Framework Adjustment 47

to the

Northeast Multispecies FMP

Appendix I

Summary of Past, Present, or Reasonably Foreseeable Future Actions

APPENDIX V

The actions summarized in the table below are presented in chronological order, and codes indicate whether an action relates to the past (P), present (Pr), or reasonably foreseeable future (RFF). When any of these abbreviations occur together, it indicates that some past actions are still relevant to the present and/or future. A brief explanation of the rationale for concluding what effect each action has (or will have) had on each of the VECs is provided in the table and is not repeated here.

Table I-1. Impacts of Past, Present and Reasonably Foreseeable Future Actions on the five VECs. These actions do not include those which were considered to have little impact on the fishery or actions under consideration in this framework.

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
MULTISPECIES FISHERY-RELATED ACTIONS						
[P] Prosecution of the groundfish fisheries by foreign fleets in the area that would become the U.S. EEZ (prior to implementation of the MSA)	Foreign fishing pressure peaked in the 1960s and slowly declined until passage of the MSA in 1974 and implementation of the Multispecies FMP	**Direct High Negative** Foreign fishing depleted many groundfish stocks	**Potentially Direct High Negative** Limited information on discarding, but fishing effort was very high and there were no gear requirements to reduce bycatch	**Potentially Direct High Negative** Limited information on protected resources encounters, but fishing effort was very high	**Potentially Direct High Negative** Limited information on habitat, but fishing effort was very high	**Potentially Indirect Negative** Revenue from fishing was split between foreign and domestic communities, rather than just domestic communities
[P] Original FMP implemented in 1977	Established management of cod, haddock and yellowtail via catch quotas, quota allocations by vessel class and catch limits	**Direct Positive** Provided slight effort reductions and regulatory tools available to rebuild and manage stocks	**Indirect Positive** Reduced directed fishing effort on cod, haddock and yellowtail which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Indirect Positive** Increased probability of long term sustainability

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P Interim Plan (1982)	Implemented GB seasonal closed areas, minimum fish size requirements in GB and GOM and permit requirements	**Direct Positive** Reduced directed fishing effort	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Indirect Positive** Increased probability of long term sustainability
P Multispecies Plan (1986)	Revised FMP to include pollock, redfish, winter flounder, American plaice, witch flounder, windowpane flounder and white hake. Allowed additional minimum fish size restrictions, extended GB spawning area closures and a SNE closure to protect yellowtail flounder	**Direct Positive** Reduced directed fishing effort and provided the opportunity to manage additional groundfish species	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Indirect Positive** Increased probability of long term sustainability

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P Amendments 1-4 to the Multispecies FMP (1987-1991)	Implemented closure in SNE/MA to protect yellowtail, extended GB RMA, added minimum mesh size requirements to SNE, excluded scallop dredge vessels from SNE closure, incorporated silver hake, red hake and ocean pout into the FMP	**Direct Positive** Reduced directed fishing effort and provided the opportunity to manage additional groundfish species	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Indirect Positive** Increased probability of long term sustainability
P Multispecies Emergency Action (1994)	Implemented 500-lb haddock trip limit, expanded CA II closure time and area, prohibited scallop dredge vessels from possessing haddock from Jan-Jun and prohibited pair-trawling for multispecies	**Direct Positive** Reduced directed fishing effort	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Indirect Positive** Increased probability of long term sustainability

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr Amendment 5 to the FMP (1994)	Made the above Emergency Action measures permanent, enacted a moratorium on new participants in the fishery, reduced DAS for most vessels by 50% over a 5-7 year period, implemented mandatory reporting and observer requirements, etc.	**Direct High Positive** Reduced directed fishing effort and capped the number of participants allowed to direct on the fishery	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Mixed** Increased probability of long term sustainability by limiting the number of participants in the directed fishery. However, there was a negative impact for fishermen and communities where participation was reduced
P, Pr Emergency Action (1994)	Implemented additional closed areas, prohibited scallop vessels from fishing in the closed areas, disallowed any fishery using mesh smaller than minimum mesh requirements, prohibited retaining regulated species with small mesh, etc.	**Direct High Positive** Reduced directed fishing effort	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Mixed** Increased probability of long term sustainability but effort reductions result in short term lost revenues for fishermen and communities

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
[P, Pr] Framework 9 (1985)	Made the above Emergency Action measures permanent	**Direct High Positive** Reduced directed fishing effort	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Mixed** Increased probability of long term sustainability but effort reductions result in short term lost revenues for fishermen and communities
[P, Pr] Amendment 7 to the Multispecies FMP (1996)	Accelerated Amendment 5 DAS reduction schedule, implemented seasonal GOM closures, implemented 1,000 lb haddock trip limit, expanded the 5% bycatch rule, etc.	**Direct High Positive** Reduced directed fishing effort	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Reduced fishing effort, thus reduced interactions with protected species	**Indirect Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Mixed** Increased probability of long term sustainability but effort reductions result in short term lost revenues for fishermen and communities

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
[P, Pr] Framework 20 (1997)	Implemented GOM cod daily trip limit of 1,000 lb, increased the haddock daily trip limit to 1,000 lb and added gillnet effort-reduction measures such as net limits	**Mixed** Reduced directed fishing effort but allowed for an increase in haddock landings	**Mixed** Gillnet restrictions and reduced effort on cod helped reduce discards/bycatch but this may have been offset by increased effort on haddock	**Indirect Positive** Although the haddock daily trip limit increased, gillnet restrictions provide an overall positive impact	**Mixed** Reduced cod daily trip limit would be offset by increase haddock daily landing limit	**Mixed** Reduced revenues from a smaller cod daily trip limit could be offset by the increased haddock daily landing limit but gillnet effort reductions also have negative eco/soc impacts
[P, Pr] Framework 24 (1998)	Implemented an adjustment to GOM cod daily trip limit by requiring vessels to remain in port and run their DAS clock for a cod overage and implemented the DAS carryover provisions	**Direct Low Positive** Implemented minor effort reductions	**Indirect Low Positive** Implemented minor effort reductions which resulted in minor discard/bycatch reductions	**Indirect Low Positive** Slightly reduced fishing effort, thus reduced interactions with protected species	**Indirect Low Positive** Reduced fishing effort, thus reduced gear interactions with habitat	**Mixed** Vessels must remain in port with their clock running for a cod overage which has a negative impact but vessels may carryover DAS from one fishing year into the next.
[P, Pr] Framework 25 (1998)	Implemented GOM inshore closure areas, the year-round WGOM closure, the CLCA and reduced the GOM cod daily trip limit to 700 lb	**Direct Low Positive** Implemented effort reductions via reduced cod trip limit and closure areas	**Indirect Low Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Positive** Effort controls result in reduced interactions with protected species	**Indirect High Positive** Closure areas and effort controls reduce gear interactions with habitat	**Mixed** Increased probability of long term sustainability but short term negative eco/soc impacts

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr Framework 26 (1999)	Expansion of April GOM inshore closure area and, additional seasonal inshore GOM and GB area closures	**Direct Low Positive** Implemented effort reductions via closure areas	**Indirect Low Positive** Reduced directed fishing effort which resulted in discard bycatch reductions	**Indirect Positive** Effort controls result in reduced interactions with protected species	**Indirect High Positive** Closure areas and effort controls reduce gear interactions with habitat	**Mixed** Increased probability of long term sustainability but short term negative eco/soc impacts
P, Pr, RFF Amendment 11 (1998)	Designated EFH for all species in the multispecies FMP and required Federal agencies to consult with NMFS on actions that may adversely effect EFH	**Indirect Low Positive** A consultation with NFMS that leads to the protection of multispecies EFH is beneficial to multispecies stocks	**Indirect Low Positive** A consultation with NFMS that leads to the protection of multispecies EFH is beneficial to other stocks that share the same EFH as multispecies stocks	**Indirect Low Positive** Consultation with NFMS that leads to the protection of multispecies EFH is beneficial to protected resources that share a need for the same habitat that multispecies stocks require	**Direct High Positive** Consultation with NMFS on activities that may adversely effect habitat provides NMFS the opportunity to mitigate or even prevent EFH impacts	**Indirect Low Positive** For instances where NMFS consults on projects impacting multispecies EFH, the overall health of the stocks should improve which would lead to long term sustainability

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr Framework 27 (1999)	Established large GOM rolling closures, modified CLCA, decreased GOM daily trip limit to 200 lb with subsequent reduction to 30 lb, increased haddock trip limit to 2,000 lb and increased minimum mesh size	**Mixed** Reduced directed fishing effort while also allowing the haddock trip limit to increase	**Mixed** A reduction in directed effort helped minimize bycatch and discards but increased haddock trip limit was somewhat offsetting	**Mixed** Reduced directed effort helps minimize protected species encounters but this was somewhat offset by the increased haddock trip limit	**Indirect Positive** Reduced directed effort and closed areas help improve habitat, this may be slightly offset by the increased haddock trip limit	**Mixed** Short term negative from closed areas and the reduced cod trip limit which were not offset by the increased haddock trip limit. Long term positive because of increased probability of sustainable stocks
P Interim Rule (1999)	Revised GOM cod trip limit to 100 lb/day up to 500 lb max and revised the DAS running clock to allow a 1-day overage only	**Direct Positive** Reduced directed fishing effort	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Low Positive** Effort controls result in reduced interactions with protected species	**Indirect Low Positive** Effort controls result in reduced habitat interactions	**Mixed** Increased probability of long term sustainability but short term negative eco/soc impacts
P, Pr, RFF Amendment 9 (1999)	Prohibited used of brush sweep trawl gear, added halibut to the FMP with a 1-fish per trip possession limit	**Direct Positive** Reduced directed fishing effort	**Indirect Positive** Reduced directed fishing effort which resulted in discard/bycatch reductions	**Indirect Low Positive** Effort controls result in reduced interactions with protected species	**Indirect High Positive** Effort controls result in reduced habitat interactions	**Mixed** Increased probability of long term sustainability but short term negative eco/soc impacts

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr Framework 31 (2000)	Increased GOM Daily limit to 400 lb/day up to 4,000/lb per trip, added Feb GOM inshore closure and extended 1999 Interim Rule running clock measure	**Mixed** Increased cod directed fishing effort while also reducing effort via closure area and cod running clock measure	**Mixed** Increased effort on cod could lead to greater discards/bycatch which would be somewhat offset by effort reductions via closure area and cod running clock measure	**Mixed** Increased cod effort could increase interactions but somewhat offset by effort reductions via closure area and cod running clock measure	**Indirect Low Positive** Minor positive impacts from inshore closure area	**Mixed** Short term positive from increased cod trip limit but long-term sustainability of the cod resource was effected
P, Pr Framework 33 (2000)	Added GB seasonal closure area, added conditional GOM closure areas and increase haddock trip limit to 3,000 lb	**Mixed** Increased haddock directed fishing effort while also reducing effort via closure areas	**Mixed** Increased effort on haddock could lead to greater discards/bycatch which would be somewhat offset by effort reductions via closure areas	**Mixed** Increased haddock effort could increase interactions but somewhat offset by effort reductions via closure areas	**Indirect Low Positive** Minor positive impacts from closure areas	**Mixed** Short term positive from increased haddock trip limit but negative impacts resulting from closure areas

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Interim Action (Settlement Agreement; 2002)	Restricted DAS use, modified DAS clock for trip vessels, added year-round closure of CLCA, expanded rolling closures, prohibited front-loading DAS clock, increased GOM trawl and gillnet mesh size, added new limitations on Day gillnets and further restricted charter/party vessels	**Direct High Positive** Implemented substantial directed fishing reductions	**Indirect High Positive** Implemented substantial directed fishing reductions which also reduced discards/bycatch	**Indirect Positive** Fishing reductions and expanded closure areas reduce protected species interactions	**Indirect High Positive** Fishing reductions and expanded closure areas reduce negative impacts to habitat	**Mixed** Short term impacts due to restrictions were highly negative but positive regarding the long term sustainability of the fishery

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
[P, Pr, RFF] Interim Action (Settlement Agreement Continued; 2002)	Continued above interim measures, further reduced DAS allocations, prohibited issuance of additional handgear permits, eliminated GOM Jan and Feb closures, increased SNE trawl and GB/SNE gillnet mesh sizes, further limited day and trip gillnets, added longline gear restrictions, added possession limit and restrictions on yellowtail catch and increased GOM cod daily trip limit to 500/4,000 lb max	**Direct High Positive** Implemented substantial directed fishing reductions	**Indirect High Positive** Implemented substantial directed fishing reductions which also reduced discards/bycatch	**Indirect Positive** Fishing reductions reduce protected species interactions	**Indirect Positive** Fishing reductions reduce negative impacts to habitat	**Mixed** Short term impacts due to restrictions were highly negative but improving the long term sustainability of the fishery was positive

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Amendment 13 (2004)	Adopted new rebuilding periods and a new rebuilding program that included periodic adjustments and default DAS reductions to reduce effort over time, allowed DAS to be leased or transferred, created sector allocation and special access programs to allow access to stocks that can support an increase in catch	**Direct High Positive** Implemented substantial directed fishing reductions	**Mixed** Implemented substantial directed fishing reductions which also reduced discards/bycatch. However, the mores stringent restrictions created pressure to direct on other stocks (e.g., monkfish)	**Indirect Positive** Fishing reductions reduce protected species interactions	**Indirect Positive** Fishing reductions reduce negative impacts to habitat	**Mixed** Short term impacts due to restrictions were highly negative but improving the long term sustainability of the fishery was positive
P, Pr, RFF Framework 40A (2004)	Created additional SAPs to target healthy stocks	**Direct Positive** Directing effort toward healthy stocks relieved pressure on stocks of concern	**Indirect Negative** Increased bycatch of monkfish and skates	**Negligible** Although effort increased slightly, no effort shifts impacting protected species are known to have occurred	**Negligible** Although effort increased slightly, no effort shifts impacting habitat are known to have occurred	**Indirect Positive** Provided vessels the opportunity for greater revenue while relieving pressure on stocks of concern

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Framework 40B (2005)	Relaxed DAS leasing and transfer requirements, created new yellowtail flounder SAP, provided greater opportunity for vessels to participate in the GB Cod Hook Sector, removed the net trip limit for gillnets, etc.	**Negligible** Mix of alternatives, some of which slightly increased effort and others that slightly decreased effort. Overall, changes did not threaten rebuilding targets established by Amendment 13	**Indirect Low Negative** Mix of alternatives that primarily had little impact on discards/bycatch with the exception of removing the net trip limit for gillnets which increased monkfish effort	**Negligible** Slight effort changes did not have measurable impacts to protected species	**Negligible** Slight effort changes did not have measurable impacts to habitat	**Indirect Low Positive** Slight changes to the leasing and transfer programs along with greater opportunities to participate in SAPs provides an opportunity for greater revenue
P, Pr, RFF Framework 41 (2005)	Allowed for participation in the Hook Gear Haddock SAP by non-Sector vessels	**Direct Low Positive** Encouraged effort on haddock, a healthy stock, and thus away from other stocks of concern	**Indirect Low Negative** Although directed effort shifted to a healthier stock, there was an overall effort increase resulting in a greater opportunity for bycatch/discards	**Negligible** Slight effort changes did not have measurable impacts to protected species	**Negligible** Slight effort changes did not have measurable impacts to habitat	**Indirect Low Positive** Greater opportunity to fish for a healthy stock provides increased revenue

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P Emergency Action (2006)	Implemented differential A DAS of 1.4:1, restricted the B Regular DAS program and US/CA Haddock SAP and reduced trip limits on cod, yellowtail, etc.	**Direct High Positive** Implemented effort reductions that anticipated achieving mortality reductions needed to keep stocks on track to rebuild	**Mixed** Effort reductions lead to reduced discards/bycatch but the B Regular DAS program increased monkfish and skate bycatch	**Negligible** Effort changes did not have measurable impacts to protected species	**Negligible** Effort changes did not have more than minimal impacts to habitat	**Mix** Short term effort reductions have a negative impact on revenues but increase long term sustainability of stocks
MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Framework 42 (2006)	Reduced the number of A DAS available, modified differential DAS counting to 2:1 in the GOM and SNE, reduced trip limits for several stocks, increased recreations minimum fish sizes, required use of VMS by all vessels, modified the SAPs, limited the bycatch of monkfish and skates for vessels using a haddock separator trawl, etc.	**Direct High Positive** Implemented effort reductions that anticipated achieving mortality reductions needed to keep stocks on track to rebuild	**Indirect Positive** Effort reductions lead to reduced discards/bycatch and measures were implemented to control monkfish and skate bycatch	**Indirect Low Positive** Overall effort reductions have a positive impact, particularly to protected species in high use areas such as the GOM and SNE where strict differential counting rules are in effect	**Indirect Low Positive** Overall effort reductions have a positive impact	**Mixed** Effort reductions have a significant negative impact to vessel owners and communities, primarily due to loss of revenues. Over the long term however, stocks should remain sustainable

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Framework 43 (2006)	Established a haddock incidental bycatch limit in the herring fishery on GB	**Mixed** While the incidental haddock allowance allows some legal catch of haddock which has a negative impact, the area is closed after the bycatch cap is reached which prohibits further harvest (positive impact)	**Negligible** The herring fishery is fairly clean and the increased haddock bycatch problem arose from strong 2003 and 2004 year classes. Allowing legal retention of haddock bycatch should not alter fishing practices in a manner that would impact species taken as bycatch	**Negligible** Although attaining the bycatch cap could reduce effort on GB, the extent of this reduction was not expected to have an overall impact on protected species	**Negligible** Gear used to target herring have been found not to have an impact on habitat	**Mixed** Allowing herring vessels to continue fishing practices on GB has a positive impact on those vessels and communities. However, the loss of the potential haddock catch has a negative impact on fishermen targeting groundfish
P, P, RFF Amendment 16 (2010)	Modified rebuilding mortality targets and status determination criteria, adopted ACL/AM requirements, modified effort controls, expanded sector policies, implemented 17 additional sectors, modified SAPs, changed DAS leasing and transfer programs	**Direct High Positive** Suite of measures reduces fishing mortality on groundfish stocks to continue rebuilding	**Indirect Positive** Reduced effort from common-pool and sector measures expected to reduce discards of non-target species	**Indirect Low Positive** If common pool and sector measures reduce overall groundfish fishing effort, this will likely reduce protected species impacts	**Direct Low Positive** Fishing effort reductions from common pool and sector measures should reduce interactions with EFH	**Mixed** Combination of effort controls and sector measures likely to reduce number of vessels, crew, communities participating in fishery, but remaining participants may be more profitable

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Framework 44 (2010)	Specified OFLs/ABC/ACLs for groundfish, FY 2010-2012; authorized in-season adjustments for common pool vessels; adopted YTF allocations for scallop fishery	**Positive** Established catch limits consistent with mortality targets and measures to insure targets are not exceeded	**No impact/neutral**	**Mixed** YTF allocations may reduce scallop effort if they limit fishery, reduce interactions with protected species	**Negligible**	**Minor/Mixed** Revenues should increase over time but short term losses expected
P, Pr, RFF Framework 45 (2011)	Adopted minor modifications to sector program, revised specifications for some stocks and effort control measures including a cod spawning protection area	**Positive** Continue stock rebuilding	**Negligible**	**Negligible** Analysis not complete but minimal impacts expected	**Negligible** Analysis not complete but minimal impacts expected	**Minor/Mixed** Revenues should increase over time but short term losses expected
P, Pr, RFF Framework 46 (2011)	Modified portion of GB and GOM haddock ACL that can be caught by the herring fishery	**Negligible** Did not modify overall catch limits	**Negligible** Should not alter fishing practices in a manner that would impact species taken as bycatch	**Negligible** A possible slight increase in herring fishing was not expected to have an overall impact on protected species	**Negligible** Gear used to target herring have been found not to have an impact on habitat	**Mixed** Allowing herring vessels to continue fishing has a positive impact on that fishery. However, loss of potential haddock catch has a negative impact on fishermen targeting groundfish

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MULTISPECIES FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Sector EAs (Annually 2010-)	Sector EAs are prepared for each sector approved under the FMP. These documents assess impacts from exemptions granted to individual sectors that go beyond the universal exemptions	**Negligible** Because exemptions granted to sectors must strive to have neutral impacts compared to common pool vessels, impacts would be negligible	**Negligible** Because exemptions granted to sectors must strive to have neutral impacts compared to common pool vessels, impacts would be negligible	**Negligible** Because exemptions granted to sectors must strive to have neutral impacts compared to common pool vessels, impacts would be negligible	**Negligible** Because exemptions granted to sectors must strive to have neutral impacts compared to common pool vessels, impacts would be negligible	**Low Positive** Because one of the intents of sectors is to provide participants greater freedom to maximize their operations, revenues would be expected to be slightly higher
Pr, RFF Amendment 17 (2011)	Established the operation of NOAA-sponsored, state-operated permit banks	**Negligible** Action not considered to have any impacts beyond those anticipated by Amendment 16	**Negligible** Action not considered to have any impacts beyond those anticipated by Amendment 16	**Negligible** Action not considered to have any impacts beyond those anticipated by Amendment 16	**Negligible** Action not considered to have any impacts beyond those anticipated by Amendment 16	**Negligible** Action not considered to have any impacts beyond those anticipated by Amendment 16
RFF Amendment 18 (In development)	Consider accumulation limits and measures to maintain fleet diversity	**Negligible** Will not change total groundfish catch	**Minor/Mixed** Will not change total catch but could conceivably divert effort into other fisheries	**Minor** May change types and locations of fishing activity	**Minor** May change distribution of catch by gears used in the fishery	**Mixed** While some communities may support ownership caps or other measures to maintain fleet diversity, others my view this as an inefficient way to manage

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OTHER FISHERY-RELATED ACTIONS						
[P] Prosecution of herring fisheries by foreign fleets in the area that would become the U.S. EEZ (prior to implementation of the M-S Act)	Foreign fishing pressure peaked in the 1960s and slowly declined until passage of the M-S Act and implementation of the FMP	**Negative** – high bycatch and fishing mortality rates	**High Negative** – declining population and crash on Georges Bank	**Potentially Negative** - given high bycatch in DWF mackerel and squid fisheries	**Low Negative** – unknown impacts from foreign fishing practices	**Low Negative** – value from fishery cycling to foreign businesses
[P, Pr] Interstate FMP beginning in 1983 and ASMFC Atlantic Herring FMP in 1993, ASMFC FMP actions in 1998 and 2000	Management in state waters; Address growth in the fishery, allocate IWP; Define overfishing, estimate MSY, spawning closures, days out; Redefine spawning areas, impose landing restriction from spawning areas	**Neutral**	**Positive** – establish management in State waters to ease overfishing pressure and rebuild stock	**Low Positive** – limited fishing effort	**Positive**	**Positive** – establish IWP, more available to local economies
[P, Pr, RFF] Atlantic Sea Scallop FMP – a series of amendment and framework actions from the mid-1990s through the present	Implementation of the Atlantic Sea Scallop FMP and continued management of the fishery, primarily through effort controls	**Direct Positive** Effort reductions taken over time have resulted in a sustainable scallop fishery	**Indirect Positive** Effort reductions taken over time also reduced bycatch, including gear modifications that improved bycatch escapement	**Mixed** Effort reductions taken over time reduced interactions with protected species however, turtle interactions remain problematic	**Indirect Positive** Effort reductions reduced gear contact with habitat and the current rotational access program focuses fishing effort on sandy substrates which are less susceptible to habitat impacts	**Indirect Positive** Initial negative impacts due to effort reductions have been supplanted by a sustainable, profitable fishery

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OTHER FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Monkfish FMP – a series of amendment and framework actions from implementation of the FMP in 1999 through the present	Implementation of the monkfish FMP and continued management of the fishery, primarily through effort controls	**Direct Positive** Effort reductions have resulted in a fishery that is no longer overfished, nor is overfishing occurring	**Indirect Positive** Effort reductions taken over time also reduced bycatch	**Indirect Positive** Reducing effort reduced opportunities for interactions with protected species	**Indirect Positive** Reducing effort reduced opportunities for habitat interactions	**Indirect Positive** Reducing effort has created a sustainable fishery
P,P,RFF NEFMC Atlantic Herring FMP and subsequent amendments	Establish TACs, management areas, reporting requirements, permits, complement state management	Low Positive – reduced bycatch	**Positive** – establish complementary Federal management to protect stock	**Positive** – established overall TAC and area TACs	**Low Positive** – limit fishing effort	**Neutral** – support local economies, but limit catch with TAC
Pr, RFF Large Whale Take Reduction Plan Amendment (2008)	Removed the DAM program, implement sinking ground lines for lobster gear, includes more trap/pot and gillnet fisheries under the protection plan and requires additional markings on gear to improve information on where and how entanglements occur	**Negligible** Changes implemented through the amendment are not expected to have substantial changes on groundfish	**Negligible** Changes implemented through the amendment are not expected to have substantial changes on non-groundfish species	**Direct Positive** New regulations implemented to protect large whales are expected to have a positive impact on large whales by reducing incidental takes	**Negligible** Changes implemented through the amendment are not expected to have substantial changes to habitat	**Indirect Negative** Changes implemented through the amendment require some gear changes for gillnet fisheries which have minor negative economic impacts

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
OTHER FISHERY-RELATED ACTIONS CONTINUED						
RFF Harbor Porpoise Take Reduction Plan Amendment (~2010)	Options are currently under development to reduce takes of harbor porpoise toward the long-term zero mortality rate goal	**Unknown** If current measures such as closure areas and the use of pingers are expanded upon or modified, it could impact groundfish	**Unknown** If current measures such as closure areas and the use of pingers are expanded upon or modified, it could impact non-groundfish species	**Direct Positive** Changes to protect harbor porpoise have a positive impact on protected species	**Unknown** If current measures such as closure areas and the use of pingers are expanded upon or modified, it could impact habitat	**Unknown** If current measures such as closure areas and the use of pingers are expanded upon or modified, it could impact human communities
RFF Essential Fish Habitat Omnibus Amendment (~2010/2011)	This amendment would revised EFH designations for all New England fisheries, possibly establish new HAPCs and consider measures to further protect critical habitat; may revise multispecies closed areas	**Unknown** If new measures are implemented to protect habitat, they would likely have a positive impact on groundfish	**Unknown** If new measures are implemented to protect habitat, they could have a positive impact non-groundfish species	**Unknown** If new measures are implemented to protect habitat, they could potentially impact protected species	**Direct Positive** New measures implemented to protect habitat would have a positive impact on habitat	**Unknown** If new measures are implemented to protect habitat, they would likely impact human communities
P, Pr RFF Amendment 3 to the Skate FMP (2010)	This amendment addresses rebuilding of winter and thorny skates and reduce mortality on little and smooth skates; reduces trip limits, adopts ACLs and AMs	**Minor Negative** Lower skate possession limits and closures may cause vessels to use DAS for groundfish	**Mixed** Actions taken to reduce skate mortality; they could lead to increased targeting of non-groundfish species	**Unknown** If actions are taken to reduce skate mortality, they could impact protected species	**Unknown** If actions are taken to reduce skate mortality, they could impact habitat	**Minor negative** Actions taken to reduce skate mortality negatively impact human communities

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
NON FISHERY-RELATED ACTIONS						
P, Pr, RFF Agriculture runoff	Nutrients applied to agriculture land are introduced into aquatic systems	**Indirect Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Reduced habitat quality in the immediate project area	**Direct Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Reduced habitat quality negatively affects resource viability and can lead to reduced income from fishery resources
P, Pr, RFF Port maintenance	Dredging of wetlands, coastal, port and harbor areas for port maintenance	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Indirect Negative** Reduced habitat quality negatively affects resource viability in the immediate project area
P, Pr, RFF Offshore disposal of dredged materials	Disposal of dredged materials	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Direct Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Indirect Negative** Reduced habitat quality negatively affects resource viability in the immediate project area

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
NON FISHERY-RELATED ACTIONS CONTINUED						
P, Pr, RFF Beach nourishment	Offshore mining of sand for beaches	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Direct Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Mixed** Positive for mining companies, possibly negative for fisheries
	Placement of sand to nourish beach shorelines	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Direct Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Positive** Improves beaches and can help protect homes along the shore line
P, Pr, RFF Marine transportation	Expansion of port facilities, vessel operations and recreational marinas	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Direct Negative** Reduced habitat quality in the immediate project area	**Indirect Negative** Localized decreases in habitat quality in the immediate project area	**Mixed** Positive for some interests, potential displacement for others
P, Pr, RFF Installation of pipelines, utility lines and cables	Transportation of oil, gas and energy through pipelines, utility lines and cables	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Potentially Direct Negative** Initially reduced habitat quality in the immediate project area	**Mixed** End users benefit from improved pipelines, cables, etc., but reduced habitat quality may impact fisheries and revenues

Action	Description	Impacts on Regulated Groundfish Stocks	Impacts on Non-groundfish species	Impacts on Endangered and Other Protected Species	Impacts on Habitat – Including Non-fishing Effects	Impacts on Human Communities
NON FISHERY-RELATED ACTIONS CONTINUED						
Pr, RFF Liquefied Natural Gas (LNG) terminals (w/in 5 years)	Transportation of natural gas via tanker to terminals located offshore and onshore (Several LNG terminals are proposed, including ME, MA, NY, NJ and MD)	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Potentially Direct Negative** Localized decreases in habitat quality possible in the immediate project area	**Mixed** End users benefit from a steady supply of natural gas but reduced habitat quality may impact fisheries and revenues
RFF Offshore Wind Energy Facilities (w/in 5 years)	Construction of wind turbines to harness electrical power (Several facilities proposed from ME through NC, including off the coast of MA)	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Indirect Negative** Initially localized decreases in habitat quality in the immediate project area	**Potentially Direct Negative** Localized decreases in habitat quality possible in the immediate project area	**Potentially Direct Negative** Localized decreases in habitat quality possible in the immediate project area	**Mixed** End users benefit from a clean energy production but reduced habitat quality may impact fisheries and revenues

Framework Adjustment 47

to the

Northeast Multispecies FMP

Appendix II

Summary of Catch by Sector and Common Pool, FY 2010

Data Information:

These data are the best available to NOAA's National Marine Fisheries Service (NMFS). Data sources for this report include: (1) Vessels via VMS; (2) Vessels via vessel logbook reports; (3) Dealers via Dealer Electronic reporting. Values are in live weight and include estimates of missing dealer reports. Differences with previous reports are due to corrections made to the database.

Source: NMFS Northeast Regional Office

Run Date: June 29, 2011

Any value for a non-allocated species may be due to landings of that stock; misreporting of species and/or stock area; and/or estimated landings (in lieu of missing reports) based on vessel histories.

Table 1 – Total Sector FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	SIMM sub-ACLs*		Catch			Comparison of Catch and Final ACE						
Stock	Initial	Final	Landings	Discards^	Catch	Difference	ACE_{Final}	Carryover	Carryover **	Remaindered ACE		
						ACE_{Final} - Catch	Caught (%)	Cap*	lbs	lbs	mt	% of ACE_{Final}
GB Cod East	717,441	717,441	524,611	34,224	558,835	158,606	77.9	NA	NA	NA	NA	NA
GB Cod West	6,563,099	6,563,099	5,268,581	225,959	5,494,540	1,068,559	83.7	728,054	699,321	369,239	167.5	5.6
GB Cod	7,280,541	7,280,541	5,793,192	260,183	6,053,375	1,227,166	83.1	728,054	699,321	527,845	239.4	7.3
GOM Cod	9,540,389	9,540,389	7,798,075	176,209	7,974,284	1,566,105	83.6	954,039	949,413	616,691	279.7	6.5
GB Haddock East	26,262,695	26,262,695	3,981,619	37,677	4,019,295	22,243,400	15.3	NA	NA	NA	NA	NA
GB Haddock West	62,331,182	62,331,182	14,112,632	51,770	14,164,402	48,166,780	22.7	8,859,388	8,859,388	39,307,392	17,829.5	63.1
GB Haddock	88,593,877	88,593,877	18,094,251	89,447	18,183,697	70,410,180	20.5	8,859,388	8,859,388	61,550,792	27,919.0	69.5
GOM Haddock	1,761,206	1,761,206	810,886	5,983	816,869	944,337	46.4	176,121	173,501	770,836	349.6	43.8
GB Yellowtail Flounder	1,770,451	1,770,451	1,482,255	146,998	1,629,253	141,197	92.0	NA	NA	NA	NA	NA
SNE Yellowtail	517,372	517,372	325,947	10,178	336,125	181,247	65.0	51,737	51,603	129,644	58.8	25.1
CC/GOM Yellowtail Flounder	1,608,084	1,608,084	1,102,512	131,563	1,234,074	374,010	76.7	160,808	155,812	218,197	99.0	13.6
Plaice	6,058,149	6,058,149	2,936,355	378,707	3,315,063	2,743,086	54.7	605,815	605,815	2,137,271	969.4	35.3
Witch Flounder	1,824,125	1,824,125	1,406,928	126,098	1,533,027	291,099	84.0	182,413	177,788	113,311	51.4	6.2
GB Winter Flounder	4,018,496	4,018,496	3,008,362	39,364	3,047,725	970,770	75.8	401,850	401,850	568,921	258.1	14.2
GOM Winter Flounder	293,736	293,736	174,458	3,476	177,934	115,802	60.6	29,374	27,953	87,849	39.8	29.9
SNE Winter Flounder	NA	NA	17,462	75,700	93,163	NA	NA	NA	NA	NA	NA	NA
Redfish	14,894,618	14,894,618	4,390,655	334,602	4,725,257	10,169,361	31.7	1,489,462	1,489,462	8,679,899	3,937.1	58.3
White Hake	5,522,677	5,522,677	4,815,110	69,520	4,884,630	638,047	88.4	552,268	544,996	93,052	42.2	1.7
Pollock	35,666,741	35,666,741	11,842,183	172,585	12,014,768	23,651,973	33.7	3,566,674	3,566,674	20,085,299	9,110.5	56.3
Northern Windowpane	NA	NA	627	333,733	334,360	NA	NA	NA	NA	NA	NA	NA
Southern Windowpane	NA	NA	271	115,977	116,248	NA	NA	NA	NA	NA	NA	NA
Ocean Pout	NA	NA	123	124,397	124,520	NA	NA	NA	NA	NA	NA	NA
Halibut	NA	NA	13,415	43,004	56,419	NA	NA	NA	NA	NA	NA	NA
Wolfish	NA	NA	523	41,152	41,675	NA	NA	NA	NA	NA	NA	NA

*Does not equal sum of Sector ACEs due to rounding error
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 2 – Fixed Gear Sector FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	ACE		Trades	Catch			Comparison of Catch and Final ACE				
Stock	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	208,721	248,928	40,207	174,099	13,421	187,520	61,408	75.3	NA	NA	
GB Cod West	1,909,369	640,343	-1,269,026	454,535	37,616	492,152	148,191	76.9	211,809	209,599	
GB Cod	2,118,090	889,271	-1,228,819	628,635	51,037	679,672	209,599	76.4	211,809	209,599	0
GOM Cod	190,837	388,087	197,250	303,482	29,254	332,735	55,352	85.7	19,084	19,084	36,268
GB Haddock East	1,692,687	1,577,841	-114,846	311,731	8,159	319,890	1,257,951	20.3	NA	NA	
GB Haddock West	4,017,379	3,760,379	-257,000	442,162	8,606	450,768	3,309,611	12.0	571,007	571,007	
GB Haddock	5,710,066	5,338,220	-371,846	753,893	16,765	770,658	4,567,562	14.4	571,007	571,007	3,996,555
GOM Haddock	23,383	68,383	45,000	44,660	9	44,669	23,714	65.3	2,338	2,338	21,376
GB Yellowtail Flounder	232	536	304	99	13	111	425	20.8	NA	NA	
SNE Yellowtail	1,259	1,259	0	0	26	26	1,234	2.1	126	126	1,108
CC/GOM Yellowtail Flounder	31,297	8,967	-22,330	1,116	676	1,792	7,175	20.0	3,130	3,130	4,045
Plaice	34,673	10,173	-24,500	640	398	1,039	9,134	10.2	3,467	3,467	5,667
Witch Flounder	14,933	1,865	-13,068	370	79	449	1,416	24.1	1,493	1,416	0
GB Winter Flounder	1,090	1,509	419	962	63	1,025	484	67.9	109	109	375
GOM Winter Flounder	7,777	4,777	-3,000	235	34	269	4,509	5.6	778	778	3,731
SNE Winter Flounder	NA	NA	NA	16	6,359	6,375	NA	NA	NA	NA	
Redfish	436,270	398,270	-38,000	24,579	283	24,862	373,408	6.2	43,627	43,627	329,781
White Hake	331,691	81,891	-249,800	49,593	5,596	55,189	26,702	67.4	33,169	26,702	0
Pollock	2,843,180	2,184,180	-659,000	326,130	26,320	352,449	1,831,730	16.1	284,318	284,318	1,547,412
Northern Windowpane	NA	NA	NA	24	778	802	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	54	54	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	50	2,407	2,457	NA	NA	NA	NA	
Halibut	NA	NA	NA	574	1,193	1,767	NA	NA	NA	NA	
Wolfish	NA	NA	NA	14	4,994	5,008	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 3 – Northeast Coastal Communities Sector FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	ACE		Trades	Catch			Comparison of Catch and Final ACE				
Stock	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	1,174	91	-1,083	0	0	0	91	0.0	NA	NA	
GB Cod West	10,738	823	-9,915	4	0	4	819	0.5	1,191	910	
GB Cod	11,912	914	-10,998	4	0	4	910	0.4	1,191	910	0
GOM Cod	46,100	10,373	-35,727	5,937	265	6,202	4,171	59.8	4,610	4,171	0
GB Haddock East	31,955	31,955	0	0	0	0	31,955	0.0	NA	NA	
GB Haddock West	75,842	75,842	0	0	0	0	75,842	0.0	10,780	10,780	
GB Haddock	107,797	107,797	0	0	0	0	107,797	0.0	10,780	10,780	97,018
GOM Haddock	4,098	3,498	-600	483	33	516	2,983	14.7	410	410	2,573
GB Yellowtail Flounder	15,191	15,191	0	0	0	0	15,191	0.0	NA	NA	
SNE Yellowtail	3,597	3,597	0	0	0	0	3,597	0.0	360	360	3,237
CC/GOM Yellowtail Flounder	6,871	6,871	0	0	0	0	6,871	0.0	687	687	6,184
Plaice	8,580	5,520	-3,060	1	0	1	5,519	0.0	858	858	4,661
Witch Flounder	3,908	393	-3,515	0	0	0	393	0.0	391	391	2
GB Winter Flounder	2,805	2,805	0	0	0	0	2,805	0.0	281	281	2,525
GOM Winter Flounder	929	929	0	0	0	0	929	0.0	93	93	836
SNE Winter Flounder	NA	NA	NA	8	0	8	NA	NA	NA	NA	
Redfish	66,961	66,961	0	12	2	14	66,947	0.0	6,696	6,696	60,251
White Hake	48,511	4,867	-43,644	635	74	710	4,157	14.6	4,851	4,157	0
Pollock	161,843	148,801	-13,042	0	1	1	148,800	0.0	16,184	16,184	132,616
Northern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Halibut	NA	NA	NA	270	2,070	2,340	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	134	134	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 4 – NEFS II FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	ACE		Trades	Catch	Comparison of Catch and Final ACE						
Stock	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	39,659	52,493	12,834	48,716	1,918	50,635	1,858	96.5	NA	NA	
GB Cod West	362,798	945,931	583,133	803,634	14,597	818,231	127,700	86.5	40,246	40,246	
GB Cod	402,457	998,424	595,967	852,350	16,515	868,866	129,558	87.0	40,246	40,246	89,312
GOM Cod	1,917,357	2,703,234	785,877	2,212,600	53,596	2,266,197	437,038	83.8	191,736	191,736	245,302
GB Haddock East	3,072,445	3,340,803	268,358	631,057	3,264	634,320	2,706,483	19.0	NA	NA	
GB Haddock West	7,292,059	7,460,762	168,703	1,620,568	935	1,621,503	5,839,259	21.7	1,036,450	1,036,450	
GB Haddock	10,364,504	10,801,565	437,061	2,251,625	4,199	2,255,824	8,545,741	20.9	1,036,450	1,036,450	7,509,291
GOM Haddock	321,574	516,796	195,222	307,348	906	308,253	208,543	59.6	32,157	32,157	176,385
GB Yellowtail Flounder	30,787	55,844	25,057	29,343	9,942	39,285	16,559	70.3	NA	NA	
SNE Yellowtail	11,460	1,146	-10,314	0	0	0	1,146	0.0	1,146	1,146	0
CC/GOM Yellowtail Flounder	327,564	457,066	129,502	313,069	72,777	385,845	71,221	84.4	32,756	32,756	38,465
Plaice	517,134	801,799	284,665	301,267	59,087	360,354	441,445	44.9	51,713	51,713	389,732
Witch Flounder	247,574	312,200	64,626	247,419	17,452	264,872	47,328	84.8	24,757	24,757	22,571
GB Winter Flounder	69,069	85,106	16,037	21,220	1,808	23,028	62,078	27.1	6,907	6,907	55,171
GOM Winter Flounder	68,090	91,980	23,890	68,413	1,941	70,354	21,626	76.5	6,809	6,809	14,817
SNE Winter Flounder	NA	NA	NA	144	836	980	NA	NA	NA	NA	
Redfish	2,494,479	3,181,194	686,715	956,281	128,861	1,085,142	2,096,052	34.1	249,448	249,448	1,846,604
White Hake	345,144	454,024	108,880	416,404	3,104	419,508	34,515	92.4	34,514	34,514	1
Pollock	4,484,994	5,696,920	1,211,926	2,003,080	13,418	2,016,498	3,680,422	35.4	448,499	448,499	3,231,922
Northern Windowpane	NA	NA	NA	30	25,253	25,283	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	4,025	4,025	NA	NA	NA	NA	
Halibut	NA	NA	NA	1,004	7,770	8,774	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	9,649	9,649	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 5 – NEFS III FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	ACE		Trades	Catch			Comparison of Catch and Final ACE				
Stock	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	7,075	1,314	-5,761	0	0	0	1,314	0.0	NA	NA	
GB Cod West	64,720	20,130	-44,590	1,991	1,189	3,181	16,949	15.8	7,179	7,179	
GB Cod	71,795	21,444	-50,351	1,991	1,189	3,181	18,263	14.8	7,179	7,179	11,084
GOM Cod	1,600,839	1,946,216	345,377	1,677,064	30,459	1,707,523	238,693	87.7	160,084	160,084	78,609
GB Haddock East	42,403	42,236	-167	0	0	0	42,236	0.0	NA	NA	
GB Haddock West	100,639	100,013	-626	116	85	202	99,811	0.2	14,304	14,304	
GB Haddock	143,042	142,249	-793	116	85	202	142,048	0.1	14,304	14,304	127,743
GOM Haddock	196,856	351,605	154,749	143,724	1,319	145,042	206,562	41.3	19,686	19,686	186,877
GB Yellowtail Flounder	817	2,214	1,397	0	0	0	2,214	0.0	NA	NA	
SNE Yellowtail	428	425	-3	0	126	126	299	29.7	43	43	256
CC/GOM Yellowtail Flounder	141,881	198,397	56,516	146,379	14,649	161,027	37,370	81.2	14,188	14,188	23,182
Plaice	269,450	186,882	-82,568	5,877	1,507	7,384	179,499	4.0	26,945	26,945	152,554
Witch Flounder	55,658	34,767	-20,891	17,445	75	17,520	17,246	50.4	5,566	5,566	11,680
GB Winter Flounder	750	1,289	539	0	0	0	1,289	0.0	75	75	1,214
GOM Winter Flounder	34,647	49,542	14,895	33,976	370	34,346	15,197	69.3	3,465	3,465	11,732
SNE Winter Flounder	NA	NA	NA	1	16	17	NA	NA	NA	NA	
Redfish	219,381	217,580	-1,801	2,560	399	2,959	214,621	1.4	21,938	21,938	192,683
White Hake	285,042	112,386	-172,656	83,126	723	83,850	28,537	74.6	28,504	28,504	33
Pollock	2,685,694	2,945,334	259,640	538,060	7,621	545,681	2,399,653	18.5	268,569	268,569	2,131,084
Northern Windowpane	NA	NA	NA	30	718	748	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	291	291	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	661	661	NA	NA	NA	NA	
Halibut	NA	NA	NA	603	1,797	2,400	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	3,868	3,868	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 6 – NEFS IV FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	35,100	5,681	-29,419	0	0	0	5,681	0.0	NA	NA	
GB Cod West	321,097	37,144	-283,953	0	0	0	37,144	0.0	35,620	35,620	
GB Cod	356,197	42,825	-313,372	0	0	0	42,825	0.0	35,620	35,620	7,205
GOM Cod	867,905	87,794	-780,111	0	0	0	87,794	0.0	86,791	86,791	1,004
GB Haddock East	1,433,073	1,117,825	-315,248	0	0	0	1,117,825	0.0	NA	NA	
GB Haddock West	3,401,216	3,118,197	-283,019	0	0	0	3,118,197	0.0	483,429	483,429	
GB Haddock	4,834,289	4,236,022	-598,267	0	0	0	4,236,022	0.0	483,429	483,429	3,752,593
GOM Haddock	121,520	11,430	-110,090	0	0	0	11,430	0.0	12,152	11,430	0
GB Yellowtail Flounder	39,212	3,830	-35,382	0	0	0	3,830	0.0	NA	NA	
SNE Yellowtail	18,336	4,020	-14,316	0	0	0	4,020	0.0	1,834	1,834	2,186
CC/GOM Yellowtail Flounder	123,287	17,630	-105,657	0	0	0	17,630	0.0	12,329	12,329	5,301
Plaice	578,845	231,158	-347,687	0	0	0	231,158	0.0	57,885	57,885	173,274
Witch Flounder	174,050	28,605	-145,445	0	0	0	28,605	0.0	17,405	17,405	11,200
GB Winter Flounder	29,005	4,368	-24,637	0	0	0	4,368	0.0	2,900	2,900	1,467
GOM Winter Flounder	26,477	1,748	-24,729	0	0	0	1,748	0.0	2,648	1,748	0
SNE Winter Flounder	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Redfish	974,175	223,390	-750,785	0	0	0	223,390	0.0	97,417	97,417	125,972
White Hake	446,241	45,430	-400,811	0	0	0	45,430	0.0	44,624	44,624	806
Pollock	2,059,277	792,478	-1,266,799	0	0	0	792,478	0.0	205,928	205,928	586,550
Northern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Halibut	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	0	0	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 7 – NEFS V FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	ACE		Trades	Catch			Comparison of Catch and Final ACE				
Stock	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	20,906	2,205	-18,701	1,444	163	1,607	599	72.8	NA	NA	
GB Cod West	191,251	326,012	134,761	250,031	26,263	276,294	49,718	84.7	21,216	21,216	
GB Cod	212,157	328,217	116,060	251,474	26,426	277,900	50,317	84.7	21,216	21,216	29,101
GOM Cod	23,090	2,313	-20,777	0	5	5	2,308	0.2	2,309	2,308	0
GB Haddock East	1,403,821	1,390,041	-13,780	9,567	429	9,995	1,380,046	0.7	NA	NA	
GB Haddock West	3,331,791	3,262,017	-69,774	662,117	2,960	665,077	2,596,940	20.4	473,561	473,561	
GB Haddock	4,735,612	4,652,058	-83,554	671,683	3,389	675,072	3,976,986	14.5	473,561	473,561	3,503,425
GOM Haddock	12,201	6,643	-5,558	0	0	0	6,643	0.0	1,220	1,220	5,423
GB Yellowtail Flounder	173,157	129,636	-43,521	115,767	8,763	124,530	5,106	96.1	NA	NA	
SNE Yellowtail	181,232	208,058	26,826	160,800	3,677	164,478	43,581	79.1	18,123	18,123	25,457
CC/GOM Yellowtail Flounder	27,165	2,929	-24,236	0	25	25	2,905	0.8	2,717	2,717	188
Plaice	129,802	121,602	-8,200	23,624	1,680	25,304	96,298	20.8	12,980	12,980	83,317
Witch Flounder	47,301	40,501	-6,800	18,478	1,899	20,377	20,124	50.3	4,730	4,730	15,394
GB Winter Flounder	104,147	102,902	-1,245	57,953	526	58,479	44,422	56.8	10,415	10,415	34,008
GOM Winter Flounder	2,345	280	-2,065	0	0	0	280	0.1	235	235	46
SNE Winter Flounder	NA	NA	NA	3,281	31,289	34,570	NA	NA	NA	NA	
Redfish	61,649	54,453	-7,196	950	86	1,036	53,417	1.9	6,165	6,165	47,252
White Hake	20,215	5,371	-14,844	2,839	510	3,349	2,021	62.4	2,021	2,021	0
Pollock	148,928	144,194	-4,734	2,212	20	2,232	141,962	1.5	14,893	14,893	127,069
Northern Windowpane	NA	NA	NA	400	20,057	20,457	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	214	67,123	67,337	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	13,768	13,768	NA	NA	NA	NA	
Halibut	NA	NA	NA	167	49	216	NA	NA	NA	NA	
Wolfish	NA	NA	NA	6	0	6	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 8 – NEFS VI FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	13,950	11,362	-2,588	6,420	533	6,953	4,409	61.2	NA	NA	
GB Cod West	127,615	328,262	200,647	310,619	1,988	312,607	15,655	95.2	14,157	14,157	
GB Cod	141,565	339,624	198,059	317,039	2,521	319,560	20,064	94.1	14,157	14,157	5,908
GOM Cod	170,012	221,158	51,146	197,852	994	198,845	22,313	89.9	17,001	17,001	5,312
GB Haddock East	706,942	1,002,808	295,866	87,371	1,402	88,773	914,035	8.9	NA	NA	
GB Haddock West	1,677,838	2,380,040	702,202	95,739	15	95,754	2,284,286	4.0	238,478	238,478	
GB Haddock	2,384,781	3,382,849	998,068	183,110	1,417	184,527	3,198,322	5.5	238,478	238,478	2,959,844
GOM Haddock	53,817	68,441	14,624	11,867	4	11,871	56,570	17.3	5,382	5,382	51,188
GB Yellowtail Flounder	24,320	19,657	-4,663	13,601	1,858	15,459	4,197	78.6	NA	NA	
SNE Yellowtail	33,138	16,572	-16,566	5,413	18	5,431	11,141	32.8	3,314	3,314	7,827
CC/GOM Yellowtail Flounder	35,289	54,100	18,811	47,013	1,647	48,660	5,439	89.9	3,529	3,529	1,911
Plaice	212,976	355,807	142,831	273,832	25,750	299,582	56,225	84.2	21,298	21,298	34,928
Witch Flounder	78,277	156,456	78,179	143,306	4,813	148,119	8,337	94.7	7,828	7,828	509
GB Winter Flounder	34,349	23,447	-10,902	7,967	103	8,071	15,376	34.4	3,435	3,435	11,941
GOM Winter Flounder	11,391	12,904	1,513	10,607	135	10,742	2,161	83.2	1,139	1,139	1,022
SNE Winter Flounder	NA	NA	NA	945	83	1,028	NA	NA	NA	NA	
Redfish	785,040	1,028,215	243,175	668,275	5,669	673,944	354,270	65.5	78,504	78,504	275,766
White Hake	205,772	303,461	97,689	277,982	290	278,273	25,189	91.7	20,577	20,577	4,611
Pollock	1,167,019	1,601,459	434,440	705,148	3,664	708,812	892,647	44.3	116,702	116,702	775,945
Northern Windowpane	NA	NA	NA	0	923	923	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	59	59	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	7,170	7,170	NA	NA	NA	NA	
Halibut	NA	NA	NA	329	1,262	1,591	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	646	646	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 9 – NEFS VII FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	ACE		Trades	Catch			Comparison of Catch and Final ACE				
Stock	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	44,807	21,395	-23,412	21,160	237	21,396	-1	100.0	NA	NA	
GB Cod West	409,889	343,181	-66,708	306,481	7,395	313,875	29,306	91.5	45,470	29,304	
GB Cod	454,696	364,576	-90,120	327,640	7,631	335,272	29,304	92.0	45,470	29,304	0
GOM Cod	61,217	31,796	-29,421	4,164	295	4,459	27,337	14.0	6,122	6,122	21,215
GB Haddock East	1,388,646	1,091,859	-296,787	85,718	115	85,832	1,006,027	7.9	NA	NA	
GB Haddock West	3,295,776	2,585,987	-709,789	642,368	3,100	645,468	1,940,519	25.0	468,442	468,442	
GB Haddock	4,684,422	3,677,846	-1,006,576	728,086	3,214	731,300	2,946,546	19.9	468,442	468,442	2,478,104
GOM Haddock	13,193	12,775	-418	136	18	154	12,622	1.2	1,319	1,319	11,302
GB Yellowtail Flounder	292,814	212,284	-80,530	201,751	10,531	212,281	3	100.0	NA	NA	
SNE Yellowtail	28,336	23,032	-5,304	18,529	1,162	19,692	3,340	85.5	2,834	2,834	506
CC/GOM Yellowtail Flounder	83,175	64,118	-19,057	37,899	645	38,544	25,574	60.1	8,318	8,318	17,257
Plaice	252,128	226,067	-26,061	154,155	20,062	174,217	51,850	77.1	25,213	25,213	26,637
Witch Flounder	76,160	70,987	-5,173	56,359	9,765	66,124	4,864	93.1	7,616	4,864	0
GB Winter Flounder	694,918	532,431	-162,487	428,300	5,609	433,909	98,522	81.5	69,492	69,492	29,030
GOM Winter Flounder	11,156	5,920	-5,236	0	3	3	5,918	0.0	1,116	1,116	4,802
SNE Winter Flounder	NA	NA	NA	172	3,497	3,669	NA	NA	NA	NA	
Redfish	74,200	73,388	-812	10,904	1,838	12,742	60,647	17.4	7,420	7,420	53,227
White Hake	43,162	39,638	-3,524	25,743	7,109	32,852	6,787	82.9	4,316	4,316	2,470
Pollock	273,807	257,796	-16,011	62,969	1,625	64,593	193,203	25.1	27,381	27,381	165,822
Northern Windowpane	NA	NA	NA	0	33,383	33,383	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	4,496	4,496	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	60	10,528	10,588	NA	NA	NA	NA	
Halibut	NA	NA	NA	182	1,041	1,223	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	1,237	1,237	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 10 – NEFS VIII FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trade	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	54,842	65,053	10,211	59,632	5,422	65,053	-1	100.0	NA	NA	
GB Cod West	501,688	508,364	6,676	433,317	15,809	449,126	59,238	88.3	55,653	55,653	
GB Cod	556,530	573,417	16,887	492,949	21,231	514,180	59,237	89.7	55,653	55,653	3,584
GOM Cod	46,761	13,288	-33,473	12,524	274	12,798	490	96.3	4,676	490	0
GB Haddock East	1,746,944	1,743,943	-3,001	329,728	2,619	332,347	1,411,596	19.1	NA	NA	
GB Haddock West	4,146,152	4,139,028	-7,124	908,054	2,607	910,662	3,228,366	22.0	589,310	589,310	
GB Haddock	5,893,096	5,882,971	-10,125	1,237,783	5,226	1,243,009	4,639,962	21.1	589,310	589,310	4,050,652
GOM Haddock	3,644	1,053	-2,591	445	21	466	587	44.3	364	364	222
GB Yellowtail Flounder	289,088	261,341	-27,747	241,307	20,003	261,309	31	100.0	NA	NA	
SNE Yellowtail	40,744	40,468	-276	25,459	182	25,641	14,827	63.4	4,074	4,074	10,752
CC/GOM Yellowtail Flounder	124,825	86,382	-38,443	77,801	1,095	78,896	7,486	91.3	12,483	7,486	0
Plaice	152,808	172,041	19,233	75,173	20,195	95,368	76,673	55.4	15,281	15,281	61,392
Witch Flounder	58,668	53,808	-4,860	44,223	5,511	49,735	4,073	92.4	5,867	4,073	0
GB Winter Flounder	842,352	846,358	4,006	653,343	5,952	659,295	187,063	77.9	84,235	84,235	102,828
GOM Winter Flounder	11,660	3,464	-8,196	6	11	17	3,447	0.5	1,166	1,166	2,281
SNE Winter Flounder	NA	NA	NA	121	8,839	8,960	NA	NA	NA	NA	
Redfish	65,835	94,925	29,090	19,967	1,907	21,875	73,050	23.0	6,584	6,584	66,467
White Hake	28,779	65,121	36,342	54,892	487	55,378	9,742	85.0	2,878	2,878	6,864
Pollock	233,708	275,547	41,839	132,447	448	132,895	142,652	48.2	23,371	23,371	119,282
Northern Windowpane	NA	NA	NA	70	34,106	34,176	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	2,543	2,543	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	22,104	22,104	NA	NA	NA	NA	
Halibut	NA	NA	NA	497	2,597	3,094	NA	NA	NA	NA	
Wolfish	NA	NA	NA	6	259	265	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 11 – NEFS IX FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

	ACE		Trade	Catch			Comparison of Catch and Final ACE				
Stock	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	93,032	124,986	31,954	104,593	8,406	112,999	11,987	90.4	NA	NA	
GB Cod West	851,053	1,337,581	486,528	1,196,150	68,317	1,264,467	73,114	94.5	94,409	85,101	
GB Cod	944,085	1,462,567	518,482	1,300,743	76,723	1,377,466	85,101	94.2	94,409	85,101	0
GOM Cod	167,695	204,904	37,209	177,365	730	178,094	26,810	86.9	16,770	16,770	10,040
GB Haddock East	2,727,022	2,990,593	263,571	669,807	4,508	674,315	2,316,278	22.5	NA	NA	
GB Haddock West	6,472,242	7,127,989	655,747	2,107,540	10,093	2,117,632	5,010,356	29.7	919,926	919,926	
GB Haddock	9,199,264	10,118,582	919,318	2,777,347	14,600	2,791,947	7,326,634	27.6	919,926	919,926	6,406,708
GOM Haddock	86,211	20,831	-65,380	13,231	54	13,285	7,546	63.8	8,621	7,546	0
GB Yellowtail Flounder	343,761	512,481	168,720	444,943	60,207	505,150	7,332	98.6	NA	NA	
SNE Yellowtail	48,803	71,505	22,702	20,075	8	20,084	51,422	28.1	4,880	4,880	46,541
CC/GOM Yellowtail Flounder	164,854	205,519	40,665	153,114	2,819	155,933	49,586	75.9	16,485	16,485	33,101
Plaice	473,209	543,331	70,122	201,919	43,682	245,601	297,730	45.2	47,321	47,321	250,409
Witch Flounder	143,089	183,567	40,478	148,070	21,190	169,260	14,308	92.2	14,309	14,308	0
GB Winter Flounder	1,373,955	1,537,322	163,367	1,213,930	18,571	1,232,501	304,821	80.2	137,395	137,395	167,425
GOM Winter Flounder	8,950	15,283	6,333	17	6	22	15,261	0.1	895	895	14,366
SNE Winter Flounder	NA	NA	NA	8,843	9,183	18,026	NA	NA	NA	NA	
Redfish	872,638	929,352	56,714	264,665	44,726	309,391	619,961	33.3	87,264	87,264	532,697
White Hake	229,262	343,424	114,162	307,497	13,000	320,497	22,927	93.3	22,926	22,926	1
Pollock	1,392,838	2,116,960	724,122	1,137,715	6,124	1,143,839	973,121	54.0	139,284	139,284	833,837
Northern Windowpane	NA	NA	NA	0	143,128	143,128	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	124	124	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	31,249	31,249	NA	NA	NA	NA	
Halibut	NA	NA	NA	1,740	5,620	7,360	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	5,220	5,220	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 12 – NEFS X FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	6,960	12	-6,948	0	0	0	12	0.0	NA	NA	
GB Cod West	63,674	89,460	25,786	67,214	1,063	68,277	21,182	76.3	7,063	7,063	
GB Cod	70,634	89,472	18,838	67,214	1,063	68,277	21,195	76.3	7,063	7,063	14,131
GOM Cod	513,036	497,270	-15,766	376,936	11,543	388,478	108,792	78.1	51,304	51,304	57,488
GB Haddock East	68,329	74,687	6,358	0	0	0	74,687	0.0	NA	NA	
GB Haddock West	162,169	177,260	15,091	18,819	18	18,838	158,422	10.6	23,050	23,050	
GB Haddock	230,498	251,947	21,449	18,819	18	18,838	233,109	7.5	23,050	23,050	210,059
GOM Haddock	49,764	41,327	-8,437	7,346	101	7,447	33,880	18.0	4,976	4,976	28,903
GB Yellowtail Flounder	307	11	-296	0	0	0	11	0.0	NA	NA	
SNE Yellowtail	1,306	331	-975	0	0	0	331	0.0	131	131	201
CC/GOM Yellowtail Flounder	200,899	235,246	34,347	190,423	17,565	207,988	27,258	88.4	20,090	20,090	7,168
Plaice	108,791	106,052	-2,739	14,405	6,395	20,800	85,252	19.6	10,879	10,879	74,373
Witch Flounder	54,853	53,488	-1,365	41,568	1,113	42,681	10,807	79.8	5,485	5,485	5,322
GB Winter Flounder	239	311	72	0	0	0	311	0.0	24	24	287
GOM Winter Flounder	56,812	60,598	3,786	43,433	403	43,836	16,762	72.3	5,681	5,681	11,081
SNE Winter Flounder	NA	NA	NA	62	639	701	NA	NA	NA	NA	
Redfish	86,440	87,840	1,400	2,934	580	3,514	84,326	4.0	8,644	8,644	75,682
White Hake	52,031	24,743	-27,288	18,241	895	19,136	5,607	77.3	5,203	5,203	404
Pollock	525,852	537,595	11,743	64,865	1,734	66,599	470,996	12.4	52,585	52,585	418,411
Northern Windowpane	NA	NA	NA	12	5,403	5,415	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	2,878	2,878	NA	NA	NA	NA	
Halibut	NA	NA	NA	206	893	1,099	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	3,224	3,224	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 13 – NEFS XI FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	2,952	822	-2,130	0	0	0	822	0.0	NA	NA	
GB Cod West	27,003	2,625	-24,378	0	0	0	2,625	0.0	2,995	2,995	
GB Cod	29,955	3,447	-26,508	0	0	0	3,447	0.0	2,995	2,995	451
GOM Cod	1,375,164	1,213,417	-161,747	1,040,351	22,430	1,062,781	150,636	87.6	137,516	137,516	13,120
GB Haddock East	9,778	9,778	0	0	0	0	9,778	0.0	NA	NA	
GB Haddock West	23,206	23,206	0	0	0	0	23,206	0.0	3,298	3,298	
GB Haddock	32,983	32,983	0	0	0	0	32,983	0.0	3,298	3,298	29,685
GOM Haddock	58,418	30,900	-27,518	17,703	724	18,428	12,473	59.6	5,842	5,842	6,631
GB Yellowtail Flounder	29	29	0	0	0	0	29	0.0	NA	NA	
SNE Yellowtail	94	94	0	0	0	0	94	0.0	9	9	84
CC/GOM Yellowtail Flounder	37,927	18,308	-19,619	9,058	1,609	10,667	7,641	58.3	3,793	3,793	3,848
Plaice	117,224	70,250	-46,974	12,684	4,934	17,618	52,633	25.1	11,722	11,722	40,910
Witch Flounder	34,871	13,464	-21,407	7,931	1,158	9,089	4,375	67.5	3,487	3,487	888
GB Winter Flounder	144	144	0	0	0	0	144	0.0	14	14	130
GOM Winter Flounder	7,391	4,828	-2,563	2,606	130	2,735	2,093	56.6	739	739	1,354
SNE Winter Flounder	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Redfish	283,102	282,718	-384	32,333	3,596	35,929	246,789	12.7	28,310	28,310	218,479
White Hake	271,643	200,772	-70,871	166,971	4,405	171,376	29,396	85.4	27,164	27,164	2,232
Pollock	3,379,854	3,399,411	19,557	1,588,966	59,253	1,648,219	1,751,192	48.5	337,985	337,985	1,413,207
Northern Windowpane	NA	NA	NA	0	57	57	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	13	13	NA	NA	NA	NA	
Halibut	NA	NA	NA	659	3,868	4,527	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	1,136	1,136	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 14 – NEFS XII FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	60	200	140	0	0	0	200	0.0	NA	NA	
GB Cod West	546	189	-357	0	0	0	189	0.0	61	61	
GB Cod	605	388	-217	0	0	0	388	0.0	61	61	328
GOM Cod	126,954	113,323	-13,631	94,176	2,190	96,366	16,957	85.0	12,695	12,695	4,261
GB Haddock East	43	1,354	1,311	0	0	0	1,354	0.0	NA	NA	
GB Haddock West	102	3,175	3,073	0	0	0	3,175	0.0	14	14	
GB Haddock	144	4,528	4,384	0	0	0	4,528	0.0	14	14	4,514
GOM Haddock	2,384	4,285	1,901	349	0	349	3,935	8.2	238	238	3,697
GB Yellowtail Flounder	8	3	-5	0	0	0	3	0.0	NA	NA	
SNE Yellowtail	6	4	-2	0	0	0	4	0.0	1	1	4
CC/GOM Yellowtail Flounder	8,311	20,862	12,551	15,378	2,817	18,195	2,668	87.2	831	831	1,836
Plaice	22,789	29,037	6,248	9,300	1,871	11,171	17,866	38.5	2,279	2,279	15,587
Witch Flounder	5,171	6,614	1,443	4,039	312	4,351	2,263	65.8	517	517	1,746
GB Winter Flounder	4	2	-2	0	0	0	2	0.0	0	0	2
GOM Winter Flounder	1,132	5,128	3,996	2,557	31	2,588	2,540	50.5	113	113	2,427
SNE Winter Flounder	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Redfish	10,127	3,761	-6,366	8	33	41	3,720	1.1	1,013	1,013	2,707
White Hake	1,948	1,162	-786	58	0	58	1,104	5.0	195	195	909
Pollock	19,167	9,597	-9,570	290	5	295	9,303	3.1	1,917	1,917	7,386
Northern Windowpane	NA	NA	NA	0	194	194	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	2	2	NA	NA	NA	NA	
Halibut	NA	NA	NA	0	9	9	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	456	456	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 15 – NEFS XIII FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	56,077	56,962	885	44,069	895	44,964	11,998	78.9	NA	NA	
GB Cod West	512,987	579,494	66,507	424,641	16,209	440,850	138,645	76.1	56,906	56,906	
GB Cod	569,064	636,456	67,392	468,709	17,104	485,814	150,643	76.3	56,906	56,906	93,736
GOM Cod	70,017	29,355	-40,662	21,167	97	21,264	8,091	72.4	7,002	7,002	1,090
GB Haddock East	3,717,136	3,720,137	3,001	79,962	549	80,511	3,639,626	2.2	NA	NA	
GB Haddock West	8,822,151	8,829,275	7,124	2,017,257	2,848	2,020,105	6,809,170	22.9	1,253,929	1,253,929	
GB Haddock	12,539,287	12,549,412	10,125	2,097,219	3,397	2,100,616	10,448,796	16.7	1,253,929	1,253,929	9,194,867
GOM Haddock	10,631	10,891	260	17	7	24	10,867	0.2	1,063	1,063	9,804
GB Yellowtail Flounder	279,823	292,325	12,502	244,919	14,200	259,119	33,206	88.6	NA	NA	
SNE Yellowtail	71,966	98,211	26,245	72,943	4,227	77,170	21,041	78.6	7,197	7,197	13,845
CC/GOM Yellowtail Flounder	53,374	34,946	-18,428	13,510	4,152	17,662	17,283	50.5	5,337	5,337	11,946
Plaice	214,013	214,780	767	70,212	15,620	85,832	128,949	40.0	21,401	21,401	107,547
Witch Flounder	84,700	81,690	-3,010	49,740	5,628	55,368	26,322	67.8	8,470	8,470	17,852
GB Winter Flounder	441,135	437,129	-4,006	323,720	4,763	328,484	108,646	75.1	44,114	44,114	64,532
GOM Winter Flounder	4,857	5,725	868	1,980	71	2,051	3,674	35.8	486	486	3,189
SNE Winter Flounder	NA	NA	NA	2,703	11,344	14,047	NA	NA	NA	NA	
Redfish	682,250	673,160	-9,090	38,309	5,911	44,220	628,940	6.6	68,225	68,225	560,715
White Hake	99,324	77,982	-21,342	59,562	4,423	63,985	13,996	82.1	9,932	9,932	4,064
Pollock	803,507	791,668	-11,839	122,311	730	123,041	668,627	15.5	80,351	80,351	588,276
Northern Windowpane	NA	NA	NA	0	46,771	46,771	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	30	35,721	35,751	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	18,854	18,854	NA	NA	NA	NA	
Halibut	NA	NA	NA	655	3,245	3,900	NA	NA	NA	NA	
Wolfish	NA	NA	NA	6	1,084	1,090	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 16 – Port Clyde Sector FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE Initial	ACE Final	Trades Final Net	Catch Landings	Catch Discards ^	Catch Catch	Comparison of Catch and Final ACE: Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	1,536	307	-1,229	0	0	0	307	0.0	NA	NA	
GB Cod West	14,051	482	-13,569	0	0	0	482	0.0	1,559	788	
GB Cod	15,586	788	-14,798	0	0	0	788	0.0	1,559	788	0
GOM Cod	473,541	424,997	-48,544	327,524	4,002	331,527	93,470	78.0	47,354	47,354	46,116
GB Haddock East	12,673	15,722	3,049	0	0	0	15,722	0.0	NA	NA	
GB Haddock West	30,077	37,312	7,235	0	0	0	37,312	0.0	4,275	4,275	
GB Haddock	42,750	53,034	10,284	0	0	0	53,034	0.0	4,275	4,275	48,759
GOM Haddock	41,613	39,158	-2,455	5,859	149	6,008	33,150	15.3	4,161	4,161	28,989
GB Yellowtail Flounder	65	62	-3	0	0	0	62	0.0	NA	NA	
SNE Yellowtail	4,776	343	-4,433	0	0	0	343	0.0	478	343	0
CC/GOM Yellowtail Flounder	16,728	13,450	-3,278	987	742	1,729	11,721	12.9	1,673	1,673	10,048
Plaice	398,541	392,607	-5,934	88,952	9,684	98,637	293,970	25.1	39,854	39,854	254,116
Witch Flounder	83,251	71,572	-11,679	44,819	6,489	51,309	20,264	71.7	8,325	8,325	11,939
GB Winter Flounder	285	283	-2	0	0	0	283	0.0	28	28	254
GOM Winter Flounder	7,467	4,615	-2,852	376	65	442	4,174	9.6	747	747	3,427
SNE Winter Flounder	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Redfish	385,364	364,329	-21,035	13,392	1,745	15,137	349,193	4.2	38,536	38,536	310,656
White Hake	258,315	254,727	-3,588	154,841	3,859	158,700	96,027	62.3	25,831	25,831	70,195
Pollock	1,557,580	1,587,879	30,299	362,331	4,748	367,079	1,220,800	23.1	155,758	155,758	1,065,042
Northern Windowpane	NA	NA	NA	61	217	278	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	13	27	40	NA	NA	NA	NA	
Halibut	NA	NA	NA	1,100	2,840	3,940	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	657	657	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 17 – Sustainable Harvest Sector FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE Final - Catch	ACE Final Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	124,273	120,823	-3,450	64,479	3,229	67,707	53,116	56.0	NA	NA	
GB Cod West	1,136,842	1,359,116	222,274	986,272	32,913	1,019,185	339,931	75.0	126,112	126,112	
GB Cod	1,261,115	1,479,939	218,824	1,050,751	36,142	1,086,893	393,047	73.4	126,112	126,112	266,935
GOM Cod	1,801,761	1,577,960	-223,801	1,292,513	19,633	1,312,146	265,814	83.2	180,176	180,176	85,638
GB Haddock East	7,822,107	7,727,557	-94,550	1,776,678	16,633	1,793,311	5,934,246	23.2	NA	NA	
GB Haddock West	18,564,781	18,340,378	-224,403	5,229,886	16,761	5,246,647	13,093,731	28.6	2,638,689	2,638,689	
GB Haddock	26,386,888	26,067,935	-318,953	7,006,564	33,394	7,039,958	19,027,977	27.0	2,638,689	2,638,689	16,389,289
GOM Haddock	750,027	572,726	-177,301	257,620	2,637	260,257	312,469	45.4	75,003	75,003	237,466
GB Yellowtail Flounder	149,459	133,626	-15,833	85,526	16,602	102,128	31,498	76.4	NA	NA	
SNE Yellowtail	63,590	40,009	-23,581	22,727	751	23,479	16,530	58.7	6,359	6,359	10,171
CC/GOM Yellowtail Flounder	186,632	147,846	-38,786	69,671	9,331	79,002	68,844	53.4	18,663	18,663	50,180
Plaice	2,494,550	2,527,803	33,253	1,691,786	164,719	1,856,506	671,297	73.4	249,455	249,455	421,842
Witch Flounder	637,193	696,383	59,190	576,966	49,762	626,727	69,656	90.0	63,719	63,719	5,936
GB Winter Flounder	345,155	363,996	18,841	255,166	1,687	256,853	107,144	70.6	34,516	34,516	72,628
GOM Winter Flounder	24,973	22,108	-2,865	6,617	255	6,872	15,236	31.1	2,497	2,497	12,739
SNE Winter Flounder	NA	NA	NA	1,166	3,615	4,782	NA	NA	NA	NA	
Redfish	7,394,787	7,214,422	-180,365	2,355,486	138,966	2,494,452	4,719,970	34.6	739,479	739,479	3,980,491
White Hake	2,848,594	3,505,860	657,266	3,196,669	24,443	3,221,112	284,748	91.9	284,859	284,748	0
Pollock	13,908,712	13,166,301	-742,411	4,795,385	46,619	4,842,004	8,324,298	36.8	1,390,871	1,390,871	6,933,426
Northern Windowpane	NA	NA	NA	0	19,167	19,167	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	27	5,565	5,592	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	9,338	9,338	NA	NA	NA	NA	
Halibut	NA	NA	NA	5,430	8,593	14,022	NA	NA	NA	NA	
Wolfish	NA	NA	NA	491	8,491	8,982	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 18 – Tri-State Sector FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	ACE		Trades	Catch			Comparison of Catch and Final ACE				
	Initial	Final	Final Net	Landings	Discards ^	Catch	Difference ACE_{Final} - Catch	ACE_{Final} Caught (%)	Carryover Cap*	Carryover**	Remaindered ACE
GB Cod East	6,316	4,806	-1,510	0	0	0	4,806	0.0	NA	NA	
GB Cod West	57,780	43,964	-13,816	33,691	2,601	36,292	7,672	82.5	6,410	6,410	
GB Cod	64,096	48,770	-15,326	33,691	2,601	36,292	12,478	74.4	6,410	6,410	6,068
GOM Cod	88,102	74,903	-13,199	54,421	443	54,864	20,039	73.2	8,810	8,810	11,229
GB Haddock East	386,691	383,556	-3,135	0	0	0	383,556	0.0	NA	NA	
GB Haddock West	917,763	910,323	-7,440	368,005	3,741	371,746	538,576	40.8	130,445	130,445	
GB Haddock	1,304,454	1,293,879	-10,575	368,005	3,741	371,746	922,133	28.7	130,445	130,445	791,687
GOM Haddock	11,872	464	-11,408	98	0	98	365	21.2	1,187	365	0
GB Yellowtail Flounder	131,381	131,381	0	105,000	4,879	109,879	21,502	83.6	NA	NA	
SNE Yellowtail	8,301	8,298	-3	0	0	0	8,298	0.0	830	830	7,468
CC/GOM Yellowtail Flounder	38,004	35,446	-2,558	27,094	1,015	28,109	7,337	79.3	3,800	3,800	3,536
Plaice	72,636	63,240	-9,396	12,528	3,123	15,651	47,589	24.7	7,264	7,264	40,325
Witch Flounder	24,469	17,766	-6,703	6,194	852	7,046	10,720	39.7	2,447	2,447	8,273
GB Winter Flounder	79,094	79,094	0	45,800	281	46,081	33,013	58.3	7,909	7,909	25,104
GOM Winter Flounder	7,680	3,905	-3,775	3,636	22	3,658	247	93.7	768	247	0
SNE Winter Flounder	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Redfish	1,920	660	-1,260	0	0	0	660	0.0	192	192	468
White Hake	7,004	1,819	-5,185	56	600	657	1,162	36.1	700	700	462
Pollock	20,782	10,622	-10,160	275	256	531	10,091	5.0	2,078	2,078	8,012
Northern Windowpane	NA	NA	NA	0	3,576	3,576	NA	NA	NA	NA	
Southern Windowpane	NA	NA	NA	0	0	0	NA	NA	NA	NA	
Ocean Pout	NA	NA	NA	0	1,374	1,374	NA	NA	NA	NA	
Halibut	NA	NA	NA	0	157	157	NA	NA	NA	NA	
Wolfish	NA	NA	NA	0	97	97	NA	NA	NA	NA	

* Carryover Cap = maximum carryover allowed, 10% of initial ACE
^ Discards include both observed and calculated discards
** There is no carryover for GB Yellowtail Flounder. Up to 10% of Cod and Haddock maybe carried over, but will be added to GB Cod west and GB Haddock west ACEs in the following fishing year

Table 19 – Common Pool FY 2010 End of Year Accounting of NE Multispecies Catch (lbs)

Stock	sub-ACLs		Trades	Catch			Comparison of Catch and Final Sub-ACL		
	Initial	Final	Final Net	Landings	Discards	Catch	Difference ACL_{Final} - Catch	sub-ACL_{Final} Caught (%)	Remaindered Sub-ACL
GB Cod East	27,721	27,721	0	0	0	0	27,721	0.0	27,721
GB Cod West	253,594	253,594	0	144,303	40,786	185,090	68,504	73.0	68,504
GB Cod	281,315	281,315	0	144,303	40,786	185,090	96,225	65.8	96,225
GOM Cod	528,123	528,123	0	430,392	67,817	498,208	29,915	94.3	29,915
GB Haddock East	166,321	166,321	0	0	0	0	166,321	0.0	166,321
GB Haddock West	394,741	394,741	0	202,362	998	203,360	191,381	51.5	191,381
GB Haddock	561,062	561,062	0	202,362	998	203,360	357,702	36.2	357,702
GOM Haddock	57,608	57,608	0	15,304	429	15,733	41,875	27.3	41,875
GB Yellowtail Flounder	43,954	43,954	0	17,135	23,919	41,054	2,899	93.4	2,899
SNE Yellowtail	166,061	166,061	0	32,371	10,458	42,829	123,232	25.8	123,232
CC/GOM Yellowtail Flounder	109,317	109,317	0	40,162	41,171	81,333	27,984	74.4	27,984
Plaice	220,617	220,617	0	49,074	23,152	72,226	148,391	32.7	148,391
Witch Flounder	54,213	54,213	0	57,213	8,876	66,089	-11,876	121.9	-11,876
GB Winter Flounder	64,465	64,465	0	12,975	6,401	19,376	45,089	30.1	45,089
GOM Winter Flounder	54,594	54,594	0	48,883	7,135	56,018	-1,424	102.6	-1,424
SNE Winter Flounder	NA	NA	0	5,812	5,514	11,326	NA	NA	
Redfish	198,229	198,229	0	14,586	2,792	17,379	180,850	8.8	180,850
White Hake	112,338	112,338	0	87,689	9,669	97,358	14,980	86.7	14,980
Pollock	826,377	826,377	0	317,315	16,129	333,445	492,932	40.4	492,932
Northern Windowpane	NA	NA	0	0	4,055	4,055	NA	NA	
Southern Windowpane	NA	NA	0	16,495	29,585	46,080	NA	NA	
Ocean Pout	NA	NA	0	1,044	18,238	19,282	NA	NA	
Halibut	NA	NA	0	4,179	780	4,960	NA	NA	
Wolfish	NA	NA	0	0	7,659	7,659	NA	NA	

*Any value for a non-allocated species may be due to landings of that stock; misreporting of species and/or stock area; and/or estimated landings (in lieu of missing reports) based on vessel histories

Framework Adjustment 47

to the

Northeast Multispecies FMP

Appendix III

Calculation of Northeast Multispecies Annual Catch Limits, FY 2010 – FY 2012

This appendix documents the calculation of Northeast Multispecies Overfishing Levels (OFLs), Acceptable Biological Catches (ABCs), and Annual Catch Limits (ACLs) for FY 2010 - FY 2012. The general approach for all stocks is to first determine the OFL then determine the ABC. The ABC is distributed to various components of the fishery, and then an adjustment is made to these "sub-ABCs" to determine the ACLs, sub-ACLs, or other sub-components. The descriptions in this section are only accurate if the preferred alternative specifications are adopted.

For this action, the preferred alternative lists specifications for all Northeast Multispecies stocks for FY 2012. For XXX stocks, the FY 2012 values were established by FW 44 and the calculation of OFLs and ABCs are described in Appendix III to that document. That information is not repeated here; it is available at www.nefmc.org. For the remaining stocks, specifications are proposed for FY 2012 – FY 2014 and the calculations are described in detail. These stocks are:

GB winter flounder
SNE/MA winter flounder
GOM winter flounder
GB yellowtail flounder
GOM/GB windowpane flounder
SNE/MAB windowpane flounder
Ocean pout

This appendix also documents and clarifies how available catches are distributed to the sub-components of the fishery. These are listed for all stocks (even those where specifications are determined only for FY 2012) in order to keep a clear record of the distribution. Amendment 16 authorized changes to be made in a framework action and this summary documents several changes.

Determining OFL and ABC

Stocks with Age-Based Assessments and Projections

Catch levels (including OFLs, ABCs, and ACLs) for the following stocks are based on age-based projections:

GB yellowtail flounder
GB winter flounder
SNE/MA winter flounder

For these stocks the projections were performed using the Northeast Fisheries Science Center's (NEFSC) AGEPRO projection model. The two winter flounder stocks were last assessed at SARC 52 (NEFSC 2011). GB yellowtail flounder was assessed by the Transboundary Resource Assessment Committee (TRAC) in 2011, with a terminal year of 2010.

There are a number of assumptions that must be made to complete the projections. All of these assumptions are potential sources of error. The assumptions for recruitment, selectivity, and weights-at-age that were used were those recommended by the SARC and TRAC review panels.

Since the first year for ACLs based on these projections is 2012, an additional assumption must be made in the projections for the years between the terminal year and 2012 (in this case, 2011). An estimate of 2011 catch developed by the NEFSC was input into the projection model. The values may differ from realized catches and introduce uncertainty into the results. The 2011 catch assumptions for these projections are provided in Table 1.

When calculating the OFL in future years, F_{MSY} is used as the fishing mortality in the projection. When calculating the ABC, either 75% of F_{MSY} or Frebuild is used (whichever is lower). This is consistent with the ABC control rules recommended by the Science and Statistical Committee (SSC) and adopted in Amendment 16. There are two exceptions. For GB yellowtail flounder, because there are two assessment models extant, FY 2013 ABCs are preliminary and are expected to be revisited after the 2011 TRAC assessment. For SNE/MA winter flounder, the ABC was calculated using the fishing mortality expected to result from management measures designed to achieve a mortality as close to 0 as possible. The value selected was the average of the realized fishing mortality for CY 2009 and 2010. Specific mortality targets used for the ABC projections are provided in Table 2.

Projection output used for setting ABCs is in Appendix IV.

Stocks with Index-Based Assessments

For these three stocks, the OFL was calculated as the F_{MSY} proxy applied to the most recent biomass estimate (a survey-based proxy). The ABC was calculated as 75% of F_{MSY} applied to the most recent biomass estimate. The index-based projection model was not used for any of these stocks. The R/V Bigelow survey indices were converted to R/V Albatross units but this correction did not use length-based conversion factors because these are not yet available.

Northern Windowpane Flounder
Southern Windowpane Flounder
Ocean Pout

Other Stocks

The GOM winter flounder assessment approved at SARC 52 is based on a swept area assessment model. The OFL and ABC are based on applying the F_{MSY} proxy to an estimate of swept area biomass, while the ABC is based on the default ABC control rule – 75 percent of the F_{MSY} proxy applied to the most recent estimate of swept area biomass.

Distribution of ABCs

Because the Council wants the ability to consider a different adjustment for management uncertainty for different components of the fishery, ABCs were first distributed to the components prior to applying this adjustment. A brief description of the components follows. Note that there are a few stock-specific instances (described in a later section) that may differ from this general overview.

ABC: Acceptable Biological Catch for the entire stock.

Canadian Share/Allowance: An amount from the stock that Canadian vessels are expected to harvest. For GB cod, GB haddock, and GB yellowtail flounder, this is based on the Canadian allocation under the TMGC (but see the GB yellowtail flounder discussion below). For other stocks with substantial Canadian catches this is based on an estimate of Canadian catch.

U.S. ABC: That portion of the ABC available to U.S. fishermen after accounting for Canadian harvests.

State waters: Portion of the U.S. ABC expected to be harvested from state waters, outside of the federal management plan.

Other sub-components: Portion of the U.S. ABC expected to be harvested by unidentified non-groundfish fishery components. These are not attributed to specific components because individual amounts are small. This action clarifies that in cases where there is no specific recreational allocation, unless otherwise specified recreational catches are counted against this sub-component. There are a few stocks where this may not be the case, such as when the majority of recreational catches are from state waters and the recreational catch is considered part of the state waters sub-component. These instances will be specifically identified.

Scallops: Portion of U.S. ABC either allocated to, or expected to be harvested by, the U.S. scallop fishery and specifically allocated to that fishery.

Groundfish: Portion of the U.S. ABC available to the groundfish fishery (including recreational and commercial vessels if there is a specific allocation). This ABC has several sub-components:

Commercial: Portion of the U.S. ABC available to commercial vessels; this is further sub-divided into sector and common-pool portions.

Recreational: Portion of the U.S. ABC available to recreational vessels.

MWT: Portion of the ABC available to herring mid-water trawl vessels. Currently only applies to the two haddock stocks.

Table 3 summarizes the distribution of the U.S. ABC to the various sub-components, while Table 4 provides the resulting ABCs. Details on the distribution of specific stocks are provided below. Changes are the result of FY 2010 catches and are intended to more closely align allocations with recent experiences. It is expected that these values may be changed in future actions as more experience with the ACL system is gained.

a. GB cod: FW 44 was ambiguous on how to treat recreational catches of this stock. At the time, recreational catches were less than 10 mt, but catches have increased in recent years. Since the Council has not identified a specific commercial/recreational allocation, recreational catches will be assigned to the "other subcomponents" category unless a recreational allocation is made in the future. This is the only change to the distribution of ABCs/ACLs for this stock.

b. GOM cod: The division into sub-components was calculated differently for this stock based on the way the components were calculated by the PDT. First, the PDT calculated the recreational/commercial allocation as described in Amendment 16 using the numbers of fish caught (as determined by GARM III). This was done without regard to whether the fish were caught in state waters or not. In contrast, the state waters component (10 percent) came from a NMFS report required by the M-S Act reauthorization and included commercial catches only. Similarly, "other sub-components" represented only commercial catches since a specific recreational/commercial component was anticipated. The state waters component and the other sub-component portion are thus calculated as a percent of the commercial allocation (e.g. 10 percent of the 66.3 percent commercial allocation).

The recreational harvest of cod from state waters (without regard to stock) averaged 19 percent from 2001-2008, but was highly variable and ranged from 9 percent to 35 percent. Proportional standard errors (PSEs) are also high for the state waters components, indicating high uncertainty over these values. It is not known how much of the state waters recreational catch came from party/charter boats with federal permits that should be subject to ACL requirements. These factors make it difficult to determine what percentage of the recreational allocation is expected to be harvested from state waters.

The PDT calculated the groundfish recreational and commercial ACLs based on the recreational/commercial percentages as determined by the Council (based on historical data). Since some of the recreational catch comes from state waters, the ACL for recreational fishermen is higher than if a specific state water recreational allocation could be identified. It also means in order to monitor and account for recreational catch, all recreational catches (including state waters catches) should be applied against the ACL.

The commercial components (state waters, other sub-components, and federal waters) add to the total commercial allocation.

Another issue for this stock is that an assessment was scheduled for December 2011, with final results not expected to be released until January 2012, after submission of this document. The document analyzes a range of catch levels and NMFS will base the final level on an ABC based on the assessment results. The distribution shown below is for the ABC consistent with that implemented by FW 44 (9.018 mt in FY 2012) and is roughly the middle of the range considered in the document. At lower levels, adjustments may be needed to correctly account for state waters catches.

		Rec	Comm	Total
Shares,	Based on Total Catch, in Numbers	0.337	0.663	1.0
	FY 2010 ABC, Based on Totals	3,039	5,979	9,018
	State waters (assumed all commercial)		598	
	Other sub (assumed all commercial)		299	
	Adjusted ABC	3,039	5,082	

c. GOM haddock: This stock has similar issues recreational/commercial issues as GOM cod. Calculations were done in a similar fashion. One difference is that there is a portion of this stock that is allocated to the MWT fishery. This is based on 1% of the total ABC. The ABC is first divided between the recreational and commercial fisheries. In FY 2010, 94.6% of the state waters allowance was caught but only 3.6% of the "other subcomponents" was caught. This action modifies the state waters allowance to 2% (from 1%) and decreases the other subcomponents to 3% (from 4%). The MWT share is also subtracted from the commercial ABC.

		Rec	Comm	Total
Shares,	Based on Total Catch, in Numbers	0.275	0.725	1
	ABC, Based on Totals	279	734	1,013
	MWT Haddock		10	
	State waters (assumed all commercial)		15	
	Other sub (assumed all commercial)		22	
	Adjusted ABC	279	**687**	
	ACL			

d. GB yellowtail flounder: There is no state waters component because the stock area does not include state waters. Five percent is considered an “other subcomponent” caught in other fisheries. As described in the framework text, there is an allocation to the scallop fishery that is based on an estimate of the amount the fishery is expected to harvest if the scallop yield is taken. This was estimated for FW 44 and the allocation has not been changed even though the ABC has been revised. In FY 2010, only 12% of the other sub-components catch was caught. This action reduces this allocation to 4 percent (from 5 percent) and this increases the amount allocated to the commercial fishery.

e. SNE/MA yellowtail flounder: One percent is expected to be taken in state waters. Four percent is considered an “other subcomponent” caught in other fisheries. As described in the framework text, there is an allocation to the scallop fishery that is based on an estimate of the amount the fishery is expected to harvest if the scallop yield is taken. This was estimated for FW 44 and the allocation has not been changed even though the ABC has been revised.

f. CC/GOM yellowtail flounder: The state waters allowance (1%) was too small in FY 2010 when catches totaled 368.6% of the amount allowed. The ABC increases significantly in FY 2012. The other subcomponents catch was only 39.4% of the amount allocated. This action increases the state waters allowance to 3% and decreases the other subcomponents allocation to 2% (from 4%).

g. Witch flounder: In FY 2010 catches were more than twice the state waters allowance (207.3%) and the other subcomponents catches were 421.3% of the allocation. The allowance for state waters catches would be increased to 3%, which would reduce the allocation to groundfish to 93% (from 95%). There may be a need in the future to adjust the other subcomponents portion of the ABC if it is exceeded again, but no change is proposed in this action because while the overage was large in relative terms it was small in absolute terms.

h. GB winter flounder: There is no state waters allocation because the stock area does not include state waters.

i. GOM winter flounder: The recreational fishery is almost entirely in state waters. From 2005 to 2007, the recreational harvest averaged 29 mt, but increased to 107 mt in 2008. ASMFC is adopting management measures to reduce harvests 11 percent. The PDT has allowed 60 mt for state waters/recreational harvest for this stock. This is 89 percent of the 2007/2008 average, reflecting the expected impacts of ASMFC measures. This is 25 percent of the ABC. For this stock recreational catches are counted against state waters catches.

j. SNE/MA winter flounder: Catches in state waters were over three times the allowance (341%) and the other subcomponents catches were 421% of the allocation. This action recommends increasing the state waters allowance to 28% (from 8%). The other subcomponents portion would be increased to 20% (from 5%). This reduces the groundfish allocation from 87% to 52% of the ABC. AS is the case for GOM winter flounder, for this stock nearly all the recreational catches are taken in state waters. For this stock recreational catches are counted against the state waters catches.

i. White hake: : Because more than 90% of the amount allowed to state waters was caught, this action would increase the state waters allowance to 2% and decrease the other subcomponents allocation to 3%.

j. Pollock: Recreational harvest increased to 912 mt in 2008, about 2.5 times the harvest from 2005 through 2007 and 24 percent of the ABC. Since 2001, about half of the recreational harvest has been from state waters. The PDT allowed 1,200 mt for recreational harvest in state waters, reflecting the amount in FY 2010. Pollock recreational catches are split between federal waters and state waters, so this value is split between state waters and the "other sub-components" category. While FW 44 included an allowance for Canadian catches the assessment completed in 2010 revised the stock unit to exclude Canadian catches and so an allowance is no longer needed.

k. Atlantic halibut: The Council estimates that about 50 percent of halibut catches are by Maine state vessels from state waters. State waters catches in FY 2010 were less than this amount, but no change is proposed in this action; the decision was made to wait for additional data before making a change. There are also some Canadian catches that will be attributed to the other subcomponents category

l. GOM/GB windowpane flounder: Only a fraction of the state waters allowance was caught in FY 2010, and only 18.6% of the other subcomponents allocation. The commercial groundfish fishery allocation was exceeded, with 139.5% caught. This action would keep the state waters allowance at 1%, and would reduce the other subcomponent allocation to 19%. This would increase the groundfish fishery sub-ACL to 80% (from 70%).

m. SNE/MAB windowpane flounder: In FY 2010, catches in state waters were 1,550% of the state waters allowance. The other subcomponents catches were 623.6% of the allocation. In FY 2010, the scallop fishery catch was 33% of the total catch. The groundfish fishery accounted for about 13.7% of the catch in FY 2010. The changes recommended by this action would increase the state waters allowance to 10%, increase the other subcomponents to 70% (50% for the scallop fishery and 20% for other fisheries), and reduce the groundfish fishery to 20% (from 70%). Because of the large catches by the scallop and other fisheries the Council may consider allocating sub-ACLs to other fisheries in a future action.

n. Ocean pout: The other subcomponents catch in FY 2010 was 227.7% of the amount allocated. This action would increase the allocation for FY 2012 to 9% and keep the state waters catch at 1%.

ACLs

After the ABCs are distributed to the various components, they are adjusted for management uncertainty. As discussed in Appendix II, the default sets the ACL at 95 percent of the ABC. For stocks with less management uncertainty the ACL is set at 97 percent of the ABC; for stocks with more uncertainty it is set at 93 percent of the ACL. Adjustments are shown in Table 5. The rationale for deviation from 95 percent for specific stocks is provided below.

a. GOM cod: The management uncertainty associated with the recreational fishery is greater than that associated with the commercial fishery because data for the recreational fishery is more uncertain than that from the commercial fishery, the number of participants is unknown, the AMs for the recreational fishery are implemented after a time lag, and impacts of the management measures are less predictable. Therefore the ACL for the recreational component was set at 93 percent of the ABC.

b. GOM haddock: The MWT ACL was set at 93 percent of the ABC due to uncertainty over monitoring of the herring MWT fishery.

The management uncertainty associated with the recreational fishery is greater than that associated with the commercial fishery because data for the recreational fishery is more uncertain than that from the commercial fishery, the number of participants is unknown, the AMs for the recreational fishery are implemented after a time lag, and impacts of the management measures are less predictable. Therefore the ACL for the recreational component was set at 93 percent of the ABC.

c. GB yellowtail flounder: The management uncertainty is less for this stock because this stock has been successfully managed with a hard TAC for several years and there are in-season AMs (Regional Administrator authority to modify in-season measures including trip limits, closures, gear restrictions, etc.). Therefore, the PDT set the ACL at 97 percent of the ABC. The same percentage is used for the scallop fishery in FY 2011 and FY 2012. There is no state waters allocation because the stock area does not include state waters.

d. SNE/MA yellowtail flounder: This stock is the only stock where catches exceeded TTACs for several years. Also, non-groundfish fisheries may catch this stock. The PDT set the ACL at 93 percent of the ABC in recognition of the fact management measures may not be as effective at keeping catch levels below the desired catch level for this stock. The same percentage is used for the scallop fishery in FY 2011 and FY 2012.

e. SNE/MA winter flounder: The ACL was set at 93 percent of the ABC. With the adoption of Amendment 16, landings are prohibited, which will increase the uncertainty over catch. In addition, there are no controls on the catch of this stock by sector vessels other than a prohibition on retention (in contrast, the proposed measures for the common pool include two gear restricted areas that will help reduce impacts on this stock).

f. Windowpane flounders, ocean pout, Atlantic wolffish: Retention of these stocks is prohibited. In addition, there are no controls on the catches of these stocks by sector vessels other than a prohibition on retention. The ACL was set at 93 percent of the ABC, reflecting the additional uncertainty over catch.

g. GB haddock: The MWT ACL was set at 93 percent of the ABC due to uncertainty over monitoring of the herring MWT fishery.

Incidental Catch TACs

Part of the commercial non-sector ACL is allocated to the incidental catch TACs that limit catches of stocks of concern in the Category B (regular) DAS program and certain SAPs.   Table 6 and Table 7 are reproduced from Amendment 16.

An incidental catch TAC is specified for American plaice even though GARM III determined this stock was not overfished and overfishing was not occurring. This was done for several reasons. First, stock size barely exceeds the minimum biomass threshold and is at 51% of B_{MSY}, and has not completed stock rebuilding. Given uncertainty in the assessment it was considered prudent to continue to control catches until certain that rebuilding is on track. Second, plaice is often caught with witch flounder, an overfished stock, and allowing vessels to target plaice in these programs would likely lead to excessive catches of witch flounder.

Table 1 – 2011 catch assumption used in age-based projections for stocks with recent age-based analytic assessments. Values are only provided for those three stocks with recent age-based assessments that are used as the basis for FY 2012 -2014 ABCs.

Stock	2011 Catch
GB Cod	
GB Haddock	
GB Yellowtail	2,650
SNE/MA Yellowtail	
CC/GOM Yellowtail	
GOM Cod	
Witch Flounder	
Plaice	
GOM Winter Flounder	
SNE/MA Winter Flounder	363
GB Winter Flounder	2,230
White Hake	
Pollock	
Redfish	
GOM Haddock	
Ocean pout	
Northern window	
Southern window	

Table 2 – Mortality targets used to calculate ABCs, FY 2012 – 2014. Information in grey text is for stocks last assessed at GARM III that do not have updated ABCs for FY 2012 -2014 specified in this action.
Note: SNE/MA winter flounder target fishing mortality is based on the average of 2009 – 2010.

Species	Stock	Basis for Target Fishing Mortality	Targeted Fishing Mortality or Exploitation	F_{msy}
Cod	GB	75%FMSY	0.184	0.2466
Cod	GOM	75%FMSY	0.18	0.237
Haddock	GB	75%FMSY	0.26	0.35
Haddock	GOM	75%FMSY	0.32	0.43
Yellowtail Flounder	**GB**	Frebuild(1)	0.188	0.254
Yellowtail Flounder	SNE/MA	Frebuild	0.072	0.254
Yellowtail Flounder	CC/GOM	75%FMSY	0.18	0.239
American Plaice	GB/GOM	75%FMSY	0.14	0.19
Witch Flounder		75%FMSY	0.15	0.2
Winter Flounder	**GB**	75% FMSY	0.315	0.420
Winter Flounder	**GOM**	75% FMSY	0.2325	0.31
Winter Flounder	**SNE/MA**	See text	0.07 (see note)	0.29
Redfish		75%FMSY	0.03	0.038
White Hake	GB/GOM	Frebuild	0.084	0.125
Pollock	GB/GOM	See text	4.245	5.66
Windowpane	**GOM/GB**	75%FMSY	n/a	0.5
Windowpane	**SNE/MA**	75%FMSY	n/a	1.47
Ocean Pout		75%FMSY	n/a	0.76
Atlantic Halibut		Frebuild	0.044	0.073
Atlantic Wolffish		75% FMSY	See text	

Table 3 – Distribution of ABC to fishery components. Sector PSCs are preliminary and may change based on final sector rosters.
(1) Includes commercial ABC in state waters and other subcomponents

Stock	Year	ABC	Canadian Share/ Allowance	US ABC	State Waters	Other Sub-Components	Scallops	Groundfish	Comm Groundfish	Rec Groundfish	Sector PSC	MWT
GB Cod	2012	5,616	513	5,103	0.01	0.04		0.95	0.95		0.978301389	
	2013		0	0	0.01	0.04		0.95	0.95		0.978301389	
	2014		0	0	0.01	0.04		0.95	0.95		0.978301389	
GOM Cod	2012	9,018	0	9,018	0.10	0.05		na	0.663	0.337	0.978468075	
	2013	500	0	500	0.10	0.05		na	0.663	0.337	0.978468075	
	2014	20,000	0	20,000	0.10	0.05		na	0.663	0.337	0.978468075	
GB Haddock	2012	39,846	9,120	30,726	0.01	0.04		0.940	0.94		0.993883768	0.01
	2013		0	0	0.01	0.04		0.940	0.94		0.993883768	0.01
	2014		0	0	0.01	0.04		0.940	0.94		0.993883768	0.01
GOM Haddock	2012	1,013		1,013	0.02	0.03		0.94	0.725	0.275	0.990240753	0.01
	2013			0	0.02	0.03		0.94	0.725	0.275	0.990240753	0.01
	2014			0	0.02	0.03		0.94	0.725	0.275	0.990240753	0.01
GB Yellowtail Flounder	2012	1,150	586	564	0.00	0.04	0.562	0.398	0.40		0.982913844	
	2013	1,150	0	0	0.00	0.04					0.982913844	
	2014		0	0	0.00	0.04					0.982913844	
SNE/MA Yellowtail Flounder	2012	1,003		1,003	0.01	0.04	0.136	0.814	0.81		0.770551565	
	2013			0	0.01	0.04					0.770551565	
	2014			0	0.01	0.04					0.770551565	
CC/GOM Yellowtail Flounder	2012	1,159		1,159	0.03	0.02		0.95	0.95		0.9717042	
	2013			0	0.03	0.02		0.95	0.95		0.9717042	
	2014			0	0.03	0.04		0.93	0.93		0.9717042	
Plaice	2012	3,632		3,632	0.01	0.04		0.95	0.95		0.977319652	
	2013			0	0.01	0.04		0.95	0.95		0.977319652	
	2014			0	0.01	0.04		0.95	0.95		0.977319652	
Witch Flounder	2012	1,639		1,639	0.03	0.04		0.93	0.93		0.979650512	
	2013			0	0.03	0.04		0.93	0.93		0.979650512	
	2014			0	0.03	0.04		0.93	0.93		0.979650512	

Stock	Year	ABC	Canadian Share/ Allowance	US ABC	State Waters	Other Sub-Components	Scallops	Ground-fish	Comm Groundfish	Rec Groundfish	Sector PSC	MWT
GB Winter Flounder	2012	3,753		3,753	0.00	0.05		0.95	0.95		0.993125515	
	2013	3,750		3,750	0.00	0.05		0.95	0.95		0.993125515	
	2014	3,598		3,598	0.00	0.05		0.95	0.95		0.993125515	
GOM Winter Flounder	2012	1,078		1,078	0.25	0.05		0.70	0.70		0.949972429	
	2013	1,078		1,078	0.25	0.05		0.70	0.70		0.949972429	
	2014	1,078		1,078	0.25	0.05		0.70	0.70		0.949972429	
SNE/MA Winter Flounder	2012	626		626	0.28	0.20		0.52	0.52			
	2013	697		697	0.28	0.20		0.52	0.52			
	2014	912		912	0.28	0.20		0.52	0.52			
Redfish	2012	9,224		9,224	0.01	0.04		0.95	0.95		0.995193093	
	2013			0	0.01	0.04		0.95	0.95		0.995193093	
	2014			0	0.01	0.04		0.95	0.95		0.995193093	
White Hake	2012	3,638		3,638	0.02	0.03		0.95	0.95		0.990422378	
	2013			0	0.02	0.03		0.95	0.95		0.990422378	
	2014			0	0.02	0.03		0.95	0.95		0.990422378	
Pollock	2012	15,400		15,400	0.05	0.09		0.86	0.86		0.992546584	
	2013	15,600		15,600	0.05	0.09		0.86	0.86		0.992546584	
	2014	16,000		16,000	0.05	0.09		0.87	0.87		0.992546584	
N. Window-pane Flounder	2012	173		173	0.01	0.19		0.80	0.80			
	2013	173		173	0.01	0.19		0.80	0.80			
	2014	173		173	0.01	0.19		0.80	0.80			
S. Window-pane Flounder	2012	386		386	0.10	0.70		0.20	0.20			
	2013	386		386	0.10	0.70		0.20	0.20			
	2014	386		386	0.10	0.70		0.20	0.20			
Ocean Pout	2012	256		256	0.01	0.09		0.90	0.90			
	2013	256		256	0.01	0.09		0.90	0.90			
	2014	256		256	0.01	0.09		0.90	0.90			

Stock	Year	ABC	Canadian Share/ Allowance	US ABC	State Waters	Other Sub-Components	Scallops	Groundfish	Comm Groundfish	Rec Groundfish	Sector PSC	MWT
Atlantic Halibut	2012	85		85	0.50	0.05		0.45	0.45			
	2013	85		85	0.50	0.05		0.45	0.45			
	2014	85		85	0.50	0.05		0.45	0.45			
Atlantic Wolffish	2012	83		83	0.01	0.04		0.95	0.95			
	2013	83		83	0.01	0.04		0.95	0.95			
	2014	83		83	0.01	0.04		0.95	0.95			

Table 4 – Distribution of ABC to fishery components

(1) Includes commercial ABC in state waters and other sub-components

Stock	Year	ABC	Canadian Share/ Allowance	US ABC	State Waters	Other Sub-Compo-nents	Scallops	Groundfish	Comm Groundfish	Rec Groundfish	Sector PSC	Non-Sector	MWT
GB Cod	2012	5,616	513	5,103	51	204	0	4,848	4,848	0	4,743	105	0
	2013		0	0	0	0	0	0	0	0	0	0	0
	2014		0	0	0	0	0	0	0	0	0	0	0
GOM Cod	2012	9,018	0	9,018	598	299	0	9,018	5,979	3,039	4,973	109	0
	Low	500	0	500	33	17	0	500	332	169	276	6	0
	High	20,000	0	20,000	1,326	663	0	20,000	13,260	6,740	11,028	243	0
GB Haddock	2012	39,846	9,120	30,726	307	1,229	0	28,882	28,882	0	28,706	177	307
	2013		0	0	0	0	0	0	0	0	0	0	0
	2014		0	0	0	0	0	0	0	0	0	0	0
GOM Haddock	2012	1,013		1,013	15	22	0	1,013	734	279	681	7	10
	2013			0	0	0	0	0	0	0	0	0	0
	2014			0	0	0	0	0	0	0	0	0	0
GB Yellowtail Flounder	2012	1,150	586	564	0	23	317.0	224	224	0	221	4	0
	2013	1,150	0	0	0	0							0
	2014		0	0	0	0				0			0
SNE/MA Yellowtail Flounder	2012	1,003		1,003	10	40	136	817	817	0	629	187	0
	2013			0	0	0				0			0
	2014			0	0	0				0			0
CC/GOM Yellowtail Flounder	2012	1,159		1,159	35	23	0	1,101	1,101	0	1,070	31	0
	2013			0	0		0			0			0
	2014			0	0	0	0	0	0	0	0	0	0
Plaice	2012	3,632		3,632	36	145	0	3,450	3,450	0	3,372	78	0
	2013			0	0	0	0	0	0	0	0	0	0
	2014			0	51	204	0	4,848	4,848	0	4,743	105	0

Stock	Year	ABC	Canadian Share/ Allow-ance	US ABC	State Waters	Other Sub-Compo-nents	Scallops	Ground-fish	Comm Ground-fish	Rec Ground-fish	Sector PSC	Non-Sector	MWT
Witch Flounder	2012	1,639		49	66	0	1,524	1,524	0	1,493	31	0	1,639
	2013			0	0	0	0	0	0	0	0	0	0
	2014			0	0	0	0	0	0	0	0	0	0
GB Winter Flounder	2012	3,753		0	188	0	3,565	3,565	0	3,541	25	0	3,753
	2013	3,750		0	188	0	3,563	3,563	0	3,538	24	0	3,750
	2014	3,598		0	180	0	3,418	3,418	0	3,395	23	0	3,598
GOM Winter Flounder	2012	1,078		272	54	0	752	752	0	715	38	0	1,078
	2013	1,078		272	54	0	752	752	0	715	38	0	1,078
	2014	1,078		272	54	0	752	752	0	715	38	0	1,078
NE/MA Winter Flounder	2012	626		175	125	0	326	326	0	0	326	0	626
	2013	697		195	139	0	362	362	0	0	362	0	697
	2014	912		255	182	0	474	474	0	0	474	0	912
Redfish	2012	9,224		92	369	0	8,763	8,763	0	8,721	42	0	9,224
	2013			0	0	0	0	0	0	0	0	0	0
	2014			0	0	0	0	0	0	0	0	0	0
White Hake	2012	3,638		73	109	0	3,456	3,456	0	3,423	33	0	3,638
	2013			0	0	0	0	0	0	0	0	0	0
	2014			0	0	0	0	0	0	0	0	0	0
Pollock	2012	15,400		3,293	754	1,370	0	13,276	13,276	0	13,177	99	0
	2013	15,600		3,293	756	1,380	0	13,464	13,464	0	13,364	100	0
	2014	16,000		3,293	760	1,400	0	13,840	13,840	0	13,737	103	0
N. Window-pane Flounder	2012	173		169	2	33	0	138	138	0	0	138	0
	2013	173		169	2	33	0	138	138	0	0	138	0
	2014	173		169	2	33	0	138	138	0	0	138	0
S. Window-pane Flounder	2012	386		237	39	270	0	77	77	0	0	77	0
	2013	386		237	39	270	0	77	77	0	0	77	0
	2014	386		237	39	270	0	77	77	0	0	77	0

Stock	Year	ABC	Canadian Share/ Allow-ance	US ABC	State Waters	Other Sub-Compo-nents	Scallops	Ground-fish	Comm Ground-fish	Rec Ground-fish	Sector PSC	Non-Sector	MWT
Ocean Pout	2012	256		256	3	23	0	230	230	0	0	230	0
	2013	256		256	3	23	0	230	230	0	0	230	0
	2014	256		256	3	23	0	230	230	0	0	230	0
Atlantic Halibut	2012	85		85	43	4	0	38	38	0	0	38	0
	2013	85		85	43	4	0	38	38	0	0	38	0
	2014	85		85	43	4	0	38	38	0	0	38	0
Atlantic Wolffish	2012	83		83	1	3	0	79	79	0	0	79	0
	2013	83		83	1	3	0	79	79	0	0	79	0
	2014	83		83	1	3	0	79	79	0	0	79	0

Table 5 – ACL adjustments

Stock	Year	State Waters	Other Sub-Components	Scallops	Groundfish	Comm/Non_ Sector Groundfish	Rec Groundfish	Sector PSC	MWT
GB Cod	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
GOM Cod	2010	1	1	1	0.95	0.95	0.93	0.95	1
	2011	1	1	1	0.95	0.95	0.93	0.95	1
	2012	1	1	1	0.95	0.95	0.93	0.95	1
GB Haddock	2010	1	1	1	0.95	0.95	0.95	0.95	0.93
	2011	1	1	1	0.95	0.95	0.95	0.95	0.93
	2012	1	1	1	0.95	0.95	0.95	0.95	0.93
GOM Haddock	2010	1	1	1	0.95	0.95	0.93	0.95	0.93
	2011	1	1	1	0.95	0.95	0.93	0.95	0.93
	2012	1	1	1	0.95	0.95	0.93	0.95	0.93
GB Yellowtail Flounder	2010	1	1	1	0.97	0.97	0.95	0.97	1
	2011	1	1	0.97	0.97	0.97	0.95	0.97	1
	2012	1	1	0.97	0.97	0.97	0.95	0.97	1
SNE/MA Yellowtail Flounder	2010	1	1	1	0.93	0.93	0.95	0.93	1
	2011	1	1	0.93	0.93	0.93	0.95	0.93	1
	2012	1	1	0.93	0.93	0.93	0.95	0.93	1
CC/GOM Yellowtail Flounder	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
Plaice	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
Witch Flounder	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1

Stock	Year	State Waters	Other Sub-Components	Scallops	Groundfish	Comm/Non -Sector Groundfish	Rec Groundfish	Sector PSC	MWT
GB Winter Flounder	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
GOM Winter Flounder	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
SNE/MA Winter Flounder	2010	1	1	1	0.93	0.93	0.95	0.93	1
	2011	1	1	1	0.93	0.93	0.95	0.93	1
	2012	1	1	1	0.93	0.93	0.95	0.93	1
Redfish	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
White Hake	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
Pollock	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
N. Windowpane Flounder	2010	1	1	1	0.93	0.93	0.95	0.93	1
	2011	1	1	1	0.93	0.93	0.95	0.93	1
	2012	1	1	1	0.93	0.93	0.95	0.93	1
S. Windowpane Flounder	2010	1	1	1	0.93	0.93	0.95	0.93	1
	2011	1	1	1	0.93	0.93	0.95	0.93	1
	2012	1	1	1	0.93	0.93	0.95	0.93	1
Ocean Pout	2010	1	1	1	0.93	0.93	0.95	0.93	1
	2011	1	1	1	0.93	0.93	0.95	0.93	1
	2012	1	1	1	0.93	0.93	0.95	0.93	1

Stock	Year	State Waters	Other Sub-Components	Scallops	Groundfish	Comm/Non-Sector Groundfish	Rec Groundfish	Sector PSC	MWT
Atlantic Halibut	2010	1	1	1	0.95	0.95	0.95	0.95	1
	2011	1	1	1	0.95	0.95	0.95	0.95	1
	2012	1	1	1	0.95	0.95	0.95	0.95	1
Atlantic Wolffish	2010	1	1	1	0.93	0.93	0.95	0.95	1
	2011	1	1	1	0.93	0.93	0.95	0.95	1
	2012	1	1	1	0.93	0.93	0.95	0.95	1

Table 6 – Proposed incidental catch TACs for major stocks of concern (mt). TACs are for the fishing year. TACs shown are metric tons, live weight. Note: GB cod and GB yellowtail flounder TAC is determined annually and cannot be estimated in advance. Values are dependent on ACLs, which have not yet been determined.

	Percentage of ACL
GB cod	Two
GOM cod	One
GB Yellowtail	Two
CC/GOM yellowtail	One
SNE/MA Yellowtail	One
Plaice	Five
Witch Flounder	Five
SNE/MA Winter Flounder	One
GB Winter Flounder	Two
White Hake	Two
Pollock	Two

Table 7 - Proposed allocation of incidental catch TACs for major stocks of concern to Category B DAS programs (shown as percentage of the incidental catch TAC)

	Category B (regular) DAS Program	CAI Hook Gear SAP	Eastern US/CA Haddock SAP	Southern CAII Haddock SAP
GOM cod	100%	NA	NA	
GB cod	50%	16%	34%	
CC/GOM yellowtail	100%	NA	NA	
Plaice	100%	NA	NA	
White Hake	100%	NA	NA	
SNE/MA Yellowtail	100%	NA	NA	
SNE/MA Winter Flounder	100%	NA	NA	
Witch Flounder	100%	NA	NA	
GB Yellowtail	50%	NA	50%	
GB Winter Flounder	50%	NA	50%	
Pollock	50%	16%	34%	

Framework Adjustment 47

to the

Northeast Multispecies FMP

Appendix IV

Analytic Techniques: Derivation of Accountability Measure Areas

Development of Accountability Measure (AM) Areas

This action proposes to adopt area-based AMs for two windowpane flounder stocks, ocean pout, Atlantic wolffish, and Atlantic halibut. This section describes the analyses used to identify and define the areas. Much of the information in this section summarizes Groundfish Plan Development Team (PDT) reports documenting this work.

The approach used to identify the AM areas uses a combination of observer data and fishery-dependent data. To simplify analyses and make them consistent with data sources used in assessments, the fishery dependent catch data was queried from the "AA" tables created by the Northeast Fisheries Science Center (NEFSC). These tables assign a catch location to catch weights as reported to dealers by matching VTR records to dealer records. Not all trips can be matched and so some dealer records do not have position information; these were not included in the analyses. The analyses were performed for the major groundfish gear: otter trawl, longline, and sink gillnet. Note that these gears are used in other fisheries in addition to the groundfish fishery, particularly in the area south of New England. No attempt was made to assign each trip to a particular fishery, which introduces uncertainty into evaluating the impacts of the AM measures because as proposed they would only limit groundfish fishing trips.

Observer Data Analysis

The first step in the analysis was to query the observer database and extract observed tows for the three primary gears used in the groundfish fishery: large mesh otter trawl, large and extra-large mesh sink gillnets, and longlines. The following discussion will describe the steps used in the analysis for trawl gear catches of windowpane flounder and ocean pout, but similar approaches were used for the other two gears.

Data analyzed were from calendar years 2008 – 2010; all data were pooled. Pooling was done to get a greater geographic coverage of the observed tows and to increase the number of observed tows in the data set. This approach is problematic in that discard rates can differ from year to year and pooling the data glosses over those differences. On the other hand, the management system is unlikely to change the areas annually and so this approach gives a blended picture of discard rates over a recent time period.

The observed tow information on total kept catch and on the discards of windowpane flounder and ocean pout[1] were plotted in Arcview© GIS. The plotted tows were binned into ten-minute squares. This provided an illustration of the range of observer coverage as well as an indication of the squares where most observed discards were documented (see Figure 1 and Figure 2 for an example). The magnitude of observed discards in a square is related to the number of observed trips in a square so these data alone do not necessarily indicate the correct areas for AMs. The second step was to calculate a simple ratio of observed species discards to total kept catch (d/kall) in each ten-minute square. This

[1] Since almost all windowpane flounder and ocean pout has been discarded in recent years, the analysis for these species focused on discards. For wolffish and halibut the analysis included kept catch.

identifies areas with higher discard rates but still does not account for the number of observed tows – there is no measure of variability in this plot, and a square with one observed tow cannot be differentiated from a square with hundreds of observed tows (see Figure 3 for an example).

The discards from a ten-minute square are a function not only of the d/kall ratio but of the total fishing effort in the area. Conceptually the discard ratio can be expanded to an estimate of total discards from the area by multiplying it by the total kept catch in the same area. There is a concern with doing this type of analysis at small spatial scales because of the uncertainty over reported fishing locations. Groundfish fishermen are required to report one fishing location for every statistical area fished that represents the general area of fishing activity. Several studies have shown that while the information is reliable for assigning catch at the stock area level, it becomes less accurate as the spatial scale gets smaller (see, for example, Palmer and Wigley 2009). Nevertheless, the information is often used at small scales. Analyses for the future habitat actions bin the data into 10-km squares; protected species catch estimates bin the data at various depth profiles (Murray 2007); and the impacts of closed areas have been evaluated using the data binned into ten minute squares (Murawski et al. 2005). So for this analysis the data was binned at ten-minute squares. The data limitations must be kept in mind while evaluating these analyses and a criticism of this approach is that it places a heavy reliance on the accuracy of self-reported fishing locations that are known to be inaccurate. A assumption is that by pooling data over a three-year period it is likely the data are a fair representation of fishing activity even if an individual trip is misreported. Another consideration was the desire to make the AM areas as small as can be justified to minimize interference with other groundfish fishing activities. Binning the data at larger scales would make it difficult to identify smaller areas. A sensitivity analysis was performed with the data binned at 30 minute squares in the case of windowpane flounder and trawl gear to see how the analyses would change if binned at a larger scale.

With both observed d/kall and catch data binned into the same ten-minute squares the discards from each square can be estimated by multiplying the observed ratio by the reported kept all. The resulting value can be plotted - or, as is the case in Figure XXX, the log of the value can be plotted because the data are highly skewed. This gives an illustration of the distribution of discards. Note that discards are only estimated in a ten-minute square with both observed trips and reported kept catch. This is more of an issue with sink gillnet gear than trawl gear, as the distribution of observed hauls does not cover the range of reported kept catches (see Figure 20).

The estimated discards by ten-minute square were further analyzed to identify statistically-significant "hotspots" – areas with higher or lower discards than the region as a whole. ArcGis© includes an analytic tool which calculates these areas. As described by the software "This tool identifies statistically significant spatial clusters of high values (hot spots) and low values (cold spots)." The tool uses a spatial statistic called the Getis - Ord G* statistic. It does not identify isolated features with a high or low value; it identifies features that have a high (or low) value that are surrounded by other features with a high (or low) value. These areas reflect a statistically significant departure from complete spatial randomness. These areas generally match areas with high d/kall ratios.

The use of the statistic requires the user to define the appropriate neighborhood for the analysis, and results can be sensitive to the choice of the neighborhood. For this analysis the neighborhood was defined with a fixed distance of 25,000 meters, or roughly the eight squares surrounding each ten-minute square. This neighborhood scale was selected primarily because of a desire to use a scale that would allow for designing AM areas that were as small as possible. In addition, only ten minute squares with more than 10 or more observed tows were used in order to minimize effects of isolated observed tows. A sensitivity analysis was run using all squares for windowpane flounder and trawl gear; the results were not noticeably different than when all squares were included.

For wolffish and halibut a similar approach was followed. Because a larger proportion of the catches of these species were retained in recent years the approach was modified to use a catch/kall ratio for the observer data and kept catches of the species were combined with the estimated discards in each ten-minute square.

Once the hot-spot areas were plotted the AM areas were identified by drawing boundaries around a group of ten-minute squares that accounted for a desired reduction in catches. Because of data limitations with respect to the accuracy of reported fishing locations and the expectation that the areas would not be completely effective, they areas were drawn larger than would be expected if the data were completely accurate and compliance was 100 percent. The area boundaries may be adjusted in the future as experience is gained on the effectiveness of the AM system.

The figures following this discussion are the output from the analyses.

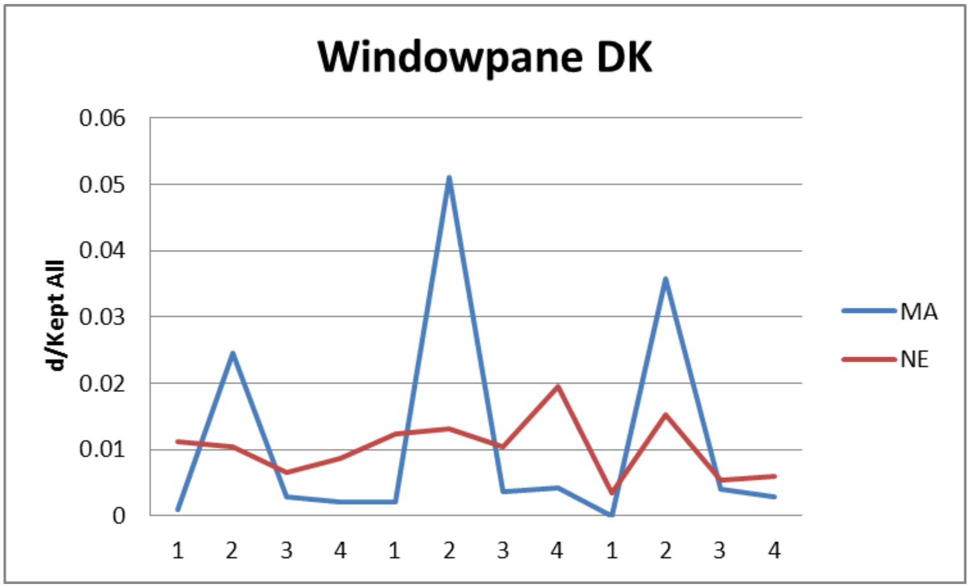
Additional Analyses

The preceding section describes the method used to identify the AM areas. A second approach applied regression trees to windowpane flounder during development of the areas. The results from this approach were consistent and are documented in PDT reports, while not as detailed as the GIS analyse..

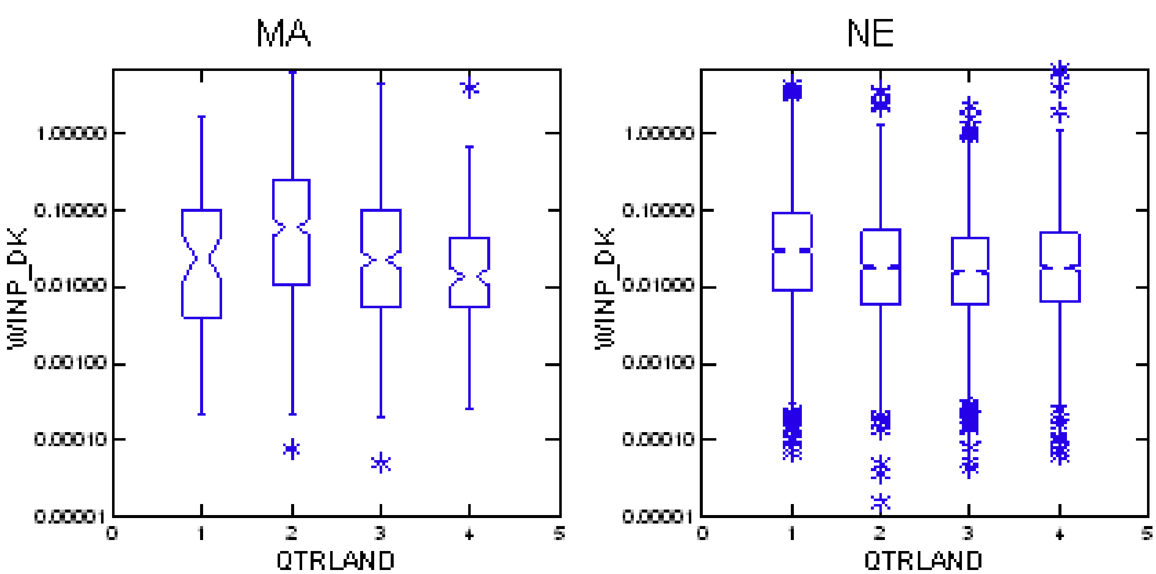
As noted, the analyses used pooled data. Since discard rates may change seasonally within a year, the observer data were analyzed to see if there were different discard rates in each quarter.

The following plot shows the simple windowpane observed sum discards/sum kept all ratio, by quarter, for large mesh otter trawls from 2008 – 2010. The two lines represent trips departing from NE ports and from MA ports (not area fished).

Note there seems to be a clear pattern for trips from MA ports with the ratio peaking in the second quarter. But there does not seem to be as obvious a pattern for trips leaving from NE ports.



The same l data were used for these box plots but were analyzed differently. These charts summarize the discard/kept all ratios on **individual tows** for tows that discarded windowpane flounder (note log scale). There still seems to be an increase in the second quarter for trips departing from MA ports. For NE ports, there might be a suggestion of a higher rate in the first quarter but it is not as pronounced as for the MA ports. The distributions overlap quite a bit, though.



Charts were plotted (not included here) that show the d/Kall ratios by ten minute square and quarter for large mesh otter trawls (050). All data are pooled for the years 2008 – 2010. The data include some tows coded as gear 050 but using an excluder device such as a separator. The ratio is a simple sum of discards divided by the sum of the total kept on observed tows in each ten-minute square. With windowpane flounder on GB there do not appear to be large differences in the observed discard ratios over the four quarters. In the GOM, however, ratios seem higher in the first quarter in the inshore area. There are few squares in SNE that have more than nine tows, making it difficult to draw conclusions

For ocean pout, ratios on GB appear higher in the second and possibly the third quarters, and lower in the first and fourth quarters. The inshore GOM seems to follow an opposite pattern. Again, the lack of observations in SNE makes it difficult to draw conclusions.

Wolffish discard ratios appear to be lowest in the first quarter. In the inshore GOM the ratios appear higher in the third quarter, but there does not seem to be much difference between the second through fourth quarters. It is difficult to detect much seasonality in the discard ratios for halibut. For sink gillnet gear, wolffish were not observed in sink gillnet tows at all in the first quarter. The second and third quarter seemed to have the highest catch/ kept all ratios.

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Palmer, Michael C. and Wigley, Susan E. 2009. Using Positional Data from Vessel Monitoring Systems to Validate the Logbook-Reported Area Fished and the Stock Allocation of Commercial Fisheries Landings. North American Journal of Fisheries Management, Vol. 29, Issue 4, 2009.

Figure 1 – Number of observed large mesh otter trawl tows, by ten-minute square, 2008 and later

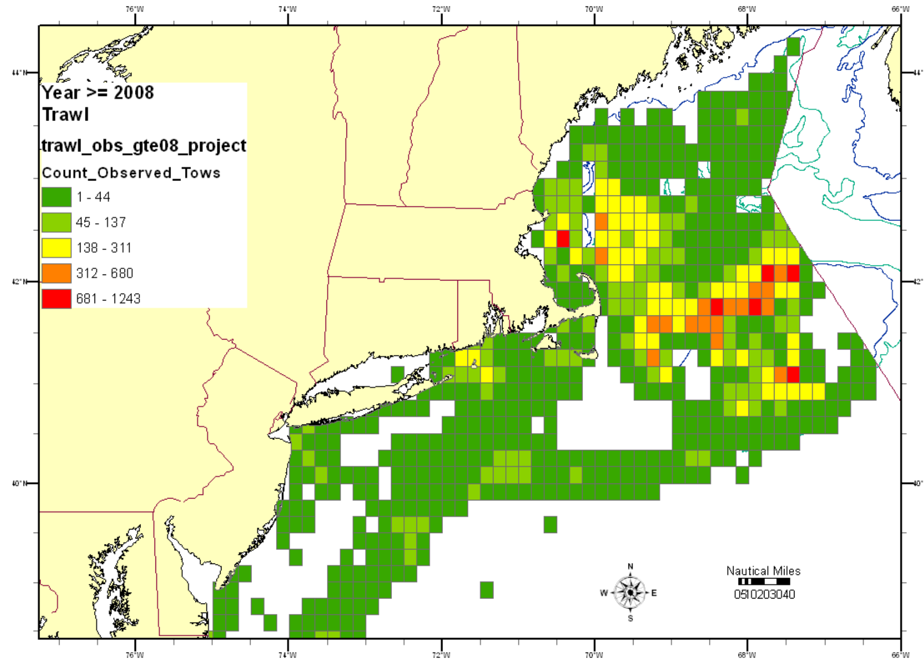


Figure 2 – Observed large mesh otter trawl discards of windowpane flounder. Colors binned by quintile of total observed squares.

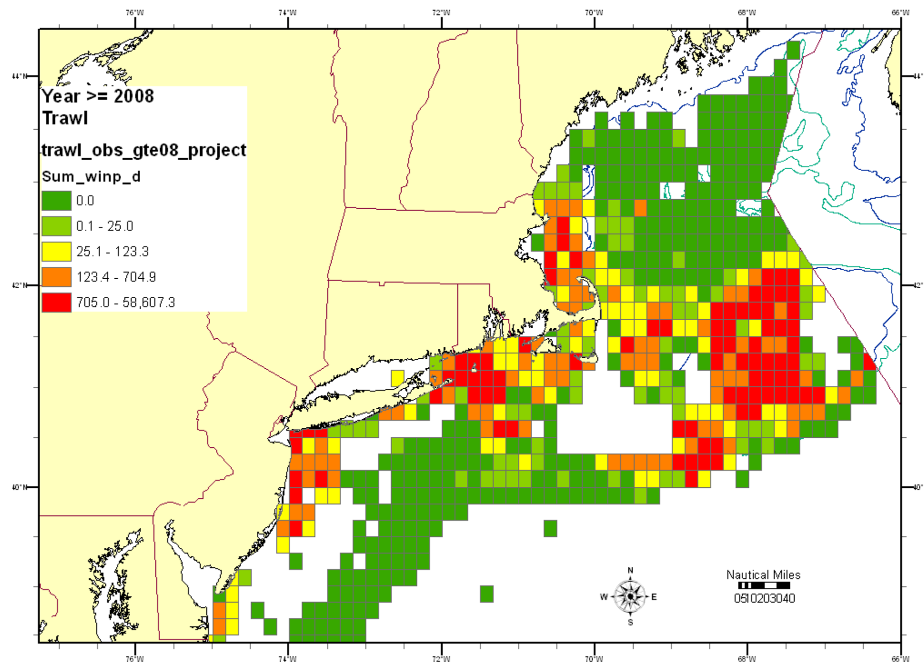


Figure 3 – Large mesh otter trawl windowpane flounder discard to kept all ratio, by ten minute squares

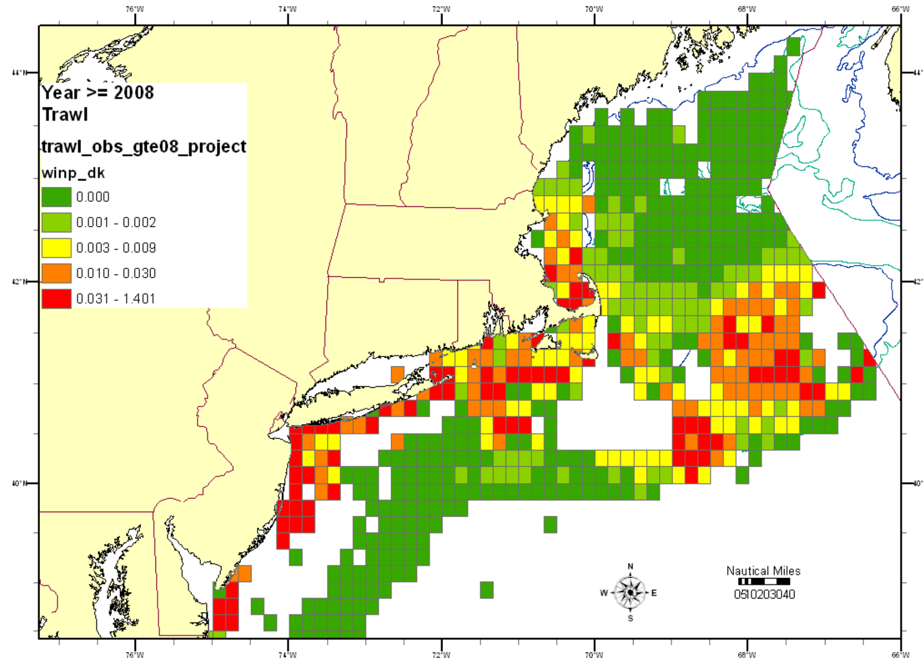


Figure 4 – Large mesh otter trawl expanded discards of windowpane flounder

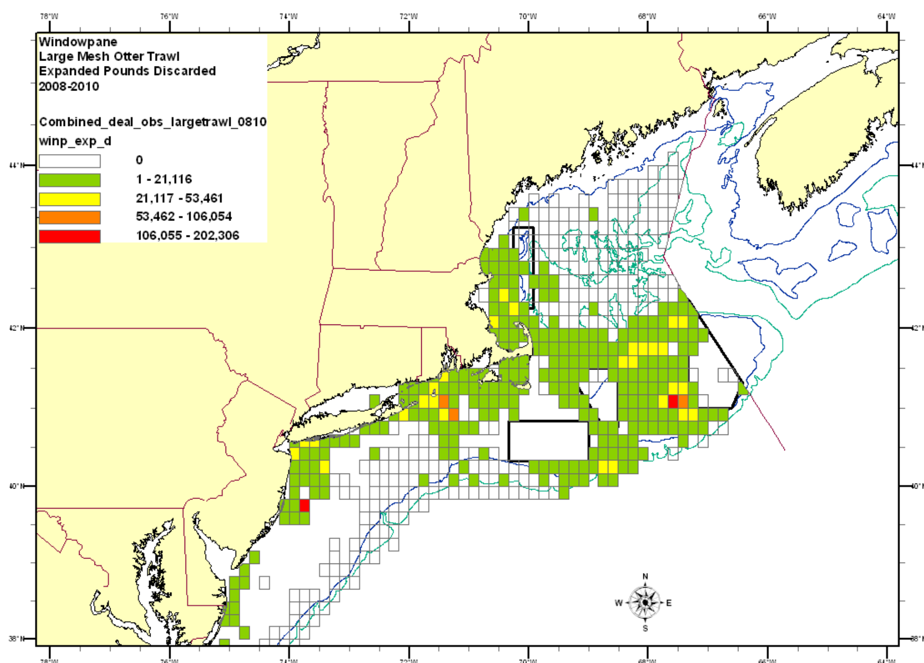


Figure 5 – Large mesh otter trawl expanded discards of windowpane flounder (log scale)

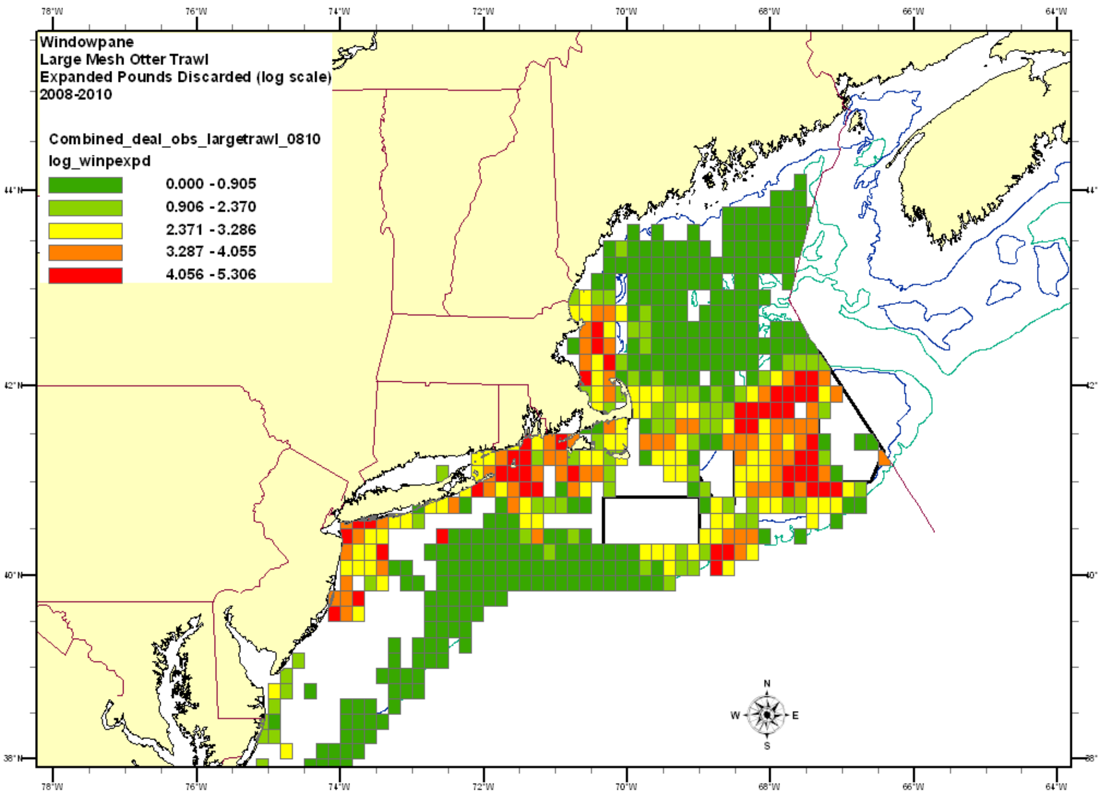


Figure 6 – Getis Gi* hotspots for large mesh otter trawl expanded discards of windowpane flounder, all observed tows.

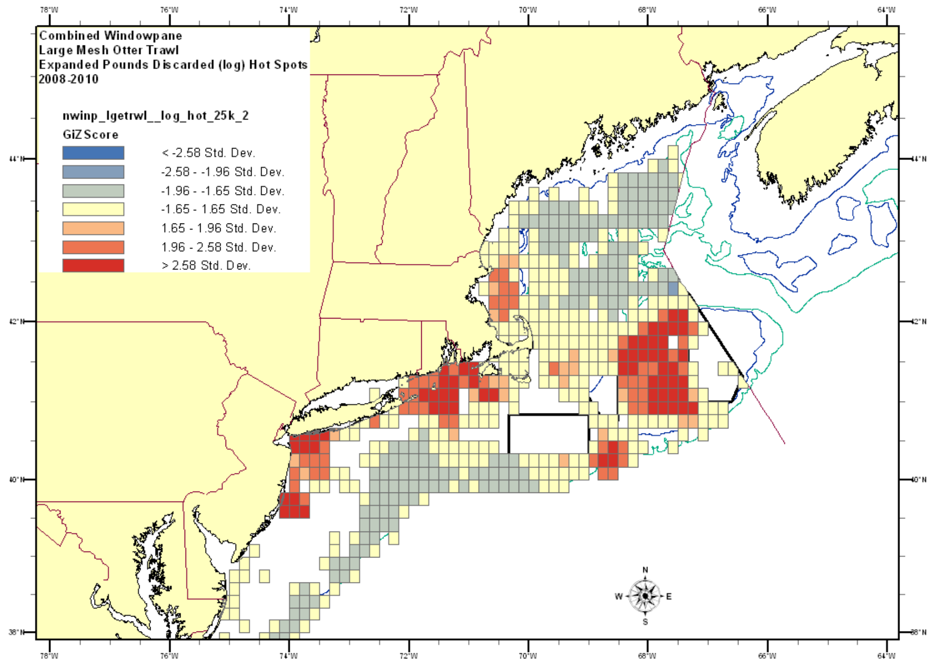


Figure 7 – Getis Gi* hotspots for large mesh otter trawl expanded discards of windowpane flounder, 10 or more observed tows in a ten-minute square

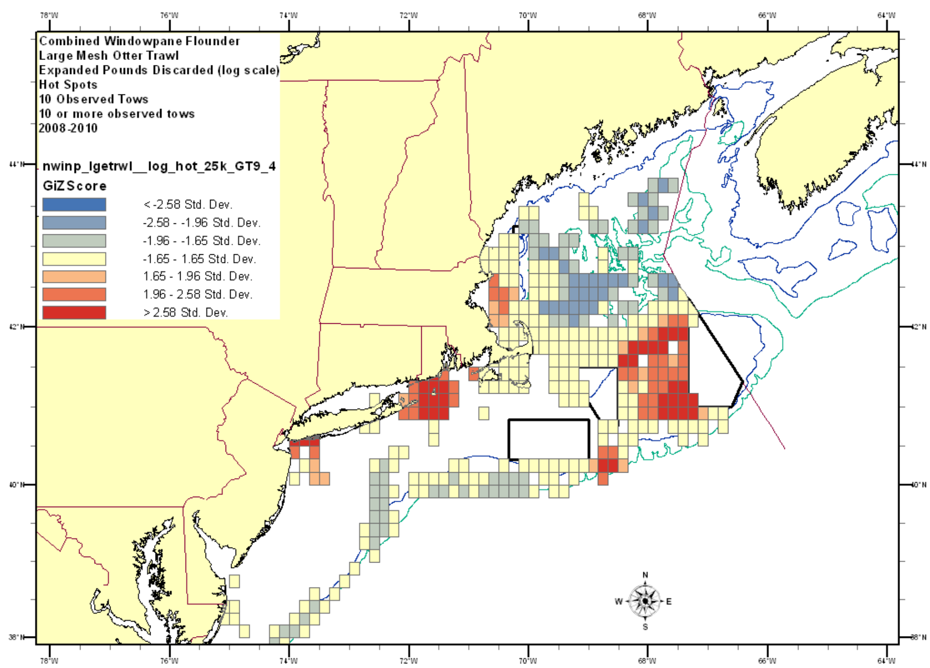


Figure 8 – Large mesh otter trawl expanded discards of ocean pout, 2008 - 2010

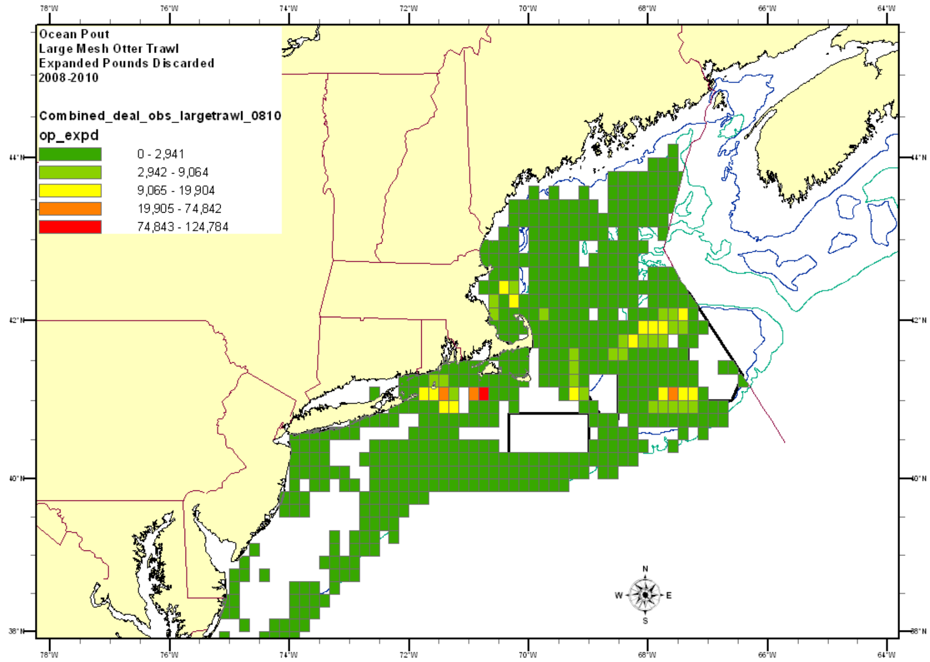


Figure 9 – Large mesh otter trawl expanded discards of ocean pout (log scale), 2008 - 2010

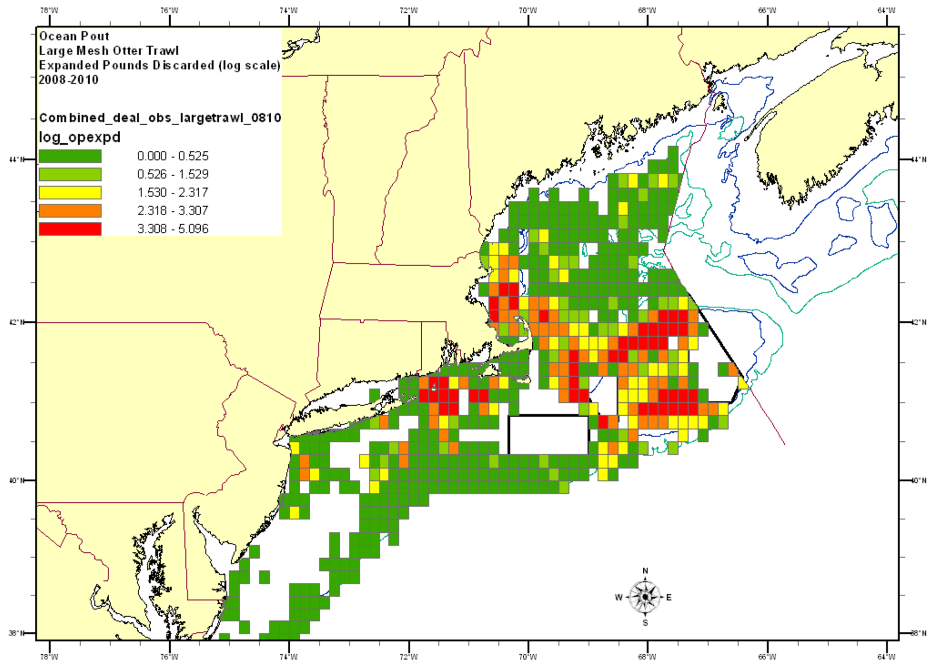


Figure 10 - – Getis Gi* hotspots for large mesh otter trawl expanded discards of ocean pout, all observed tows.

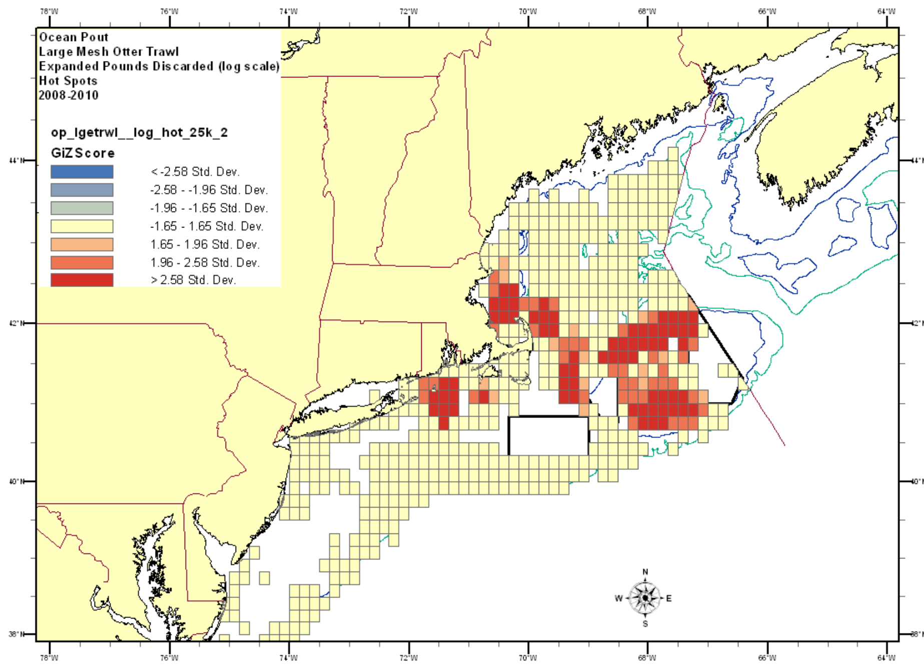


Figure 11 - Getis Gi* hotspots for large mesh otter trawl expanded discards of ocean pout, 10 or more observed tows in each ten-minute square

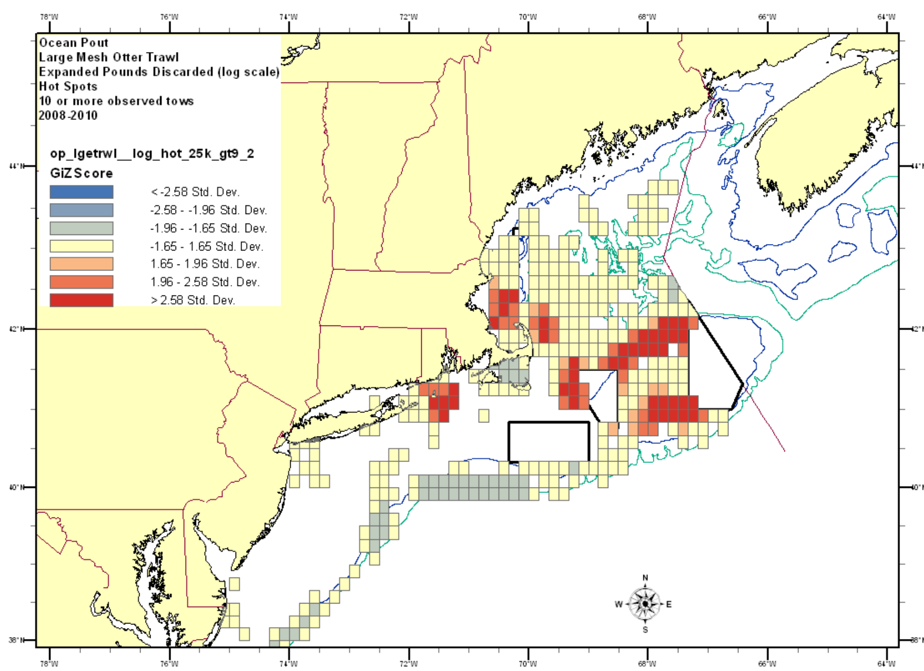


Figure 12 – Large mesh otter trawl catches of Atlantic halibut (reported kept catch plus expanded discards)

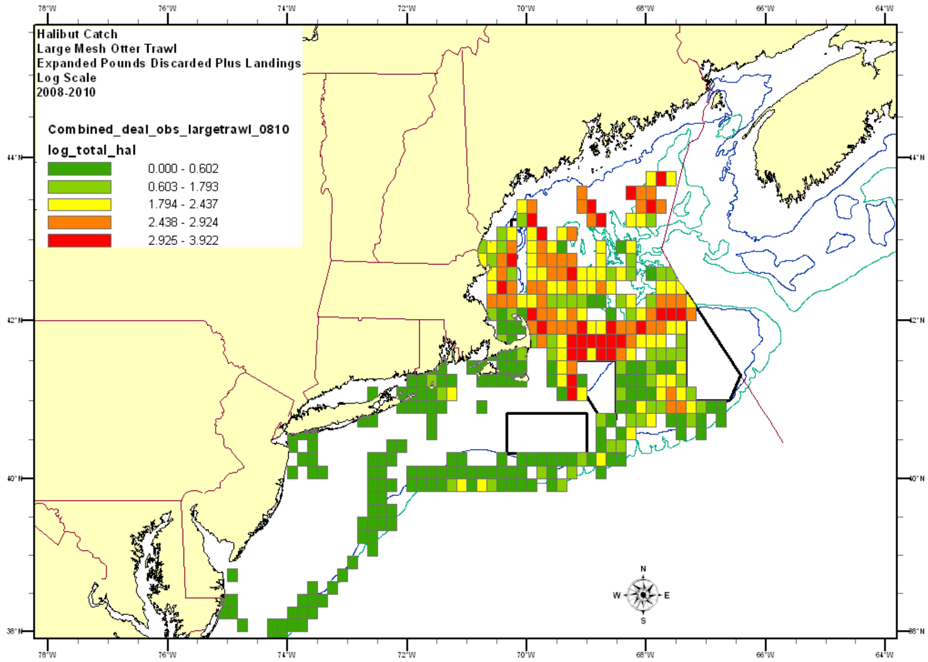


Figure 13 - – Large mesh otter trawl catches of Atlantic halibut (reported kept catch plus expanded discards), log scale

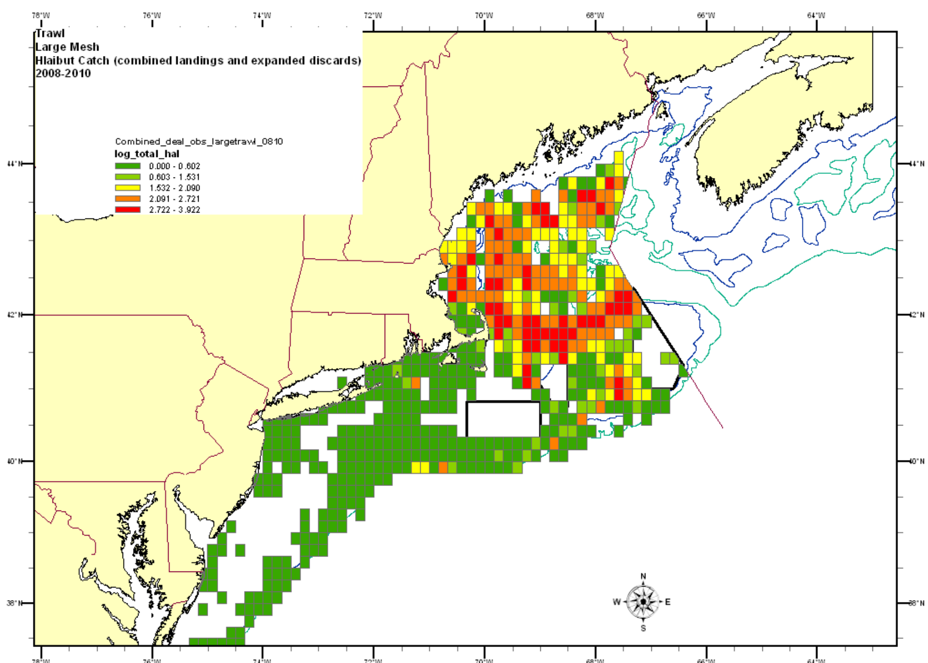


Figure 14 - Getis Gi* hotspots for large mesh otter trawl catch of halibut, all observed tows

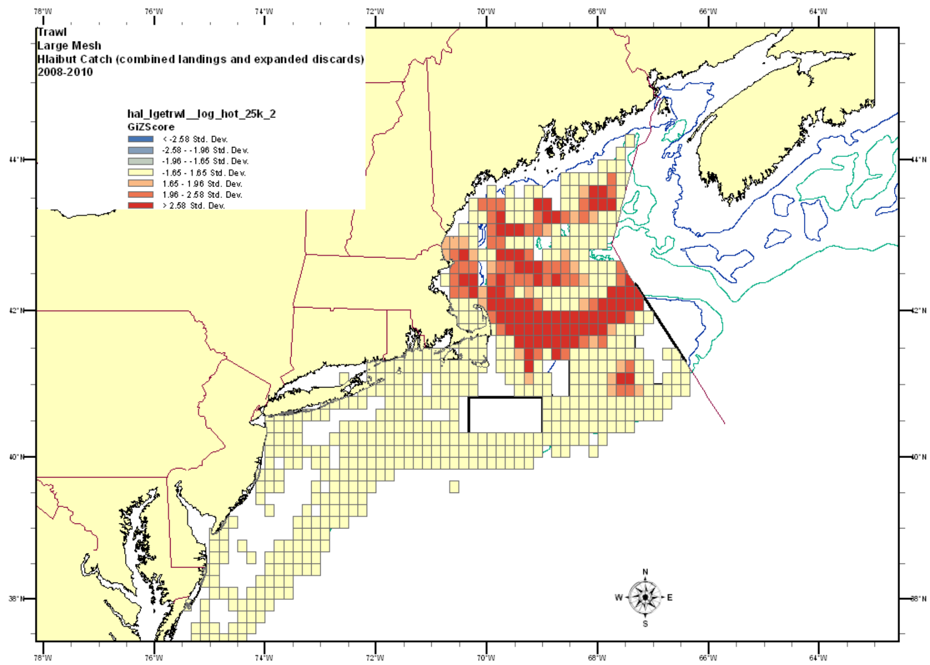


Figure 15 - Getis Gi* hotspots for large mesh otter trawl catch of halibut, 10 or more observed tows in each ten-minute square

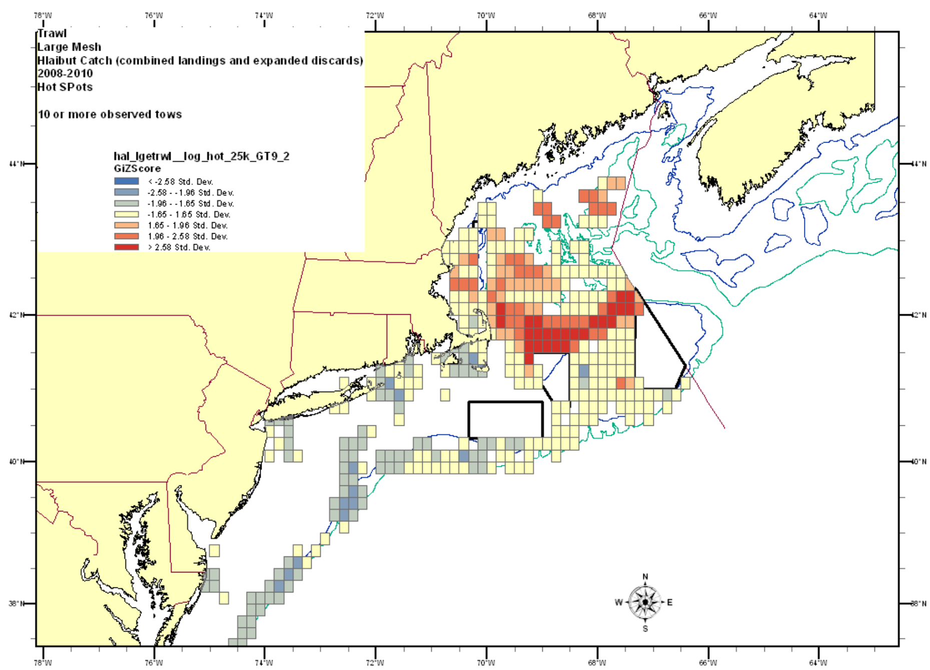


Figure 16 – Large mesh otter trawl Atlantic wolffish catch (landings plus expanded discards)

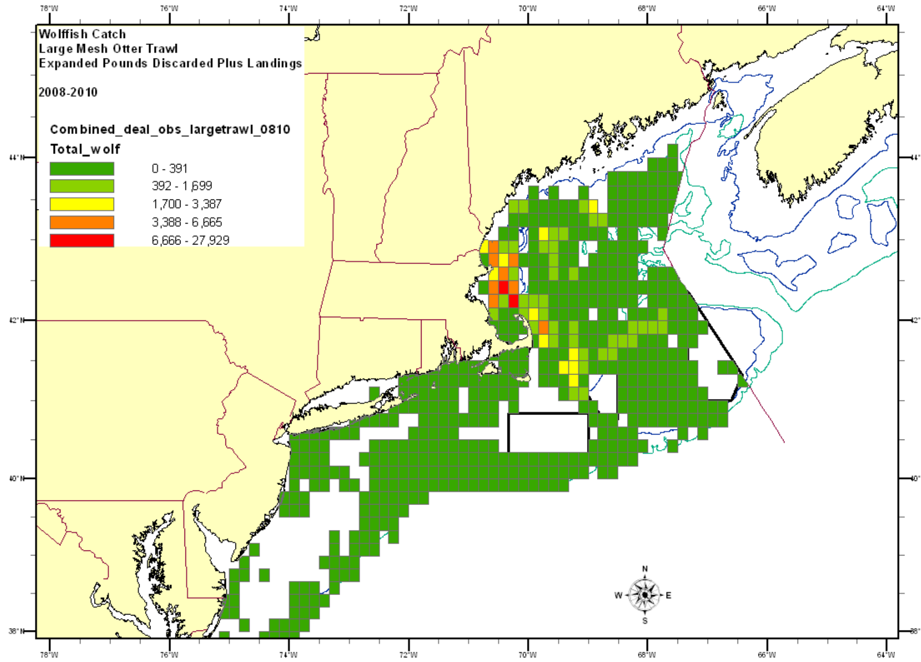


Figure 17 – Large mesh otter trawl Atlantic wolffish catch (landings plus expanded discards), log scale

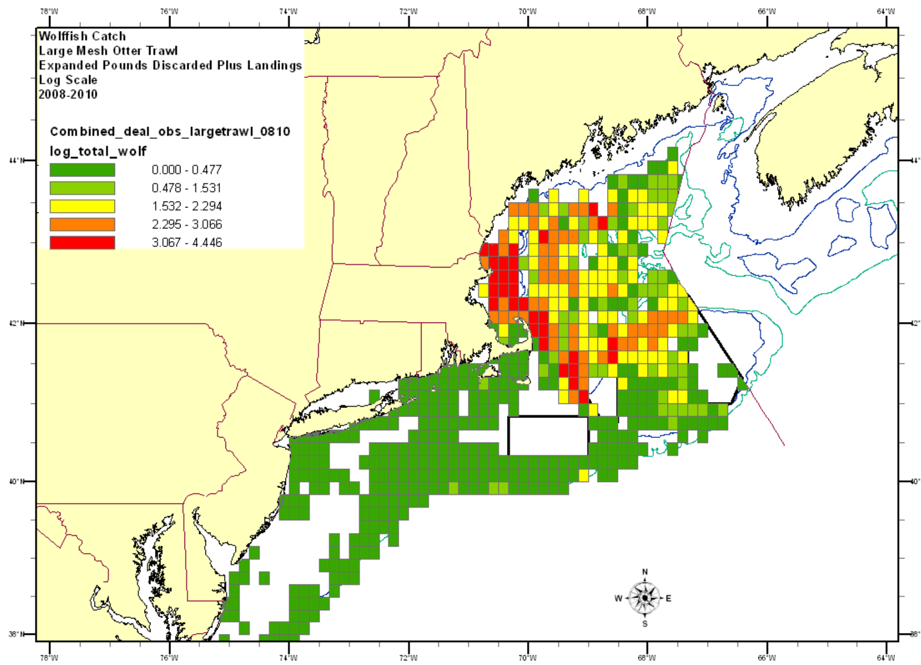


Figure 18 - - Getis Gi* hotspots for large mesh otter trawl expanded catch of wolffish, all observed tows

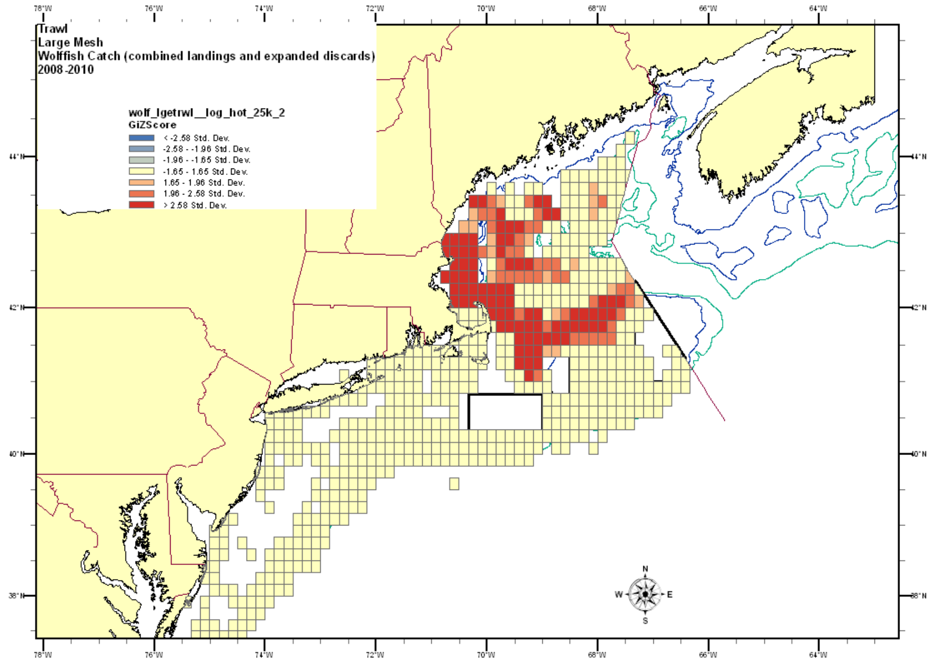


Figure 19 - Getis Gi* hotspots for large mesh otter trawl catch wolffish, 10 or more observed tows in each ten-minute square

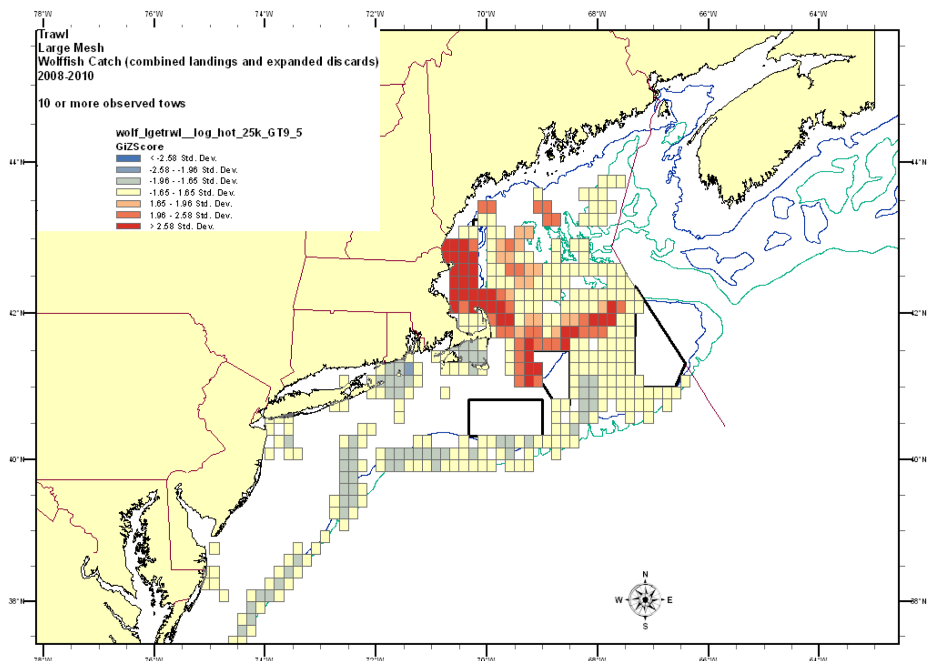


Figure 20 – Observed large and extra-large mesh sink gillnet hauls plotted over sink gillnet reported kept catch by ten-minute square, 2008 - 2010

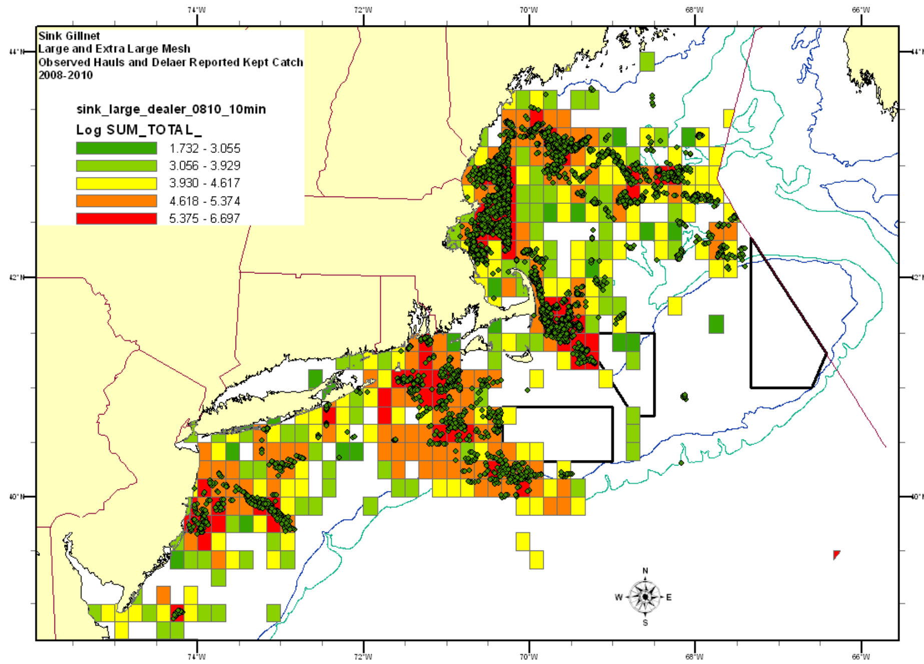


Figure 21 – Sink gillnet catch, areas with 10 or more observed tows, 2008 - 2010

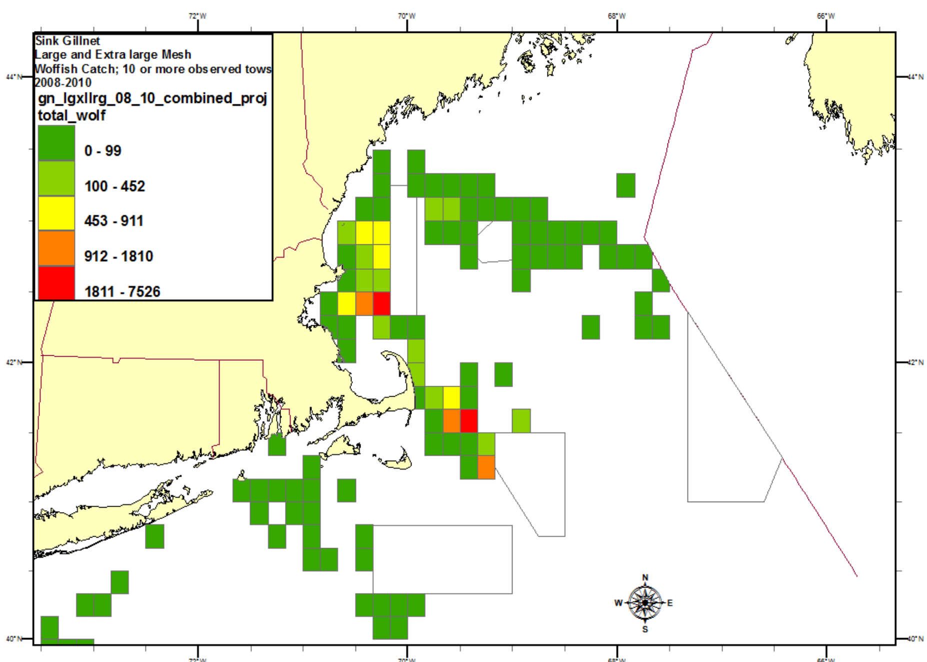


Figure 22 – Sink gillnet catch, areas with 10 or more observed tows, log scale, 2008 - 2010

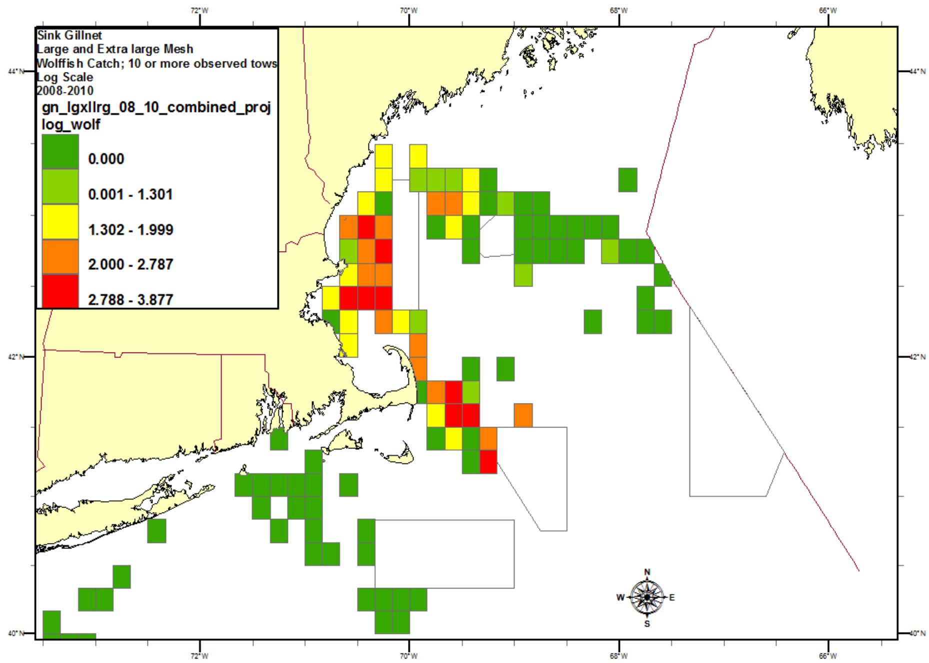


Figure 23 – Sink gillnet wolffish hotspots, areas with ten or more observed tows only, 2008 - 2010

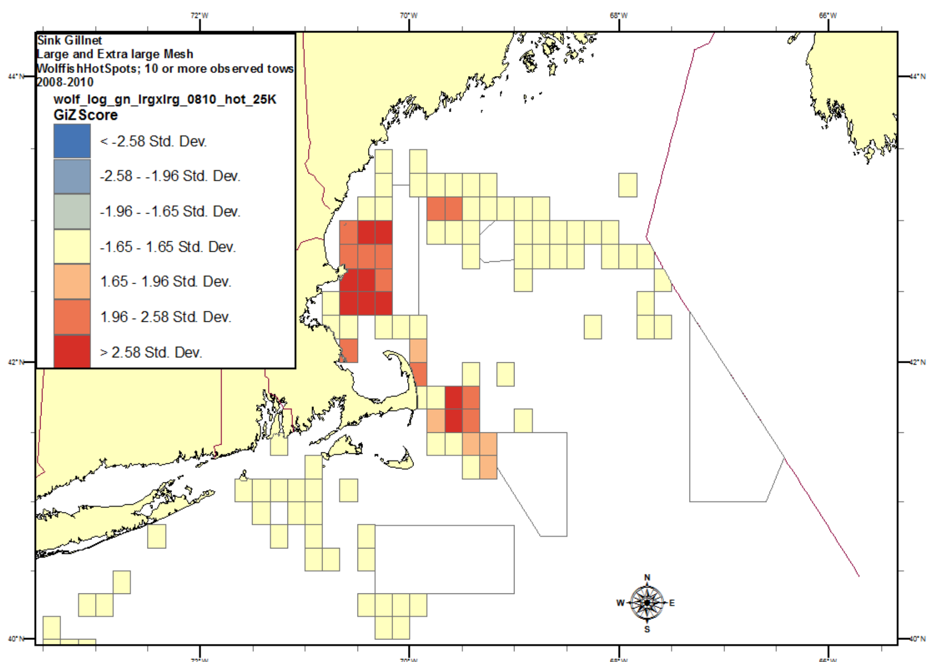


Figure 24 – Sink gillnet halibut catch, areas with ten or more observed tows, 2008 -2010

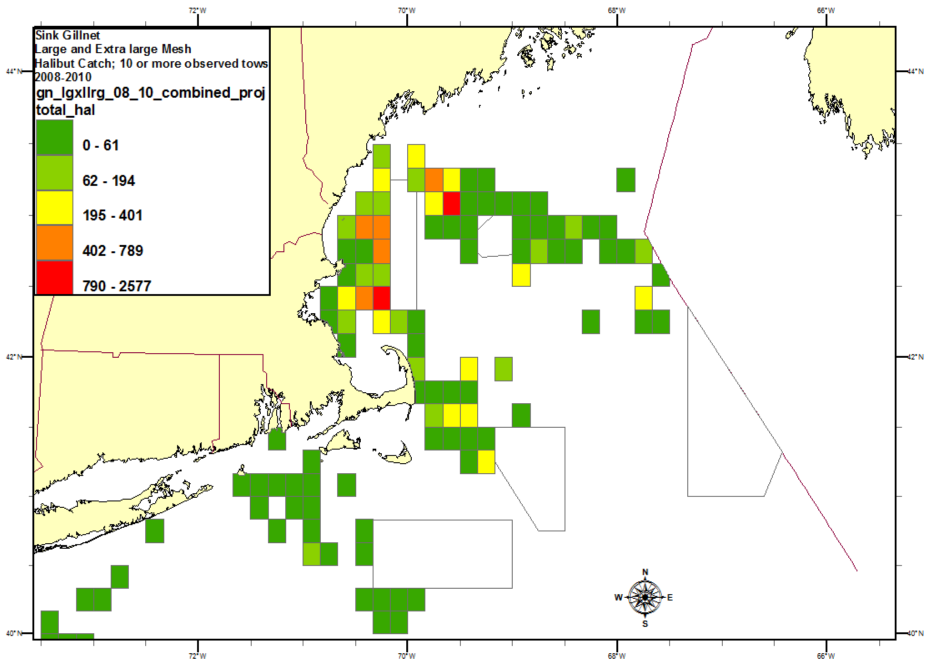


Figure 25 – Sink gillnet halibut catch, log scale, areas with ten or more observed tows, 2008 -2010

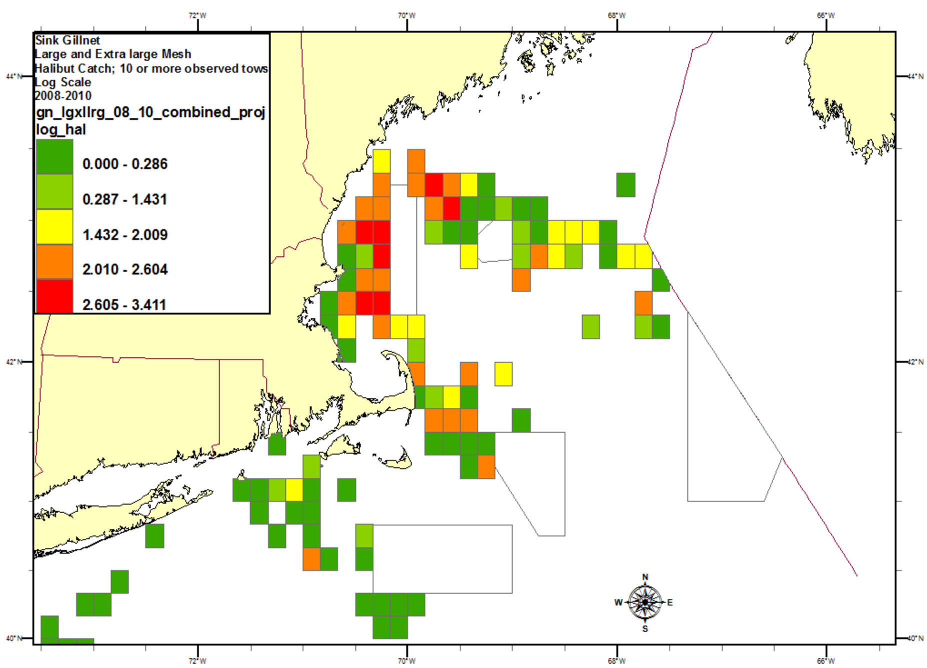
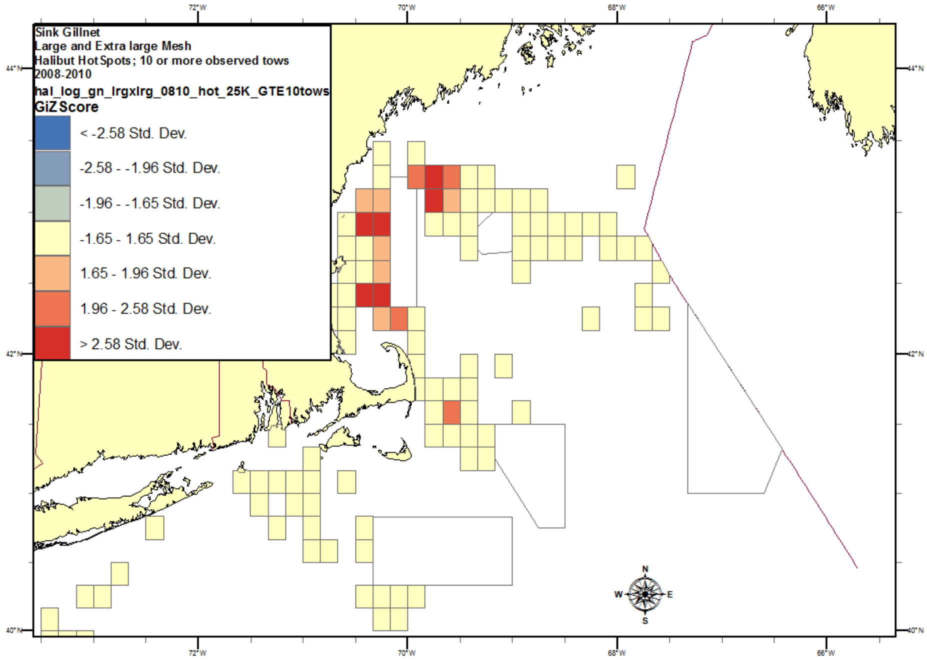


Figure 26 – Sink gillnet halibut hotspots, areas with ten or more observed tows, 2008 - 2010



Identifying hotspots of windowpane discard using regression tree analyses on windowpane discards per tow and proportion of tows with windowpane

Developed for the groundfish PDT

by

Steven Correia
Massachusetts Division of Marine Fisheries
July 19, 2011

I used regression trees to identify geographic areas with high and low proportion of tows with windowpane or log10 discards of windowpane per tow. Tom Nies provided a dataset of observed tows. The analysis was based on tow observations. Total discards were estimated by multiplying the discard rate (discard (species)/ (kept all) by the kept hailweight. Tow observations were treated as independent, that is the correlation of tows within trips was ignored. All analyses were completed on at tow level, and the distribution of observed effort or fleet effort was not taken into account in this analysis.

Tree regression proceeds by binary recursive partitioning of the predictor variables in order to minimize the variance within each split and maximize the difference in mean between the two splits. The use of latitude and negative longitude as variables results in the creation of rectangles with homogeneous catches.

Proportion of tows with windowpane.

Tows were coded as having windowpane (1) or no windowpane(0). The overall proportion of tows with windowpane over the entire study area was 0.30. The proportion of tows with windowpane is plotted against latitude and negative longitude (Figure 27 and Figure 28). The plot suggests that the highest proportion of positive tows with windowpane occur between 41 and 42 degrees north latitude and west of 70 degrees longitude and east of 69 degrees longitude.

I used a tree regression of presence/ absence of windowpane in tow with negative longitude and latitude as predictor variables. The full tree was pruned using 10-fold cross-validation and a complexity parameter chosen using the 1 standard deviation rule on the average error from cross-validation. The pruned tree is shown in Figure 28 and explains 29.9% of the deviance. Fitted proportions were derived using gridded area defined by latitude 35.5 to 44.3 in 0.1 degree increments and longitude (-75.7 to -63.6, in 0.1 degree increments. Note that portions of this area do not contain observed trips. The fitted proportion positive tows are shown as level plots in Figure 29. Tow locations are shown in Figure 30. Areas with relatively high proportion of tows with windowpane are western Georges Bank, Southern New England near Long Island and the Nantucket Light ship area and inshore western Gulf of Maine.

Catch of windowpane weight per tow

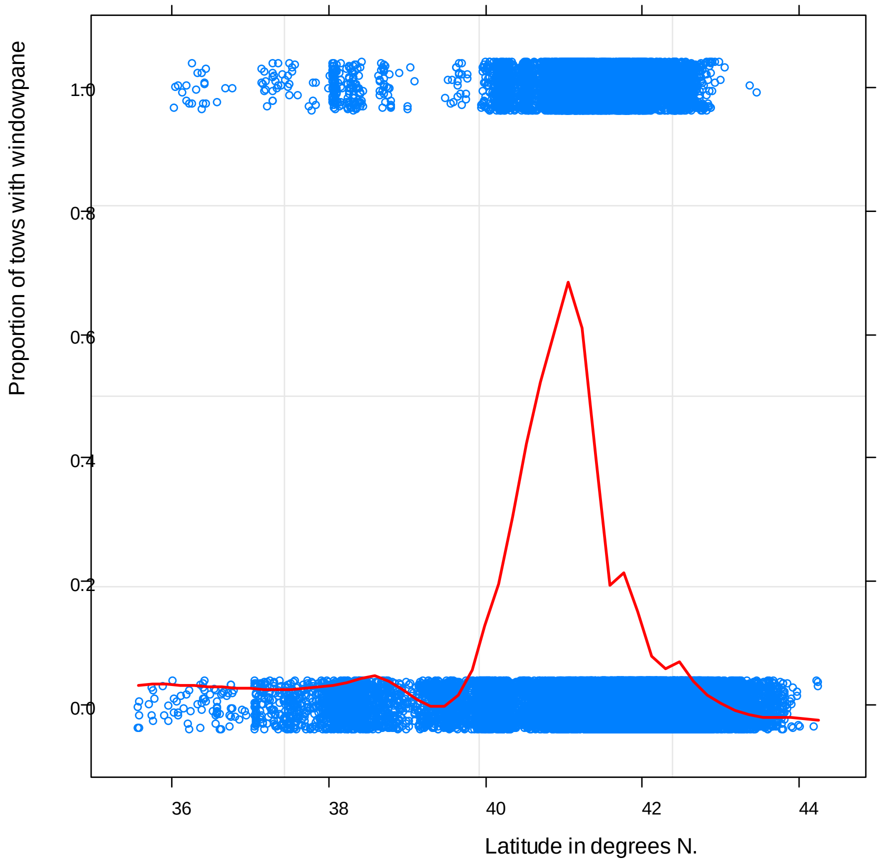
Windowpane are generally caught in small quantities, and 75% of tows with windowpane discards are 38 lb or less. However, the distribution is highly skewed right and tows with large amount of windowpane occur but are relatively rare. For example, the 90th quantile is 94 lb, the 99th quantile is 363, and the 99.9 is 1018 lb. Boxplots of the windowpane catch by bins of latitude and longitude are shown in Figure 31 and Figure 32. The Large contrast in the median or iterquartile range is not apparent in either the bins of latitiude or longitude. Bins with high number of observations do tend to have more observations at the tails than bins with fewer observations.

I used a regression tree to log10 windowpane discards using the same method applied to the proportion of tows. This analysis included tows with zero observations. The pruned tree is shown in Figure 33 and explains 29.9% of the deviance. Fitted proportions were derived using gridded area defined by latitude 35.5 to 44.3 in 0.1 degree increments and longitude (-75.7 to -63.6, in 0.1 degree increments. Note that portions of this area do not contain observed trips. An attempt to fit a regression tree to only tows with windowpane was unsuccessful, likely a result of lack of contrast in the observations.

The fitted proportion positive tows are shown as level plots in Figure 34. Tow locations are shown in Figure 30. Results are similar to areas identified with proportions. Given the lack of contrast in distribution of discards in the positive tows and skewness in the distribution, the proportion of zero tows is having a large influence on the analysis. The fitted values are highest off Long Island (7.0 lb per tow) and Southern Georges (5.6 lb per tow) and Georges Bank (3.7).

Comparison with spatial statistics analysis.
These areas identified as high and low discards generally correspond to area's identified Tom Nies's high-low clustering analysis using Getis-Ord G statistics.

Implications for using area management as an accountability measure.
The regression tree analyses identified areas with high and low proportion of tows with windowpane and also areas with high and low discard per tow. These results would need to be scaled by expected effort in order to be useful for defining areas to use as accountability measure. Additionally, the effects of redistributing effort to non- AM on windowpane discards needs consideration. The lack of contrast in the distribution of discarded windowpane suggests that areas may need to be larger rather than smaller to reduce windowpane discards and may reduce the economic yield from other groundfish species.


Proportion of tows with windowpane
1.0
0.8
0.6
0.4
0.2
0.0
36
38
40
42
44
Latitude in degrees N.

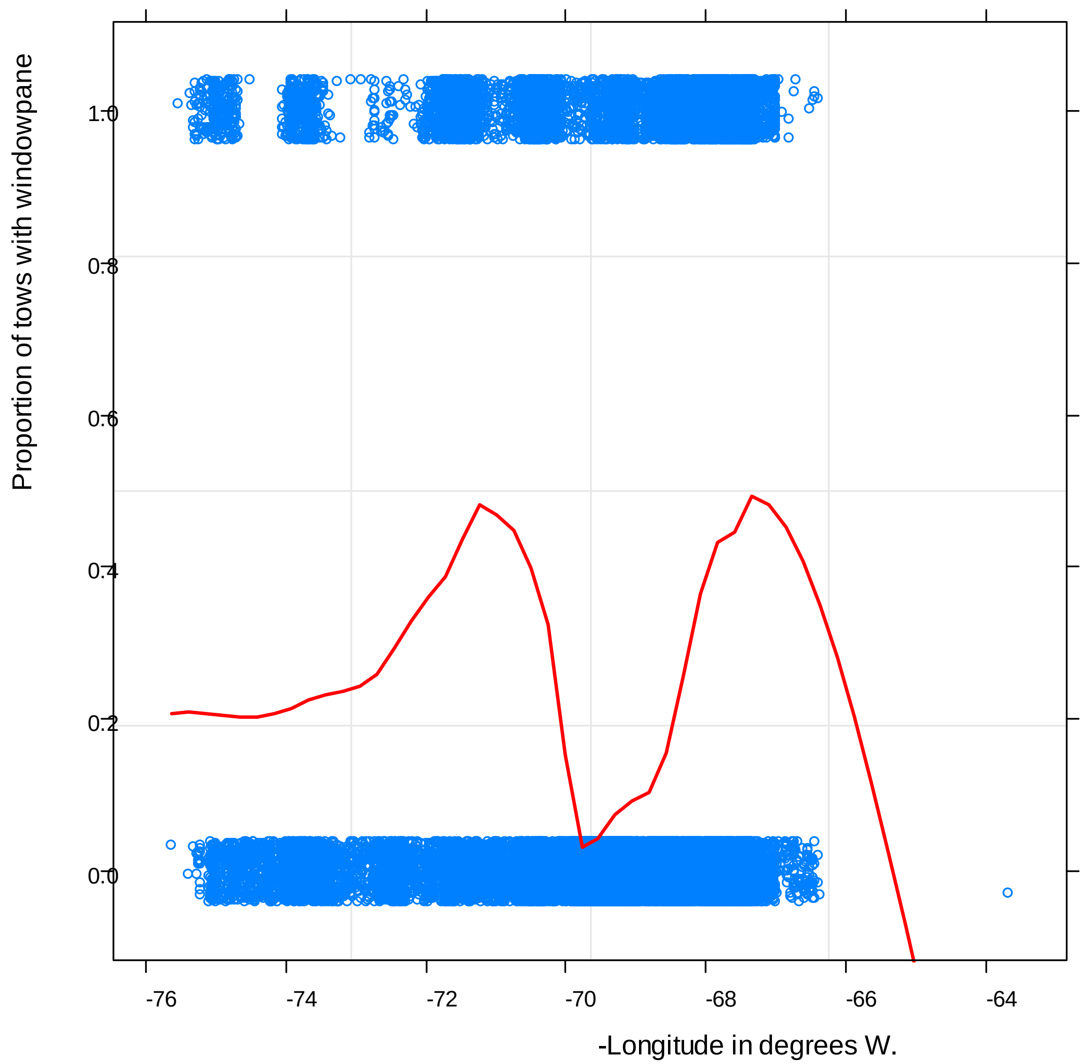


Figure 27. Proportion of tows with windowpane against beginning longitude. Red line is loess with span=0.2 and degree=1 and represents proportion positive tows. Blue dots are jittered presence (1)/ absence (0) of windowpane.

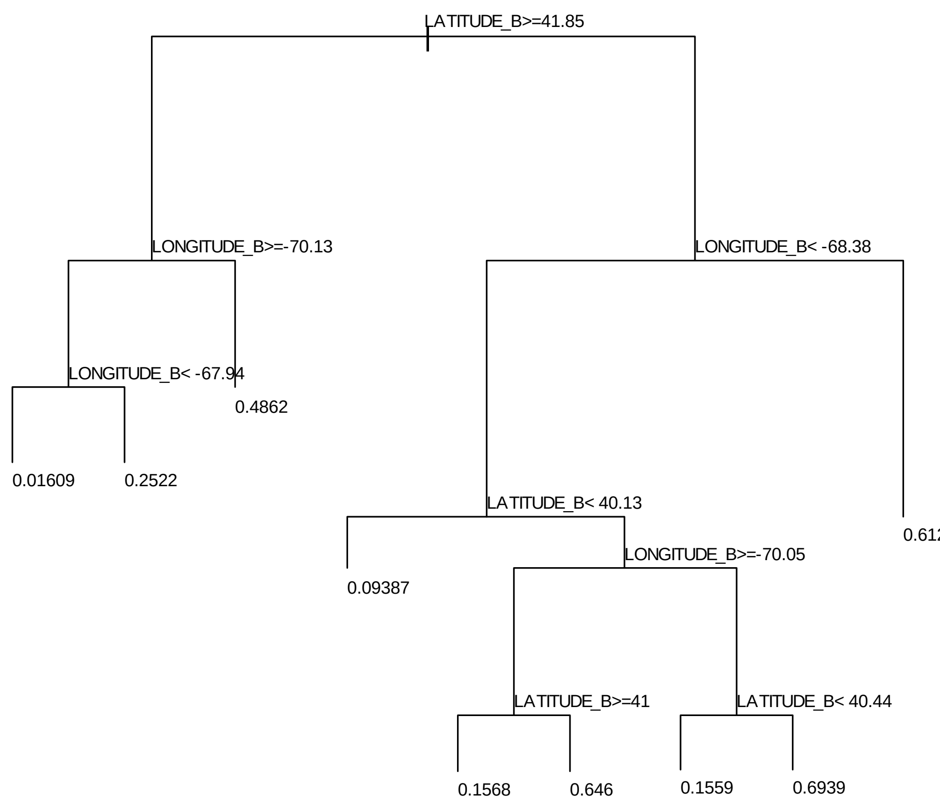


Figure 28. Partition tree for presence/absence (proportion) of windowpane in observed tows. Pruned tree using xerror+1 standard deviation as cut off criterion. Numbers at end of splits are fitted proportion of tows with windowpane.

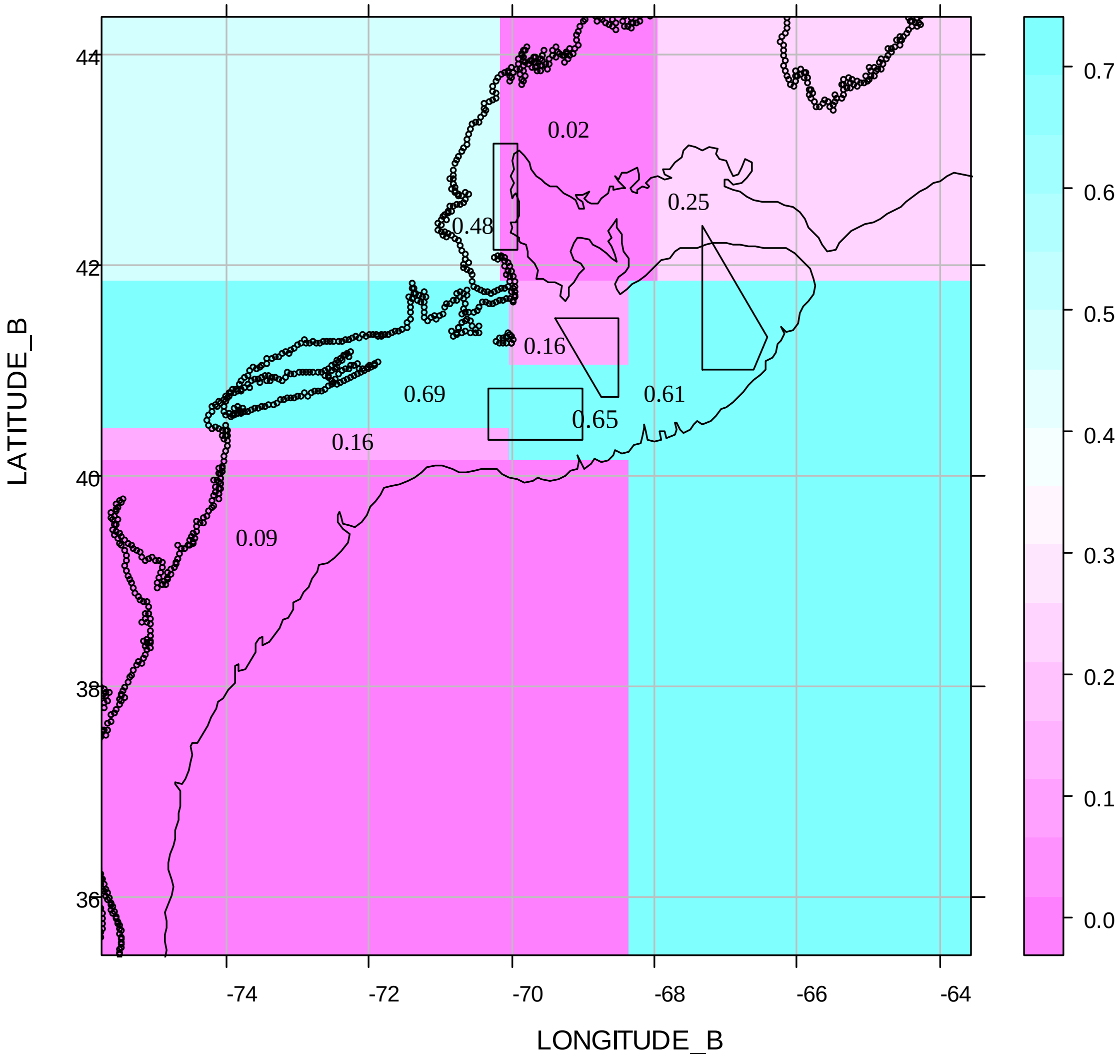


Figure 29. Levelplot of predicted proportion positive tows from tree regression based on latitude and longitude. Number within shaded area is proportion positive tows. Note that predicted values for areas without data should be ignored (see Figure 30 for location of tows) .

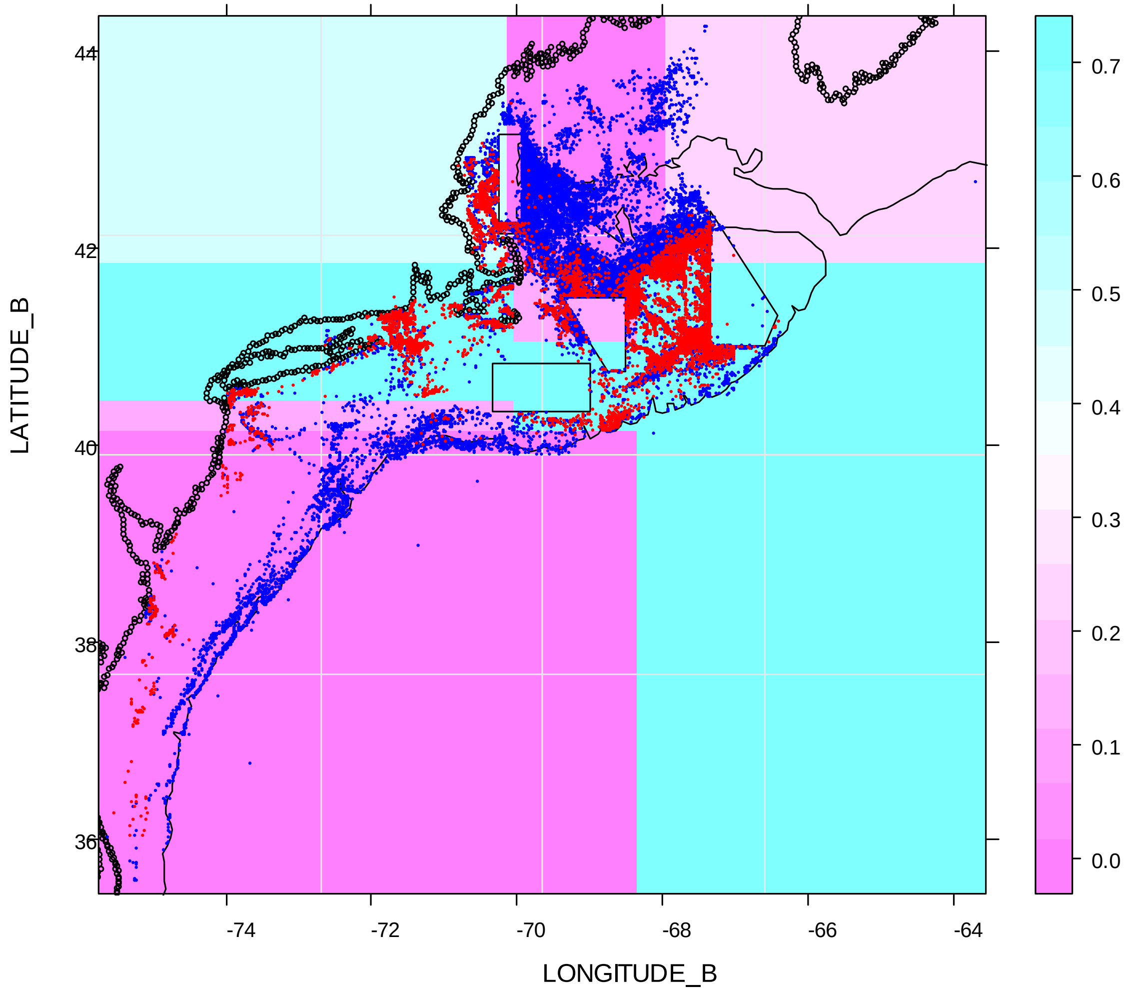


Figure 30. Same as Figure 3 but with observed tows (blue=no windowpane, red=windowpane observed). Colored regions coded to represent proportion of tows with windowpane (see scale on right).

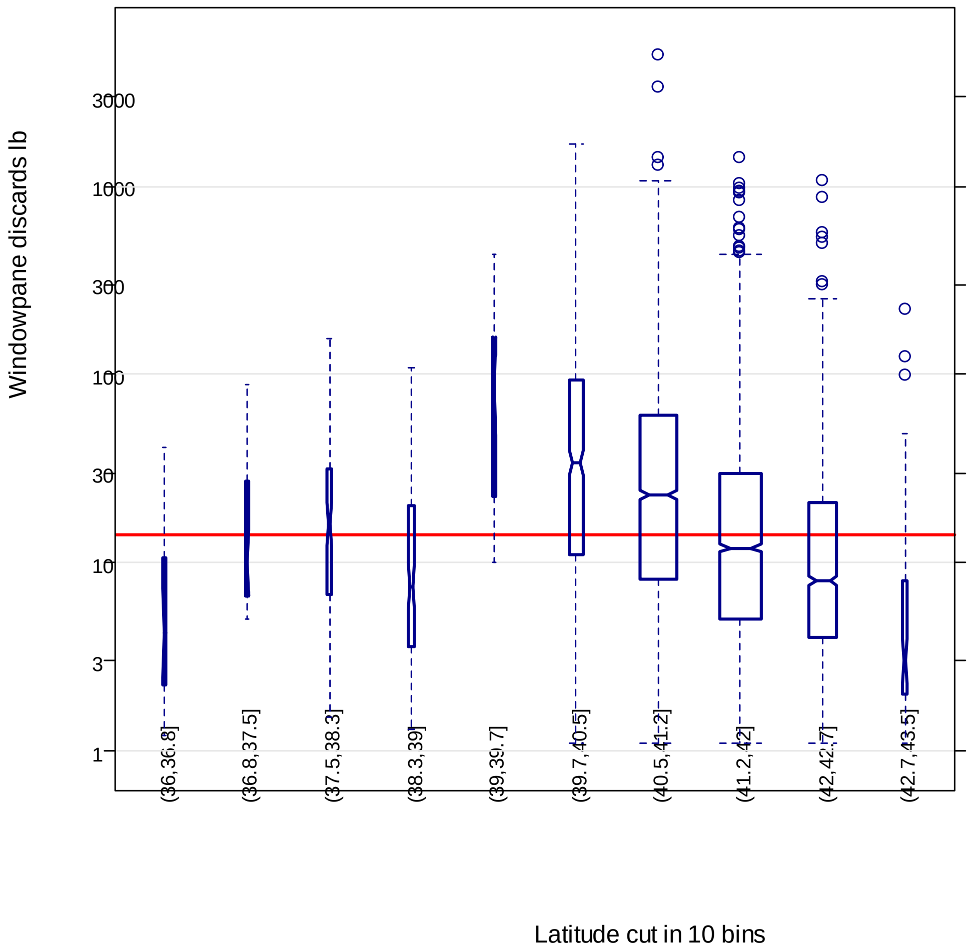


Figure 31. Boxplots of windowpane catch per tow (lb) by 10 bins of latitude. Zero tows not included. Width of box is proportional to square root of the number of observations. Red line is overall median. Note that y axis scale is logarithmic.

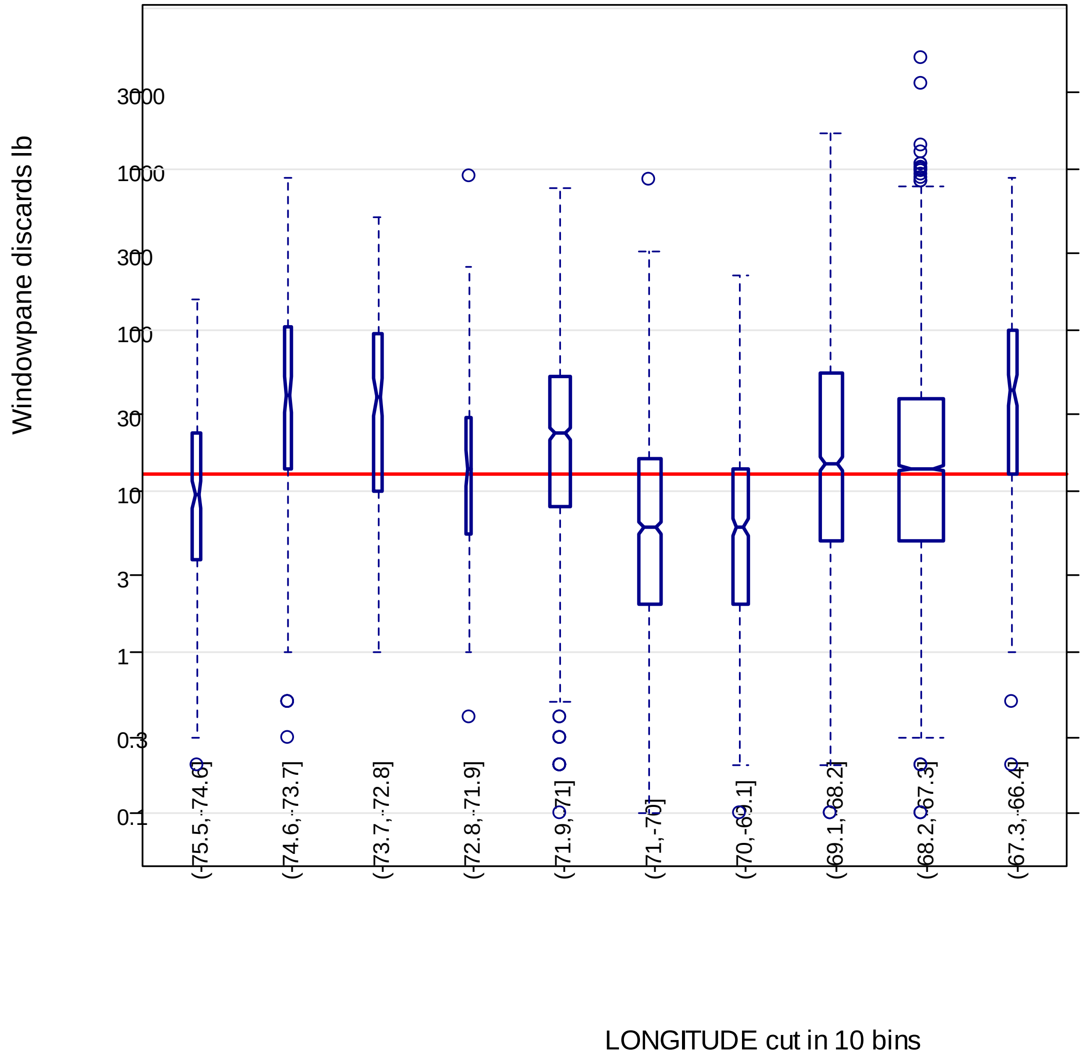


Figure 32. Boxplots of windowpane catch per tow (lb) by 10 bins of negative longitude. Zero tows not included. Width of box is proportional to square root of the number of observations. Red line is overall median. Note that y axis scale is logarithmic.

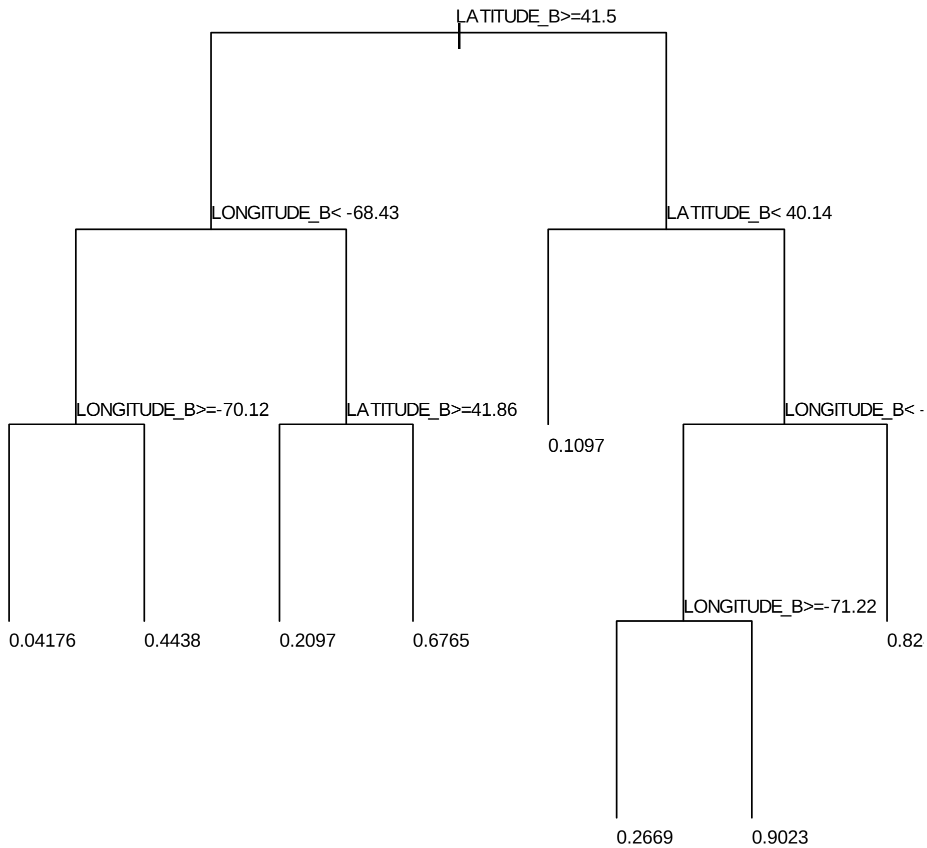
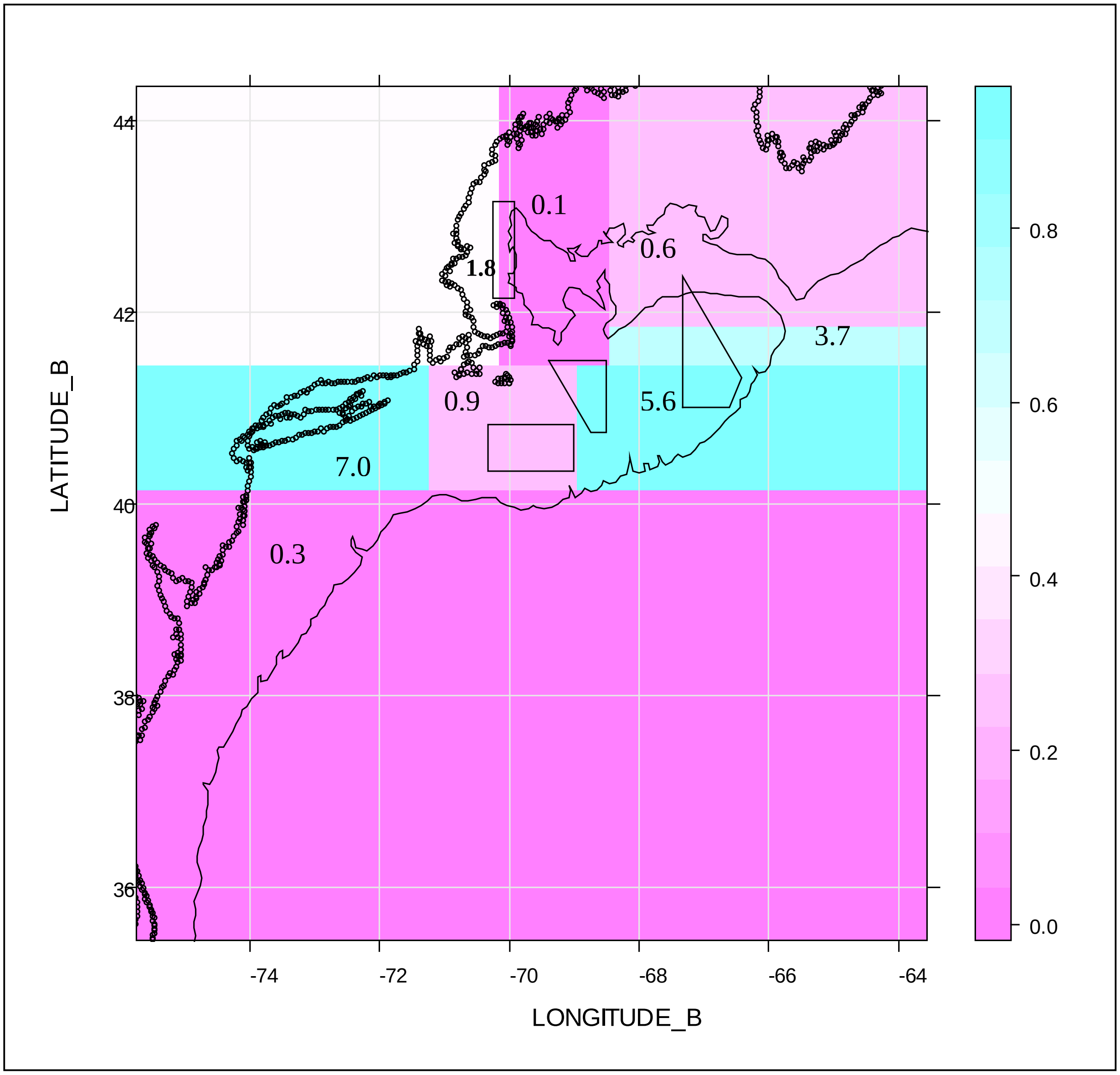


Figure 33. Pruned tree from regressing log10 windowpane discards against negative longitude and latitude. Numbers at end of leaves are log10 windowpane discards in lb.



44
42
40
38
36
LATITUDE_B
-74
-72
-70
-68
-66
-64
LONGITUDE_B
0.8
0.6
0.4
0.2
0.0
0.1
0.6
1.8
3.7
0.9
5.6
7.0
0.3

Figure 34. Levelplot of tree regression of log10 windowpane dk* hailwt +1 lb. Numbers within the chart are the back-transformed geometric mean catch (lb). Scale on right bar is in common logs. Note that predicted values for areas without data should be ignored (see Figure 30 for location of tows)

Framework Adjustment 47

To the

Northeast Multispecies FMP

Appendix V

ABC Projection Output

SNE/MA Winter Flounder

AGEPRO VERSION 3.3

PROJECTION RUN: 2011 SARC 52 SNE WFL: CAT10 Projected FMSY

INPUT FILE:
C:\NIT\GARM_III_PDT_PROJ_EST08CAT_A16\JSNEWIN\SARC52\PDT_CAT10_AVG09_10_F_STATUSQUO2011.IN
OUTPUT FILE:
C:\NIT\GARM_III_PDT_PROJ_EST08CAT_A16\JSNEWIN\SARC52\PDT_CAT10_AVG09_10_F_STATUSQUO2011.OUT
NUMBER OF SIMULATIONS PER BOOTSTRAP REALIZATION: 100
TOTAL NUMBER OF SIMULATIONS: 100000
NUMBER OF FEASIBLE SIMULATIONS: 100000
PROPORTION OF SIMULATIONS THAT ARE FEASIBLE: 1.00000000000000
NUMBER OF BOOTSTRAP REALIZATIONS: 1000

NUMBER OF RECRUITMENT MODELS: 1
PROBABLE RECRUITMENT MODELS: 5
RECRUITMENT MODELS BY YEAR

YEAR	RECRUITMENT MODELS
2011	5
2012	5
2013	5
2014	5
2015	5
2016	5
2017	5
2018	5
2019	5
2020	5

RECRUITMENT MODEL PROBABILITIES BY YEAR

YEAR	MODEL PROBABILITY
2011	1.00000000000000
2012	1.00000000000000
2013	1.00000000000000
2014	1.00000000000000
2015	1.00000000000000
2016	1.00000000000000
2017	1.00000000000000
2018	1.00000000000000
2019	1.00000000000000
2020	1.00000000000000

RECRUITMENT MODEL SAMPLING FREQUENCIES BY YEAR

YEAR	MODEL SAMPLING FREQUENCIES
2011	100000
2012	100000
2013	100000
2014	100000

2015	100000
2016	100000
2017	100000
2018	100000
2019	100000
2020	100000

MIXTURE OF F AND QUOTA BASED CATCHES

YEAR	F	QUOTA (THOUSAND MT)
2011		0.363
2012	0.070	
2013	0.070	
2014	0.070	
2015	0.070	
2016	0.070	
2017	0.070	
2018	0.070	
2019	0.070	
2020	0.070	

SPAWNING STOCK BIOMASS (THOUSAND MT)

YEAR	AVG SSB (000 MT)	STD
2011	9.333	0.844
2012	9.944	0.843
2013	10.535	0.886
2014	13.618	2.316
2015	18.145	4.090
2016	22.807	5.376
2017	27.793	6.626
2018	33.735	8.221
2019	39.821	9.801
2020	45.962	11.284

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	7.604	8.111	8.310	8.736	9.268	9.870	10.462	10.848	11.557
2012	8.206	8.673	8.920	9.358	9.850	10.478	11.096	11.437	12.090
2013	8.735	9.214	9.471	9.913	10.432	11.119	11.747	12.126	12.779
2014	9.984	10.712	11.158	12.018	13.209	14.740	16.554	17.911	21.261
2015	11.583	12.887	13.691	15.273	17.448	20.238	23.444	25.749	31.168
2016	13.730	15.602	16.768	18.986	21.990	25.722	29.855	32.755	39.227
2017	16.313	18.712	20.222	23.074	26.876	31.521	36.529	40.013	47.528
2018	19.333	22.363	24.276	27.896	32.625	38.402	44.578	48.697	58.062
2019	22.477	26.255	28.502	32.834	38.514	45.415	52.748	57.711	68.504
2020	25.868	30.258	32.899	37.917	44.496	52.480	60.809	66.617	78.803

ANNUAL PROBABILITY THAT SSB EXCEEDS THRESHOLD: 43.661 THOUSAND MT

YEAR	Pr(SSB >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.000
2015	0.000
2016	0.003
2017	0.022
2018	0.116

2019	0.303
2020	0.531

Pr(SSB >= Threshold Value) AT LEAST ONCE:= 0.532

MEAN BIOMASS (THOUSAND MT) FOR AGES: 1 TO 7

YEAR	AVG MEAN B (000 MT)	STD
2011	12.697	1.055
2012	15.379	1.991
2013	20.925	4.442
2014	26.509	6.001
2015	32.204	7.422
2016	38.851	9.185
2017	46.398	11.207
2018	54.515	13.237
2019	62.489	14.983
2020	70.349	16.552

PERCENTILES OF MEAN STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	10.471	11.136	11.436	11.952	12.561	13.381	14.124	14.585	15.365
2012	11.971	12.734	13.170	13.991	15.086	16.431	17.916	18.989	21.618
2013	13.929	15.309	16.168	17.828	20.148	23.130	26.625	29.132	35.361
2014	16.516	18.557	19.828	22.257	25.562	29.706	34.342	37.594	45.053
2015	19.387	22.068	23.775	26.923	31.153	36.340	42.005	45.892	54.432
2016	22.801	26.180	28.321	32.329	37.595	44.037	50.964	55.568	65.894
2017	26.713	30.940	33.493	38.407	44.894	52.791	61.130	66.818	79.332
2018	30.964	36.135	39.208	45.095	52.748	62.114	71.972	78.641	93.238
2019	35.497	41.491	45.069	51.821	60.634	71.122	82.273	89.874	105.686
2020	40.258	46.831	50.978	58.513	68.404	79.961	92.178	100.461	117.687

ANNUAL PROBABILITY THAT MEAN BIOMASS EXCEEDS THRESHOLD: 43.661 THOUSAND MT

YEAR	Pr(MEAN B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.001
2014	0.014
2015	0.075
2016	0.262
2017	0.548
2018	0.792
2019	0.922
2020	0.975

Pr(MEAN B >= Threshold Value) AT LEAST ONCE:= 0.975

F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 7

YEAR	AVG F_WT_B	STD
2011	0.029	0.002
2012	0.041	0.004
2013	0.035	0.004
2014	0.036	0.004
2015	0.040	0.005
2016	0.042	0.005

2017	0.042	0.005
2018	0.042	0.004
2019	0.043	0.004
2020	0.044	0.004

PERCENTILES OF F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 7

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.024	0.025	0.026	0.027	0.029	0.030	0.032	0.033	0.034
2012	0.030	0.034	0.036	0.039	0.042	0.044	0.046	0.047	0.048
2013	0.025	0.027	0.029	0.032	0.035	0.038	0.040	0.042	0.044
2014	0.026	0.029	0.031	0.033	0.036	0.039	0.041	0.043	0.045
2015	0.029	0.032	0.034	0.037	0.040	0.043	0.046	0.047	0.050
2016	0.030	0.034	0.035	0.039	0.042	0.045	0.048	0.049	0.052
2017	0.031	0.034	0.036	0.039	0.042	0.045	0.048	0.049	0.052
2018	0.031	0.035	0.037	0.040	0.043	0.046	0.048	0.049	0.052
2019	0.032	0.035	0.037	0.040	0.043	0.046	0.048	0.050	0.052
2020	0.033	0.036	0.038	0.041	0.044	0.047	0.049	0.050	0.053

ANNUAL PROBABILITY THAT F WEIGHTED BY MEAN BIOMASS EXCEEDS THRESHOLD: 0.290

YEAR	Pr(F_WT_B > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000
2018	0.000
2019	0.000
2020	0.000

TOTAL STOCK BIOMASS (THOUSAND MT)

YEAR	AVG TOTAL B (000 MT)	STD
2011	12.421	1.033
2012	14.544	1.574
2013	18.285	3.020
2014	23.987	5.025
2015	29.582	6.540
2016	35.781	8.116
2017	42.885	9.970
2018	51.039	12.067
2019	59.065	13.907
2020	66.960	15.529

PERCENTILES OF TOTAL STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	10.263	10.886	11.179	11.692	12.308	13.091	13.854	14.195	15.077
2012	11.665	12.348	12.731	13.432	14.353	15.455	16.586	17.379	19.120
2013	13.301	14.339	14.978	16.180	17.805	19.843	22.178	23.827	27.834
2014	15.710	17.385	18.434	20.456	23.185	26.613	30.511	33.245	39.650
2015	18.370	20.696	22.173	24.943	28.628	33.181	38.168	41.628	49.308
2016	21.531	24.556	26.447	29.999	34.690	40.382	46.488	50.666	59.621
2017	25.230	29.028	31.367	35.792	41.583	48.630	56.041	61.015	72.138
2018	29.483	34.224	37.055	42.438	49.491	58.037	66.986	72.933	86.191
2019	33.963	39.557	42.864	49.166	57.323	67.176	77.381	84.377	98.976

2020	38.639	44.946	48.774	55.894	65.153	76.000	87.425	95.212	111.394

ANNUAL PROBABILITY THAT TOTAL STOCK BIOMASS EXCEEDS THRESHOLD: 43.661 THOUSAND MT

YEAR	Pr(B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.004
2015	0.033
2016	0.156
2017	0.415
2018	0.708
2019	0.885
2020	0.962

Pr(B >= Threshold Value) AT LEAST ONCE:= 0.962

RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	AVG RECRUITMENT	STD
2011	31803.464	17195.307
2012	33321.714	17904.848
2013	34715.466	18789.917
2014	40652.275	22077.012
2015	47901.765	26365.461
2016	54064.201	29904.603
2017	59067.297	32339.783
2018	64060.452	34788.539
2019	68277.430	37284.054
2020	71442.571	38696.886

PERCENTILES OF RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	8599.603	12211.529	14629.500	19921.191	27990.002	39300.502	53399.830	64372.304	91327.974
2012	9053.161	12851.198	15370.166	20828.060	29324.359	41313.177	56106.684	67244.892	94283.625
2013	9378.349	13281.869	15955.826	21677.228	30521.042	42978.391	58334.661	70350.464	99399.908
2014	10825.889	15394.428	18555.100	25288.435	35700.042	50500.396	68689.469	82290.951	116667.405
2015	12645.637	18044.632	21776.724	29624.437	42041.580	59391.074	81025.179	97547.125	139426.510
2016	14280.688	20304.320	24436.600	33478.148	47364.405	66898.638	91333.267	110367.734	157930.183
2017	15673.131	22279.463	26886.283	36689.515	51793.775	73182.733	100014.899	120145.481	170490.084
2018	17139.485	24201.665	29144.279	39876.271	56204.810	79547.142	108372.402	130003.808	181341.585
2019	18170.642	25897.361	31264.009	42629.839	59900.649	84392.130	114861.741	139074.709	196651.878
2020	19203.697	27241.747	32744.843	44657.537	62780.417	88478.042	120069.311	144103.700	203522.549

LANDINGS (000 MT)

YEAR	AVG LANDINGS (000 MT)	STD
2011	0.363	0.000
2012	0.632	0.053
2013	0.707	0.075
2014	0.948	0.198

2015	1.283	0.318
2016	1.611	0.402
2017	1.952	0.486
2018	2.303	0.578
2019	2.679	0.679
2020	3.063	0.774

PERCENTILES OF LANDINGS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.363	0.363	0.363	0.363	0.363	0.363	0.363	0.363	0.363
2012	0.527	0.554	0.569	0.595	0.626	0.667	0.703	0.726	0.766
2013	0.569	0.601	0.619	0.653	0.697	0.751	0.805	0.841	0.923
2014	0.642	0.701	0.738	0.811	0.912	1.043	1.199	1.315	1.607
2015	0.768	0.871	0.934	1.059	1.231	1.448	1.695	1.872	2.278
2016	0.924	1.068	1.158	1.326	1.553	1.832	2.141	2.351	2.831
2017	1.105	1.286	1.395	1.605	1.885	2.226	2.594	2.841	3.384
2018	1.291	1.506	1.638	1.891	2.225	2.632	3.062	3.358	4.015
2019	1.484	1.741	1.898	2.196	2.587	3.065	3.571	3.923	4.690
2020	1.693	1.993	2.170	2.512	2.961	3.504	4.085	4.481	5.341

REALIZED F SERIES

YEAR	AVG F	STD
2011	0.042	0.004
2012	0.070	0.000
2013	0.070	0.000
2014	0.070	0.000
2015	0.070	0.000
2016	0.070	0.000
2017	0.070	0.000
2018	0.070	0.000
2019	0.070	0.000
2020	0.070	0.000

PERCENTILES OF REALIZED F SERIES

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.034	0.036	0.038	0.040	0.042	0.045	0.047	0.048	0.051
2012	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2013	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2014	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2015	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2016	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2017	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2018	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2019	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
2020	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070

ANNUAL PROBABILITY FULLY-RECRUITED F EXCEEDS THRESHOLD: 0.290

YEAR	Pr(F > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000
2018	0.000

2019	0.000
2020	0.000

GB Winter Flounder

AGEPRO VERSION 3.3

PROJECTION RUN: Freb 2011 ACL projected out to 2017 (must have 75% prob of being

INPUT FILE:
C:\NIT\GARM_III_PDT_PROJ_EST08CAT_A16\KGBWIN\SARC52\PDT_GBWF_75FMSY_2230IN2011.IN
OUTPUT FILE:
C:\NIT\GARM_III_PDT_PROJ_EST08CAT_A16\KGBWIN\SARC52\PDT_GBWF_75FMSY_2230IN2011.OUT
NUMBER OF SIMULATIONS PER BOOTSTRAP REALIZATION: 50
TOTAL NUMBER OF SIMULATIONS: 50000
NUMBER OF FEASIBLE SIMULATIONS: 50000
PROPORTION OF SIMULATIONS THAT ARE FEASIBLE: 1.00000000000000
NUMBER OF BOOTSTRAP REALIZATIONS: 1000

NUMBER OF RECRUITMENT MODELS: 1
PROBABLE RECRUITMENT MODELS: 5
RECRUITMENT MODELS BY YEAR

YEAR	RECRUITMENT MODELS
2011	5
2012	5
2013	5
2014	5
2015	5
2016	5
2017	5

RECRUITMENT MODEL PROBABILITIES BY YEAR

YEAR	MODEL PROBABILITY
2011	1.00000000000000
2012	1.00000000000000
2013	1.00000000000000
2014	1.00000000000000
2015	1.00000000000000
2016	1.00000000000000
2017	1.00000000000000

RECRUITMENT MODEL SAMPLING FREQUENCIES BY YEAR

YEAR	MODEL SAMPLING FREQUENCIES
2011	50000
2012	50000
2013	50000
2014	50000
2015	50000
2016	50000
2017	50000

MIXTURE OF F AND QUOTA BASED CATCHES

YEAR	F	QUOTA (THOUSAND MT)
2011		2.230
2012	0.315	
2013	0.315	
2014	0.315	
2015	0.315	
2016	0.315	

2017 0.315

SPAWNING STOCK BIOMASS (THOUSAND MT)

YEAR	AVG SSB (000 MT)	STD
2011	12.299	3.095
2012	14.413	3.419
2013	13.021	2.734
2014	13.245	3.051
2015	13.733	3.488
2016	14.376	3.735
2017	14.632	3.823

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	6.833	7.963	8.696	10.132	11.864	14.019	16.184	18.122	22.049
2012	8.174	9.470	10.234	11.971	14.168	16.364	18.757	20.396	23.939
2013	7.925	8.963	9.660	11.085	12.904	14.615	16.555	17.845	20.845
2014	7.869	9.036	9.760	11.136	12.860	14.893	17.148	18.735	22.515
2015	7.876	9.118	9.862	11.292	13.197	15.559	18.238	20.101	24.588
2016	8.082	9.405	10.207	11.746	13.815	16.354	19.237	21.271	25.949
2017	8.107	9.511	10.338	11.919	14.054	16.704	19.623	21.724	26.292

ANNUAL PROBABILITY THAT SSB EXCEEDS THRESHOLD: 11.866 THOUSAND MT

YEAR	Pr(SSB >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.499
2012	0.767
2013	0.636
2014	0.647
2015	0.677
2016	0.736
2017	0.756

Pr(SSB >= Threshold Value) AT LEAST ONCE:= 0.937

MEAN BIOMASS (THOUSAND MT) FOR AGES: 1 TO 7

YEAR	AVG MEAN B (000 MT)	STD
2011	17.979	3.896
2012	18.687	3.929
2013	18.938	4.031
2014	19.548	4.456
2015	20.033	4.729
2016	20.638	4.909
2017	20.964	5.008

PERCENTILES OF MEAN STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	10.837	12.361	13.192	15.187	17.700	20.193	22.936	24.724	28.778
2012	11.249	12.876	13.958	15.926	18.376	20.997	23.765	25.708	29.796
2013	11.489	13.159	14.216	16.120	18.507	21.228	24.150	26.109	30.682
2014	11.607	13.396	14.424	16.432	18.977	22.017	25.333	27.588	33.047
2015	11.748	13.568	14.620	16.703	19.385	22.658	26.208	28.667	34.131
2016	12.004	13.889	15.011	17.186	19.966	23.360	27.058	29.641	35.152
2017	12.062	14.039	15.205	17.421	20.319	23.775	27.551	30.140	35.715

ANNUAL PROBABILITY THAT MEAN BIOMASS EXCEEDS THRESHOLD: 1000.000 THOUSAND MT

YEAR	Pr(MEAN B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000

Pr(MEAN B >= Threshold Value) AT LEAST ONCE:= 0.000

F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 7

YEAR	AVG F_WT_B	STD
2011	0.130	0.028
2012	0.204	0.019
2013	0.202	0.025
2014	0.190	0.022
2015	0.193	0.023
2016	0.196	0.024
2017	0.197	0.024

PERCENTILES OF F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 7

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.076	0.090	0.097	0.110	0.126	0.147	0.169	0.180	0.202
2012	0.148	0.169	0.179	0.193	0.206	0.218	0.226	0.231	0.241
2013	0.140	0.159	0.169	0.186	0.204	0.220	0.233	0.240	0.252
2014	0.135	0.152	0.161	0.176	0.191	0.206	0.218	0.225	0.238
2015	0.136	0.153	0.162	0.177	0.193	0.208	0.222	0.230	0.244
2016	0.137	0.156	0.165	0.180	0.196	0.212	0.226	0.234	0.248
2017	0.138	0.156	0.166	0.181	0.197	0.213	0.227	0.235	0.249

ANNUAL PROBABILITY THAT F WEIGHTED BY MEAN BIOMASS EXCEEDS THRESHOLD: 0.500

YEAR	Pr(F_WT_B > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000

TOTAL STOCK BIOMASS (THOUSAND MT)

YEAR	AVG TOTAL B (000 MT)	STD
2011	18.111	3.741
2012	20.732	4.512
2013	20.616	4.228
2014	21.014	4.514
2015	21.414	4.822
2016	22.191	5.080
2017	22.497	5.183

PERCENTILES OF TOTAL STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	11.337	12.755	13.553	15.422	17.844	20.192	22.791	24.761	28.742

2012	12.270	14.094	15.339	17.565	20.345	23.365	26.567	28.811	33.570
2013	12.608	14.430	15.546	17.661	20.212	23.108	26.107	28.210	32.632
2014	12.701	14.656	15.764	17.861	20.488	23.569	26.861	29.114	34.441
2015	12.843	14.737	15.868	18.022	20.792	24.126	27.730	30.188	35.673
2016	13.176	15.154	16.329	18.628	21.534	25.037	28.825	31.424	37.110
2017	13.191	15.280	16.502	18.831	21.853	25.432	29.323	31.963	37.650

ANNUAL PROBABILITY THAT TOTAL STOCK BIOMASS EXCEEDS THRESHOLD: 1000.000 THOUSAND MT

YEAR	Pr(B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000

Pr(B >= Threshold Value) AT LEAST ONCE:= 0.000

RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	AVG RECRUITMENT	STD
2011	17639.328	10328.986
2012	18197.069	10747.168
2013	17891.845	10553.501
2014	17873.392	10452.373
2015	18153.897	10760.064
2016	18206.436	10713.423
2017	18136.465	10587.538

PERCENTILES OF RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	4315.357	6209.584	7580.392	10553.358	15171.201	22001.560	30555.561	37156.350	53732.309
2012	4420.909	6406.680	7809.530	10835.600	15649.091	22690.148	31592.539	38400.096	55735.158
2013	4347.482	6263.447	7652.917	10661.725	15437.033	22218.858	31061.182	37781.989	55180.615
2014	4349.855	6300.084	7670.124	10678.530	15451.611	22256.058	30900.453	37791.767	54476.913
2015	4290.295	6335.690	7728.173	10807.721	15640.902	22544.881	31431.396	38422.343	56054.970
2016	4380.673	6402.085	7802.220	10867.675	15726.926	22660.576	31401.934	38550.710	55988.817
2017	4412.987	6384.415	7724.447	10823.822	15629.621	22672.492	31492.687	38412.226	54690.855

LANDINGS (000 MT)

YEAR	AVG LANDINGS (000 MT)	STD
2011	2.230	0.000
2012	3.824	0.933
2013	3.795	0.791
2014	3.675	0.760
2015	3.828	0.912
2016	4.016	0.996
2017	4.100	1.029

PERCENTILES OF LANDINGS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	2.230	2.230	2.230	2.230	2.230	2.230	2.230	2.230	2.230
2012	2.158	2.485	2.707	3.152	3.753	4.349	4.983	5.521	6.532

2013	2.299	2.614	2.821	3.233	3.750	4.257	4.804	5.203	6.047
2014	2.255	2.580	2.777	3.144	3.598	4.111	4.655	5.034	5.870
2015	2.253	2.600	2.803	3.191	3.696	4.317	5.002	5.472	6.679
2016	2.312	2.678	2.892	3.317	3.871	4.552	5.310	5.849	7.051
2017	2.331	2.709	2.936	3.375	3.955	4.656	5.442	5.990	7.210

REALIZED F SERIES

YEAR	AVG F	STD
2011	0.196	0.050
2012	0.315	0.000
2013	0.315	0.000
2014	0.315	0.000
2015	0.315	0.000
2016	0.315	0.000
2017	0.315	0.000

PERCENTILES OF REALIZED F SERIES

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.102	0.125	0.139	0.161	0.190	0.224	0.263	0.286	0.331
2012	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315
2013	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315
2014	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315
2015	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315
2016	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315
2017	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315

ANNUAL PROBABILITY FULLY-RECRUITED F EXCEEDS THRESHOLD: 0.420

YEAR	Pr(F > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.001
2012	0.000
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000

GB Yellowtail Flounder – No Rho Adjustment

No Rho Adjustment

AGEPRO VERSION 3.3

PROJECTION RUN: Fref=0.25

INPUT FILE: C:\DOCUMENTS AND SETTINGS\TAN\MY DOCUMENTS\PROJECTION_FILES\TRAC 2011\GB YTF\POST_SSC_EXAM\NORHO_2659_1150_0.21.IN
OUTPUT FILE: C:\DOCUMENTS AND SETTINGS\TAN\MY DOCUMENTS\PROJECTION_FILES\TRAC 2011\GB YTF\POST_SSC_EXAM\NORHO_2659_1150_0.21.OUT
NUMBER OF SIMULATIONS PER BOOTSTRAP REALIZATION: 10
TOTAL NUMBER OF SIMULATIONS: 10000
NUMBER OF FEASIBLE SIMULATIONS: 10000
PROPORTION OF SIMULATIONS THAT ARE FEASIBLE: 1.00000000000000
NUMBER OF BOOTSTRAP REALIZATIONS: 1000

NUMBER OF RECRUITMENT MODELS: 1
PROBABLE RECRUITMENT MODELS: 15
RECRUITMENT MODELS BY YEAR

YEAR	RECRUITMENT MODELS
2011	15
2012	15
2013	15
2014	15
2015	15
2016	15
2017	15
2018	15
2019	15
2020	15
2021	15
2022	15
2023	15
2024	15
2025	15
2026	15
2027	15
2028	15
2029	15
2030	15
2031	15
2032	15
2033	15
2034	15
2035	15
2036	15
2037	15
2038	15
2039	15
2040	15

RECRUITMENT MODEL PROBABILITIES BY YEAR

YEAR	MODEL PROBABILITY
2011	1.00000000000000

2012	1.00000000000000
2013	1.00000000000000
2014	1.00000000000000
2015	1.00000000000000
2016	1.00000000000000
2017	1.00000000000000
2018	1.00000000000000
2019	1.00000000000000
2020	1.00000000000000
2021	1.00000000000000
2022	1.00000000000000
2023	1.00000000000000
2024	1.00000000000000
2025	1.00000000000000
2026	1.00000000000000
2027	1.00000000000000
2028	1.00000000000000
2029	1.00000000000000
2030	1.00000000000000
2031	1.00000000000000
2032	1.00000000000000
2033	1.00000000000000
2034	1.00000000000000
2035	1.00000000000000
2036	1.00000000000000
2037	1.00000000000000
2038	1.00000000000000
2039	1.00000000000000
2040	1.00000000000000

RECRUITMENT MODEL SAMPLING FREQUENCIES BY YEAR

YEAR	MODEL SAMPLING FREQUENCIES
2011	10000
2012	10000
2013	10000
2014	10000
2015	10000
2016	10000
2017	10000
2018	10000
2019	10000
2020	10000
2021	10000
2022	10000
2023	10000
2024	10000
2025	10000
2026	10000
2027	10000
2028	10000
2029	10000
2030	10000
2031	10000
2032	10000
2033	10000
2034	10000

2035	10000
2036	10000
2037	10000
2038	10000
2039	10000
2040	10000

MIXTURE OF F AND QUOTA BASED CATCHES

YEAR	F	QUOTA (THOUSAND MT)
2011		2.650
2012		1.150
2013	0.210	
2014	0.210	
2015	0.210	
2016	0.210	
2017	0.210	
2018	0.210	
2019	0.210	
2020	0.210	
2021	0.210	
2022	0.210	
2023	0.210	
2024	0.210	
2025	0.210	
2026	0.210	
2027	0.210	
2028	0.210	
2029	0.210	
2030	0.210	
2031	0.210	
2032	0.210	
2033	0.210	
2034	0.210	
2035	0.210	
2036	0.210	
2037	0.210	
2038	0.210	
2039	0.210	
2040	0.210	

SPAWNING STOCK BIOMASS (THOUSAND MT)

YEAR	AVG SSB (000 MT)	STD
2011	8.414	1.512
2012	7.872	1.642
2013	11.896	3.627
2014	18.820	7.407
2015	24.886	9.275
2016	30.391	10.494
2017	35.079	11.311
2018	38.200	11.551
2019	40.295	11.697
2020	41.591	11.756
2021	42.427	11.779
2022	43.046	11.814
2023	43.458	11.905
2024	43.729	11.952

2025	43.916	11.908
2026	44.056	11.850
2027	44.170	11.838
2028	44.194	11.829
2029	44.175	11.837
2030	44.206	11.890
2031	44.266	11.956
2032	44.352	11.949
2033	44.433	11.960
2034	44.476	11.950
2035	44.461	11.899
2036	44.401	11.925
2037	44.365	12.007
2038	44.401	12.054
2039	44.458	12.035
2040	44.436	12.016

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	5.297	6.119	6.571	7.336	8.381	9.322	10.443	11.002	12.369
2012	4.530	5.294	5.796	6.676	7.807	8.914	9.926	10.774	12.111
2013	5.987	7.173	7.905	9.255	11.079	13.963	17.438	19.132	21.449
2014	8.382	9.962	10.997	12.997	16.914	23.160	30.237	33.404	39.198
2015	10.968	12.912	14.184	17.247	23.316	31.084	37.829	42.079	50.093
2016	13.515	15.988	17.708	22.085	29.064	37.105	44.790	49.561	58.085
2017	15.849	19.084	21.106	26.409	33.935	42.401	50.524	55.574	64.645
2018	17.865	21.327	24.001	29.425	37.083	45.458	53.798	59.165	68.558
2019	19.206	23.103	25.951	31.495	39.306	47.782	56.115	61.311	71.228
2020	20.133	24.365	27.168	32.748	40.535	49.154	57.584	62.639	72.636
2021	21.146	25.194	27.863	33.610	41.329	49.965	58.280	63.578	74.422
2022	21.531	25.640	28.394	34.236	41.915	50.716	58.871	64.227	74.598
2023	22.019	25.944	28.775	34.576	42.351	51.127	59.687	64.551	75.228
2024	22.338	26.121	28.991	34.672	42.632	51.477	59.877	65.019	75.464
2025	22.477	26.379	29.123	35.003	42.855	51.609	59.904	65.020	75.416
2026	22.786	26.562	29.436	35.237	42.893	51.774	60.022	65.190	74.967
2027	22.945	26.695	29.588	35.378	43.032	51.619	60.220	65.668	76.056
2028	22.824	26.668	29.423	35.315	43.172	51.833	60.071	65.655	75.180
2029	22.536	26.702	29.587	35.396	43.190	51.775	60.139	65.363	75.660
2030	22.776	26.872	29.506	35.313	43.112	51.653	60.131	65.853	75.391
2031	22.678	26.726	29.552	35.475	43.162	52.026	60.447	65.807	75.991
2032	22.979	26.788	29.523	35.396	43.376	52.036	60.631	66.170	75.266
2033	22.886	26.794	29.536	35.433	43.314	52.102	60.804	66.018	75.269
2034	22.802	26.806	29.681	35.531	43.400	52.301	60.676	65.872	75.713
2035	22.775	26.903	29.673	35.437	43.441	52.230	60.857	65.687	75.154
2036	22.876	27.132	29.560	35.526	43.218	52.034	60.450	65.811	75.329
2037	22.631	26.711	29.542	35.397	43.161	52.008	60.655	66.155	75.981
2038	22.667	26.738	29.654	35.370	43.297	52.173	60.766	66.098	76.234
2039	22.557	26.702	29.537	35.544	43.291	52.281	60.625	65.981	75.813
2040	22.367	26.682	29.477	35.401	43.431	52.297	60.543	65.917	75.714

ANNUAL PROBABILITY THAT SSB EXCEEDS THRESHOLD: 43.200 THOUSAND MT

YEAR	Pr(SSB >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.001

2015	0.042
2016	0.124
2017	0.231
2018	0.313
2019	0.375
2020	0.415
2021	0.438
2022	0.458
2023	0.471
2024	0.481
2025	0.491
2026	0.491
2027	0.495
2028	0.499
2029	0.500
2030	0.497
2031	0.498
2032	0.504
2033	0.504
2034	0.505
2035	0.508
2036	0.501
2037	0.499
2038	0.504
2039	0.502
2040	0.507

Pr(SSB >= Threshold Value) AT LEAST ONCE:= 0.977

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2011

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	37.3	51.2	58.6	77.0	103.4	132.6	163.2	186.4	222.6
3	422.6	571.9	634.9	792.1	1008.9	1269.6	1559.1	1752.9	2077.3
4	665.4	855.1	989.0	1191.7	1521.8	1823.9	2268.6	2551.9	3027.2
5	1752.8	2084.5	2276.7	2646.2	3081.4	3570.7	4033.3	4414.6	4998.0
6+	1421.2	1690.1	1846.0	2145.6	2498.4	2895.2	3270.3	3579.5	4052.5

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2012

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	145.3	298.1	514.2	828.0	1216.9	1691.0	2030.4	2238.3	2409.1
3	78.2	106.7	121.9	160.9	216.4	277.6	339.7	395.1	465.3
4	341.7	443.6	516.6	653.5	839.6	1074.4	1316.5	1490.0	1786.9
5	504.8	664.7	752.9	932.3	1216.0	1480.9	1857.1	2116.2	2595.7
6+	2088.9	2539.6	2834.8	3432.3	4114.2	4918.1	5745.0	6314.9	7291.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2013

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	838.6	1151.2	1258.6	2158.6	2671.3	5849.7	9635.7	10934.3	12653.0
3	302.1	624.3	1072.4	1740.2	2555.7	3547.4	4265.7	4720.5	5084.7

4	68.9	95.1	108.5	142.7	191.1	246.7	304.0	346.8	417.7
5	289.7	373.4	443.5	567.8	729.1	940.2	1158.0	1315.0	1580.2
6+	1933.3	2416.0	2751.7	3284.2	3976.0	4652.3	5365.9	5945.5	6924.2

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2014

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	815.2	1148.4	1239.8	2102.1	2663.5	5767.3	9484.4	10925.6	12532.3
3	1751.2	2404.0	2628.2	4507.5	5578.2	12215.2	20121.0	22832.7	26421.6
4	263.1	543.6	933.8	1515.3	2225.3	3088.8	3714.3	4110.2	4427.4
5	58.5	80.7	92.1	121.2	162.2	209.4	258.1	294.4	354.6
6+	1652.1	2112.0	2334.0	2746.0	3334.8	3868.5	4431.1	4739.5	5470.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2015

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	846.1	1147.2	1251.2	2164.0	2668.6	5816.3	9523.9	10925.5	12602.8
3	1702.3	2398.0	2588.9	4389.5	5561.8	12043.2	19805.0	22814.6	26169.7
4	1524.8	2093.2	2288.5	3924.8	4857.1	10636.2	17519.9	19881.1	23006.1
5	223.3	461.5	792.8	1286.4	1889.2	2622.3	3153.3	3489.5	3758.7
6+	1213.7	1512.5	1675.9	1967.7	2353.6	2719.4	3103.2	3311.7	3816.6

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2016

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	809.2	1152.2	1254.9	2165.7	2671.7	5837.5	9737.1	10926.2	12818.1
3	1766.8	2395.5	2612.8	4518.9	5572.6	12145.4	19887.6	22814.3	26316.8
4	1482.3	2088.0	2254.3	3822.1	4842.8	10486.4	17244.8	19865.4	22786.7
5	1294.5	1777.1	1942.8	3332.0	4123.5	9029.8	14873.9	16878.5	19531.5
6+	1416.6	1890.5	2181.0	2683.4	3275.4	3925.0	4543.3	4867.6	5499.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2017

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	848.8	1154.6	1283.2	2175.0	2669.3	5833.3	9607.8	10925.6	12749.0
3	1689.8	2406.0	2620.5	4522.3	5579.0	12189.6	20332.8	22815.9	26766.5
4	1538.4	2085.8	2275.0	3934.7	4852.2	10575.3	17316.7	19865.1	22914.8
5	1258.4	1772.7	1913.8	3244.8	4111.4	8902.6	14640.3	16865.1	19345.2
6+	2898.8	3527.1	3979.6	4921.0	6061.1	10326.9	15367.3	17148.2	19384.9

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2018

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	838.8	1155.3	1266.4	2171.7	2674.5	5831.5	9731.6	10927.1	12840.5
3	1772.4	2411.0	2679.6	4541.8	5574.0	12180.9	20062.8	22814.5	26622.2
4	1471.3	2095.0	2281.7	3937.7	4857.8	10613.9	17704.4	19866.5	23306.4
5	1306.0	1770.8	1931.4	3340.5	4119.4	8978.2	14701.4	16864.9	19454.0
6+	4014.2	4892.5	5503.8	6779.7	9696.7	14207.5	18453.4	20675.7	25202.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2019

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	862.0	1157.7	1271.7	2165.7	2671.9	5808.5	9500.8	10925.6	12687.1
3	1751.6	2412.4	2644.6	4535.0	5584.8	12177.1	20321.2	22817.7	26813.3
4	1543.3	2099.4	2333.2	3954.6	4853.5	10606.3	17469.3	19865.2	23180.7
5	1249.1	1778.6	1937.1	3343.0	4124.1	9010.9	15030.5	16866.1	19786.4
6+	4974.7	6180.3	6837.6	8440.9	11966.7	16444.6	20744.4	23139.5	27827.2

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2020

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	837.4	1148.6	1248.6	2135.1	2662.1	5793.7	9491.4	10925.3	12639.4
3	1800.0	2417.5	2655.6	4522.4	5579.4	12129.1	19839.3	22814.6	26492.9
4	1525.1	2100.5	2302.7	3948.7	4862.8	10602.9	17694.3	19868.0	23347.1
5	1310.2	1782.3	1980.8	3357.4	4120.5	9004.4	14830.9	16865.0	19679.8
6+	5782.2	6986.0	7878.9	9842.9	13373.1	18044.9	22477.9	24968.5	29732.4

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2021

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	821.7	1153.8	1271.3	2163.4	2671.3	5847.5	9563.3	10925.6	12555.7
3	1748.6	2398.4	2607.2	4458.4	5559.0	12098.2	19819.7	22813.9	26393.2
4	1567.3	2105.0	2312.3	3937.8	4858.1	10561.1	17274.7	19865.3	23068.2
5	1294.8	1783.3	1954.9	3352.4	4128.4	9001.6	15022.0	16867.4	19821.0
6+	6351.2	7805.7	8738.4	10872.8	14389.1	18907.0	23176.2	25745.5	30527.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2022

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	843.3	1151.7	1258.3	2163.4	2666.8	5822.1	9719.2	10926.4	12696.2
3	1715.9	2409.4	2654.7	4517.6	5578.2	12210.7	19969.9	22814.6	26218.5
4	1522.6	2088.4	2270.2	3882.0	4840.4	10534.2	17257.6	19864.7	22981.4
5	1330.6	1787.1	1963.1	3343.1	4124.4	8966.1	14665.7	16865.1	19584.2
6+	6853.3	8335.5	9410.5	11561.9	15024.8	19477.3	23934.4	26528.6	30984.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2023

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	837.0	1151.7	1262.1	2168.2	2671.4	5855.4	9513.8	10925.9	12714.3
3	1761.0	2405.0	2627.5	4517.7	5568.7	12157.5	20295.4	22816.1	26511.9
4	1494.1	2097.9	2311.6	3933.6	4857.1	10632.2	17388.4	19865.3	22829.2
5	1292.6	1773.0	1927.3	3295.7	4109.4	8943.3	14651.2	16864.6	19510.5
6+	7122.5	8732.9	9734.1	11922.3	15383.3	19956.5	24329.3	26892.0	31419.9

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2024

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	850.2	1150.7	1262.6	2168.2	2668.8	5797.4	9764.9	10926.0	12621.5
3	1747.8	2404.9	2635.4	4527.6	5578.4	12227.0	19866.4	22815.2	26549.6
4	1533.3	2094.1	2287.9	3933.7	4848.8	10585.9	17671.8	19866.7	23084.7
5	1268.4	1781.1	1962.5	3339.5	4123.5	9026.4	14762.2	16865.1	19381.4

6+	7379.1	8925.0	9900.5	12018.9	15583.0	20059.6	24491.3	27024.9	32376.3

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2025

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	844.6	1152.9	1262.9	2165.5	2668.2	5811.9	9629.8	10926.3	12789.0
3	1775.3	2402.9	2636.4	4527.6	5573.0	12106.0	20390.7	22815.5	26355.8
4	1521.9	2094.0	2294.7	3942.3	4857.3	10646.4	17298.3	19865.8	23117.6
5	1301.7	1777.8	1942.3	3339.6	4116.5	8987.1	15002.8	16866.2	19598.2
6+	7594.9	9074.6	10061.0	12309.9	15751.6	20296.3	24732.4	27263.5	31963.5

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2026

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	836.5	1152.7	1265.6	2165.8	2670.3	5823.9	9731.8	10926.5	12794.1
3	1763.7	2407.5	2637.2	4521.9	5571.7	12136.3	20108.6	22816.0	26705.6
4	1545.8	2092.3	2295.6	3942.4	4852.5	10541.0	17754.8	19866.1	22948.8
5	1292.0	1777.7	1948.2	3346.9	4123.7	9038.5	14685.7	16865.5	19626.1
6+	7723.5	9167.5	10156.2	12374.6	15869.7	20528.4	24837.8	27343.2	32287.9

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2027

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	867.4	1153.7	1269.3	2167.5	2673.6	5836.0	9705.6	10925.8	12835.1
3	1746.7	2407.0	2642.9	4522.5	5576.1	12161.2	20321.7	22816.4	26716.3
4	1535.7	2096.3	2296.3	3937.4	4851.5	10567.4	17509.2	19866.5	23253.3
5	1312.3	1776.3	1948.9	3346.9	4119.7	8949.0	15073.3	16865.7	19482.9
6+	7842.3	9239.6	10189.8	12383.9	15981.2	20705.2	24958.8	27741.5	32270.5

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2028

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	844.8	1154.4	1267.1	2169.4	2666.1	5760.3	9566.8	10925.9	12719.4
3	1811.4	2409.2	2650.4	4526.2	5583.0	12186.5	20267.0	22814.9	26802.0
4	1520.9	2095.8	2301.2	3937.9	4855.3	10589.2	17694.7	19866.9	23262.7
5	1303.8	1779.7	1949.5	3342.7	4118.8	8971.4	14864.8	16866.1	19741.4
6+	7922.8	9298.5	10248.2	12478.9	16016.8	20584.9	25018.6	27663.9	32455.8

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2029

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	832.1	1154.0	1270.7	2163.0	2670.3	5828.0	9505.3	10925.9	12721.4
3	1764.0	2410.5	2646.0	4530.1	5567.3	12028.5	19977.2	22815.2	26560.4
4	1577.2	2097.7	2307.8	3941.1	4861.3	10611.2	17647.1	19865.6	23337.3
5	1291.2	1779.3	1953.7	3343.2	4122.0	8989.9	15022.3	16866.4	19749.4
6+	7829.5	9325.3	10298.6	12559.8	16102.8	20649.1	24936.2	27480.4	32244.4

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2030

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2	843.6	1149.4	1261.0	2162.7	2668.3	5818.0	9668.6	10926.1	12852.5
3	1737.6	2409.8	2653.3	4516.7	5576.1	12169.9	19848.6	22815.2	26564.6
4	1536.0	2098.9	2303.9	3944.5	4847.6	10473.6	17394.7	19865.9	23126.9
5	1339.0	1780.9	1959.3	3345.9	4127.1	9008.6	14981.9	16865.3	19812.7
6+	8012.0	9459.6	10434.1	12608.6	16038.5	20617.4	24953.2	27689.6	32637.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2031

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	831.0	1154.3	1267.1	2168.7	2672.7	5866.6	9635.2	10926.3	12746.8
3	1761.5	2400.0	2633.2	4516.1	5571.8	12148.9	20189.7	22815.6	26838.2
4	1513.0	2098.3	2310.3	3932.8	4855.2	10596.7	17282.8	19865.9	23130.5
5	1304.0	1781.9	1956.0	3348.8	4115.4	8891.8	14767.6	16865.6	19634.1
6+	8065.0	9459.1	10418.5	12611.0	16138.0	20701.1	25196.6	27727.5	32309.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2032

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	867.3	1158.1	1288.9	2173.2	2675.7	5856.6	9655.4	10926.1	12734.4
3	1735.3	2410.3	2646.0	4528.5	5581.1	12250.4	20119.9	22815.9	26617.5
4	1533.8	2089.8	2292.8	3932.3	4851.5	10578.4	17579.8	19866.2	23368.8
5	1284.5	1781.4	1961.4	3338.8	4122.0	8996.3	14672.6	16865.5	19637.2
6+	7920.4	9393.5	10383.3	12569.3	16115.5	20639.8	24942.9	27648.2	32477.9

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2033

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	831.9	1149.9	1255.5	2161.7	2673.1	5877.0	9649.0	10925.9	12725.4
3	1811.1	2418.2	2691.5	4538.1	5587.4	12229.5	20162.1	22815.6	26591.6
4	1511.0	2098.7	2303.9	3943.1	4859.7	10666.8	17519.0	19866.5	23176.6
5	1302.1	1774.2	1946.6	3338.4	4118.8	8980.8	14924.8	16865.8	19839.4
6+	7990.8	9425.0	10392.4	12562.9	16109.5	20566.5	24999.3	27766.5	32668.6

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2034

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	840.2	1154.4	1269.7	2163.6	2671.7	5858.1	9806.4	10926.0	12766.4
3	1737.1	2401.3	2621.6	4514.0	5581.8	12272.3	20148.9	22815.2	26572.9
4	1577.0	2105.6	2343.6	3951.5	4865.1	10648.6	17555.7	19866.2	23154.1
5	1282.8	1781.8	1956.0	3347.6	4125.7	9055.8	14873.1	16866.1	19676.3
6+	7931.5	9475.6	10411.6	12578.6	16065.0	20668.6	25106.2	27792.6	32446.7

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2035

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	841.2	1145.9	1245.8	2160.5	2665.7	5828.6	9567.9	10925.7	12675.9
3	1754.5	2410.6	2651.4	4517.9	5578.9	12232.8	20477.4	22815.4	26658.5
4	1512.5	2090.8	2282.7	3930.5	4860.2	10685.8	17544.2	19865.8	23137.8
5	1338.8	1787.6	1989.6	3354.7	4130.4	9040.4	14904.3	16865.9	19657.2
6+	7958.2	9382.6	10357.5	12554.6	16246.1	20810.0	25164.2	27924.7	32446.2

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2036

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	831.4	1154.4	1268.1	2165.8	2670.3	5792.7	9645.7	10925.6	12788.2
3	1756.5	2392.8	2601.5	4511.5	5566.5	12171.2	19979.5	22814.8	26469.5
4	1527.7	2099.0	2308.6	3933.9	4857.7	10651.4	17830.3	19866.0	23212.4
5	1284.1	1775.1	1937.9	3336.9	4126.2	9071.9	14894.5	16865.5	19643.3
6+	7936.6	9454.3	10396.0	12663.8	16304.9	20814.5	25170.2	27869.8	32490.3

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2037

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	821.1	1152.6	1261.2	2161.1	2672.0	5856.5	9613.4	10925.1	12671.1
3	1736.0	2410.7	2648.0	4522.6	5576.1	12096.2	20141.8	22814.5	26704.0
4	1529.4	2083.5	2265.2	3928.3	4846.9	10597.8	17396.7	19865.5	23047.8
5	1297.0	1782.0	1960.0	3339.8	4124.0	9042.8	15137.4	16865.7	19706.6
6+	7929.9	9437.3	10438.3	12647.1	16244.6	20808.9	25301.3	27787.1	32723.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2038

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	850.8	1155.3	1265.6	2169.6	2671.7	5898.7	9672.2	10925.6	12714.9
3	1714.6	2406.8	2633.7	4512.7	5579.7	12229.3	20074.3	22813.6	26459.4
4	1511.6	2099.0	2305.7	3938.0	4855.3	10532.5	17538.1	19865.2	23251.9
5	1298.5	1768.8	1923.1	3335.0	4114.9	8997.2	14769.3	16865.3	19566.9
6+	8016.3	9465.1	10410.0	12666.2	16277.3	20773.1	25211.8	27823.0	32725.4

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2039

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	830.6	1151.3	1268.5	2167.0	2671.1	5841.8	9647.9	10926.0	12681.8
3	1776.5	2412.4	2642.9	4530.4	5579.0	12317.5	20197.2	22814.6	26550.9
4	1493.0	2095.6	2293.2	3929.3	4858.4	10648.4	17479.3	19864.4	23039.0
5	1283.3	1782.0	1957.5	3343.2	4122.0	8941.8	14889.3	16865.0	19740.2
6+	7978.7	9458.8	10418.1	12654.5	16158.0	20856.5	25098.0	27600.3	32865.8

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2040

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	811.3	1147.0	1256.7	2157.9	2666.4	5821.7	9645.1	10926.1	12676.9
3	1734.4	2404.0	2648.9	4525.1	5577.8	12198.8	20146.6	22815.3	26481.8
4	1546.9	2100.5	2301.2	3944.8	4857.8	10725.2	17586.3	19865.3	23118.6
5	1267.5	1779.1	1946.9	3335.9	4124.6	9040.2	14839.5	16864.4	19559.4
6+	7993.7	9481.6	10422.7	12580.1	16143.4	20738.6	25170.2	27881.7	32564.1

MEAN BIOMASS (THOUSAND MT) FOR AGES: 1 TO 6

YEAR	AVG MEAN B (000 MT)	STD
2011	9.630	1.659
2012	13.565	3.839
2013	20.874	7.657
2014	27.788	10.019

2015	33.802	11.461
2016	39.197	12.389
2017	43.769	12.949
2018	46.793	13.200
2019	48.727	13.347
2020	49.995	13.386
2021	50.878	13.432
2022	51.492	13.520
2023	51.884	13.577
2024	52.135	13.552
2025	52.336	13.473
2026	52.491	13.456
2027	52.546	13.461
2028	52.544	13.459
2029	52.574	13.501
2030	52.648	13.577
2031	52.748	13.594
2032	52.826	13.611
2033	52.883	13.597
2034	52.874	13.542
2035	52.826	13.551
2036	52.790	13.641
2037	52.826	13.704
2038	52.883	13.702
2039	52.860	13.670
2040	52.740	13.619

PERCENTILES OF MEAN STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	6.259	7.023	7.522	8.413	9.572	10.683	11.729	12.578	13.981
2012	7.174	8.504	9.288	10.751	12.753	15.756	19.372	21.194	23.511
2013	9.708	11.491	12.692	14.893	19.026	25.417	32.499	35.913	41.794
2014	12.593	14.818	16.212	19.590	26.088	34.484	41.680	46.314	55.006
2015	15.342	17.987	19.909	24.728	32.354	41.200	49.567	54.796	64.358
2016	18.132	21.600	23.879	29.659	37.969	47.242	55.965	61.627	71.453
2017	20.759	24.806	27.898	34.016	42.618	51.939	61.172	67.274	77.620
2018	22.640	27.146	30.502	36.982	45.831	55.269	64.346	70.445	82.020
2019	23.947	29.027	32.338	38.796	47.506	57.303	66.627	72.568	84.478
2020	25.224	30.090	33.443	40.121	48.787	58.476	67.747	74.013	86.289
2021	25.950	30.929	34.106	40.968	49.724	59.763	68.746	74.613	86.193
2022	26.497	31.450	34.778	41.519	50.236	60.147	69.830	75.229	87.047
2023	27.097	31.671	35.012	41.767	50.747	60.611	70.240	75.855	87.921
2024	27.153	31.919	35.275	42.042	50.967	60.979	70.302	75.966	87.582
2025	27.617	32.243	35.622	42.349	51.182	61.081	70.364	76.214	87.403
2026	27.802	32.400	35.766	42.615	51.341	61.018	70.604	76.476	88.623
2027	27.762	32.256	35.667	42.745	51.456	61.267	70.675	76.736	87.602
2028	27.307	32.346	35.862	42.607	51.537	61.143	70.656	76.535	88.109
2029	27.623	32.612	35.771	42.562	51.508	61.185	70.572	76.929	87.789
2030	27.529	32.340	35.951	42.719	51.399	61.376	71.130	76.696	88.572
2031	27.873	32.460	35.788	42.704	51.642	61.504	71.022	77.469	88.429
2032	27.639	32.533	35.756	42.682	51.705	61.567	71.351	77.232	87.687
2033	27.681	32.528	35.970	42.759	51.747	61.701	71.352	76.661	87.491
2034	27.734	32.565	35.964	42.727	51.724	61.808	71.303	76.804	87.641
2035	27.804	32.717	35.985	42.813	51.541	61.489	71.235	76.878	87.541
2036	27.526	32.450	35.853	42.819	51.578	61.468	71.131	77.342	88.528
2037	27.677	32.529	35.904	42.624	51.751	61.649	71.435	77.296	88.825

2038	27.439	32.503	35.838	42.773	51.644	61.863	71.232	77.230	88.623
2039	27.223	32.453	35.794	42.740	51.777	61.769	71.137	76.997	88.062
2040	27.527	32.563	35.820	42.768	51.508	61.569	71.313	77.207	87.681

ANNUAL PROBABILITY THAT MEAN BIOMASS EXCEEDS THRESHOLD: 0.000 THOUSAND MT

YEAR	Pr(MEAN B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	1.000
2012	1.000
2013	1.000
2014	1.000
2015	1.000
2016	1.000
2017	1.000
2018	1.000
2019	1.000
2020	1.000
2021	1.000
2022	1.000
2023	1.000
2024	1.000
2025	1.000
2026	1.000
2027	1.000
2028	1.000
2029	1.000
2030	1.000
2031	1.000
2032	1.000
2033	1.000
2034	1.000
2035	1.000
2036	1.000
2037	1.000
2038	1.000
2039	1.000
2040	1.000

Pr(MEAN B >= Threshold Value) AT LEAST ONCE:= 1.000

F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 6

YEAR	AVG F_WT_B	STD
2011	0.284	0.050
2012	0.091	0.025
2013	0.096	0.022
2014	0.114	0.023
2015	0.130	0.025
2016	0.140	0.023
2017	0.147	0.022
2018	0.152	0.021
2019	0.154	0.020
2020	0.156	0.020
2021	0.157	0.019
2022	0.157	0.019
2023	0.158	0.019
2024	0.158	0.019

2025	0.158	0.019
2026	0.158	0.019
2027	0.159	0.019
2028	0.159	0.019
2029	0.159	0.019
2030	0.158	0.019
2031	0.158	0.019
2032	0.158	0.019
2033	0.158	0.019
2034	0.159	0.019
2035	0.159	0.019
2036	0.159	0.019
2037	0.159	0.019
2038	0.158	0.019
2039	0.159	0.019
2040	0.159	0.019

PERCENTILES OF F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 6

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.189	0.210	0.226	0.248	0.277	0.315	0.352	0.377	0.419
2012	0.049	0.054	0.059	0.073	0.090	0.107	0.124	0.135	0.160
2013	0.057	0.064	0.069	0.078	0.095	0.113	0.126	0.133	0.145
2014	0.067	0.076	0.082	0.096	0.116	0.133	0.146	0.151	0.158
2015	0.076	0.088	0.095	0.112	0.132	0.149	0.161	0.167	0.176
2016	0.087	0.099	0.107	0.124	0.142	0.158	0.169	0.174	0.181
2017	0.093	0.108	0.116	0.132	0.150	0.164	0.174	0.179	0.185
2018	0.099	0.114	0.122	0.137	0.154	0.168	0.177	0.181	0.187
2019	0.104	0.118	0.126	0.141	0.157	0.170	0.178	0.182	0.188
2020	0.106	0.120	0.128	0.142	0.159	0.172	0.180	0.183	0.189
2021	0.107	0.121	0.130	0.143	0.159	0.172	0.180	0.184	0.189
2022	0.108	0.122	0.130	0.144	0.160	0.173	0.180	0.184	0.190
2023	0.110	0.123	0.131	0.144	0.160	0.173	0.180	0.184	0.190
2024	0.110	0.124	0.131	0.145	0.161	0.173	0.181	0.184	0.190
2025	0.110	0.123	0.131	0.145	0.161	0.173	0.181	0.185	0.190
2026	0.110	0.123	0.131	0.145	0.161	0.173	0.181	0.185	0.190
2027	0.110	0.124	0.132	0.146	0.161	0.173	0.181	0.185	0.191
2028	0.112	0.125	0.132	0.146	0.162	0.174	0.181	0.185	0.190
2029	0.110	0.124	0.132	0.146	0.161	0.173	0.181	0.185	0.190
2030	0.111	0.124	0.132	0.145	0.161	0.173	0.181	0.184	0.190
2031	0.110	0.124	0.131	0.145	0.161	0.173	0.181	0.184	0.190
2032	0.111	0.124	0.132	0.145	0.161	0.173	0.181	0.184	0.190
2033	0.110	0.124	0.132	0.145	0.161	0.174	0.181	0.185	0.190
2034	0.111	0.124	0.131	0.145	0.161	0.174	0.182	0.185	0.190
2035	0.111	0.124	0.132	0.146	0.162	0.174	0.181	0.185	0.191
2036	0.110	0.125	0.133	0.146	0.161	0.174	0.181	0.184	0.190
2037	0.112	0.124	0.132	0.145	0.161	0.174	0.181	0.185	0.190
2038	0.110	0.124	0.132	0.145	0.161	0.174	0.181	0.185	0.190
2039	0.109	0.123	0.131	0.146	0.162	0.174	0.181	0.185	0.190
2040	0.112	0.124	0.132	0.146	0.162	0.174	0.181	0.185	0.191

ANNUAL PROBABILITY THAT F WEIGHTED BY MEAN BIOMASS EXCEEDS THRESHOLD: 0.000

YEAR	Pr(F_WT_B > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	1.000
2012	1.000
2013	1.000
2014	1.000

2015	1.000
2016	1.000
2017	1.000
2018	1.000
2019	1.000
2020	1.000
2021	1.000
2022	1.000
2023	1.000
2024	1.000
2025	1.000
2026	1.000
2027	1.000
2028	1.000
2029	1.000
2030	1.000
2031	1.000
2032	1.000
2033	1.000
2034	1.000
2035	1.000
2036	1.000
2037	1.000
2038	1.000
2039	1.000
2040	1.000

TOTAL STOCK BIOMASS (THOUSAND MT)

YEAR	AVG TOTAL B (000 MT)	STD
2011	9.537	1.501
2012	7.371	1.559
2013	8.536	1.981
2014	15.648	6.903
2015	21.866	9.058
2016	27.748	10.394
2017	33.323	11.638
2018	36.973	11.983
2019	39.498	12.155
2020	41.111	12.211
2021	42.044	12.279
2022	42.783	12.258
2023	43.254	12.356
2024	43.584	12.430
2025	43.800	12.439
2026	43.954	12.371
2027	44.079	12.338
2028	44.175	12.324
2029	44.118	12.300
2030	44.151	12.356
2031	44.180	12.418
2032	44.262	12.463
2033	44.356	12.406
2034	44.418	12.480
2035	44.447	12.405
2036	44.383	12.376

2037	44.332	12.452
2038	44.314	12.533
2039	44.402	12.541
2040	44.419	12.512

PERCENTILES OF TOTAL STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	6.404	7.245	7.698	8.460	9.483	10.456	11.546	12.107	13.532
2012	4.235	4.976	5.460	6.259	7.344	8.319	9.501	10.059	11.452
2013	4.434	5.570	6.010	7.090	8.450	9.828	11.079	11.848	13.669
2014	6.856	8.251	9.109	10.656	12.949	19.443	27.366	30.220	33.822
2015	9.130	10.863	12.045	14.392	19.856	28.345	34.354	38.617	47.387
2016	11.929	14.119	15.596	19.022	26.388	34.453	42.122	46.858	55.976
2017	14.426	17.155	18.953	24.235	32.178	40.696	49.278	54.403	64.516
2018	16.380	19.893	22.109	27.777	35.788	44.726	53.287	58.776	68.088
2019	18.173	21.720	24.542	30.387	38.409	47.185	55.939	61.399	71.769
2020	19.184	23.272	25.994	31.947	39.980	48.991	57.709	62.922	73.656
2021	19.905	24.092	27.028	32.723	40.860	49.949	58.685	64.116	74.968
2022	20.797	24.867	27.589	33.632	41.636	50.620	59.509	64.784	75.442
2023	21.098	25.168	27.996	33.977	42.023	51.271	60.100	65.023	76.328
2024	21.723	25.517	28.224	34.241	42.413	51.600	60.391	66.059	76.328
2025	21.790	25.607	28.420	34.491	42.613	51.842	60.466	65.951	76.861
2026	21.877	25.845	28.465	34.506	42.858	52.103	60.721	66.064	76.200
2027	22.212	26.067	28.860	34.713	42.855	51.923	60.625	66.406	77.306
2028	22.554	26.103	28.826	34.967	43.124	52.158	60.856	66.939	76.462
2029	22.160	25.950	28.855	34.837	42.992	52.023	60.858	65.866	76.664
2030	22.070	26.075	28.820	34.929	43.102	51.946	60.741	66.215	76.835
2031	22.006	26.179	28.931	34.800	43.006	52.071	61.201	66.284	77.610
2032	22.276	26.123	28.734	34.881	43.159	52.260	61.261	66.679	76.943
2033	22.318	26.240	28.915	35.006	43.178	52.357	61.467	66.883	76.975
2034	22.168	26.155	28.925	35.030	43.199	52.519	61.381	66.870	77.166
2035	22.174	26.138	29.040	35.135	43.392	52.373	61.353	66.820	76.227
2036	22.244	26.215	29.135	35.009	43.246	52.513	60.888	66.332	77.085
2037	22.302	26.340	28.819	34.906	43.149	52.374	61.218	66.816	77.571
2038	22.336	26.071	28.856	35.034	43.031	52.289	61.282	66.984	77.557
2039	22.099	26.033	28.809	34.971	43.285	52.407	61.523	66.655	77.315
2040	21.997	25.905	28.768	35.087	43.377	52.526	61.410	66.800	77.553

ANNUAL PROBABILITY THAT TOTAL STOCK BIOMASS EXCEEDS THRESHOLD: 0.000 THOUSAND MT

YEAR	Pr(B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	1.000
2012	1.000
2013	1.000
2014	1.000
2015	1.000
2016	1.000
2017	1.000
2018	1.000
2019	1.000
2020	1.000
2021	1.000
2022	1.000
2023	1.000
2024	1.000
2025	1.000
2026	1.000

2027	1.000
2028	1.000
2029	1.000
2030	1.000
2031	1.000
2032	1.000
2033	1.000
2034	1.000
2035	1.000
2036	1.000
2037	1.000
2038	1.000
2039	1.000
2040	1.000

Pr(B >= Threshold Value) AT LEAST ONCE:= 1.000

RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	AVG RECRUITMENT	STD
2011	39019.196	28990.321
2012	38246.491	28675.301
2013	38759.310	28848.352
2014	39226.159	29193.678
2015	39015.768	28956.038
2016	39301.197	29217.726
2017	38881.723	28700.215
2018	38390.513	28833.363
2019	39023.987	28868.223
2020	38978.034	29166.332
2021	39079.530	28950.768
2022	38892.919	29052.793
2023	38976.775	29103.324
2024	39065.380	29196.806
2025	39130.751	29053.828
2026	38557.098	28753.987
2027	38964.266	28878.825
2028	38978.895	29073.805
2029	39321.988	29091.314
2030	39309.032	28993.072
2031	39251.663	29039.566
2032	39128.327	29187.736
2033	38810.575	28982.166
2034	38880.716	29002.097
2035	39018.159	28955.870
2036	39485.752	29197.761
2037	39155.565	29205.289
2038	38792.920	29000.091
2039	38351.608	28617.199
2040	38943.367	29047.720

PERCENTILES OF RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	7737.782	10616.754	11610.663	19914.645	24644.237	53969.907	88920.867	100858.131	116694.316

2012	7525.727	10601.347	11445.283	19405.387	24587.739	53241.054	87554.724	100859.943	115692.041
2013	7810.610	10589.959	11550.627	19977.397	24635.431	53692.859	87920.127	100858.472	116342.586
2014	7470.300	10636.491	11584.687	19992.429	24664.004	53888.411	89888.346	100865.516	118330.558
2015	7835.477	10658.787	11846.165	20078.390	24641.989	53849.837	88694.692	100859.287	117692.723
2016	7743.371	10664.847	11691.170	20048.409	24689.513	53833.000	89837.132	100873.409	118537.307
2017	7957.312	10687.419	11739.940	19992.828	24665.477	53620.724	87706.673	100859.769	117121.234
2018	7730.351	10602.980	11526.222	19709.717	24575.511	53484.180	87619.971	100856.586	116680.471
2019	7585.606	10651.496	11736.221	19971.686	24660.361	53981.524	88283.914	100859.767	115908.073
2020	7784.913	10632.183	11615.899	19971.868	24618.166	53746.525	89722.794	100866.626	117205.043
2021	7726.855	10631.546	11650.748	20015.758	24661.369	54053.878	87826.321	100862.294	117371.910
2022	7848.219	10623.001	11655.313	20016.022	24637.206	53518.630	90144.291	100863.626	116515.081
2023	7797.186	10643.410	11658.583	19990.680	24631.768	53652.601	88897.123	100865.940	118061.246
2024	7721.813	10640.775	11683.654	19993.450	24651.143	53763.015	89838.971	100867.738	118108.861
2025	8007.722	10650.535	11717.105	20009.590	24681.498	53874.840	89597.480	100861.081	118487.365
2026	7798.345	10656.433	11697.525	20026.929	24611.974	53176.120	88315.980	100862.687	117419.251
2027	7681.721	10653.408	11730.002	19967.580	24650.941	53801.255	87747.682	100862.454	117437.877
2028	7787.312	10610.241	11641.148	19964.960	24631.953	53708.613	89255.790	100864.141	118647.542
2029	7671.512	10655.648	11697.446	20020.000	24673.326	54157.290	88947.156	100865.721	117671.898
2030	8006.702	10690.566	11898.784	20062.266	24701.122	54064.838	89133.494	100864.417	117557.447
2031	7679.255	10615.576	11589.680	19955.678	24676.313	54253.752	89075.131	100862.305	117474.770
2032	7756.529	10656.837	11721.335	19973.026	24663.406	54079.211	90527.635	100863.177	117853.309
2033	7765.272	10578.270	11501.033	19944.786	24608.613	53806.969	88326.323	100860.824	117017.658
2034	7674.628	10657.179	11706.410	19993.828	24651.208	53475.269	89043.874	100859.220	118054.078
2035	7580.087	10639.958	11643.143	19949.828	24666.804	54063.926	88745.629	100855.311	116973.012
2036	7853.706	10664.834	11683.805	20028.233	24663.727	54453.762	89288.610	100859.727	117377.341
2037	7667.497	10627.762	11710.166	20004.848	24658.478	53928.976	89064.953	100863.154	117072.053
2038	7489.963	10588.492	11601.498	19920.801	24614.489	53743.277	89038.263	100864.479	117026.631
2039	7545.411	10647.550	11618.015	19987.165	24635.134	53042.021	87063.259	100860.719	117018.790
2040	7833.248	10644.706	11664.636	19960.444	24645.630	53725.230	89465.911	100863.742	117251.613

LANDINGS (000 MT)

YEAR	AVG LANDINGS (000 MT)	STD
2011	2.650	0.000
2012	1.150	0.000
2013	1.889	0.449
2014	3.126	1.213
2015	4.365	1.666
2016	5.481	1.936
2017	6.438	2.129
2018	7.074	2.188
2019	7.505	2.214
2020	7.779	2.225
2021	7.946	2.233
2022	8.068	2.236
2023	8.151	2.251
2024	8.209	2.265
2025	8.247	2.262
2026	8.274	2.250
2027	8.296	2.244
2028	8.307	2.243
2029	8.302	2.242
2030	8.306	2.252
2031	8.314	2.263
2032	8.329	2.267
2033	8.346	2.264
2034	8.357	2.267

2035	8.359	2.259
2036	8.348	2.259
2037	8.339	2.272
2038	8.339	2.283
2039	8.352	2.282
2040	8.353	2.279

PERCENTILES OF LANDINGS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650
2012	1.150	1.150	1.150	1.150	1.150	1.150	1.150	1.150	1.150
2013	1.007	1.225	1.340	1.566	1.852	2.174	2.498	2.701	3.029
2014	1.447	1.723	1.897	2.225	2.751	3.784	5.090	5.627	6.381
2015	1.925	2.285	2.517	3.002	4.011	5.539	6.666	7.436	8.991
2016	2.448	2.897	3.196	3.891	5.217	6.721	8.166	9.052	10.707
2017	2.914	3.457	3.824	4.772	6.223	7.801	9.379	10.282	12.078
2018	3.268	3.923	4.368	5.404	6.859	8.449	10.052	11.085	12.772
2019	3.577	4.287	4.781	5.825	7.325	8.897	10.505	11.491	13.394
2020	3.737	4.551	5.040	6.104	7.590	9.206	10.786	11.754	13.760
2021	3.919	4.680	5.204	6.274	7.741	9.383	10.950	11.925	14.013
2022	4.044	4.802	5.294	6.398	7.847	9.541	11.106	12.046	14.002
2023	4.130	4.845	5.388	6.454	7.918	9.595	11.201	12.110	14.146
2024	4.187	4.907	5.412	6.494	8.012	9.662	11.286	12.238	14.201
2025	4.220	4.932	5.446	6.549	8.036	9.709	11.294	12.299	14.274
2026	4.266	4.969	5.474	6.583	8.068	9.755	11.301	12.321	14.106
2027	4.314	5.004	5.525	6.611	8.082	9.730	11.332	12.316	14.287
2028	4.303	5.000	5.511	6.625	8.106	9.745	11.323	12.397	14.202
2029	4.281	4.988	5.520	6.630	8.112	9.750	11.369	12.284	14.239
2030	4.268	5.020	5.516	6.625	8.106	9.729	11.326	12.378	14.207
2031	4.264	5.011	5.544	6.611	8.112	9.761	11.391	12.358	14.390
2032	4.316	5.012	5.502	6.610	8.129	9.790	11.394	12.465	14.292
2033	4.308	5.026	5.528	6.635	8.150	9.807	11.461	12.456	14.201
2034	4.272	5.025	5.554	6.655	8.155	9.845	11.431	12.415	14.271
2035	4.310	5.031	5.557	6.647	8.162	9.827	11.435	12.354	14.151
2036	4.309	5.047	5.532	6.644	8.130	9.818	11.389	12.389	14.291
2037	4.252	5.030	5.531	6.637	8.121	9.790	11.418	12.425	14.360
2038	4.279	5.030	5.520	6.628	8.128	9.799	11.424	12.442	14.382
2039	4.253	5.001	5.524	6.638	8.141	9.830	11.443	12.396	14.282
2040	4.224	5.004	5.511	6.638	8.148	9.833	11.427	12.462	14.302

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2011

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	1350.5	2751.8	4717.0	7602.4	11223.8	15584.8	18678.1	20570.4	22150.8
2	283.6	392.5	447.1	586.6	786.2	1008.8	1245.7	1421.2	1681.0
3	1229.1	1694.1	1909.6	2366.6	2988.8	3745.8	4565.2	5118.1	6099.9
4	1608.7	2075.2	2393.6	2883.2	3569.6	4292.6	5277.4	5897.4	6969.9
5	3481.3	4044.6	4368.2	4977.2	5686.8	6490.4	7269.9	7852.0	8760.5
6+	2126.4	2470.5	2668.2	3040.2	3473.6	3964.4	4440.6	4796.2	5351.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2012

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7737.8	10616.8	11610.7	19914.6	24644.2	53969.9	88920.9	100858.1	116694.3
2	1097.8	2240.2	3846.3	6197.0	9121.5	12696.1	15211.6	16754.9	18045.3
3	217.3	298.6	340.0	447.7	602.3	771.3	946.2	1088.7	1303.0

4	765.3	1011.6	1139.1	1437.6	1847.3	2344.7	2892.3	3242.0	3884.7
5	879.4	1150.5	1312.9	1612.8	2096.0	2526.9	3169.6	3567.9	4376.6
6+	2786.2	3388.3	3753.6	4474.5	5335.0	6310.9	7312.8	8032.1	9231.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2013

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7525.7	10601.3	11445.3	19405.4	24587.7	53241.1	87554.7	100859.9	115692.0
2	6317.1	8672.1	9480.9	16259.9	20122.4	44064.6	72583.3	82365.3	95311.9
3	854.6	1765.9	3033.3	4922.1	7228.4	10033.5	12065.2	13351.3	14381.6
4	154.3	212.9	242.9	319.5	427.7	552.2	680.5	776.3	935.0
5	506.8	653.3	775.9	993.5	1275.7	1645.1	2026.2	2300.9	2764.9
6+	2548.3	3184.5	3627.0	4329.0	5240.9	6132.3	7073.0	7836.8	9126.9

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2014

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7810.6	10590.0	11550.6	19977.4	24635.4	53692.9	87920.1	100858.5	116342.6
2	6140.9	8650.5	9339.2	15834.5	20063.2	43443.9	71443.3	82300.1	94402.9
3	4953.1	6799.5	7433.7	12748.9	15777.3	34549.6	56910.2	64580.0	74731.0
4	588.9	1216.8	2090.1	3391.7	4980.9	6913.8	8313.8	9200.0	9909.9
5	102.4	141.3	161.2	212.0	283.9	366.5	451.6	515.2	620.5
6+	2177.6	2783.8	3076.5	3619.6	4395.6	5099.2	5840.8	6247.2	7210.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2015

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7470.3	10636.5	11584.7	19992.4	24664.0	53888.4	89888.3	100865.5	118330.6
2	6373.3	8641.2	9425.1	16301.2	20102.1	43812.5	71741.5	82298.9	94933.7
3	4814.9	6782.6	7322.5	12415.3	15730.9	34062.9	56016.4	64528.9	74018.3
4	3413.0	4685.3	5122.3	8784.9	10871.7	23807.1	39215.2	44500.2	51495.0
5	390.8	807.5	1387.1	2250.9	3305.6	4588.3	5517.4	6105.6	6576.7
6+	1599.8	1993.6	2209.0	2593.7	3102.3	3584.5	4090.4	4365.2	5030.7

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2016

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7835.5	10658.8	11846.2	20078.4	24642.0	53849.8	88694.7	100859.3	117692.7
2	6095.6	8679.2	9452.9	16313.5	20125.4	43972.1	73347.5	82304.7	96555.9
3	4997.1	6775.3	7389.9	12781.3	15761.4	34352.0	56250.2	64527.9	74434.5
4	3317.8	4673.7	5045.8	8555.0	10839.7	23471.8	38599.3	44465.0	51003.9
5	2265.0	3109.4	3399.4	5830.1	7215.0	15799.6	26025.2	29532.6	34174.7
6+	1867.3	2491.9	2874.8	3537.1	4317.3	5173.6	5988.6	6416.1	7248.3

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2017

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7743.4	10664.8	11691.2	20048.4	24689.5	53833.0	89837.1	100873.4	118537.3
2	6393.6	8697.4	9666.3	16383.7	20107.5	43940.6	72373.5	82299.6	96035.4
3	4779.4	6805.1	7411.7	12790.9	15779.7	34477.1	57509.4	64532.4	75706.4
4	3443.4	4668.7	5092.2	8807.2	10860.8	23671.0	38760.4	44464.4	51290.7
5	2201.8	3101.7	3348.6	5677.6	7193.8	15577.1	25616.4	29509.2	33848.7
6+	3820.9	4649.2	5245.6	6486.5	7989.3	13612.2	20256.0	22603.5	25551.6

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2018

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7957.3	10687.4	11739.9	19992.8	24665.5	53620.7	87706.7	100859.8	117121.2
2	6318.5	8702.3	9539.8	16359.2	20146.3	43926.9	73305.7	82311.1	96724.6
3	5013.0	6819.4	7579.0	12845.9	15765.6	34452.4	56745.7	64528.5	75298.3
4	3293.3	4689.2	5107.2	8813.8	10873.4	23757.2	39628.1	44467.5	52167.1
5	2285.2	3098.4	3379.4	5844.9	7207.7	15709.3	25723.3	29508.8	34039.1
6+	5291.2	6448.9	7254.7	8936.4	12781.4	18727.3	24323.8	27253.1	33219.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2019

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7730.4	10603.0	11526.2	19709.7	24575.5	53484.2	87620.0	100856.6	116680.5
2	6493.0	8720.8	9579.6	16313.8	20126.6	43753.7	71567.3	82300.0	95569.1
3	4954.1	6823.2	7479.9	12826.7	15796.0	34441.7	57476.6	64537.5	75838.6
4	3454.3	4699.0	5222.5	8851.7	10863.6	23740.2	39101.9	44464.7	51885.9
5	2185.6	3112.0	3389.4	5849.3	7216.1	15766.5	26299.2	29510.9	34620.7
6+	6557.2	8146.4	9012.8	11126.2	15773.6	21676.0	27343.7	30500.7	36679.6

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2020

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7585.6	10651.5	11736.2	19971.7	24660.4	53981.5	88283.9	100859.8	115908.1
2	6307.8	8651.9	9405.2	16082.8	20053.2	43642.3	71496.5	82297.4	95209.4
3	5091.0	6837.7	7511.1	12791.2	15780.7	34305.8	56113.6	64528.8	74932.6
4	3413.7	4701.7	5154.2	8838.5	10884.6	23732.8	39605.5	44471.0	52258.2
5	2292.5	3118.5	3465.9	5874.5	7209.7	15755.2	25950.0	29509.0	34434.1
6+	7621.7	9208.4	10385.4	12974.2	17627.4	23785.4	29628.6	32911.5	39190.9

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2021

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7784.9	10632.2	11615.9	19971.9	24618.2	53746.5	89722.8	100866.6	117205.0
2	6189.7	8691.5	9576.6	16296.6	20122.5	44048.1	72038.3	82300.0	94579.2
3	4945.8	6783.6	7374.3	12610.0	15723.1	34218.5	56058.1	64526.7	74650.6
4	3508.1	4711.6	5175.7	8814.0	10874.0	23639.2	38666.3	44464.9	51634.0
5	2265.5	3120.3	3420.6	5865.7	7223.6	15750.3	26284.2	29513.2	34681.2
6+	8371.6	10288.8	11518.3	14331.7	18966.6	24921.7	30549.0	33935.7	40238.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2022

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7726.9	10631.5	11650.7	20015.8	24661.4	54053.9	87826.3	100862.3	117371.9
2	6352.4	8675.7	9478.4	16296.7	20088.0	43856.3	73212.4	82305.6	95637.5
3	4853.2	6814.7	7508.7	12777.6	15777.4	34536.7	56482.9	64528.8	74156.5
4	3408.0	4674.4	5081.4	8689.2	10834.3	23579.0	38628.1	44463.5	51439.6
5	2328.1	3126.9	3434.8	5849.4	7216.5	15688.1	25660.9	29509.2	34266.9
6+	9033.5	10987.2	12404.2	15239.9	19804.5	25673.4	31548.5	34967.9	40840.7

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2023

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7848.2	10623.0	11655.3	20016.0	24637.2	53518.6	90144.3	100863.6	116515.1
2	6305.0	8675.2	9506.8	16332.5	20123.3	44107.1	71664.9	82302.1	95773.7
3	4980.7	6802.3	7431.7	12777.7	15750.4	34386.3	57403.5	64533.2	74986.3
4	3344.2	4695.8	5174.0	8804.7	10871.7	23798.2	38920.8	44464.9	51099.1
5	2261.7	3102.2	3372.3	5766.6	7190.2	15648.2	25635.5	29508.2	34137.9

6+	9388.3	11511.0	12830.8	15715.1	20277.1	26305.0	32068.9	35447.0	41415.2

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2024

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7797.2	10643.4	11658.6	19990.7	24631.8	53652.6	88897.1	100865.9	118061.2
2	6404.0	8668.2	9510.6	16332.8	20103.6	43670.4	73556.3	82303.1	95074.5
3	4943.5	6801.9	7454.0	12805.8	15778.0	34583.0	56190.1	64530.4	75093.0
4	3432.0	4687.3	5121.0	8804.8	10853.1	23694.6	39555.1	44468.0	51670.9
5	2219.4	3116.4	3433.7	5843.2	7215.0	15793.7	25829.8	29509.2	33911.9
6+	9726.6	11764.2	13050.1	15842.4	20540.3	26441.0	32282.5	35622.1	42675.9

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2025

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7721.8	10640.8	11683.7	19993.5	24651.1	53763.0	89839.0	100867.7	118108.9
2	6362.4	8684.9	9513.2	16312.1	20099.1	43779.7	72538.7	82305.0	96336.1
3	5021.2	6796.5	7456.9	12806.0	15762.6	34240.5	57673.1	64531.2	74544.8
4	3406.5	4687.0	5136.3	8824.1	10872.2	23830.1	38719.0	44466.1	51744.5
5	2277.7	3110.7	3398.5	5843.3	7202.7	15725.0	26250.8	29511.2	34291.4
6+	10011.0	11961.4	13261.6	16225.9	20762.5	26752.9	32600.3	35936.6	42131.8

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2026

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	8007.7	10650.5	11717.1	20009.6	24681.5	53874.8	89597.5	100861.1	118487.4
2	6300.9	8682.7	9533.7	16314.3	20114.9	43869.8	73307.2	82306.5	96375.0
3	4988.5	6809.5	7459.0	12789.8	15759.1	34326.2	56875.2	64532.7	75534.0
4	3460.0	4683.2	5138.4	8824.2	10861.5	23594.2	39740.9	44466.6	51366.7
5	2260.7	3110.5	3408.7	5856.1	7215.3	15814.9	25695.9	29509.9	34340.2
6+	10180.5	12083.9	13387.1	16311.2	20918.2	27058.9	32739.3	36041.7	42559.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2027

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7798.3	10656.4	11697.5	20026.9	24612.0	53176.1	88316.0	100862.7	117419.3
2	6534.2	8690.7	9561.0	16327.5	20139.7	43961.0	73110.1	82301.1	96683.8
3	4940.3	6807.8	7475.0	12791.5	15771.5	34396.9	57477.8	64533.9	75564.5
4	3437.5	4692.2	5139.8	8813.1	10859.1	23653.2	39191.1	44467.7	52048.4
5	2296.2	3108.0	3410.1	5856.2	7208.3	15658.3	26374.1	29510.3	34089.5
6+	10337.1	12178.9	13431.3	16323.5	21065.2	27292.0	32898.7	36566.7	42536.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2028

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7681.7	10653.4	11730.0	19967.6	24650.9	53801.3	87747.7	100862.5	117437.9
2	6363.3	8695.5	9545.0	16341.7	20083.0	43390.9	72064.5	82302.4	95812.3
3	5123.2	6814.1	7496.5	12801.9	15790.9	34468.4	57323.3	64529.6	75806.7
4	3404.2	4691.1	5150.8	8814.3	10867.7	23701.9	39606.3	44468.5	52069.4
5	2281.3	3114.0	3411.0	5848.8	7206.7	15697.5	26009.2	29511.0	34541.9
6+	10443.2	12256.6	13508.3	16448.7	21112.1	27133.4	32977.5	36464.4	42780.7

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2029

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7787.3	10610.2	11641.1	19965.0	24632.0	53708.6	89255.8	100864.1	118647.5

2	6268.2	8693.0	9571.5	16293.2	20114.8	43901.0	71600.7	82302.2	95827.5
3	4989.3	6817.8	7483.9	12813.0	15746.4	34021.4	56503.4	64530.6	75123.3
4	3530.3	4695.4	5165.6	8821.4	10881.1	23751.2	39499.9	44465.5	52236.2
5	2259.2	3113.2	3418.4	5849.6	7212.3	15729.8	26284.7	29511.5	34555.8
6+	10320.3	12291.8	13574.8	16555.3	21225.5	27218.0	32868.9	36222.5	42502.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2030

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7671.5	10655.6	11697.4	20020.0	24673.3	54157.3	88947.2	100865.7	117671.9
2	6354.3	8657.8	9499.0	16291.1	20099.3	43825.4	72831.3	82303.6	96814.5
3	4914.7	6815.9	7504.7	12775.0	15771.4	34421.3	56139.8	64530.5	75135.2
4	3438.0	4698.0	5157.0	8829.1	10850.4	23443.2	38934.9	44466.2	51765.3
5	2342.9	3116.1	3428.1	5854.3	7221.2	15762.5	26214.1	29509.6	34666.6
6+	10560.8	12469.0	13753.5	16619.7	21140.7	27176.2	32891.3	36498.2	43019.5

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2031

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	8006.7	10690.6	11898.8	20062.3	24701.1	54064.8	89133.5	100864.4	117557.4
2	6259.8	8694.8	9544.9	16336.0	20133.1	44191.5	72579.5	82304.9	96018.4
3	4982.2	6788.3	7447.9	12773.3	15759.2	34362.1	57104.7	64531.6	75909.2
4	3386.6	4696.7	5171.3	8802.9	10867.6	23718.8	38684.4	44466.1	51773.6
5	2281.6	3117.8	3422.4	5859.4	7200.9	15558.1	25839.2	29510.0	34354.1
6+	10630.7	12468.2	13732.9	16622.9	21271.8	27286.6	33212.2	36548.2	42587.2

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2032

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7679.3	10615.6	11589.7	19955.7	24676.3	54253.8	89075.1	100862.3	117474.8
2	6533.3	8723.3	9709.2	16370.5	20155.7	44116.1	72731.5	82303.8	95925.0
3	4908.1	6817.3	7483.9	12808.5	15785.7	34649.1	56907.2	64532.6	75284.9
4	3433.1	4677.6	5132.1	8801.7	10859.2	23677.9	39349.2	44466.9	52306.8
5	2247.5	3116.9	3431.9	5842.0	7212.3	15741.0	25672.9	29510.0	34359.5
6+	10440.1	12381.8	13686.4	16567.9	21242.2	27205.7	32877.8	36443.7	42809.8

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2033

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7756.5	10656.8	11721.3	19973.0	24663.4	54079.2	90527.6	100863.2	117853.3
2	6266.2	8662.1	9457.0	16283.5	20135.5	44270.2	72683.9	82302.1	95857.6
3	5122.6	6839.7	7612.7	12835.6	15803.5	34590.0	57026.4	64531.7	75211.7
4	3382.1	4697.6	5156.9	8826.0	10877.5	23875.7	39213.2	44467.6	51876.7
5	2278.4	3104.3	3405.9	5841.3	7206.7	15713.9	26114.1	29510.5	34713.5
6+	10532.9	12423.2	13698.4	16559.5	21234.3	27109.2	32952.1	36599.6	43061.2

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2034

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7765.3	10578.3	11501.0	19944.8	24608.6	53807.0	88326.3	100860.8	117017.7
2	6329.2	8695.8	9564.4	16297.7	20125.0	44127.8	73869.1	82302.8	96166.5
3	4913.1	6791.7	7414.9	12767.4	15787.6	34710.8	56989.1	64530.4	75158.8
4	3529.8	4713.0	5245.7	8844.6	10889.7	23835.0	39295.3	44467.0	51826.3
5	2244.5	3117.6	3422.4	5857.4	7218.8	15845.1	26023.8	29510.9	34428.0
6+	10454.7	12490.0	13723.7	16580.2	21175.6	27243.7	33093.1	36634.0	42768.7

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2035

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7674.6	10657.2	11706.4	19993.8	24651.2	53475.3	89043.9	100859.2	118054.1
2	6336.3	8631.7	9384.7	16274.6	20080.2	43905.6	72072.9	82300.9	95484.6
3	4962.5	6818.1	7499.2	12778.5	15779.3	34599.2	57918.4	64530.9	75401.0
4	3385.5	4680.0	5109.4	8797.6	10878.8	23918.3	39269.6	44466.1	51789.8
5	2342.6	3127.8	3481.3	5869.7	7227.0	15818.1	26078.3	29510.5	34394.5
6+	10489.9	12367.3	13652.4	16548.5	21414.3	27430.1	33169.4	36808.1	42768.0

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2036

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7580.1	10640.0	11643.1	19949.8	24666.8	54063.9	88745.6	100855.3	116973.0
2	6262.4	8696.1	9552.2	16314.7	20115.0	43635.0	72658.4	82299.6	96330.3
3	4968.1	6767.8	7358.2	12760.4	15744.3	34425.0	56510.0	64529.4	74866.4
4	3419.5	4698.2	5167.5	8805.3	10873.1	23841.3	39909.9	44466.4	51956.7
5	2246.8	3105.9	3390.9	5838.6	7219.7	15873.4	26061.3	29509.9	34370.3
6+	10461.4	12461.9	13703.2	16692.4	21491.8	27436.0	33177.4	36735.8	42826.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2037

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7853.7	10664.8	11683.8	20028.2	24663.7	54453.8	89288.6	100859.7	117377.3
2	6185.2	8682.0	9500.6	16278.7	20127.7	44115.3	72415.1	82296.4	95448.2
3	4910.1	6818.3	7489.6	12791.8	15771.5	34212.8	56969.1	64528.4	75529.5
4	3423.4	4663.5	5070.3	8792.8	10848.9	23721.3	38939.5	44465.4	51588.3
5	2269.4	3117.9	3429.4	5843.6	7215.9	15822.3	26486.2	29510.2	34481.1
6+	10452.6	12439.5	13758.9	16670.4	21412.3	27428.7	33350.1	36626.8	43133.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2038

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7667.5	10627.8	11710.2	20004.8	24658.5	53929.0	89065.0	100863.2	117072.1
2	6408.5	8702.3	9533.8	16342.7	20125.2	44433.4	72858.1	82300.0	95778.1
3	4849.6	6807.3	7449.1	12763.6	15781.5	34589.4	56778.3	64525.9	74837.8
4	3383.4	4698.3	5160.9	8814.5	10867.7	23575.1	39255.8	44464.7	52045.2
5	2271.9	3095.0	3364.9	5835.4	7199.9	15742.6	25842.2	29509.5	34236.6
6+	10566.5	12476.1	13721.7	16695.5	21455.4	27381.5	33232.2	36674.1	43136.0

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2039

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7490.0	10588.5	11601.5	19920.8	24614.5	53743.3	89038.3	100864.5	117026.6
2	6256.6	8672.1	9555.3	16323.6	20120.9	44005.2	72675.6	82302.8	95529.0
3	5024.7	6823.2	7475.1	12813.8	15779.5	34838.8	57125.7	64528.7	75096.5
4	3341.8	4690.7	5133.0	8795.1	10874.6	23834.6	39124.3	44463.0	51568.6
5	2245.4	3118.0	3425.0	5849.7	7212.4	15645.6	26052.1	29509.0	34539.8
6+	10517.0	12467.8	13732.3	16680.1	21298.2	27491.4	33082.2	36380.5	43321.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2040

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7545.4	10647.5	11618.0	19987.2	24635.1	53042.0	87063.3	100860.7	117018.8
2	6111.7	8640.0	9466.6	16255.1	20085.0	43853.7	72653.8	82303.8	95491.9
3	4905.6	6799.5	7492.0	12798.8	15776.2	34503.1	56982.6	64530.9	74901.2

4	3462.4	4701.7	5150.9	8829.6	10873.2	24006.4	39363.7	44464.9	51746.9
5	2217.8	3113.0	3406.5	5836.8	7216.9	15817.8	25964.9	29507.9	34223.5
6+	10536.7	12497.9	13738.4	16582.1	21279.0	27336.1	33177.4	36751.5	42923.5

REALIZED F SERIES

YEAR	AVG F	STD
2011	0.345	0.065
2012	0.171	0.039
2013	0.210	0.000
2014	0.210	0.000
2015	0.210	0.000
2016	0.210	0.000
2017	0.210	0.000
2018	0.210	0.000
2019	0.210	0.000
2020	0.210	0.000
2021	0.210	0.000
2022	0.210	0.000
2023	0.210	0.000
2024	0.210	0.000
2025	0.210	0.000
2026	0.210	0.000
2027	0.210	0.000
2028	0.210	0.000
2029	0.210	0.000
2030	0.210	0.000
2031	0.210	0.000
2032	0.210	0.000
2033	0.210	0.000
2034	0.210	0.000
2035	0.210	0.000
2036	0.210	0.000
2037	0.210	0.000
2038	0.210	0.000
2039	0.210	0.000
2040	0.210	0.000

PERCENTILES OF REALIZED F SERIES

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.223	0.253	0.267	0.299	0.336	0.384	0.429	0.460	0.533
2012	0.104	0.119	0.128	0.145	0.164	0.192	0.223	0.245	0.287
2013	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2014	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2015	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2016	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2017	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2018	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2019	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2020	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2021	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2022	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2023	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2024	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2025	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2026	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2027	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210

2028	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2029	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2030	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2031	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2032	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2033	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2034	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2035	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2036	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2037	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2038	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2039	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2040	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210

ANNUAL PROBABILITY FULLY-RECRUITED F EXCEEDS THRESHOLD: 0.250

YEAR	Pr(F > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.955
2012	0.042
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000
2018	0.000
2019	0.000
2020	0.000
2021	0.000
2022	0.000
2023	0.000
2024	0.000
2025	0.000
2026	0.000
2027	0.000
2028	0.000
2029	0.000
2030	0.000
2031	0.000
2032	0.000
2033	0.000
2034	0.000
2035	0.000
2036	0.000
2037	0.000
2038	0.000
2039	0.000
2040	0.000

GB Yellowtail Flounder – Rho Adjustment

Rho Adjustment

AGEPRO VERSION 3.3

PROJECTION RUN: Fref=0.25

INPUT FILE: C:\DOCUMENTS AND SETTINGS\TAN\MY DOCUMENTS\PROJECTION_FILES\TRAC 2011\GB YTF\POST_SSC_EXAM\RHO_2650_1150_0.21.IN
OUTPUT FILE: C:\DOCUMENTS AND SETTINGS\TAN\MY DOCUMENTS\PROJECTION_FILES\TRAC 2011\GB YTF\POST_SSC_EXAM\RHO_2650_1150_0.21.OUT
NUMBER OF SIMULATIONS PER BOOTSTRAP REALIZATION: 10
TOTAL NUMBER OF SIMULATIONS: 10000
NUMBER OF FEASIBLE SIMULATIONS: 10000
PROPORTION OF SIMULATIONS THAT ARE FEASIBLE: 1.00000000000000
NUMBER OF BOOTSTRAP REALIZATIONS: 1000

NUMBER OF RECRUITMENT MODELS: 1
PROBABLE RECRUITMENT MODELS: 15
RECRUITMENT MODELS BY YEAR

YEAR	RECRUITMENT MODELS
2011	15
2012	15
2013	15
2014	15
2015	15
2016	15
2017	15
2018	15
2019	15
2020	15
2021	15
2022	15
2023	15
2024	15
2025	15
2026	15
2027	15
2028	15
2029	15
2030	15
2031	15
2032	15
2033	15
2034	15
2035	15
2036	15
2037	15
2038	15
2039	15
2040	15

RECRUITMENT MODEL PROBABILITIES BY YEAR

YEAR	MODEL PROBABILITY
2011	1.00000000000000

2012	1.00000000000000
2013	1.00000000000000
2014	1.00000000000000
2015	1.00000000000000
2016	1.00000000000000
2017	1.00000000000000
2018	1.00000000000000
2019	1.00000000000000
2020	1.00000000000000
2021	1.00000000000000
2022	1.00000000000000
2023	1.00000000000000
2024	1.00000000000000
2025	1.00000000000000
2026	1.00000000000000
2027	1.00000000000000
2028	1.00000000000000
2029	1.00000000000000
2030	1.00000000000000
2031	1.00000000000000
2032	1.00000000000000
2033	1.00000000000000
2034	1.00000000000000
2035	1.00000000000000
2036	1.00000000000000
2037	1.00000000000000
2038	1.00000000000000
2039	1.00000000000000
2040	1.00000000000000

RECRUITMENT MODEL SAMPLING FREQUENCIES BY YEAR

YEAR	MODEL SAMPLING FREQUENCIES
2011	10000
2012	10000
2013	10000
2014	10000
2015	10000
2016	10000
2017	10000
2018	10000
2019	10000
2020	10000
2021	10000
2022	10000
2023	10000
2024	10000
2025	10000
2026	10000
2027	10000
2028	10000
2029	10000
2030	10000
2031	10000
2032	10000
2033	10000
2034	10000

2035	10000
2036	10000
2037	10000
2038	10000
2039	10000
2040	10000

MIXTURE OF F AND QUOTA BASED CATCHES

YEAR	F	QUOTA (THOUSAND MT)
2011		2.650
2012		1.150
2013	0.210	
2014	0.210	
2015	0.210	
2016	0.210	
2017	0.210	
2018	0.210	
2019	0.210	
2020	0.210	
2021	0.210	
2022	0.210	
2023	0.210	
2024	0.210	
2025	0.210	
2026	0.210	
2027	0.210	
2028	0.210	
2029	0.210	
2030	0.210	
2031	0.210	
2032	0.210	
2033	0.210	
2034	0.210	
2035	0.210	
2036	0.210	
2037	0.210	
2038	0.210	
2039	0.210	
2040	0.210	

SPAWNING STOCK BIOMASS (THOUSAND MT)

YEAR	AVG SSB (000 MT)	STD
2011	4.338	0.919
2012	3.323	0.971
2013	5.493	2.436
2014	9.189	4.582
2015	12.977	5.765
2016	18.812	7.992
2017	25.358	9.654
2018	30.543	10.479
2019	34.770	11.155
2020	37.905	11.506
2021	39.980	11.666
2022	41.423	11.770
2023	42.380	11.888
2024	43.014	11.947

2025	43.441	11.907
2026	43.741	11.849
2027	43.961	11.837
2028	44.055	11.828
2029	44.083	11.837
2030	44.145	11.890
2031	44.225	11.956
2032	44.325	11.949
2033	44.415	11.960
2034	44.464	11.950
2035	44.453	11.899
2036	44.396	11.925
2037	44.362	12.007
2038	44.399	12.054
2039	44.457	12.035
2040	44.435	12.016

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	2.402	2.925	3.213	3.689	4.325	4.894	5.566	5.899	6.713
2012	1.359	1.787	2.091	2.622	3.284	3.944	4.540	5.044	5.838
2013	2.382	3.011	3.378	4.059	4.942	6.062	7.951	10.663	15.400
2014	4.756	5.394	5.832	6.686	7.897	9.675	13.680	19.304	28.596
2015	6.803	7.553	8.100	9.231	11.046	14.926	20.490	24.777	34.334
2016	9.031	10.285	11.114	12.980	16.506	22.169	30.719	35.750	43.913
2017	11.465	13.527	14.757	17.681	23.351	31.467	38.933	43.494	53.233
2018	13.851	16.476	18.132	22.261	29.152	37.121	44.942	49.859	59.422
2019	15.880	19.029	21.168	26.139	33.553	42.003	49.895	55.042	64.884
2020	17.635	21.112	23.802	29.211	36.739	45.230	53.670	58.596	68.793
2021	19.024	22.880	25.538	31.154	38.849	47.565	55.831	60.904	71.052
2022	20.171	24.129	26.790	32.617	40.290	49.089	57.404	62.576	72.088
2023	21.070	24.947	27.710	33.450	41.231	50.026	58.650	63.406	74.089
2024	21.571	25.506	28.298	33.991	41.913	50.753	59.185	64.266	74.701
2025	21.965	25.915	28.661	34.528	42.382	51.136	59.477	64.607	75.177
2026	22.523	26.270	29.037	34.940	42.612	51.430	59.680	64.867	74.564
2027	22.796	26.484	29.383	35.175	42.870	51.357	60.023	65.364	75.892
2028	22.716	26.556	29.293	35.179	43.033	51.679	59.901	65.537	75.037
2029	22.407	26.609	29.531	35.311	43.103	51.675	60.057	65.319	75.540
2030	22.732	26.830	29.435	35.231	43.047	51.604	60.077	65.819	75.362
2031	22.621	26.680	29.497	35.419	43.119	51.996	60.410	65.753	75.919
2032	22.950	26.767	29.491	35.371	43.338	52.011	60.590	66.163	75.206
2033	22.878	26.782	29.522	35.420	43.292	52.087	60.795	65.994	75.238
2034	22.782	26.786	29.672	35.517	43.380	52.285	60.673	65.844	75.702
2035	22.765	26.897	29.666	35.435	43.429	52.221	60.853	65.677	75.147
2036	22.872	27.127	29.550	35.523	43.215	52.025	60.448	65.806	75.323
2037	22.628	26.710	29.536	35.394	43.159	52.002	60.654	66.152	75.981
2038	22.667	26.736	29.653	35.366	43.295	52.169	60.763	66.098	76.229
2039	22.556	26.702	29.533	35.541	43.290	52.281	60.625	65.980	75.811
2040	22.366	26.680	29.476	35.400	43.431	52.296	60.542	65.915	75.714

ANNUAL PROBABILITY THAT SSB EXCEEDS THRESHOLD: 43.200 THOUSAND MT

YEAR	Pr(SSB >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	0.000
2012	0.000
2013	0.000
2014	0.000

2015	0.002
2016	0.012
2017	0.052
2018	0.126
2019	0.220
2020	0.303
2021	0.364
2022	0.405
2023	0.437
2024	0.459
2025	0.475
2026	0.481
2027	0.489
2028	0.495
2029	0.497
2030	0.495
2031	0.497
2032	0.504
2033	0.503
2034	0.505
2035	0.507
2036	0.500
2037	0.499
2038	0.504
2039	0.502
2040	0.507

Pr(SSB >= Threshold Value) AT LEAST ONCE:= 0.969

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2011

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	21.3	29.3	33.3	43.9	59.0	75.7	92.9	106.8	127.7
3	215.2	286.2	326.3	411.8	529.2	669.1	828.1	929.5	1110.8
4	326.3	428.2	487.7	598.0	777.4	938.8	1177.9	1326.2	1616.6
5	816.3	992.5	1106.5	1322.5	1575.2	1861.0	2143.9	2355.4	2702.2
6+	661.9	804.8	897.2	1072.3	1277.2	1508.9	1738.3	1909.8	2191.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2012

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	80.6	169.3	287.4	473.7	696.1	966.2	1163.4	1289.9	1392.8
3	38.1	52.2	60.1	79.8	107.4	140.3	172.0	196.6	247.6
4	106.2	148.7	182.3	251.8	337.5	447.5	566.0	644.0	782.8
5	139.8	199.7	246.9	337.1	462.1	600.4	751.9	882.5	1155.7
6+	482.6	707.1	888.6	1193.4	1588.6	2009.2	2455.4	2788.2	3321.6

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2013

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	922.3	974.9	1025.0	1257.8	1819.3	2430.1	4107.0	6169.0	10914.6
3	161.1	337.2	580.2	961.4	1416.5	1965.8	2376.1	2641.1	2897.9

4	26.0	37.6	44.6	59.7	83.2	111.8	139.2	158.3	200.6
5	63.8	95.9	123.2	180.3	252.8	348.7	445.6	509.0	634.4
6+	276.6	507.5	662.5	951.8	1322.4	1701.0	2112.9	2424.8	2988.2

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2014

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	926.5	974.8	1018.2	1247.9	1604.9	2135.8	2527.0	3900.4	6530.7
3	1925.9	2035.7	2140.5	2626.5	3798.9	5074.5	8576.0	12882.0	22791.7
4	140.3	293.6	505.2	837.1	1233.4	1711.7	2069.0	2299.7	2523.3
5	22.1	31.9	37.9	50.7	70.7	95.0	118.2	134.4	170.3
6+	250.4	447.6	575.1	808.6	1128.8	1424.9	1763.4	1940.8	2348.3

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2015

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	920.6	996.7	1098.4	1428.1	2060.9	2751.0	6625.3	9431.2	11837.4
3	1934.7	2035.6	2126.1	2605.7	3351.3	4459.8	5276.8	8144.8	13637.3
4	1677.0	1772.5	1863.8	2287.0	3307.8	4418.5	7467.4	11216.7	19845.4
5	119.1	249.3	428.9	710.7	1047.1	1453.2	1756.5	1952.4	2142.2
6+	193.1	334.9	427.6	590.4	811.8	1016.5	1248.5	1372.6	1646.3

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2016

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	809.2	1149.9	1247.7	2138.3	2666.0	5803.8	9599.8	10926.0	12818.1
3	1922.3	2081.3	2293.7	2982.2	4303.4	5744.6	13834.8	19693.9	24718.6
4	1684.6	1772.4	1851.2	2268.9	2918.1	3883.3	4594.7	7091.9	11874.4
5	1423.7	1504.8	1582.3	1941.6	2808.3	3751.2	6339.6	9522.7	16848.2
6+	421.7	687.5	851.3	1140.0	1477.0	1867.6	2220.1	2415.2	2794.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2017

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	848.8	1154.6	1283.2	2175.0	2669.3	5833.3	9607.8	10925.6	12749.0
3	1689.8	2401.2	2605.4	4465.1	5567.1	12119.2	20046.1	22815.4	26766.5
4	1673.8	1812.2	1997.2	2596.7	3747.1	5002.0	12046.3	17148.0	21523.2
5	1430.2	1504.8	1571.7	1926.2	2477.4	3296.8	3900.8	6020.8	10081.0
6+	1839.0	2121.3	2301.7	2701.4	3359.8	4278.0	6630.1	9680.2	16211.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2018

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	838.8	1155.3	1266.4	2171.7	2674.5	5831.5	9731.6	10927.1	12840.5
3	1772.4	2411.0	2679.6	4541.8	5574.0	12180.9	20062.8	22814.5	26622.2
4	1471.3	2090.8	2268.6	3887.9	4847.4	10552.6	17454.8	19866.0	23306.4
5	1421.0	1538.5	1695.6	2204.5	3181.2	4246.6	10227.0	14558.2	18272.6
6+	2797.3	3124.1	3363.1	3888.0	4608.8	5689.2	8074.2	10313.0	15530.9

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2019

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	862.0	1157.7	1271.7	2165.7	2671.9	5808.5	9500.8	10925.6	12687.1
3	1751.6	2412.4	2644.6	4535.0	5584.8	12177.1	20321.2	22817.7	26813.3
4	1543.3	2099.4	2333.2	3954.6	4853.5	10606.3	17469.3	19865.2	23180.7
5	1249.1	1775.0	1926.0	3300.7	4115.3	8958.8	14818.6	16865.7	19786.4
6+	3455.2	3887.6	4180.7	4828.5	6006.1	8439.5	13882.1	17512.4	21093.2

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2020

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	837.4	1148.6	1248.6	2135.1	2662.1	5793.7	9491.4	10925.3	12639.4
3	1800.0	2417.5	2655.6	4522.4	5579.4	12129.1	19839.3	22814.6	26492.9
4	1525.1	2100.5	2302.7	3948.7	4862.8	10602.9	17694.3	19868.0	23347.1
5	1310.2	1782.3	1980.8	3357.4	4120.5	9004.4	14830.9	16865.0	19679.8
6+	4164.1	4911.5	5512.3	6670.0	8948.5	13992.7	18431.3	20539.3	25086.8

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2021

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	821.7	1153.8	1271.3	2163.4	2671.3	5847.5	9563.3	10925.6	12555.7
3	1748.6	2398.4	2607.2	4458.4	5559.0	12098.2	19819.7	22813.9	26393.2
4	1567.3	2105.0	2312.3	3937.8	4858.1	10561.1	17274.7	19865.3	23068.2
5	1294.8	1783.3	1954.9	3352.4	4128.4	9001.6	15022.0	16867.4	19821.0
6+	4920.6	6161.1	6854.9	8387.7	11835.2	16302.2	20425.6	22753.2	27896.6

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2022

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	843.3	1151.7	1258.3	2163.4	2666.8	5822.1	9719.2	10926.4	12696.2
3	1715.9	2409.4	2654.7	4517.6	5578.2	12210.7	19969.9	22814.6	26218.5
4	1522.6	2088.4	2270.2	3882.0	4840.4	10534.2	17257.6	19864.7	22981.4
5	1330.6	1787.1	1963.1	3343.1	4124.4	8966.1	14665.7	16865.1	19584.2
6+	5772.8	7063.3	7950.7	9888.4	13321.1	17825.2	22315.7	24864.3	29403.7

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2023

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	837.0	1151.7	1262.1	2168.2	2671.4	5855.4	9513.8	10925.9	12714.3
3	1761.0	2405.0	2627.5	4517.7	5568.7	12157.5	20295.4	22816.1	26511.9
4	1494.1	2097.9	2311.6	3933.6	4857.1	10632.2	17388.4	19865.3	22829.2
5	1292.6	1773.0	1927.3	3295.7	4109.4	8943.3	14651.2	16864.6	19510.5
6+	6389.5	7791.8	8727.4	10832.2	14221.5	18898.9	23197.2	25681.5	30241.7

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2024

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	850.2	1150.7	1262.6	2168.2	2668.8	5797.4	9764.9	10926.0	12621.5
3	1747.8	2404.9	2635.4	4527.6	5578.4	12227.0	19866.4	22815.2	26549.6
4	1533.3	2094.1	2287.9	3933.7	4848.8	10585.9	17671.8	19866.7	23084.7
5	1268.4	1781.1	1962.5	3339.5	4123.5	9026.4	14762.2	16865.1	19381.4

6+	6719.3	8286.8	9248.5	11304.5	14866.3	19345.3	23672.4	26304.5	31508.3

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2025

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	844.6	1152.9	1262.9	2165.5	2668.2	5811.9	9629.8	10926.3	12789.0
3	1775.3	2402.9	2636.4	4527.6	5573.0	12106.0	20390.7	22815.5	26355.8
4	1521.9	2094.0	2294.7	3942.3	4857.3	10646.4	17298.3	19865.8	23117.6
5	1301.7	1777.8	1942.3	3339.6	4116.5	8987.1	15002.8	16866.2	19598.2
6+	7134.1	8618.4	9569.8	11815.4	15284.4	19842.0	24195.8	26774.3	31384.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2026

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	836.5	1152.7	1265.6	2165.8	2670.3	5823.9	9731.8	10926.5	12794.1
3	1763.7	2407.5	2637.2	4521.9	5571.7	12136.3	20108.6	22816.0	26705.6
4	1545.8	2092.3	2295.6	3942.4	4852.5	10541.0	17754.8	19866.1	22948.8
5	1292.0	1777.7	1948.2	3346.9	4123.7	9038.5	14685.7	16865.5	19626.1
6+	7469.5	8873.4	9840.1	12072.5	15545.0	20181.1	24558.6	27028.4	32075.7

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2027

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	867.4	1153.7	1269.3	2167.5	2673.6	5836.0	9705.6	10925.8	12835.1
3	1746.7	2407.0	2642.9	4522.5	5576.1	12161.2	20321.7	22816.4	26716.3
4	1535.7	2096.3	2296.3	3937.4	4851.5	10567.4	17509.2	19866.5	23253.3
5	1312.3	1776.3	1948.9	3346.9	4119.7	8949.0	15073.3	16865.7	19482.9
6+	7653.5	9060.7	9984.2	12164.1	15770.1	20454.6	24764.2	27534.7	32146.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2028

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	844.8	1154.4	1267.1	2169.4	2666.1	5760.3	9566.8	10925.9	12719.4
3	1811.4	2409.2	2650.4	4526.2	5583.0	12186.5	20267.0	22814.9	26802.0
4	1520.9	2095.8	2301.2	3937.9	4855.3	10589.2	17694.7	19866.9	23262.7
5	1303.8	1779.7	1949.5	3342.7	4118.8	8971.4	14864.8	16866.1	19741.4
6+	7800.1	9161.3	10112.4	12329.3	15851.5	20456.7	24901.6	27514.8	32380.5

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2029

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	832.1	1154.0	1270.7	2163.0	2670.3	5828.0	9505.3	10925.9	12721.4
3	1764.0	2410.5	2646.0	4530.1	5567.3	12028.5	19977.2	22815.2	26560.4
4	1577.2	2097.7	2307.8	3941.1	4861.3	10611.2	17647.1	19865.6	23337.3
5	1291.2	1779.3	1953.7	3343.2	4122.0	8989.9	15022.3	16866.4	19749.4
6+	7732.7	9241.0	10195.5	12458.5	16017.6	20555.8	24838.9	27412.4	32155.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2030

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2	843.6	1149.4	1261.0	2162.7	2668.3	5818.0	9668.6	10926.1	12852.5
3	1737.6	2409.8	2653.3	4516.7	5576.1	12169.9	19848.6	22815.2	26564.6
4	1536.0	2098.9	2303.9	3944.5	4847.6	10473.6	17394.7	19865.9	23126.9
5	1339.0	1780.9	1959.3	3345.9	4127.1	9008.6	14981.9	16865.3	19812.7
6+	7943.9	9385.2	10371.0	12549.2	15974.4	20563.8	24876.9	27636.5	32581.0

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2031

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	831.0	1154.3	1267.1	2168.7	2672.7	5866.6	9635.2	10926.3	12746.8
3	1761.5	2400.0	2633.2	4516.1	5571.8	12148.9	20189.7	22815.6	26838.2
4	1513.0	2098.3	2310.3	3932.8	4855.2	10596.7	17282.8	19865.9	23130.5
5	1304.0	1781.9	1956.0	3348.8	4115.4	8891.8	14767.6	16865.6	19634.1
6+	8032.5	9418.5	10379.5	12563.9	16100.6	20656.0	25129.5	27672.5	32266.7

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2032

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	867.3	1158.1	1288.9	2173.2	2675.7	5856.6	9655.4	10926.1	12734.4
3	1735.3	2410.3	2646.0	4528.5	5581.1	12250.4	20119.9	22815.9	26617.5
4	1533.8	2089.8	2292.8	3932.3	4851.5	10578.4	17579.8	19866.2	23368.8
5	1284.5	1781.4	1961.4	3338.8	4122.0	8996.3	14672.6	16865.5	19637.2
6+	7899.4	9370.6	10359.6	12544.6	16090.5	20587.2	24906.4	27598.6	32433.2

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2033

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	831.9	1149.9	1255.5	2161.7	2673.1	5877.0	9649.0	10925.9	12725.4
3	1811.1	2418.2	2691.5	4538.1	5587.4	12229.5	20162.1	22815.6	26591.6
4	1511.0	2098.7	2303.9	3943.1	4859.7	10666.8	17519.0	19866.5	23176.6
5	1302.1	1774.2	1946.6	3338.4	4118.8	8980.8	14924.8	16865.8	19839.4
6+	7963.6	9404.1	10368.9	12547.8	16089.0	20545.7	24979.1	27736.0	32657.7

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2034

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	840.2	1154.4	1269.7	2163.6	2671.7	5858.1	9806.4	10926.0	12766.4
3	1737.1	2401.3	2621.6	4514.0	5581.8	12272.3	20148.9	22815.2	26572.9
4	1577.0	2105.6	2343.6	3951.5	4865.1	10648.6	17555.7	19866.2	23154.1
5	1282.8	1781.8	1956.0	3347.6	4125.7	9055.8	14873.1	16866.1	19676.3
6+	7922.4	9464.0	10404.4	12566.8	16053.0	20655.8	25099.3	27780.4	32421.3

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2035

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	841.2	1145.9	1245.8	2160.5	2665.7	5828.6	9567.9	10925.7	12675.9
3	1754.5	2410.6	2651.4	4517.9	5578.9	12232.8	20477.4	22815.4	26658.5
4	1512.5	2090.8	2282.7	3930.5	4860.2	10685.8	17544.2	19865.8	23137.8
5	1338.8	1787.6	1989.6	3354.7	4130.4	9040.4	14904.3	16865.9	19657.2
6+	7951.5	9377.2	10353.3	12547.5	16235.9	20806.2	25157.9	27914.6	32439.8

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2036

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	831.4	1154.4	1268.1	2165.8	2670.3	5792.7	9645.7	10925.6	12788.2
3	1756.5	2392.8	2601.5	4511.5	5566.5	12171.2	19979.5	22814.8	26469.5
4	1527.7	2099.0	2308.6	3933.9	4857.7	10651.4	17830.3	19866.0	23212.4
5	1284.1	1775.1	1937.9	3336.9	4126.2	9071.9	14894.5	16865.5	19643.3
6+	7932.2	9448.2	10392.0	12661.0	16300.4	20811.0	25163.1	27865.6	32482.7

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2037

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	821.1	1152.6	1261.2	2161.1	2672.0	5856.5	9613.4	10925.1	12671.1
3	1736.0	2410.7	2648.0	4522.6	5576.1	12096.2	20141.8	22814.5	26704.0
4	1529.4	2083.5	2265.2	3928.3	4846.9	10597.8	17396.7	19865.5	23047.8
5	1297.0	1782.0	1960.0	3339.8	4124.0	9042.8	15137.4	16865.7	19706.6
6+	7927.1	9430.3	10434.4	12644.0	16243.5	20804.8	25300.4	27782.7	32722.2

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2038

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	850.8	1155.3	1265.6	2169.6	2671.7	5898.7	9672.2	10925.6	12714.9
3	1714.6	2406.8	2633.7	4512.7	5579.7	12229.3	20074.3	22813.6	26459.4
4	1511.6	2099.0	2305.7	3938.0	4855.3	10532.5	17538.1	19865.2	23251.9
5	1298.5	1768.8	1923.1	3335.0	4114.9	8997.2	14769.3	16865.3	19566.9
6+	8016.0	9463.7	10408.5	12663.9	16272.1	20770.1	25208.0	27822.1	32725.1

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2039

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	830.6	1151.3	1268.5	2167.0	2671.1	5841.8	9647.9	10926.0	12681.8
3	1776.5	2412.4	2642.9	4530.4	5579.0	12317.5	20197.2	22814.6	26550.9
4	1493.0	2095.6	2293.2	3929.3	4858.4	10648.4	17479.3	19864.4	23039.0
5	1283.3	1782.0	1957.5	3343.2	4122.0	8941.8	14889.3	16865.0	19740.2
6+	7978.2	9456.2	10414.5	12652.8	16157.3	20854.9	25097.0	27600.1	32864.8

PERCENTILES OF SPAWNING BIOMASS AT AGE VECTOR (MT)
IN YEAR: 2040

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	811.3	1147.0	1256.7	2157.9	2666.4	5821.7	9645.1	10926.1	12676.9
3	1734.4	2404.0	2648.9	4525.1	5577.8	12198.8	20146.6	22815.3	26481.8
4	1546.9	2100.5	2301.2	3944.8	4857.8	10725.2	17586.3	19865.3	23118.6
5	1267.5	1779.1	1946.9	3335.9	4124.6	9040.2	14839.5	16864.4	19559.4
6+	7992.0	9480.6	10422.1	12578.9	16143.3	20737.9	25169.2	27879.5	32563.0

MEAN BIOMASS (THOUSAND MT) FOR AGES: 1 TO 6

YEAR	AVG MEAN B (000 MT)	STD
2011	5.032	0.993
2012	6.452	2.607
2013	10.021	4.795
2014	14.359	6.378

2015	20.528	8.540
2016	27.769	10.430
2017	34.305	11.640
2018	39.342	12.340
2019	43.350	12.879
2020	46.408	13.175
2021	48.498	13.344
2022	49.912	13.488
2023	50.835	13.566
2024	51.439	13.548
2025	51.874	13.471
2026	52.184	13.455
2027	52.343	13.459
2028	52.409	13.459
2029	52.484	13.501
2030	52.588	13.577
2031	52.708	13.594
2032	52.800	13.611
2033	52.866	13.597
2034	52.862	13.542
2035	52.819	13.551
2036	52.785	13.641
2037	52.822	13.704
2038	52.880	13.702
2039	52.858	13.670
2040	52.739	13.619

PERCENTILES OF MEAN STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	3.014	3.470	3.773	4.306	4.997	5.668	6.288	6.793	7.620
2012	3.070	3.764	4.164	4.908	5.865	7.089	9.107	12.007	16.898
2013	5.179	5.955	6.423	7.381	8.679	10.587	14.741	20.703	30.160
2014	7.573	8.415	9.006	10.237	12.232	16.404	22.545	27.454	38.038
2015	10.005	11.383	12.293	14.313	18.103	24.116	33.135	38.380	47.514
2016	12.821	15.022	16.330	19.540	25.546	34.309	42.369	47.470	57.880
2017	15.840	18.703	20.526	25.135	32.678	41.478	50.218	55.950	66.445
2018	18.354	21.874	24.350	29.830	38.116	47.176	56.175	61.659	72.489
2019	20.496	24.587	27.527	33.633	42.020	51.620	60.981	66.400	77.633
2020	22.390	26.861	30.102	36.563	45.219	54.891	64.224	69.883	81.634
2021	23.920	28.628	31.853	38.550	47.343	57.216	66.337	72.102	83.374
2022	25.179	29.857	33.183	39.889	48.650	58.640	68.121	73.650	85.560
2023	26.008	30.698	34.048	40.741	49.691	59.523	69.098	74.812	86.703
2024	26.566	31.258	34.619	41.394	50.327	60.284	69.611	75.117	86.949
2025	27.168	31.799	35.091	41.879	50.725	60.659	69.849	75.742	86.936
2026	27.556	32.054	35.488	42.267	50.954	60.696	70.225	76.173	88.226
2027	27.603	32.050	35.458	42.542	51.243	61.005	70.482	76.534	87.402
2028	27.165	32.213	35.744	42.499	51.405	61.021	70.528	76.431	87.968
2029	27.546	32.528	35.641	42.468	51.420	61.095	70.455	76.775	87.743
2030	27.468	32.234	35.922	42.657	51.340	61.323	71.090	76.671	88.545
2031	27.834	32.426	35.757	42.679	51.611	61.476	70.987	77.429	88.390
2032	27.613	32.509	35.720	42.657	51.683	61.549	71.327	77.223	87.682
2033	27.653	32.511	35.959	42.736	51.735	61.684	71.327	76.640	87.487
2034	27.721	32.543	35.957	42.722	51.707	61.799	71.298	76.795	87.634
2035	27.796	32.714	35.977	42.806	51.532	61.482	71.223	76.875	87.522
2036	27.525	32.445	35.850	42.818	51.574	61.467	71.123	77.338	88.522
2037	27.676	32.527	35.900	42.620	51.748	61.645	71.435	77.295	88.819

2038	27.436	32.503	35.837	42.771	51.640	61.862	71.231	77.228	88.620
2039	27.222	32.452	35.793	42.738	51.774	61.767	71.135	76.996	88.059
2040	27.526	32.562	35.819	42.767	51.507	61.569	71.312	77.206	87.680

ANNUAL PROBABILITY THAT MEAN BIOMASS EXCEEDS THRESHOLD: 0.000 THOUSAND MT

YEAR	Pr(MEAN B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	1.000
2012	1.000
2013	1.000
2014	1.000
2015	1.000
2016	1.000
2017	1.000
2018	1.000
2019	1.000
2020	1.000
2021	1.000
2022	1.000
2023	1.000
2024	1.000
2025	1.000
2026	1.000
2027	1.000
2028	1.000
2029	1.000
2030	1.000
2031	1.000
2032	1.000
2033	1.000
2034	1.000
2035	1.000
2036	1.000
2037	1.000
2038	1.000
2039	1.000
2040	1.000

Pr(MEAN B >= Threshold Value) AT LEAST ONCE:= 1.000

F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 6

YEAR	AVG F_WT_B	STD
2011	0.548	0.113
2012	0.200	0.061
2013	0.085	0.015
2014	0.107	0.018
2015	0.111	0.023
2016	0.117	0.025
2017	0.130	0.024
2018	0.140	0.023
2019	0.147	0.022
2020	0.152	0.021
2021	0.154	0.020
2022	0.156	0.020
2023	0.157	0.019
2024	0.157	0.019

2025	0.158	0.019
2026	0.158	0.019
2027	0.158	0.019
2028	0.159	0.019
2029	0.158	0.019
2030	0.158	0.019
2031	0.158	0.019
2032	0.158	0.019
2033	0.158	0.019
2034	0.159	0.019
2035	0.159	0.019
2036	0.159	0.019
2037	0.159	0.019
2038	0.158	0.019
2039	0.159	0.019
2040	0.159	0.019

PERCENTILES OF F WEIGHTED BY MEAN BIOMASS FOR AGES: 1 TO 6

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.347	0.389	0.421	0.467	0.530	0.615	0.701	0.762	0.874
2012	0.068	0.096	0.126	0.162	0.196	0.234	0.276	0.305	0.374
2013	0.051	0.060	0.065	0.074	0.086	0.096	0.105	0.110	0.119
2014	0.064	0.075	0.083	0.096	0.108	0.119	0.129	0.136	0.150
2015	0.064	0.072	0.078	0.093	0.113	0.127	0.140	0.147	0.164
2016	0.069	0.077	0.084	0.097	0.118	0.135	0.150	0.157	0.167
2017	0.078	0.089	0.097	0.112	0.132	0.149	0.160	0.167	0.177
2018	0.087	0.100	0.108	0.124	0.143	0.158	0.169	0.174	0.182
2019	0.094	0.108	0.117	0.132	0.150	0.165	0.174	0.178	0.185
2020	0.099	0.114	0.122	0.137	0.155	0.168	0.177	0.181	0.187
2021	0.102	0.117	0.126	0.140	0.157	0.170	0.178	0.182	0.188
2022	0.105	0.120	0.128	0.142	0.158	0.171	0.179	0.183	0.189
2023	0.107	0.121	0.129	0.143	0.159	0.172	0.180	0.183	0.190
2024	0.108	0.123	0.130	0.144	0.160	0.173	0.180	0.184	0.190
2025	0.109	0.122	0.130	0.144	0.160	0.173	0.181	0.184	0.190
2026	0.109	0.123	0.130	0.145	0.161	0.173	0.181	0.184	0.190
2027	0.110	0.124	0.132	0.145	0.161	0.173	0.181	0.185	0.191
2028	0.112	0.124	0.132	0.146	0.162	0.174	0.181	0.184	0.190
2029	0.110	0.124	0.132	0.146	0.161	0.173	0.181	0.185	0.190
2030	0.111	0.124	0.132	0.145	0.161	0.173	0.181	0.184	0.190
2031	0.110	0.124	0.131	0.145	0.161	0.173	0.181	0.184	0.190
2032	0.111	0.124	0.132	0.145	0.161	0.173	0.181	0.184	0.190
2033	0.110	0.124	0.132	0.145	0.161	0.174	0.181	0.185	0.190
2034	0.111	0.124	0.131	0.145	0.161	0.174	0.181	0.185	0.190
2035	0.111	0.124	0.132	0.146	0.162	0.174	0.181	0.185	0.191
2036	0.110	0.125	0.133	0.146	0.161	0.174	0.181	0.184	0.190
2037	0.112	0.124	0.132	0.145	0.161	0.174	0.181	0.185	0.190
2038	0.110	0.124	0.132	0.145	0.161	0.174	0.181	0.185	0.190
2039	0.109	0.123	0.131	0.146	0.162	0.174	0.181	0.185	0.190
2040	0.112	0.124	0.132	0.146	0.162	0.174	0.181	0.185	0.191

ANNUAL PROBABILITY THAT F WEIGHTED BY MEAN BIOMASS EXCEEDS THRESHOLD: 0.000

YEAR	Pr(F_WT_B > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	1.000
2012	1.000
2013	1.000
2014	1.000

2015	1.000
2016	1.000
2017	1.000
2018	1.000
2019	1.000
2020	1.000
2021	1.000
2022	1.000
2023	1.000
2024	1.000
2025	1.000
2026	1.000
2027	1.000
2028	1.000
2029	1.000
2030	1.000
2031	1.000
2032	1.000
2033	1.000
2034	1.000
2035	1.000
2036	1.000
2037	1.000
2038	1.000
2039	1.000
2040	1.000

TOTAL STOCK BIOMASS (THOUSAND MT)

YEAR	AVG TOTAL B (000 MT)	STD
2011	5.597	0.881
2012	3.201	0.908
2013	3.508	1.160
2014	7.697	4.429
2015	10.579	4.865
2016	15.436	7.572
2017	22.564	9.712
2018	28.157	10.561
2019	32.955	11.423
2020	36.738	11.885
2021	39.141	12.119
2022	40.857	12.198
2023	41.976	12.330
2024	42.736	12.421
2025	43.237	12.437
2026	43.580	12.370
2027	43.832	12.337
2028	44.011	12.323
2029	44.009	12.299
2030	44.078	12.355
2031	44.131	12.418
2032	44.230	12.463
2033	44.334	12.406
2034	44.404	12.480
2035	44.438	12.405
2036	44.377	12.376

2037	44.328	12.452
2038	44.311	12.533
2039	44.400	12.541
2040	44.418	12.512

PERCENTILES OF TOTAL STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	3.759	4.252	4.518	4.965	5.566	6.136	6.776	7.105	7.942
2012	1.381	1.804	2.086	2.552	3.178	3.751	4.444	4.769	5.578
2013	1.118	1.785	2.049	2.664	3.433	4.267	5.025	5.426	6.559
2014	3.482	4.134	4.536	5.339	6.454	8.093	11.773	17.024	27.170
2015	5.653	6.355	6.837	7.831	9.207	11.277	15.612	21.028	30.202
2016	7.617	8.531	9.122	10.423	12.654	17.522	27.235	32.289	40.076
2017	9.926	11.497	12.663	14.856	19.812	28.927	36.125	40.872	51.565
2018	12.133	14.671	16.084	19.442	26.533	35.078	42.678	47.990	57.463
2019	14.502	17.358	19.277	23.921	31.677	39.993	48.739	53.912	63.918
2020	16.404	19.674	22.015	27.650	35.529	44.495	53.096	58.090	68.574
2021	17.782	21.565	24.313	29.887	37.964	46.960	55.594	61.038	71.312
2022	19.098	23.115	25.687	31.612	39.629	48.609	57.531	62.945	73.034
2023	19.896	23.969	26.687	32.759	40.671	49.933	58.908	63.771	74.679
2024	20.914	24.673	27.330	33.351	41.512	50.787	59.573	65.125	75.532
2025	21.408	25.008	27.867	33.909	42.039	51.249	59.895	65.415	76.392
2026	21.597	25.446	28.091	34.133	42.518	51.739	60.427	65.740	75.714
2027	22.038	25.885	28.635	34.492	42.626	51.696	60.357	66.100	77.119
2028	22.342	25.945	28.652	34.793	42.955	51.960	60.696	66.777	76.363
2029	22.058	25.810	28.767	34.726	42.884	51.907	60.698	65.760	76.545
2030	21.997	26.016	28.738	34.869	43.009	51.892	60.654	66.182	76.755
2031	21.953	26.131	28.866	34.754	42.951	52.026	61.138	66.227	77.571
2032	22.244	26.083	28.704	34.842	43.120	52.215	61.213	66.636	76.912
2033	22.304	26.208	28.892	34.987	43.158	52.335	61.453	66.877	76.938
2034	22.165	26.139	28.912	35.021	43.177	52.505	61.360	66.857	77.138
2035	22.164	26.127	29.026	35.123	43.379	52.362	61.339	66.795	76.196
2036	22.243	26.210	29.130	35.005	43.239	52.507	60.886	66.327	77.073
2037	22.300	26.338	28.816	34.903	43.144	52.363	61.216	66.814	77.571
2038	22.330	26.071	28.852	35.032	43.029	52.287	61.280	66.984	77.554
2039	22.094	26.030	28.808	34.969	43.282	52.406	61.521	66.653	77.312
2040	21.996	25.905	28.767	35.086	43.376	52.525	61.409	66.799	77.553

ANNUAL PROBABILITY THAT TOTAL STOCK BIOMASS EXCEEDS THRESHOLD: 0.000 THOUSAND MT

YEAR	Pr(B >= Threshold Value) FOR FEASIBLE SIMULATIONS
2011	1.000
2012	1.000
2013	1.000
2014	1.000
2015	1.000
2016	1.000
2017	1.000
2018	1.000
2019	1.000
2020	1.000
2021	1.000
2022	1.000
2023	1.000
2024	1.000
2025	1.000
2026	1.000

2027	1.000
2028	1.000
2029	1.000
2030	1.000
2031	1.000
2032	1.000
2033	1.000
2034	1.000
2035	1.000
2036	1.000
2037	1.000
2038	1.000
2039	1.000
2040	1.000

Pr(B >= Threshold Value) AT LEAST ONCE:= 1.000

RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	AVG RECRUITMENT	STD
2011	21248.913	17658.390
2012	17483.858	10450.875
2013	27086.362	23453.028
2014	38691.061	29034.431
2015	39015.768	28956.038
2016	39301.197	29217.726
2017	38881.723	28700.215
2018	38390.513	28833.363
2019	39023.987	28868.223
2020	38978.034	29166.332
2021	39079.530	28950.768
2022	38892.919	29052.793
2023	38976.775	29103.324
2024	39065.380	29196.806
2025	39130.751	29053.828
2026	38557.098	28753.987
2027	38964.266	28878.825
2028	38978.895	29073.805
2029	39321.988	29091.314
2030	39309.032	28993.072
2031	39251.663	29039.566
2032	39128.327	29187.736
2033	38810.575	28982.166
2034	38880.716	29002.097
2035	39018.159	28955.870
2036	39485.752	29197.761
2037	39155.565	29205.289
2038	38792.920	29000.091
2039	38351.608	28617.199
2040	38943.367	29047.720

PERCENTILES OF RECRUITMENT UNITS ARE: 1000.00000000000 FISH

YEAR CLASS	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	8555.765	9047.374	9511.379	11655.741	16875.612	22560.795	37994.431	56978.727	100874.749

2012	8553.035	8999.020	9399.101	11519.555	14815.618	19716.172	23327.988	36006.703	60288.357
2013	8498.350	9200.973	10140.197	13183.756	19024.762	25396.121	61161.434	87063.603	109277.223
2014	7470.300	10615.332	11518.212	19739.716	24611.214	53577.322	88620.875	100863.298	118330.558
2015	7835.477	10658.787	11846.165	20078.390	24641.989	53849.837	88694.692	100859.287	117692.723
2016	7743.371	10664.847	11691.170	20048.409	24689.513	53833.000	89837.132	100873.409	118537.307
2017	7957.312	10687.419	11739.940	19992.828	24665.477	53620.724	87706.673	100859.769	117121.234
2018	7730.351	10602.980	11526.222	19709.717	24575.511	53484.180	87619.971	100856.586	116680.471
2019	7585.606	10651.496	11736.221	19971.686	24660.361	53981.524	88283.914	100859.767	115908.073
2020	7784.913	10632.183	11615.899	19971.868	24618.166	53746.525	89722.794	100866.626	117205.043
2021	7726.855	10631.546	11650.748	20015.758	24661.369	54053.878	87826.321	100862.294	117371.910
2022	7848.219	10623.001	11655.313	20016.022	24637.206	53518.630	90144.291	100863.626	116515.081
2023	7797.186	10643.410	11658.583	19990.680	24631.768	53652.601	88897.123	100865.940	118061.246
2024	7721.813	10640.775	11683.654	19993.450	24651.143	53763.015	89838.971	100867.738	118108.861
2025	8007.722	10650.535	11717.105	20009.590	24681.498	53874.840	89597.480	100861.081	118487.365
2026	7798.345	10656.433	11697.525	20026.929	24611.974	53176.120	88315.980	100862.687	117419.251
2027	7681.721	10653.408	11730.002	19967.580	24650.941	53801.255	87747.682	100862.454	117437.877
2028	7787.312	10610.241	11641.148	19964.960	24631.953	53708.613	89255.790	100864.141	118647.542
2029	7671.512	10655.648	11697.446	20020.000	24673.326	54157.290	88947.156	100865.721	117671.898
2030	8006.702	10690.566	11898.784	20062.266	24701.122	54064.838	89133.494	100864.417	117557.447
2031	7679.255	10615.576	11589.680	19955.678	24676.313	54253.752	89075.131	100862.305	117474.770
2032	7756.529	10656.837	11721.335	19973.026	24663.406	54079.211	90527.635	100863.177	117853.309
2033	7765.272	10578.270	11501.033	19944.786	24608.613	53806.969	88326.323	100860.824	117017.658
2034	7674.628	10657.179	11706.410	19993.828	24651.208	53475.269	89043.874	100859.220	118054.078
2035	7580.087	10639.958	11643.143	19949.828	24666.804	54063.926	88745.629	100855.311	116973.012
2036	7853.706	10664.834	11683.805	20028.233	24663.727	54453.762	89288.610	100859.727	117377.341
2037	7667.497	10627.762	11710.166	20004.848	24658.478	53928.976	89064.953	100863.154	117072.053
2038	7489.963	10588.492	11601.498	19920.801	24614.489	53743.277	89038.263	100864.479	117026.631
2039	7545.411	10647.550	11618.015	19987.165	24635.134	53042.021	87063.259	100860.719	117018.790
2040	7833.248	10644.706	11664.636	19960.444	24645.630	53725.230	89465.911	100863.742	117251.613

LANDINGS (000 MT)

YEAR	AVG LANDINGS (000 MT)	STD
2011	2.650	0.000
2012	1.150	0.000
2013	0.826	0.305
2014	1.529	0.781
2015	2.216	0.985
2016	3.201	1.389
2017	4.455	1.756
2018	5.509	1.946
2019	6.376	2.094
2020	7.026	2.172
2021	7.446	2.208
2022	7.737	2.226
2023	7.931	2.247
2024	8.062	2.263
2025	8.150	2.262
2026	8.210	2.250
2027	8.253	2.244
2028	8.279	2.242
2029	8.284	2.242
2030	8.293	2.252
2031	8.306	2.263
2032	8.324	2.267
2033	8.343	2.264
2034	8.355	2.267

2035	8.357	2.259
2036	8.347	2.259
2037	8.338	2.272
2038	8.339	2.283
2039	8.351	2.282
2040	8.353	2.279

PERCENTILES OF LANDINGS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650	2.650
2012	1.150	1.150	1.150	1.150	1.150	1.150	1.150	1.150	1.150
2013	0.337	0.449	0.511	0.626	0.776	0.950	1.192	1.459	1.890
2014	0.761	0.880	0.952	1.103	1.312	1.613	2.296	3.207	4.898
2015	1.181	1.321	1.418	1.613	1.919	2.472	3.282	4.290	6.063
2016	1.603	1.814	1.954	2.258	2.756	3.646	5.333	6.204	7.657
2017	2.078	2.401	2.621	3.085	3.977	5.570	6.910	7.806	9.687
2018	2.530	2.964	3.269	3.929	5.231	6.756	8.169	9.132	10.848
2019	2.922	3.466	3.841	4.718	6.170	7.677	9.242	10.207	12.041
2020	3.266	3.882	4.362	5.379	6.805	8.439	10.007	10.900	12.833
2021	3.548	4.223	4.717	5.760	7.225	8.872	10.456	11.419	13.324
2022	3.754	4.494	4.975	6.068	7.512	9.166	10.771	11.740	13.558
2023	3.923	4.643	5.163	6.247	7.704	9.365	10.979	11.880	13.892
2024	4.032	4.777	5.268	6.345	7.858	9.517	11.140	12.114	14.083
2025	4.142	4.843	5.348	6.447	7.940	9.608	11.187	12.197	14.142
2026	4.197	4.912	5.410	6.525	8.001	9.694	11.238	12.243	14.002
2027	4.279	4.965	5.480	6.566	8.039	9.688	11.297	12.281	14.244
2028	4.279	4.972	5.479	6.600	8.079	9.716	11.299	12.361	14.170
2029	4.257	4.976	5.497	6.607	8.090	9.729	11.355	12.260	14.217
2030	4.248	5.007	5.504	6.611	8.094	9.719	11.310	12.372	14.201
2031	4.255	5.001	5.536	6.605	8.105	9.752	11.385	12.349	14.379
2032	4.308	5.006	5.498	6.607	8.122	9.785	11.386	12.462	14.287
2033	4.305	5.024	5.526	6.630	8.147	9.804	11.457	12.454	14.195
2034	4.268	5.025	5.552	6.650	8.154	9.843	11.430	12.411	14.271
2035	4.308	5.028	5.556	6.645	8.160	9.826	11.433	12.352	14.150
2036	4.308	5.046	5.531	6.643	8.128	9.818	11.387	12.389	14.290
2037	4.251	5.030	5.530	6.636	8.120	9.790	11.418	12.424	14.359
2038	4.278	5.029	5.520	6.628	8.128	9.799	11.423	12.442	14.381
2039	4.252	5.001	5.523	6.638	8.141	9.830	11.443	12.396	14.282
2040	4.224	5.004	5.510	6.638	8.147	9.833	11.427	12.462	14.301

RETROSPECTIVE ADJUSTMENT COEFFICIENTS WERE APPLIED
TO THE POPULATION NUMBERS AT AGE IN YEAR: 2011

AGE	COEFFICIENT
1	0.587
2	0.587
3	0.587
4	0.587
5	0.587
6	0.587

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2011

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	792.6	1615.0	2768.4	4461.9	6587.3	9146.7	10962.2	12072.8	13000.3
2	166.4	230.3	262.4	344.3	461.4	592.1	731.1	834.1	986.6
3	721.3	994.3	1120.8	1389.0	1754.1	2198.4	2679.3	3003.8	3580.0

4	944.2	1217.9	1404.8	1692.2	2095.0	2519.3	3097.3	3461.2	4090.6
5	2043.2	2373.7	2563.7	2921.1	3337.6	3809.2	4266.7	4608.4	5141.5
6+	1248.0	1449.9	1566.0	1784.3	2038.6	2326.7	2606.2	2814.9	3140.5

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2012

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	8555.8	9047.4	9511.4	11655.7	16875.6	22560.8	37994.4	56978.7	100874.7
2	639.3	1307.4	2249.2	3622.9	5327.3	7411.1	8884.7	9786.5	10539.7
3	119.6	163.7	186.2	246.3	329.9	424.5	520.3	601.2	710.7
4	314.6	404.1	482.8	633.1	828.0	1071.2	1332.8	1516.0	1831.0
5	308.6	435.2	497.6	660.5	883.7	1110.1	1395.6	1638.3	2047.8
6+	878.1	1194.0	1400.4	1786.5	2272.7	2805.8	3360.8	3748.8	4392.6

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2013

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	8553.0	8999.0	9399.1	11519.6	14815.6	19716.2	23328.0	36006.7	60288.4
2	6947.5	7343.5	7721.4	9474.8	13704.0	18305.3	30936.7	46469.7	82217.4
3	455.8	953.8	1641.0	2719.1	4006.3	5560.1	6720.6	7470.2	8196.4
4	58.3	84.2	99.8	133.7	186.3	250.3	311.6	354.3	449.0
5	111.7	167.8	215.6	315.4	442.3	610.1	779.7	890.7	1110.0
6+	364.6	669.0	873.3	1254.6	1743.1	2242.1	2785.0	3196.2	3938.8

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2014

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	8498.3	9201.0	10140.2	13183.8	19024.8	25396.1	61161.4	87063.6	109277.2
2	6979.1	7343.1	7669.5	9399.8	12089.3	16088.1	19035.3	29380.9	49194.4
3	5447.3	5757.8	6054.1	7428.8	10744.9	14352.6	24256.5	36435.4	64464.0
4	314.0	657.2	1130.8	1873.7	2760.6	3831.3	4631.0	5147.5	5647.9
5	38.7	55.9	66.2	88.7	123.6	166.1	206.8	235.1	298.0
6+	330.0	590.0	758.1	1065.9	1487.8	1878.2	2324.4	2558.3	3095.3

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2015

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7470.3	10615.3	11518.2	19739.7	24611.2	53577.3	88620.9	100863.3	118330.6
2	6934.5	7507.9	8274.2	10757.7	15523.9	20722.8	49906.8	71042.5	89168.5
3	5472.1	5757.5	6013.4	7370.1	9478.8	12614.2	14924.9	23036.6	38571.7
4	3753.6	3967.5	4171.7	5119.0	7404.0	9890.0	16714.4	25106.6	44420.3
5	208.4	436.2	750.5	1243.5	1832.1	2542.7	3073.4	3416.2	3748.3
6+	254.5	441.4	563.7	778.2	1070.1	1339.8	1645.7	1809.2	2170.0

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2016

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7835.5	10658.8	11846.2	20078.4	24642.0	53849.8	88694.7	100859.3	117692.7
2	6095.6	8661.9	9398.7	16107.3	20082.4	43718.3	72313.3	82302.9	96555.9
3	5437.1	5886.7	6487.6	8434.8	12171.8	16248.1	39130.3	55702.2	69914.1
4	3770.7	3967.3	4143.7	5078.5	6531.6	8692.1	10284.4	15873.9	26578.7
5	2491.1	2633.0	2768.6	3397.2	4913.7	6563.5	11092.5	16662.0	29479.5
6+	555.8	906.2	1122.1	1502.7	1946.9	2461.7	2926.3	3183.5	3683.0

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2017

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7743.4	10664.8	11691.2	20048.4	24689.5	53833.0	89837.1	100873.4	118537.3
2	6393.6	8697.4	9666.3	16383.7	20107.5	43940.6	72373.5	82299.6	96035.4
3	4779.4	6791.6	7369.2	12629.2	15745.9	34278.1	56698.5	64531.0	75706.4
4	3746.6	4056.3	4470.4	5812.2	8387.2	11196.1	26963.6	38382.8	48175.9
5	2502.4	2632.9	2750.0	3370.3	4334.7	5768.5	6825.2	10534.7	17638.9
6+	2424.0	2796.1	3033.9	3560.7	4428.7	5638.9	8739.3	12759.7	21368.2

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2018

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7957.3	10687.4	11739.9	19992.8	24665.5	53620.7	87706.7	100859.8	117121.2
2	6318.5	8702.3	9539.8	16359.2	20146.3	43926.9	73305.7	82311.1	96724.6
3	5013.0	6819.4	7579.0	12845.9	15765.6	34452.4	56745.7	64528.5	75298.3
4	3293.3	4679.9	5077.9	8702.4	10850.1	23620.0	39069.3	44466.5	52167.1
5	2486.4	2692.0	2966.8	3857.3	5566.2	7430.3	17894.4	25472.7	31971.9
6+	3687.2	4118.0	4433.0	5124.9	6075.0	7499.1	10642.7	13593.7	20471.6

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2019

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7730.4	10603.0	11526.2	19709.7	24575.5	53484.2	87620.0	100856.6	116680.5
2	6493.0	8720.8	9579.6	16313.8	20126.6	43753.7	71567.3	82300.0	95569.1
3	4954.1	6823.2	7479.9	12826.7	15796.0	34441.7	57476.6	64537.5	75838.6
4	3454.3	4699.0	5222.5	8851.7	10863.6	23740.2	39101.9	44464.7	51885.9
5	2185.6	3105.8	3370.0	5775.4	7200.7	15675.5	25928.4	29510.2	34620.7
6+	4554.4	5124.3	5510.6	6364.6	7916.8	11124.2	18298.3	23083.5	27803.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2020

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7585.6	10651.5	11736.2	19971.7	24660.4	53981.5	88283.9	100859.8	115908.1
2	6307.8	8651.9	9405.2	16082.8	20053.2	43642.3	71496.5	82297.4	95209.4
3	5091.0	6837.7	7511.1	12791.2	15780.7	34305.8	56113.6	64528.8	74932.6
4	3413.7	4701.7	5154.2	8838.5	10884.6	23732.8	39605.5	44471.0	52258.2
5	2292.5	3118.5	3465.9	5874.5	7209.7	15755.2	25950.0	29509.0	34434.1
6+	5488.8	6474.0	7265.9	8791.9	11795.2	18444.0	24294.7	27073.3	33067.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2021

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7784.9	10632.2	11615.9	19971.9	24618.2	53746.5	89722.8	100866.6	117205.0
2	6189.7	8691.5	9576.6	16296.6	20122.5	44048.1	72038.3	82300.0	94579.2
3	4945.8	6783.6	7374.3	12610.0	15723.1	34218.5	56058.1	64526.7	74650.6
4	3508.1	4711.6	5175.7	8814.0	10874.0	23639.2	38666.3	44464.9	51634.0
5	2265.5	3120.3	3420.6	5865.7	7223.6	15750.3	26284.2	29513.2	34681.2
6+	6485.9	8121.1	9035.6	11055.9	15600.3	21488.2	26923.5	29991.5	36771.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2022

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7726.9	10631.5	11650.7	20015.8	24661.4	54053.9	87826.3	100862.3	117371.9
2	6352.4	8675.7	9478.4	16296.7	20088.0	43856.3	73212.4	82305.6	95637.5
3	4853.2	6814.7	7508.7	12777.6	15777.4	34536.7	56482.9	64528.8	74156.5
4	3408.0	4674.4	5081.4	8689.2	10834.3	23579.0	38628.1	44463.5	51439.6
5	2328.1	3126.9	3434.8	5849.4	7216.5	15688.1	25660.9	29509.2	34266.9

6+	7609.2	9310.3	10480.0	13034.1	17558.8	23495.8	29414.8	32774.2	38757.7

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2023

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7848.2	10623.0	11655.3	20016.0	24637.2	53518.6	90144.3	100863.6	116515.1
2	6305.0	8675.2	9506.8	16332.5	20123.3	44107.1	71664.9	82302.1	95773.7
3	4980.7	6802.3	7431.7	12777.7	15750.4	34386.3	57403.5	64533.2	74986.3
4	3344.2	4695.8	5174.0	8804.7	10871.7	23798.2	38920.8	44464.9	51099.1
5	2261.7	3102.2	3372.3	5766.6	7190.2	15648.2	25635.5	29508.2	34137.9
6+	8422.1	10270.6	11503.7	14278.1	18745.7	24911.1	30576.8	33851.3	39862.2

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2024

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7797.2	10643.4	11658.6	19990.7	24631.8	53652.6	88897.1	100865.9	118061.2
2	6404.0	8668.2	9510.6	16332.8	20103.6	43670.4	73556.3	82303.1	95074.5
3	4943.5	6801.9	7454.0	12805.8	15778.0	34583.0	56190.1	64530.4	75093.0
4	3432.0	4687.3	5121.0	8804.8	10853.1	23694.6	39555.1	44468.0	51670.9
5	2219.4	3116.4	3433.7	5843.2	7215.0	15793.7	25829.8	29509.2	33911.9
6+	8856.9	10923.0	12190.7	14900.7	19595.6	25499.5	31203.0	34672.6	41531.8

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2025

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7721.8	10640.8	11683.7	19993.5	24651.1	53763.0	89839.0	100867.7	118108.9
2	6362.4	8684.9	9513.2	16312.1	20099.1	43779.7	72538.7	82305.0	96336.1
3	5021.2	6796.5	7456.9	12806.0	15762.6	34240.5	57673.1	64531.2	74544.8
4	3406.5	4687.0	5136.3	8824.1	10872.2	23830.1	38719.0	44466.1	51744.5
5	2277.7	3110.7	3398.5	5843.3	7202.7	15725.0	26250.8	29511.2	34291.4
6+	9403.6	11360.1	12614.2	15574.1	20146.7	26154.1	31893.1	35291.8	41368.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2026

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	8007.7	10650.5	11717.1	20009.6	24681.5	53874.8	89597.5	100861.1	118487.4
2	6300.9	8682.7	9533.7	16314.3	20114.9	43869.8	73307.2	82306.5	96375.0
3	4988.5	6809.5	7459.0	12789.8	15759.1	34326.2	56875.2	64532.7	75534.0
4	3460.0	4683.2	5138.4	8824.2	10861.5	23594.2	39740.9	44466.6	51366.7
5	2260.7	3110.5	3408.7	5856.1	7215.3	15814.9	25695.9	29509.9	34340.2
6+	9845.7	11696.2	12970.4	15913.1	20490.2	26601.2	32371.2	35626.7	42279.6

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2027

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7798.3	10656.4	11697.5	20026.9	24612.0	53176.1	88316.0	100862.7	117419.3
2	6534.2	8690.7	9561.0	16327.5	20139.7	43961.0	73110.1	82301.1	96683.8
3	4940.3	6807.8	7475.0	12791.5	15771.5	34396.9	57477.8	64533.9	75564.5
4	3437.5	4692.2	5139.8	8813.1	10859.1	23653.2	39191.1	44467.7	52048.4
5	2296.2	3108.0	3410.1	5856.2	7208.3	15658.3	26374.1	29510.3	34089.5
6+	10088.3	11943.1	13160.3	16033.8	20786.9	26961.6	32642.3	36294.1	42372.5

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2028

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7681.7	10653.4	11730.0	19967.6	24650.9	53801.3	87747.7	100862.5	117437.9

2	6363.3	8695.5	9545.0	16341.7	20083.0	43390.9	72064.5	82302.4	95812.3
3	5123.2	6814.1	7496.5	12801.9	15790.9	34468.4	57323.3	64529.6	75806.7
4	3404.2	4691.1	5150.8	8814.3	10867.7	23701.9	39606.3	44468.5	52069.4
5	2281.3	3114.0	3411.0	5848.8	7206.7	15697.5	26009.2	29511.0	34541.9
6+	10281.5	12075.8	13329.4	16251.6	20894.2	26964.4	32823.4	36267.8	42681.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2029

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7787.3	10610.2	11641.1	19965.0	24632.0	53708.6	89255.8	100864.1	118647.5
2	6268.2	8693.0	9571.5	16293.2	20114.8	43901.0	71600.7	82302.2	95827.5
3	4989.3	6817.8	7483.9	12813.0	15746.4	34021.4	56503.4	64530.6	75123.3
4	3530.3	4695.4	5165.6	8821.4	10881.1	23751.2	39499.9	44465.5	52236.2
5	2259.2	3113.2	3418.4	5849.6	7212.3	15729.8	26284.7	29511.5	34555.8
6+	10192.6	12180.7	13439.0	16421.9	21113.2	27095.0	32740.6	36132.9	42384.3

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2030

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7671.5	10655.6	11697.4	20020.0	24673.3	54157.3	88947.2	100865.7	117671.9
2	6354.3	8657.8	9499.0	16291.1	20099.3	43825.4	72831.3	82303.6	96814.5
3	4914.7	6815.9	7504.7	12775.0	15771.4	34421.3	56139.8	64530.5	75135.2
4	3438.0	4698.0	5157.0	8829.1	10850.4	23443.2	38934.9	44466.2	51765.3
5	2342.9	3116.1	3428.1	5854.3	7221.2	15762.5	26214.1	29509.6	34666.6
6+	10471.0	12370.8	13670.2	16541.3	21056.2	27105.5	32790.8	36428.2	42945.7

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2031

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	8006.7	10690.6	11898.8	20062.3	24701.1	54064.8	89133.5	100864.4	117557.4
2	6259.8	8694.8	9544.9	16336.0	20133.1	44191.5	72579.5	82304.9	96018.4
3	4982.2	6788.3	7447.9	12773.3	15759.2	34362.1	57104.7	64531.6	75909.2
4	3386.6	4696.7	5171.3	8802.9	10867.6	23718.8	38684.4	44466.1	51773.6
5	2281.6	3117.8	3422.4	5859.4	7200.9	15558.1	25839.2	29510.0	34354.1
6+	10587.8	12414.7	13681.5	16560.7	21222.5	27227.1	33123.7	36475.8	42531.4

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2032

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7679.3	10615.6	11589.7	19955.7	24676.3	54253.8	89075.1	100862.3	117474.8
2	6533.3	8723.3	9709.2	16370.5	20155.7	44116.1	72731.5	82303.8	95925.0
3	4908.1	6817.3	7483.9	12808.5	15785.7	34649.1	56907.2	64532.6	75284.9
4	3433.1	4677.6	5132.1	8801.7	10859.2	23677.9	39349.2	44466.9	52306.8
5	2247.5	3116.9	3431.9	5842.0	7212.3	15741.0	25672.9	29510.0	34359.5
6+	10412.3	12351.6	13655.2	16535.4	21209.3	27136.4	32829.7	36378.3	42750.9

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2033

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7756.5	10656.8	11721.3	19973.0	24663.4	54079.2	90527.6	100863.2	117853.3
2	6266.2	8662.1	9457.0	16283.5	20135.5	44270.2	72683.9	82302.1	95857.6
3	5122.6	6839.7	7612.7	12835.6	15803.5	34590.0	57026.4	64531.7	75211.7
4	3382.1	4697.6	5156.9	8826.0	10877.5	23875.7	39213.2	44467.6	51876.7
5	2278.4	3104.3	3405.9	5841.3	7206.7	15713.9	26114.1	29510.5	34713.5
6+	10497.0	12395.7	13667.4	16539.5	21207.3	27081.7	32925.5	36559.5	43046.9

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2034

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7765.3	10578.3	11501.0	19944.8	24608.6	53807.0	88326.3	100860.8	117017.7
2	6329.2	8695.8	9564.4	16297.7	20125.0	44127.8	73869.1	82302.8	96166.5
3	4913.1	6791.7	7414.9	12767.4	15787.6	34710.8	56989.1	64530.4	75158.8
4	3529.8	4713.0	5245.7	8844.6	10889.7	23835.0	39295.3	44467.0	51826.3
5	2244.5	3117.6	3422.4	5857.4	7218.8	15845.1	26023.8	29510.9	34428.0
6+	10442.6	12474.7	13714.2	16564.6	21159.9	27226.8	33084.0	36618.0	42735.2

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2035

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7674.6	10657.2	11706.4	19993.8	24651.2	53475.3	89043.9	100859.2	118054.1
2	6336.3	8631.7	9384.7	16274.6	20080.2	43905.6	72072.9	82300.9	95484.6
3	4962.5	6818.1	7499.2	12778.5	15779.3	34599.2	57918.4	64530.9	75401.0
4	3385.5	4680.0	5109.4	8797.6	10878.8	23918.3	39269.6	44466.1	51789.8
5	2342.6	3127.8	3481.3	5869.7	7227.0	15818.1	26078.3	29510.5	34394.5
6+	10481.1	12360.3	13646.9	16539.1	21400.9	27425.2	33161.2	36794.8	42759.6

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2036

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7580.1	10640.0	11643.1	19949.8	24666.8	54063.9	88745.6	100855.3	116973.0
2	6262.4	8696.1	9552.2	16314.7	20115.0	43635.0	72658.4	82299.6	96330.3
3	4968.1	6767.8	7358.2	12760.4	15744.3	34425.0	56510.0	64529.4	74866.4
4	3419.5	4698.2	5167.5	8805.3	10873.1	23841.3	39909.9	44466.4	51956.7
5	2246.8	3105.9	3390.9	5838.6	7219.7	15873.4	26061.3	29509.9	34370.3
6+	10455.6	12453.9	13697.9	16688.7	21485.9	27431.4	33168.0	36730.2	42816.1

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2037

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7853.7	10664.8	11683.8	20028.2	24663.7	54453.8	89288.6	100859.7	117377.3
2	6185.2	8682.0	9500.6	16278.7	20127.7	44115.3	72415.1	82296.4	95448.2
3	4910.1	6818.3	7489.6	12791.8	15771.5	34212.8	56969.1	64528.4	75529.5
4	3423.4	4663.5	5070.3	8792.8	10848.9	23721.3	38939.5	44465.4	51588.3
5	2269.4	3117.9	3429.4	5843.6	7215.9	15822.3	26486.2	29510.2	34481.1
6+	10448.9	12430.3	13753.7	16666.3	21410.9	27423.2	33348.9	36621.0	43131.9

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2038

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7667.5	10627.8	11710.2	20004.8	24658.5	53929.0	89065.0	100863.2	117072.1
2	6408.5	8702.3	9533.8	16342.7	20125.2	44433.4	72858.1	82300.0	95778.1
3	4849.6	6807.3	7449.1	12763.6	15781.5	34589.4	56778.3	64525.9	74837.8
4	3383.4	4698.3	5160.9	8814.5	10867.7	23575.1	39255.8	44464.7	52045.2
5	2271.9	3095.0	3364.9	5835.4	7199.9	15742.6	25842.2	29509.5	34236.6
6+	10566.1	12474.3	13719.6	16692.6	21448.6	27377.6	33227.2	36673.0	43135.6

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2039

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7490.0	10588.5	11601.5	19920.8	24614.5	53743.3	89038.3	100864.5	117026.6
2	6256.6	8672.1	9555.3	16323.6	20120.9	44005.2	72675.6	82302.8	95529.0
3	5024.7	6823.2	7475.1	12813.8	15779.5	34838.8	57125.7	64528.7	75096.5

4	3341.8	4690.7	5133.0	8795.1	10874.6	23834.6	39124.3	44463.0	51568.6
5	2245.4	3118.0	3425.0	5849.7	7212.4	15645.6	26052.1	29509.0	34539.8
6+	10516.3	12464.4	13727.5	16677.9	21297.2	27489.3	33080.8	36380.3	43319.8

PERCENTILES OF POPULATION NUMBERS AT AGE VECTOR (000s FISH)
IN YEAR: 2040

AGE	1%	5%	10%	25%	50%	75%	90%	95%	99%
1	7545.4	10647.5	11618.0	19987.2	24635.1	53042.0	87063.3	100860.7	117018.8
2	6111.7	8640.0	9466.6	16255.1	20085.0	43853.7	72653.8	82303.8	95491.9
3	4905.6	6799.5	7492.0	12798.8	15776.2	34503.1	56982.6	64530.9	74901.2
4	3462.4	4701.7	5150.9	8829.6	10873.2	24006.4	39363.7	44464.9	51746.9
5	2217.8	3113.0	3406.5	5836.8	7216.9	15817.8	25964.9	29507.9	34223.5
6+	10534.5	12496.5	13737.6	16580.6	21278.9	27335.1	33176.0	36748.6	42921.9

REALIZED F SERIES

YEAR	AVG F	STD
2011	0.684	0.157
2012	0.450	0.168
2013	0.210	0.000
2014	0.210	0.000
2015	0.210	0.000
2016	0.210	0.000
2017	0.210	0.000
2018	0.210	0.000
2019	0.210	0.000
2020	0.210	0.000
2021	0.210	0.000
2022	0.210	0.000
2023	0.210	0.000
2024	0.210	0.000
2025	0.210	0.000
2026	0.210	0.000
2027	0.210	0.000
2028	0.210	0.000
2029	0.210	0.000
2030	0.210	0.000
2031	0.210	0.000
2032	0.210	0.000
2033	0.210	0.000
2034	0.210	0.000
2035	0.210	0.000
2036	0.210	0.000
2037	0.210	0.000
2038	0.210	0.000
2039	0.210	0.000
2040	0.210	0.000

PERCENTILES OF REALIZED F SERIES

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
2011	0.414	0.475	0.505	0.575	0.657	0.772	0.883	0.969	1.172
2012	0.219	0.259	0.286	0.341	0.407	0.514	0.659	0.780	1.029
2013	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2014	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2015	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2016	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2017	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210

2018	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2019	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2020	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2021	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2022	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2023	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2024	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2025	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2026	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2027	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2028	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2029	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2030	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2031	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2032	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2033	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2034	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2035	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2036	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2037	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2038	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2039	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
2040	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210

ANNUAL PROBABILITY FULLY-RECRUITED F EXCEEDS THRESHOLD: 0.250

YEAR	Pr(F > Threshold Value) FOR FEASIBLE SIMULATIONS
2011	1.000
2012	0.966
2013	0.000
2014	0.000
2015	0.000
2016	0.000
2017	0.000
2018	0.000
2019	0.000
2020	0.000
2021	0.000
2022	0.000
2023	0.000
2024	0.000
2025	0.000
2026	0.000
2027	0.000
2028	0.000
2029	0.000
2030	0.000
2031	0.000
2032	0.000
2033	0.000
2034	0.000
2035	0.000
2036	0.000
2037	0.000
2038	0.000
2039	0.000
2040	0.000