RE-OPENING A PORTION OF THE GEORGES BANK CLOSED AREA TO SURFCLAM AND OCEAN QUAHOG HARVESTING

Environmental Assessment
Regulatory Impact Review

National Marine Fisheries Service
Northeast Regional Office
55 Great Republic Drive
Gloucester, MA

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LIST OF ACRONYMS

CAW	Cape Wind Associates
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DMV	Delmarva
EA	Environmental Assessment
EEZ	Exclusive Economic Zone

EFH	Essential Fish Habitat
EFP	Experimental Fishing Permit
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FDA	Food and Drug Administration
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FR	Federal Register
FY	Fishing Year
GB	Georges Bank
GOM	Gulf of Maine
HAB	Harmful Algal Bloom
ICES	International Council for the Exploration of the Sea
ISSC	Interstate Shellfish Sanitation Conference
ITQ	Individual Transferable Quota
LI	Long Island
LNG	Liquefied Natural Gas
LOF	List of Fisheries
LUPE-	Landings Per Unit Effort
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
NEFMC	New England Fisheries Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NJ	New Jersey
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NAO	National Oceanic and Atmospheric Administration Administrative Order
NSSP	National Shellfish Sanitation Program
OQ	Ocean quahog
PSP	Paralytic Shellfish Poison
RA	Regional Administrator
RIR	Regulatory Impact Review
SC	Surfclam
SNE	Southern New England
SVA	Southern Virginia
USDC	United States Department of Commerce
VEC	Valued Ecosystem Component
VMS	Vessel Monitoring System
VTR	Vessel Trip Report

1.0 INTRODUCTION

The following Environmental Assessment (EA) has been prepared in response to the request from Mid-Atlantic Fishery Management Council (MAFMC) to re-open a portion of the Georges Bank (GB) Closed Area that has been closed to surfclam/ocean quahog (SC/OQ) harvesting since 1990 due to red tide blooms which cause paralytic shellfish poisoning (PSP). In accordance with the National Environmental Policy Act of 1969 (NEPA) and the National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-6, the environmental impacts of this action and the anticipated level of significance of these impacts are addressed in this EA.

Since red tide events can vary inter-annually, the areas of closure can vary depending upon the severity of the event and the level of monitoring by the U.S. Food and Drug Administration (FDA) to indicate safe consumption. For purposes of this EA, it is anticipated that the FDA will request portions of the existing GB Closed Area to be re-opened and closed based upon future PSP-toxin monitoring results of SC/OQ. The impacts related to re-opening and closing areas within the GB Closed Area to harvesting SC/OQ are discussed in this EA, and this analysis would be in compliance with NEPA for future related actions. If the Council requests the re-opening of an area larger than or an area outside of what is described in this EA, a new EA must be prepared.

It should be noted that in the case of an emergency, such as a public health concern, the Secretary of Commerce has the authority, under section 305(c) of the Magnuson-Stevens Act, to re-open or close an area at any time by publication in the Federal Register. Duration and seasonality are factors associated with a SC/OQ harvest area re-opening or closing that would affect the economic impacts described below in Section 6.0.

2.0 BACKGROUND

The SC/OQ GB Closed Area, located east of 69°00’ West longitude and South of 42°20’ North latitude (Figure 4.4-1), was closed on May 25, 1990 (50 CFR 648.73(a)(4)). This closure was implemented based on the advice of the FDA after samples of surfclams tested positive for toxins (saxitoxins) that cause paralytic shellfish poisoning (PSP). These toxins are produced by the alga *Alexandrium fundyense*, which can form blooms commonly referred to as red tides. Red tide blooms, a form of harmful algal bloom (HAB), can produce toxins that accumulate in water column filter-feeding shellfish. Shellfish contaminated with the saxitoxin, if eaten in large enough quantity, can cause illness or death in humans from PSP. Due, in part, to the inability to test and monitor this area for the presence of PSP-causing toxins, this closure was later made permanent through a technical change under Amendment 12 to the Atlantic Surfclam and Ocean Quahog Fisheries Management Plan (FMP) in 1999.

The FDA has spent many years developing at-sea and shore-based testing procedures to verify that any harvests taken from GB are safe (MAFMC, 2009). Exempted Fishing Permits (EFP) were issued on January 9, 2008, December 10, 2009, and December 14, 2010, by NOAA’s National Marine Fishery Service (NMFS) to Truex Enterprises of New

Bedford, MA to allow for testing the efficiency of harvesting SC/OQ from a portion of the GB Closed Area (Figure 4.4-1) utilizing the latest *Protocol for Onboard Screening and Dockside Testing for PSP in Molluscan Shellfish* (protocol).

The protocol was developed to test for the presence of saxitoxins in shellfish, and to facilitate the harvest of shellfish in waters susceptible to HABs, such as the GB Closed Area, which is not currently under rigorous water quality monitoring programs of either state or Federal management agencies (NMFS 2009). The protocol was formally adopted into the National Shellfish Sanitation Program (NSSP) at the October 2011 Interstate Shellfish Sanitation Conference (ISSC). On March 16, 2012, after the adoption of the protocol, NMFS issued an EFP to Truex Enterprises to allow the continuation of research to assess not only the performance of the approved protocol, but also to continue sample collection and testing through another year to gain additional data on the spatial distribution of the PSP toxin in the GB Closed Area. Recent testing of clams on GB by the FDA in cooperation with the NMFS and the fishing industry under the EFP demonstrated that PSP toxin levels were well below the regulatory limit established for public health safety (FDA 2010).

3.0 PURPOSE AND NEED FOR THE ACTION

The purpose of this action is to re-open a portion of the existing GB Closed Area for the harvest of SC/OQ at the request of the MAFMC. The proposed re-opening is based upon the recent adoption of the protocol into the NSSP by the ISSC and the interpretation of the regulatory authority of the NMFS Northeast Regional Office Regional Administrator (RA) when considering re-opening PSP closure areas. NMFS published a similar proposal to re-open a portion of the GB Closed Area in the Federal Register on June 30, 2010, (75 FR 37745), which was later withdrawn due to comments received in opposition of re-opening a portion of the GB Closed Area without a testing protocol in place. It was recently determined that the RA has the authority to impose additional harvesting restrictions when re-opening PSP closure areas. Now that the protocol has been formally adopted, NMFS is proposing to re-open a portion of the GB Closed Area with the requirement that the protocol be used for all trips into the area.

The need for the re-opening is to allow for the harvesting of a resource which has been determined to be safe for human health consumption. Without this action, the harvest of SC/OQ would continue to be prohibited from the GB Closed Area. Re-opening the GB Closed Area would also relieve fishing pressure on southern stocks.

4.0 PROPOSED ALTERNATIVES

4.1 Alternative A (The 2012 Preferred Action – Re-open historic EFP Area)

This preferred alternative would re-open the entire section of the GB Closed Area to SC/OQ harvesting that is defined under previously issued EFPs, and fished pursuant to the protocol. This section encompasses an area of approximately 6,378 square miles (16,519 sq. km), and the East and West sides are adjacent to the groundfish Closed Areas II and I, respectively. The latitude and longitude of the points forming this alternative area (Figure 4.4-1) begin with the north-westernmost point (point 1) and continue clockwise as follows:

Point	Latitude	Longitude
1	42°00'	68°50'
2	42°00'	67°20'
3	41°00'	67°20'
4	41°00'	67°10'
5	40°40'	67°10'
6	40°40'	68°30'
7	41°30'	68°30'
8	41°30'	68°50'

This alternative would limit harvesting of SC/OQ to areas determined to be safe for human health consumption by the FDA. Any or all portions of the Alternative A, including the smaller areas described in Alternative B and C, may be re-opened or re-closed if based upon PSP monitoring levels and requested by the FDA and approved by NMFS. The size and area definition of any re-openings or re-closures would be based on results of the PSP testing protocol. Should samples of surfclams test positive for toxins that cause paralytic shellfish poisoning it is likely that the area where the positive results were found would be re-closed. Harvesting SC/OQ for research purposes has been occurring within the GB Closed Area using the testing protocol since 2008, and to date, no positive results have been recorded that would have led to a re-closure.

4.2 Alternative B (Re-open Current EFP Area)

This alternative would re-open the section of the GB Closed Area to SC/OQ harvesting that is defined under the 2012 EFP, and fished pursuant to the protocol. This section encompasses an area of approximately 2,381 square miles (6,167 km), and the south-western boundary meets the eastern boundary of groundfish Closed Area II. The latitude and longitude of the points forming this proposed area (Figure 4.4-1) begin with the north-westernmost point (point 1) and continue clockwise as follows:

Point	Latitude	Longitude
1	42°00'	68°30'
2	42°00'	67°30'
3	41°20'	67°30'
4	41°20'	68°30'

4.3 Alternative C (Re-open Cultivator Shoal Area)

This alternative would re-open a section of the GB Closed Area to SC/OQ harvesting which has been determined safe for human health consumption by the FDA (Figure 4.4-1). This area was previously proposed for re-opening in 2010, but the decision to re-open was withdrawn due to the lack of an approved testing protocol. This rectangular shaped section encompasses an area of approximately 447 square miles (1,158 sq. km).

Point	Latitude	Longitude
1	41°40’	68°25’
2	41°40’	67°55’
3	41°25’	67°55’
4	41°25’	68°25’

4.4 Alternative D (The Status Quo/ No Action)

As mentioned above, the SC/OQ GB Closed Area has been closed since May 25, 1990. Thus, the no action alternative would be to leave the entire GB Closed Area closed to the harvesting of SC/OQ. This area encompasses an area approximately equal to 37,334 square miles (96,695 square km), which is bound by the following coordinates and the EEZ: east of 69°00’ West longitude and South of 42°20’ North latitude (Figure 4.4-1). This alternative is the baseline scenario for this EA, as it represents the continuation of the current condition.

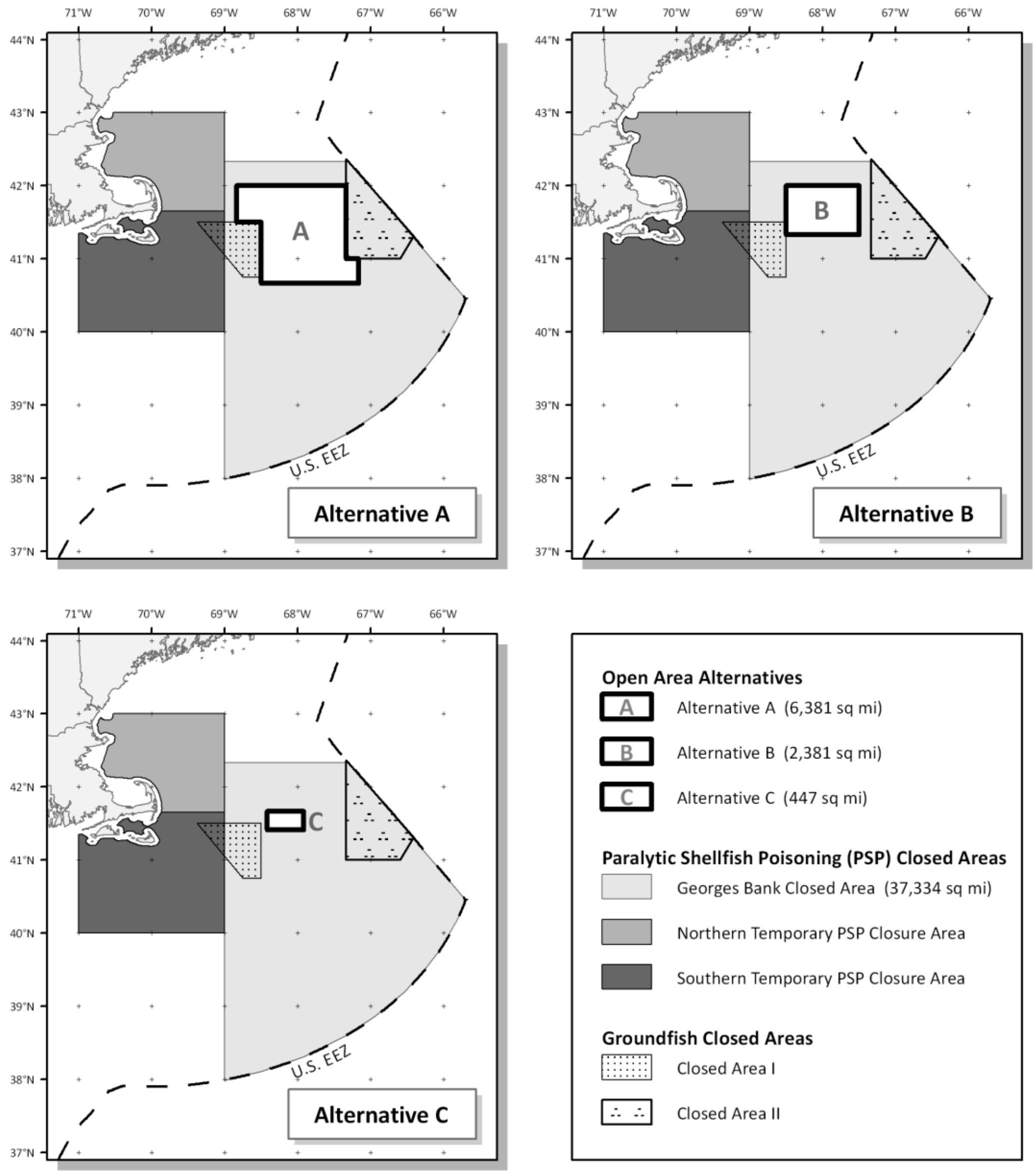

Figure 4.4-1 Map of Proposed Alternatives

4.5 Alternatives Considered but Not Further Analyzed

4.5.1 Re-opening the entire GB Closed Area for SC/OQ harvest

This alternative (Current GB Closed Area) was considered to be not reasonable because a large portion of the GB Closed Area is not suitable for the harvesting of SC/OQ due to excessive depths and the presence of non-sandy substrate types which render clam dredges ineffective. Additionally, there are insufficient sampling and/or monitoring data within the GB Closed Area, outside of the area encompassing the proposed alternatives, to allow the FDA to make a determination regarding whether harvest of SC/OQ would be safe for human consumption. Therefore, re-opening the entire GB Closed Area to SC/OQ harvesting is not considered a viable alternative at this time.

4.5.2 Re-opening the Northern and Southern Temporary PSP Closure Areas

This alternative (Northern and Southern Temporary PSP Closure Area) was not considered because no research or controlled experimental harvest has taken place in these areas that would provide samples that would indicate the PSP toxin levels are below the regulatory limit. Further, these areas are temporary closure areas and a determination of whether or not to lift the closure is considered on an annual basis. Should new data become available, the decision to lift the closures would be revisited.

5.0 AFFECTED ENVIRONMENT

5.1 Location/Physical Environment

The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream (Figure 5.1 1). The continental slope includes the area east of the shelf, out to a depth of 2,000 meters (m). Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: the Gulf of Maine (GOM), GB, the Mid-Atlantic Bight, and the continental slope. Southern New England is sometimes referred to as a separate sub-region rather than being included as part of the Mid-Atlantic.

The GOM is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. GB is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

Pertinent physical characteristics of GB that could potentially be affected by this action are described in this section. Information included in this document was extracted from Stevenson et al. (2004). Key primary references are Backus, Uchupi and Austin, and Twichell et al. in the 1987 Georges Bank book (MIT 1987).

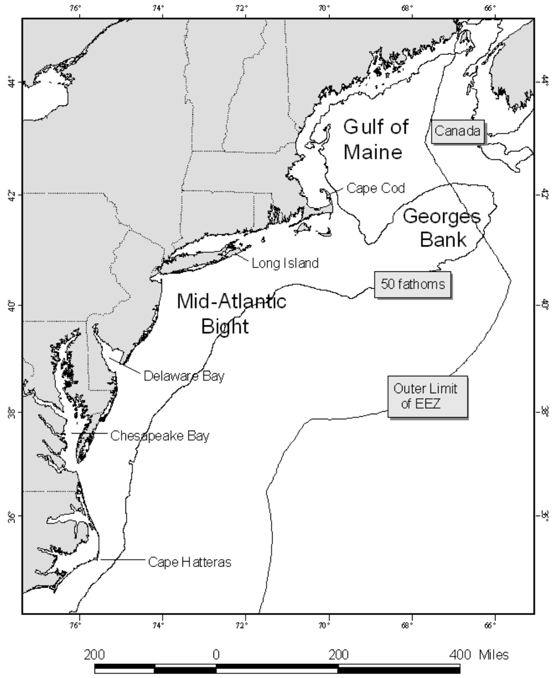

Figure 5.1-1 Northeast U.S. Shelf Ecosystem

GB is a shallow (3 - 150 m), elongate (161 km wide by 322 km long) extension of the continental shelf that was formed during the Wisconsinian glacial episode (Figure 5.1-2). It is characterized by a steep slope on its northern edge and a broad, flat, gently sloping southern flank. The Great South Channel lies to the west. Glacial retreat during the late Pleistocene deposited the bottom sediments currently observed on GB, and the sediments have been continuously reworked and redistributed by the action of rising sea level, by strong tidal and other currents, and by storm-generated wave action. These highly dynamic physical processes have the most notable effects on sediment transport and seafloor features in shallower water; they also affect the character of the biological community.

Oceanographic frontal systems separate water masses of the GOM and GB from oceanic waters south of the bank. These water masses differ in temperature, salinity, nutrient concentration, and planktonic communities, which influence productivity and may influence fish abundance and distribution. Currents on GB include a weak, persistent clockwise gyre around the bank, a strong semidiurnal tidal flow predominantly northwest and southeast, and very strong, intermittent storm induced currents, which all can occur simultaneously (Figure 5.1-3). Tidal currents over the shallow top of GB can be very strong, and keep the waters over the bank well mixed vertically. This results in a tidal front that separates the cool waters of the well mixed shallows of the central bank from the warmer, seasonally stratified shelf waters on the seaward and shoreward sides of the Bank. The clockwise gyre is instrumental in distribution of plankton, including fish eggs and larvae.

Within the portion of GB being considered in this action, Twichell et al. (1987) described two principal subregions based on the frequency and direction of sediment movement and the principal processes causing the movement (principally tidal currents and surface waves). Strong tidal currents cause nearly continuous and intense sediment movement in depths less than 60 m on the crest of the bank. There, the seafloor is shaped into large sand ridges covered by sand waves with gravel in the troughs between ridges and medium-to-fine sand on the ridges. On the flanks of the bank between 60 and 100 m, where the tidal currents are weaker, sediment movement is less frequent and transport is primarily associated with strong winter storms. The sediment here is somewhat finer than on the crest of the bank and the seafloor is largely featureless.

Bottom topography on eastern GB – including a large portion of the Northeast Peak in Canadian waters – is characterized by linear ridges in the western shoal areas; a relatively smooth, gently dipping sea floor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 m high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin (Valentine and Lough 1991).

The central region of the Bank is shallow, and the bottom is characterized by shoals and troughs, with sand dunes superimposed upon them. The two most prominent elevations on the ridge and trough area are Cultivator and Georges Shoals. This shoal and trough area is a region of strong currents. The dunes migrate at variable rates, and the ridges may also move. The following two sedimentary provinces were described in the shallower portions of eastern GB by Valentine and Lough (1991), Valentine et al. (1993), and Valentine, personal communication:

Shoals ridges (10-80 m) - Dominated by sand (fine and medium grain) with large sand ridges, dunes, waves, and ripples with small bedforms in southern part.

Shoal troughs (40-60 m) - Gravel (including gravel lag) and gravel-sand between large sand ridges with patchy large bedforms and strong currents. Submersible observation noted presence of gravel lag, rippled gravel-sand, and large bedforms.

Minimal epifauna were observed on gravel in both of these sediment provinces due to sand movement. Representative epifauna in sandy areas included amphipods, sand dollars, and burrowing anemones. Theroux and Grosslein (1987) described a central GB assemblage of benthic invertebrates living on and in bottom sediments that consisted of small to moderately large organisms with burrowing or motile habits. Sand dollars were most characteristic of this assemblage. Other representative organisms included various types of crustaceans (mysids, isopods, cumaceans, amphipods, shrimp, and crabs), annelid worms, gastropods (snails), and starfish.

Harris and Stokesbury (2010) mapped surficial sediment types in U.S. waters on Georges Bank using several different methods for processing eleven years of video survey data. Figure 5.1-3 shows the distribution of the largest sediment types present at each station. Sediment data were interpolated using the nearest neighbor Using this metric, sand was most abundant, occupying 62.9% of the survey area, which included the western end of the bank, outside the area that would be affected by this action. Granule-pebble sediments accounted for 23.8% of the area, cobble 11.5%, and boulders 1.8%. A large swath of gravel stretched southeast from Cape Cod to the bottom of the Great South Channel and then ran northeast to the U.S.-Canada boundary near the top of Closed Area 2. Sand is the dominant sediment type in the deeper water on the southwest portion of the bank and in a narrow band along its northern edge. As described above, even though sand predominates, there are substantial areas of gravel substrate (granule-pebble and cobble) in all three alternative re-opening areas.

Along with high levels of primary productivity, GB has been historically characterized by high levels of fish production. Several studies have attempted to identify demersal fish assemblages over large spatial scales. Overholtz and Tyler (1985) and Gabriel (1992) identified two shallow water assemblages in the GOM-GB region. Managed species listed in both studies in the GOM-GB transition zone were Atlantic cod, haddock, and pollock; managed species in the shallow water GB-southern New England aggregation were yellowtail flounder, windowpane, winter flounder, winter skate, and little skate. In addition, Overholtz and Tyler included three hakes (white, red, and silver), monkfish, and ocean pout in the transition zone complex and summer flounder in the GB-SNE assemblage.

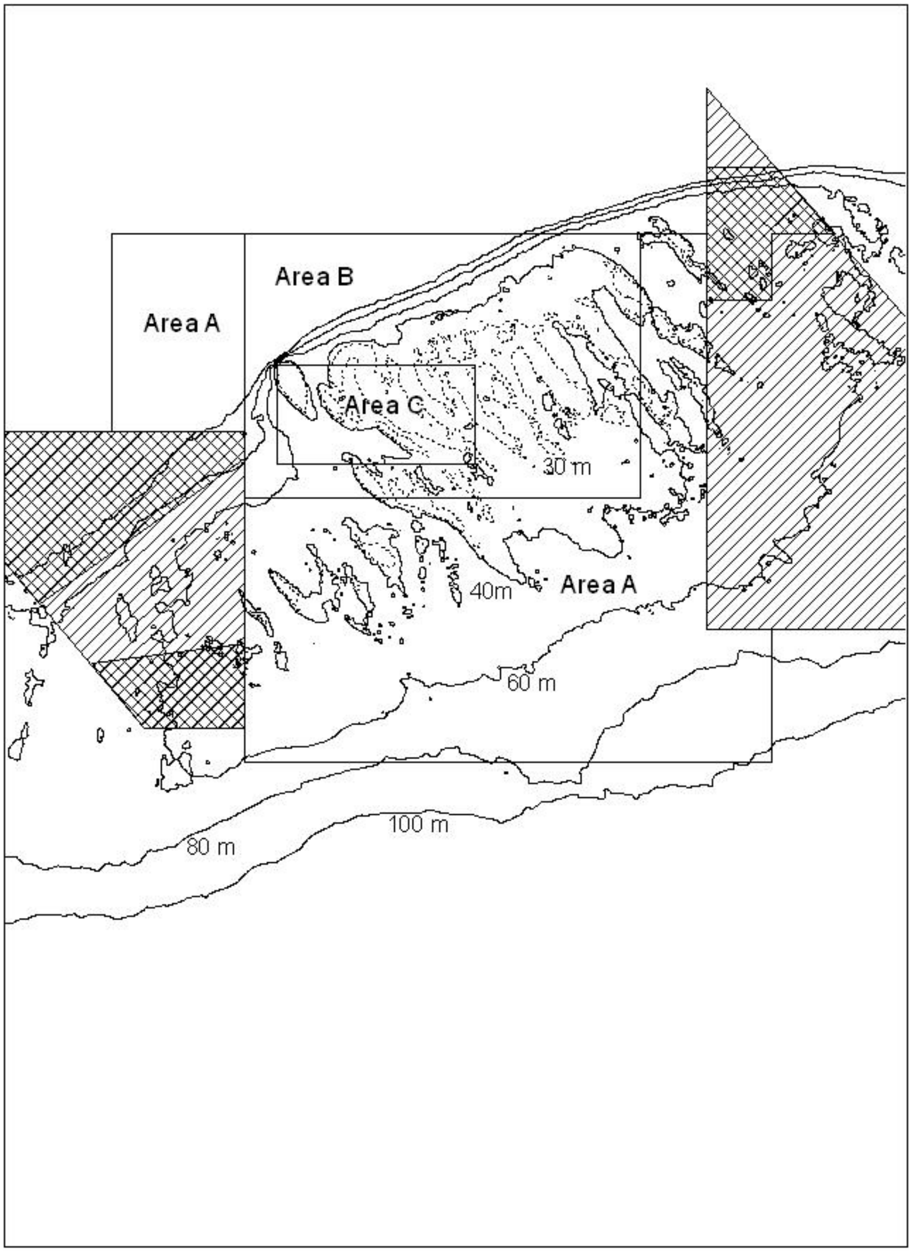

Figure 5.1-2 Portion of Georges Bank being considered for re-opening for clam harvesting. Closed areas for groundfish management (diagonal hatching) and Essential Fish Habitat protection (cross-hatched) would remain closed to hydraulic dredging.

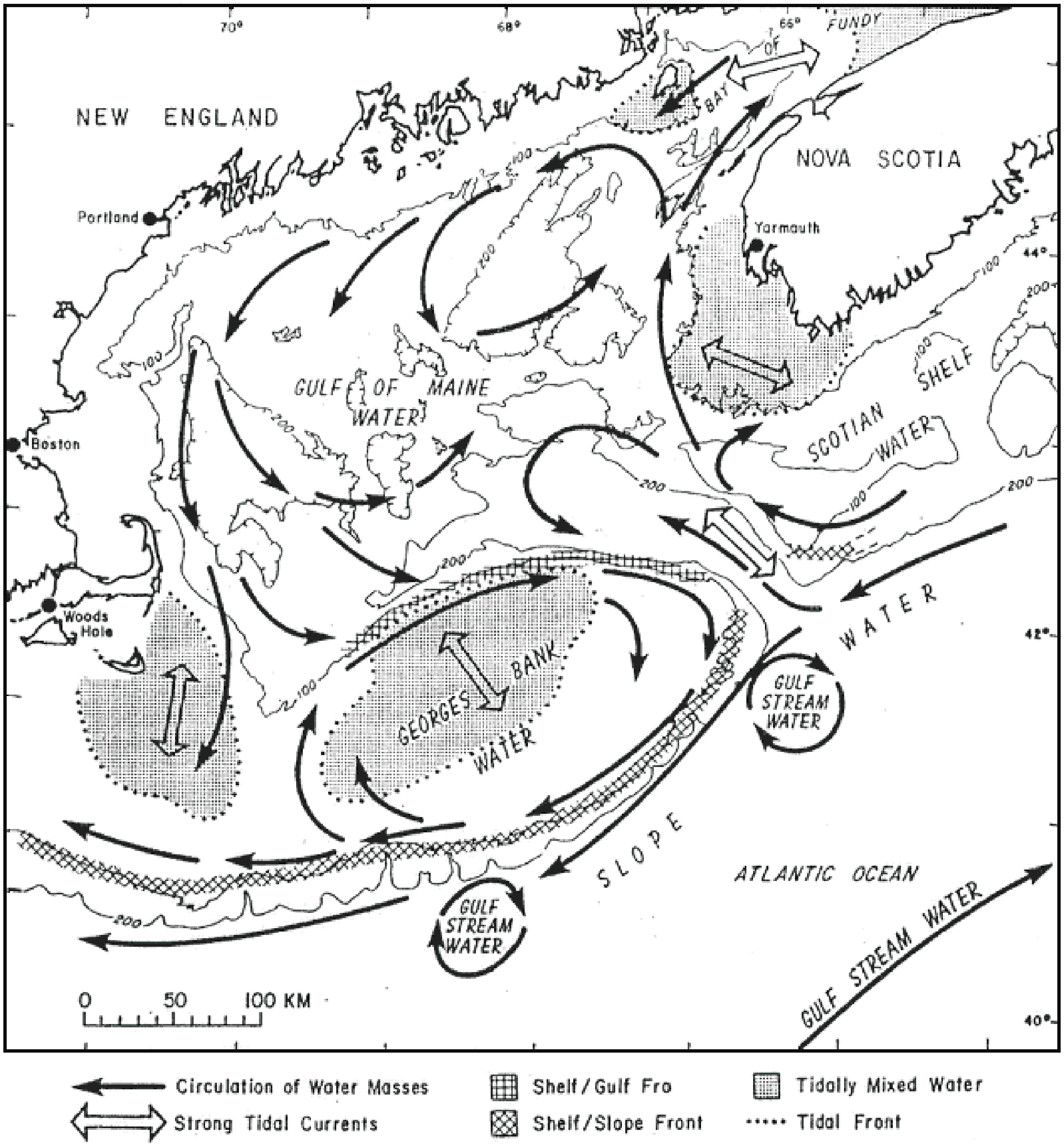

Figure 5.1-3 Water mass circulation patterns in the GB - Gulf of Maine region

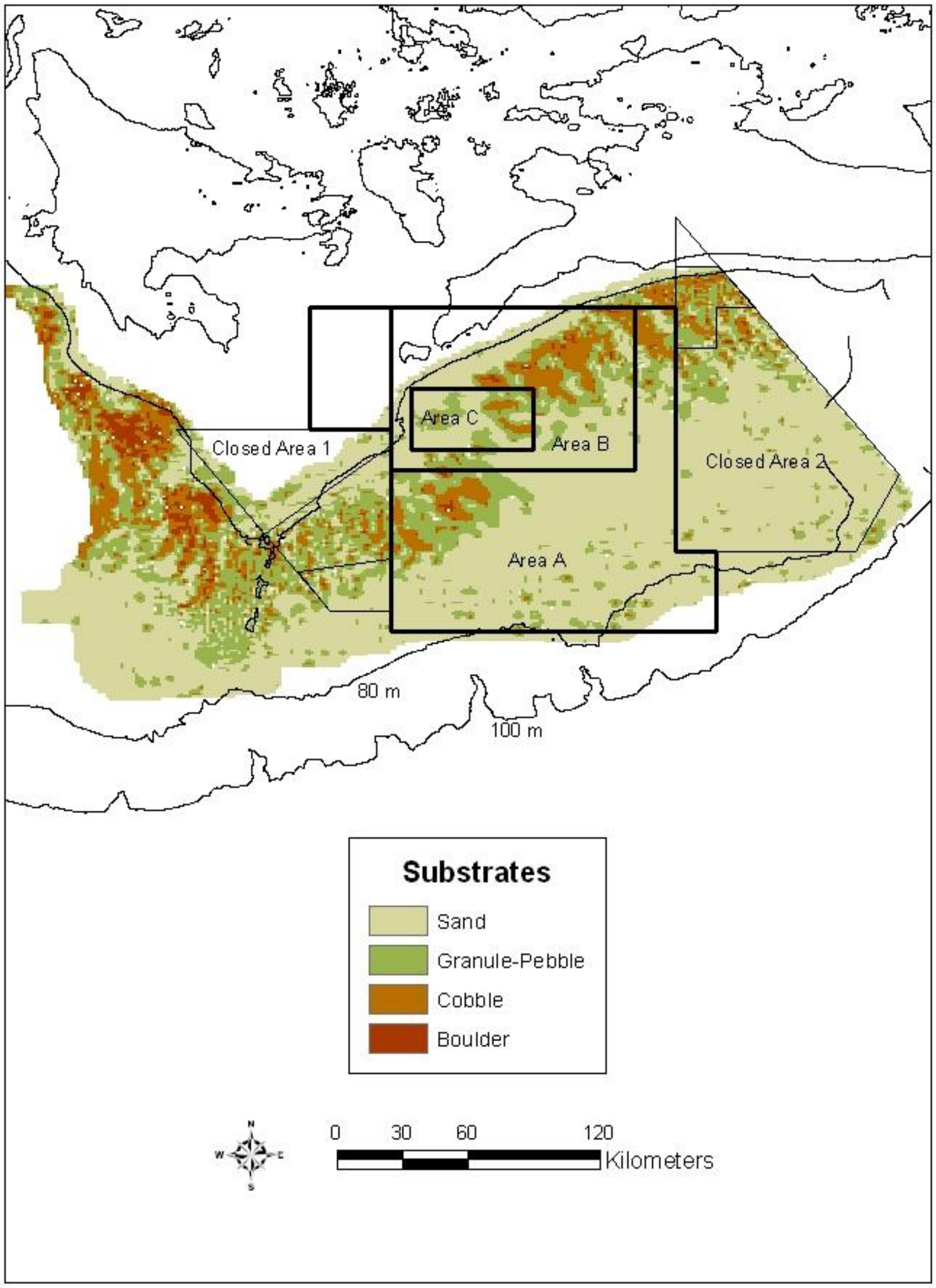

Figure 5.1-4 Dominant surficial sediments on Georges Bank. Spatial interpolations were based on video survey data collected by SMAST/UMA at Dartmouth (Harris and Stokesbury 2010).

Essential Fish Habitat (EFH)

Amendment 12 (MAFMC 1998) identified and described EFH for surfclams and ocean quahogs. The EFH descriptions are summarized in the following table.

Species	**Life Stage**	**Geographic Area of EFH**	**Depth (meters)**	**EFH Description**
Ocean quahog	adult	Eastern edge of GB and Gulf of Maine throughout the Atlantic EEZ	8 - 245	Throughout substrate to a depth of 3 ft within federal waters, occurs progressively further offshore between Cape Cod and Cape Hatteras
Ocean quahog	juvenile	Eastern edge of GB and Gulf of Maine throughout the Atlantic EEZ	8 - 245	Throughout substrate to a depth of 3 ft within federal waters, occurs progressively further offshore between Cape Cod and Cape Hatteras
Atlantic surfclam	juvenile	Eastern edge of GB and the Gulf of Maine throughout Atlantic EEZ	0 - 60, low density beyond 38	Throughout substrate to a depth of 3 ft within federal waters, burrow in medium to coarse sand and gravel substrates, also found in silty to fine sand, but not in mud
Atlantic surfclam	adult	Eastern edge of GB and the Gulf of Maine throughout Atlantic EEZ	0 - 60, low density beyond 38	Throughout substrate to a depth of 3 ft within federal waters

Table 5.1-1 Essential Fish Habitat description for ocean quahog and Atlantic surfclam

Stevenson *et al* (2004) determined the following species and life stages to have EFH that may be vulnerable to impacts from hydraulic clam dredges: black sea bass (juveniles and adults), scup (juveniles), ocean pout (all life stages), red hake (juveniles), silver hake (juveniles), winter flounder (juveniles and adults), and Atlantic sea scallops (juveniles). EFH descriptions of the geographic range, depth, and bottom types for all the benthic life stages of the species identified as vulnerable to hydraulic clam dredges are summarized in the following table.

Species	**Life Stage**	**Geographic Area of EFH**	**Depth (meters)**	**EFH Description**
Black sea bass	juvenile	Demersal waters over continental shelf from GOME to Cape Hatteras, NC, also includes estuaries from Buzzards Bay to Long Island Sound; Gardiners Bay, Barnegat Bay to ChesaPeake Bay; Tangier/ Pocomoke Sound, and James River	1 - 38	Rough bottom, shellfish and eelgrass beds, manmade structures in sandy-shelly areas, offshore clam beds, and shell patches may be used during wintering
Black sea bass	adult	Demersal waters over continental shelf from GOME to Cape Hatteras, NC, also includes estuaries: Buzzards Bay, Narragansett Bay, Gardiners Bay, Great South Bay, Barnegat Bay to ChesaPeake Bay; Tangier/ Pocomoke Sound, and James River	20 - 50	Structured habitats (natural and manmade), sand and shell substrates preferred
Scup	juvenile	Continental shelf from GOME to Cape Hatteras, NC includes the following estuaries: Mass. Bay, Cape Cod Bay to Long Island Sound; Gardiners Bay to Delaware Inland Bays; and ChesaPeake Bay	(0 - 38)	Demersal waters north of Cape Hatteras and inshore on various sands, mud, mussel, and eelgrass bed type substrates
Ocean pout	eggs	GOME, GB, southern NE, and middle Atlantic south to Delaware Bay, and the following estuaries: Passamaquoddy Bay to Saco Bay, Massachusetts and Cape Cod Bay	<50	Bottom habitats, generally in hard bottom sheltered nests, holes, or crevices
Ocean pout	juvenile	GOME, GB, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, and Cape Cod Bay	< 50	Bottom habitats in close proximity to hard bottom nesting areas

Species	Life Stage	Geographic Area of EFH	Depth (meters)	EFH Description
Ocean pout	adult	GOME, GB, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Saco Bay; Mass. Bay, Boston Harbor, and Cape Cod Bay	< 80	Bottom habitats, often smooth bottom near rocks or algae
Red hake	juvenile	GOME, GB, continental shelf off southern NE, and middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Saco Bay; Great Bay, Mass. Bay to Cape Cod Bay; Buzzards Bay to Conn. R.; Hudson R./ Raritan Bay, and ChesaPeake Bay	< 100	Bottom habitats with substrate of shell fragments, including areas with an abundance of live scallops
Silver hake	juvenile	GOME, GB, continental shelf off southern NE, middle Atlantic south to Cape Hatteras and the following estuaries: Passamaquoddy Bay to Casco Bay, Mass. Bay to Cape Cod Bay	20 – 270	Bottom habitats of all substrate types
Winter flounder	juvenile	GB, inshore areas of GOME, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Chincoteague Bay	0.1 – 10 (1 - 50, age 1+)	Bottom habitats with a substrate of mud or fine grained sand
Winter flounder	adult	GB, inshore areas of GOME, southern NE, middle Atlantic south to Delaware Bay and the following estuaries: Passamaquoddy Bay to Chincoteague Bay	1 - 100	Bottom habitats including estuaries with substrates of mud, sand, grave
Atlantic sea scallop	juvenile	GOME, GB, southern NE and middle Atlantic south to Virginia-North Carolina border and following estuaries: Passamaquoddy Bay to Sheepscot R.; Casco Bay, Great Bay, Mass Bay, and Cape Cod Bay	18 - 110	Bottom habitats with a substrate of cobble, shells, and silt

Table 5.1-2 EFH descriptions for all benthic life stages of federally-managed species and life stages which are vulnerable to hydraulic clam dredges

5.2 Target Species: Atlantic Surfclam/Ocean Quahog

Atlantic surfclams (*Spisula solidissima*) are bivalve mollusks which are distributed in the western North Atlantic from the Gulf of St. Lawrence to Cape Hatteras. Although Atlantic surfclams can inhabit waters from the surf zone to a depth of 420 feet (128 m), most are found at depths of less than 240 feet (73 m). The greatest concentrations of surfclams are usually found in well-sorted, medium sand, but they may also occur in fine sand and silty fine sand. Surfclams are most common in the turbulent areas beyond the breaker zone (Cargnelli *et al*. 1999a). Analysis of NEFSC clam surveys from 1980 to 2008 shows that surfclams are most commonly found in depths of 10 to 40 meters (unpublished, NEFSC 2010b). Growth rates are relatively rapid, with clams reaching the preferred harvest size of approximately 5 inches in about 6 years (MAFMC 2009). Maximum size is about 9 inches in length, though individuals larger than 8 inches are rare. They have a maximum age of approximately 31 years, and while some individuals reach sexual maturity within 3 months, most spawn by the end of their second year. Surfclams have planktonic larvae which may disperse sufficiently to cause gene flow throughout the entire geographical range (Cargnelli et al. 1999a).

Surfclams have traditionally been used in the in the “strip market” to produce fried clams. However, in recent years they have increasingly been used in chopped or ground form for other products, such as high quality soups and chowders (MAFMC 2009).

Ocean quahogs (*Arctica islandica*) are found in the colder waters on both sides of the North Atlantic. On the western Atlantic, they range from Newfoundland to Cape Hatteras. Adult ocean quahogs are usually found in dense beds over level bottoms, just below the surface of the sediment which ranges from medium to fine grain sand. Although adult ocean quahogs have been found as deep as 256 m (Cargnelli *et al*., 1999b) an analysis of NEFSC clam surveys from 1980 to 2008 shows that surfclams are most commonly found in depths of 40 to 80 meters (unpublished, NEFMC 2010b). Ocean quahogs are one of the longest-living, slowest growing marine bivalves in the world. Under normal circumstances, they live to more than 100 years old but have been aged in excess of 200 years. Ocean quahogs require roughly 20 years to grow to sizes currently harvested by the industry (approximately 3 inches), and reach sexual maturity between ages 5 and 10 (MAFMC 2009).

The dominant use of ocean quahogs has traditionally been in soups, chowders, and white sauces. Their small meat has a shaper taste and darker color than surfclams, which has not permitted their use in strip products or the higher-quality chowders (MAFMC 2009).

Both the SC/OQ fisheries are managed by the MAFMC under the SC/OQ FMP that was approved in 1977 (MAFMC 1977). Both fisheries have been managed under an Individual Transfer Quota (ITQ) since 1990 where annual landings are allocated to the participating vessels based on a combination of performance history and vessel size. Neither species is characterized as overfished and overfishing is not occurring (NEFSC 2010a and NEFSC 2009b). Both species occur in and have the potential to be commercially harvested within the existing GB Closed Area. However, only one species can be landed per trip even if a vessel holds a permit for both species.

Stock assessment regions for surfclams and ocean quahogs are shown in (Figure 5.2-1). From North to South, regions of interest are: Georges Bank (GB), southern New England (SNE), Long Island (LI), New Jersey (NJ), Delmarva (DMV) and southern Virginia (SVA). Biomass of the total Atlantic surfclam stock (120+ mm shell length [SL]) has declined from high levels during the late 1990s to current levels which are similar to the levels during 1981-1992. High stock biomass (120+ mm SL) during the late 1990s was due to good recruitment and relatively faster growth rates in southern regions in the past. Total biomass increased to peak levels during the late 1990's and then declined at about 3% per year afterwards. Stock biomass during 2008 was 878 (CV = 0.16) thousand mt (NEFSC 2010a).

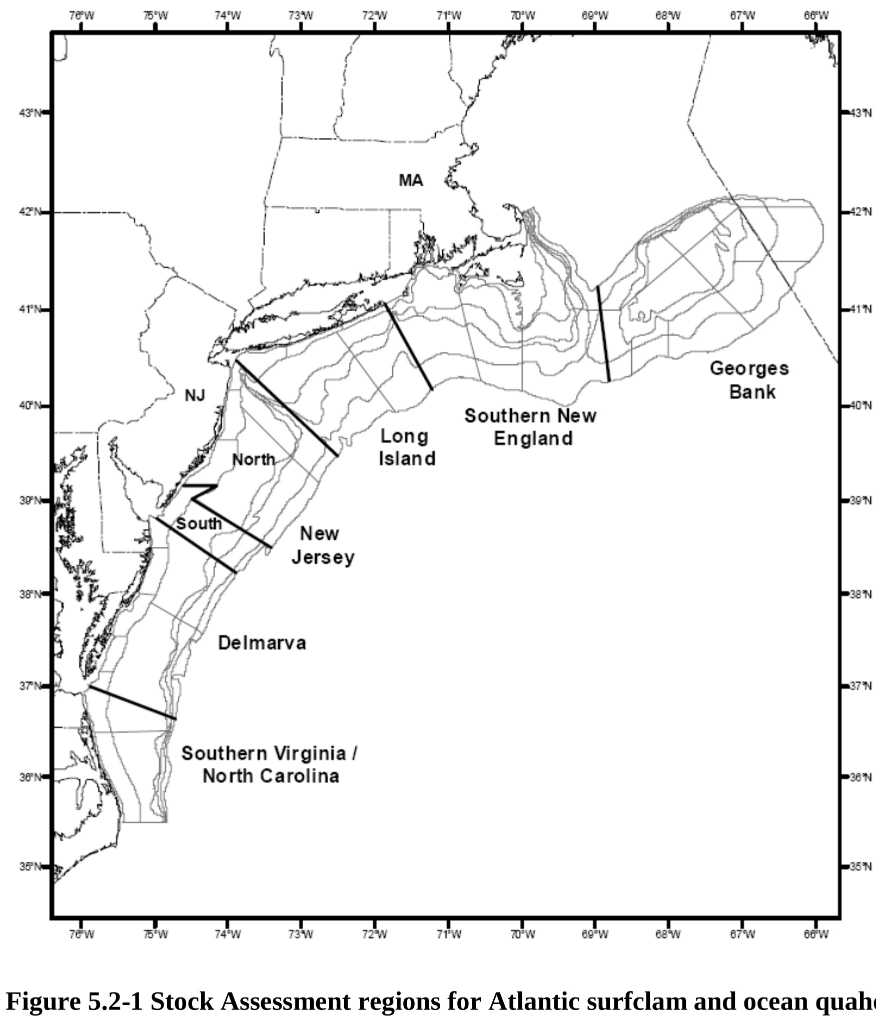

Figure 5.2-1 Stock Assessment regions for Atlantic surfclam and ocean quahog in the US EEZ with survey strata and stock assessment regions. For ocean quahog the southern and northern portions of the New Jersey regions area combined.

The decline in surfclam biomass since the late 1990s can be explained by negative surplus production caused by lower recruitment and slower growth rates in the NJ and

DMV regions. Recruitment has been below average since 1999. The last strong year classes on GB, NJ, and DMV occurred in 1999, 1992, and 1993 (NEFSC 2010a).

The distribution of surfclam biomass has shifted to the North during 1982-2008 (Figure 5.2-2). NJ held the largest fraction of surfclam biomass during 1994-2002. During 2008, the largest fraction of surfclam biomass was in GB (48%) due to declining biomass in DMV and NJ, and increasing biomass on GB (NEFSC 2010a).

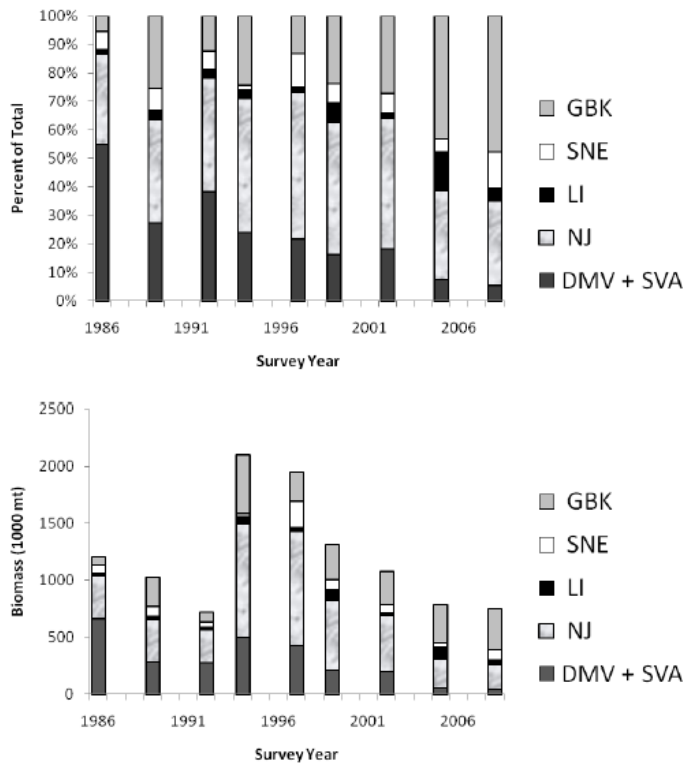

Figure 5.2-2 Efficiency corrected swept area biomass estimates for surfclams (120+ mm SL), by region, during years with NEFSC clam surveys

The ocean quahog population is an unproductive stock with infrequent and limited recruitment. Biomass of the total fishable ocean quahog stock during 2008 was 2.905 million mt, which is above the then recommended target of 1.790 million mt (NEFSC 2009b).

An increasingly large fraction of the ocean quahog stock (84% during 2008 compared to 67% during 1978) now occurs in the northern regions (Long Island, Southern New England, and GB). The GB region is of particular importance because it contained 32% of total biomass in 1978 and 45% of total biomass in 2008 (NEFSC 2009b).

The 2008 NEFSC stock assessment survey for surfclams and ocean quahogs included a number of stations on GB (Figures 5.2-3 and 5.2-5). Surfclams were more abundant on the northern edge of the bank and quahogs on the southern portion of the bank, in deeper water. The catch rates of quahogs in this area were very high. Generally speaking, these same patterns of distribution were observed in earlier years of the survey (NEFSC 2009b; NEFSC 2010a).

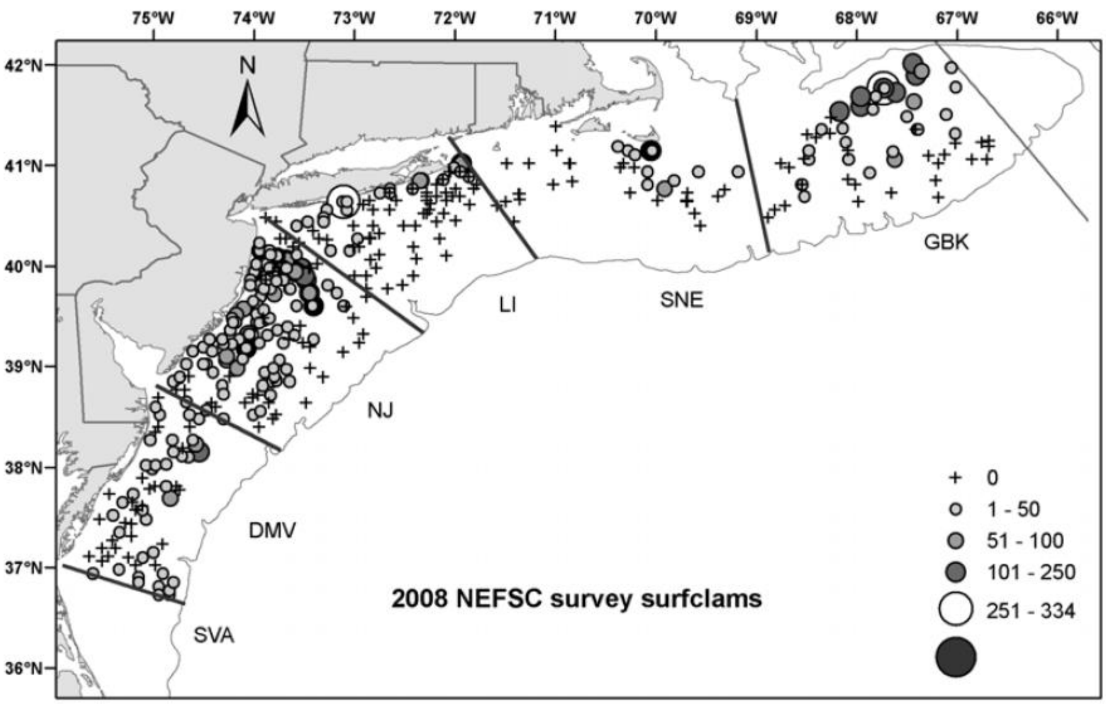

Figure 5.2-3 NEFSC surfclam survey map (2008). Symbols represent numbers per tow.

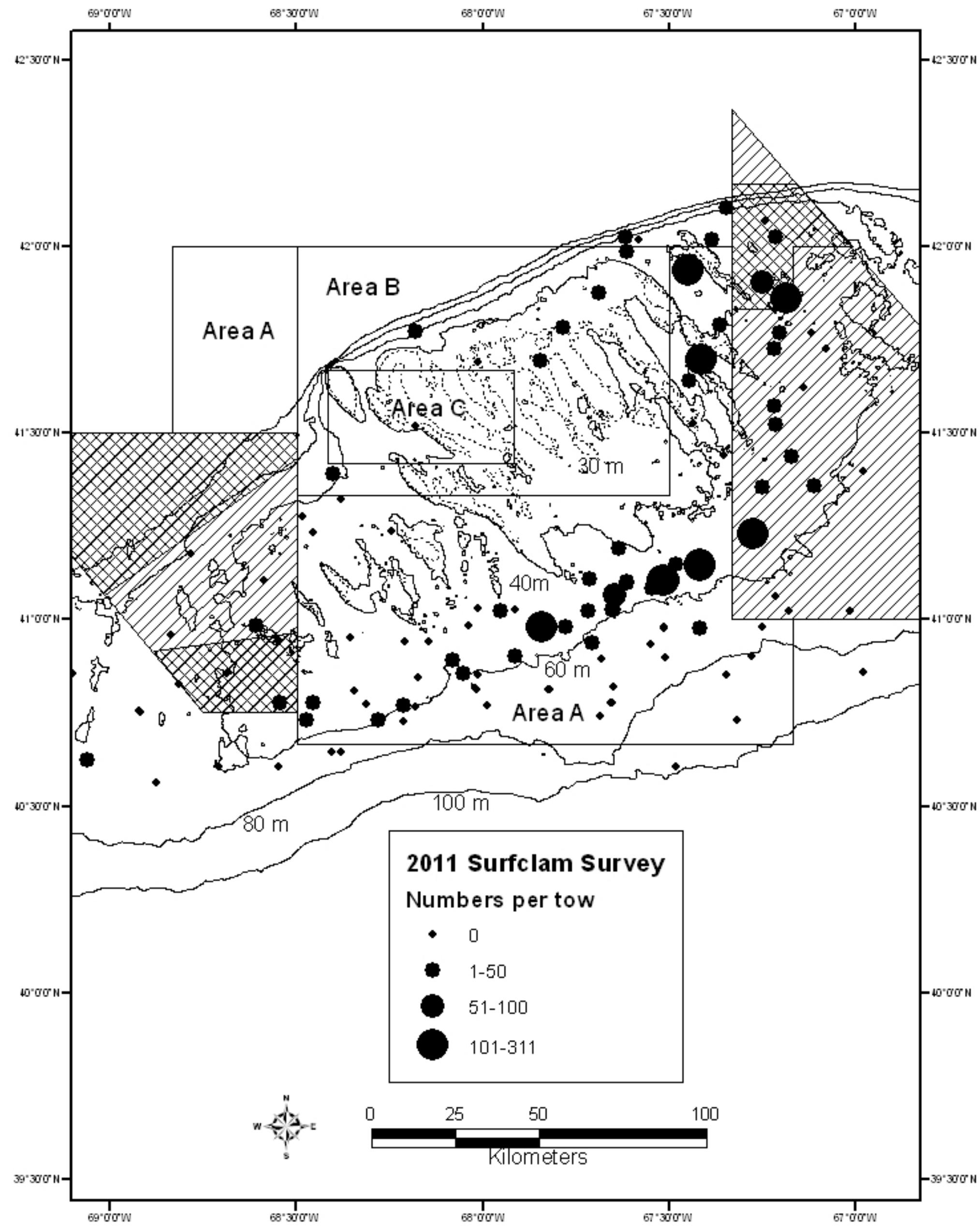

Figure 5.2-4 NEFSC surfclam survey map of GB (2011). Symbols represent numbers per tow.

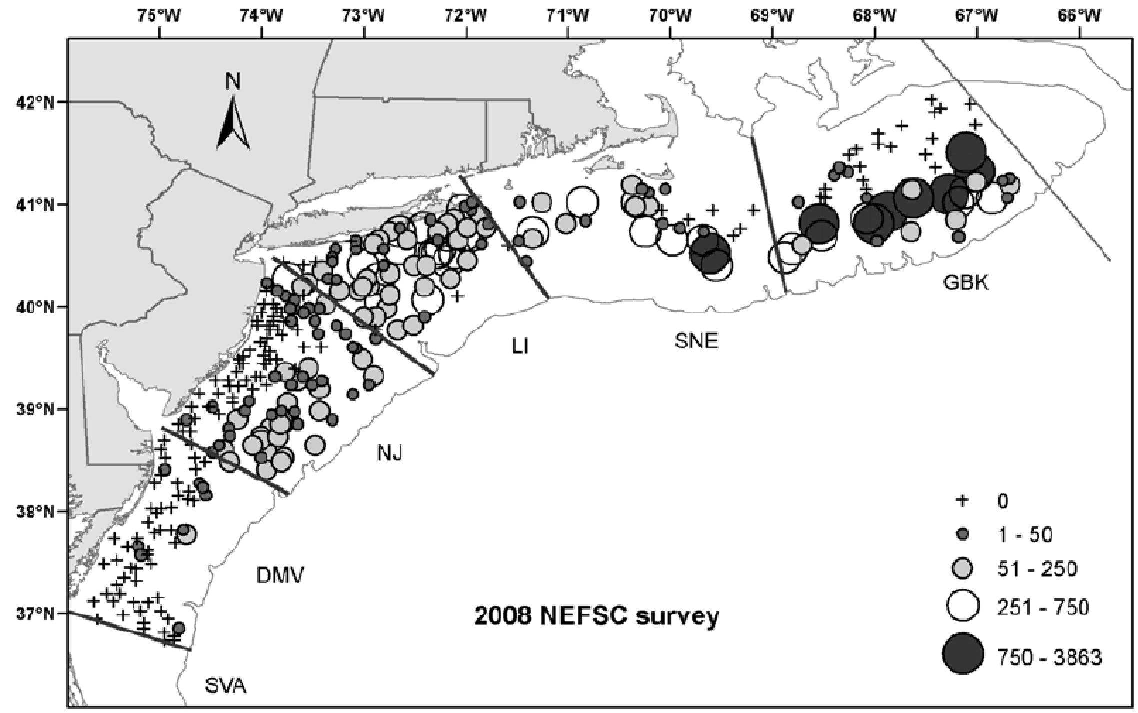

Figure 5.2-5 NEFSC ocean quahog survey map (2008). Symbols represent numbers per tow.

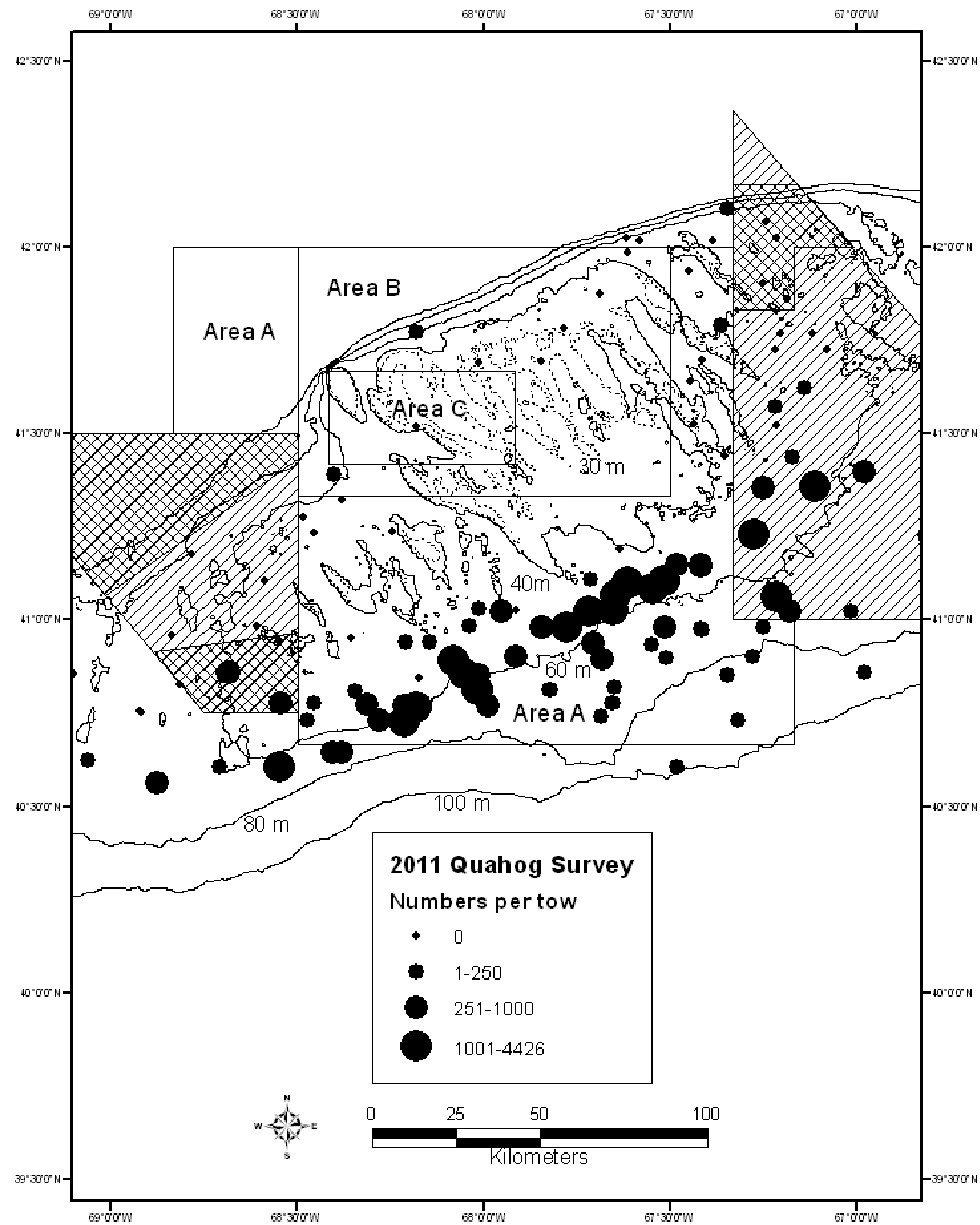

Figure 5.2-6 NEFSC ocean quahog survey map of GB (2011). Symbols represent numbers per tow.

5.3 Non-Target Species

The surfclam/ocean quahog is considered a "clean" fishery with regards to incidental catch since the target species comprises well over 80% of the catches. This is demonstrated in the 1997 NEFSC clam survey species listing (Table 6.2-1) (Weinburg pers. comm.). No fish were caught during the survey and only sea scallops, representing other commercially desirable invertebrates, were caught at around one-half of one percent of the total catch. The remaining non-target species caught included a variety of benthic invertebrates including a variety of crabs, other bivalves, snails, and starfish, among them rock crab, Jonah crab, several species of whelks and horseshoe crab (MAFMC 2003). It is noted that commercial operations are certainly even cleaner than the scientific surveys which have liners in the dredges to collect these invertebrates. During commercial operations all animate and inanimate objects except for surfclams and ocean quahogs are discarded quickly before the resources are placed in cages. Cages are the standard industry container used for storing and transporting surfclams and ocean quahogs. The processors reduce their payments if species other than surfclams or ocean quahogs are in the cages (MAFMC 2003).

Total #	Animal	Species
6	Sea Scallop (Clapper)	*Placopecten magelanicus*
6	Southern Quahog (Clapper)	*Mercenaria campechianus*
12	Ten-Ridged Whelk	*Neptunea decemcostata*
67	Spider Crab (Unclassified)	*Majidae* spp.
75	Knobbed Whelk	*Busycon carica*
81	Horseshoe Crab	*Limulus polyphemus*
101	Stimpson's Whelk	*Colus stimpsoni*
104	Dog Whelk	*Nassaruis* spp.
121	Horse Mussel	*Modiolus modiolus*
154	Northern Cardita	*Venercardia borealis*
155	False Quahog	*Pitar morrhuana*
167	Pastel Swimming Crab	*Ovalipes guadalupensis*
198	Channeled Whelk	*Busycon Canaliculatum*
245	Shark's Eye or Lobed Moonshell	*Polinices duplicatus*
303	Waved Whelk	*Buccunum undatum*
351	Southern Quahog (Live)	*Mercenaria campechianus*
423	Jonah Crab	*Cancer borealis*
441	Lady Crab	*Ovalipes ocellatus*
647	Hermit Crab (Unclassified)	*Diogenidae/Paguridae* spp.
679	Chestnut Astarte	*Astarte castanea*
787	Sea Scallop (Live)	*Placopecten magelanicus*
1,052	Northern Moon Shell	*Lunatia heros*
1,630	Common Razor Clam	*Ensis directus*
1,873	Surfclam (Clapper)	*Spisula solidissima*
2,206	Starfish (Unclassified)	*Asteriidae* spp.
2,233	Boreal Asterias	*Asterias vulgaris*
2,593	Ocean Quahog (Clapper)	*Arctica islandica*
3,073	Margined Seastar	*Astropecten* spp.
3,486	Rock Crab	*Cancer irroratus*
36,221	Surfclam (Live)	*Spisula solidissima*
66,682	Ocean Quahog (Live)	*Arctica islandica*
126,172	Total	

Source: Weinberg pers. comm.

Table 5.3-1 List of number of animals, by species, captured during the 1997 NMFS Clam Survey. All tows are included. List is ordered by total number caught.

5.4 Protected Species

There are numerous species of marine mammal and sea turtle species that inhabit the PSP closure area and are protected under the Endangered Species Act (ESA) of 1973. The species under NMFS' jurisdiction protected by either the ESA or the Marine Mammal Protection Act and found in this region include cetaceans (14 species), sea turtles (5 species), and fish (2 species). The species are listed in Appendix II and are described in detail in Section 6.1.3.1 of the Amendment 13 of the SC/OQ FMP (MAFMC 2003).

Marine mammals including the humpback whale, northern right whale, fin whale, and four species of protected sea turtles may be found in the action area for this fishery. The four turtle species found in the action area are the loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, and leatherback sea turtle. The gear used for the SC/OQ fisheries is a hydraulic clam dredge. Due to clam dredge fishing protocol, physical configuration and the typical slow movement of the gear, the fishery has little interaction potential with endangered and threatened species. The fisheries are included under Category III in the final List of Fisheries (LOF) for 2010 (NOAA 2010) for the taking of marine mammals by commercial fishing operations under the MMPA. Gear classified as Category III in the LOF indicate that as a result of this gear use, annual mortality and serious injury of a stock in a given fishery is less than or equal to 1 percent of the Potential Biological Removal (PBR) level. No mortalities or serious injuries of marine mammals have been documented due to use of the hydraulic dredge in the U.S. Mid-Atlantic offshore SC/OQ fisheries.

Atlantic sturgeon are not known to interact with hydraulic clam dredge gear, which is the only gear type used in the surfclam and ocean quahog fishery. Hydraulic clam dredge gear is not known to pose a bycatch risk for Atlantic sturgeon. No documented Atlantic sturgeon interactions with surfclam and ocean quahog gear have been documented (Stein *et al.* 2004; ASMFC TC 2007).

SC/OQ fisheries and ESA-listed species overlap to a large degree, and there always exists some very limited potential for an incidental take. However, according to the LOF there have been no documented takes of any marine mammal or sea turtle in either the surfclam or ocean quahog fisheries. The effects of the SC/OQ fisheries on protected marine mammals and sea turtles have been previously considered in informal ESA Section 7 consultations. While listed species may occur near SC/OQ beds, it is likely that there will be no conflict between the fishers of this FMP and these endangered or threatened species because SC/OQ dredges are very slow moving and listed species are capable of moving out of the way and avoiding the gear.

5.5 Human Communities

This EA evaluates the effect this action may have on people's way of life, traditions, and community. Participants in the fishery, ports, and public health are the three facets of human communities that are discussed in this section. The geographic scope for the human communities will consist of those port communities from which vessels land the bulk of their allocation, the fishing communities where the majority of the product is processed and consumers for SC/OQ products.

Economics and Fishery Participants

A total of 3.1 million bushels of surf clams were landed in 2002 valued at $40 million (Table 5.5-1). Surfclam landings increased slightly in 2003 but declined in both 2004 and 2005. Even though landings declined by about 400 thousand bushels in 2005, an increase in average price to almost $13 per bushel resulted in industry revenues equivalent to that received in 2004. Total landings increased in 2006 and 2007 to pre-2005 levels. Surfclam landings in 2008 returned to 2004-2005 levels and have continued to decrease.

Year	Total Bushels	Total Sales ($millions)	Average Price per Bushel
2002	3,100,000	40.0	$12.90
2003	3,200,000	39.4	$12.32
2004	3,100,000	35.1	$11.32
2005	2,700,000	33.1	$12.27
2006	3,100,000	35.9	$11.58
2007	3,200,000	40.8	$12.74
2008	2,900,000	34.7	$11.91
2009	2,600,000	29.1	$11.15
2010	2,300,000	26.8	$11.42
2011	2,400,000	27.4	$11.35

Table 5.5-1 Summary of Surf Clam Landings

The pattern of landings and prices for ocean quahogs was similar to that of surfclams from 2002 to 2005. Four million bushels of ocean quahogs were harvested in 2002 followed by a small increase to 4 million bushels in 2003 and an annual decline to 3-3.5 million bushels in 2005-2008 (Table 5.5-2). With their low price per bushel, ocean quahog have historically been a bulk, low-priced food item and the industrial ocean quahog fishery has only been viable when large quantities could be harvested quickly and efficiently.

Year	Total Bushels	Total Sales ($ millions)	Average Price per Bushel
2002	4,000,000	25.5	$6.37
2003	4,200,000	26.0	$6.20
2004	3,900,000	23.6	$6.06
2005	3,000,000	18.6	$6.19
2006	3,200,000	19.4	$6.07
2007	3,500,000	20.6	$5.88
2008	3,400,000	22.3	$6.61
2009	3,500,000	22.0	$6.29
2010	3,600,000	23.2	$6.43
2011	3,200,000	22.1	$6.96

Table 5.5-2 Summary of Ocean Quahog Landings (Excluding Maine)

Although regarded as a single stock, the EEZ and Maine components of the ocean quahog fishery have different biological characteristics and are managed separately. The Maine ocean quahog fishery uses small vessels (approximately 35-45 feet) to actively target smaller ocean quahogs for the fresh, half-shell market. The Maine ocean quahog fishery is generally excluded in the discussion of this EA as biomass and landings are minor compared to the rest of the EEZ fishery and would have no appreciable effect on estimates for the whole stock (MAFMC 2009). Additionally, based on the small scale nature of the Maine ocean quahog fishery it is assumed these vessels would not harvest ocean quahog on GB.

Industry has experienced difficulty utilizing increases in both the federal SC/OQ quotas that were implemented in 2004. In 2011 the unharvested portion of the surfclam quota equaled 29% of the 3.4 million bushel total. In 2008 the unharvested portion of the ocean quahog quota equaled 37% of the 5.3 million bushel total. Table 5.5-3 lists the Federal quotas and/or landings data from 1979 through 2011.

Federal Surfclam and Ocean Quahog Quotas and Landings: 1979-2011								
Surfclams (Thou. Bushels)					Ocean Quahogs (Thou. Bushels)			
*GB first closed for PSP in 1990					*Maine ocean quahog fishery excluded 1991-2011			
Year	Landings	Quota	% Harvested		Year	Landings	Quota	% Harvested
1979	1,674	1,800	93%		1979	3,035	3,000	101%
1980	1,924	1,825	105%		1980	2,962	3,500	85%
1981	1,976	1,825	108%		1981	2,888	4,000	72%
1982	2,003	2,400	83%		1982	3,241	4,000	81%
1983	2,412	2,450	98%		1983	3,216	4,000	80%
1984	2,967	2,750	108%		1984	3,963	4,000	99%
1985	2,909	3,150	92%		1985	4,570	4,900	93%
1986	3,181	3,225	99%		1986	4,167	6,000	69%
1987	2,820	3,120	90%		1987	4,743	6,000	79%
1988	3,032	3,385	90%		1988	4,469	6,000	74%
1989	2,838	3,266	87%		1989	4,930	5,200	95%
1990*	3,114	2,850	109%		1990	4,622	5,300	87%
1991	2,673	2,850	94%		1991*	4,840	5,300	91%
1992	2,812	2,850	99%		1992*	4,939	5,300	93%
1993	2,835	2,850	99%		1993*	4,812	5,400	89%
1994	2,847	2,850	100%		1994*	4,611	5,400	85%
1995	2,545	2,565	99%		1995*	4,628	4,900	94%
1996	2,569	2,565	100%		1996*	4,391	4,450	99%
1997	2,414	2,565	94%		1997*	4,279	4,317	99%
1998	2,365	2,565	92%		1998*	3,897	4,000	97%
1999	2,538	2,565	99%		1999*	3,770	4,500	84%
2000	2,561	2,565	100%		2000*	3,161	4,500	70%
2001	2,855	2,850	100%		2001*	3,691	4,500	82%
2002	3,113	3,135	99%		2002*	3,871	4,500	86%
2003	3,244	3,250	100%		2003*	4,069	4,500	90%
2004	3,138	3,400	92%		2004*	3,823	5,000	77%
2005	2,744	3,400	81%		2005*	2,940	5,333	55%
2006	3,057	3,400	90%		2006*	3,066	5,333	57%
2007	3,226	3,400	95%		2007*	3,366	5,333	63%
2008	2,914	3,400	86%		2008*	3,374	5,333	63%
2009	2,613	3,400	77%		2009*	3,450	5,333	65%
2010	2,347	3,400	69%		2010*	3,550	5,333	67%
2011	2,416	3,400	71%		2011*	3,100	5,333	58%

Table 5.5-3 Federal SC/OQ Quota and Landings: 1979- 2009

Productivity of effort in the surfclam fishery has declined in recent years. The average number of bushels harvested in an hour of fishing is an important indicator of both the abundance of clams in the beds being fished, as well as the costs of fishing operations. Increases in fishing time from working on sparser beds translate directly into higher fuel costs (MAFMC 2009).

A fleet-wide calculation of surfclam Landings Per Unit of Effort (LPUE) has declined by an average of almost 10% each year between 2000 and 2009, from 129 to 52 bushels per hour (MAFMC 2011).

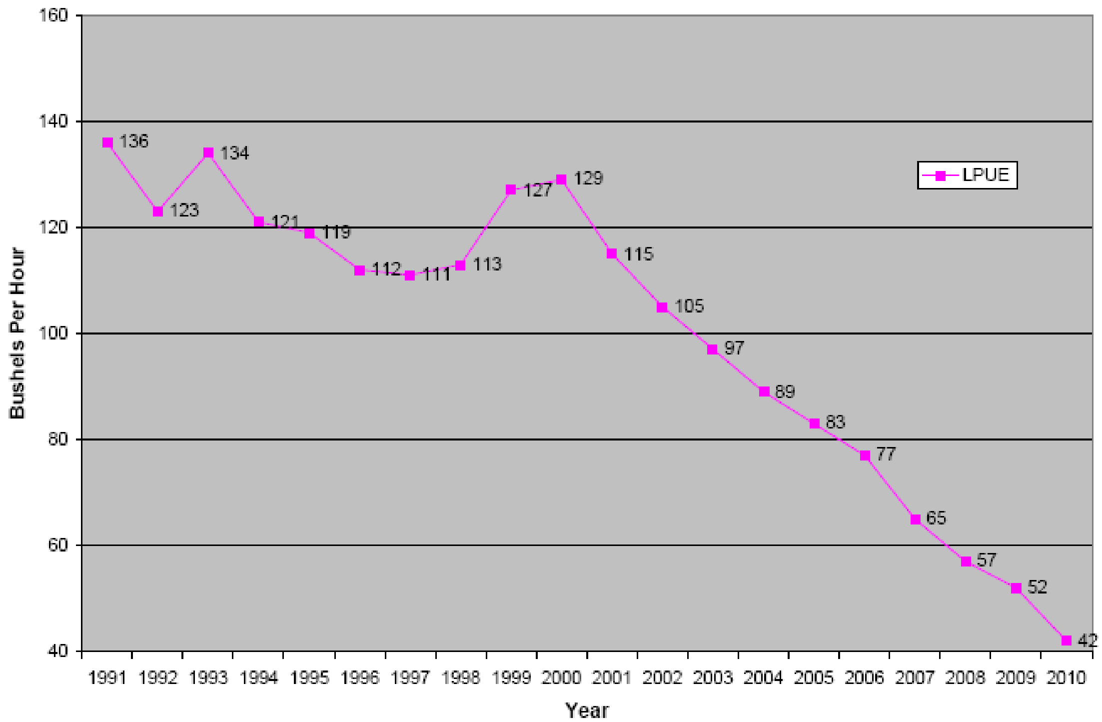

Figure 5.5-1 Surfclam landing per unit of effort: 1991-2010. (All Vessel Classes- 2009 trips reported through April 12, 2010 only

As described in Section 5.2, the distribution of surfclam biomass has shifted to the North during 1982-2008. Figure 5.5-1 depicts the most current surfclam LPUE data per 10 minute square.

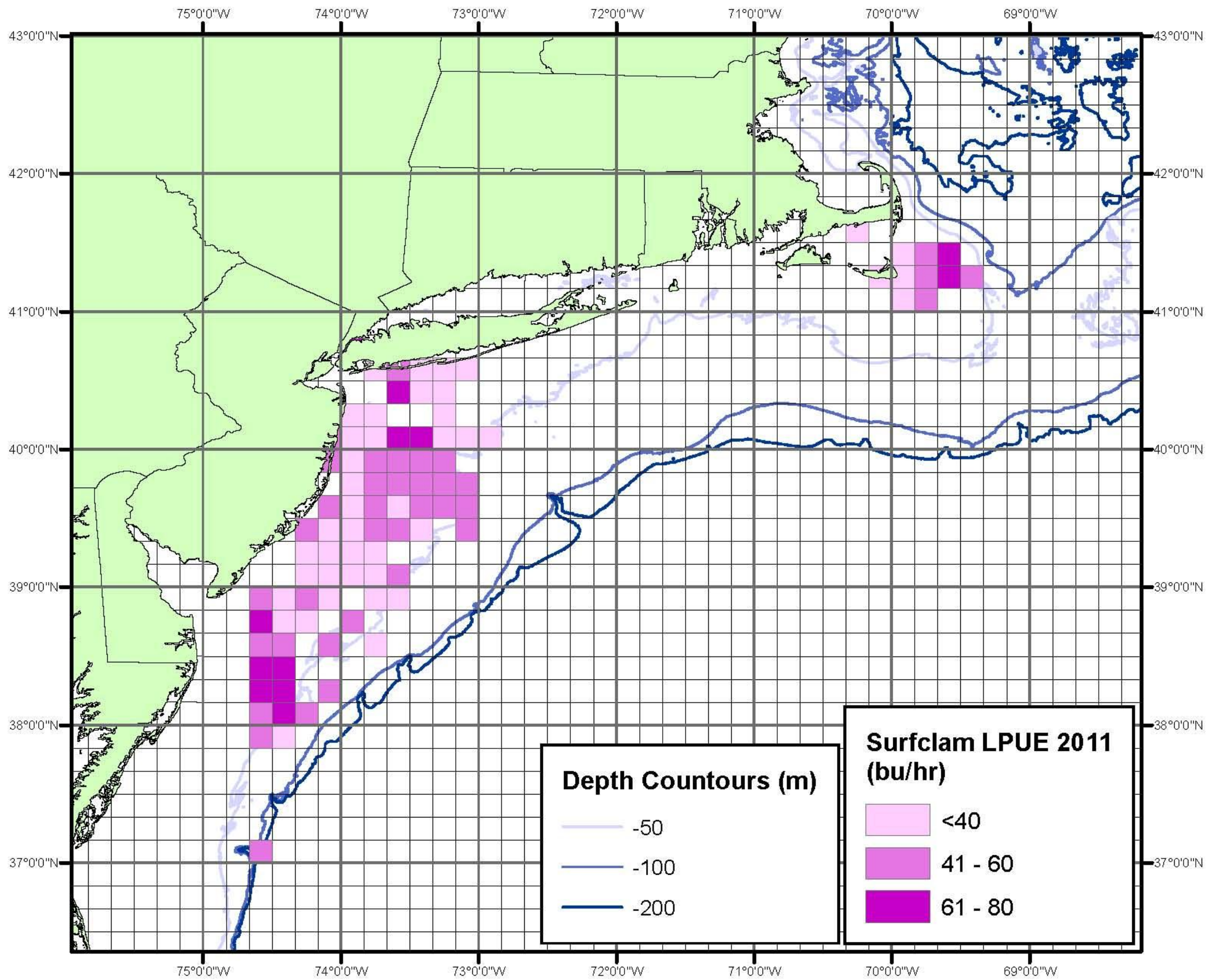

Figure 5.5-2 Surfclam LPUE by 10 minute square (2011)

The ocean quahog fishery has historically been able to find large, dense beds of high-yield ocean quahog to replace those that have been the mainstay of the fleet for many years. Examination of ocean quahog LPUE over the past 20 years (Figure 5.5-3) illustrates distinct patterns of improved productivity (higher LPUE) as the fleet moves to a new area of virgin biomass followed by a decline in productivity (Lower LPUE) as that area is fished down (MAFMC 2011).

A fleet-wide calculation of LPUE showed that the average number of bushels harvested per hour of fishing decreased from 135 in 2008 to 141 in 2009. In early 2010 the average increased to almost 144 again, though this may be reflecting the fact that only the larger vessels would be able to fish the dense offshore beds in the winter months of January and February (MAFMC 2011).

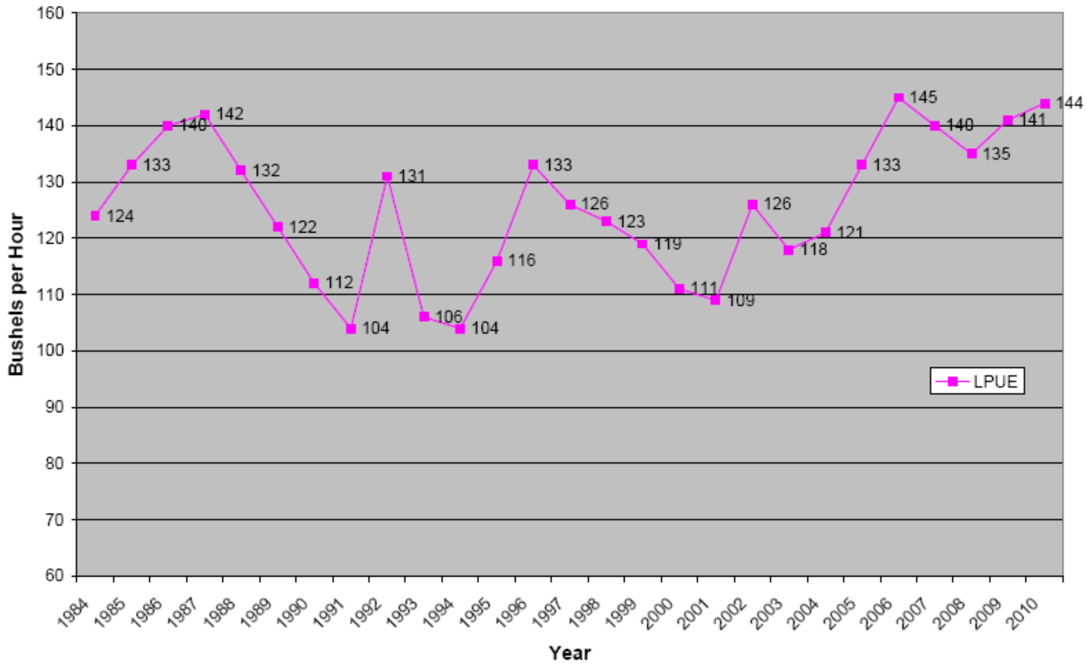

Figure 5.5-3 Ocean quahog landings per unit of effort: 1984-2010. All vessel classes, excluding Maine fishery. 2010 trips reported through April 14, 2010 only

As noted in Section 5.2, an increasingly large fraction of the ocean quahog stock (84% during 2008 compared to 67% during 1978) now occurs in the northern regions (Long Island, Southern New England, and GB). Figure 5.5-4 depicts the most current ocean quahog LPUE data per 10 minute square.

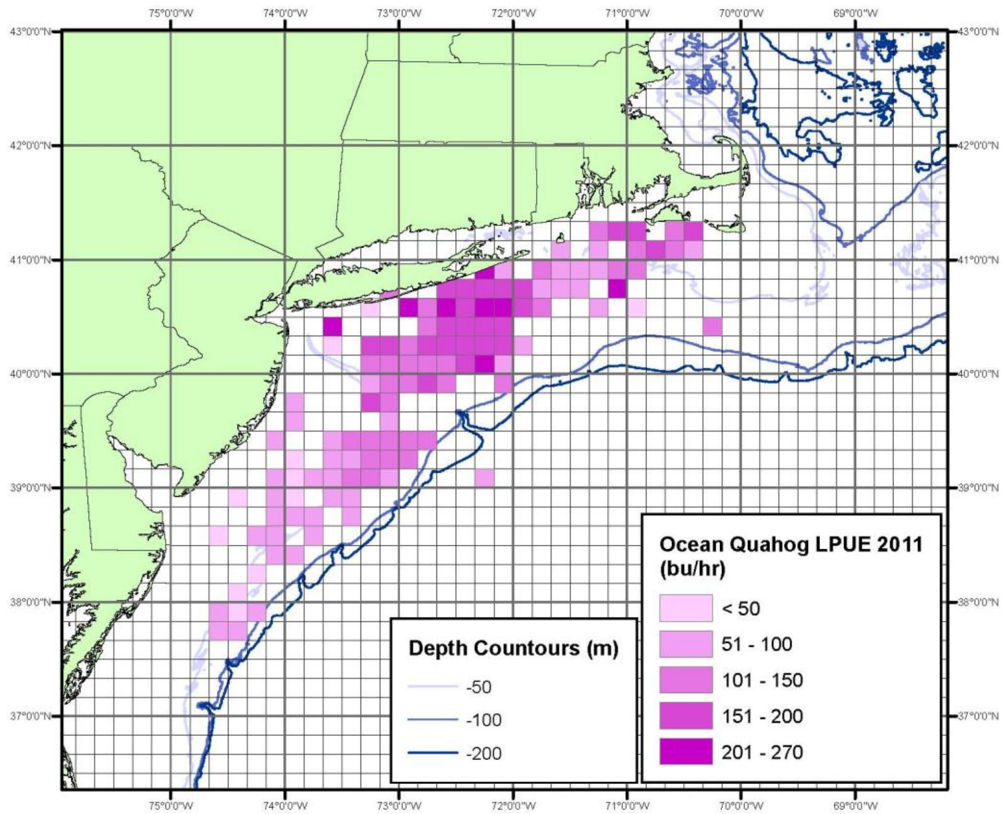

Figure 5.5-4 Ocean quahog LPUE by 10 minute square (2011)

The small-scale fishery for ocean quahogs in Maine provides a stark contrast to the industrial fishery that occurs off the coast of the Mid-Atlantic States up to Massachusetts. Small vessels in the 35 to 45 foot range actively target smaller ocean quahogs for the fresh, half shell market in Maine. Most of the catch is trucked directly out of Maine and brings an ex-vessel price that ranges from $24 - $40 per Maine bushel (MAFMC 2009).

The total number of vessels participating in the SC/OQ fisheries outside the State of Maine has experienced a dramatic decline as the fisheries moved beyond a market crisis in 2005. The 50 or so vessels that reported landings during 2004 and 2005 was slashed and coast-wide harvests consolidated on to approximately 40 vessels in the subsequent years (Table 5.5-1). In the ocean quahog fishery consolidation is very evident as just four large vessels accounted for over 50% of the Federal ocean quahog harvest in each of the past few years (MAFMC 2009). In 2009 these four large vessels listed their home port state as New Jersey. The majority of vessels in the Federal SC/OQ fishery, outside of the State of Maine, listed a fishing community in New Jersey as their home port. In 2009, 46% of the Federal surfclam permits listed a home port in the State of New Jersey and 64% of the Federal surfclam landings (total bushels) came from vessels with a home port in New Jersey. In 2009, 57% of the Federal ocean quahog permits (outside of Maine) listed a home port in the State of New Jersey and 79% of the Federal surfclam landings (total bushels outside of Maine) came from vessels with a home port in New Jersey (NMFS 2010b).

Federal Fleet Profile, 1997 through 2011																
Year (non-Maine vessels)	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
Harvests both SC & OQ	14	14	8	11	12	14	16	11	14	12	9	9	8	8	10	11
Harvests only SC	20	19	23	22	19	21	23	23	21	24	20	24	24	28	22	25
Harvests only OQ	22	17	16	12	17	16	15	16	15	12	9	8	10	7	11	11
Total Non-Maine Vessels	56	50	47	45	48	51	54	50	50	48	38	41	42	43	43	47
Maine OQ Vessels	25	34	39	38	34	31	35	35	34	32	25	24	22	19	36	32

Table 5.5-4 Federal Fleet Profile, 1997 through 2011

<u>Ports</u>

Communities from Maine to Virginia are involved in the harvesting and processing of surfclams and ocean quahogs. Ports in New Jersey and Massachusetts handle the most volume and value, particularly Atlantic City, Point Pleasant, New Bedford, and Fairhaven. There are also significant landings in Ocean City, Maryland, Warren, Rhode Island, and the Jonesport/Beals Island area of Maine (NMFS 2010b). Figure 5.5-5 and Figure 5.5-6 display landings values by port compiled by NMFS from vessel logbooks for the 2011 fishing year.

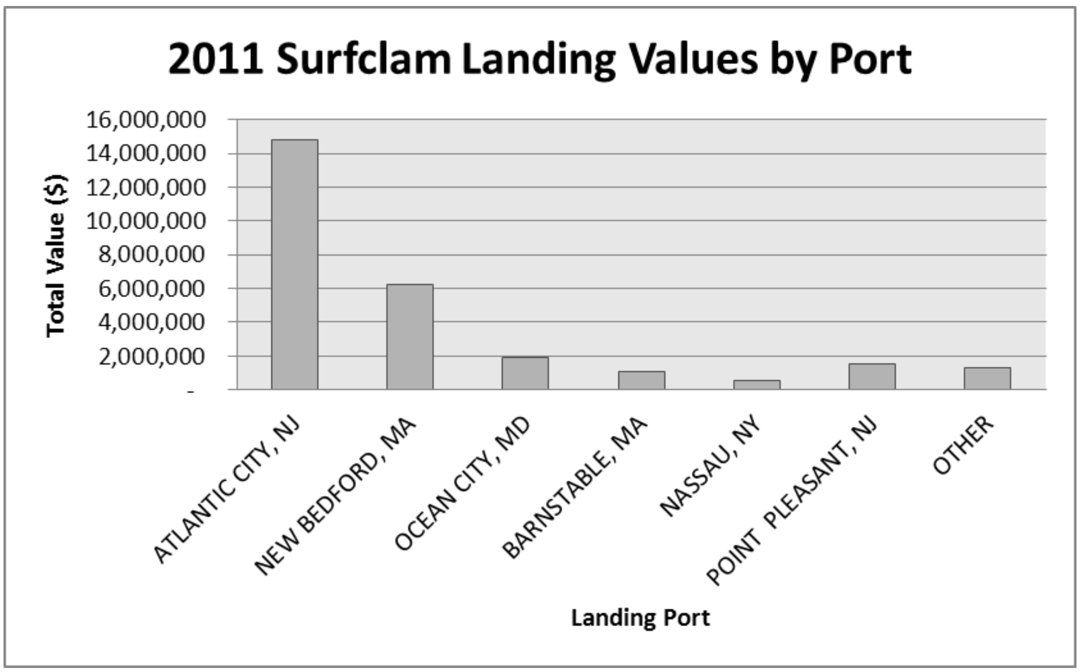

Figure 5.5-5 Value of surfclam landings by landing port for FY 2011

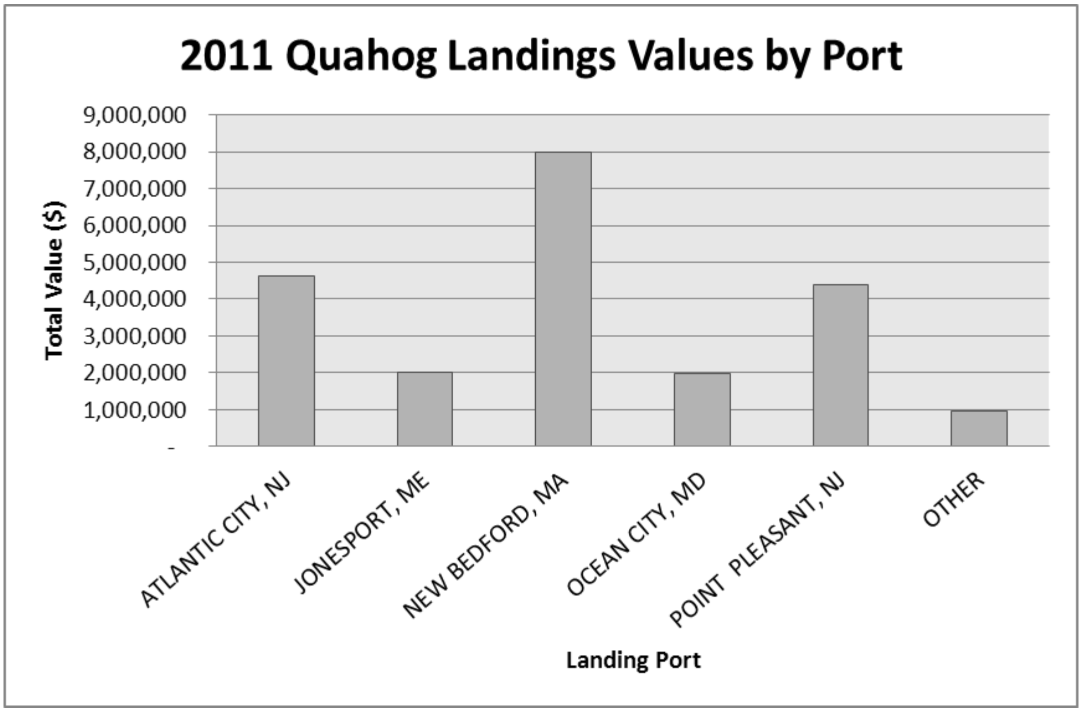

Figure 5.5-6 Value of ocean quahog landings by landing port for FY 2011

Due to the highly industrial nature of the fishery, with the exception of the Maine fishery, processing plants are a major component and must be considered in addition to port towns. In early 2009 there were a total of ten companies reporting purchases of surfclams or ocean quahogs from the industrial fisheries outside of Maine. The twelve processing facilities operated by these companies are listed below with the species they processed, arrayed from North to South (MAFMC 2009).

State	Processing facility	Species processed
Massachusetts	Blount Seafood (Fall River)	Surfclams & ocean quahogs
	Fair Tide Shellfish (New Bedford)	Surfclams only; hand-shucked
	Intershell Seafood (Gloucester)	Surfclams only
	Sea Watch (New Bedford)	Surfclams & ocean quahogs
	Harbor Blue Seafood (Fairhaven)	Offloading of surfclams only – no processing
Rhode Island	Blount Seafood (Warren)	Surfclams & ocean quahogs
	Galilean Seafood (Bristol) -Owned by Atlantic Cape Fisheries	Surfclams only; hand-shucked
New Jersey	Atlantic Capes Fisheries (Point Pleasant Beach)- Offices in Cape May	Surfclams only; hand-shucked
	La Monica Fine Foods (Millville)	Surfclams only; hand-shucked
	Surfside Products (Port Norris)	Primarily ocean quahogs, some surfclams
Delaware	Sea Watch (Milford)	Surfclams & ocean quahogs
Maryland	Sea Watch (Easton)	Secondary processing
Virginia	J H Miles & Company (Norfolk)	Surfclams & ocean quahogs

Table 5.5-5 SC/OQ processing facilities

Atlantic City, New Jersey's commercial fishing fleet is based in the Marina section of the city, in the shadow of the casinos. The fishery almost exclusively targets SC/OQ. There are no processing facilities in Atlantic City, so the clams must be trucked elsewhere. In addition to the large commercial clam industry, numerous small-scale fishing operations in Atlantic City fish for clams on the bay side using rakes and tongs or fishing by hand (NEFSC 2009a). In 2009 the value of the SC/OQ landings for Atlantic City was just under $21 million (NMFS 2010b).

Point Pleasant, New Jersey is located in Ocean County and is with a reasonable driving distance of New York City and Philadelphia. Much of the economy of Point Pleasant and Point Pleasant Beach is based on tourism, and a substantial segment of the tourist population travel to this area to fish. The landings values (1997-2006) for Point Pleasant show the highest value species as surfclams and ocean quahogs, followed by scallops, summer flounder, scup, and black sea bass (NEFSC 2009a). In 2009 the value of the SC/OQ landings for Point Pleasant was about $6.6 million (NMFS 2010b). The ocean quahogs and scallops, as well as most of the surfclams are trucked away elsewhere for shucking, as Point Pleasant no longer has a processing plant with the exception of a small facility where some surfclams are shucked by hand (NEFSC 2009a).

New Bedford, the fourth largest city in the commonwealth of Massachusetts, is situated on Buzzards Bay, located in the southeastern section of the state in Bristol County. The range of species landed in New Bedford is quite diverse. According to the federal commercial landings data, New Bedford's most successful fishery in the past ten years has been scallops, followed by groundfish (NEFSC 2009a). In 2009 the value of the SC/OQ landings for New Bedford was just over $12 million (NMFS 2010b). Fairhaven's fishing industry is so closely linked to that of its neighbor New Bedford that it is often considered one and the same. Most of Fairhaven's vessels unload and sell their fish in New Bedford, while vessels from both communities haul out in Fairhaven (NEFSC 2009a). In 2009 the value of the SC/OQ landings for Fairhaven was about $1.5 million (NMFS 2010b).

Detailed descriptions of the all fishing communities involved in the SC/OQ fisheries are provided in Amendment 13 to the Atlantic SC/OQ Fishery Management Plan as well as the Community Profiles for the Northeast US Fisheries articles which are available on the NOAA website (http://www.nefsc.noaa.gov/read/socialsci/community_profiles).

Since 1979, 85-100% of landings have been taken from the Mid-Atlantic Bight (SVA, DMV, and NJ). Areas of highest landings have shifted north from DMV to NJ over time (Figure 5.5-7). After 1983, the importance of DMV declined and NJ has supplied the bulk of landings since 1985. About 8% of landings were taken from SNE and LI since 2005 (NEFSC, 2010a).

The regional distribution of fishing effort is similar to that of landings although fishing effort in DMV has increased in recent years. Declining LPUE trends reflect stock conditions for regions where clam fishing occurred (excluding GB) but overstate declines in biomass for the stock as a whole (including GB) (NEFSC, 2010a).

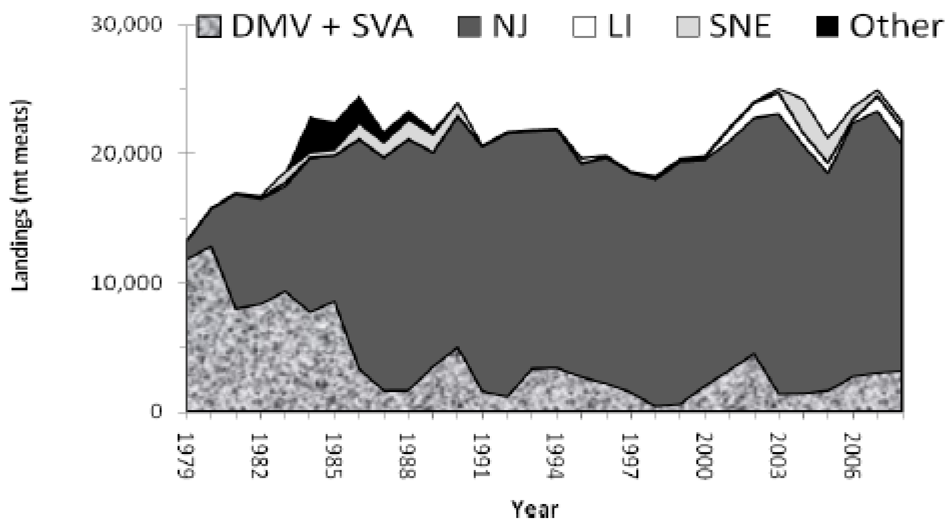

Figure 5.5-7 Surfclam landings data during 1979-2008 by stock assessment region

The ocean quahog fishery has shifted North over the last two decades as catch rates declined in the original fishing grounds off Delmarva and New Jersey. In the 1980s, the bulk of the fishing effort was off Delmarva and southern New Jersey, with some fishing off southern New England. In the early 1990s effort fell by half in the Delmarva region while effort increased south of Long Island until about 40% of total effort was concentrated there. By the late 1990s, most of the fishing effort had moved to the Southern New England region. In the early 2000s, the majority of fishing effort was in the Long Island region. By the late 2000s only 22% of total effort was in the Delmarva and New Jersey regions (NEFSC 2009b).

Public Health

In addition to economic and social impacts, this EA considers public health for consumers of SC/OQ as a facet of the human communities VEC. Saxitoxins (toxins) are produced by the alga *Alexandrium fundyense*, which can form blooms commonly referred to as red tides. Red tide blooms, a form of harmful algal bloom (HAB), can produce toxins that accumulate in water column filter-feeding shellfish. Shellfish contaminated with the saxitoxin, if eaten in large enough quantity, can cause illness or death in humans from PSP. Given the high inter-annual variability of red tide blooms, NMFS may need to close any re-open area within the GB Closed Area to harvesting of surfclams and ocean quahogs to prevent contaminated shellfish from entering the market. NMFS traditionally defers to the FDA in matters of public health. Therefore any SC/OQ closures or re-openings by NMFS are based upon PSP toxin monitoring results provided by the FDA and the most current available scientific information.

6.0 ENVIRONMENTAL CONSEQUENCES- ANALYSIS OF (DIRECT AND INDIRECT) IMPACTS

6.1 Impacts to Physical Environment, Habitat and Essential Fish Habitat (EFH)

Fishing Gear Impacts

Hydraulic dredges are used to extract surfclams and ocean quahogs from the sediment. The typical dredge is about 12 feet wide and about 22 feet long, and uses pressurized water jets to wash clams out of the seafloor. The vessels are equipped with large pumps, connected to the dredges via flexible hoses that inject seawater into the sediment through a manifold with multiple nozzles, ahead of the blade of the dredge. The water jets penetrate the sediment in the front of the dredge to a depth of about 8 to 10 inches, depending on the type of sediment and water pressure. Water pressure varies from 50 pounds per square inch (psi) to 110 psi, depending on the type of sediment. The dredge must be towed slowly so as not to exceed the rate at which the sediment is fluidized (NEFSC 2002).

When operated correctly these dredges are highly efficient, taking as much as 90% of the clams in their path. A stern rig dredge, which is basically a giant sieve, allows small clams and bycatch to fall through the bottom of the cage into the trench minimizing damage or injury. Most tows are conducted in large grain sand but hydraulic clam dredges can also be operated in areas of fine sand, small grain gravel, sand and small amounts of mud, and sand with very small amounts of clay. Boat captains will not dredge in areas with very soft or hard substrate due to the risk of losing or damaging the gear. The fishery is also limited to the sandy sediments because the processors do not want mud blown into the clam bodies by the dredge (NEFSC 2002). An analysis of data collected by observers placed aboard commercial clam dredge vessels (unpublished data, NEFSC 2010b) shows that most tows are made no deeper than 70 meters.

Surfclams grow much more rapidly than ocean quahogs. As a result, surfclam beds are dredged every few years and areas dredged for ocean quahogs are left untouched for many years. Ocean quahogs are much more likely to be dredged from a number of more or less discrete patches surrounded by undisturbed areas. As a general rule, once 50% of the harvestable clams are removed from an area, the catch rates drop to a point where it is no longer economically feasible for fishing to continue there. (NEFSC 2002)

Impacts of Hydraulic Clam Dredge Gear

Results of eleven hydraulic dredge studies are summarized in Table 6.1-1. Hydraulic clam dredges created steep-sided trenches 8-30 cm deep that started deteriorating immediately after they were formed (Hall *et al.* 1990, Medcof and Caddy 1971, Meyer *et al.* 1981, Pranovi and Giovanardi 1994, Tuck *et al.* 2000, Murawski and Serchuk 1989). Trenches in a shallow, inshore location with strong bottom currents filled in within 24 hours (Meyer *et al.* 1981). Trenches in a shallow, protected, coastal lagoon were still visible two months after they were formed (Pranovi and Giovanardi 1994). Dredge tracks in fine sediments in the U.S. Mid-Atlantic Bight filled in within several days and even more quickly in coarse sediments (Murawski and Serchuk 1989). Hydraulic dredges also fluidized sediments in the bottom and sides of trenches (Tuck *et al.* 2000), created mounds of sediment along the edges of the trench (Tuck *et al.* 2000), re-suspended and dispersed fine sediment (Meyer *et al.* 1981), and caused a re-sorting of sediments that settled back into trenches (MacKenzie, 1982). In one study (Tuck *et al.* 2000), sediment in the bottom of trenches was initially fluidized to a depth of 30 cm and in the sides of the trench to 15 cm. After 11 weeks, sand in the bottom of the trench was still fluidized to a depth of 20 cm, but trenches were no longer visible. Silt clouds only last for a few minutes or hours (Medcof and Caddy 1971, Meyer *et al.* 1981). Complete recovery of seafloor topography, sediment grain size, and sediment water content was noted after 40 days in a shallow, sandy environment that was exposed to winter storms (Hall *et al.* 1990).

Commercial clam dredges on the Scotian shelf cut deep (20 cm), wide (4 m) furrows in the sandy bottom and caused the loss of burrows, tubes, and shells through destruction or burial, and local sedimentation (Gilkinson et al. 2005a and b). Densities of large burrows were reduced by up to 90% immediately after dredging. The margins of the dredge furrows were gradually degraded, likely through the combined actions of slumping, sediment transport, and bioturbation. Over time empty shells are trapped in dredge furrows. Dredge furrows were no longer visible in video one year after dredging due to their low relief; however, side scan sonograms showed that they persisted for three years, while undergoing changes. There were no signs of burrow recovery after three years due to the high mortalities of their architect, the propeller clam (*Cyrtodaria siliqua*).

Benthic organisms are dislodged from the sediment, or damaged by the dredge, temporarily providing food for foraging fish and invertebrates (Hall *et al.* 1990, Meyer *et al.* 1981, Murawski and Serchuk 1989, and Morello et al. 2005). Hydraulic dredging caused an immediate and significant reduction in the total number of infaunal organisms in four studies (Hall *et al.* 1990, Pranovi and Giovanardi 1994, Tuck *et al.* 2000, and Gilkinson et al. 2005a and b) and, in another case, on the abundance and biomass of mollusks (Morello et al. 2005). There were also significant reductions in the number of infaunal species in one case (Tuck *et al.* 2000) and in the number of macrofaunal species and biomass in another (Pranovi and Giovanardi 1994). In this study (Pranovi and Giovanardi 1994), polychaetes were most affected. Total infaunal abundance was reduced by approximately 45% immediately after dredging in Iceland (Thorarinsdottir et al 2008) and 36% after three months, but the differences between treatment and control samples were not significant. One study failed to detect any significant reduction in the abundance of any individual species (Hall *et al.* 1990), but there were significant reductions in the total number of infaunal organisms and the mean abundances of the ten most common species were all lower one day after dredging, with a significant difference in the abundance of the whole group (all ten species). Evidence from the study conducted off the New Jersey coast indicated that the number of infaunal organisms and species, and species composition, were the same in actively dredged and un-dredged locations (MacKenzie 1982).

Biological recovery times were estimated in six studies. Five of them (Hall *et al.* 1990, Pranovi and Giovanardi 1994, Tuck *et al.* 2000, Morello et al. 2005, and Thorarinsdottir et al 2008) were conducted in very shallow (1.5-10 m) water and one in deep water (10, 70-80 m) . Total infaunal abundance and species diversity had fully recovered only five days after dredging in one location where tidal currents reach maximum speeds of three knots (Tuck *et al.* 2000). Some species had recovered after 11 weeks. Total abundance recovered 40 days after dredging in another location exposed to winter storms, when the site was re-visited for the first time (Hall *et al.* 1990). Total macrofaunal abundance (but not biomass) recovered within two months at a protected, commercially exploited site (Pranovi and Giovanardi 1994), where recovery was monitored at three-week intervals for two months, but not at a nearby, unexploited site. The actual recovery time at the exposed sub-tidal site (Hall *et al.* 1990) was probably much quicker than 40 days, the only point in time when the post-experimental observations were made. In the Scotian shelf study (Gilkinson et al. 2005a and b), there were marked increases in the abundance of polychaetes and amphipods after one year; two years after dredging, opportunistic species were even more abundant relative to pre-dredging levels. The authors concluded that the disturbed community was still in the colonizing phase two years after dredging. In the Iceland study (Thorarinsdottir et al 2008), crustaceans and bivalves recovered within three months, with full recovery of the entire infaunal assemblage occurring sometime between sampling three months and a year after dredging.

(S=statistically significant; citations in bold print are peer-reviewed publications.)							
No.	**Reference**	**Location**	**Depth**	**Sediment**	**Effects**	**Recovery**	**Approach**
1	**Hall *et al.* (1990)**	Loch Gairloch, Scotland	7 m	Fine sand	Shallow trenches (25 cm deep) and large holes; sediment "almost fluidized"; median sediment grain size S higher in fished area; S reductions in numbers of infaunal organisms; no S effect on abundance of any individual species, but mean abundances of 10 most common species were all lower 1 d after fishing than in controls and difference for whole group was S; some mortality (not assessed) of large polychaetes and crustaceans retained on conveyor belt or returned to sea surface.	Complete recovery of physical features and benthic community after 40 days; filling of trenches and holes accelerated by winter storms.	Experimental study in unexploited area to evaluate effects of simulated commercial escalator dredging activity; recovery evaluated after 40 days.
2	**MacKenzie, 1982**	East of Cape May, New Jersey, USA	37 m	Very fine to medium sand	Resorting of sediments (coarser at bottom of dredge track); no effect on total number of individuals or species, but S more polychaetes and S fewer mollusks at AF site. No S differences in mean number of invertebrates (annelids, arthropods, mollusks, and sand dollars) from samples collected in "evidently" dredged and undredged locations at AF and RF sites.		Comparison of macrofauna in an area actively fished (AF) by commercial quahog vessels, an area recently fished for a yr then abandoned 4 mo prior to sampling (RF), and a never fished (NF) area on the continental shelf.
3	Medcof and Caddy 1971	Southern Nova Scotia, Canada	7-12 m	Sand and sand-mud	Smooth tracks with steep walls, 20 cm deep; sediment cloud.	Sediment plume lasted 1 min; dredge tracks still clearly visible after 2-3 days.	SCUBA and submersible observations of the effects of individual tows with a cage dredge.
4	**Meyer *et al.* 1981**	South of Long Island, New York, USA	11 m	Fine to medium sand, covered by silt layer	>20-cm-deep trench; sediment pushed into mounds 15-35 cm wide and 5-15 cm high on either side of trench; silt cloud, attraction of predators.	Slumping along walls of trench began immediately, trench nearly indistinct, and predator abundance normal, after 24 hr; silt settled in 4 min.	SCUBA observations during and following a single tow with a cage dredge in a closed area; effects evaluated after 2 and 24 hr.
5	**Pranovi and Giovanardi 1994**	Venice Lagoon, Adriatic Sea, Italy	1.5-2 m	Sand	8-10 cm deep trench; S decrease in total abundance, biomass, and diversity of benthic macrofauna in fishing ground; no S effects outside fishing ground.	After 2 mo, dredge tracks still visible; densities (especially of small species and epibenthic species) in fishing ground recovered, biomass did not.	Experimental dredging with a cage dredge (single tows) in previously dredged and undredged areas in coastal lagoon; recovery monitored every 3 wk for 2 mo.
6	**Tuck *et al.* 2000**	Sound of Ronay, Outer Hebrides, Scotland	2-5 m	Medium to fine sand	Steep-sided trenches (30 cm deep); sediments fluidized up to 30 cm; S decrease in number of infaunal species and individuals within a day of dredging; S decrease in proportion of polychaetes and S increase in proportion of amphipods 5 days after dredging; S increases in abundance of some species and S decreases in abundance of other species.	Trenches no longer visible but sand still fluidized after 11 wk; species diversity and total abundance recovered within 5 days; proportions of polychaetes and amphipods, and abundances of individual species, returned to pre-dredge levels after 11	Experimental dredging with cage dredge (individual tows at 6 sites) in area closed to commercial dredging, effects evaluated 1 day, 5 days, and 11 wk after dredging.

						wk.	
7	Murawski and Serchuk 1989	Mid-Atlantic Bight, USA	Not given	Sand, mud, and coarse gravel	Trench cut; temporary increase in turbidity, disruption of benthic organisms in dredge path; attraction of predators.	Trenches filled quickly in coarse gravel, but took several days in fine sediments.	Submersible observations following hydraulic cage dredge tows.
8	**Morello et al. 2005**	Adriatic Sea (Italy)	6 m	Very fine sand	No impacts of experimental tows on entire sampled macrobenthic community or on polychaetes, crustaceans, detritivores, or suspensivores, but abundance and biomass of mollusks (excluding target species of fishery) were S reduced by dredging; predators and scavengers S more abundant 1 day after dredging in dredged sites.	Abundance and biomass of mollusks had not recovered at end of experiment (18 days after dredging).	Experimental BACI study in small, heavily-dredged area; impacts evaluated 4,7,11 and 18 days after dredging (reEAted 50 m tows).
9	**Gilkinson et al. 2003**	Banquereau Bank (Scotian Shelf), Canada	70-80 m	Sand	Dredges cut deep (20 cm), wide (4 m) furrows in bottom; the loss of burrows, tubes, and shells through destruction or burial, and local sedimentation created a smooth surface; the margins of furrows were gradually degraded, likely through the combined actions of slumping, sediment transport and bioturbation; differences in patterns of acoustic reflectance between dredge furrows and the surrounding seabed indicate long-lasting effects on sediment structure; over time empty shells are trapped in dredge furrows; densities of large burrows were reduced by up to 90% after dredging.	Dredge furrows were no longer visible in video 1 year after dredging due to their low relief; however, they persisted for 3 yrs, while undergoing changes, as evidenced in side scan sonograms; no signs of recovery of burrows after 3 yrs due to the high mortalities of their architect, the propeller clam, (*Cyrtodaria siliqua*).	Three year BACI study in previously undredged low-energy site; experimental tows using a commercial cage dredge.
10	**Gilkinson et al. 2005a and b**	Banquereau Bank (Scotian Shelf), Canada	70-80 m	Sand	Immediately after dredging, most macrofaunal species (polychaetes and amphipods most common) decreased in abundance and biomass (average across samples typically >40%), with the greatest declines inside dredge furrows (which covered 53-68% of the area inside the dredged boxes); no detectable effects of dredging on soft coral abundances (esp *Gersemia rubiformis*), but power of ANOVA was relatively low.	Marked increases in abundance of polychaetes and amphipods after 1 year; two years after dredging, abundances of opportunistic species were generally elevated by >> 100% relative to pre-dredging levels; authors conclude that the disturbed community was still in the colonizing phase 2 years after dredging.	BACI study in previously undredged low-energy location; experimental tows using a commercial cage dredge, effects evaluated (video) immediately after, and 1&2 yrs after dredging; dredged-only impacts compared with dredged + discards, visible soft corals counted in dredged and non-dredged areas.
11	Thorarinsdottir et al 2008	Iceland	10 m	Sand	NS effects of dredging on all infaunal organisms, or on indiv taxonomic groups, but results confounded by low sample size; immediate NS 45% reduction in density of all organisms (except quahogs), still 36% 3 mos later; effects (NS) on polychaetes, cumaceans, and other organism lasted 3 mos, only imm effects on crustaceans and bivalves, no effects on hydrozoa.	Full recovery of total assemblage within a year (could have been sooner); crustaceans and bivalves recovered within 3 mos (mean densities higher in dredge tracks than outside).	Experimental dredge tows (3) in unfished area, 3 core samples collected inside/outside dredge tracks imm after and 3,13,25 mos after dredging

Table 6.1-1 Effects of hydraulic clam dredges on sand and mixed substrate habitat: summary of published studies

Recovery times – biological communities

Environment	**Total abundance**	**Biomass**	**Number of species**
Shallow, exposed to strong tidal currents and/or winter storms	• Within 5 days • Within 40 days • 3 months – 1 year (crustaceans and bivalves within 3 months)		Within 5 days
Shallow, protected (coastal lagoon)	Within 2 months (not after 3 or 6 weeks)	Not within 2 months	
Deep (70-80 m), low energy	Marked increase in polychaetes and amphipods within a year, even more so after 2 years		

Recovery times – physical habitat features

Environment	**Trenches**	**Fluidized sediment**	**Grain size**
Shallow, exposed to strong tidal currents and/or winter storms	• Within 24 hours • Still visible after 5 days, but not after 11 weeks	• Sand still fluidized after 11 weeks (to 2/3 of original depth) • Within 40 days	Within 40 days
Shallow, protected (coastal lagoon)	Still visible after 2 months		
Continental shelf	Within several days, faster in coarser sediment		
Deep (70-80 m), low energy	No longer visible after 1 year, but persisted in sonograms for 3 years	See trenches	

Summary of Results from Dredge Impact Studies

Immediate physical habitat effects

- Trenches 8-30 cm deep with sediment mounds along sides
- Sand in bottom of trench fluidized to 30 cm, in sides of trench to 15 cm
- Re-suspension and loss of fine sediment in dredge path
- Re-sorting of sediment in trench, coarser sediment at bottom and finer at surface
- Destruction and burial of biogenic burrows and tubes in dredge path
- Partial burial and sedimentation of burrow and tubes adjacent to trench

Immediate biological habitat effects

- Benthic organisms dislodged from sediment surface and sub-sediment
- Reduction in total number, biomass, and species diversity of benthic organisms

Recovery

- Total abundance of organisms in affected biological communities in shallow and deep-water environments recovered as quickly as within a few days to a few months; in all cases, recovery was complete within a year

- Dredge tracks (trenches) in highly-energetic environments filled in within a matter of one to a few days and within a year in more stable environments
- In shallow environments, sand remained fluidized for at least 11 weeks in one study, but in another study sand was no longer fluidized and there was no difference in median size between dredged and undredged areas 40 days after dredging
- In deeper water, the acoustic properties of dredge tracks were still affected three years after dredging, suggesting that sediments were still re-sorted and/or fluidized to some extent

Impacts of Fishing Gears Used on Georges Bank

Hydraulic clam dredges have never been used on the portion of Georges Bank that is being considered in this action. Bottom-tending gears that are used on GB includes scallop dredges, trawls, sink gill nets, longlines, pots and traps. Like clam dredges, bottom trawls and scallop dredges are mobile, bottom-tending gear that affect benthic habitats much more severely than stationary bottom-tending gear like sink gill nets, longlines, and traps (NEFSC 2002). The adverse impacts of scallop dredging and bottom trawling were evaluated in Amendment 13 to the NE Multispecies FMP and Amendment 10 to the Scallop FMP. The impacts of these two gears were determined to be more than minimal and not temporary in nature and management measures (closed areas) were established to minimize the impacts of all mobile, bottom-tending gear, including hydraulic dredges (see Figure 4.4-1). Adverse impacts of scallop dredges and bottom trawls on sandy substrate include the disturbance of physical and benthic features (e.g., sand ripples and waves, shell deposits, amphipod tube mats, and biogenic burrows and depressions), the loss of fine surficial sediment, and reductions in the abundance of epifaunal organisms (e.g., sponges, tube-dwelling anemones and polychaetes, and bryozoans) (NEFSC 2002). Scallop dredges and bottom trawls are dragged over the bottom, primarily affecting the sediment surface and epifaunal organisms, while hydraulic clam dredges affect surface and sub-surface sediments and organisms that live on and in the sediment.

As shown in Figure 6.1-1, fishing trips made by vessels using bottom trawls on GB during 2011 were reported within areas A and B along the northern edge of the bank in depths of 50 to over 100 meters, in shallow water west of Closed Area 2 and east of Closed Area 1 just inside and outside of area C, and between 50 and 80 meters on the southeastern portion of the bank. Scallop dredging in 2011 (Figure 6.1-2) was confined mostly to the re-open access areas in closed areas 1 and 2 outside the PSP closure area, and on the northern edge of the bank, also mostly outside the PSP closure area. There were a few scattered trips reported inside Area C and in the southern part of Area A. Of the three candidate clam harvesting areas being considered in this action, the smallest area (C) appears to be subjected to less mobile, bottom-tending fishing activity, at least recently. This is also true of the central portion of the bank, inside the 50 meter contour. Trips made by re-open access scallop vessels vary a great deal from year to year according to which rotational harvest areas are re-open: in 2011 both access areas were re-open (in the middle of closed area 1 and in the southern part of closed area 2), but in other years dredging by re-open access scallop vessels has been concentrated in the Mid-Atlantic, with only a few scattered trips by general category vessels, mostly in the Great South Channel (i.e., west of the PSP closure area).

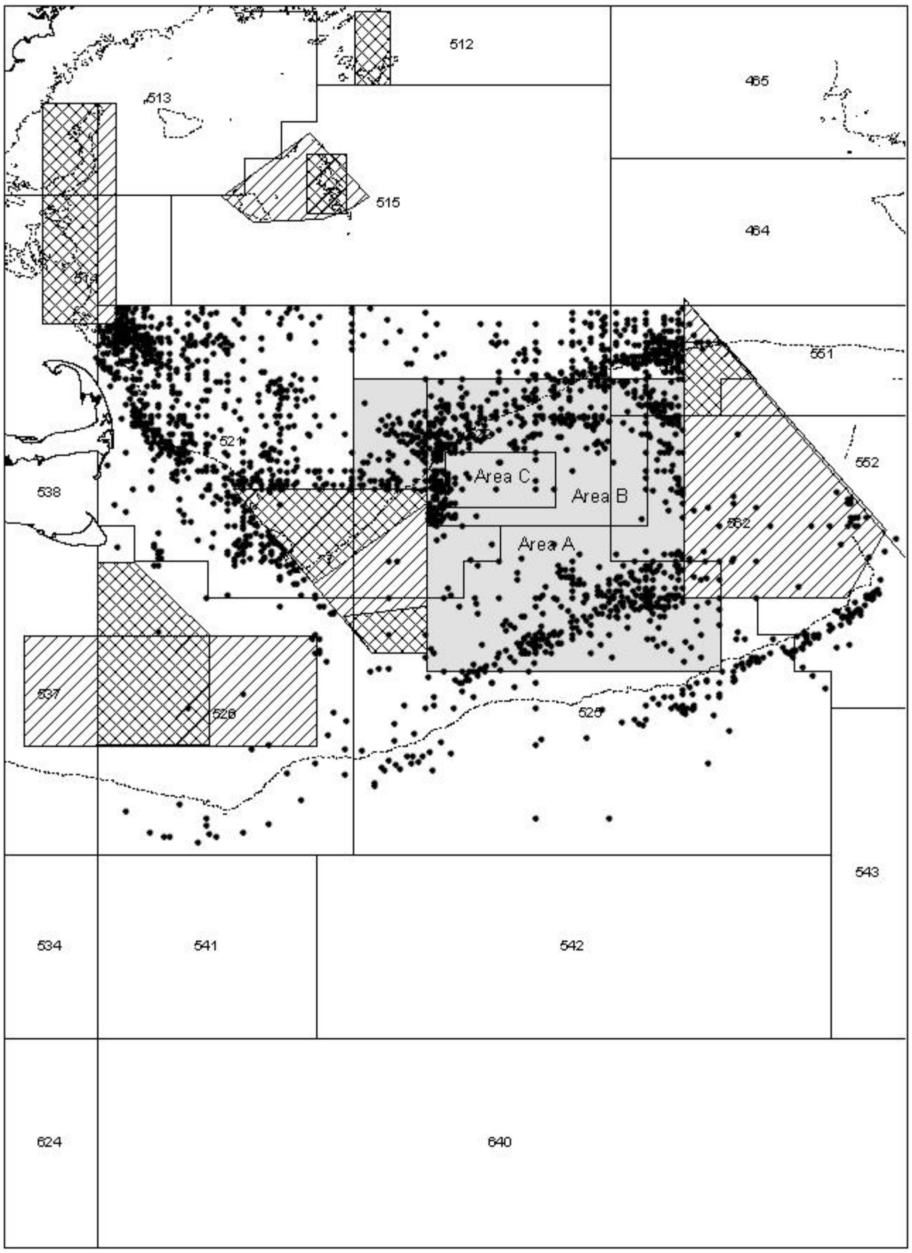

Figure 6.1-1 Locations of trips reported by bottom trawl vessels during calendar year 2011 in six statistical areas on Georges Bank (521, 522, 525, 526, 561, and 562). Note: Each trip is assigned to a

point location that best represents where fishing takes place during an entire trip which often lasts several days.

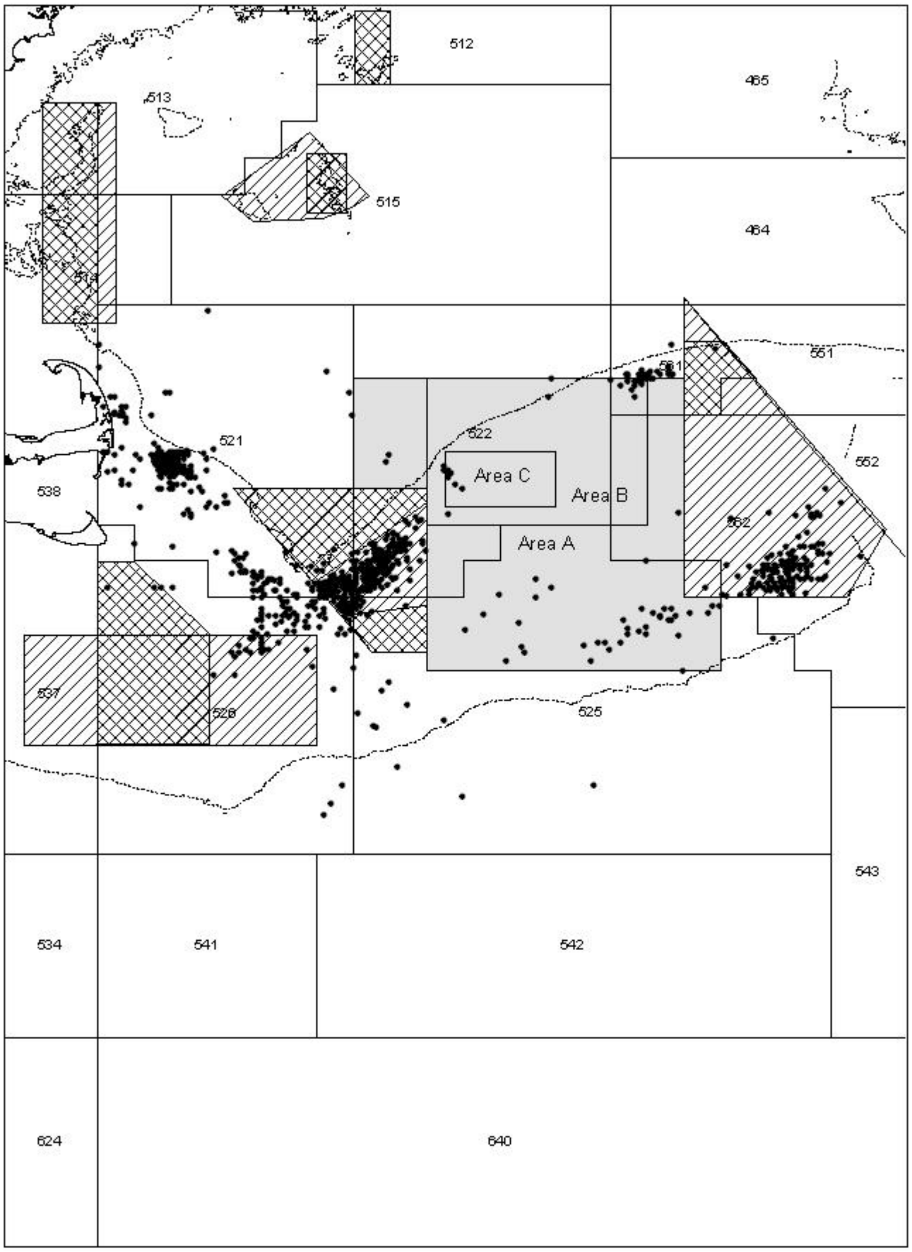

Figure 6.1-2 Locations of trips reported by scallop dredge vessels during calendar year 2011 in six statistical areas on Georges Bank (521, 522, 525, 526, 561, and 562). Note: Each trip is assigned to a

point location that best represents where fishing takes place during an entire trip which often lasts several days.

Potential Habitat Impacts of This Action

Vulnerability of Benthic Habitats on GB to Effects of Hydraulic Clam Dredges

As part of the process of evaluating the effects of different commercial fishing gears on benthic habitats for EFH Omnibus Amendment 2, the NEFMC's Habitat Plan Development Team (PDT) has assessed the susceptibility and recovery potential of the four habitat types on GB in which hydraulic dredges can operate. They are: 1) shallow water (<80 m), high energy sand; 2) deep water (>80 m), low energy sand; 3) shallow water (<80 m), high energy granule-pebble; and 4) deep water (>80 m), low energy granule-pebble. Because hydraulic dredges are not expected to be used in any of the three alternative re-opening areas in depths less than 80 meters, this analysis is limited to the two high energy substrates. This gear cannot be used in cobble or boulder-dominated substrates (Wallace and Hoff 2005).

The assessment performed by the Habitat PDT was based on the effects of a single pass of the gear in reducing the functional value of a number of structure-forming geological and biological features associated with each substrate type and the time required for each type of feature to recover to the point that its functional value (e.g., in providing shelter from predation for juvenile fish) to be restored. Susceptibility to disturbance was assessed as the percentage reduction in functional value and recovery in years. Examples of geological features are sand waves, sub-surface sediment structure, and burrows and depressions formed by organisms; biological features are structure-forming epifaunal organisms like sponges or tube-dwelling aphipods. "Scores" were based as much as possible on the results of the gear impact studies that are described in Table 6.1-1 and on professional judgment by PDT members. The results of the vulnerability assessment provided input values for the Swept Area Seabed Impact Model (SASI) developed by the PDT that provides a means for comparing the vulnerability of different habitat types to fishing by different gear types, and for quantifying the effects of realized fishing effort by any gear type in any given geographic location. Details of the vulnerability assessment and its application in the SASI model are provided in NEFMC (2011).

Relevant results of the PDT's vulnerability assessment are as follows:

- High energy sand and granule-pebble habitats are much more susceptible to the effects of hydraulic dredges than they are to the effects of either bottom trawls or scallop dredges, i.e., 60-75% loss of biological and geological features from a single pass vs. 20-35% for bottom trawls and 12-35% for scallop dredges;
- However, recovery of geological and biological features in these two habitat types following a single pass of a hydraulic dredge (1.4 to 4 years) is about the same as it is for one bottom trawl or scallop dredge tow (1 to 3.5 years);
- In high energy sand, geological features are more susceptible to the effects of hydraulic dredging than biological features (about 70% vs. just under 60%), but in high energy granule-pebble habitat biological features are more susceptible (just over 70% vs. just over 60%);

- It takes longer for affected biological features to recover from hydraulic dredging in sand (3.8 years) than in granule-pebble habitats (3 years), but geological features take longer to recover in granule-pebble than in sand (2 vs. 1.4 years).

Application of the S (susceptibility) and R (recovery) scores for hydraulic clam dredges into the SASI model, assuming a uniform distribution of fishing effort in all areas, produced a map of overall habitat vulnerability that is composed of a geological and biological component (Figure 6.1-3). The more vulnerable areas on GB (high negative Z_{∞} values in red) are located in deeper water (low energy habitats) on the northern and southern edges of the bank, beyond the depths where clam dredges are expected to operate. The low vulnerability areas (in blue) correspond generally to the high energy sandy habitats on the top of the bank. Intermediate values (orange and green) are in places like the Northeast Peak and on the western part of the bank, outside of the three alternative re-opening areas.

Landings Per Unit Effort

Surfclams

The surfclam resource in the traditional fishing grounds in the Mid-Atlantic (Figure 5.5-2) has been declining steadily since 2000. The primary fishing grounds are located off New Jersey and the DelMarVa peninsula. Landings per unit effort (LPUE) declined from 130 bu/hr to about 40 bu/hr in the last ten years (Figures 5.5-6 and 5.5-7). Results of the 2008 and 2011 NEFSC clam surveys (Figures 5.2-3 and 5.2-4) indicate that there are harvestable quantities of surfclams within the PSP closure area on GB. In 2008, the highest catch rates were in the northeast part of the bank in areas A and B and in 2011 the highest catch rates were just west of Closed Area 2 in Area A and in the southern part of Area A just inside the 60 m contour.

Analysis of surfclam LPUE data within the ten minute squares where PSP sampling was conducted on GB in 2011 indicates that the average catch rate (weighted according to the amount of time spent fishing in each square) was 305 bushels per hour of fishing. In contrast, in the traditional surfclam fishing grounds in the Mid-Atlantic, the weighted average catch rate in 2011 was only 42 bushels per hour. Assuming that a similar catch rate could be expected anywhere within the PSP closure area on the bank where there are harvestable concentrations of surfclams, it would take vessels of a comparable size and fishing power to the ones that operated on the bank in 2011 about seven times less time to harvest the same quantity of clams on GB than in the Mid-Atlantic. Since harvest levels in this fishery are limited by annual allocations, the total amount of seafloor that would be impacted to harvest surfclams would be reduced substantially if vessels shifted their effort from the Mid-Atlantic to GB. As shown in the following table, the total “savings” in area swept (assuming equal dredge sizes among all vessels) depends on how much effort would shift into the PSP closure area. If 50% of the 2011 harvest had been taken on GB, for example, total effort and area swept in the fishery would have been reduced by about 46%. Regardless of how much effort shifts to GB, the resulting economic cost of harvesting would, of course, be affected by other factors such as increased fuel costs to make the longer trips to GB.

	Georges Bank	Mid-Atlantic	Total	Percent Reduction In Effort
Harvest (bu x 10^3)	0	2000	2000	
Effort (hrs fished)	0	50,000	50,000	0
Harvest (bu x 10^3)	200	1800	2000	
Effort (hrs fished)	655	42,857	43,512	13
Harvest (bu x 10^3)	500	1500	2000	
Effort (hrs fished)	1,640	35,715	37,355	25
Harvest (bu x 10^3)	1000	1000	2000	
Effort (hrs fished)	3,278	23,810	27,088	46
Harvest (bu x 10^3)	1500	500	2000	
Effort (hrs fished)	4,918	11,905	16,823	66
Harvest (bu x 10^3)	1800	200	2000	
Effort (hrs fished)	5,902	4,762	10,664	79

Table 6.1-2 Percent reduction in overall fishing effort for surfclams under various assumptions regarding how much of the total harvest is taken in on Georges Bank. Calculations are based on a total harvest of 2 x 10^6 bushels, the 2011 average catch rate of 42 bu/hr in the Mid-Atlantic, and 305 bu/hr in the PSP closure on GB in 2011.

Quahogs

Unlike surfclams, catch rates of ocean quahogs have varied from year to year, but have not declined since the mid-1980s (Figure 6.5-3). In fact, there is an upward trend in catch rates since 2000, from approximately 110 to over 140 bu/hr. The primary fishing grounds for quahogs is centered southeast of Long Island (Figure 6.5-4). According to the results of the 2008 and 2011 surveys, there is a large un-exploited quantity of quahogs on the southern part of GB (Figures 5.2-5 and 5.2-6). In 2011, the highest catch rates were in Area A along the 60 m contour at the same stations where surfclams were also present. There are not many quahogs in shallower water on the northern part of the bank.

PSP sampling in the northern part of GB has focused on surfclams, so there are no quahog catch rate data for commercial vessels to indicate what would be the difference in capture efficiency between the current fishing grounds and GB if Area A was re-opened to clam harvesting. However, judging from the 2008 survey data (Figure 5.2-5) it is apparent that the density of quahogs on the southern part of the bank is significantly higher than in the Mid-Atlantic. That being the case, if Area A was re-opened to commercial harvesting, it seems likely that both species would be harvested there. If so, the catch rates of quahogs would, like surfclams, be considerably higher on the bank than in the inshore fishery, resulting in a significant reduction in towing time and swept area over the entire footprint of the fishery and reducing impacts from hydraulic dredging on the inshore grounds.

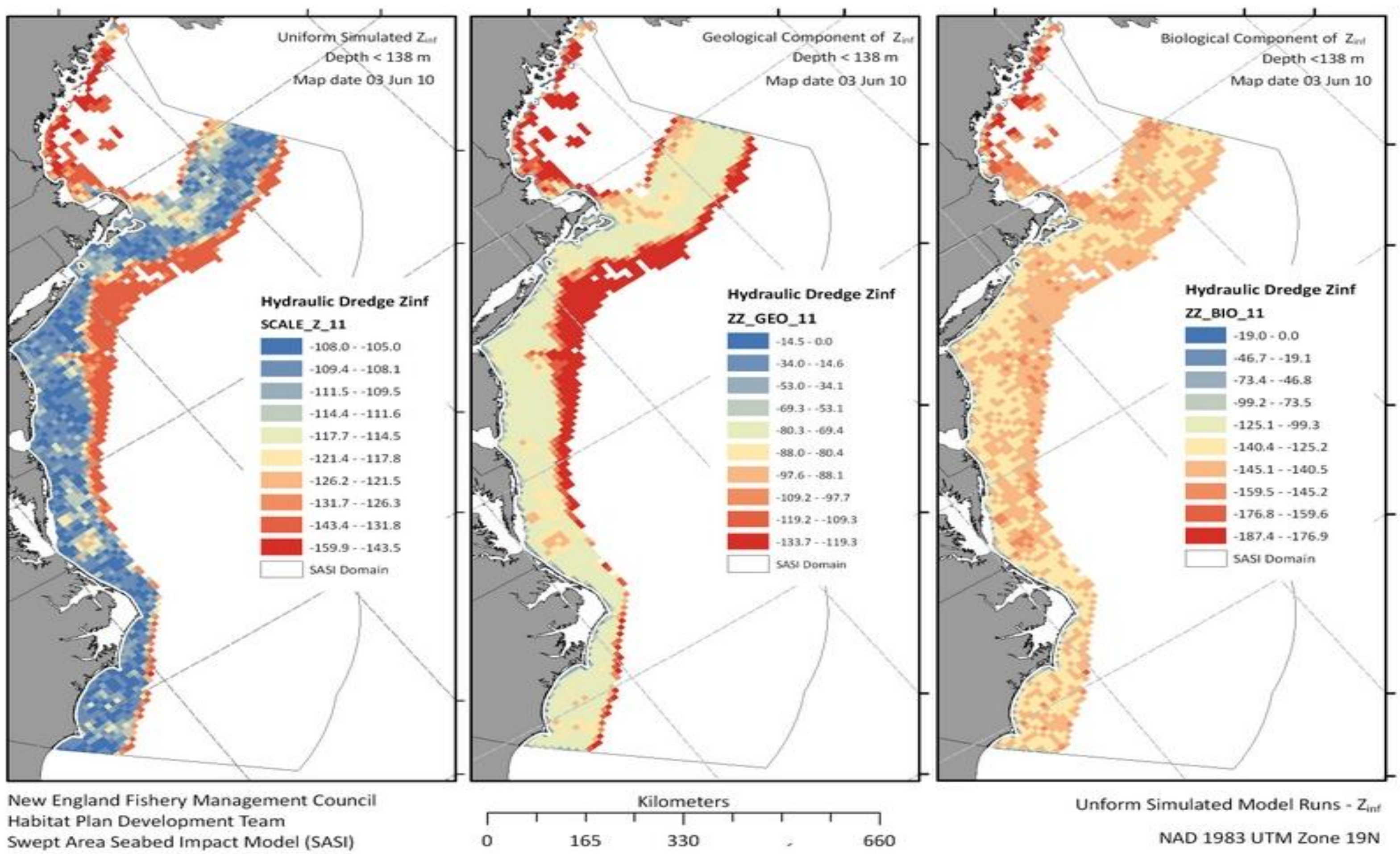

Figure 6.1-3 Simulation outputs (Z_∞) for hydraulic dredge gear from SASI model showing range of habitat vulnerability values within the model domain. The model was only run for sand and granule-pebble dominated habitats and at depths <137 m, i.e., the substrate types and maximum depth where hydraulic dredges are known to operate. Biological and geological components (shown separately) were weighted equally in computing total Z_∞ scores. See text and NEFMC (2011) for more details.

Potential Habitat Impacts by Area

All three candidate re-opening areas within the GB PSP closure area have several features in common that affect the vulnerability of EFH for managed resources from the effects of hydraulic dredging in the event that the commercial fleet is granted access to them. The predominant habitat type in all three areas is high energy sand, with some granule-pebble and cobble substrate. Hydraulic dredging would be primarily limited to sandy areas shallower than 80 meters, although gravel areas with less coarse sediments (granule-pebble, but not cobble) could also be impacted. All areas provide EFH for other managed resources and all three have been affected to varying degrees over time by bottom trawls and, to a much lesser extent, scallop dredges.

There are also some differences between these areas that could affect how vulnerable they are to hydraulic dredging. One important difference is the degree to which tidal currents and wave action from storms disturbs bottom sediments. In shallower water, natural disturbance is greater than in deeper water and the effects of dredging will not last as long. So, even though the SASI model is coded for high vs. low energy at a discrete depth (about 80 m on GB), in reality there is a gradation in energy level going from shallow to deep water. Thus, the variation in size of the three areas and the proportion of shallow, highly dynamic benthic habitat they contain is a factor.

There also appears to be some variation in the amount of bottom trawling that each area has been exposed to in recent years; areas that have not been impacted as much by fishing would be more vulnerable to the first contact effects of hydraulic dredging, whereas trawled areas would be more susceptible to the cumulative effects of both gear types. However, it must be emphasized that because hydraulic dredges are designed to dislodge clams from sub-surface sediments with pressurized water, they have a much more disruptive effect on bottom sediments and organisms than bottom trawls or scallop dredges which primarily disturb the sediment surface (see Section 6.1). The effects of natural disturbance on shallow sandy habitats is also limited primarily to the sediment-water interface, so that natural disturbance cannot be assumed to completely over-ride the effects of hydraulic dredging even in highly dynamic, sandy environments.

Given the fact that this gear has significant immediate effects on benthic habitats (see lit review and Section re SASI vulnerability assessment), the most important criterion in assessing long-term impacts is recovery time. The lit review indicates that the trenches caused by dredging do not last more than a few days to weeks in highly energetic environments, but that sediments may remain fluidized for weeks to months even in shallow, highly-disturbed habitats or for years in deeper, more stable environments . Also, infaunal organisms are flushed out of the sediment to a depth of 8-10 inches, but total abundance returns to pre-dredge levels within a year (although there may be changes in species composition). In deep-water studies (70-80 m) on the Scotian shelf, opportunistic invertebrate species colonized sub-surface sediments within a year after dredging to the point where they were total abundance exceeded pre-dredge levels. Recovery of epifaunal organisms to the point where they provide the same functional value (e.g., for shelter) for fish in high or low energy sandy habitats takes longer – 3.5 to 3.8 years, according to the assessment done by the NEFMC Habitat PDT. Geological features (e.g., biogenic burrows, subsurface sediments) were judged to take longer to recover from dredging in low energy environments – 2.5 years vs. 1.4 years. There is reason, therefore, to expect sandy habitats to be more adversely impacted in deeper water than in shallow water.

<u>Alternative A</u>

Alternative A is the largest area being proposed for re-opening and would provide more opportunities for commercial dredge vessels to locate harvestable quantities of surfclams and ocean quahogs in the future. Subject to FDA testing results and NMFS approval, any sub-set of this larger area could be re-opened to clam dredging at any point in time, and any area that was re-opened could subsequently be closed if PSP levels reached threshold concentrations. Thus, clam dredging activity could, over the long term, shift from one area to another within the 6,378 square miles defined by this alternative. Without knowing where within this large area clam dredging could occur, or when, this evaluation assumes that the entire area could be re-opened at some point in time to dredging, or that during some period of time (years), dredging could occur in a number of discrete areas within the larger area. Since hydraulic clam dredges are normally operated at depths less than 80 meters (see Section 6.1), the area that would be exposed to impacts from this gear actually makes up about 80% of the entire area, i.e., about 5,180 square miles.

The predominant habitat type within this area is high energy sand, but there is an area of high profile sand ridges and intervening troughs of gravel in the northeast corner of the area, inside sub-area B (Figure 5.1-4). The southeast portion of this area gets gradually deeper and includes much more sandy bottom habitat between 50 and 80 m than the other two areas. There are significant quantities of surfclams and quahogs in this part of the bank. Natural disturbance caused by bottom currents and storm waves is reduced in this area so that recovery from the effects of hydraulic dredging would likely be somewhat slower here than in the shallower, more dynamic portions of the bank .

There were few scallop dredge trips reported in Area A in 2011, but quite a few bottom trawl trips along the northern edge of the bank, just west of Closed Area 2 and east of Closed Area 1 (west of Area C), and in deeper water in the southeast portion of the bank in the same area where the 2008 and 2011 clam surveys captured large numbers of surfclams and quahogs. There are more likely to be cumulative impacts to benthic habitats from hydraulic dredging in these areas if Area A is re-opened to clam harvesting in 2013 than there would be in the shallower, less impacted portion of the bank. Due to the combined effect of all three gears and the fact that it is a lower energy area, the adverse effects of re-opening Area A are likely to be more severe between 50 and 80 m in the southeast portion of Area A.

Although a much larger area on GB would potentially be re-opened to clam dredging under this alternative, the same amount of fishing effort (bottom contact time) that would be concentrated in the smaller area alternatives would either be dispersed over a larger area with reduced per unit area habitat impacts, or it could be focused on a larger number of small, productive areas. Because it is so much larger than the other two candidate areas, Area A provides more opportunities to locate and harvest either managed species at maximum efficiency and to avoid areas where PSP closures may be required. For this reason, it is expected that re-opening this area would reduce total fishing effort and area swept in this fishery to a greater extent than re-opening either of the other two areas.

Conclusion: Due to the extreme natural disturbance caused by bottom currents and storm-generated waves on the predominantly sandy substrate in the shallower, northern portion of this area, EFH impacts would be minimal and/or temporary and not require any mitigation. However, in the deeper portion of this area (60-80 m) to the southeast, where there is less natural disturbance of bottom habitats and where there are existing impacts from bottom trawling and scallop dredging, the additional effects of hydraulic dredging are expected to have adverse impacts on EFH which would likely be more than minimal and not temporary in nature. These impacts would, however, be mitigated by the reduction in the amount of bottom area affected by the gear over the entire range of the fishery (see below).

Alternative B

Of the three candidate areas that could be re-opened, this one is intermediate in size. It includes Area C and is part of the larger Area A. Depths and sediments in this area are more diverse than in Area C. Most of the area is shallow and exposed to strong tidal bottom currents and storm waves which are constantly moving sand around (see Section 6.1). For this reason, it is likely that the added disturbance caused by dredging would be relatively minor. The deeper water along the northern edge of the bank probably would not attract hydraulic dredge vessels because it drops off rapidly. The shallower portions of the area are composed of high profile sand ridges and intervening troughs of gravel. It seems to provide better habitat conditions for surfclams than for quahogs. PSP sampling trips in the eastern portion of this area in 2011 produced high catch rates of surfclams, so it is likely to be targeted if the area is re-opened for commercial harvesting in 2013. This area is also affected by bottom trawling, particularly along the northern edge of the bank.

Any hydraulic dredging activity from the Mid-Atlantic that would shift into this area would potentially be dispersed over a smaller area or concentrated in fewer small areas than in Area A, but would be more dispersed or in more small areas than in Area C. Thus, there is a greater probability that certain highly productive areas would be more heavily impacted if Area B was re-opened instead of Area A; the reverse would be true if Area B was re-opened instead of Area C. It seems likely, given its larger size and the fact that a considerable quantity of surfclams were harvested in this area in 2011 during the PSP sampling trips, that more vessels would make fishing trips to Area B in 2013 and subsequent years than they would if the smaller Area C was re-opened instead. This would cause a bigger reduction on the total amount of area swept in the fishery.

Conclusion: There would be adverse habitat impacts of hydraulic dredging in this area, but it would be minimal and/or temporary due to the extreme natural disturbance of bottom currents and storm- generated waves on the predominantly sandy substrate.

Alternative C

Of the three candidate areas that could be re-opened, this is the smallest. Unlike the other two areas, it is uniformly shallow; like the other areas, it is predominantly sandy and is exposed to extremely strong tidal bottom currents and storm waves. It provides good habitat conditions for surfclams, but not for quahogs which seem to prefer deeper, less energetic environments and/or coarser sediments. Very few bottom trawl or scallop dredge trips were reported in this area in 2011, so the initial impacts of hydraulic dredging would potentially be more severe than in other areas. Due to its small size, if this was the only area that was re-opened for clam harvesting and a large amount of dredging activity shifted from the Mid-Atlantic into this area, it would be more concentrated with a greater potential to adversely impact benthic habitats. On the other hand, extreme natural disturbance would have a greater compensating effect than in deeper water and recovery times would be faster. Also, because it is smaller, this area would be less likely to draw effort out of the highly-impacted fishing grounds in the Mid-Atlantic than the larger areas and the total amount of area swept by the gear would probably be higher. In the long run, the appeal of this area might also be reduced by the fact that there don't appear to be many quahogs in it.

Conclusion: There would be adverse habitat impacts of hydraulic dredging in this area, but it would be minimal and/or temporary due to the extreme natural disturbance of bottom currents and storm- generated waves on the predominantly sandy substrate.

Alternative D

This alternative would not result in a change in fishing effort, areas fished, or harvest. Therefore, Alternative D would not result in a change of the quality or disturbance of habitat in the surfclam and ocean quahog fisheries.

Impacts throughout the range of the fishery

Based upon the most recent data available, the total area of the seafloor affected by hydraulic dredges by the SC/OQ fishery in 2000 was estimated to be approximately 145 square miles (USDC 2002). Based on the small area contacted by the gear in any given year and the fact that fishing grounds in the Mid-Atlantic are located primarily in highly dynamic, sandy habitats, the adverse impacts of the fishery on EFH were determined to be minimal (MAFMFC 2002). As long as the PSP area on GB remain closed for clam harvesting and the quotas remain the same, the total amount of bottom area swept by the gear on the existing fishing grounds in the Mid-Atlantic is not expected to change, although it may have increased slightly in recent years as the catch rates of surfclams has continued to decline.

Re-opening up the areas being considered in Alternatives B and C would adversely impact benthic habitats and EFH, but the effects would be minimal and/or temporary. The same conclusion applies to the shallower portions of Area A which largely overlap Areas B and C, but in the deeper portion of Area A, on the southeast portion of the bank, the impacts would potentially be more than minimal and not temporary. However, since the abundance of clams (especially quahogs) in this area is very high, much higher than in the Mid-Atlantic, the savings in time spent fishing and, therefore, in the total amount of bottom that is impacted throughout the range of the fishery, would be considerable (see Table 6.1-2).   The re-location of hydraulic dredge vessels to GB would reduce the amount of time spent harvesting clams in the Mid-Atlantic, thus reducing total area swept and the amount of bottom disturbance caused by the gear. Under any scenario that includes access to previously unexploited clam resources on GB, the adverse effects of the fishery on EFH would, therefore, continue to be minimized. In future years, if harvest quotas are increased in response to the increased available biomass, this determination would have to be re-evaluated using more recent LPUE data.

6.2 Impacts to Target Species

The proposed re-opening of any portion of the existing GB Closed Area for the harvesting of surfclams and ocean quahogs (either Alternatives A, B, or C) would subject the target species to exploitation for the first time since the area was closed to commercial clam dredging in 1990. Alternative A would potentially re-open a much larger area than Alternatives B and C. While it is difficult to predict the extent to which either Alternative A, B, or C would displace fishing effort from currently harvested areas to newly re-opened areas, it is anticipated that at least some fishing effort would be displaced. The entire existing GB Closed Area contains approximately 48% of the total biomass for surfclams and approximately 45% of the total biomass for ocean quahog.

At least in the short term it would be expected that the landings per unit effort (LPUE) would be higher in the GB Closed Area due to the high biomass and that vessels would move into any new re-open area on GB to take advantage of the available resource. However, it is not anticipated that overall landings will increase. Landings data for the past several years suggests that the total number of bushels harvested for the entire fishery has been market price driven as the industry has not been taking the entire allotted quota. Although, there may be an initial increase in LPUE, it is likely that these market factors will continue to limit overall harvest quantities. Further, higher costs associated with getting to and operating in the offshore GB may limit fishing effort in these newly re-opened areas.

Alternatives A, B, and C are not expected to impact the stock or population size of the surfclam or ocean quahog fisheries. Both fisheries have been managed under an Individual Transfer Quota (ITQ) since 1990 where annual landings are allocated disproportionately to the participating vessels based on a combination of performance history and vessel size. Neither species is characterized as overfished and overfishing is not occurring. As discussed in Section 5.5, total stock biomass is relatively high and total fishing mortality rates are low. The quota is currently set well below a threshold that would represent overfishing.

As noted above, GB contains a large portion of the biomass for SC/OQ. Since the larvae remain in the water column for weeks or months, spawning on GB may also provide a source of new recruits throughout the range of both species as water movement off GB is typically westerly and southerly (see Section 5.1). However, since the areas being proposed for re-opening have previously been closed, the areas could contain more mature populations, and therefore, more prolific spawners. Despite the ITQ system, removing some of these could produce a short term decrease in spawning and recruitment. However, since SC/OQ are not overfished and quotas would not increase under either alternative, Alternatives A, B, and C are not expected to have a significant impact on the spawning biomass on GB. In fact, Alternatives A, B, and C may have a potentially positive long term impact on the target species because fishing will be more spread out over the entire range, thereby helping to avoid localized depletion and taking pressure off of the heavily fished southern region populations.

Alternative A represents 17% of the entire GB PSP Closure Area but, based upon the substrate and depth data presented in Section 5.1, it contains a large portion of the suitable clam habitat. Alternative A could potentially re-open up a much larger area to harvest SC/OQ than Alternatives B and C. However, the size of an re-opened area would be dependent on PSP toxin levels as well as be subject to PSP toxin testing by the FDA and the approval of NMFS. Alternatives B and C both represent smaller areas within the larger Alternative A area.

Alternative D could have impacts on the stock or population size, particularly southern populations. Since the area proposed for re-opening has been closed since 1990, the majority of SC/OQ effort has been limited to harvesting the southern populations. Alternative D would leave an area closed where the SC/OQ are abundant, and would continue the trend of targeting primarily southern stocks. While Alternative D would likely not change the amount of fishing effort or areas fished, it could have long term impacts on southern SC/OQ populations.

6.3 Impacts to Non-Target Species/Bycatch

SC/OQ is considered a “clean” fishery with regards to incidental catch since the target species comprises well over 80% of the catches. Based upon scientific surveys bycatch typically consists of scallops, benthic invertebrates including a variety of crabs, other bivalves, snails, and starfish, among them rock crab, Jonah crab, several species of whelks and horseshoe crab. The implementation of Alternatives A, B, or C may temporarily reduce bycatch for the entire fishery due to the fewer and shorter dredges anticipated in an area of high biomass such as GB. However, the implementation of Alternatives A, B, or C would have a long term negligible impact on bycatch since the LPUE of re-open areas on GB would likely diminish over time as LPUE declines to levels similar to other harvesting areas.

Alternative D could have a minor benefit on bycatch since hydraulic dredge gear would not be introduced to a new area resulting in additional bycatch.

6.4 Impacts to Protected Resources

While listed species may occur near SC/OQ beds, it is likely that there will be no conflict between the fishers of this FMP and these endangered or threatened species because SC/OQ dredges are very slow moving and listed species are capable of moving out of the way and avoiding the gear. The gear used in the SC/OQ fisheries is classified as Category III. No mortalities or serious injuries of marine mammals have been documented due to use of the hydraulic dredge in the U.S. Mid-Atlantic offshore SC/OQ fisheries. Therefore, the implementation of Alternatives A, B, C, or D would have negligible impact upon ESA-listed species.

6.5 Impacts to Human Communities

The implementation of Alternatives A, B, or C is expected to have a positive impact to fishing communities. Higher LPUE is likely expected in the short term as a result of the higher biomass associated with GB region. However, the attractiveness of re-opening Alternatives A, B, or C would likely diminish over time as LPUE declines to levels similar to other harvesting areas. That is, assuming these areas remain re-open to harvesting and catch rates approach the average, the importance of the re-opened GB area will be diminished. Higher fuel and/or labor costs may be a factor if vessels must travel further distances to reach GB than they would have to catch the same fixed amount in another area. As the higher-value commodity, surfclam may be targeted over ocean quahog to compensate for the higher fuel and labor costs associated with fishing on GB. The longer trips associated with fishing on GB may also carry additional risk to fisherman safety.

There is potential for long term economic benefit from the implementation of either Alternatives A, B, or C as they would result in a larger area re-open to fishing and provide fisherman with more potentially profitable fishing options. Alternative A would potentially be more positive because it would incorporate a larger re-open fishing area. Alternative B and C would also have positive economic benefit, but because these areas are smaller than alternative A, the economic benefit may be short term due to localized stock depletion from high effort within a small area. It is noted that the potential economic benefits of the re-opening are dependent upon PSP monitoring data provided by the FDA and benefits may increase or decrease as areas are re-opened or closed.

Consolidation of the Federal fleet in recent years is evident as the total number of vessels participating in the SC/OQ fisheries outside the State of Maine has experienced a dramatic decline as the fisheries moved beyond a market crisis in 2005. Further consolidation of the fleet would not be expected as a result of Alternatives A, B, C, or D as the quota would not be reduced and the federal fleet has been consolidated in its current state for several years.

At the time of this report it is unclear if Federal vessels would be able to land their harvest in all of the New England and Mid-Atlantic states. Due to the potential public health concerns associated with PSP toxins there is the potential for states not to allow landings of SC/OQ from re-open areas of GB. New Jersey and Massachusetts were the only states that allowed catch under the EFP to be landed. If states do not allow for SC/OQ from re-open areas of GB to be landed then economic and social impacts of Alternatives A, B, or C will differ between states.

The FDA has developed a PSP testing protocol and determines the risk to public health from the PSP toxin. The fishing industry in collaboration with the FDA and NMFS have tested and refined the testing protocol in the GB Closed Area since 2008. The protocol was developed to test for the presence of saxitoxins in shellfish, and to facilitate the harvest of shellfish in waters susceptible to HABs, such as the GB Closed Area, which is not currently under rigorous water quality monitoring programs of either state or Federal management agencies (NMFS 2009). Recent testing of clams on GB by the FDA in cooperation with the NMFS and the fishing industry under the EFP demonstrated that PSP toxin levels were well below the regulatory limit established for public health safety (FDA 2010).

The testing protocol was recently adopted into the NSSP by the ISSC. Alternatives A, B, and C would all require the use of the testing protocol to continue to monitor harvesting in the area and determine if any samples are recorded above the regulatory limits established for public health safety. NMFS defers to the FDA in matters concerning public health and any or all portions of the Alternative A, B, or C, may be re-opened or closed if requested by the FDA and approved by NMFS.

Based on future PSP testing results, the FDA could declare SC/OQ in any or all portions of the Alternatives A, B, or C areas safe for human consumption. These safe areas would have to be approved NMFS before being re-opened for SC/OQ harvesting. NMFS acknowledges that there exists a potential threat of PSP toxins reaching the human population from any re-open area, including those areas described in Alternatives A, B, and C. While the chances of PSP toxins reaching the human population may be small, the impacts associated with this scenario would be negative. A PSP incident would not only impact human health but it also would likely carry negative economic implications for fisherman, processors, and the food industry due to negative public health concerns associated with the product. However, FDA PSP toxin monitoring procedures, as well as various state and industry PSP testing would still be in effect under Alternatives A, B, and C. Additionally, an increase in the number of SC/OQ in the marketplace would not be anticipated as the quota would not increase under Alternatives A, B, or C. Therefore, the public health risks associated with PSP under Alternatives A, B, or C would be negligible compared to the No Action alterative (Alternative D).

Alternatives A, B, or C would re-open new areas for fishing; however, as the harvest quotas would not be increased, these alternatives would simply be displacing fishing effort. Since the distribution of the Federal fleet, location of the processors, and the harvest reaching the processors would not likely change, Alternatives A, B, or C would be expected to have a negligible impact on ports. Alternative D would have negligible impact on ports since there would be no change in the amount of fishing effort, areas fished, or harvest.

Alternative D would have negligible impact on the revenue and social well being of fishermen and/or associated businesses as there would be no change in fishing effort, areas fished, or harvest. Alternative D would have a negligible impact on public welfare as it would maintain the current risk level of PSP toxins getting to the human population from GB SC/OQ because the area is closed.

	Physical Impacts	Biological Impacts			Human Communities Impacts		
	Physical Habitat/EFH	Surfclam & Ocean Quahog	Non-Target Species	Protected Resources	Participants	Public Health	Ports
Alternative A Allow access to surfclam/ocean quahog harvesters in the historic EFP area	localized negative low negative for entire range	negligible	negligible	negligible	low positive	negligible	negligible
Alternative B – Allow access to surfclam/ocean quahog harvesters in the current EFP area	localized negative low negative for entire range	negligible	negligible	negligible	low positive	negligible	negligible
Alternative C – Allow access to surfclam/ocean quahog harvesters in the Cultivator Shoal Area	localized negative low negative for entire range	negligible	negligible	negligible	low positive	negligible	negligible
Alternative D – No Action Alternative – Offshore GB Area remains closed to Surfclam/Quahog harvesting	negligible	negligible	negligible	negligible	negligible	negligible	negligible

Table 6.5-1 Summary of direct and indirect effects of alternatives by VEC

6.6 Cumulative Effects Analysis

The need for a cumulative effects analysis (CEA) is referenced in the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Part 1508.25). CEQ regulations define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action.” The purpose of a CEA is to consider the effects of the Proposed Action and the combined effects of many other actions on the human environment over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective, but, rather, the intent is to focus on those effects that are truly meaningful. The CEA baseline in this case consists of the past, present, and reasonably foreseeable future fishing and non-fishing actions.

This CEA assesses the combined impact of the direct and indirect effects of this action, and the past, present, and reasonably foreseeable future fishing actions, as well as factors external to the SC/OQ fisheries that affect the physical, biological, and socioeconomic resource components of the shellfish environment. The analysis is focused on the VECs (see below) and compares the impacts of harvesting surfclams and/or ocean quahogs in the GB Closed Area to the status quo (No-Action Alternative) which is to continue to prohibit the taking of surfclams and ocean quahogs in the GB Closed Area.

Valued Ecosystem Components (VECs): The CEA focuses on VECs specifically including:

- Physical environment/habitat (including EFH);
- Target species (surfclams and ocean quahogs);
- Non-target species and bycatch;
- Protected resources; and
- Human communities (ports of operation, participants, and public health).

Temporal and Geographic Scope of the Analysis: The temporal range that will be considered for habitat, target species, non-target species and bycatch, and human communities, extends from 1988, the year that Amendment 8 to the SC/OQ FMP was implemented, through November 1, 2015, the beginning of the FY 2016. The cumulative effects analysis for this action focuses on Amendment 8 and subsequent actions because Amendment 8 implemented the ITQ system and included major changes to management of the SC/OQ fisheries, including substantial effort reductions.

The temporal range considered for endangered and other protected species begins in the 1990's when NMFS began generating stock assessments for marine mammals and developed recovery plans for sea turtles that inhibit waters of the U.S. EEZ.

The geographic scope considered for cumulative effects to habitat, target species, and non-target species and bycatch consists of the range of species, primary ports, and geographic areas (habitat) discussed in Section 5.0 (Affected Environment). The geographic scope for protected resources generally encompasses the northwest Atlantic Ocean. The range of each endangered and protected species is presented in Section 6.1.3.1 of Amendment 13 of the SC/OQ FMP (MAFMC 2003). The geographic scope for the human communities will consist of those port communities from which vessels land the bulk of their allocation and the fishing communities where the majority of the product is processed. The scope of public health concerns will consist of all consumers of SC/OQ products.

<u>Impact Category Definitions and Qualifiers</u>
The following definitions and qualifiers are used in the narratives and tables of this EA:

Impact Definition

VEC	Direction		
	Positive (+)	**Negative (-)**	**Negligible (Negl)**
Habitat	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Target Species, Non- Target Species & Bycatch, Protected Resources	Actions that increase stock/population health	Actions that decrease stock/population health	Actions that have little or no positive or negative impact on stocks/populations
Human Communities	Actions that increase revenue and social well being of fishermen and/or associated businesses, or public welfare	Actions that decrease revenue and social well being of fishermen and/or associated businesses, or public welfare	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses, or public welfare

Impact Qualifiers:	
Low (L; as in low positive or low negative):	To a lesser degree
High (H; as in high positive or high negative):	To a substantial degree
Likely	Some degree of uncertainty associated with the impact
ND	Impacts could not be determined at time of this writing

NEGL = Negligible

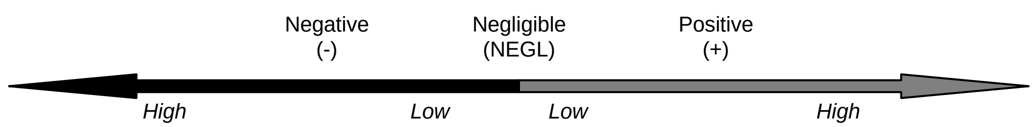

Table 6.6-1 VEC Definitions and qualifiers used in this EA

Summary of Direct and Indirect Impacts of the Alternatives

The impacts from Alternatives A (Proposed Action) and Alternatives B and C are predicted to be the same for all VECs. As summarized in Table 6.5-1, impacts from these alternatives are expected to be negligible to the biological environment, including target species, non-target species and bycatch, and protected resources. Impacts to physical habitat and EFH are expected to be negative in localized areas that have not been subject to clam dredging for almost 20 years, but these impacts are expected to be temporary, as the sandy benthic habitats in the high energy environment where the dredging would occur would recover quickly from the adverse effects of dredging. The subject areas of the alternatives range between approximately 447 and 6,378 square miles, and it has been estimated that the area swept by active vessels in 2000 was approximately 145 square miles. Since quotas and associated fishing effort are not increasing as a result of this action, impacts to the overall habitat suitable for SC/OQ and other species impacted by the hydraulic clam dredge would be expected to be less than impacts to the localized habitat, and therefore are considered to be low negative.

There are three facets to the Human Communities VEC; participants in the fishery, ports, and public health. Re-opening a portion of the GB Closed Area to harvesting surfclams and ocean quahogs would increase landings per unit effort (LPUE), which would increase revenue for participants, an impact which is considered to be low positive. The impact to ports would be negligible as the distribution of the Federal fleet, location of the processors, and the harvest reaching the processors would not likely change. While all surfclams and ocean quahogs have had PSP toxin levels below the regulatory limit for human consumption, conditions in the marine environment change seasonally and vary inter-annually, such that HABs may occur and contaminate shellfish before proper surveying can be conducted. Therefore, it is noted that there is still a low potential for product from any re-open area which is contaminated with hazardous levels of PSP-toxin to reach the marketplace. However, the proposed action requires harvesting from all area alternatives to be conducted under the terms and conditions of the approved testing protocol. Should the testing protocol reveal a sample with recorded PSP toxin levels over the regulatory limit safe for public health the area would be closed and shellfish would not be permitted to enter the market. Also, NMFS generally defers to the FDA in matters of public health, and future closers could be implemented by NMFS or recommended by the FDA. Therefore, considering the mitigation measures involved with this proposed action negative impacts on public health and welfare would be minimal.

Other Fishing Effects: Past, Present and Reasonably Foreseeable Future Management Actions

This section is a summary of the past, present, and reasonably foreseeable future fishing actions and effects that are related to the affected environment and the proposed action. The impact assessment terms (i.e., positive, negative, negligible) are for the impacts associated with the action on the VECs discussed in the impact definition table above. Specifically, the VECs include: the physical environment and EFH; target species; non-target species and bycatch; protected resources such as marine mammals and sea turtles; and the human communities of participants, ports, and public health.

Past and Present Management Actions:

Amendment 8 (MAFMC 1988) to the SC/OQ FMP established an individual transferable quota (ITQ) system to replace regulated fishing time system in place in the mid-Atlantic surfclam fishery. As a result, fishing time in this fishery declined from 96 hours per week in 1978 to six 6-hour trips per quarter in 1988. The ITQ system essentially converted allowable fishing time into allowable individual levels of harvest. An ITQ system was also established for the ocean quahog fishery. Each vessel in these fisheries is given an allocation of the total quota, and the corresponding number of tags for each cage. Allocations can be bought and sold if approved by the Regional Administrator of NMFS. Among other changes, this amendment also empowered the Regional Administrator to authorize an experimental fishery to gather information necessary for management. This amendment is also important because it established the four primary long-term objectives for the FMP. The objectives are as follows: 1) conserve and rebuild the Atlantic SC/OQ resources by stabilizing annual harvest rates throughout the management unit in a way that minimizes short term economic dislocations; 2) simplify the maximum extent the regulatory requirement of clam and quahog management to minimize the government and private costs of administering and complying with regulatory, reporting, enforcement, and research requirements of clam and quahog management; 3) provide opportunity for industry to operate efficiently, consistent with the conservation of clam and quahog resources, which will bring harvesting capacity in balance with processing and biological and allow industry participants to achieve efficiency including efficient utilization of capital resources by the industry; 4) provide a management regime and regulatory framework which is flexible and adaptive to unanticipated short term events or circumstances and consistent with overall plan objectives and long term industry planning and investment needs.

Fishing management actions that have been implemented subsequent to Amendment 8 include Amendments 9, 10, 11, 12, and 13. Amendment 9 (MAFMC 1996) was developed to revise the overfishing definitions in response to a scientific review by NMFS. Amendment 10 (MAFMC 1998) provided management measures for the small scale, traditional fishery for ocean quahogs off the northeast coast of Maine which had been operating as an experimental fishery since 1990. Amendment 11 (NMFS 1998) was drafted to achieve consistency among Mid-Atlantic and New England FMPs on vessel replacement and update provisions, permit history transfer and splitting and renewal regulations for fishing vessels issued Northeast Limited Access Federal Fishery permits. Amendment 12 (MAFMC 1998) was drafted to bring the FMP into compliance with the new National Standards and the 1996 Sustainable Fisheries Act (SFA). To comply with the National Standards, Amendment 12 included SC/OQ overfishing definitions (National Standard 1), the effects on fishing communities (National Standard 8), bycatch reduction (National Standard 9), and safety at sea (National Standard 10). Amendment 12 also identified EFH for surfclams and ocean quahogs. The Regional Administrator approved all measures in Amendment 12 except for the proposed overfishing definition for surfclams and the fishing gear impacts to EFH. Amendment 13 (MAFMC 2003) addressed the following five issues: 1) a new overfishing definition for surfclams, 2) analysis of fishing gear impacts on EFH, 3) the ability to adjust or suspend the minimum surfclam size through a framework adjustment, 4) multi-year fishing quotas, and 5) inclusion of a vessel monitoring system, when such a system is economically viable.

In June 2005, the FDA requested the NMFS to close an area of Federal waters off the coasts of New Hampshire and Massachusetts (Northern and Southern Temporary PSP Closure Areas -Figure 4.4-1), to fishing for bivalve shellfish intended for human consumption (FDA 2005), due to recurring red tide blooms from the dinoflagellate, *Alexandrium* sp. These red tide blooms have occurred every spring since 2005. These temporary closure areas are located West of the GB Closure Area. If portions of the GB Closure Area are re-opened to bivalve shellfish harvesting, prolonged annual closure of these inshore areas may increase the importance of fishing in the offshore area.

<u>Future Management Actions:</u>
Actions in the reasonably foreseeable future include the process of specifying commercial quotas for surfclams, ocean quahogs, Maine ocean quahogs, and continued suspension of the surfclam minimum size limit. In addition, the MAFMC recently implemented an Omnibus Amendment which amended each of the Council's FMPs to address the new requirements of the Magnuson-Stevens Reauthorization Act of 2006 (MSRA) for annual catch limits (ACLs) and accountability measures (AMs). This was Amendment 14 to the SC/OQ FMP. Amendment 15 is currently in development and will

consider the following three issues: 1) EFH update, 2) cost-recovery, 3) ocean quahog overfishing threshold. This amendment will include a revised analysis of the impacts of all fishing activities on the EFH of surfclams and ocean quahogs, and the impacts of hydraulic clam dredging on the EFH of other federally-managed species. This analysis will take into account the proposed expansion of the fishery into the GB closed area in the overall context of the entire fishery.

<u>Summary of Impacts for Other Fishing Actions:</u>
In general, past and present actions implemented by Amendments to the FMP have had positive impacts to target and non-target species because the objective stated in Amendment 8 to prevent overfishing has been achieved to date. The action with the most positive impact for all VECs was the migration to a system of ITQs, which allowed for the intensity of fishing effort to be distributed throughout the year, while still allowing for control of overall harvest. ITQs have also allowed fishermen to harvest efficiently. This system has also promoted safety at sea by eliminating derby-style fishing.

The northern and southern PSP Closed Areas that are in proximity to Alternatives A, B, C, and D have been in closed, in some form, since 2006. Because these closures were implemented as an emergency action, they are revisited on an annual basis. Therefore, should new data become available indicating that either area is safe for shellfish harvesting, the area may be considered for re-re-opening. Re-opening either one of these areas would provide a large area where SC/OQ could be harvested in the North, relieving stress off of southern populations.

Administrative actions such as those implemented in Amendments 9, 10, 11, and 12 have had essentially negligible impacts to the physical and biological environments, but had some low positive impacts to human communities. For example, transferring of allocations and permits, has allowed fishermen to retire deteriorating vessels or facilitate purchases and sales of vessels, and vessel upgrades. The actions in these amendments have had negligible impacts on protected resources since this fishery already is already designated a Category III fishery in the List of Fisheries. Amendment 13 has also had positive impacts for the target and non-target species from continuation of management measures which have prevented overfishing of these resources for the last two decades. The addition of EFH designations in Amendment 13 has had positive impacts to habitat because it added protection to the physical environment.

Other fishing activities such as scallop dredging and trawling, may have low negative impacts to the physical and biological environment of the GB Offshore Closed Area due to additional fishing pressure and associated impacts to habitat and target/non-target species. Although these two gears primarily affect habitat features at the sediment surface, whereas hydraulic dredges affect surface and sub-surface habitat quality, there could be a cumulative effect on benthic habitats in any area where two or more of them are used concurrently. An evaluation of the spatial distribution of bottom trawling and scallop dredging activity in the areas included in the three action alternatives in the EA indicates that fishing trips made by vessels using bottom trawls on GB during fishing year (FY) 2011 (May 1 2011 – April 30 2012) were reported within the Alternative A and

B areas along the northern and southern edges of the bank, primarily, along the perimeter of the Alternative B area in sand, gravel, and cobble substrates, and west of the western boundary of Closed Area 2, as shown in Figure 6.1-1. Scallop dredging activity in recent years has shifted south into the Mid-Atlantic region, but is expected to increase on GB in the near future in response to increasing scallop biomass (NEFMC 2009). Scallop dredge vessels are more likely to operate in the same areas where clam dredging occurs because both gears are designed for use in sandy bottom habitats, whereas bottom trawls are used in a greater variety of bottom types.

Future fishing actions will likely have continued positive impacts on the biological and physical environment because the Council will strive to maintain the same management objectives discussed in Amendment 8, but these future actions may have some low negative impacts on human communities if consolidation of shares is limited. Amendment 13 to the Northeast Multispecies FMP and Amendment 10 of the Atlantic Sea Scallop FMP established habitat closed areas which are off-limits to all mobile, bottom-tending gear which includes hydraulic clam dredges. These closures were designed to minimize the adverse effects of fishing on EFH for a range of species which includes those impacted by hydraulic clam dredges (Table 5.1-2). These closed habitat areas are currently up for revision under the Omnibus EFH Amendment and therefore may be changed or eliminated in the future.

<u>Non-Fishing Effects: Past, Present, and Reasonably Foreseeable Future Actions</u>
Non-fishing activities that occur in the marine nearshore and offshore environments and their watersheds can cause the loss or degradation of habitat and/or affect the species that reside in those areas. The following discussions of impacts are based on past assessments of activities and assume these activities will likely continue into the future as projects are proposed. More detailed information about these and other activities and their impacts are available in the publications by Hansen (2003) and Johnson et al. (2008).

Construction/Development Activities and Projects: Construction and development activities include, but are not limited to, point source pollution, agricultural and urban runoff, land (roads, shoreline development, wetland loss) and water-based (beach nourishment, piers, jetties) coastal development, marine transportation (port maintenance, shipping, marinas), marine mining, dredging and disposal of dredged material and energy-related facilities, all of which are discussed in detail in Johnson et al. (2008). These activities can introduce pollutants (through point and non-point sources), cause changes in water quality (temperature, salinity, dissolved oxygen, suspended solids), modify the physical characteristics of a habitat or remove/replace the habitat altogether. Many of these impacts have occurred in the past and present and their effects would likely continue in the reasonably foreseeable future. It is likely that these projects would have negative impacts caused from disturbance, construction, and operational activities in the area immediately around the affected project area. However, given the wide distribution of the affected species, minor overall negative effects to offshore habitat, protected resources, target species, and non- target species and bycatch are anticipated since the affected areas are localized to the project sites, which involve a small percentage of the fish populations and their habitat. Thus, these activities for most biological VECs would likely have an overall low negative effect due to limited exposure to the population or habitat as a whole. Any impacts to inshore water quality from these permitted projects, including impacts to planktonic, juvenile, and adult life stages, are uncertain but likely minor due to the transient and limited exposure. It should be noted that wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the target species, non- target species and bycatch, and protected resources.

Similar to the discussion above on non-fishing impacts to fish habitat, generally the closer the proximity of species to the coast, the greater the potential for impact (although predation, a non-fishing impact, would be one threat that would occur everywhere). However, the proposed action would be offshore where impacts from construction/development activities would likely be low because the localized nature of the activities would minimize exposure to organisms in the immediate area.

These projects are permitted by other Federal and state agencies that conduct examinations of potential biological, socioeconomic, and habitat impacts. In addition to guidelines mandated by the Magnuson-Stevens Act, and the Fish and Wildlife Coordination Act, NMFS, the Councils, and the other federal and state regulatory agencies review these projects through a process required by the Clean Water Act; Rivers and Harbors Act; and the Marine Protection, Research, and Sanctuaries Act for certain activities that are regulated by Federal, state, and local authorities. These reviews limit and often mitigate the impact of these projects. The jurisdiction of these authorities is in the "waters of the U.S." and ranges from inland riverine to marine habitats offshore in the EEZ.

Restoration Projects: Other regional projects that are restorative or beneficial in nature include estuarine wetland restoration; offshore artificial reef creation, which provides structure and habitat for many aquatic species; and eelgrass (*Zostera marina*) restoration, which provides habitat for marine life. Due to past and present adverse impacts from human activities on these types of habitat, restorative projects likely have slightly positive effects at the local level.

Protected Resources Rules: The NMFS final Rule on Ship Strike Reduction Measures (73 FR 60173, October 10, 2008) is a non-fishing action in the United States-controlled North Atlantic that is likely to affect endangered species and protected resources. The goal of this rule is to significantly reduce the threat of ship strikes on North Atlantic right whales and other whale species in the region. Ship strikes are considered the main threat to North Atlantic right whales; therefore, NMFS anticipates this regulation will result in population improvements to this critically endangered species.

Energy Projects: Although only two offshore wind energy projects have formally been proposed in the northeast region, at least 20 other separate projects may be proposed in the near future. Cape Wind Associates (CWA) proposes to construct a wind farm on Horseshoe Shoal, located between Cape Cod and Nantucket in Nantucket Sound, Massachusetts. A second project is proposed by the Long Island Power Authority (LIPA) off of Long Island, New York. The CWA project would have 130 wind turbines located as close as 4.1 miles offshore of Cape Cod in an area of approximately 24 square miles, with the turbines being placed at a minimum of 1/3 mile apart. The turbines will be interconnected by cables, which will relay the energy to shore to the power grid. If approved, vessels from southern New England may experience an increase in costs associated with having to steam around the wind farms on their way to and from fishing grounds on Georges Bank.

The Army Corps of Engineers has developed a DEIS and has completed a scoping process for the proposed Cape Wind Associates (CWA) project on Horseshoe Shoal. If constructed, the turbines would preempt other bottom uses in an area similar to oil and natural gas leases. The potential impacts associated with the CWA offshore wind energy project include the construction, operation and removal of turbine platforms and transmission cables; thermal and vibration impacts; and changes to species assemblages within the area from the introduction of vertical structures. A thorough analysis of the effects of these impacts on fishing has not yet been conducted, but data indicate that there would not be a substantial impact on the surfclam ocean quahog fishery as there is little surfclam and ocean quahog fishing activity in this area. While EFH may be adversely impacted in the vicinity of the wind turbines, the extent of this proposal is not sufficient to have any population-level impacts on resource biomass or health.

Other offshore projects that can affect VECs include the construction of offshore liquefied natural gas (LNG) facilities such as the project "Neptune." The first phase of this project construction was completed in September 2008, which includes the installation of a 13-mile subsea pipeline. The second phase will connect the new pipeline to an existing pipeline network called HubLine east of Marblehead, Massachusetts, and will install the two off-loading buoys 10 miles off the coast of Gloucester, Massachusetts. Upon completion, the LNG facility will consist of an unloading buoy system where specially designed vessels will moor and offload their natural gas into a pipeline, which will deliver the product to customers in Massachusetts and throughout New England. The Neptune project is expected to have small, localized impacts where the pipelines and buoy anchors contact the bottom.

Summary of Impacts from Non-Fishing Actions:

The impacts of most of these actions are localized and although considered negative at the site, they have an overall low negative or negligible effect on each VEC due to limited exposure of action to the population or habitat as a whole. Restoration activities and the ship strike rule are exceptions to this rule. Restoration activities result in positive impacts to the physical habitat, and both restoration activities and the ship strike rule result in positive impacts to aspects of the biological environment. In general, however, all of these non-fishing actions would have negligible impacts to the VECs related to the GB Offshore Area, because of the distance from these on- or near-shore activities and the localized impacts they present.

Table 6.6-2. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the Five VECs.						
Action	**Description**	**Impacts on Managed Resource**	**Impacts on Non-target Species**	**Impacts on Habitat and EFH**	**Impacts on Protected Species**	**Impacts on Human Communities**
P, Pr Original FMP and subsequent Amendments and Frameworks to the FMP	Establish commercial management measures	**Direct Positive** Regulatory tool available to manage stocks	**Indirect Positive** Limited fishing effort and reduced race to fish	**Indirect Positive** Limited fishing effort and reduced race to fish	**Indirect Positive** Limited fishing effort and reduced race to fish	**Direct Positive** Benefitted domestic businesses
P, Pr Surfclam and Ocean Quahog Specifications	Establish annual quotas and minimum surfclam size regulations	**Indirect Positive** Regulatory tool to specify annual quotas and regulations; allows response to stock updates	**Indirect Positive** Limited fishing effort	**Indirect Positive** Limited fishing effort	**Indirect Positive** Limited fishing effort	**Indirect Positive** Benefitted domestic businesses
P, Pr, RFF PSP Closed Areas	Rere-opening of PSP Closed Areas to Clam fishing	**Direct Positive** More surfclams and ocean quahogs will be available	**Indirect Positive** Reduced overall fishing effort	**Indirect Positive** Reduced overall fishing effort	**Indirect Positive** Reduced overall fishing effort	**Indirect Positive** Benefitted domestic businesses
P, Pr Amendment 15 to the FMP	Cost recovery, EFH update, and ocean quahog overfishing threshold	**Neutral** Will not affect distribution of effort	**Neutral** Will not affect distribution of effort	**Neutral** Will not affect distribution of effort	**Neutral** Will not affect distribution of effort	**Direct Negative** Will impose additional costs on industry
P, Pr, RFF Agricultural runoff	Nutrients applied to agricultural land are introduced into aquatic systems	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource
P, Pr, RFF Port maintenance	Dredging of coastal port and harbor areas for port maintenance	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects

Table 6.6-2 (Continued). Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the Five VECs.						
Action	**Description**	**Impacts on Managed Resource**	**Impacts on Non-target Species**	**Impacts on Habitat and EFH**	**Impacts on Protected Species**	**Impacts on Human Communities**
[P, Pr, RFF] Offshore disposal of dredged materials	Disposal of dredged materials	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource
[P, Pr, RFF] Beach nourishment	Offshore mining of sand for beaches and placement of sand to nourish beach shorelines	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Mixed** Positive for mining companies, negative for fishing industry and beachgoers like sand
[P, Pr, RFF] Marine transportation	Expansion of port facilities, vessel operations and recreational marinas	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Mixed** Positive for some interests, potential displacement for others
[P, Pr, RFF] Installation of pipelines, utility lines and cables	Transportation of oil, gas and energy through pipelines, utility lines and cables	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Potentially Direct Negative** Reduced habitat quality	**Uncertain – Likely Direct Negative** Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects

Table 6.6-2 (Continued). Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the Five VECs.						
Action	**Description**	**Impacts on Managed Resource**	**Impacts on Non-target Species**	**Impacts on Habitat and EFH**	**Impacts on Protected Species**	**Impacts on Human Communities**
RFF Offshore Wind Energy Facilities (within 5 years)	Construction of wind turbines to harness electrical power (several facilities proposed from ME through NC	**Uncertain -- Likely Indirect Negative** Dependent on mitigation effects	**Uncertain -- Likely Indirect Negative** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Uncertain -- Likely Indirect Negative** Dependent on mitigation effects	**Uncertain -- Likely Mixed** Dependent on mitigation effects
RFF Liquified Natural Gas (LNG) terminals (within 5 years)	Transportation of natural gas via tanker to terminals located offshore and onshore (several LNG terminals are propose, including RI, NY, NJ and DE	**Uncertain -- Likely Indirect Negative** Dependent on mitigation effects	**Uncertain -- Likely Indirect Negative** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Uncertain -- Likely Indirect Negative** Dependent on mitigation effects	**Uncertain -- Likely Mixed** Dependent on mitigation effects
RFF NMFS Protected Resources Ship Strike Rule	Recommend measures to reduce mortality and injury to whales from ship strikes	**Direct Positive** Will reduce mortality and injury to whales from ship strikes	**Uncertain – Likely Mixed** Dependent on changes in whale populations	**Neutral** Will not affect habitat	**Direct Positive** Will reduce mortality and injury to whales from ship strikes and possible other protected species	**Uncertain – Likely mixed** Protect resource and could increase revenue from whale watching, but could cause burden for other vessels and ships

Table 6.6-2 Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the Five VECs.

Summary of Cumulative Effects

Since the direct and indirect impacts of Alternatives A, B, and C are predicted to be the same, the cumulative effects resulting from the implementation of either of these alternatives and the CEA Baseline are discussed by VEC in the following sections.

Physical Environment/Habitat/EFH:
Since quotas are not increasing as a result of this action, it is anticipated that the total area swept by hydraulic clam dredges would be no more than the current area that is estimated to be swept in the current extent of the fishery. However, clam dredges would have a negative impact on benthic habitats in localized areas within the GB PSP Closure Area that have not been subject to clam dredging for almost 20 year. The direct and indirect adverse impacts on the physical environment associated with Alternatives A, B, and C would, however, be temporary since affected habitat features in the highly energetic environment on GB would be expected to recover fairly rapidly from the disturbance caused by dredging. Either action alternative would expand the geographic range of the fishery – even if the total area swept remains the same – and re-open up previously unexploited areas on GB to clam dredging. Therefore, there would be an overall low negative impact of the fishery on the EFH of a number of federally-managed species, but it would be minimal and/or temporary for the reasons given above.

Other past and present fishing actions have had impacts ranging from negligible to positive, but overall impacts have been low positive due to the establishment of EFH and the switch to an ITQ management system which has allowed for distribution of fishing effort throughout the year, and consequently a decline in fishing intensity. Future management actions are likely to have negligible impacts. Non-fishing actions have had negligible impacts on the physical environment of the GB Closure Area. In summary, cumulative impacts from the proposed action, fishing actions, and non-fishing actions to the physical environment of the GB Closure Area range from negligible to negative.

Target Species:
Since there would be no change in quotas (i.e., there would be no increase in harvesting permitted) and it is not expected that long term overall harvest levels will increase, the implementation of Alternatives A, B, or C would have negligible impacts to the SC/OQ species. Other past and present fishing actions have had impacts ranging from negligible to positive, but overall management measures have had a cumulative positive impact on these species as overfishing has not occurred. Future fishing actions would likely continue this trend of managing the resource in a sustainable manner, in accordance with the management objectives presented in Amendment 8. Non-fishing actions have had negligible impacts on the target species. In summary, cumulative impacts from the proposed action, fishing actions, and non-fishing actions to the target species of the GB Closure Area are low positive.

Non-Target Species and Bycatch:
As discussed in Section 5.3, the SC/OQ fisheries are very "clean" in terms of the efficiency with which the dredges select and capture target species over non-target and

bycatch species. Since there would be no increase in harvesting permitted, the implementation of Alternatives A, B, or C would have negligible impacts to the non-target and bycatch species. Other past, present, and future fishing actions have had negligible impacts on non-target and bycatch species. Non-fishing actions have had negligible impacts on the non-target and bycatch species. In summary, cumulative impacts from the proposed action, fishing actions, and non-fishing actions to the non-target and bycatch species of the GB Closure Area are negligible.

Protected Resources:
As discussed in Section 5.4, the SC/OQ fisheries are considered to be Category III fisheries on the List of Fisheries, meaning that takes of protected resources are minimal. Since there would be no increase in harvesting permitted, overall fishing effort would remain the same, and the implementation of Alternatives A, B, or C would result in negligible impacts to protected resources. Other past, present, and future fishing actions have had negligible impacts on protected resources. Non-fishing actions have had negligible impacts on protected resources. In summary, cumulative impacts from the proposed action, fishing actions, and non-fishing actions to protected resources of the GB Closure Area are negligible.

Human Communities:
As discussed in Section 5.5, re-opening a portion of the GB Offshore Closed Area would result in a temporary increase in the LPUE, thereby resulting in greater revenues for fishery participants in the short term. Because the quota is not changing as a result of this action, revenues for ports are not necessarily going to increase, therefore impacts from Alternatives A, B, or C are expected to be negligible for ports, but positive for participants. Harvesting SC/OQ from any re-open area presents a low potential risk that shellfish contaminated with saxitoxins may reach the marketplace. However, based upon the various FDA and state testing protocols with which the proposed action will be subjected, as well as the fact that the proposed action will not increase the number of SC/OQ harvested, the impact of the proposed action on public health is considered to be negligible. Other past, present, and future fishing actions have had impacts ranging from negligible to positive for participants and ports, and negligible impacts to public health. Non-fishing actions have had negligible impacts on human communities. In summary, cumulative impacts from the proposed action, fishing actions, and non-fishing actions to fishery participants would be positive, to ports impacts and public health would be negligible.

Conclusion: In conclusion, the summary of impacts from Alternatives A, B, or C and the CEA Baseline would be negligible on habitat, non-target species and bycatch, protected resources, and ports; low positive to target species and fishery participants; and low negative to public health. These impacts would not be significant due to the reasons stated in this assessment.

7.0 APPLICABLE LAWS

7.1 National Environmental Policy Act (NEPA)

Finding of No Significant Impact (FONSI)
This section is subject to further evaluation/consideration, including public comment, and will be addressed in the final version of this document.

7.2 Magnuson-Stevens Fishery Conservation Management Act

Pursuant to section 304(b)(1)(A) of the Magnuson-Stevens Act, the proposed action is consistent with the Surfclam and Ocean Quahog FMP, other provisions of the Magnuson-Stevens Act, and other applicable law, subject to further consideration after public comment.

Essential Fish Habitat Assessment

Description of Action
The proposed action would re-open an area of 6,381 square miles (16,519 square kilometers) within the Georges Bank PSP Closure Area to the harvesting of surfclams and ocean quahogs, subject to a request from the MAFMC. Any or all portions of this area would be subject to seasonal or annual PSP re-openings or closings based on action taken by NMFS or a recommendation from the FDA.

Potential Adverse Effects of the Action on EFH
The area that is proposed to be re-opened has been designated EFH for a number of federally-managed species. Because the area has been closed to the harvesting of these two species of clams since 1990, the use of hydraulic clam dredges by commercial fishing vessels would expose benthic habitats to the adverse effects of this gear for the first time in 20 years. Hydraulic clam dredges adversely affect benthic habitats more severely than other types of fishing gear because they inject pressurized water 8-10 inches into sandy sediments to dislodge the clams, allowing them to be caught and brought to the surface. However, a large portion of this area is located in a relatively shallow (30-60 meters) part of GB that is highly disturbed by strong tidal currents and wave action from storms. Furthermore, published studies of the effects of hydraulic clam dredges in high-energy, sandy, habitats indicate that, in this type of environment, the affected physical and biological features of the seafloor can be expected to recover from the impacts of this gear within a matter of a few days or months. Therefore, the proposed action would have no more than a minimal or temporary adverse impact on EFH in the affected area. The effect throughout the entire range of the fishery, which includes the Mid-Atlantic region, is also expected to be minimal, since the proposed action would not increase the quantity of clams that can be harvested annually and, therefore, the total amount of bottom contact time by dredges would not increase.

Proposed Measures to Avoid, Minimize, or Mitigate Adverse Impacts of This Action
No such measures are required because the adverse impacts of this action are no more than minimal and not temporary in nature.

Conclusions

The proposed action would adversely impact EFH within the 6,381 square miles that would be re-opened to surfclam and ocean quahog harvesting, but because the area is subject to a high degree of natural disturbance and because any affected benthic habitat features are expected to recover within a few days or months, the impacts would be minimal and/or temporary and not require any mitigation.

7.3 Endangered Species Act

Section 7 of the ESA requires agencies conducting, authorizing, or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The impact of the proposed action on protected species is considered in Sections 5.4 and 6.4 of the EA. This action is not expected to have a direct or indirect impact on protected resources, including endangered or threatened species or their habitat.

7.4 Marine Mammal Protection Act

The impact of the proposed action on protected species is considered in Sections 5.4 and 6.4 of the EA. This action is not expected to have any direct or indirect impacts on marine mammals, is consistent with the provisions of the MMPA, and would not alter existing measures to protect the marine mammal-listed species that are likely to inhabit the management units of the subject fisheries.

7.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, provides measures for ensuring stability of productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals.

NMFS must determine whether the FMP or regulatory action will affect a state's coastal zone. If it will, the FMP must be evaluated relative to the state's approved CZM program to determine whether it is consistent to the maximum extent practicable. The states have 60 days in which to agree or disagree with NMFS evaluation. If a state fails to respond within 60 days, the state's agreement may be presumed. If a state disagrees, the issue may be resolved through negotiation or, if that fails, by the Secretary.

NMFS has determined that this action is consistent to the maximum extent practicable with the enforceable provisions of the approved coastal management programs as understood by NMFS. This determination will be submitted for review by the responsible state agencies under section 307 of the Coastal Zone Management Act. Letters will be sent to each of the following states within the management unit reviewing the consistency of the NMFS-proposed action relative to each state’s Coastal Zone Management Program: Maine; New Hampshire; Massachusetts; Rhode Island; Connecticut; New York; New Jersey; Pennsylvania; Delaware; Maryland; Virginia; and North Carolina. To request a copy of the letter or a list of the CZM contacts for each state, contact Jason Berthiaume at NOAA National Marine Fisheries Service, Northeast Region, Sustainable Fisheries Division, 55 Great Republic Drive, Gloucester, MA 01930, Telephone: (978) 281-9177, Fax: (978) 281-9135.

7.6 Administrative Procedure Act

Section 553 of the Administrative Procedure Act establishes procedural requirements applicable to informal rulemaking by Federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process, and to give the public adequate opportunity for comment. At this time, NMFS is not requesting any abridgement of the rulemaking process for this action. The public will have an opportunity to comment on this action once NMFS publishes a request for comments notice in the Federal Register (FR).

7.7 Section 515 (Information Quality Act)

Pursuant to NOAA guidelines implementing section 515 of Public Law 106-554 (the Information Quality Act), all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of the information (including statistical information) disseminated by or for Federal agencies. The following sections address these requirements.

Utility of Information Product

The information presented in this document is helpful to the intended users (the affected public) by presenting a clear description of the purpose and need of the proposed action, the measures proposed and the impacts of those measures. A discussion of the reasons for selecting the proposed action is included so that intended users may have a full understanding of the proposed action and its implications.

The proposed rule informs the public that NMFS proposes a change in the regulations that would re-open a portion of the GB Closed Area to the harvest of surfclams and ocean quahogs for human consumption under the terms of the testing protocol. This proposed action is being developed in response to a request from the MAFMC.

Until a proposed rule is published, this document is the principle means by which the information pertaining to this action will be made available to the public. The information provided in the proposed rule is based on the most recent information available from relevant data sources. The information contained in this document and includes detailed and relatively recent information on the surfclam and ocean quahog resource and, therefore, represents an improvement over previously available information. The information product will be subject to public comment through proposed rulemaking, as required under the Administrative Procedure Act and, therefore, may be improved based on comments received.

The proposed rule prepared for this action is available in several formats, including printed publication, and online through the Northeast Regional Office web page (www.nero.noaa.gov). The Federal Register notice announces that the proposed rule will be made available in printed publication, on the website for the Northeast Regional Office (www.nero.noaa.gov), and through the Regulations.gov website.

Integrity of Information Product

Prior to dissemination, information associated with this action, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information.

The information product meets the standards for integrity under the following types of documents:

Other/Discussion (e.g., Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.)

Objectivity of Information Product

The category of information product that applies for this product is "Natural Resource Plans."

The proposed rule, adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat Guidelines; the National Standards Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act.

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Several sources of data were used in the development of the regulatory amendment. The data sources included, but are not limited to, surfclam and ocean quahog logbook reports and commercial dealer databases, and Northeast Fisheries Science Center (NEFSC) and Council prepared documents. In addition to these sources, additional information is presented that has been accepted and published in peer-reviewed journals or scientific organizations.

The management measures proposed for this action were selected based upon the best scientific information available. The analysis conducted used information from the most recent fishing years through 2011. Specialists who worked with the data are familiar with the available data and information relevant to the SC/OQ fishery.

The policy choices are clearly articulated in the proposed rule and all supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency.

The review process used in preparation of this document involves the NEFSC, the Northeast Regional Office (NERO), and NMFS Headquarters. The Center's technical review is conducted by senior level scientist with specialties in population dynamics, stock assessment methods, demersal resources, population biology, and the social sciences. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of any proposed regulatory action, including any implementing regulations, is conducted by staff at NMFS Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

7.8 Paperwork Reduction Act

The purpose of the PRA is to control and, to the extent possible, minimize the paperwork burden for individuals, small businesses, nonprofit institutions, and other persons resulting from the collection of information by or for the Federal Government. The authority to manage information and recordkeeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications. This regulatory amendment may contain provisions subject to the PRA, including:

- Additional vessel monitoring system or notification requirements
- Submission of application for a letter of authorization
- Completion and submission of materials as required under the terms of the protocol

7.9 Impacts of the Plan Relative to Federalism/Executive Order (E.O.) 13132

This specifications document does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under E.O. 13132.

7.10 E.O. 13158 (Marine Protected Areas)

The Executive Order on Marine Protected Areas (MPA) requires each Federal agency whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions, and, to the extent permitted by law and to the maximum extent practicable, in taking such actions, avoid harm to the natural and cultural resources that are protected by and MPA. The E.O. directs Federal agencies to refer to the MPAs identified in a list of MPAs that meet the definition of MPA for the purpose of the Order. The E.O. requires that the Department of Commerce and the Interior jointly publish and maintain such a list of MPAs. As of the date of submission of this document, the list of MPA sites has not been developed by the departments. No further guidance related to this E.O. is available at this time.

7.11 Environmental Justice/E.O. 12898

This E.O. provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." E.O. 12898 directs each Federal agency to analyze the environmental effects, including human health, economic, and social effects of Federal actions on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA. Agencies are further directed to "identify potential effects and mitigation measures in consultation with affected communities, and improve the accessibility of meetings, crucial documents, and notices."

Due to data constraints, the means for conducting this analysis in detail are not available at this time. It is unknown if any of the participants in the surfclam and ocean quahog fishery come from lower income and/or ethnic minority populations. Nonetheless, because the management of the SC/OQ fishery is managed under an Individual Transfer Quota (ITQ) and this action would not increase the quota, the proposed action is not expected to affect the participants in a negative social or economic manner. This action would increase the fishing grounds available to the fleet, resulting in a positive impact on fishing communities. This action would cause fishing efforts to shift North, but is not expected to have a significant impact to the fleet or processors (Section 6.5).

7.12 E.O. 12866

Background

In compliance with Executive Order (E.O.) 12866, NOAA's National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions or for significant policy changes that are of public interest. E.O. 12866 was signed on September 30, 1993, and established guidelines for Federal agencies promulgating new regulations and reviewing existing regulations.

An RIR is a required component of the process of preparing and reviewing FMPs or amendments and provides a comprehensive review of the economic impacts associated with the proposed regulatory action. An RIR addresses many of the concerns posed by the regulatory philosophy and principles of E.O. 12866. An RIR also serves as the basis for assessing whether or not any proposed regulation is a "significant regulatory action" under criteria specified in E.O. 12866. According to the "Guidelines for Economic Analyses of Fishery Management Actions," published by NMFS in August 2000, an RIR must include the following elements: (1) A description of the management objectives of the regulatory action; (2) a description of the fishery affected by the regulatory action; (3) a statement of the problem the regulatory action is intended to address; (4) a description of each selected alternative, including the "no action" alternative; and (5) an economic analysis of the expected effects of each selected alternative relative to the baseline.

The MAFMC has managed the SC/OQ fishery since the implementation of the first FMP on November 25, 1977. The FMP established quotas; effort limitations; permit and logbook provision; and placed a moratorium on the surfclam fishery. The SC/OQ has been amended several times since the original FMP. Amendment 8, approved by NMFS on March 23, 1990, was one of the most significant amendments because it replaced the allowable fishing time system with ITQs. The objective to implementing ITQs were to improve conservation and management of the SC/OQ resources, provide the opportunity for the industry to operate efficiently and consistent with the conservation efforts, and build a management system that would meet the objectives and long-term goals of the plan. The fishery continues to operate under the ITQ system and Section 5.5 of the EA presents a detailed description of the past and current participation in the SC/OQ fishery.

Statement of the Problem and Management Objectives of the Regulatory Action
The SC/OQ range extends to the GB, however, the GB area, known as the GB Closed Area, as defined in Section 4.4 of the EA has been closed to the harvest of SC/OQ since 1990. The closure was implemented as an emergency action at the request of the FDA, in response to samples of surfclams that tested positive for the toxin (saxitoxins) known to cause PSP. The toxins are produced by the alga, *Alexandrium fundyense*, which can form blooms known as red tides. The red tides, also known as harmful algal blooms (HABs), can produce toxins that accumulate in filter-feeding shellfish. The contaminated shellfish, if eaten in large enough quantity could cause illness or death from PSP. Due to the inability of the FDA to monitor the GB Closed Area for PSP toxins, the closure was made permanent during the implementation of Amendment 12 to the SC/OQ FMP in 1999.

The management objective of the regulatory action is to consider re-opening a portion of the GB Closed Area. The area proposed to be re-opened is listed in Section 4.1 and Section 4.4-1 of the EA. NMFS is implementing this action in response to a request from the MAFMC. Recent testing of clams on GB by the FDA in cooperation with the NMFS and the fishing industry under the EFP demonstrated that PSP toxin levels were well below the regulatory limit established for public health safety (FDA 2010).

Description of the Affected Fishery

A complete description of the ports and communities affected by this action is found under Section 6.5 of the EA.

Description of the Alternatives

<u>Alternative A – Re-open Historic EFP Exemption Area</u>

Alternative A would re-open the section of the GB Closed Area that is defined under a previous EFP that was issued by NMFS. This area is defined in Section 4.1 and shown in Figure 4.4-1 of the EA and encompasses approximately 6,378 square miles. The EFP authorized one vessel to participate in a Shellfish Harvesting Pilot Project to test the efficacy of the sampling protocol that was developed by state and Federal regulatory agencies to test for presence of saxitoxins in shellfish, and which has been in a trial period through previous EFPs since 2006.

<u>Alternative B – Re-open Current EFP Exemption Area</u>

Alternative B would re-open the section of the GB Closed Area that is defined under an EFP that was recently issued by NMFS. This area is defined in Section 4.2 and shown in Figure 4.4-1 of the EA and encompassed approximately 2,381 square miles. The EFP authorizes three vessels to participate in a shellfish harvesting to continue to test the approved protocol and to collect samples from a wider area.

<u>Alternative C – Re-open Cultivator Shoal Area</u>

Alternative C would re-open a portion of the GB Closed Area to the harvest of SC/OQ that the FDA previously determined to be safe for human consumption. The area encompasses 447 square miles (see Section 4.3, and Figure 4.4-1).

<u>Alternative D – Status Quo/No Action</u>

Alternative D is a no action alternative and the entire GB Closed Area would remain closed to the harvest of SC/OQ.

Expected Economic Effects of the Alternatives

Alternatives A, B, and C would not have an adverse impact on the economy all alternatives would provide a larger area re-open to the harvest of SC/OQ. In addition, SC/OQs are managed under an ITQ, and this action does not change the quota. Furthermore, the amount of SC/OQ harvested is largely driven by market demand. The entire allocated quota available for surfclams has not been harvested since 2001 and the available quota available for ocean quahogs came close to being fully harvested in 1997 (99 percent) (Table 6.5 4). In FY 2011, the quota harvested for SC/OQ was the lowest to date, 71 percent and 52 percent, respectively. This is another indicator that the harvest of SC/OQ is market limited. Overall, Alternatives A, B, and C would provide a positive economic impacts due to increased area and target species biomass available to harvest SC/OQ. Additionally, re-opening part of this area may decrease fishing pressure on the southern SC/OQ stocks that are experiencing localized depletions (Section 6.1).

If an area of the GB Closed Area is re-opened to the harvest of SC/OQ, due to health concerns associated with PSP, there is the potential that some states may not permit landings of SC/OQ from the GB area (Section 6.5). The majority of surf clams harvested in Federal waters are landed in New Jersey and trucked to Delaware for processing. New Jersey, however, has already authorized landings of clams harvested from the GB area through an EFP that was issued by NMFS. The EFP authorizes vessels to participate in a shellfish harvesting to continue to test the recently approved sampling protocol that was developed by state and Federal regulatory agencies to test for presence of saxitoxins in shellfish. Since New Jersey, Delaware, Massachusetts, and Maine have already authorized landings and processing of clams harvested from the GB Area, this action is not expected to have a significant impact on major landing ports and processing plants.

Alternative D is a no action alternative and the entire GB Closed Area would remain closed to the harvest of SC/OQ. Under this alternative, there would be no change in the area available to the harvest of SC/OQ, and no change in fishing effort; thus, Alternative D would have not have an economic impact as a result of this action.

Determination of Significance Under E.O. 12866

E.O. 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be significant. A "significant regulatory action" is one that is likely to: (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, safety, or state, local, or tribal Governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

A regulatory program is "economically significant" if it is likely to result in the effects described above. The RIR is designed to provide information to determine whether the proposed regulation is likely to be "economically significant."

NMFS has determined that, based on the information presented above, this action is expected to have an annual effect on the economy of $100 million. Because none of the factors defining "significant regulatory action" are triggered by this action, the action has been determined to be not significant for the purposes of E.O. 12866.

7.13 Regulatory Flexibility Act (RFA)

The purpose of the RFA is to reduce the impacts of burdensome regulations and recordkeeping requirements on small businesses. To achieve this goal, the RFA requires Federal agencies to describe and analyze the effects of proposed regulations, and possible alternatives, on small business entities. For the purpose of this action, NMFS has determined that this action would not have a significant economic impact on a substantial number of small entities and therefore an initial regulatory flexibility analysis is not required and none has been prepared. NMFS has submitted a request for certification under section 605(b) of the RFA. Factual basis for the certification is described below.

Objective and legal basis for the action

The purpose and need for this action is described in Section 3.0 of the EA. The regulations implementing the GB Closure Area (50 CFR 648.76(a)(4)) to the harvest of SC/OQ were implemented in response to the presence of PSP toxin levels and its associated health risks. NMFS is implementing this action in response to a request from the MAFMC. Under 50 CFR 648.76(c)(1) the RA has the authority to re-open or close an area due to PSP. When re-opening an area this also included the authority to impose additional harvesting restrictions. Since red tide events can vary inter-annually, NMFS will require the use of the now approved testing protocol for all trips into the area.

Description and estimate of the number of small entities to which the rule applies

The Small Business Administration (SBA) defines a small business in the commercial fishing and recreational fishing activity, as a firm with receipts (gross revenues) of up to $4.0 million. The SC/OQ fishery is managed under an Individual Transferable Quota (ITQ), where annual landings are allocated to the industry based on catch history and vessel size. The proposed measure would affect any vessel which actively fishes and holds a current federal surfclam/ocean quahog permit. In 2011 there were 46 non-Maine vessels that landed surfclams and/or ocean quahogs. All of these vessels fall within the definition of a small business.

Economic impacts to affected small businesses
The proposed action is not expected to have an adverse impact on small business. The action only proposes to re-open an area of water that has previously been closed. Since the area is farther offshore, it is likely that the larger vessels (>90 feet) would target the SC/OQ from the GB area. The SC/OQ fishery, however, is managed under an ITQ system, and since the quotas are not being changed, as a result of this action, there would be no net change in fishing effort, and participating vessels regardless of is size would still be able to fish in any of existing areas re-open to the harvest of SC/OQ. Those vessels that would fish in the area proposed to be re-opened would experience increased operational costs. These costs, however, may be offset due to increased productivity in effort because of greater abundance of SC/OQ in the GB Closed Area. In addition, given their high value, it is likely that surflcams would be targeted over ocean quahogs. Vessels that target ocean quahogs are generally larger because ocean quahogs are farther offshore and thus these vessels are likely to fish in the GB Area and are likely to target surfclams to offset the increase in operational costs (e.g., fuel and labor). Due to the seasonal variability of PSP toxin levels, it is likely that the any or all of the areas associated with this action may re-open or close based on PSP conditions. Given this uncertainty for the area to remain re-open, it is not anticipated that there would be an increase in participation in the fishery.

The Economic impacts associated with this action are discussed in more detail in section 6.5 of the EA.

Analysis of Significant Economic Impact

<u>Profitability</u>
The analysis presented in Section 6.5 of the EA indicates that the profitability of vessels would overall have a positive impact to the fleet. The proposed action would provide a larger area available to harvest SC/OQ. The biomass on the GB Closed Area represents 48 percent of the total biomass for surfclams and 45 percent of the total biomass for ocean quahogs, and re-opening a small portion of the GB Closed Area would provide some of this abundance to the SC/OQ fleet.

<u>Disproportionality</u>
There are no large businesses involved in the SC/OQ fishery. All vessels are considered to be small entities under the SBA approved size definition of “small entity”. Since the area is farther offshore, it is likely that the larger vessels would target the SC/OQ from the GB area. The SC/OQ fishery, however, is managed under an ITQ system, and since the quotas are not being changed, as a result of this action, there would be no net change in fishing effort, and participating vessels regardless of is size would still be able to fish in any of existing areas re-open to the harvest of SC/OQ. As well, the SC/OQ is largely

market limited, as the total quota available for SC/OQ in most years are not fully harvested (Table 6.5 4).

Substantial number criterion

All vessels that actively fish in the SC/OQ fishery will be affected by this rule. The large vessels of the total vessels engaged in the fishery will primarily be affected.

8.0 LIST OF PREPARERS AND PERSONS/AGENCIES CONSULTED

This document was prepared by the National Marine Fisheries Service staff in the Sustainable Fisheries Division (Jason Berthiaume), the Habitat Conservation Division (David Stevenson), the Northeast Fisheries Science Center (Geret Depiper) and the National Environmental Policy Group (Katherine Richardson). In addition, this document was reviewed by NMFS staff in the following divisions:

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ATTACHEMENT I

Section IV Guidance Documents Chapter II. Growing Areas .03 Example of Protocol for Onboard Screening and Dockside Testing for PSP in Closed Federal Waters

Protocol for the Landing of Shellfish from Federally Closed Waters due to PSP

When the harvest of molluscan shellfish is closed in Federal Waters due to Paralytic Shellfish Poison (PSP), exceptions to the prohibitions may be authorized provided the Authority in the State of landing in cooperation with appropriate Federal agencies shall develop agreements or memorandums of understanding between the Authority and individual shellfish harvesters or individual shellfish dealers. This guidance provides descriptions of the specific information to be included in the protocol.

A. Harvest Permit Requirements

   The Authority in the landing state will only allow the landing of shellfish from federal waters closed due to PSP from vessels in possession of an appropriate Exempted Fishing Permit (EFP) issued by the National Marine Fisheries Service (NMFS). The NMFS shall receive concurrence from the SSCA in the State of landing.

B. Training

   The Authority shall ensure that all shipboard persons conducting onboard sampling have been trained by a National Shellfish Sanitation Program (NSSP) Laboratory Evaluation Officer (LEO) or a US Food and Drug Administration (FDA) marine biotoxin expert to conduct onboard PSP screening using a NSSP recognized method(s).

C. Vessel Monitoring

   The Authority shall ensure that the harvesting location(s) of each landing vessel has been appropriately monitored. This requirement may be met by the vessel participating in the Federal Vessel Monitoring System (VMS).

D. Identification of Shellfish

   Prior to landing each vessel shall provide the Authority with a record identifying each lot of shellfish as follows: For each harvesting trip the Captain or Mate shall record the following information on a “Harvest Record.” Electronic logging of this information may be permitted provided it is made available to the authorized individual at dockside.

   1. Vessel name and Federal Fishing Permit number

   2. Name and telephone number of the vessel Captain and vessel owner

   3. Date(s) of harvest

   4. Number of lots and volume of catch per lot or number of containers per lot
   5. Location(s) of harvest (GPS coordinates or latitude/longitude coordinates in degrees:minutes:seconds)

6. Identification of each harvest lot, including cage tag numbers for surfclams and ocean quahogs, and container numbers or identification codes for other shellfish species.

7. Location (GPS coordinates or latitude/longitude coordinates in degrees:minutes:seconds) of each PSP screening sample

8. Results of each PSP screening test.

9. Destination(s) and purchaser(s) of each lot and amount of each lot to each destination

The Captain or Mate shall sign the "Harvest Record." The "Harvest Record" shall be checked by the individual authorized to sample the harvested shellfish. Failure to provide complete and accurate information will result in revocation or suspension of the NMFS EFP and rejection of the entire lot(s) of harvested shellfish. Four (4) copies of the "Harvest Record" shall be prepared. One (1) copy shall remain with the vessel, one (1) copy shall be provided to the SSCA in the state of landing, one (1) copy shall accompany the catch to the processing firm(s), and one (1) copy shall be retained by the laboratory authorized to conduct lot sample analyses.

CONTAINER LABELING:

Each container of shellfish shall be clearly labeled with the following NSSP required information at the time of harvest:

1. For surfclams and ocean quahogs existing NMFS tagging requirements

2. For all other molluscan shellfish (including Stimpson clams also known as Arctic surfclams) using Tyvek tags:

    a. Vessel name

    b. Type and quantity of shellfish

    c. Date of harvest

    d. Harvest lot area defined by GPS coordinates or latitude/longitude coordinates in degrees:minutes:seconds

E. Pre-Harvest Sampling

Prior to commercial harvesting of molluscan shellfish, a minimum of five (5) screening samples shall be collected within each area of intended harvest (lot area) and tested for PSP toxins in accordance with a NSSP recognized screening method. Each screening sample shall be collected during a separate and distinct gear tow. Screening sample tows shall be conducted in a manner that evenly distributes the five (5) samples throughout the intended harvest area for each area of intended harvest (see Section H.). Only shipboard officials trained in the use of the designated NSSP screening method may conduct these tests. Each of the five (5) samples must test negative for PSP toxins. A positive result from any one (1) sample shall render the "lot area" unacceptable for harvest. The harvest vessel captain shall immediately report all positive screening test results, by telephone, to the SSCA within the intended state of landing and the NMFS. The Captain should also notify other permitted harvest vessels of the positive screening test and advise them to avoid the questionable area. For each screening test, positive and negative, the remaining sample material (homogenate) shall be maintained under refrigeration for later use should the SSCA in the State of landing request confirmatory testing using a NSSP recognized test method.

Each screening sample shall be comprised of at least twelve (12) whole animals with the exception of mussels and "whole" or "roe-on" scallops. For mussels each sample shall be comprised of thirty (30) animals. For "whole" scallops each sample shall be comprised of twenty (20) scallop viscera and gonads. For "roe-on" scallops each sample shall be comprised of twenty (20) scallop gonads.

F. Submittal of Onboard Screening Homogenates and Test Results

All screening results shall be recorded on the "Harvest Record" as stipulated in Section D of this Protocol. Upon landing of the harvest vessel, the "Harvest Record" and screening homogenates shall be provided to the authority in the State of landing authorized to sample the harvested shellfish as described in Section G. of this Protocol.

G. Dockside Sampling

After dockside samples are collected, molluscan shellfish may be processed while awaiting PSP analytical results. Each lot must be identified and segregated during storage while awaiting dockside sample test results. Under no circumstances will product be released from the processor prior to receiving satisfactory paralytic shellfish toxin test results.

The dockside sampling protocol for molluscan shellfish shall be as follows:

1. For each lot of molluscan shellfish, a minimum of seven (7) composite samples, each comprised of at least twelve (12) whole animals, shall be taken at random by the individual authorized to sample, with the following exceptions:

    a. For each lot of mussels, a minimum of seven (7) composite samples, each comprised of at least thirty (30) whole animals, shall be taken at random by the individual authorized to sample.

    b. For each lot of "whole" scallops, a minimum of seven (7) composite samples, each comprised of twenty (20) scallop viscera and gonads, shall be taken at random by the individual authorized to sample.

    c. For each lot of "roe-on" scallops, a minimum of seven (7) composite samples, each comprised of twenty (20) scallop gonads, shall be taken at random by the individual authorized to sample.

2. Shellfish samples collected in accordance with G.1 shall be tested for the presence of paralytic shellfish toxins using NSSP recognized methods.

3. Laboratory test results for each lot of shellfish shall be forwarded to the SSCA in the state in which the shellfish is being held prior to the product being released by the SSCA.

H. Holding and Lot Separation

A harvest lot is defined as all molluscan shellfish harvested during a single period of uninterrupted harvest activity within a geographic area not to exceed three (3) square miles. Once harvesting has ceased and the harvest vessel moves to another location, regardless of the distance, a new harvest lot will be established. Any harvest vessel containing more than one lot shall clearly mark and segregate each lot while at sea, during off loading, and during transportation to a processing facility. Prior to harvesting in Federal waters, each harvest vessel shall submit to the NMFS a written onboard lot segregation plan. The SSCA in the intended state of landing and the FDA Regional Shellfish Specialist must approve the proposed lot segregation plan.

I. Disposal of Shellfish

If test results of any one (1) of the seven (7) samples collected in accordance with G.1 equal or exceed 80ug of paralytic shellfish toxins/100g of shellfish tissue (n=7, c=0), the entire lot must be discarded or destroyed at the cost of the harvester under the supervision of the SSCA in accordance with state laws and regulations except when:

> A lot of “whole” or “roe-on” scallops equals or exceeds 80ug paralytic shellfish toxins/100g of tissue, the adductor muscle may be shucked from the viscera and/or gonad and marketed. The remaining materials (viscera and/or gonad) must be discarded or destroyed under supervision of the SSCA in accordance with state laws and regulations.

Confirmatory PSP analyses shall be according to NSSP recognized methods and shall be conducted by laboratories certified in accordance with NSSP guidelines. Private laboratories may be used if certified by a Federal or state shellfish Laboratory Evaluation Officer (LEO) in accordance with NSSP guidelines.

J. Notification Prior to Unloading

Prior to the issuance of an EFP, the harvester shall be responsible for notifying the SSCA in the state of landing and in a manner approved by the SSCA that molluscan shellfish is being harvested for delivery to the intended receiving processor.

Each vessel shall give at least twelve (12) hours notice to the individual authorized to sample prior to unloading shellfish. Notice of less than twelve (12) hours may be approved by the authorized individual at his/her discretion. SSCAs may approve industry sampling and sample transport to the NSSP certified testing laboratory in accordance with the practices and procedures used by the SSCA under the NSSP. Such procedures may be approved by the SSCA only when sample collection and sample transport training is provided by the SSCA.

Shellfish from a federally closed harvest area must be kept separate and not sold until so authorized by the SSCA.
Failure to comply with the provisions of this Protocol will result in the suspension or revocation of the vessel’s EFP.

K. Unloading Schedule

Unloading shall take place between 7:00 A.M. and 5:00 P.M. Monday through Friday, unless otherwise mutually agreed upon by the individual authorized to sample, the processing plant manager, the harvest vessel captain, and the SSCA in the state of landing, sample testing, and processing.

L. Access for Dockside Sampling

Individuals authorized to sample shall be provided access to the catch of shellfish.

M. Record Keeping

Record keeping requirements shall be as follows:

1. The vessel shall maintain Harvest Records for at least one (1) year.
2. The processor(s) shall maintain Harvest Records for at least one (1) year or two (2) years if the product is frozen.
3. The SSCA in the State of landing shall retain Harvest Records for at least two (2) years.

N. Early Warning/Alert System

PSP sample data acquired as a result of onboard screening and dockside testing shall be transmitted to a central data register to be maintained by the FDA. These data, both screening and confirmatory, shall be transmitted to the FDA by the NSSP certified laboratory conducting PSP analyses of the sampled lot(s) within one week of the completion of the PSP analyses. The data provided shall include the following:

1. shellfish species

2. harvest location name and coordinates (GPS or latitude/longitude)

3. harvest date

4. onboard screening test method, date, and results

5. laboratory test date and test results

Results of all samples having acceptable levels of paralytic shellfish toxins (<80ug/100g) shall immediately be reported to the SSCA in the state of landing. If the results of any one (1) sample equal or exceed 80ug/100g the testing laboratory shall immediately notify the FDA Regional Shellfish Specialist, the SSCA, and the processor by telephone. The FDA shall notify the NMFS. The NMFS shall notify permitted harvesters to advise them to cease fishing in the affected area(s).

NOTE: Due to the resources necessary to meet the requirements of this Protocol, State Shellfish Control Authorities (SSCAs) may find it necessary to require industry to fund associated costs. These costs may include sample collection, screening, transportation, analysis, inspection, enforcement, and other related expenses.

ATTACHEMENT II

Endangered, Threatened and Protected Species

The list of protected species affected by the Surfclam/Ocean Quahog FMP is discussed in the FSEIS for Amendment 13. The following species are found in the alternative PSP closure areas and are listed under the Endangered Species Act of 1973 (ESA) as endangered or threatened under NMFS' jurisdiction. The list includes a number of species that are identified as protected under the Marine Mammal Protection Act of 1972 (MMPA).

Cetaceans	
Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella* spp.)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected
Seals	
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Harp seal (*Phoca groenlandica*)	Protected
Sea Turtles	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Fish	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic sturgeon (*Acipenser oxyrinchus*)	Endangered