

**Habitat Area of Particular Concern
Candidate Proposal Submission Form (Version 2)**

Name of Proposal Developer(s):

The Ocean Conservancy

Telephone/Fax/e-mail:

207-879-5444 (p)

2070879-5445 (f)

Title of HAPC Proposal:

Jeffreys Ledge/Stellwagen Bank HAPC Proposal

Abstract / Brief Statement of Proposal:

The title of this proposal is the Jeffreys Ledge/Stellwagen Bank HAPC. The portions of Jeffreys Ledge and Stellwagen Bank contained within this proposed HAPC represent some of the most diverse and highly productive habitat features within the Gulf of Maine. Unique substrate features on Jeffreys Ledge and Stellwagen Bank include gravel/cobble substrates, boulder fields, deep mud basins, and glacially-formed banks. Oceanographic currents driven by the Gulf of Maine gyre deliver nutrient-rich waters to the area and the topographic features result in upwelling that drives production of a number of plankton species. The high productivity of the area support a wide diversity of marine life ranging from anemones, sponges, sea stars, and polychete worms to herring and sand lance to large predatory fish including cod, haddock, tuna and sharks, to marine mammals including harbor porpoises, humpback whales, and endangered right whales. The unique oceanographic characteristics and habitat features found in the area satisfy many of the HAPC designation criteria, including importance of ecological function, sensitivity to human-induced degradation, rarity of habitat type, existence of current and/or future development stresses.

Coordinates of Jeffrey's Ledge/Stellwagen Bank HAPC (Version 2):

Point 1: 42 deg 15 min Latitude, 69 deg, 55 min Longitude

Point 2: 43 deg 15 min Latitude, 69 deg, 55 min Longitude

Point 3: 43 deg 15 min Latitude, 70 deg 15 min Longitude

Point 4: 42 deg 45 min Latitude, 70 deg 15 min Longitude

Point 5: 42 deg 40 min Latitude, 70 deg 25 min Longitude

Point 6: 42 deg 15 min Latitude, 70 deg 25 min Longitude

Point 7: 42 deg 15 min Latitude, 69 deg, 55 min Longitude

Signature of Primary Proposer Representative: _____

Habitat Area of Particular Concern Proposal

Topic 1: Statement of Proposal

The title of this proposal is the Jeffreys Ledge/Stellwagen Bank HAPC. The portions of Jeffreys Ledge and Stellwagen Bank contained within this proposed HAPC represent some of the most diverse and highly productive habitat features within the Gulf of Maine. Unique substrate features on Jeffreys Ledge and Stellwagen Bank include gravel/cobble substrates, boulder fields, deep mud basins, glacially-formed banks. Oceanographic currents driven by the Gulf of Maine gyre deliver nutrient-rich waters to the area and the topographic features of the area result in upwelling that drives production of a number of plankton species. The high productivity of the area supports a wide diversity of marine life ranging from anemones, sponges, sea stars, and polychete worms to herring and sand lance to large predatory fish including cod, haddock, tuna and sharks, to marine mammals including harbor porpoises, humpback whales, and endangered right whales. The unique oceanographic characteristics and habitat features found in the area satisfy many of the HAPC designation criteria, including importance of ecological function, sensitivity to human-induced degradation, rarity of habitat type, existence of current and/or future development stresses.

Topic 2: Objectives of Proposal

The objective of this proposal is to designate portions of Jeffreys Ledge and Stellwagen Bank as an HAPC. As described in further detail below, the Jeffreys Ledge/Stellwagen Bank area contains unique oceanographic characteristics and habitat features that warrant designation. This proposal seeks to formally recognize the biological and ecological importance of unique habitat features found on Jeffreys Ledge and Stellwagen Bank and to assure these unique characteristics are carefully considered when future management decisions are made by the NEFMC, SBNMS, and other regulatory agencies.

Topic 3: Justification for Council Action

Rarity of habitat Type:

Jeffreys Ledge and Stellwagen Bank are shallow, glacially formed features that include a diversity of habitat types, including gravel/cobble substrates, boulder fields, and deep mud basins. Stellwagen. Oceanographic currents driven by the Gulf of Maine gyre deliver nutrient-rich waters to the area and the topographic features of the area result in upwelling that drives production of a number of plankton species. The high productivity of the area supports a wide diversity of marine life ranging from anemones, sponges, sea stars, and polychete worms to herring and sand lance to large predatory fish including cod, haddock, tuna and sharks, to marine mammals including harbor porpoises, humpback whales, and endangered right whales. Unique aspects of the habitats contained within the proposed HAPC include their near-shore location and the fact that they represent the diversity of habitat types in the Gulf of Maine in a discrete location.

Importance of Historic Ecologic Function:

The important ecological functions known to occur with the proposed HAPC have been recognized for over a century. Captain Henry Stellwagen first described the Stellwagen Bank area in 1854 as a 15 fathom bank characterized by a rocky substrate on the northern flank, sand features in the middle and southern end, and deeper mud basins just inshore of the bank itself. (SBMNS web page). After the turn of the century, the report entitled *Fishing Grounds of the Gulf of Maine* identified both Jeffreys Ledge and Stellwagen Bank (or Middle Bank) as key fishing grounds. Jeffreys was known to contain rocky bottom in the shoaler water with gravel and pebbles along the edges. It was considered one of the best fishing grounds in the Gulf of Maine with cod, haddock, pollock, cusk, hake, flounder, herring, and mackerel all found in the area. Stellwagen and Tillies Bank were also identified as important fishing grounds with cod, haddock, pollock, cusk, and hake all present during times of the year. (Rich, 1929). Additionally, the area has been recognized as a preferred habitat for several marine mammal species and seabirds for decades.

Importance of Current Ecologic Function:

This area continues to be a rich ecological area, supporting important habitat for several managed species including codfish and lobster, and important habitat for marine mammals (including endangered humpback and North Atlantic right whales), seabirds, forage species such as herring, sand lance, and invertebrate species. The array of habitat types within the proposed area is representative of important habitat for managed species throughout the Gulf of Maine, and Sanctuary research has indicated site affinity by codfish, redfish, and other species for habitat features within the Sanctuary boundaries. (Auster, Joy, and Lindholm, 2001; Auster, Lindholm, Valentine (2003). (Figures 1 and 2). Furthermore, Sanctuary research on the recovery of seafloor habitat from groundfish fishing within the overlap of the Sanctuary and the Western Gulf of Maine Closed Area (“the sliver”) provides important insight into the ecologic function of this site and the relationship of habitat recovery to fishing stock status. (see summaries of Lindholm and Auster studies at <http://www.sbnms.nos.noaa.gov>).

The NEFMC has recognized the ecological importance of the Jeffreys Ledge/Stellwagen Bank area. Habitats within the proposed HAPC have been designated as Essential Fish Habitat for a number of Council-managed species, including juvenile and/or adult life stages of Atlantic cod, haddock, herring, monkfish, ocean pout, American plaice, pollock, redfish, white hake, whiting, witch flounder, and halibut. (NEFMC, 1998). Habitat features and oceanographic conditions within this proposed HAPC are known to be especially important to Gulf of Maine codfish. In 1997, the Council implemented the Western Gulf of Maine closed area (which encompasses much of this proposed HAPC) specifically to reduce fishing mortality on GOM cod and to protect cod aggregations known to occur within the area (NEFMC, 2001). Additionally, analysis of cod catches on the NMFS trawl surveys between 1995-2001 demonstrate that some of the highest

catch per tow rates in the entire Gulf of Maine occurred within the area encompassed by the proposed HAPC. (NEFMC 2004, p. I-478, Figure 3)

The Council has also recognized the important ecological functions provided by habitat features within the proposed HAPC area by designating a portion of the proposed Jeffreys Ledge/Stellwagen area as a Level 3 habitat closure (closed to bottom-tending mobile fishing gear). (NEFMC 2004, p. I-93). The proposed HAPC will encompass additional habitat features to the west of the existing habitat closed area. This expansion was specifically designed by the Council's Habitat Technical Team to include additional complex habitat features, including gravel habitats on Stellwagen Bank and boulder reefs on Tillies Bank to the north. (NEFMC 2003, p. I-157).

The ecological importance of the Stellwagen Bank portion of the proposed HAPC has also been formally recognized by the National Marine Sanctuary Program. The Sanctuary Program was established to identify and recognize nationally significant marine areas and to promote long-term management of their conservation, ecological, and other values. The Stellwagen Bank National Marine Sanctuary was officially designated by Congress in 1992 in recognition of the unique physical and oceanographic conditions in the area that support a diverse biological community including plankton, benthic invertebrates, forage fish, large predatory fish, and a number of marine mammals, including endangered right whales.

The designation of this area as a National Marine Sanctuary has helped to significantly increase the ecological understanding of the area. The United States Geological Survey (USGS) has completed a detailed seafloor mapping project of the Sanctuary using multibeam sonar mapping techniques. This mapping effort has greatly increased understanding of water depths and various substrate types within the Sanctuary boundaries, including a portion of Jeffreys Ledge. This effort has provided essential information for 1) determining distribution of ecological habitat features and the natural processes that affect them, 2) assessing natural and human disturbances of habitat and biological communities, and 3) identifying areas where contaminants may accumulate. (USGS 1998).

Additionally, the area has also seen a focused scientific research effort. The unique physical, oceanographic, and ecological characteristics of the Stellwagen area and its close proximity to several universities and research institutions make the Jeffreys Ledge/Stellwagen area an excellent scientific research site. Ongoing studies conducted in conjunction with the Sanctuary include quantification of fish movements relative to various habitat features, species and area relationships for multiple taxa, and recovery rates and processes for seafloor habitats in response to cessation of certain types of fishing. In addition to improving understanding of ecological processes within the Sanctuary, the research effort also provides useful information that can be applied to other areas throughout the Gulf of Maine and beyond. To date over \$1.3 million has been invested in research programs in the area, and that level of funding is expected to exceed \$4 million by the end of the decade. (NEFMC 2004, p. I-561).

Sensitivity to Anthropogenic Stresses:

Impacts to benthic habitat features have been widely studied, both in the Northeast region and across the Atlantic. Numerous studies and reports have documented the sensitivity of benthic habitats characterized by complex substrates with emergent epifauna to impacts caused by fishing gear. In its 2002 report, the National Research Council found that trawling and dredging changes the physical and biological structure of ecosystems and therefore can have potentially wide-ranging consequences. Mobile gear reduces benthic habitat complexity by removing or damaging the actual physical structure of the seafloor, and it causes changes in species composition. The reduction of physical structure in repeatedly trawled areas results in reduced productivity of benthic habitats and lower overall biodiversity. (NRC 2002).

In addition to the broader-scale analyses conducted by the NRC, a Northeast region-specific analysis was also conducted. In 2001, the Northeast Region Essential Fish Habitat Steering Committee convened a panel workshop of experts in benthic ecology, fishery ecology, geology, and fishing gear technology and operations. The purpose of the workshop was to evaluate existing scientific research on the effects of fishing gear on benthic habitats, to assess the degree of impacts caused by various fishing gear types, and to offer recommendations on measures to minimize those adverse impacts. The Workshop participants concluded, among other things, that otter trawls and dredges were the fishing gears of greatest concern and that high energy gravels substrates containing attached biological organisms were most susceptible to impacts. Identified impacts to this habitat types included 1) changes in physical and biological structure, 2) removal of attached epifauna, and 3) changes in abundance of benthic prey species (NEFSC 2002).

The NEFMC has reviewed numerous studies on impacts to marine habitats caused by various fishing gear types and incorporated the findings into regional Fishery Management Plan Amendments. These studies and others clearly demonstrate that benthic habitat features region-wide and within the proposed Jeffreys Ledge/Stellwagen Bank HAPC are sensitive to anthropogenic sources, including impacts caused by fishing gear. A summary of those studies is provided below.

Auster et al. (1996) conducted three studies of mobile fishing gear in the Gulf of Maine and concluded that mobile fishing gear alters the seafloor, and reduces habitat complexity, sedimentary structures, and emergent epifauna. Collie (1998) reviewed studies from New England and concluded that hard bottom benthic habitats (e.g. boulders and gravel pavement) experience significant impacts of mobile bottom-tending fishing gear. Jennings and Kaiser (1998) concluded that fishing activities lead to changes in the structure of marine habitats and influence the diversity, composition, biomass, and productivity of the associated biota. They further concluded these effects vary according to gears used, habitats fished and the magnitude of natural disturbance, but tend to increase with depth and the stability of the substrate.

Auster and Langton (1999) reviewed 22 studies from a wide geographic range and concluded that mobile fishing gear reduces habitat complexity by: (1) directly removing

epifauna or damaging epifauna leading to mortality, (2) smoothing sedimentary bedforms and reducing bottom roughness, and (3) removing taxa which produces structure (i.e., taxa which produce burrows and pits). They also concluded that for fixed gear, the area impacted per unit effort is smaller than for mobile gear, but the types of damage to emergent benthos appear to be similar. These studies and others clearly demonstrate that benthic habitat features region-wide and within the proposed Jeffreys Ledge/Stellwagen Bank HAPC are sensitive to anthropogenic sources, including impacts caused by fishing gear.

These impacts are especially important to consider in this proposal given that juvenile and adult life stages of several Council-managed species have been determined to be moderately to highly vulnerable to impacts from mobile fishing gear. According to analyses presented in Amendment 13 to the Northeast Multispecies FMP, juvenile and/or adult life stages of the following species have EFH within the proposed HAPC: Atlantic cod, haddock, ocean pout, American plaice, pollock, redfish, white hake, witch flounder, and halibut. EFH for all of these species have been determined to be moderately to highly vulnerable to impacts from bottom-tending mobile gears. (NEFMC 2004, p. I-511).

In addition to the areas sensitivity to direct disturbances caused by bottom-tending fishing gear, ecological processes within the proposed HAPC can be affected by fishing activities in other ways. The abundance of prey species such as herring and sand lance that provide critical forage for numerous marine species can be adversely affected by large-scale removals by directed fisheries. Additionally, continued fishing pressure on both forage species and predatory fish including cod, haddock, and tuna can affect the population structure and ecosystem function within the proposed HAPC area.

The unique habitat features and ecological processes within the proposed HAPC area are also vulnerable to a number of other anthropogenic stresses, including but not limited to: 1) alteration of ecological processes resulting from nutrient and chemical pollution caused by cruise ships and cargo vessel discharges, sewage discharges from coastal communities including the city of Boston's municipal wastewater discharge, and terrestrial non-point source pollution, and 2) habitat alteration and disturbance of benthic communities caused by future sand and gravel mining operations, waste disposal, construction of fiber-optic cable and pipelines, and potential new industrial uses of the coastal waters and the seabed including offshore aquaculture facilities, wind energy, LNG facilities, and other energy-related infrastructure.

Topic 4: Potential and Existing Threats

Impacts to benthic habitat features and ecological processes caused by fishing activities are a significant concern for the proposed HAPC area. Despite the fact that portions of the proposed area have been designated as groundfish mortality closures, habitat closures, and a National Marine Sanctuary, there is still considerable commercial and recreational fishing effort in the proposed area. An analysis of the spatial distribution of fishing effort in the Northeast region from 1995 shows moderate to high intensity fishing effort by otter

trawls, gillnets, and long-lines in areas outside the groundfish mortality closures. (NEFMC 2004, p. 1207-1211, Figures 5-7). Additionally, spatial analysis of fishing effort within the WGOM Closed Area shows significant fishing effort in the proposed HAPC area by herring vessels, shrimp vessels, handlines, and lobster pots/traps. (NEFMC 2004, p. I-463-467, Figures 8-9). Stellwagen Bank and Jeffreys Ledge are also known to experience considerable fishing effort by recreational fishermen targeting cod, haddock, tuna and other species. (Figure 10 courtesy of SBNMS).

In addition to the potential and existing threats posed by fishing-related activities, the unique habitat features and ecological processes within the proposed HAPC area is also vulnerable to a number of other anthropogenic stresses, including but not limited to: 1) vessel discharges (ballast and gray water) from cruise ships and cargo vessels, 2) future sand and gravel mining operations, 3) sewage discharges from coastal communities including the city of Boston's municipal wastewater discharge, 4) terrestrial non-point source pollution, 5) other waste disposal operations, 6) fiber-optic cable and pipeline construction, and 7) potential new industrial uses of the coastal waters and seabed including offshore aquaculture facilities, wind energy, LNG facilities, and other energy-related infrastructure.

Topic 5: HAPC Boundary (Map and Coordinates)

Coordinates:

Point 1: 42 deg 15 min Latitude, 69 deg, 55 min Longitude

Point 2: 43 deg 15 min Latitude, 69 deg, 55 min Longitude

Point 3: 43 deg 15 min Latitude, 70 deg 15 min Longitude

Point 4: 42 deg 45 min Latitude, 70 deg 15 min Longitude

Point 5: 42 deg 40 min Latitude, 70 deg 25 min Longitude

Point 6: 42 deg 15 min Latitude, 70 deg 25 min Longitude

Point 7: 42 deg 15 min Latitude, 69 deg, 55 min Longitude

Topic 6: Discretionary Topics

We have not included recommendations for management measures associated with this HAPC proposal at this time. We believe the HAPC evaluation process should consider a full range of alternative measures, including area-specific closures, gear requirements, and effort reductions. We request that the Council develop a range of alternatives for this HAPC proposal and that the analysis include evaluation of Level I, II, and III habitat closures (as defined in Amendment 13 to the Groundfish FMP). Additionally, we request that the impacts analysis specifically evaluate the potential benefits to habitat function, fish productivity, and overall ecosystem health. Analyses of habitat closures in recent FMP Amendments focused almost exclusively potential adverse socio-economic impacts of various habitat closures. We urge the Council to provide a comprehensive assessment of the Jeffreys Ledge/Stellwagen Bank HAPC proposal to provide the public and decision-makers the data necessary to make well-informed decisions.

Topic 7: Supportive Data and Other Information (copies available upon request)

Auster, P.J. et al. (1996). The impacts of mobile fishing gear on seafloor habitats of the Gulf of Maine (northwest Atlantic): implications for conservation of fish populations. *Reviews in Fisheries Science* 4(2): 185-202.

Auster, P.J. and R.W. Langton (1999). The effects of fishing on fish habitat. In L.R. Benaka, editor. *Fish Habitat: Essential fish habitat and rehabilitation*. American Fisheries Society, Symposium 22, Bethesda, MD.

Auster, P.J., K. Joy, and P.C. Valentine. 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.

Auster, P. J., J. Lindholm, P.C. Valentine (2003). Variation in habitat use by juvenile Acadian Redfish, *Sebastes fasciatus*. *Environmental Biology of Fishes* 68: 381-389, 2003.

Collie, J.S. et al. (1997). Effects of bottom fishing on the benthic megafauna of Georges Bank. *Marine Ecology Progress Series* 155:159-172.

NRC (2002). Effects of trawling and dredging on seafloor habitat. National Academy of Sciences, Washington, D.C.

NEFMC (1998). Essential Fish Habitat Omnibus Amendment, Volume 1. EFH Source documents. New England Fisheries Management Council in consultation with the National Marine Fisheries Service.

NEFMC (2001). Report of the New England Fishery Management Council's Multispecies Monitoring Committee. October 29, 2001.

NEFMC (2003). Draft Environmental Impact Statement for the Essential Fish Habitat Components of Amendment 13 to the Northeast Multispecies Fishery Management Plan. New England Fishery Management Council and National Marine Fisheries Service, March, 2003.

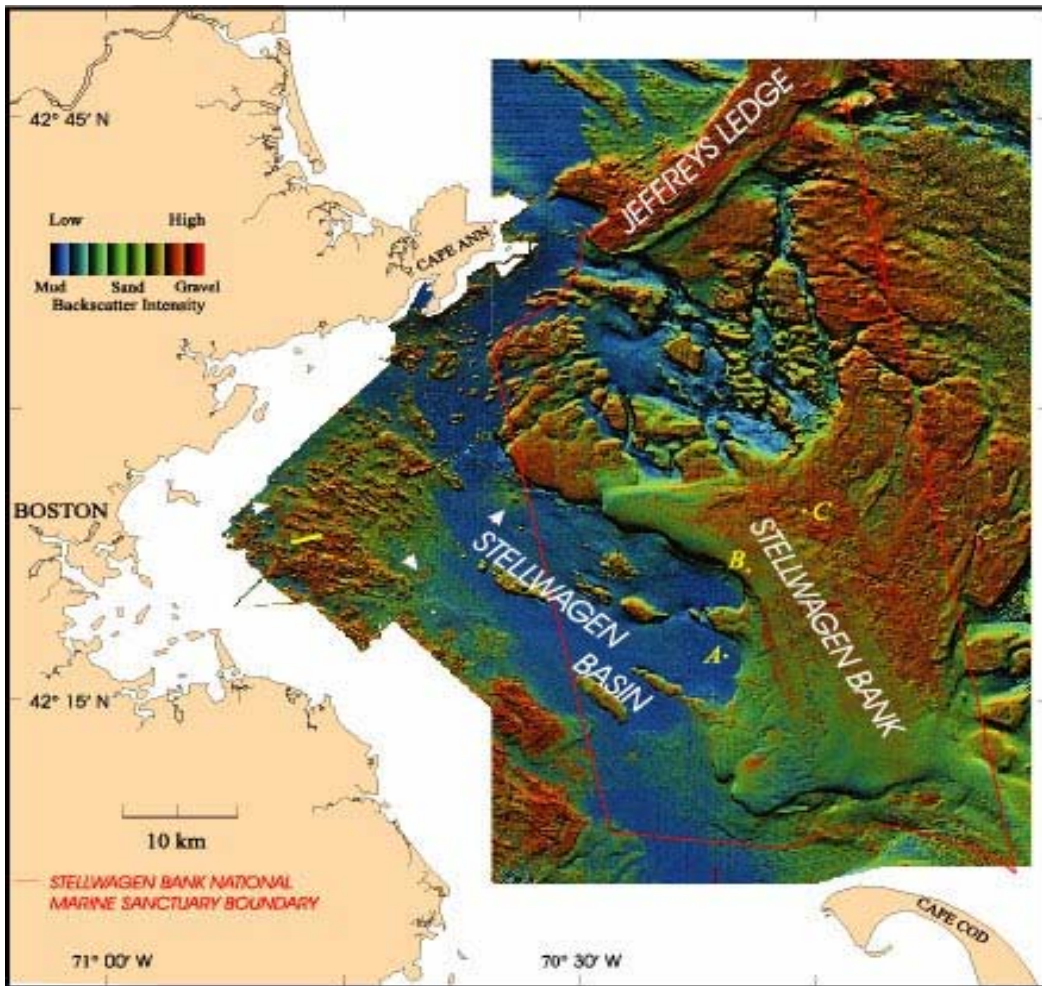
NEFMC (2004). Final Environmental Impact Statement for Amendment 13 to the Northeast Multispecies Fishery Management Plan (p. I-478). New England Fishery Management Council and National Marine Fisheries Service, May 2004.

NEFSC (2002). Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern United States. Northeast Region Essential Fish Habitat Steering Committee. Northeast Fisheries Science Center Reference Document 02-01. February 2002.

Rich, Walter, H. (1929). *Fishing Grounds of the Gulf of Maine*. Department of Commerce, Bureau of Fisheries, Report of the United States Commissioner of Fisheries.

Stellwagen Bank National Marine Sanctuary (2005). *Discovery of the Bank*. Found at <http://www.sbnms.nos.noaa.gov>

USGS (1998). United States Geological Survey Fact Sheet 078-98. Mapping the sea floor and biological habitats of the Stellwagen Bank National Marine Sanctuary Region. USGS, May 1998.



* Courtesy of United States Geological Survey

