

first place. In addition, education and language barriers will continue to limit the possibilities for retraining, despite other important skills that fishermen have acquired at sea. The declining status of today's economy exacerbates these problems.

5.7 Cumulative Effects

5.7.1 Definition of Cumulative Effects

The term "cumulative effects" is defined in the Council of Environmental Quality (CEQ) regulations in 40 CFR Part 1508.7 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 actions."

5.7.2 General Approach

Cumulative effects are described with respect to:

- (a) Communities – human communities engaged in the Northeast multispecies fishery;
- (b) Resource – all stocks of regulated multispecies and protected species; and
- (c) Habitat – benthic marine habitat, particularly Essential Fish Habitat (EFH).

Cumulative effects of gear use, non-fishing entities and actions, past management actions in the multispecies fishery, and the proposed alternatives in Amendment 13 (Fishery Administration, Capacity Reduction, Rebuilding, Recreational, and Habitat). Much of the cumulative effects discussion is derivative of the detailed Environmental Impacts sections in Amendment 13:

- Biological Impacts (Section 5.2) (including impacts on protected resources section 5.2.9)
- Habitat Impacts (Section 5.3)
- Economic Impacts (Section 5.4)
- Social Impacts (Section 5.6)

Additionally, the Affected Human Environment section (9.4) characterizes the multispecies fishery since Amendment 5 (1994), providing a baseline with which to compare predicted changes to the fishery and associated communities that will result from Amendment 13. Because of the lack of quantitative data on parameters that are potentially cumulative, a quantitative assessment of cumulative effects was not possible. Thus, the analyses that follow are qualitative in nature.

5.7.3 Summary of Non-fishing Impacts

Following is an assessment of non-fishing impacts on fish habitat and fishery resources. For fish habitat, non-fishing effects have been reviewed in the Essential Fish Habitat Amendment for Groundfish prepared by the New England Fishery Management Council (Amendment 11 to the Groundfish FMP, NEFMC 1998). Table 359 below, taken from that document, represents the review of the EFH Technical Team of the potential effects of numerous chemical, biological and physical effects to riverine, inshore and offshore fish habitats. Table 359 exhibits twelve representative classes of chemicals, three categories of biological and nineteen types of physical threats, which are categorized as low, moderate or high threats to habitat, based on their geographic location—riverine, inshore and offshore. In general, the closer the proximity to the coast, i.e., close to pollution sources and habitat alternations, the greater the potential for impact. Riverine and inshore habitats were generally categorized as moderate to high threats whereas the offshore areas were low to moderate. For the offshore area, with the exception of events such as oil spills and algae blooms, which can spread over large areas, moderate effects were generally localized to a well-defined and

relatively small impact area such as oil/gas mining and dredged material disposal. Thus, only small portions of fish stocks would potentially use these sparsely located areas and would be adversely affected. For example, dredged material disposal sites, usually about 1 nm² in size, are managed by the U.S. Army Corps of Engineers and the U.S. EPA to minimize physical effect to the defined disposal area and allow no chemical effects at the site based on stringent sediment testing.

THREATS	RIVERINE	INSHORE	OFFSHORE
Chemical			
oil	M	M	M
heavy metals	M	M	M
nutrients	H	H	L
pesticides	M	M	L
herbicides / fungicide	M	M	L
acid	H	M	
chlorine	M	M	
thermal	M	M	
metabolic & food wastes	M	M	
suspended particles	M	M	L
radioactive wastes	L	M	M
greenhouse gases	M	M	M
Biological			
nonindigenous / reared species	M	M	M
nuisance / toxic algae	M	H	M
pathogens	M	M	M
Physical			
channel dredge	M	H	
dredge and fill	H	H	
marina / dock construction	M	H	
vessel activity	M	H	L
erosion control			
bulkheads	M	M	
seawalls		M	
jetties		M	
groins		M	
tidal restriction	M	H	
dam construction / operation	H	M	
water diversion			
water withdrawal	H	M	
irrigation	M	M	
deforestation	H	M	
mining			
gravel/mineral mining	M	M	M
oil/gas mining	L	M	M
peat mining	L		
debris	M	M	M
dredged material disposal	L	M	M
artificial reefs	L	M	M

Table 359 - Potential non-fishing threats to fish habitat in the New England region prioritized within regions (H = high; M = moderate; L = low)²

¹ From NEFMC (1998)

² Prioritization developed by compilation of *EFH Technical Team* survey

For fishery resources, there are several non-fishing threats that could have a direct and/or indirect impact on the groundfish stocks. Several of the items identified as non-fishing threats to fish habitat, identified in Table 359, could also pose a threat to groundfish stocks, such as the oil spills, pesticides, and radioactive wastes. Similar to the discussion above on non-fishing impacts to fish habitat, generally the closer the proximity of groundfish stocks to the coast, the greater the potential for impact (although predation, a non-fishing impact, would be one threat that would occur everywhere). Many groundfish species reside in both inshore and offshore areas at different stages of their lives and during different seasons throughout the year. However, some stocks, such as SNE winter flounder, live out a large portion of their lives closer to shore and, therefore, may likely be impacted by inshore threats to a greater degree than some of the other groundfish species. In the offshore areas, such effects would likely be low because the localized nature of the effects would minimize exposure to organisms in the immediate area.

An additional inshore threat of note would be the effect on fishery resources presented by power plants. The operations of power plants are thought to be especially of consequence to fish eggs, larvae and juveniles. Entrainment, or intake of cooling seawater for the purposes of cooling power plant reactors, is known to draw in eggs and larvae and, therefore, could have a negative impact on groundfish resources that spawn in areas in close proximity to active power plants. An additional threat associated with power is the discharge of warm. This thermal discharge is believed to have a negative impact on reproduction capability and recruitment of affected fishery resources.

Although still speculative at this time, foreseeable future non-fishing threats to fishery resources could include global warming and the effects that this may have on water temperature. The impacts to the fish stocks are not certain and therefore could not be incorporated into this assessment. The possibility of windmill construction in marine waters for the purposes of harnessing alternative means of energy could also have an impact on fishery resources, especially as it relates to disruption of habitat. This is the subject of a forthcoming EIS being prepared by the Army Corps of Engineers. The impacts of this project to the fisheries are yet to be determined.

5.7.4 Summary of Fishing Gear Effects on EFH

The effects of mobile bottom-tending gear (trawls and dredges) on fish habitat have been recently reviewed by the National Research Council (NRC 2002). This study determined that repeated use of trawls/dredges reduce the bottom habitat complexity by the loss of erect and sessile epifauna, smoothing sedimentary bedforms and bottom roughness. This activity, when repeated over a long term also results in discernable changes in benthic communities, which involve a shift from larger bodied long-lived benthic organisms for smaller shorter-lived ones. This shift also can result in loss of benthic productivity and thus biomass available for fish predators. Thus, such changes in bottom structure and loss of productivity can reduce the value of the bottom habitat for demersal fish. These effects varied with sediment type with lower level of impact to sandy communities, where there is a high natural dynamic nature to these bedforms, to a high degree of impact to hardbottom areas such as bedrock, cobble and coarse gravel, where the substrate and attached epifauna are more stable. In the Northwest Atlantic, the more valued groundfish habitat is located in areas where there is a high percentage of gravel and cobble (NREFHSC 2002).

Use of trawls and dredges are common in inshore and offshore areas and somewhat less common in riverine areas. Section 9.3.1.2 of this document discusses the numerous types of gear used in estuarine and offshore habitats. This section indicates that mobile bottom-tending gears are commonly used in most inshore and offshore habitats. In the Northeast, otter trawls are used to prosecute most MSA managed fisheries including: Northeast Multispecies; Sea scallops; Monkfish; Mackerel, squid and butterfish; Summer flounder, scup and black seabass; Bluefish; and Spiny dogfish. Scallop dredges are used in the Sea scallop fishery and hydraulic clam dredges are used in the Surf clam and Ocean quahogs fisheries. Smaller trawls are used in inshore areas and lower estuaries, which are managed by states and not subject to the MSA. In addition, some states allow smaller dredges are used for harvesting oysters, bay scallops, sea urchins,

quahogs, and mussels. Hydraulic dredging for softshell clams and bottom trawling for shrimp is also accomplished in certain nearshore and riverine habitats.

It is assumed for this analysis that the effects of gear are generally moderate to high in the riverine, inshore and offshore areas, depending upon the type of bottom and the frequency of fishing.

5.7.5 Summary of Existing Threats to Protected Resources:

Table 360 summarizes the past and current threats for these species as described in Section 9.2.2 and the Biological Opinion (NMFS 2001). It should be noted that all these species have a special status because of threats to their continued sustainability. Six of the large whale species (Right, Humpback, Fin, Sei, Blue and Sperm) and three sea turtles (Leatherback, Kemps' Ridley and Green) are listed as endangered under the Endangered Species Act. The Loggerhead is listed as threatened while two other species, Harbor Porpoise, Barndoor Skate, are candidates for listing. The remaining mammal species are protected under the Marine Mammal Protection Act. The Right Whale continues to be at the highest risk for extinction because of its low numbers and low reproductive rates.

For the Right, Humpback, Fin, and Minke whales, ship strikes and fishing gear entanglements continue to be the most likely sources of injuries and mortality. Gear entanglements occur in the vertical buoy lines of sink gillnet and pot/trap gear, the groundlines of pot/trap gear, and also in the net panels of gillnet gear. Other species such as Sei, Blue, and Sperm whales are vulnerable too but less strikes/entanglements are recorded. Over the period 1996-2000 within U.S. Atlantic waters, an average of 3.2 whales (right, humpback, fin, sei, sperm, blue, and Minke combined) were killed by ship strikes and 7.8 were killed or suffered injuries likely to cause death as a result of gear entanglements (Waring et. al, 2002). Mobile bottom trawls, which are common for the groundfish fishery, are less of a concern for these large whale species. Other marine mammals such as Harbor Porpoise, dolphins and seals are also at risk to be entangled in net gear (seines, gillnets, drift nets). Turtles have been entangled in these and are particularly vulnerable to shrimp trawls, pound nets and bottom trawls. Shrimp trawls are now required to use turtle-excluder-devices to reduce the potential for entanglement.

These species are also affected by habitat alteration/destruction. Species such as turtles may be more prone to such impacts because their nests are particularly vulnerable to disturbance or predation. The impacts of pelagic habitat alteration on these species are less known. Water quality in coastal areas is particularly vulnerable to coastal pollution from nutrients, which can alter the phytoplankton and the food of species such as the Right whale, and toxic contaminants. The latter can be accumulated through prey species and cause adverse effects to a predator(s) higher in the food web, such as PCBs and DDT which are suspected of causing reproductive failures in many vertebrates including marine mammals (Reijnders and Aguilar, 2002)). The potential impact of pollution is more likely problematic in nearshore areas closer to the sources such as land runoff, sewer outfalls and urbanized areas. Nutrients can also promote toxic phytoplankton blooms, which have been known or suspected in killing humpback whales and other marine mammals (Geraci et. al, 1990; Harwood 2002). These and other factors potentially have had cumulative adverse effects on all these species to varying degrees. Because of a lack of cause-effect data, little is know how much these factors have contributed to their special listing. The third column of Table 360 lists the cumulative impacts for each of the alternatives evaluated in this Amendment. The detailed evaluation of effects of each alternative on protected resources is provided in Section 5.2.9 and is summarized in Table 363 - Table 366.

Species	Status	Threats			
		Ship Strikes	Gear Entanglement	Habitat	Other
Right Whale	Endang Highest risk	High Potential	High potential due sink gillnets, pots, traps	Unkown: Water Quality: Nutirents; Toxic contaminants; Biotoxins; Noise	Unknown: Low Genetic diversity; Low reproductive rates; Reduction/ Competition of prey; Harassment
Humpback	Endang	High Potential	High potential	Unkown: Water Quality: Nutirents; Toxic contaminants; Biotoxins; Noise	Unknown: Reduction/ Competition of prey; Harassment
Fin	Endang	High Potential Mortality Less Certain	High potential Mortality Less Certain	Unkown: Water Quality: Nutirents; Toxic contaminants; Biotoxins; Noise	Unknown: Reduction/ Competition of prey; Harassment
Sei	Endang	Potential but few recorded instances	Potential but no recorded instances	Offshore Species Less likely but still vulnerable to Offshore Development	Unknown: Reduction/ Competition of prey; Harassment
Blue	Endang	Potential but few recorded instances	Potential but few recorded instances	Offshore Species Less likely but still vulnerable to Offshore Development	Unknown (no data): Ice entrapment
Sperm	Endang	Potential but few recorded instances	Potential but few recorded instances	Offshore Species Less likely but still vulnerable to Offshore Development	
Minke	Protected under MMPA	Potential but few recorded instances	Sink Gillnets known threat; Pot/Trap Gear	Unkown: Water Quality: Nutirents; Toxic contaminants; Biotoxins; Noise	Aboriginal subsistence whaling on West Greenland stock (non-U.S. stock)

Table 360 - Summary of Threats to Protected Species Potentially Affected Amendment 13 Multispecies Plan.

Harbor Porpoise	Protected under MMPA; ESA Candidate Species	Potential but few recorded instances	Sink Gillnets known threat	Biotoxins; Noise	Unknown: Reduction/ Competition of prey; Harassment
Atlantic White-sided Dolphin, Pelagic Delphids	Protected under MMPA	Potential but few recorded instances	Sink Gillnets known threat; Frequent Takes with longline and Trawl Gear	Offshore Species Less likely but still vulnerable to Offshore Development: Biotoxins; Noise	
Harbor and Gray Seal	Protected under MMPA	Potential but few recorded instances	Sink Gillnets known threat	Unknown: Possible Biotoxin exposure	Disturbance at haul out sites/Harassment
Harp Seal	Protected under MMPA	Potential but few recorded instances	Sink Gillnets known threat	Unknown: Possible Biotoxin exposure	Fishery in Canada
Leatherback, Kemp's Ridley, Green Turtle	Endang	High Potential Boats and Ships	Bottom and midwater Trawls, seine nets, longlines gillnets drift nets, pound nets; Shrimp Trawls impact reduced with TEDs; Lobster/Crab Trap, pots;	Loss of Nesting Habitat; Consumption of ocean debris; Water Quality: Habitat Destruction/degradation; (Beach erosion/nourishment); Toxic contaminants; increased human presence; Noise	Egg Predation/Exploitation; Cold Stunning (Leatherback less than others); Hurricanes destroying beaches
Loggerhead	Threatened	Same as above	Same as above	Same as above	Same as above
Barndoor Skate	Candidate Species	NA	Overfished Species	Bottom Mobile gear effects on habitat/prey	Limited Reproductive capacity

Table 360 - Summary of Threats to Protected Species Potentially Affected Amendment 13 Multispecies Plan.

5.7.6 Review Of Past Groundfish Management Actions That Affected Groundfish Resources, Fishing Communities, And EFH

5.7.6.1 Impacts associated with Groundfish Resources and Fishing Communities

The groundfish fishery of New England in the 19th Century was originally accomplished on sailing vessels using such low impact techniques such as handlines, jigging and later longlines. When steam-powered vessels came into prominence in the early 1890s, mobile gear such as trawls were found to be very efficient harvesters of groundfish. By 1930, otter trawls became the dominant gear. As a result of more efficient gear, faster and larger vessels and better preservation, haddock landings, for example, grew from 20,000 mt/year in 1900 to over 100,000 mt/yr in 1920 (Collette & Klein-MacPhee, 2002). Using landings as an indicator of fishing effort, one can see how trawling has increased over a relative short timeframe. Fishing effort expanded in the 1950s due to the influx of foreign vessels after World War II, and in the late 1970s/early 1980s, when the domestic fishery expanded in the wake of the Magnuson Act of 1976. There are currently several gear types employed in the multispecies fishery. As reported in the Amendment 13 Affected Environment section, the major gear types used now are bottom trawl, bottom longline, hook and line, and sink gillnet gear.

Although management measures for groundfish were first enacted in 1977 under the original Groundfish Fishery Management Plan, the dramatic increase in larger vessels, bigger gear and electronic aids such as fishfinders and navigation equipment, contributed to a greater efficiency and intensity of fishing, which, in turn, resulted in a precipitous drop in landings during the 1980s to an all-time low in the early 1990s. Table 361, below, describes the major regulatory actions taken to manage the New England groundfish fishery since the original Magnuson Act was enacted and their effect on groundfish resources, community, and EFH. The first several years of groundfish management included annual and quarterly catch quotas for cod, haddock and yellowtail flounder, quota allocations by vessel class, and trip limits. The quota and trip limits imposed during the inception of the Groundfish FMP led to frequent fishery closures of one or more segments of the fishing fleet, interrupting the normal activities of the industry. Consequently, this form of management frequently imposed both economic inefficiencies and hardships on the industry, which led to a breakdown in support of these measures. This in turn, led to widespread misreporting and non-reporting by the industry as a way to circumvent the regulations. Starting in the early 1980's a new management program was implemented through the 1982 Interim Fishery Management Plan. This plan, and the next several groundfish actions (through Amendment 4 in 1991) managed the groundfish fishery (now expanded to include 13 species) primarily through seasonal closures and minimum mesh and fish size restrictions. However, these measures proved not enough since the condition of the resources, especially cod, haddock and yellowtail flounder continued to decline to record low levels.

To end overfishing and address the severe decline in the groundfish resources and the influx of more and larger vessels, the Council began developed of Amendment 5 to the FMP. This action, which became effective in 1994, implemented a moratorium on permits as well as an effort-control program that proposed to reduce a vessel's days-at-sea (DAS) by 50% over a 5-7 year period. Amendment 5, thus, was the first action to restrict both access and effort in the multispecies fishery. The FSEIS for Amendment 5 determined that this action may have significant effects on a substantial number of small entities, specifically those vessels less than 45', which, at the time, consisted of 36% of the qualified vessels. Although the FSEIS demonstrated that Amendment 5 provided economic and social benefits to the fishery in the long-term, vessels were expected to incur significant short-term loses in revenue.

Despite implementation of Amendment 5, however, stocks continued to decline rapidly and a "Special Advisory" was issued by the Northeast Fisheries Science Center in 1994 stating that Amendment 5 was

“too little, too late” to address the critical status of many of the groundfish stocks. In response, the Council requested that NMFS implement an emergency action to close, on a year-round basis, three large areas to all vessels capable of catching groundfish (Closed Area I, Closed Area II, and the Nantucket Lightship Closed Area), while it developed Amendment 7 to the FMP. NMFS implemented the emergency action to close these three areas in December of 1994. These closure areas have been thought to have a major beneficial effect on groundfish stocks, as they afforded protection over large areas and for extended amounts of time. Indirect benefits to other species accrued from these closures as well, such as protection of sea scallops. Although there were large benefits attributed to these closures, it is important to note that they may have had a negative effect on other groundfish stocks as vessels moved elsewhere to fish. Framework 9, implemented in 1995, extended the emergency action permanently and also implemented a prohibition on all small mesh fisheries in the GOM, GB and SNE Regulated Mesh Areas, unless it was determined that the fishery had less than 5% bycatch of regulated species. Through elimination of small mesh fisheries where groundfish bycatch exceeded 5%, discard of groundfish was largely reduced by vessels fishing in non-groundfish fisheries. Amendment 7, implemented in 1996, accelerated the Amendment 5 DAS effort-reduction schedule and expanded the 5% bycatch rule to include a prohibition on all non-DAS fisheries, further reducing bycatch of regulated species. Amendment 7 also implemented recreational fishing restrictions and framework adjustment criteria that would allow management measures to be implemented under a more accelerated mechanism than through an amendment. These actions, in combination, have reduced fishing effort significantly and have provided large areas of year-round protection, especially on Georges Bank, for several species of groundfish. In response, the status of several groundfish stocks have improved over the past several years and landings have increased as a result (see Affected Environment section). Similar to Amendment 5, the FSEIS for Amendment 7 specified that this action was expected to have a significant impact on a substantial number of small entities in the short-term, with higher, long-term benefits accruing to the industry and to the Nation. Overall revenues were projected to be reduced by 10-25% in the first 3 years, with differential effects on gear groups, with trawlers projected to be more disadvantaged than others are.

Following Amendment 7, there have been several framework adjustments implementing further restrictions and, in some cases, extensive restrictions in the groundfish fishery. Due to concerns primarily regarding the status of GOM cod, Frameworks 20, 25, 26, 27, 31 and 33 implemented additional management measures to further protect this stock. These measures included new GOM seasonal and year-round closures, gillnet effort-reduction measures (including limits on the number of allowable nets), and adjustments of the GOM cod trip limit. Additionally, measures in these actions also increased the haddock daily trip limit and increased the minimum square mesh size throughout the GOM/GB/SNE Regulated Mesh Areas. Because the main focus of these actions was to protect GOM cod, the socio-economic impact was primarily felt within communities located in the states of Maine, New Hampshire and Massachusetts, due to the proximity of these communities to the GOM fishing areas.

In response to a Federal Court decision in the case of Conservation Law Foundation, et al. V. Evans, et al., NMFS, in August 2002, implemented management measures consistent with a Settlement Agreement through an interim final rule. Measures contained in the interim rule included a freeze of DAS at the highest annual level used during fishing years 1996-2000 and a 20% cut from that level; increased gear restrictions for certain gear types, including gillnets, hook-gear, and trawl nets; modifications and additions to the closure areas; limits on yellowtail flounder catch; and more restrictive recreational fishing measures. Biological impacts of the “Settlement Agreement” management measures that were first implemented on August 1, 2002, vary by species. Based on a quantitative analysis only, the July 2002 EA estimated the resultant decrease in fishing mortality to range from 1% for GB winter flounder and 16% for GOM cod. It has been recently projected in the June 2003 EA, completed for an Emergency Action to extend the August 2002 interim rule measures, that, based upon the number of DAS used in 2002, continuation of the Settlement Agreement for the duration of the 2003 fishing year would result in a 25-35% reduction in fishing effort.

Measures implementing the Settlement Agreement have further protected several groundfish species, most notably GOM cod, and increased the likelihood of timely stock rebuilding. A particularly important aspect of these rules is the control of latent DAS. The DAS freeze has significantly limited the extent to which latent DAS can be activated and, therefore, has limited the extent to which the increases in fishing mortality from the use of such DAS could undermine efforts to control fishing mortality. The DAS allocations for the 2002 fishing year were 45.7% less than the DAS allocations for the 2001 fishing year (including carryover days). Preliminary estimates made in June 2003 calculated a 37% decline in DAS use during the 2002 fishing year (compared with the 2001 fishing year). While the combination of measures implemented since the adoption of Amendment 5 have improved stock status (increasing biomass and reducing fishing mortality) for many stocks, as discussed in section 9.2.1.1, the improvement has not been achieved for all stocks.

Overall, the DAS restrictions resulting from the Settlement Agreement impacted most, those vessels that rely on groundfish for a majority of their income. For vessels with high dependence on groundfish income, the adverse income effects of the Settlement Agreement were nearly twice that of vessels that rely on groundfish for less than half of their annual fishing income. Estimated revenue losses were greatest for vessels bordering the GOM (Gloucester, Portland, Portsmouth, Chatham/Harwich). DAS reductions were largest for the home port states of New Jersey, New York, Maine, and Massachusetts (in descending order). Charter/party vessels experienced a decrease in the number of trips booked, however the majority of the economic impacts were borne by approximately 20-25 charter/party operators whose primary business is in offering groundfish trips.

Bottom trawl, longline gear and hook-gear are classified as Category III fisheries under the Marine Mammal Protection Act and are, therefore, determined to have a remote likelihood of, or no known, incidental mortalities and serious injuries of marine mammals. Gillnet gear has been categorized as a Category I fishery; a fishery that has been determined to have frequent incidental mortality or serious injury of marine mammals. Many of the groundfish actions discussed above have had an overall beneficial impact on protected resources. For instance, the DAS reductions have significantly reduced effort in this fishery. Extensive area closures to protect groundfish stocks, including harbor porpoise closure areas specific to gillnet vessels, and reductions in fishing gear, such as reductions in allowable gillnet gear, have all contributed to benefiting protected resources.

Development of other recent management actions, such as for whiting and monkfish, have also benefited groundfish stocks as they have likely reduced groundfish discards (e.g., through the development and implementation of a whiting grate fishery, and coupling of multispecies and monkfish DAS). Also, it should be noted that a vessel buyout program, starting in 1996, has contributed to reducing the socio-economic impacts on small entities associated with the groundfish actions.

5.7.6.2 Impacts associated with EFH

The increased intensity of trawling also has been correlated with habitat impact (Jennings et al. 2001, 2002; Thrush et al., 1998; Collie et al. 1997, 2000). Mobile gear such as otter trawls do have a more direct impact on the bottom habitat by disturbing or scraping the bottom substrate and removing, damaging or destroying benthic organisms at the sediment surface or just below. The vulnerability of the various life stages and species to this and other mobile gear are summarized in section 9.3.1.2 of this document. Even as early as the 1920's, concerns were raised over the ecological damage to bottom dwellers from increasing levels of trawling (Collette & Klein-MacPhee, 2002). Although management measures were taken as early as 1977 to control groundfish catches, there was no dedicated effort to regulate impacts to fish habitat until 1996 when the Sustainable Fisheries Act (SFA) was implemented to, in part, minimize the adverse effects of fishing to the "essential fish habitat" (EFH) of managed species. However, management measures developed to date to control fish catch, effort and capacity have incidentally benefited habitat by reducing bottom contact time of mobile bottom-tending fishing gear.

In general, measures such as area closures (depending upon size of area, time closed and habitat type within), gear restrictions/alterations, permitting restrictions, reductions in effort allowed or days at sea (DAS), and possession/trip limits can clearly benefit habitat. Some measures such as, effort monitoring, crew limits, onboard observers, recreational measures, and Total Allowable Catches (TAC) limits may also benefit habitat. Other measures, such as an increase in fish and mesh size limits, although they are designed to meet stock rebuilding objectives, may have negative habitat effects since they may encourage increased fishing effort to meet catch limits if DAS are not limiting. As noted in Table 361, each major management actions are characterized according to its probable benefit on habitat. The actions that are believed to have the greatest benefit to habitat have included Amendment 5 in 1994, due to the moratorium on new entrants and DAS reductions; Emergency Action in 1994, due to the year round closures and prohibition of scallop vessels in closed areas reductions and elimination of small mesh fisheries which were 5% or greater of the catch of regulated species; Framework 9, due to its continuance of the 1994 management measures on a permanent basis; Amendment 7, due to its accelerated DAS reductions and closer areas and expansion of the 5% bycatch rule to all fisheries; Framework 25, due to closure areas; Framework 27, due to closure areas and gear restrictions; and the 2002 Interim Action, due to additional DAS cap on use of latent effort; and expansion of the closure areas. Other management actions are believed to have moderate to negligible benefits in their protection of EFH. However, NMFS believes that the combined effect of the noted significant and moderate measures that have been implemented during the last 10 years has been to enhance the protection and preservation of EFH.

It should be kept in mind that the benefit of closure areas might be limited by the fact that when areas are closed, effort is often displaced to other fishing areas. This may reduce the beneficial effect of this management measure over a larger area, i.e., impacts in the closure area may be reduced but impacts to other areas may be increased. On the other hand, if reductions in DAS cause a shift of effort to other fisheries such as whiting, squid/mackerel/butterfish, or herring, these fisheries would have less impact to EFH since they use either a raised footrope (in some areas) on the trawl or use mid-water trawls. However, if the shift is into the scallop fishery or other fisheries utilizing bottom-tending mobile gear, then the impacts may be the same or greater as those caused by bottom trawling. Little is actually known of the true impacts of these management measures. However, it is reasonable to assume a positive benefit from the groundfish management measures that are currently in place will continue in the foreseeable future.

DATE	ACTION	FEATURES THAT AFFECT RESOURCES, HABITAT AND COMMUNITIES	RESOURCE BENEFITS	HABITAT BENEFITS	COMMUNITY IMPACTS
1977	Original FMP	Cod, haddock and yellowtail annual and quarterly catch quotas Quota allocations by vessel class Trip or weekly catch limits	Moderate	Negligible	Moderate - High
1982	Interim Plan	George Bank Closed Areas (seasonal) Minimum mesh size requirements when fishing for cod, haddock or yellowtail flounder in GB and portions of the GOM (5.5") Minimum fish size requirements Permit requirements	Moderate-High	Low	Moderate-High
1986	Multispecies Plan	Inclusion of pollock, redfish, winter flounder, American plaice, witch flounder, windowpane flounder, and white hake Additional minimum fish size restrictions Extensions of GB spawning areas closures to protect haddock (seasonal) A SNE closure to protect yellowtail (seasonal)	Moderate	Moderate	Moderate
1987-1991	Amendments 1-4	Closure of the Southern New England/Mid-Atlantic Yellowtail Area during March-May Extension of GB RMA Minimum mesh size requirements in SNE Exclusion of scallop dredge vessels from SNE closure Minimum fish size changes Gear restrictions in the Northern Shrimp fishery Inclusion of silver hake, red hake, and ocean pout	Moderate-High	Moderate	Moderate-High
1994 (01/03/94)	Emergency Action	Implementation of a 500-lb haddock trip limit Expansion of CAII in area and time (from 4 month to 6 months) Prohibition on scallop dredge vessels from possessing haddock during January-June Prohibition on pair-trawling for multispecies	Moderate	Low	Moderate

Table 361 - History of Management Actions and Associated Habitat Benefits

DATE	ACTION	FEATURES THAT AFFECT RESOURCES, HABITAT AND COMMUNITIES	RESOURCE BENEFITS	HABITAT BENEFITS	COMMUNITY IMPACTS
1994	Amendment 5	Implementation of '94 Emergency Action year-round Moratorium on new entrants to the multispecies fishery An effort reduction program for most vessels whereby historical DAS would be reduced by 50% over a 5-7 year period SNE and MidAtl Regulated Mesh Area (RMA) (5.5") Increase mesh in GOM/GB RMA (6.0") Minimum fish sizes Suspension of CAI (except for gillnet vessels) Finfish excluder requirement for shrimp vessels Mandatory reporting and observer requirements Framework adjustment provisions	High	High	High
1994	Amendment 6	Implementation of March 1994 Emergency Action measures on a permanent basis	Moderate	Moderate	Moderate
1994	Emergency Action	Year-round closure of redefined CAI, the Nantucket Lightship Closed Area and CAII - to protect cod, haddock and yellowtail flounder Prohibition on scallop vessels from fishing in the closed areas A small mesh prohibition - disallowance on any fishery utilizing mesh smaller than the minimum mesh size requirements, with the exception of fisheries that have been determined to have a catch of less than 5 % by weight of regulated species Prohibition on retaining regulated species w/ sm mesh Increase in SNE mesh size (6.0") Winter flounder exemption in state waters	High	High	High
1995	Framework 9	Implementation of December 1994 Emergency Action measures on a permanent basis	High	High	High

Table 361 - History of Management Actions and Associated Habitat Benefits

DATE	ACTION	FEATURES THAT AFFECT RESOURCES, HABITAT AND COMMUNITIES	RESOURCE BENEFITS	HABITAT BENEFITS	COMMUNITY IMPACTS
1996	Amendment 7	Acceleration of Amendment 5 DAS reduction schedule Elimination of exemptions to effort control program Implementation of seasonal GOM closures Implementation of a 1,000 lb haddock trip limit Expansion of the 5% bycatch rule, where vessels fishing in the GOM/GB/SNE RMAs are allowed to fish only in an exempted fishery, under a multis or scallop DAS ,or under the Small Vessel permit category Establishment of an annual target TAC for cod, haddock and yellowtail stocks, and expansion of framework provisions to set annual TACs Restrictions on party/charter and recreational vessels	High	High	High
1997 (05/01/97)	Framework 20	Implementation of GOM cod daily trip limit (1,000 lb) Seasonal increase in haddock daily trip limit (1,000 lb) Gillnet effort-reduction measures, including net limits	Moderate	Moderate	Moderate
1998 (04/09/98)	Framework 24	Adjustment to GOM cod trip limit – vessels must remain in port & run clock to account for cod overage Implementation of DAS carry-over provision Implementation of NAFO exemption	Low	Low	Moderate
1998 (05/01/98)	Framework 25	Implementation of GOM Inshore Closure Areas Implementation of year-round Western GOM Closure Area Addition of a seasonal offshore GOM closure area (Cashes Ledge Closure Area) Reduction in the GOM cod daily trip limit (700 lb)	High	High	High
1999 (01/19/99)	Framework 26	Expansion of April GOM Inshore Closure Area Addition of seasonal inshore GOM and Georges Bank area closures	Low	Low	Moderate
1998	Amendment 11	Designated EFH for Multispecies Required Federal agencies to consult with NMFS on actions that may adversely effect EFH. NMFS provides recommendations to avoid or minimize impacts to EFH	Low	High	Low

Table 361 - History of Management Actions and Associated Habitat Benefits

DATE	ACTION	FEATURES THAT AFFECT RESOURCES, HABITAT AND COMMUNITIES	RESOURCE BENEFITS	HABITAT BENEFITS	COMMUNITY IMPACTS
1999 (05/01/99)	Framework 27	Elimination of the Northeast Closure Area Establishment of seasonal inshore GOM Rolling Closure Areas of greater size and duration than Inshore Closure Areas (from 1 month 2 months) Reconfiguration of the seasonal Cashes Ledge Closure Area and expansion in time (from 1 to 4 months) Exemption for scallop dredge vessels to fish within the GOM Rolling Closure Areas and Cashes Limitation on roller and rockhopper trawl gear to a maximum diameter of 12" within a GOM inshore area Decrease in the GOM cod daily trip limit (200 lb), w/ mechanism to reduce further if necessary (reduced to 30 lb on 5/28/99) Increase in the haddock daily trip limit (2,000 lb) Increase in GOM/GB/SNE square mesh size (6.5")	Moderate-High	Moderate	Moderate-High
1999 (07/29/99)	Interim Rule	GOM cod daily trip limit revision (100 lb/500 lb max) DAS running clock revised-cod overage limit to 1 day	Moderate	Low	Moderate
1999 (11/15/99)	Amendment 9	Prohibition on the use of Brush-Sweep Trawl gear Inclusion of halibut into the FMP Possession and size limit on halibut - 1 fish (36")	Moderate	High	Moderate
2000 (01/05/00)	Framework 31	Increase in GOM cod daily limit (400 lb/4,000 lb max) Additional February inshore GOM closure Extension of '99 Interim rule running clock measure	Moderate	Low-Moderate	Moderate
2000 (05/01/00)	Framework 33	Addition of a Georges Bank Seasonal Closure Addition of 2 1-month conditional GOM closure areas Increase in haddock daily trip limit (3,000 lb)	Moderate	Negligible	Moderate

Table 361 - History of Management Actions and Associated Habitat Benefits

DATE	ACTION	FEATURES THAT AFFECT RESOURCES, HABITAT AND COMMUNITIES	RESOURCE BENEFITS	HABITAT BENEFITS	COMMUNITY IMPACTS
2002 (05/01/02)	Interim Action (Settlement Agreement)	Restriction on vessels using more than 25% of their DAS allocation during May-July 2002 Modification of DAS clock – all vessel trips 3-15 hours counted as 15 hours during May-July 2002 Year-round closure of Cashes Ledge Area Closure Expansion of Rolling Closure Area III and IV Prohibition on front-loading the DAS clock Increase in GOM trawl (codend) & gillnet mesh (6.5") Limitations on Day gillnets Restrictions on party/charter and recreational vessels	High	Moderate-High	High
2002 (08/01/02)	Interim Action (Settlement Agreement cont'd)	May 2002 interim measures continued Establishment of "used DAS baseline" and reduction of 20% from this baseline Freeze on Handgear permits & trip limit reduction Elimination of GOM January & February seasonal closure areas Increase in SNE trawl (codend) mesh (7.0/6.5" sq/diamond) Increase in GB gillnet mesh (6.5") Further limitations of both Day & Trip gillnets Increase in SNE gillnet mesh (6.5") Longline gear restrictions - prohibition on de-hookers (crucifiers) w/ < 6" spacing between fairlead rollers, hook size restrictions, and limit on number of hooks Increase in commercial cod fish size (22") Possession limits and restrictions on yellowtail catch Increase in GOM daily cod trip limit (500/4000 lb max)	High	Moderate	High

Table 361 - History of Management Actions and Associated Habitat Benefits

5.7.7 Cumulative Effects of Amendment 13 Measures

Table 363 - Table 366 summarize the impacts of Amendment 13 alternatives on communities, groundfish stocks, protected species and habitat. Table 367 summarizes cumulative effects of gear use, non-fishing entities and actions, past management actions in the multispecies fishery, and the proposed alternatives in Amendment 13 (Fishery Administration, Capacity Reduction, Rebuilding, Recreational, and Habitat). This section further discusses the content of these summary tables.

5.7.7.1 Fishery Program Administration Measures

The majority of the fishery administration measures have only limited or negligible effects on communities, stocks, protected species, and habitat. The additive effects of these measures in conjunction with other Amendment 13 alternatives, including measures to address stock rebuilding and capacity issues, as well as past actions in the groundfish fishery are low or negligible. In general, it is unlikely that the Fishery Program Administration measures will have any adverse cumulative effects on protected resources because the measures are primarily administrative. Should a new fishing year be selected, two options for DAS proration are considered. Neither option will result in an increase in DAS use compared to the no action alternative. Otherwise, cumulative effects of these measures ranged from none to negligible. The special access programs and DAS leasing program may slightly reduce the net benefit of rebuilding alternatives for stocks but alleviate the burden of increased regulation on communities to a limited extent. Their cumulative effects may differ among stocks and fishing communities. Those fishery program administration measures which are likely to have cumulative effects are discussed below. If the cumulative effects of a measure on communities, resources, or habitat, are likely to be negligible or none, this is indicated briefly in the following discussion.

Fishing Year (Not selected)

A change to the fishing year will not have any cumulative effects on communities, resources, or habitat.

DAS Proration (Not selected)

Because it allows for 10 carry-over DAS, DAS proration Option 1 may have a very limited negative cumulative effect on the resource (groundfish stocks), with no appreciable cumulative effects on communities or habitat. Other DAS proration options will have negligible cumulative effects on communities, resources and habitat.

Periodic Adjustment Process (Proposed action)

Modifying the current framework adjustment process will not have any cumulative effects on communities, resources, or habitat.

US/CAN Resource Sharing Understanding (Proposed action)

While the US/CAN resource sharing understanding is likely to have impacts on allocation of shared fishery resources, the cumulative effects of this program are likely to be negligible. Because the proposed agreement does not reduce overall effort or establish additional gear restrictions, closures, or effort controls, there will be no cumulative effects on the resource and habitat.

Administration of Certified Bycatch/Exempted Fisheries (Proposed action)

This alternative establishes closer monitoring and review of bycatch and exempted fisheries. This action will not have any cumulative effects on fishing communities. Because of an increased administrative burden associated with this alternative, it may have small negative effects on NMFS administrative staff and analysts. With closer review and monitoring of bycatch/exempted fisheries, violations of the 5% bycatch standard and other issues will be identified in a more timely and effective manner. Improvements in data and information quality may have positive, indirect cumulative effects on the resource in the long term. There are no cumulative effects on habitat associated with this alternative.

Special Access Programs (Proposed action)

The Georges Bank yellowtail flounder SAP allows vessels to access a portion of Closed Area II to harvest a limited quantity of yellowtail flounder. This program will increase fishing mortality on GB yellowtail to a small extent, resulting in minimal negative impacts on the stock. Affects of this SAP on other stocks are negligible. The SNE/MA winter flounder incidental catch program allows fluke vessels to retain a small portion of incidental catch of winter flounder on directed fluke trips. This program is unlikely to increase mortality on winter flounder, since the winter flounder retained would have otherwise been discarded. The U.S./Canada resource sharing agreement SAP encourages U.S. vessels to fish in area 5Zjm so that the United States will take full advantage of their allocated quota. The specific measures chosen for this program may result in increased fishing effort on Georges Bank cod and potentially increased incidental catch of other species. The cumulative effects of this program on resources may be negative but low. The Closed Area I Hook Gear SAP will increase catches of haddock, but will provide additional revenues to small boat hook fishermen and their communities. Special access programs are positive for communities which rely on fishing, since they provide increased harvesting opportunities and potentially increased flexibility in determining when and where to fish. Their cumulative effects on communities, however, are likely to be only slightly positive or negligible, since these programs focus on specific harvesting sectors/fisheries and do not benefit the fishery as a whole. The cumulative effects of special access programs on habitat are negligible.

Closed Area Administration (Proposed action, in part)

The options related to defining the rationale for closed areas and reviewing year-round closed areas are administrative in nature and are unlikely to have any appreciable cumulative effects on the resource, communities, or habitat. Options determining the extent to which closed areas may be accessed may have differing effects, but no changes are adopted by this Amendment. Options 1-4 allow access of current multispecies exempted gear into year-round closed areas, with certain restrictions. These options will not have a cumulative effect on the resource or habitat, since they do not liberalize existing gear restrictions and any further restrictions on the use of certain gear types in closed areas are likely to have small positive effects. Option 5 extends the restriction on access to year-round closures to all gear types. This may have small positive cumulative effects on habitat in closed areas and for species with EFH-designations in closed areas. Options which prohibit certain gear types from accessing closed areas may have negative cumulative effects on fisheries which operate in year-round closures, including certain pot and trap fisheries.

Flexible Area Action System (FAAS) (Proposed action)

Eliminating or retaining the current FAAS will not have cumulative effects on communities, resources or habitat.

Leasing of DAS (Proposed action)

Days-at-sea leasing could have a negative affect on the resource. Total allocated DAS are higher than the desired level of used DAS; a leasing program may thus result in more DAS being used and increased effort could result in fishing mortality rates that exceed desired levels. DAS leasing remains subject to vessel upgrade restrictions, which will reduce opportunities for leases.. DAS leasing is intended to increase the functional value of days-at-sea by providing fishermen with more control over how they utilize these days. Leasing programs should have a positive effect on fishing communities. The overall cumulative effects of this program are likely to be negligible for the resource and habitat, and positive for individuals who choose to participate in the program.

Recreational Fishing Permit (Not selected)

Establishing a fishing permit for recreational fishers is not likely to have appreciable cumulative effects on the resource or habitat and may incur limited negative effects on the recreational sector, if permitting leads to additional costs. Improved data on recreational harvests may have positive, indirect cumulative effects on the resource in the long term.

Running Clock Alternatives (Not selected)

The running clock alternatives are unlikely to have cumulative effects on the resource and habitat. Option 1 (no action) will have no cumulative effects on communities. Option 2 (industry funded weighmaster) may be costly to fishermen but is unlikely to incur demonstrable cumulative effects on the industry and associated communities. Option 3 (extended modified running clock) will have positive impacts on fishermen who utilize the running clock, and may have low to moderate cumulative effects on this group.

Observer Coverage (Proposed action)

Options that increase the current level of observer coverage in the fishery may have indirect positive long-term cumulative effects on the resource, as improved data results in more accurate understanding of the fishery. Cumulative effects of observer coverage on communities and habitat are likely to be negligible.

VMS Requirements (Proposed action)

VMS is expensive for individual vessel owners due to the cost of purchasing, maintenance and energy requirements. Mandatory VMS is likely to have limited negative cumulative effects on the industry, particularly for vessels with high operating costs, or those fishing less frequently. VMS will have indirect positive cumulative effects on the resource, since it will improve enforcement of regulations and improve fishery-dependent data, providing more explicit information on spatial distribution of fishing effort. It is unlikely that VMS will have cumulative effects on habitat. Providing the ability to sign-out of the VMS program will reduce costs.

Day Gillnet Block Out of Fishery (Not selected)

Option 1, which retains the current restrictions on gillnet vessels, will not have cumulative effects on communities, resources or habitat. Options 2 and 3, which liberalize restrictions on gillnet vessels, may have small positive cumulative effects on the gillnet sector only, and non for other gear types. Options 2 and 3 may result in increased effort on some species harvested in gillnets but the negative cumulative effects of these measures are likely to be low.

DAS Counting (Not selected)

The options which eliminate partial days-at-sea (Options 2 and 3), are likely to have negative effects on data quality and may have indirect adverse effects on the fishery and resource. These options also reduce the value of days-at-sea, in effect, limiting the fishing that may take place within one DAS. Changes to the way DAS are counted may have a slightly negative cumulative effect on limited access multispecies vessels, and a very limited positive cumulative effect on the resource and habitat, due to a slight reduction in effort that results.

Reporting Requirements (Proposed action)

If VMS is required, cumulative effects on the communities, resources, or habitat will be similar to those discussed under VMS Requirements, above. The proposed action does not adopt a VMS requirement. The proposed action adopts electronic dealer reporting, links dealer and vessel reports through a trip identifier, and may eventually result in electronic vessel reporting. The impacts on the resource are likely to be positive as a result of improved information gathering, but not to any significant degree.

Hand-Gear Only Permit Alternatives (Proposed action)

These alternatives establish a hand-gear only permit, and are unlikely to have cumulative effects on the resource, communities or habitat. The proposed action limits hand-gear permits.

Sector Allocation (General) (Proposed action)

In general, sector allocation may be positive for fishermen, since it provides them with more control over specific management measures that will affect their fishing practices. It may lend flexibility to fishers and a greater sense of involvement in the regulatory process. Cumulative effects on fishing communities are, however, unknown at this time. Cumulative effects on the resource and habitat are negligible.

Georges Bank Hook/Gillnet Sector Allocation (Proposed action, in part)

Designed by stakeholders in the hook and gillnet gear sectors, this proposal is likely to have some positive cumulative effects for Georges Bank hook and gillnet vessels and their associated communities, although the extent of these benefits are unknown. The cumulative effects of this alternative on the resource are positive for Georges Bank cod for which a quota is established, and positive but low for other Georges Bank stocks due to the additional effort restrictions proposed. There are no cumulative effects on habitat. The Closed Area I access program associated with this alternative may have negative effects on Georges Bank haddock if participation in the sector is high. Although this alternative allows for access into Closed Area I, cumulative effects on habitat are negligible, since the hook and gillnet gear have limited contact with the bottom. The proposed action only adopts a hook gear sector.

Gulf of Maine Inshore Conservation and Management Stewardship Plan (Not selected)

The cumulative effects of this area management alternative are unknown for communities. They are likely to be positive for stocks and negligible to none for habitat.

5.7.7.2 Capacity Reduction Alternatives

Each of the capacity alternatives is designed to provide greater economic opportunity and flexibility for multispecies fisheries and, to some extent, open access scallop fisheries while maintaining the character of the existing fleet. In addition, they are intended to achieve some long-term reduction in the number of vessels permitted to fish in Northeast fisheries. The overall cumulative effects of capacity alternatives will be generally positive for participants in the capacity reduction program, and neutral for others. The way in which effective effort is defined in Alternative 5 may create some loss in allocated DAS for some individuals. Generally, permit holders who opt to transfer, acquire, or freeze permits are those who are likely to get a net economic benefit from doing so. Because these alternatives are intended to reduce effort in the long-term, their cumulative effects on the resource will likely be positive. Alternatives 1, 2, 3 and 4 are voluntary programs, making their impacts uncertain. Cumulative effects of Alternatives 5 and 6 on the resource are likely to be positive, since these options will reduce available DAS. Any of the alternatives will be more effective in controlling mortality if combined with Alternative 5 or another approach to reduce or control latent, unused DAS. If not, capacity reduction alternatives may increase effort in the short term, however, diminishing the positive value of their long-term cumulative effects. Cumulative effects on habitat are unknown, though most likely negligible unless effort is sharply reduced in regions of particularly sensitive habitat.

The impact of the Capacity Reduction alternatives, such as Permit Absorption, Permit Transfer, DAS Transfer and Freeze on Unused DAS, range from none to slightly positive due to the facts that these four are voluntary and may reduce latent effort, which would be beneficial to protected species. Since these measures are voluntary, no benefit will necessarily accrue if no one participates. The no action alternative assumes a generally negative impact due to little or no control of fleet size. The assumption is here that effects on protected species would be negative without any control on the fleet size. However, there would be a more positive effect when more permanent measures are adopted to recover large whales by reducing takings as the forthcoming Atlantic Large Whale Take Reduction Plan get developed and implemented. For the Permit Absorption alternative, the overall positive effect may be reduced for turtles if the permits that are transferred are combined with scallop permits, which may have negative additional consequences for sea turtles that are caught in scallop dredges. Similarly, the Permit Transfer alternative allows limited access permits holders to transfer to another vessel. This reactivation of latent effort which could result in changes in the gear used by a permit. If this results in a shift from trawls to gillnets, it may further impact large whales, harbor porpoise, dolphin and seals. This is not a likely result, however, given the relative economic performance of these sectors in recent years – the change in gear is likely to be in the other direction. The net cumulative effects to these species is unknown. The same is true for DAS Transfer and Freeze on unused DAS. The remaining alternatives, DAS Reserve and Mandatory latent Effort, have mandatory controls on latent effort and therefore have offer more benefit to protected resources in comparison to the no action and the other alternatives and therefore have more positive cumulative effects.

The proposed action adopts the DAS transfer and the DAS reserve capacity options.

5.7.7.3 Management Alternatives to Address Rebuilding Requirements

Relative to the no action alternative, the most likely cumulative effects of the proposed action and four management alternatives to address rebuilding requirements are expected to be positive for the resource and its environment, negative in the short-term but positive in the long-term for the fishery participants, and are designed to create long-term sustainability of both the resource and the directed fishery. Cumulative effects of recreational measures are similar, but of a smaller magnitude.

Each of these rebuilding alternatives approaches the issue of stock rebuilding in a different way; all of the alternatives are designed to meet the goals of stock rebuilding. However, some of the rebuilding alternatives will only be successful in meeting the requirements of formal rebuilding programs for certain stocks when considered in a cumulative sense, in conjunction with other measures in Amendment 13 as well as previous and potential future measures. For example, Rebuilding Alternative 3 – Area Management – requires that hard TACs be implemented in conjunction with the measures outlined in this alternative to ensure its success. As a stand-alone alternative, area management has a positive effect on the groundfish stocks but does not meet the requirements of rebuilding programs for most of the stocks. The cumulative effects of area management in conjunction with additional effort controls that currently exist as well as future output controls (hard TACs) are strongly positive for groundfish stocks.

With respect to the four alternatives to rebuild the groundfish stocks and the proposed action, the impacts are all positive to protected resources in comparison to the no action. The no action here assumes that the existing closed areas are beneficial to whales since they overlap with high use areas (Cashes Ledge, WGOM, and Right Whale critical habitat). Despite the negative effects of the threats discussed above, the existing closures are beneficial to large whales and other protected species. The 65 % reduction in used DAS, reduction in allocated DAS (with a hard TAC), Area Management (also with a hard TAC) and the Hard TAC alternatives all reduce the fishing mortality by reducing effort and gear in the water, thereby reducing potential for adverse effects to protected resources. It is unknown whether one of these alternatives would have a greater benefit to some or all the species. However, since there is a reduced effort and gear, there is likely less chance for gear entanglement by all species. Therefore, the four alternatives provide a net positive effect to protected species over and beyond the existing measures. This protection should further improve for large whales when the forthcoming Large Atlantic Whale Take Reduction plan goes into effect in the future.

The rebuilding alternatives in Amendment 13 employ many of the same types of measures. These basic management measures are discussed in terms of their cumulative effects, below.

Area Closures (Year-round)

Alternatives that incorporate measure:

Proposed action

NAA

Alternative 1

Alternative 2

Alternative 4

Alternative 3 not specified

All of the management measures to address rebuilding incorporate the current year-round area closures. Area closures alone are not likely to have significant effects on stock rebuilding, except for species of limited mobility, such as sea scallops. However, the effects of these closures over the long term are positive for the groundfish resource, since they protect areas of EFH for many of the stocks. There are no

cumulative effects of year-round closures in the rebuilding alternatives in Amendment 13, since they are identical to the existing closures.

Seasonal/Rolling Closures

Alternatives that incorporate measure:

Proposed action

NAA

Alternative 1

Alternative 2

Alternative 4

Alternative 3 not specified

Like area closures, seasonal/rolling closures protect habitat and benefit groundfish stocks. These closures may, however, redirect effort, intensifying it in other areas. The cumulative effects of new seasonal and rolling closures are positive for the resource and habitat across the range of the fishery. The effects on communities may be negative and unequally distributed. Closures in the inshore Gulf of Maine may particularly impact smaller vessels, resulting in long-term negative cumulative effects on the inshore fleet.

Possession Limits

Alternatives that incorporate measure:

Proposed action

NAA

Alternative 1

Alternative 2

Alternative 3

Alternative 4

All of the rebuilding alternatives incorporate possession limits. If appropriate possession limits are chosen, they will have a positive cumulative effect on the resource. Possession limits may increase regulatory discards in some areas, although additional measures in Amendment 13 including special access programs and running the DAS clock, are intended to address this potential problem. Possession limits have no direct cumulative effects on habitat. They may have negative cumulative effects on fishers in the short-term, with long-term benefits resulting from successful stock rebuilding.

Effort Controls (Days-at-Sea)

Alternatives that incorporate measure:

Proposed action

NAA

Alternative 1

Alternative 2

Alternative 4

Most of the rebuilding alternatives utilize effort controls in the form of days-at-sea. Alternative 1 is the most restrictive in terms of DAS reductions, with a 65% decrease in active days across the fishery. DAS restrictions are among the most beneficial effort reduction tools, and result in a direct positive cumulative effect on the resource. By reducing the amount of time fishing gear is contacting the seafloor, DAS reductions also result in an indirect positive cumulative effect on habitat. The severe DAS reductions proposed in Alternative 1 will have a negative cumulative effect on communities, as vessels with too few days-at-sea to remain productive may be forced to retire from the fishery. The DAS leasing program and some of the capacity reduction alternatives are intended to alleviate some of the negative effects of DAS reductions.

Gear Restrictions

Alternatives that incorporate measure:

Proposed action

NAA

Alternative 1

Alternative 2

Alternative 4

Alternative 3 not specified

Gear restrictions are a component of nearly all of the rebuilding alternatives. Alternative 2, which uses gear modifications as primary tool for stock rebuilding, implements the most gear requirements and restrictions of any of the rebuilding alternatives. In general, increases in minimum mesh size, use of more selective gear to reduce the catch of incidental species and species of particular concern, net limits and other gear restrictions have a positive cumulative effect on the resource, particularly due to the protection of juveniles. Gear restrictions may have a positive cumulative effect on habitat if they reduce bottom contact time or introduce gear modifications that cause less damage to sensitive benthic structures. The cumulative effects of gear restrictions on communities are difficult to measure, although it is likely that these measures will have different effects across gear sectors.

Minimum Fish Sizes

Alternatives that incorporate measure:

Proposed action

NAA

Alternative 1

Alternative 2

Alternative 4

Alternative 3 not specified

Minimum fish sizes help protect juvenile fish, and have a positive cumulative effect on groundfish stocks. Establishing minimum sizes may have a greater impact on recreational fishers than those engaged in the commercial fishery, but the cumulative effects of minimum sizes in Amendment 13 are negligible. Minimum sizes have no cumulative effect on habitat.

VMS Requirements

Alternatives that incorporate measure:

Alternative 2

Alternative 4

The cumulative effects of VMS requirements are described under the fishery program administration section, above.

Long-term Cumulative Effects

Long-term effects of each of these rebuilding alternatives on the multispecies stocks are clear: stocks will rebuild as a result of the accumulated effects of measures applied over time and in response to these specific measures in Amendment 13 targeted at stock rebuilding. Effects of these alternatives in the long term are less clear or quantifiable from a social and economic perspective.

5.7.7.4 Alternatives to Minimize the Adverse Effects of Fishing on Habitat

5.7.7.4.1 Habitat Alternative 1, No Action Alternative – No Action

This alternative was not selected. This alternative retains management measures in place during fishing year 2001 that serve to protect habitat and minimize impacts associated with fishing. These include groundfish closed areas, effort controls, prohibition on the brush sweep or “streetsweeper” trawl, and the inshore Gulf

of Maine 12 inch roller gear limit. In addition, for the purposes of this assessment, the No Action alternative includes the cumulative benefits of the other past management actions described in the previous section.

The three areas on Georges Bank and in southern New England were closed in December 1994 to trawls and dredges; the western GOM area was closed in May 1998. Shrimp trawls and clam dredges are exempted from the closed area regulations, and portions of the two closed areas on GB were opened to scallop dredging in June 2000. Because these closures are temporary and do not exclude all types of bottom-tending gear, they are not directly comparable to proposed habitat closed areas. As such, they do not benefit benthic habitat to the same degree as would permanent habitat closures that would exclude all gears that have a potential adverse effect on benthic habitat. These closures have, nevertheless, had a positive habitat effect during the past 4-8 years.

Fishing effort in the Northeast multi-species fishery has increased since the implementation of days-at-sea limitations in the fishery in 1995, but is well below levels that prevailed during the 1970s and 1980s. In contrast, bottom contact time in the scallop fishery has declined in recent years as the resource has grown and dredging has concentrated in areas with high biomass. Even if total bottom contact time has remained fairly stable in recent years, the displacement of effort from the closed areas has undoubtedly increased habitat disturbance in certain open areas, particularly in previously undisturbed or lightly disturbed areas. Restrictions on the use of “streetsweeper” trawls could have had beneficial effects on rocky bottom habitats in the GOM, although it is not clear that this type of gear was ever used to any great degree before it was prohibited.

The amount of bottom area included in the four existing groundfish closed areas is considerably more (5,847 nm²) than in any of the habitat closed area alternatives, but they contain a smaller percentage of gravel substrate than alternatives 3, 4, and 6. Scaled for area, the percentage of EFH area for moderately and highly vulnerable species is relatively low. The predominant substrate is sand. Four of the five biomass indices (benthivores, amphipod feeders, principal groundfish, and principal demersal finfish) are high. The percentage of total biomass for six species with strong benthic habitat associations was moderate and the overall benthic biomass index was high.

5.7.7.4.2 Alternative 2 – Incidental Benefits of Stock Re-Building Measures

This alternative was selected. Proposed Amendment 13 management measures that are not directly habitat-related fall into eight categories. There are no habitat benefits, or no significant benefits, of fishery administration or sector allocation measures. Measures designed to control capacity (e.g., permit and days-at-sea transfers) will have long-term habitat benefits because they will limit the utilization of latent fishing effort that would otherwise increase effort. Days-at-sea (DAS) reductions that are implemented in Amendment 13 could be large (as much as 65% for certain stocks) and would reduce fishing effort and bottom contact time, as would possession limits – at least in certain areas and times of year. Rolling seasonal closures would only have temporary habitat benefits that would be lost as soon as fishing began again. Gear modifications that reduced gear contact with the bottom (e.g., raised footrope trawls) would have positive habitat benefits in areas where the gear is used. Habitat benefits that would result when certain areas are closed to fishing when a maximum catch (TAC) is reached would also be short-term and not very effective unless the area remained closed to all bottom-tending mobile gear for months at a time and/or the recovery time of benthic communities and seabed features was rapid. Measures that would allow unused DAS to be transferred to reduced impact gears would mitigate mobile gear effects.

Gear effects without any management measures are described as moderate to high. The implementation of fishery management measures have had incidental benefits as described above in the No Action alternative. The impact of any of the proposed Amendment 13 would add further benefits to offshore habitat. These benefits of the proposed alternatives are described in Section 5.3.6 of this document. The non-fishing

impacts described above are generally considered in the low to moderate range in the offshore areas. The incremental effect of low non-fishing activities would not likely cause cumulative effects in these offshore fishing areas. The moderate level impacts that might occur would be localized in nature and therefore would not appreciably accumulate to enhance the negative effects of gear described above. Considering the incidental beneficial impacts of any of the above-described alternatives combined with the non-fishing and fishery management measures, the resultant effect will generally be a net positive effect on fish habitat in the offshore area. Since the effects of any of these alternatives do not occur in inshore or riverine areas, the beneficial effects would not accumulate in these areas. This would be true for negative effects, which also would not accumulate in these areas.

5.7.7.4.3 Alternative 3 – Modified Groundfish Closed Areas

This alternative was not selected. The proposed modifications to the boundaries of existing closed areas are intended to expand the area of complex hard-bottom habitat (gravel-cobble-boulder) and protect it from any adverse effects associated with fishing, particularly by mobile, bottom-tending gear (trawls and dredges). There are slight differences in the proposed western boundary of the western GOM closed area in the two versions of this alternative (3a and b). The area that would be closed is 2,727 (3a) or 2,637 nm² (3b). These two alternatives rank high in terms of EFH area contained within the modified closed areas for 43 moderately and highly vulnerable species and life stages. More hard-bottom habitat (bedrock and gravel) would be protected than in any of the other six proposed closed area alternatives. The predominant substrates are sand and gravelly sand. Biomass indices for these two alternatives were high for benthivores, eleven principal groundfish species, and for six species that are closely associated with benthic habitats, and moderate for amphipod-feeding fish and a large group of demersal finfish species. The total benthic biomass index was high.

As with the previous alternative, the proposed modifications to the closed area boundaries under this alternative, combined with benefits of past manage measures, would have beneficial effects to EFH as a result of the additional hard-bottom protected areas. Thus, the negative effects of fishing offshore outside the closed areas would not accumulate and would be offset by the protection of the high quality hard-bottom areas. The slight difference in area between the two options would not result in any significantly different cumulative effects. No cumulative effects would occur in inshore/riverine areas as they are not affected by the closure.

5.7.7.4.4 Alternative 4 – Habitat Sub-Sets Within Modified Groundfish Closed Areas

This alternative was not selected. Areas within modified closed areas that would specifically protect hard-bottom habitats were selected. The area that would be closed is 2,241 nm². This alternative ranks just as high as alternative 3 in terms of EFH area for 43 moderately and highly vulnerable species and life stages. This alternative ranked second to #3 (a or b) in terms of the percent bedrock and gravel it contains. The predominant substrates are sand and gravelly sand. The biomass indices for this alternative were the same as alternative #3, i.e., high for benthivores, eleven principal groundfish species, and six species that are closely associated with benthic habitats, moderate for amphipod-feeding fish and a large group of demersal finfish species. The total benthic biomass index was high.

As with the previous alternative, the proposed modifications to the closed area boundaries under this alternative, combined with benefits of past manage measures would have beneficial effects to EFH as a result of the additional hard-bottom protected areas. As with the previous alternative, the negative effects of fishing offshore outside the closed areas would be offset by the protection of the high quality hard-bottom areas. No cumulative effects would occur in inshore/riverine areas as they are not affected by the closure.

5.7.7.4.5 Alternative 5 – Closed Areas Designed to Balance EFH AREA Protection and Fishery Productivity

This alternative was not selected.

5a (2,870 nm²) – Scaled for area, the five closed areas in this alternative contain a fairly high percentage of EFH area for 43 moderately and highly vulnerable species and life stages in the Northeast region. The percentage of gravel substrate is very low and there is no bedrock. The predominant substrates are sand and mud. Biomass indices for this alternative were low for benthivores and principal groundfish species, and moderate for amphipod-feeding fish, demersal finfish, and six species that are closely associated with benthic habitats. The total benthic biomass index was moderate.

5b (2,972 nm²) – Scaled for area, the five closed areas in this alternative contain a fairly high percentage of EFH area for 43 moderately and highly vulnerable species and life stages in the Northeast region. The area of gravel substrate is very low and there is no bedrock. The predominant substrate is sand. Biomass indices for this alternative were high for moderate for demersal finfish, moderate for benthivores and amphipod-feeding fish, and low for principal groundfish species and six benthic species. The total biomass index is moderate.

5c (2,803 nm²) – Scaled for area, the five closed areas in this alternative contain a high percentage of EFH area for 43 moderately and highly vulnerable species and life stages in the Northeast region. The percentage of gravel substrate is low and there is a very small amount of bedrock. The predominant substrates are sand and mud. Biomass indices for this alternative were low for principal groundfish species and moderate for benthivores, amphipod-feeding fish, demersal finfish species, and for six benthic species. The total benthic biomass index is moderate.

5d (2,918 nm²) – Scaled for area, the five closed areas in this alternative would contain a relatively low percentage of EFH area for 43 moderately and highly vulnerable species and life stages in the Northeast region. The percentage of gravel substrate is low and there is no bedrock. The predominant substrate is sand. Biomass indices for this alternative were low for benthivores, amphipod-feeding fish, principal groundfish, and benthic species, and moderate demersal finfish. The total benthic biomass index was low.

The four closed area options (a-d) included in this alternative, combined with benefits of past manage measures, would have beneficial effects to EFH as a result of the additional protected areas. However, gains in the amount of hard-bottom habitat would be considerably less than alternatives 3 or 4. Furthermore, the biomass of species associated with the bottom would be less per unit area than in any of the other alternatives. Nevertheless, the negative effects of fishing in un-protected offshore areas would be offset by the five area closures proposed in any one of these alternatives. No cumulative effects would occur in inshore/riverine areas as they are not affected by the closures.

5.7.7.4.6 Alternative 6 – Existing Groundfish Closed Areas Except for Areas Opened Under Scallop FW13 Closed Area Access Program (No Modifications to Closed Area Boundaries)

This alternative was not selected. This is the largest of the proposed closed areas (4,038 nm²). Scaled for area, the five closed areas in this alternative would contain a relatively low percentage of EFH area for 43 moderately and highly vulnerable species and life stages in the Northeast region. Some gravel substrate would be protected, but not as much as in the closed areas proposed in alternatives 3 and 4. The predominant substrate is sand. Biomass indices for this alternative were high for benthivores, principal groundfish species, demersal finfish species, and for six species that are closely associated with benthic habitats, and moderate for amphipod-feeding fish. Total benthic biomass ranked high.

This closed area option would have beneficial cumulative effects to EFH as a result of closing such a large area that includes some hard-bottom substrate. As was the case for alternatives 3 and 4, this area supports a high biomass of benthic species, including 11 principal groundfish species. However, scaled for area, EFH gains would be slightly less than all the other alternatives except 5d. The negative effects of fishing in offshore areas that remained accessible to trawling would be offset by the protection afforded by the closed areas. No cumulative effects would occur in inshore/riverine areas as they are not affected by the closures.

5.7.7.4.7 Alternative 7 – Expand List of Gears Prohibited in Existing Closed Areas

This alternative was selected in part. This measure would exclude bottom-tending mobile gears such as shrimp trawls and hydraulic clam dredges from the existing groundfish closed areas. These gears are known to adversely effect benthic marine habitats, so there would be a positive habitat benefit associated with this alternative. This would probably not be the case for other gears that contact the bottom, but have negligible effects on benthic habitat (e.g., pots, gill nets, and long lines). The proposed action only applies this restriction to hydraulic clam dredges.

The cumulative effect for this alternative, combined with benefits of past manage measures, would be to reduce gear effects by prohibiting a more inclusive list of gear types within the existing closed areas that adversely affect benthic habitats. This would have a net benefit to habitat within these areas and no cumulative negative effects within the areas would occur. Since the areas are offshore, this alternative should have no cumulative effects to inshore and riverine areas.

5.7.7.4.8 Alternative 8 – Restrictions on the Use of Rockhopper and/or Roller Gear

This alternative was not selected. There are five options for this management measure. The first would involve an immediate prohibition on the use of roller gear with a diameter greater than the current maximum size (31-36 inches). This would be the least effective option, since it would allow large roller gear to be used: trawling would be more difficult only in areas with large rocks that the smaller diameter rollers could not get over. Options (b), (c), and (d) would prohibit the use of roller gear larger than 22, 12, and 5 inches, either immediately or in a stepwise fashion over several years. The smaller the maximum size, the greater the area that could potentially become inaccessible to trawling.

These restrictions would indirectly reduce trawling effort in rocky bottom areas, but probably not eliminate it completely. Reducing the size of rockhopper and roller gear increases the probability that the gear will hang up and be damaged, thus increasing the risks of trawling in rocky bottom areas and encouraging fishermen to avoid them.

The cumulative effect of this alternative, combined with benefits of past manage measures, would be to reduce trawling in rocky bottom areas that remain open to mobile bottom-tending gear. The benefits of this alternative would increase as the maximum size of the prohibited roller gear decreases. Habitat benefits would also be greater if any of these options were implemented immediately as opposed to being phased in over several years (as many as six years in 8(e)), and, more importantly, if they applied in a larger versus a smaller area. Because nearshore habitats have already been compromised by coastal pollution and habitat development, the beneficial effects of reducing trawling in rocky bottom areas may be limited by the physical disturbance that has already occurred in these areas. However, when trawl gear does hang up in rocky bottom, habitat damage may be more severe in local areas.

5.7.7.4.9 Alternative 9 – Require Vessel Monitoring Systems On All Groundfish Vessels

This alternative was not selected. Use of VMS on all groundfish vessels will improve the quality of data needed to determine the amount of fishing activity that takes place in certain areas and habitat types at certain times of year. This information will improve our understanding of habitat disturbance patterns in the NE region and facilitate future management decisions.

There are no cumulative effects negative or positive associated with this alternative since there is no associated impact. However, the information provided will enable fishery managers to better relate management actions to fishing effort and thus make more informed decisions on future habitat actions.

5.7.7.4.10 Alternative 10 – Habitat Closed Areas that are Modifications of Existing Mortality Closures and Other Proposed Habitat Closures (*Preferred Alternative*)

This alternative was selected, in part. Alternative 10b is part of the proposed action as a Level 3 habitat protection area. Alternative 10a is the second largest habitat alternative (3,050 nmi²). Additionally, both 10a and 10b have a very high percentage of overlap with the existing groundfish closed areas (82% and 81%, respectively). For this reason, the vast majority of bottom area contained within this alternative has been relatively un-disturbed by mobile, bottom-tending gear for 5-8 years. The areas are between 58-60% sand, but there is a modest amount of gravel and gravelly sand as well. While alternative 10a protects more habitat than 10b, the cumulative effects of both alternatives are positive for habitat.

5.7.8 Social and Economic Effects of Habitat Measures

This cumulative impact assessment characterizes the magnitude of social and economic impacts likely to result from the alternatives considered in the Draft Environmental Impact Statement for the Essential Fish Habitat Components of Amendment 13 to the Northeast Multispecies Fishery Management Plan.

5.7.8.1 Social and Economic Conditions of Communities and Businesses

General Revenue Loss Impacts

Alternative 5b level 1 will result in the most significant revenue losses nearing 38 million dollars. The revenue impacts of Alternatives 6, 10a and 10b, which approach 4 million dollars, are significantly less than all other alternatives and is 33 million less than the losses likely to be experienced under alternative 5b, the most restrictive. The smallest losses are expected for Alternative 10b.

Port Community and Regional Impacts

The concentration of revenue loss for Level 1 EFH alternatives 3a, 3b, and 4 are localized in the New Bedford, Gloucester, and Cape Cod regions with a minimum of approximately 2/3 of the revenue loss coming from the community of New Bedford. A level 3 closure generally reduces overall revenue losses across ports except for New Bedford for which revenue loss remains constant for both closure levels. This results in an increase in the relative proportion (> 80%) of impact for New Bedford for these alternatives. Smaller impacts were found for the communities of Gloucester followed by Harwichport, and Chatham which were generally lower for level 3 closures. This contrasts with alternatives 5a, 5b, 5c, 5d, 10a and 10b, for which smaller revenue losses were more evenly distributed across five regions (New Bedford, Gloucester, New Jersey, Cape Cod, and Boston).

Surf Clam and Ocean Quahog Fishery: Alternatives 3a, 3b and 4 would have no impact on the surf clam/ocean quahog fishery. Alternative 6 would mitigate impacts for the most states but would have the largest overall impact and would affect the state of Massachusetts exclusively. Of the Alternatives that would affect the fishery, Alternative 5a would have aggregate impacts similar to that of Alternatives 5b and 5d but these impacts would be more broadly distributed across states in the Northeast region.

State	Total Bushels	Alternative 3a, 3b, & 4	Alternative 5a	Alternative 5b	Alternative 5c	Alternative 5d	Alternative 6	Alternative 10A & 10B
MA	936,236	0	4.1%	11.0%	11.0%	8.8%	40.7%	4.8%
MD	622,065	0	5.1%	0.0%	5.1%	0.0%	0.0%	0.0%
ME	108,590	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
NJ	3,788,123	0	2.4%	0.4%	2.4%	0.0%	0.0%	0.0%
RI	175,920	0	0.9%	0.9%	0.9%	44.6%	0.0%	2.1%
Totals	5,630,934	0	2.9%	2.1%	4.0%	2.9%	6.8%	0.9%

Table 362 - Proportional Loss of Surf Clam/Ocean Quahog Landings (bushels) by State and Alternative

Vessel length class

Alternative 5b has the greatest over-all impact across all vessel sectors for level 1 EFH closures ranging from income impacts of 10% for large and medium vessels to 23% for small vessels. Level 3 impacts remain the same for large vessels and fall below 10% for medium and small vessels. Alternative 6 has the least impact on revenue across all vessel categories, all of which are less than 3%. Revenue impacts for small and medium vessels are most affected by alternatives 5a - 5d while large vessels are more affected by alternatives 3a and 3b. Level 3 revenue impacts are generally lessened for medium and small vessels while large vessel impacts remain constant.

Number of affected vessels

The number of small vessels impacted is substantially less for a level 3 closure while the number of vessels impacted for large and medium vessel classes is not significantly different between level 1 and 3 closure alternatives. The number of boats affected and the average revenue loss of impacted vessels is greater for alternatives 5a, 5b, 5c, and 5d as compared to other alternatives.

Gear

The hook, gillnet, and trap gear sectors are consistently impacted across all alternatives for level one closures. These impacts are eliminated for level 3 closures. Scallop dredge and trawl gear sectors impacts remain the same for level 1 and level 3 closures.

5.7.8.2 Anticipated Revenue Losses for Habitat Alternatives Based on Input/Output Analysis

The impacts on gross sales, income and employment in the New England coastal would be greatest for Alternative 5b while either Alternative 6, 10A or 10B would reduce these impacts by nearly ten-fold. The impacts are likely to be an upper bound estimate since the potential impacts of Level 3 vis à vis Level 1 were not estimated. In between these extremes, the remaining alternatives form two clusters each having similar impacts within a cluster. Specifically, Alternatives 3a, 3b and 5c form one of these clusters with gross sales impacts of about \$100 million; income losses of about \$30 million; and employment losses of up to 1,400 jobs. Alternatives 4, 5a, and 5d form a second cluster with lower impacts of about \$70 million in sales, \$20 million in income losses, and losses of less than 1,000 jobs. Alternative 10b results in the lowest employment impact, with a loss of only 175 jobs.

Across sub-region the Massachusetts sub-regions of New Bedford, Gloucester, Cape and Islands, and Boston account for between 70 and 90% of economic impacts regardless of alternative. The New Bedford sub-region would be particularly affected followed by Gloucester and the Cape and Islands sub-region. For New Bedford the Level 3 habitat closure may not provide substantial relief because of the importance of scallops, monkfish, and groundfish in the New Bedford seafood economy.

5.7.8.3 Cumulative Effect on Communities and Businesses

In general, impacts across all forms of analysis identified habitat alternative 5b as having the greatest impact and alternatives 6, 10a, and 10b as having the least. In between these extremes, more severe impacts (gross sales impacts of about \$100 million; income losses of about \$30 million; and employment losses of up to 1,400 jobs) will result from alternatives 3a, 3b, and 5c. Less severe impacts (losses of about \$70 million in sales, \$20 million in income losses, and losses of less than 1,000 jobs) will result from alternatives 4, 5a, and 5d. The cumulative effects of habitat alternatives on communities are negative, and are evident in the predicted loss of income and jobs. Cumulative effects of alternatives 4, 5a, 5d, 10a and 10b will be less severe and long-lasting than those resulting from alternatives 5b, 5c, 3a, and 3b. Generally speaking, the amount of area closed to fishing does not predict the severity of cumulative effects of these closure measures on communities. Location and timing of closures are more important factors in determining how these alternatives will affect the fishery.

For all VTR records retained for analysis, the total estimated gross revenue from all species reported during calendar year 2001 was \$296.3 million. For a Level 1 habitat closure the relative change in total gross revenues ranged from a low of 1.3% for Alternative 6 to a high of 12.8% for Alternative 5b. The remaining alternatives all ranged between 5 and 8% in total revenue impact with little appreciable difference between Alternatives 3a (7.8%) and 3b (7.4%) or between Alternatives 4 (5.3%) and 5d (5.6%).

Revenue impacts across species were more varied across alternatives than total revenue impacts. The impact on monkfish revenue was between 11 and 18% under any of the variants of Alternative 5 a-d. By contrast, scallop revenue impacts were largest under Alternative 5b (10.8%) but were less than 1.5% for Alternatives 5a, c, and d. Revenue losses for small mesh fisheries for whiting and squid were similar (about 3%) for Alternatives 5a, b, and c but were less than 1% for all others. Revenue losses for combined "other" species (dogfish, skates, lobster, shrimp, herring, mackerel, tunas, and clams) were greatest for Alternatives 5b (12.7%) and 5c (11.4%) but were similar all other habitat alternatives (from 3.5 to 6.5%). Revenue losses for groundfish were highest for Alternative 5b (21.6%) and lowest for Alternative 6 (1.7%). With only two exceptions revenue losses for groundfish exceeded that of all other species across all alternatives. Revenue losses for combined summer flounder, black sea bass, and scup were 0.1% for all alternatives other than the variants of Alternative 5. Among these alternatives, revenue losses were similar for Alternatives 5a, c, and d.

A Level 3 habitat closure would mitigate revenue impacts on stationary bottom tending gear, and as a result, total revenue impacts would be lessened. The revenue losses for a Level 3 closure ranged from 8.1% (Alternative 5b) to 0.5% (Alternative 6). Compared to the Level 1 closure effects, the revenue losses for the remaining alternatives were about 1 to 2% lower. However, revenue losses for specific species groups were substantially reduced. Since a large proportion of monkfish are landed with gillnet gear the Level 3 closure would mitigate a substantial proportion of estimated monkfish revenue losses. Similarly, revenue losses for the "other" species group would be mitigated under a Level 3 closure because a significant proportion of these revenues are comprised of lobster using trap gear. Revenue losses for groundfish would be partially offset by a Level 3 closure since gillnet and hook segments of the groundfish fishery would not be affected. However, trawl gear accounts for the majority of groundfish effort so groundfish revenue losses would still range between 9 and 14% for all alternatives except Alternative 6.

Overall, the relative difference between a Level 1 and Level 3 habitat closure mitigates about 22% of total revenue losses for Alternatives 3a, 3b, and 4. For the Alternative 5 variants the revenue losses are reduced by as much as 46% (Alternative 5c). Much of this reduction in revenue impact is associated with savings of monkfish gillnet and lobster trap fishery revenues.

As a share of total revenue loss, groundfish losses for a Level 1 closure range from a low of 27% for Alternative 6 to a high of 54% for Alternative 4. Revenue losses for scallops represent about one-quarter of revenues loss for Alternative 4 and nearly one-third of total losses for Alternatives 3a, 3b, and 5b. Monkfish

revenue losses were 7% or less of total revenue losses for Alternatives 3a, 3b, and 4 but were at least 12% of revenue losses for all other alternatives.

Since a Level 3 habitat closure does not provide any relief to fisheries using mobile bottom-tending gear the share of revenue impact for fisheries that are dominated by these mobile gears increases relative to other fishery impacts. For example, the combined share of groundfish and scallop revenue losses is at least 70% for all Alternatives and is as much as 90% of revenue impact for Alternative 4.

5.7.8.4 Habitat Alternative Impacts on Protected Species

The Habitat alternatives also have a generally slightly positive to positive cumulative impact to protected resources in comparison to No Action. Again without the habitat alternatives, positive impacts to protected resources would result from the existing closed areas in the short term. However, the threats to large whales discussed above would likely continue until specific measures identified in the ongoing and future recovery plans and the forthcoming Atlantic Large Whale Take Reduction Plan are implemented through some future action or regulation, as appropriate. The overall cumulative effect of the rebuilding alternatives (Alternative 2) is considered positive to protected species, as discussed above. However, since the closures are made for fishery management purposes, they are subject to change by future management actions, for example, when the stocks are rebuilt. Closed area alternatives 3, 4, 5, 6 and 10 would be more permanent since they are for the purpose of habitat protection. Since the concern here is mobile bottom-tending gear such as trawls, the benefits to large whales, which will still interact with gillnets may be less positive for those species. Such closures would still reduce effort and gear in these areas and therefore reduce gear interaction with small mammals and turtles. Additional benefits would incur if habitat closures were chosen in addition to Alternative 2. Alternatives 2, 6 and 10 were identified as preferred alternatives. It is difficult to assess the impact of Alternative 7, since the gear that would be proposed for exclusion is not specified. Thus, the effects are unknown. It is not likely that Alternatives 8 (Restrictions on Rockhopper/roller gear) and Alternative 9 (VMS on all groundfish vessels) will have much positive effect and thus cumulative benefit to protected species. The latter may have positive indirect effects since it will provide accurate data on gear use and area identifying where effort is in relation to species distribution data. However, the overall cumulative effect would likely be negligible to none.

5.7.9 Other Foreseeable Local, State, and Federal Actions

While the measures to achieve rebuilding are expected to result in economic benefits to the industry over the long term, some effects of short term declines in revenues and jobs may be irreversible, restricting the economic growth of the industry during later years when the resource has been rebuilt. Two such effects are gentrification and delocalization. The process of gentrification transforms working harbors into upscale areas primed for recreation and tourism, replacing infrastructure that supports the commercial fishing industry with waterfront housing, entertainment and dining establishments, or other facilities. Among the businesses and industry support structures that may be eliminated are vessel maintenance and repair facilities, equipment manufacturers and retailers, fish processing plants, fish auctions, and provisioners of food, ice, fuel, oil, and other goods. As the industry is restricted in their ability to catch fish, the related land-based infrastructure is also constrained. With increasing shoreline property prices and an economically strained industry, this infrastructure may be permanently replaced by new entities with alternative functions. Hall-Arber et al. (2001) noted that “if the facilities as well as the stocks are not protected, once the biophysical capital rebounds, communities dependent on [these] facilities...will not be able to take advantage of the improved stock conditions to generate fisheries capital for the region and nation.” These structural changes to the economy and physical composition of fishing communities are accompanied by delocalization, or the loss of localized community character and culture (Hall-Arber et al. 2001). Long-standing traditions and close-knit alliances that unite fishing communities and families may cease to exist.

Amendment 13 does not introduce measures that specifically seek to mitigate these problems of infrastructure loss and the changing culture of fishing communities in New England. This may have serious long-term economic and social effects. However, it can be assumed that if such reductions in land-based infrastructure are significant, the income, revenue and employment trajectories will be more depressed in later years than predicted by the quantitative economic analyses in this document. Hall-Arber et al. suggest that fishing community sites at greatest risk of gentrification and delocalization are those that are most “industrial” in appearance and closest to centers of urban activity, such as Gloucester and New Bedford.

Accompanying de-localization and gentrification is a change in the composition of fishery participants. Certain individuals who currently participate in the groundfish fishery may be forced to retire from fishing or move into another fishery. The implications of this are that long-term economic gains may not apply to current fishery participants if these individuals have left the groundfish fishery.

The impacts of possible future state and local community actions are difficult to evaluate, given the complexity and geographic range of the groundfish industry. In some communities, actions have been taken to preserve shoreline access for fishing businesses, through restrictions on use or through tax advantages. Such measures help slow gentrification and loss of the waterfront, helping to preserve infrastructure. Other communities have been less committed to maintaining a commercial fishing presence, and have encouraged increased use of waterfront property for tourist, recreational boating, or residential uses.

States have partnered with the federal government in the past to administer emergency relief to fishermen affected by restrictive groundfish regulations. State universities have initiated several programs to educate fishermen about options to groundfishing, including the use of fishing vessels to participate in scientific research projects funded by a variety of sources. In some cases, states have altered regulations for fishing in state waters to provide additional opportunities to fishermen coping with strict federal regulations. These direct interactions with the fishing industry are only one possible source of future impacts. State decisions on permitting of power plants, coastal wind farms, or other shoreside development could impact groundfishing in the future, though near-coast actions will have less impact on those groundfish species that do not rely on estuaries for a significant part of their life-cycle.

Reasonably foreseeable federal actions include additional or revised fishing regulations, both for the groundfish fleet and for other target species. Amendment 13 clearly contemplates adjustments in the future to make sure that target fishing mortalities are met, and provides room for special access programs if fishing mortality is too low. But many vessels depend on groundfish for only a portion of their fishing income. Revised regulations to cope with changing stock conditions for these other species could either positively or adversely impact fishing communities, depending on whether revenues increase or decline as a result. Any federal efforts to mitigate impacts of the regulations, such as through direct assistance to fishing vessels or through the funding of job retraining programs, etc., could mitigate some of the impacts of this action on communities. Federal support for an industry-funded buyout, if sufficient in magnitude, could help reduce the capacity of the groundfish fleet and improve the profitability of the industry. Some federal actions could have indirect effects. Federal decisions on offshore petroleum access, for example, could have either a positive or negative effect on the habitat and groundfish, and, as a result, the fishing communities dependent on those resources.

Fishery Program Administration Measures

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat	
Fishing Year (Not selected)	(O)	(O) possible indirect benefits for bycatch reduction	(O)	(O)	
• No Action					
• Calendar-based					
• Beginning in October					
• Beginning in July	(O)	slight (-)	(O)	(O)	
DAS Proration (Not selected)					
• DAS Proration Option 1					
• DAS Proration Option 2					
• DAS Proration Option 3	(O)	(O)	(O)	(O)	
Periodic Adjustment Process					
• No Action Alternative (Not selected)	(O)	(O)	(O)	(O)	
• Modified Periodic Adjustment Process (Proposed action)					
US/CA Resource Sharing Understanding (Proposed action)	(O)	(O)	(O)	(O)	
Administration of Certified Bycatch/Exempted Fisheries (Proposed action)	slight (-) administrative costs	indirect (+)	(O)	(O)	
Special Access Programs (SAP)	(+) provide increased harvesting opportunities/flexibility	(O)	(O)	(O)	
• Georges Bank Yellowtail Flounder Special Access Program (Proposed action)					(-) for GB yellowtail fl. (O) other species
• Southern New England/Mid-Atlantic Winter Flounder Incidental Catch Program (Proposed action)					(O)
• U.S./CAN Resource Sharing Understanding SAP (Proposed action)					may be slightly (-) depending on specific measures chosen

Table 363 - Summary of Impacts of Fishery Program Administration Measures

(+) = positive effect

(-) = negative effect

(O) = neutral or negligible effect

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Closed Area Administration	(O)			
• Rationale for Closed Areas (Proposed action)		(O)	(O)	(O)
• Access to Closed Areas (Not selected)		slight (-) Options 1-4 (+) Options 2,3,4 for non-target species (+) Option 5	(-) Options 1 & 2 for rt. whales (O) Options 3 & 4 (+) Option 5	possibly (-) Option 1 (O) Options 2,3,4 (+) Option 5
• Review of Year-Round Closed Areas (Not selected)		(O)	(O)	(O)
Flexible Area Action System (FAAS)	(O)	(O)	(O)	(O)
• No Action Alternative (Not selected)				
• Eliminate the FAAS (Proposed action)				
Leasing of DAS	(+)	(O) as long as total allocation is capped at appropriate level; may be (-) if not closely monitored	possibly (-) if effort increases in certain gear sectors	(O)
➤ Conservation Equivalency Alternatives				
• Option 1 – Leasing Within Categories (Not selected)				
• Option 2 – Calibrated DAS (Not selected)				
• Option 3 – Leasing Within Size Categories (Proposed action)				
➤ Limitations on Number of DAS Leased				
• Option 1 (Not selected)				
• Option 2 (Proposed action)				
➤ Permit History Provisions				
Recreational Fishing Permit (Not selected)	slight (-)	indirect (+)	(O)	(O)
• Option 1				
• Option 2				
• Option 3				
• Option 4				

Table 363 - Summary of Impacts of Fishery Program Administration Measures(cont.)

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
"Running Clock" Alternatives (Not selected)				
• Option 1 – No Action	(O)	(O)	(O)	(O)
• Option 2 – Industry funded weighmaster	(-)	possible (+) convert regulatory discards to landings		
• Option 3 – Extended modified running clock	(+)			
Observer Coverage				
• Option 1 – No Action (Not selected)	(O)	indirect (+)	(O)	(O)
• Option 2 – Observer Coverage Level Specified in Court Order (Not selected)			(+)	
• Option 3 – Observer Coverage Level Adjusted by NMFS (Proposed action)			(+)	
VMS Requirements (Proposed action)	(-)	indirect (+)	(O)	(O)
Day Gillnet Block Out of Fishery (Not selected)				
• Option 1	(O)	(O)	(O)	(+)
• Option 2	slight (+)			(O)
• Option 3	slight (+)			(O)
DAS Counting (Not selected)				
• Option 1 – No Action	(O)	(O)	(O)	(O)
• Option 2 – 15 hour minimum	(-)	slight (+)		slight (+) reduced bottom contact time
• Option 3 – 24 hour DAS	(-)	but indirect (-) due to diminished data quality		
Reporting Requirements				

Table 363 - Summary of Impacts of Fishery Program Administration Measures(cont.)

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
<i>Dealer Reporting Options</i>				
• Option 1 – No Action (Not selected)	(O)	(O)	(O)	(O)
• Option 2 – Trip Identifier (Not selected)	slight (-)	indirect (+)		
• Option 3 – Daily electronic reporting (Proposed action)	(-)			
• Option 4 – Daily electronic reporting, small dealer exception (not selected)	(-)			
<i>Vessel Reporting Options</i>				
• Option 1 – No Action (Not selected)	(O)	indirect (+)	(O)	(O)
• Option 2 – Trip Identifier w/ future electronic reporting (Proposed action)	slight (-)			
• Option 3 – VMS Action (Not selected)	(-)			
• Option 4 – VMS over 45 ft Action (Not selected)	(-)			
• Option 5 – Declaration into one fishing area Action (Not selected)	(--)			
• Option 6 – Call-in system modification (Proposed action)	slight (-)			
• Option 7 – Electronic reporting (Not selected)	(-)			
<i>Hand-Gear Only Permit Alternatives</i>				
• Alternative 1 Action (Not selected)	(O)	(O)	(O)	(O)
• Alternative 2 Action (Not selected)				
• Alternative 3 (Proposed action)				
• Category A – Limited Access				
o Option 1 (Not selected)				
o Option 2 (Proposed action)				
• Category B – Open Access				

Table 363 - Summary of Impacts of Fishery Program Administration Measures(cont.)

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Sector Allocation (general) (Proposed action)	(+) increased opportunity participate in regulatory process; provides autonomy to fishers	(O)	(O)	(O)
• Formation of a Sector				
• Sector Review and Approval				
o Option 1 – Streamlined Approval Process				
o Option 2 – Periodic Adjustment Process (Proposed action)				
• Movement Between Sectors				
o Option 1				
o Option 2				
o Option 3 (Proposed action)				
• Allocation of Resources				
o Option 1				
o Option 2 (Proposed action)				
• Mortality/Conservation Controls				
• Enforcement of Sector Provisions/VMS Requirements				
• Interaction of Sector with Common Pool Vessels				
Georges Bank Hook/Gillnet Sector Allocation	(+) increased opportunity to participate in regulatory process; provides autonomy to GB cod hook and gillnet sectors	(+) gear restrictions, TACs, closed seasons	(O)	(O)
• Georges Bank Cod Hook Sector (Proposed action)		slight (-) for haddock		
• Georges Bank Cod Gillnet Sector (Not selected)				
• Hook/Gillnet Sector Georges Bank CA I Access Program			possible (-) for habitat in CA I	
Gulf of Maine Inshore Conservation and Management Stewardship Plan (Not selected)	(+) increased opportunity to participate in regulatory process; provides autonomy to GOM inshore fishers	(+) if implemented in conjunction with other measures	(O)	(O)

Table 363 - Summary of Impacts of Fishery Program Administration Measures(cont.)

Capacity Reduction Alternatives

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Past Actions	(-)	(++)	(+)	(+)
Amendment 13 Measures				
No action alternative (Not selected)	(O)	(O)	(O)	(O) unknown possible slight (+) in short-term if effort reduced; possible slight (-) if latent DAS reactivated
Alternative 1 - Permit Absorption (Not selected)	(+) for multispecies/scallop limited access multispecies permit holders only	Slight (+) most benefits with DAS reduction Option 4 and DAS reactivation Option 2	generally (O); may be (-) for turtles if much effort enters into scallop fishery	
• Option 1				
• Option 2a				
• Option 2b				
• Option 3				
• Option 4				

Table 364 - Summary of Impacts of Capacity Reduction Alternatives

(+) = positive effect
 (-) = negative effect
 (O) = neutral or negligible effect

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Alternative 2 – Permit Transfer (Not selected)	(+)	Slight (+) but not as beneficial as Alternative 1	generally (O); may be (-) for large whales, harbor porpoise, & seals if effort moves substantially from trawls to gillnets	unknown possible slight (+) in short-term if effort reduced; possible slight (-) if latent DAS reactivated
• Option 1				
• Option 2a				
• Option 2b				
• Option 3				
• Option 4				
Alternative 3 – DAS Transfer (Proposed action)	(+)	Slight (+) Option 1 – (+) long term effort reduction Option 2 – less (+)	(O)	unknown possible slight (+) in short-term if effort reduced; possible slight (-) if latent DAS reactivated
• Option 1				
• Option 2				
Alternative 4 - Freeze on Unused DAS (Not selected)	(+)	slight (+)	(O)	(O)
• Option 1				
• Option 2				
Alternative 5 - DAS Reserve (Proposed action)	(+)	(+)	(O)	(O)

Table 364 - Summary of Impacts of Capacity Reduction Alternatives(cont.)

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Alternative 6 - Mandatory latent effort categorization with voluntary flexibility options (Not selected)	(+)	(+)	(O)	(O)

Table 364 - Summary of Impacts of Capacity Reduction Alternatives(cont.)

Management Alternatives to Address Rebuilding Requirements

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Proposed Action • Reduction in allocated DAS and limits on use • Trip limit adjustments • Gear restrictions • Opportunity to target healthy stocks	(-) Greatest impacts on MA, ME, NH communities, vessels/communities most dependent on groundfish Impacts less than Alternative 1	(+) lowest mortality reduction benefit for white hake, witch flounder, plaice Combinatino of adaptive and phased strategy provide less benefit than constant mortality strategy	(+) less than Alternative 1, given opportunity to use Category B DAS	(+) effort reduction reduces bottom contact time.
No action alternative	(O)	(O)	(O)	(O)
Alternative 1 – Up to 65% reduction in used DAS (Not selected) • Option 1 – 55% reduction in used DAS • Option 2 – Phase-in of 65% DAS reduction	(-) Greatest DAS reductions Greatest impacts on MA, ME, NH vessels/communities, those most dependent on groundfish	(+) lowest mortality reduction benefit for white hake, witch flounder and Am. plaice	(+)	(+) effort reduction reduces bottom contact time
Alternative 2 – Reduction in allocated DAS/gear modifications (Not selected)	(-) greatest impacts on vessels most dependent on cod	(+) but hard TAC required to meet mortality reductions for nearly all stocks	slight (+) for whales, seals, harbor porpoise (O) for turtles	(+)
Alternative 3 – Area Management (Not selected)	Unknown, similar to alternative 4	(+) but substantially lower than required mortality reductions without hard TAC	(O)	unknown

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Alternative 4 – Hard TAC Alternative (Not selected)	(-) less negative impact than Alternatives 2 and 3 more favorable for small vessels least impact on small hook and gillnet vessels	(+)	(O)	unknown

Table 365 - Summary of Impacts of Measures to Address Rebuilding Requirements

(+) = positive effect

(-) = negative effect

(O) = neutral or negligible effect

Recreational Fishing Measures

Alternative Name	Effects on Communities	Effects on Groundfish Stocks	Effects on Protected Species	Effects on Habitat
Option 1 – FW 33 Settlement Agreement (Not selected)	(O)	(+)	(O)	(O)
Option 2 (Not selected)	slight (-)	(+) most beneficial	(O)	(O)
Option 3 (Proposed action)	slight (-) least restrictive of 3 options	(+) least beneficial	(O)	(O)

Table 366 - Summary of Impacts of Recreational Fishing Measures

(+) = positive effect

(-) = negative effect

(O) = neutral or negligible effect

Cumulative Effects

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
• inshore	none	negative	Negative	negative
• offshore	none	negative		negative
Non-Fishing Entities and Actions (see Table 359)				
• inshore	chemical and biological – negative physical – positive, short-term; possibly negative long-term	negative, moderate		negative, moderate-high
• offshore		negative, low	Unknown	negative, low
Past Actions	short-term negative, high long-term positive, low	positive, moderate-high	Positive-low	positive, low
Reasonably Foreseeable Future Actions				
<i>Local</i>				
• Preserve industry waterfront access	positive	none	None	none
• Promotion of tourism, waterfront development	negative (fishing community)	positive	Cetaceans Negative-low	unknown
<i>State</i>				
• Coastal facility permitting decisions	unknown	unknown	Unknown	unknown
• Fishing industry support	positive	None	Negative-low	none
• University support for fishing industry research	positive	positive	Unknown	positive
<i>Federal</i>				
Regulatory decisions for other fisheries	unknown	unknown	Unknown	unknown
• Direct industry support	positive	unknown	unknown	unknown
• Offshore permitting decisions	unknown	unknown	unknown	unknown
Amendment 13 - Fishery Program Administration Measures				
Fishing Year	none	none	none	none
• No action (selected)				
• Calendar-based				
• Beginning in October				
• Beginning in July				

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
DAS Proration (not selected)	none			none
•DAS Proration Option 1		negative, low	Unknown	
•DAS Proration Option 2		none	none	
Periodic Adjustment Process	none	none	none	none
•No Action Alternative (not selected)				
•Modified Periodic Adjustment Process				
US/CAN Resource Sharing Understanding (selected)	negligible	none	none	none
Administration of Certified Bycatch/Exempted Fisheries (selected)	negligible (low administrative costs)	long-term positive, indirect	None	none
Special Access Programs (SAP) (selected)	positive, low			negligible
•Georges Bank Yellowtail Flounder Special Access Program		negligible	Negligible	
•Southern New England/Mid-Atlantic Winter Flounder Incidental Catch Program		negligible	Negligible	
•U.S./CAN Resource Sharing Understanding SAP		may be negative, low	Negligible	
•CAI hook gear CAP		Negligible	Negligible	
Closed Area Administration	none may be negative for certain fisheries, extent unknown			none
•Rationale for Closed Areas (selected)		none	none	
•Access to Closed Areas (not selected)		none for Options 1-4 positive, low for Option 5	Unknown-negligible	
•Review of Year-Round Closed Areas (not selected)		none	None	
Flexible Area Action System (FAAS)	none	none	None'	none
•No Action Alternative (not selected)				
•Eliminate the FAAS (selected)				

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
Leasing of DAS (selected)	positive, moderate for participants low to negligible for others	none	Possibly Negative due to potential increase	none
➤ Conservation Equivalency Alternatives			No cumulative effects if these measures are in effect; Otherwise, negative due to increase in effort.	
•Option 1 – Leasing Within Categories				
•Option 2 – Calibrated DAS				
•Option 3 – Leasing Within Size Categories (selected)				
➤ Limitations on Number of DAS Leased				
• Option 1				
• Option 2 (selected)				
➤ Permit History Provisions				
Recreational Fishing Permit (not selected)	negative but negligible	long-term positive, indirect	none	none
• Option 1				
• Option 2				
• Option 3			None	
• Option 4				
"Running Clock" Alternatives		none	None	none
•Option 1 – No Action (selected)	none			
•Option 2 – Industry funded weighmaster	negative, low			
•Option 3 – Extended modified running clock	positive, low -moderate			
Observer Coverage	negligible	long-term positive, indirect		none
• Option 1 – No Action			Negligible	
• Option 2 – Observer Coverage Level Specified in Court Order			Positive-low	
• Option 3 – Observer Coverage Level Adjusted by NMFS (selected)				
VMS Requirements (selected)	negative, moderate	positive, indirect	None	none

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
Day Gillnet Block Out of Fishery				
Option 1	none	none	Positive-low	none
Option 2	positive, low (gillnet sector)	negative, low	Negative-low	
Option 3	positive, low (gillnet sector)		Negative	
DAS Counting				
Option 1 – No Action (selected)	none	none	Negligible	none
Option 2 – 15 hour minimum	negative, low	positive, low (effort reduction) negative, indirect (diminished data quality)	Negligible	positive, low
Option 3 – 24 hour DAS	negative, moderate		Positive-low	
Reporting Requirements	negative, slight to moderate	positive, indirect	none	none
Dealer Reporting Options				
• Option 1 – No Action				
• Option 2 – Trip Identifier				
• Option 3 – Daily electronic reporting (selected)				
• Option 4 – Daily electronic reporting, small dealer exception				
Vessel Reporting Options				
Option 1 – No Action				
Option 2 – Trip Identifier (selected)				
Option 3 – VMS				
Option 4 – VMS over 45 ft				
Option 5 – Declaration into one fishing area			none	
Option 6 – Call-in system modification				
Option 7 – Electronic reporting for all vessels				

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on	Cumulative Effects on
Hand-Gear Only Permit Alternatives	none	none	none	none
Alternative 1				
Alternative 2				
Alternative 3 (selected)				
Category A – Limited Access				
Option 1				
Option 2 (selected)				
Category B – Open Access				
Sector Allocation (general) (selected)	unknown	none		none
• Formation of a Sector			none	
• Sector Review and Approval				
Option 1 – Streamlined Approval Process				
Option 2 – Periodic Adjustment Process				
• Movement Between Sectors				
Option 1				
Option 2				
Option 3				
• Allocation of Resources				
Option 1				
Option 2				
• Mortality/Conservation Controls				
• Enforcement of Sector Provisions/VMS Requirements				
• Interaction of Sector with Common Pool Vessels				

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species Species	Cumulative Effects on Habitat
Georges Bank Hook/Gillnet Sector Allocation	positive for hook/gillnet sectors, extent unknown	positive, low (Georges Bank)	unknown	none
• Georges Bank Cod Hook Sector (selected)				
• Georges Bank Cod Gillnet Sector (not selected)				
• Hook/Gillnet Sector Georges Bank CA I Access Program (not selected, but see above)		negative (for GB haddock), extent unknown	unknown	none
Gulf of Maine Inshore Conservation and Management Stewardship Plan (not selected)	unknown	positive, low	Unknown/positive if increase in observer coverage	none
Amendment 13 Measures- Capacity Reduction Alternatives				
No action alternative	Existing condition continue	none	Generally negative in short term with a more positive outcome pending the improvements implemented through recovery and take reduction plans	Generally Negative except for closed areas where impacts are positive
Alternative 1 - Permit Absorption (not selected)	positive, low	Slight (+)	None – Slightly positive due to potential control of latent effort; May be negative for turtles if effort shifts to scallops	Positive-low
• Option 1				
• Option 2a				
• Option 2b				
• Option 3				
• Option 4				
Alternative 2 – Permit Transfer (not selected)	positive, low	Slight (+)	None – Slightly positive due to potential control of latent effort; May be negative for large whales, small cetaceans, seals and turtles if effort shifts from trawls to gillnets	Positive-low
• Option 1				
• Option 2a				
• Option 2b				
• Option 3				
• Option 4				

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species Species	Cumulative Effects on Habitat
Alternative 3 – DAS Transfer (selected)	positive, low	Slight (+) Option 1 - long-term positive, Option 2 – positive, low	None – Slightly positive due to potential control of latent effort; May be negative for large whales, small cetaceans, seals and turtles if effort shifts from trawls to gillnets	Positive-low
• Option 1				
• Option 2				
Alternative 4 – Freeze on Unused DAS (not selected)	positive, low	Slight (+)	None – Slightly positive due to potential control of latent effort; May be negative for large whales, small cetaceans, seals and turtles if effort shifts from trawls to gillnets	none
• Option 1				
• Option 2				
Alternative 5 – DAS Reserve (selected)	Positive, moderate	(+)	Slightly positive to moderately positive due to mandatory control of latent effort	none
Alternative 6 – Mandatory latent effort categorization with voluntary flexibility options (not selected)	Positive, moderate	(+)	Slightly positive to moderately positive due to mandatory control of latent effort	none

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
Amendment 13 Measures - Management Alternatives to Address Rebuilding Requirements				
No action alternative	Positive, low. Landings and revenues expected to increase for many stocks, but not to same extent as for rebuilding alternatives.	Positive, low. Many stocks projected to increase in short term, but will not achieve rebuilding targets.	Generally positive in short term existing closures are coincident with important use areas; long term closures are uncertain since they are subject to fishery management actions	Negative
Proposed Action	negative, high	positive, high	Adds further benefits but degree is unknown	positive, moderate
Alternative 1 – Up to 65% reduction in used DAS (not selected)	negative, high	positive, high	Adds further benefits to No Action but degree is unknown	positive, moderate
•Option 1 – 55% reduction in used DAS				
•Option 2 – Phase-in of 65% DAS reduction				
Alternative 2 – Reduction in allocated DAS DAS/gear modifications (not selected)	negative, high	positive, high	Adds further benefits to No Action but degree is unknown	positive, moderate
Alternative 3 – Area Management (not selected)	unknown	positive, moderate		unknown
Alternative 4 – Hard TAC Alternative (not selected)	negative, high	positive, high		unknown

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
Amendment 13 Measures - Recreational Fishing Measures				
Option 1 – FW 33 Settlement Agreement	none	positive, low	none	none
Option 2	negative, low	positive, low		none
Option 3 (selected)	negative, low	positive, low		none
Amendment 13 – Alternatives to Minimize the Adverse Effects of Fishing on Habitat				
Alternative 1 - No Action	Existing Conditions Continue	Positive-low	Generally positive in short term existing closures are coincident with important use areas; long term closures are uncertain since they are subject to fishery management actions	Generally Negative except for closed areas where impacts are positive
Alternative 2 – Complementary benefits of other Amendment 13 Alternatives (Preferred Alternative) (selected)	negative	positive	Positive for all species; long term closures are uncertain since they are subject to fishery management actions	positive
Alternative 3 - Habitat closed areas	negative	positive	Positive for small mammals and turtles; only slightly positive for whales if gillnets are not excluded	positive, high
Alternative 3A				
Alternative 3B				
Alternative 4 – Habitat Subsets of Modified Groundfish Closed Areas	negative	positive	Positive for small mammals and turtles; only slightly positive for whales if gillnets are not excluded	positive, moderate-high

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
Alternative 5 - Closed areas designed to protect EFH balance fishery productivity		positive	Positive for small mammals and turtles; slightly positive for whales if gillnets excluded	positive, moderate
• Alternative 5A – EFH/Productivity tradeoffs using group species EFH weights vs. scallop productivity and other managed species productivity	negative			
• Alternative 5B – Total EFH value only using revised species EFH weights with no productivity tradeoff	negative, high			
• Alternative 5C – EFH/Productivity tradeoffs using revised species EFH weights vs. scallop productivity and other managed species productivity	negative			
• Alternative 5D – EFH/Productivity tradeoffs using revised species EFH weights vs. productivity by species for ea. individually				
Alternative 6 – Habitat Closures Consistent with the Framework 13 Scallop Closed Areas Access Program (Preferred Alternative)	negative, low	positive	Positive for small mammals and turtles; only slightly positive for whales if gillnets are not excluded	positive, moderate (but less than alternative 5)
Alternative 7 - Expand list of gears prohibited in closed areas (selected)	negative for prohibited gears none for others	positive, low	Unknown: Could be positive, negligible or negative depending upon type and level of gear displacement to areas where species occur	positive, moderate-low

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)

Alternative Name	Cumulative Effects on Communities	Cumulative Effects on Groundfish Stocks	Cumulative Effects on Protected Species	Cumulative Effects on Habitat
Alternative 8 - Restrictions on the use of rockhopper roller gear	negative for rockhopper/roller none for others	positive, low	negligible	positive, moderate-low
• Habitat Alternative 8A				
• Habitat Alternative 8B				
• Habitat Alternative 8C				
• Habitat Alternative 8D				
• Habitat Alternative 8E				
Alternative 9 - VMS on all groundfish vessels	negative, moderate	positive, indirect	none	none
Alternative 10 - Habitat Closed Areas that are Modifications of Existing Mortality Closures and Other Proposed Habitat Closures (Preferred Alternative)	negative, low	positive	Positive for small mammals and turtles; only slightly positive for whales if gillnets are not excluded	positive, high
Alternative 10A	more impact than 10B			more beneficial than 10B
Alternative 10B (selected)	less impact than 10A			less beneficial than 10A

Table 367- Summary of Cumulative Effects of the Amendment 13 Proposed Action and Other Actions (cont.)