, Gulf of Maine, USA. *Coastal and Shelf Science* 91(1): 87–101; Sherwood GD, Grabowski JH (2010) Exploring the life-history implications of colour variation in offshore Gulf of Maine cod (*Gadus morhua*). *ICES Journal of Marine Science* 67 (8): 1640–1649; Brown BK et al. (2010) Effects of excluding bottom-disturbing mobile fishing gear on abundance and biomass of groundfishes in the Stellwagen Bank National Marine Sanctuary, USA, *Current Zoology* 56(1): 134–143; Tamsett A et al. (2010) Dynamics of hard substratum communities inside and outside of a fisheries closed area in Stellwagen Bank National Marine Sanctuary (Gulf of Maine, NW Atlantic). *Marine Sanctuaries Conservation Series ONMS-10-05*. 53 pp; Murawski SA et al. (2005) Effort distribution and catch patterns adjacent to temperate MPAs. *ICES J. Mar. Sci.* 62(6):1150–1167; Auster PJ et al. (1996) The impacts of mobile fishing gear on seafloor habitats in the Gulf of Maine (Northwest Atlantic): Implications for conservation of fish populations. *Reviews in Fisheries Science* 4: 185–202; Witman JD et al. (1993) Pulsed phytoplankton supply to the rocky subtidal zone: Influence of internal waves. *Proceedings of the National Academy of Sciences USA* 90: 1686–1690.

¹⁸ Murawski SA et al. (2000). Large-scale closed areas as a fishery-management tool in temperate marine systems: The Georges Bank experience. *Bulletin of Marine Science* 66(3): 775–798; Murawski SA et al. (2005) Effort distribution and catch patterns adjacent to temperate MPAs. *ICES J. Mar. Sci.* 62(6):1150–1167; Halliday RG (1988). Use of seasonal spawning area closures in the management of haddock fisheries in the Northwest Atlantic. *NAFO Scientific Council Studies*, 12: 27–36.

seven alternatives to these areas (including no protection at all), but only one (Alternative 8, 4,791 km²) could be considered as possibly improving EFH protection on the Bank. A move to Alternative 8 would decrease the overall extent of protection by half with a single large area along the northern edge of the Bank, including important habitat within the existing cod HAPC. This alternative would also include known spawning areas for Atlantic herring and important areas for a number of groundfish species, and would straddle a diversity of habitats, including the species-rich boundary between the Bank and the deep waters of the Gulf of Maine.

Great South Channel. The Great South Channel is a dynamic region that serves as a corridor for many species moving between southern New England and the Gulf of Maine and Georges Bank. It supports relatively high biological diversity.¹⁹ At present there is no protected EFH in the channel proper, and the addition of protection in this area through the Amendment would be beneficial. Alternative 3, Option 1, appears to be the best alternative included in the DEIS and includes the preferred cod HAPC alternative presented in the DEIS (Volume 2, pp. 390-391).

Southern New England. The Southern New England (SNE) area includes EFH protection in the Nantucket Lightship area, made up of overlapping habitat and groundfish areas with a combined extent of 9,113 km². This area was established to protect juvenile yellowtail flounder.²⁰ The DEIS does not develop alternatives for SNE beyond the areas discussed above that are situated closer to the channel. We urge NOAA Fisheries to consider additional EFH protection in SNE south of the channel.

Essential Fish Habitat and Habitat Areas of Particular Concern.

Two important goals for the Amendment are dealt with in Volume 2 of the DEIS: Revision to the EFH designations for individual species and the development of HAPCs. In contrast to the presentation of alternatives for habitat management areas in Volume 3, the DEIS does not provide a clear juxtaposition of alternatives or encourage reviewers to consider alternatives. Public review of these elements of the Amendment was completed in a separate DEIS in 2007.²¹

According to the guidelines provided by the agency for addressing EFH provisions in Fishery Management Plans, areas of EFH that have important ecological functions, are sensitive to human disturbance, will be stressed by ongoing or future development, or are rare should be considered as HAPCs.²²

We endorse the identification and **protection** of HAPCs, that is, areas of EFH that demand particular concern and corresponding protection. Thus, we support designation of the preferred alternatives identified in the DEIS. However, we are concerned that while the DEIS seeks to identify HAPCs, it specifically refrains from

¹⁹ Crawford JD, Smith J (2006) *Marine Ecosystem Conservation for New England and Maritime Canada: A Science Based Approach to Identifying Priority Areas for Conservation*. Conservation Law Foundation and WWF-Canada, 193 pp; Greene JK et al. (2010). *The Northwest Atlantic Marine Ecoregional Assessment: Species, Habitats and Ecosystems*. The Nature Conservancy, Eastern U.S. Division, Boston.

²⁰ Murawski SA et al. 2000. Large-scale closed areas as a fishery-management tool in temperate marine systems: The Georges Bank experience. *Bulletin of Marine Science* 66(3): 775–798

²¹ Phase 1 work was published in a draft Environmental Impact Statement in April 2007. See 3.4 Notices of intent, scoping, and the amendment development process, in Omnibus Essential Fish Habitat Amendment 2, Volume 1, 86.

²² § 600.758 50 CFR Ch. VI (10–1–13 Edition), Fishery Conservation and Management § 600.815, Contents of Fishery Management Plans.

offering measures that would protect such areas of particular concern from fishing gear or anything else.²³ We question the value of designation as areas of particular concern without accompanying management to measure up to this designation.

The newly discovered coral areas in eastern Maine (discussed above) clearly meet the criteria for HAPC designation and should be added to the areas that are to be classified as such.

Many of the HMAs discussed above include the identified HAPCs, including Cashes Ledge, western Gulf of Maine, Georges Bank, and areas in the Great South Channel and south. This overlap points to the importance of these HMAs, as discussed above.

Conclusion

Before final decisions on EFH areas are made, NOAA Fisheries and the Council must take a sober look at this Amendment, with fresh eyes toward a future that holds ever-greater threats to ocean ecosystems and their abilities to sustain fisheries in the long term. NOAA Fisheries must ensure a future for fishing, fishing communities, and other ocean uses that depend upon marine ecosystems rendered resilient by expanding the network of protected areas, and by reducing the impacts within the areas through management changes.²⁴ Plans that may have appeared appropriate a decade ago when the Amendment was initiated must be rigorously re-evaluated within a context that includes a changing climate and the associated stresses on marine ecosystems. The rapid deterioration of some critical fish stocks, combined with the rising stress from environmental change, makes reductions in habitat protection highly unwise and unsupportable by today's scientific understanding. Our concerns about habitat conservation in New England, and the future of fishing, remain very high.

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²³ Omnibus EFH Amendment 2, Volume 2: EFH and HAPCs Alternatives, 379: "[M]anagement measures such as gear restrictions have not been associated with the HAPC designation itself in the past, and are not proposed as part of the HAPC designations in this amendment."

²⁴ Graham J et al. (2014) Global conservation outcomes depend on marine protected areas with five key features. *Nature* 506: 216–220.

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