CORRESPONDENCE

(3)

Cpt. Michael J. Pierdinock
CPF Charters "Perseverance"
176 Sandy Beach Road, Plymouth, MA 02360
Mobile Phone (617) 291-8914
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September 25, 2014

Mr. Tom Nies
New England Fisheries Management Council
50 Water Street
Newburyport, Massachusetts 01950

RE: **Proposed Closure of Recreational Fishing/Charter Boats in the Western Gulf of Maine and Rolling Closure Areas**

Dear Mr. Nies:

The Groundfish Committee recently proposed to restrict recreational access in the Western Gulf of Maine ("WGOM") and the Rolling Closure Areas. I strongly oppose any restrictions denying access to the WGOM and Rolling Closure Areas, details are set forth below.

The status of the cod fishery is such that appropriate measures need to be implemented until the stock returns to sustainable levels. Until the flawed catch share system is addressed we will continue to suffer from lack of cod in the near shore WGOM waters or the area that we rely on to land our fish. Environmental factors do play a part in the status of the fishery but is not the driving force behind lack of bottom fish in our waters. If environmental factors are the driving force behind lack of cod than why are there appropriate levels of haddock, pollack and redfish in our waters? These species are within the areas that would be subject to the proposed closures. I recommend that we are still permitted to land these species within the proposed closure area with zero retention of cod. The cod bycatch can then be applied to the cod quota for 2015 or until the stock improves. The Recreational Advisory Panel ("RAP") proposed this approach at their recent meeting but the RAP meeting did not include a discussion on the proposed closures. I also recommend that recreational cod and haddock limits are consistent with the commercial minimum size limits to reduce dead discards as well as provide us fish to retain for consumption.

If no fishing is permitted in the proposed closure areas we will be forced to transit distances greater than 40 nautical miles to bottom fish that will result in safety concerns and loss of clients that are not interested in traveling such distances to bottom fish.

In general, the recreational sector cannot currently fish or retain Gulf of Maine cod and haddock for approximately 7 to 8 months out of the year. The proposed closure would prohibit fishing in excess of the existing 7 to 8 month closures as set forth below.

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- April and May from approximately Portsmouth, NH to Plymouth, MA.
- June from approximately Portland, ME to Marblehead, MA; and
- October from Marblehead to Plymouth, MA.

The existing and proposed closures do not allow the recreational sector access to the resource that will put numerous charter and head boats out of business resulting in a detrimental impact on tackle shops, marinas and all of those that rely on this industry.

The cod and haddock data generated from the Marine Recreational Information Program ("MRIP") associated with landings by recreational anglers and the charter boat/head boat or fore hire fleet continues to be suspect and appears flawed. Adequate funding is recommended to accurately assess and determine the fish landed in our waters and to provide reasonable estimates of dead discards for cod and haddock in order to manage the fishery based upon sound science to ensure that sustainable levels of fish are achieved in our waters resulting in unlimited access to the fishery by all recreational anglers.

In conclusion, I strongly oppose any restrictions denying access to the WGOM and Rolling Closure Areas.

If you have any questions or comments please feel free to contact me at (617) 291-8914.

Capt. Mike Pierdinock
CPF Charters "Perseverance"
Recreational Fishing Alliance - Massachusetts Chairman
Stellwagen Bank Charter Boat Association - Board of Directors
Stellwagen Bank National Marine Sanctuary Advisory Council – Recreational Seat
New England Fishery Management Council - Enforcement Advisory Panel
(617) 291-8914
cpfcharters@yahoo.com

cc: Mr. John Bullard, NOAA
Mr. Barry Gibson, NEFMC RAP
Mr. Charlie Wade, SBCBA
Mr. Paul Diodati, MA DMF
Mr. Frank Blount, MA DMF

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Joan O'Leary

From: SALVATORE NOVELLO <snovello@verizon.net>
Sent: Friday, September 26, 2014 11:36 AM
To: Joan O'Leary
Subject: COLLABORATIVE RESEARCH ----- NORTHEAST CONSORTIUM PROPOSAL

COUNCIL MEMBERS,

THE RAISED CHAIN FOOTROPE TRAWL USED WITH GEAR SPECIFICATIONS (648.80 (A) (9) (II) THAT HAS BEEN USED IN GOM FOR WHITING FISHING FOR MANY YEARS .KEEPING BY CATCH AT ACCEPTABLE RATES . THIS IS THE BEST FISH SAVER THAT I HAVE SEEN IN MY LIFE TIME AND ALL FISHERMEN THAT USED THIS GEAR AS SPECIFIED , WILL TELL YOU SAME.. USE THIS GEAR , AND MILLIONS POUNDS OF FISH WILL BE SAVED.

AS A FISHERMAN I BELIEVE CODFISH HATCHERY'S WOULD BE BETTER INVESTMENT WITH MONEY,, INST EAD OF MORE GEAR RESEARCH TO SAME FISHERMEN ,RESEARCHERS AND SCHOOLS WHO MAKE A LIVING ON THIS MONEY, WHILE OTHER FISHERMEN ARE UNEMPLOYED.

TRYING TO HELP FISHERMEN AND SAVE OUR RESOURCES

SAM NOVELLO

aa/jc/jo - 10/3/14

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

SEP 25 2014

E.F. "Terry" Stockwell III, Chair
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Terry:

I urge the Council to take meaningful and timely actions for Gulf of Maine (GOM) cod. The Northeast Fisheries Science Center's assessment update for the stock was peer-reviewed on August 28-29, 2014. The peer reviewers met all the terms of reference established for the review and upheld the findings that the GOM cod stock is overfished, subject to overfishing, and in very poor overall condition. The stock's condition has worsened substantially since the last assessment. The update indicates that the spawning stock biomass has continued to decline and is at a historically low level. Given the worsening stock condition and continued overfishing on the stock, significant action by the Council is necessary to eliminate overfishing and begin rebuilding the stock.

We must substantially reduce catch to eliminate overfishing and rebuild the stock. The fishing year 2015 GOM cod acceptable biological catch (ABC) of 1,550 mt and corresponding annual catch limit of 1,470 mt, implemented through Framework Adjustment 50, are projected to result in substantial overfishing if left in place. I urge the Council address this issue in Framework Adjustment 53 and to change the catch limit for next fishing year to ensure overfishing on this stock does not continue, and help prevent further stock decline. The Scientific and Statistical Committee (SSC) report is not yet available for our review, but we understand that to meet these goals, the SSC will recommend an ABC of 200 mt for 2015. I support this recommendation.

For GOM cod to recover, additional measures beyond catch reductions appear appropriate and necessary. With the stock critically depleted and demonstrating successive recruitment failures, when, where, and how cod are caught matters. The stock needs protection to ensure effective spawning occurs with minimal disruption to allow potential spawning to succeed. I commend the Groundfish Oversight Committee for considering a wide range of management measures and issues, including seasonal closures to protect aggregations of spawning fish, a reconsideration of current sector exemptions, changes to stock area declarations, and exploring the magnitude of cod bycatch in lobster traps. I urge the Council to give serious consideration to these, and any other measures that may enhance cod production as part of a package for fishing year 2015. I am also encouraged to hear that the Committee voted strongly in favor of recommending emergency action for the remainder of fishing year 2014, and I hope the Council will give this recommendation the serious consideration it deserves.

Finally, I want to address the question of adequate rebuilding progress for GOM cod. You recall that, in 2012, we determined that the stock was not making adequate progress under the prior

jc/jo 10/3/14

rebuilding program. This was because the rebuilding target could not be achieved even if no fishing mortality occurred in the remaining two years of the program. Our previous determination for GOM cod in 2012 was also due in part to a new and significantly revised understanding of the stock condition between the 2008 and 2012 assessments. An inadequate progress determination is not warranted at this time. The modeling approaches used for management advice by the SSC in its recommendations indicate the stock has the potential to achieve rebuilding within the remaining timeframe. We have assessed cod frequently in the past few years. Benchmark assessments were conducted in 2012 and 2013 and the assessment was updated in summer 2014. Given this frequency and the trends evident in these assessments, it is difficult to state that the most recent update is a significant revision to understanding the stock's status. In addition, and perhaps more importantly, the new rebuilding program is only in its first year and the Council has ample time to develop and implement changes that may have a positive impact on stock rebuilding.

I encourage the Council to consider any and all measures necessary to optimize cod stock rebuilding. As we have heard numerous times, cod is the iconic species in New England fisheries and there is little doubt it is in dire need of more extensive measures beyond quota reductions if it is to recover. There may be environmental factors at play, and there will be those that cast doubt on the assessment information. The simple truth is the stock is in poor condition under any metric we use to evaluate stock health, and we have not appropriately constrained fishing mortality on the stock.

Sincerely,

John K. Bullard
Regional Administrator

cc: Tom Nies, Executive Director, New England Fishery Management Council
Frank Blount, Chair, Groundfish Oversight Committee
Dr. Bill Karp, Director, Northeast Fisheries Science Center
Dr. Paul Rago, Chief, Population Dynamics Branch, Northeast Fisheries Science Center

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John K. Bullard
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(3)

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CITY OF GLOUCESTER
OFFICE OF THE MAYOR

October 1, 2014

City of Gloucester Public Testimony: New England Fishery Management Council Meeting of Oct. 1, 2014

To be brief, we are not in support of the Emergency Action request for Gulf of Maine cod. We also object to the Framework 53 Gulf of Maine spawning area considerations. This area is essentially the fishing grounds for the Gloucester day boat fishery. There are four main reasons we are opposed to these proposals:

1. We are less than 6 months into the start of a 10 year rebuilding plan (2024) for GOM cod and the "unscheduled" - yet "updated" scientific report from NMFS - indicates the scientific assumptions used to establish the rebuilding plan were wrong. In terms of the City of Gloucester, putting the questionable process that just occurred per the assessment aside, the results should prompt a more thoughtful and thorough review rather than a knee jerk reaction to reduce catch and restrict fishing so drastically.

   The closures being deemed as "spawning" (considered under the Emergency Request and under development for Groundfish Framework 53) are a direct hit on the Gloucester fishing community.

2. No one has been given time to review or consider the science and data being used to justify the areas being coined as GOM cod spawning areas, yet it is being considered in an Emergency Action to the Secretary of Commerce and in Framework 53 where a final vote is scheduled to take place in November. These areas are largely serving as mortality closures - they are not the small, discrete, dynamic areas as recommended by the commercial fishing industry that actually reflect real spawning activity. The mortality closure areas are a direct hit to Gloucester fishing community and fishermen will not be able to harvest other stocks for which they have an allocation.

3. The process can and should be better.

   Following the Secretary of Commerce's groundfish fishery disaster declaration in September 2012, the City of Gloucester received money from the state of MA to work with the community to establish a "bridge plan". The City of Gloucester also participated in the NMFS Economic Coordinating Committee to discuss ideas of how to assist the groundfish industry to weather the storm. This recent GOM cod report is a burn the bridge plan. Another direct hit on the Gloucester fishing community.

4. Lastly, we question whether or not National Standards #4 and #8 are being considered in the actions being recommended by NMFS and the Council which call for no discrimination between residents of different states and to take into account the importance of fishery resources to fishing communities respectively.

The fishing industry has repeatedly asked for management stability - so they can adjust and manage their businesses effectively. They have also requested accountability on behalf of the science and scientific parameters being accepted when rebuilding plans are adopted. This was a loud cry following the last updated review where stocks were not performing as expected even though the fleet remained within their total allowable catch.

Please – we cannot have any more direct hits on the Gloucester fishing community.

Respectfully submitted, Carolyn A. Kirk, Mayor, City of Gloucester, Massachusetts

RECEIVED AT COUNCIL MEETING
9/30/14

jc/rf/jp

(3)

From: midcoastfishermen@gmail.com [mailto:midcoastfishermen@gmail.com] **On Behalf Of** Ben Martens
Sent: Tuesday, September 30, 2014 3:48 PM
To: Tad Miller
Cc: Aaron Dority; Brett Tolley; comments
Subject: Re: comments amendment 18 fleet diversity

Hi Tad,
Very nicely put. The council has become more of a stickler for deadlines for [illegible] so I don't that this will make it into the binder but I'll be happy to share with council members. In the future, let me know if you need any help getting this stuff in on time as we are happy to lend a hand where we can.

I'll be in touch soon.

Ben
On Sep 29, 2014 9:58 PM, "Julie Miller" <jamiller54@roadrunner.com> wrote:

To the New England Fisheries Management Council,

Loss of fleet diversity equates to loss of access for the common man that affects not only myself as a fisherman and my family whom depend on me to make a living, that being just the tip of the ice berg as far as I am concerned. My community, the State of Maine as well as the whole New England region has been and will continue to be negativly and nearly irreversibly impacted by not taking actions now to protect fleet diversity as well as right of access. In Eastern Maine it became commercially unviable many years ago to ground fish and the rest of the State has been just barely hanging on. Because of this and other factors the right of historic access for has already been severely curtailed. Much of our historic access was taken away through arbitrary qualifying periods and now I think without proper action we will lose even more. If or when we ever see a big reversal in the trends of the fish stocks and they are teaming in our local waters are local people going to gain access to stocks to not just employ people but also share in in this bounty of fresh local protein with their communities? In my community as in many others especially in Midcoast and Eastern Maine fishing in all of its different forms is more than just a job, it's our livelihood. It's how and why we exist, fishing is the engine that drives this area probably more than any other. This is why we have to protect access for all would be participants. I see consolidation as a problem because it will put the owner / operator (especially small boats) at an even bigger disadvantage. I believe that we must find a balance that fits the needs of the many not just the few whom can take the time and the money to be well represented in these affairs. I cannot personally attend these meetings because of fishing commitments as well as my nieces wedding which I will be attending. But I hope you will consider my letter and testimonies I expect that you will hear from others as reason enough to proceed down a fair and just path. I also belong to two ground fish sectors (Northeast Coastal Communities and Maine Coast Community Sectors), which represent me when i'm unable to speak for myself. I believe that there is and should be a place for both large and small vessels alike to work and prosper. A18 deals with these urgent problems and must be dealt with as quickly as possible.

A range of actions can be implemented to address these problems. I recommend that the Council explore the following potential solutions in order to achieve the goals: Section 4.5 Inshore / Offshore Ares, Section 4.1 Limit the Holdings of PSC, Section 4.4 Data Confidentiality, I would consider these things as being a good starting point. I think another round of fleet visioning could help to uncover some other potential avenues to better this industry. One thing I feel is that every vessel operator should have enough ownership in a vessel and permit to promote a better sense of stewardship for the resource within the industry, this has worked well in other fisheries. I know this would be controversial but i'm simply suggesting ways to strengthen the industry in the future, which would be to everyones benefit.

Thank you, Sincerely, Ira Miller

JC/rf/jp - 10/8/14

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Mr. John Bullard, Dr. Bill Karp, Gene Martin, Esq.,

Gentlemen, I am addressing these comments to you and not the council because I believe you are the people that have to address the issue. From my perspective, as a scientist, NOAA committed two unpardonable sins with its press release on Gulf of Maine cod on August 1. Science was replaced with advocacy that day when statements were made about the condition of cod, and that immediate action must be taken after a secret, experimental stock status update before peer review. Indeed no supporting data was released for almost three weeks. The second sin was that fishermen in the Gulf of Maine were tried, convicted, and executed by their own government without one shred of evidence being offered. As someone who has always extolled science based management to fishermen as the proper way to move forward, my belief has been shaken to the core and cannot and will not be restored any time soon. I have struggled and continue to struggle with conveying to you the seriousness of this situation without appearing overtly hostile.

For the record, I feel the people who performed the assessment genuinely believe their results and that is the problem. I am here today to tell you unequivocally that what is described in this document is not what is being seen on the water. I believe the problems with the assessment, that all of us are witnessing, stem from an overreliance on the trawl survey combined with little fishery dependent data being available because the fishery was essentially shutdown by the last management action. Catch per unit effort data can no longer be used as a tuning index because the unreasonably high price of leased fish in so many of the stocks prevents fishermen from filling the quotas. This is being misinterpreted as lack of fish, when in fact vessels would drive themselves to bankruptcy catching cod, haddock, plaice, graysole and yellowtail all of which have lease prices that exceed their landed values even before accounting for the expenses of fishing. My son stated the problem succinctly in his PhD. dissertation, "Modelers must familiarize themselves first-hand with the realms they model". If that had occurred in this assessment we would not be sitting here today.

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My request, then, is that you pull this update back from consideration as advice for management and initiate the beginning of the benchmark assessment that is scheduled for 2015. Absent this being done, I must lay out for the administrative record the list of reasons that this process has not met the burden of National Standard 2, the so called best available science standard.

First, despite having a number of highly qualified cod scholars in New England this update was conducted in secret with input from only a handful of handpicked unknown people. Since none of those people were included or consulted none of the numerous, outstanding issues surrounding the last assessment were addressed or corrected.

Second the press release, wide dissemination, and extensive commentary made independent peer review impossible. To paraphrase Dr. Pat Sullivan chair of the review committee, there are problems with this assessment but if we reject it we will be seen as the people who gave up on Gulf of Maine cod.

Third, the information available to the reviewers and the public was insufficient to verify the results. Although several modelers were part of the review committee they had to request a science center employee do model runs at the end of the first day of the review because they had insufficient information to do tests in advance of the meeting. This violates the most basic tenet of science that sufficient information be provided so other scientists can verify the results.

Fourth the issue of M ramp and how M is going miraculously return to .2 next year was not scientifically explained. Miracles are the realm of religion, not science.

Fifth, issues related to outstanding cod assessment issues were dismissed with the statement that this is an update not a benchmark. This is particularly relevant to the stock boundary issue. Peer reviewed journal articles are now available which show through DNA analysis that cod off Rhode Island and in the Great South channel are Gulf of Maine not Georges Bank cod. If the stock boundaries are wrong, the management measures will unfairly penalize people in the

Northern Gulf of Maine while sparing people in other regions. This violates National standard 4.

Sixth, No ecosystem reference points were provided despite a binding vote of the council in April 2012 requesting them in all future assessments.

Finally, although not part of the actual assessment, work by the councils plan development team has produced a second miracle to rebuild cod by 2024. With cod catches set essentially at zero they can only achieve the spawning stock biomass reference point by 37 to 40% annual growth for all of the next ten years. By their own words, F-rebuild projections may be overly optimistic. This is probably the understatement of the decade.

This is not an inclusive list of issues, but rather in the interest of time, a sample of outstanding issues surrounding this current process.

In order to end on a somewhat positive note I have brought with me a journal article from Marine Policy By P. Macdonald et al. titled "Fishers' Knowledge as an indicator of spatial and temporal trends in abundance of commercial fish species" in which the authors describe and prove that fishermen are as good or better than modern analytical assessment methods in predicting current and near future trends in distribution and abundance of fish. I will leave the paper with the staff and would suggest everyone in this room should read it. We need experienced fishermen far more involved in the stock assessment process then they are now.

Thank you very much for your time.

Marine Policy 45 (2014) 228–239

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Fishers' knowledge as an indicator of spatial and temporal trends in abundance of commercial fish species: Megrim (*Lepidorhombus whiffiagonis*) in the northern North Sea

P. Macdonald [a,*], C.H. Angus [a], I.R. Cleasby [a], C.T. Marshall [b]

[a] NAFC Marine Centre, Marine Science & Technology Department, Port Arthur, Scalloway, Shetland ZE1 0UN, UK
[b] University of Aberdeen, School of Biological Sciences, Zoology Building, Tillydrone Avenue, Aberdeen AB24 2TZ, UK

ARTICLE INFO

Article history:
Received 21 July 2013
Received in revised form
4 November 2013
Accepted 4 November 2013
Available online 21 November 2013

Keywords:
Fishers' knowledge
North Sea
Fisheries Management
Lepidorhombus whiffiagonis

ABSTRACT

The need for alternative strategies to assist in the monitoring and sustainable management of many commercially important fish stocks is widely recognized. In recent years, greater utilization of fishers' knowledge has been advocated as a potentially valuable source of ecological data in the assessment and management process. In this study changes in the distribution and relative abundance of common megrim *Lepidorhombus whiffiagonis* in the North Sea were investigated by comparing three data sources: fishers' knowledge collected through a structured questionnaire; a vessel's haul-by-haul catch data from the personal diaries of a single skipper over a 10-year time-series, and catch rates from fishery-independent surveys (IBTS Q1 and Q3). Trends in the distribution and relative abundance of megrim were broadly comparable between the three data sources. The results of the study indicate that, in the northern North Sea, fishers' knowledge and catch data can provide valid data sources which can contribute to the assessment and management process. A structured approach consisting of a formal agreement, full transparency and commitment between all stakeholders is needed to provide and utilize the necessary data required to provide the most effective and inclusive approach to resource management.

1. Introduction

In 2011 the European Commission reported that analytical assessments are not available for 62% of fish stocks in European waters due to a lack of biological and ecological information about individual stocks, coupled with inaccurate or missing age catch data [1]. It is widely recognized that if this scenario is to improve new strategies are required to monitor and manage these common marine resources [2,3]. In recent years one alternative source of information on fish stocks that has been widely advocated is fishers' local knowledge [4–6]. Fishers, as a result of their extensive interaction with their surrounding environment and other fishers, often recognize long-term trends in fish populations and ecosystems and may be effective at tracking trends in fish stocks [7]. The majority of fishers are known to keep accurate records of catch composition and effort patterns, consequently gathering long-term distribution and abundance data for individual fish species that may extend beyond the chronological limit of scientifically collected data. Indeed, fishers often feel that their extensive knowledge and understanding of fisheries should be taken into consideration during the process of managing fish stocks. Johnson [8] suggests that a two-way flow between fishers and scientists can improve management by incorporating and utilizing all available knowledge. Carr and Heyman [9] also suggest that fishers' knowledge can improve management in data-poor fisheries. However, the use of fishers' knowledge may have inherent problems due to what is seen as a professional asset being distributed to science and management [10].

A number of studies have been undertaken to examine the feasibility of applying fishers' knowledge in fisheries management. Foster and Vincent [11] utilized fishers' extensive knowledge to assist in recommending management measures for an unsustainable tropical shrimp fishery. Similarly, Zukowski et al. [12] noted that, in the Australian Murray crayfish (*Euastacus armatus*) fishery, local fishers' knowledge could detect population changes at an early stage, allowing adaptive management. Furthermore, Lorance et al. [13] were able to identify regional management issues and solutions in a number of European deep-water fisheries using stakeholder knowledge collected through a structured questionnaire. The relevance and validity of fishers' knowledge has also been examined in relation to ecosystem studies. Bergmann et al. [14] reported that fishers in the Irish Sea were able to provide biological observations that were useful in supplementing knowledge of essential fish habitats. A similar study in the

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E-mail address: paul.macdonald@uhi.ac.uk (P. Macdonald).

0308-597X/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.marpol.2013.11.001

eastern English Channel noted that fishers' perceptions of ecosystem changes were consistent with scientific data [15].

In northern Europe, the common megrim, *Lepidorhombus whiffiagonis*, a commercially important flatfish with a distribution extending from the Mediterranean Sea to Iceland [16], is an example of a data-limited species. The International Council for the Exploration of the Seas (ICES) considers two stock units of megrim on the Northern Shelf (*L. whiffiagonis* and *Lepidorhombus boscii* are considered together): one in Divisions IVa and VIa (northern North Sea and west of Scotland, respectively) and one in Subarea VIb (Rockall) [17,18]. In recent years the commercial relevance of megrim, especially in the northern North Sea, has increased significantly and it is currently one of the most important species by value landed into Scotland [19].

Megrim have a depth range of 50–850 m, although they are reportedly more common in depths around 200 m [20]. Historically, catches have been largely confined to the deeper water habitat along the continental shelf edge. In recent years however, fishermen engaging in the multispecies demersal fishery in the northern North Sea have reported changes in the distribution and abundance of megrim in the area, especially in the waters around the Shetland Isles [21]. The distribution of the species is currently perceived by many fishermen to have increased, spreading further east and south of the Shetland Isles into the northern North Sea. Fishermen have also reported an increase in abundance of the species throughout its distribution in IVa [21]. These perceived changes, coupled with a lack of increase in quota in recent years, have led fishermen to argue that current quota limits are overly restrictive and do not reflect perceived changes in distribution and abundance of the species in the recent past. A recent study reported that discarding of megrim by vessels engaged in the mixed demersal fishery around the Shetland Isles has been as high as 70% [21], largely due to quota restrictions.

Quantitative management advice produced by ICES for megrim in Divisions IVa and VIa is currently provided by a Bayesian state-space biomass dynamic model utilizing indices from fishery-independent surveys and landings data [22]. One of the fishery independent survey indices utilized in the assessment is the biannual North Sea International Bottom Trawl Survey (NSIBTS) [23]. In the northern North Sea the survey is undertaken during the first and the third Quarters by eight participant countries. The main objective of the NSIBTS is to provide recruitment indices of a defined list of commercially important fish species. Further to this, the survey also allows changes in the stock size of a number of commercial fish species to be monitored. However, one of the disadvantages inherent with the use of survey data is limited spatial and temporal resolution. In the case of the NSIBTS, distribution and abundance estimates are limited to a biannual 'snapshot'. NSIBTS sampling can be limited to as little as one sample per ICES statistical rectangle, with each rectangle representing approximately 110 km^2. In contrast, fishers' sample fishing grounds on a regular basis, thereby collecting temporally resolved data on fish abundance and distribution. Therefore, accessing fishers' knowledge and data has the potential to provide increased spatial and temporal resolution that can, if provided in an appropriate format, be utilized within the assessment process. It also has the potential to validate fishery-independent survey trends and provides fishers' with the opportunity to be actively engaged in the provision of data for improved resource management.

The aim of this study was to determine whether Scottish fishing skippers' perceptions about, and personal catch data on, megrim distribution and relative abundance in the northern North Sea in recent years was consistent with trends in a fishery-independent survey index estimated from the biannual NSIBTS. Fishing skippers' perceptions about distribution and relative abundance were quantified through a structured questionnaire. An individual vessel's catch data was transcribed from haul specific catch diaries over a 10-year period. Time-series analysis was undertaken on NSIBTS data from 1971 to 2010 for the Quarter 1 survey and 1991 to 2009 for Quarter 3. The applicability of fishers' local ecological knowledge as a means to improving fisheries management is discussed.

2. Materials and methods

The study was undertaken in the northern North Sea (ICES Division IVa). ICES Division IVa extends from latitudes 57°30′N to 62°00′N and from longitudes 004°00′W to 007°00′E. It extends from the edge of the continental shelf north-west of the Shetland Isles into the fjords along the coast of Norway in the east, encompassing the Shetland and Orkney Isles as well as the north-east coast of Scotland. The study area was representative of fishing grounds frequented by Scottish vessels rather than the entire ICES Division IVa. In order to gather more localized information the study area within IVa was divided into six illustrative areas (Fig. 1).

2.1. Fishers' knowledge questionnaire

In order to gather fishers' knowledge, a questionnaire, comprising three sections, was constructed (Table 1). Section 1 (vessel descriptors) was structured to gather information on the survey participant, including information on the experience of the skipper, the vessel, gear type, fishing grounds and target species. Section 2 (fishing tactics) was designed to investigate fishing tactics employed by individual skippers. Finally, Section 3 (megrim) was designed to gather skippers' knowledge on changes in megrim distribution and abundance in the northern North Sea. A section was provided at the end of the questionnaire for skippers to add comments.

A copy of the questionnaire, a covering letter and return envelope were mailed in May 2010 to 261 individual skippers who fished in the mixed species demersal fishery in the northern North Sea. The mailing list included all Scottish vessels fishing in the northern North Sea irrespective of whether they targeted megrim consistently,

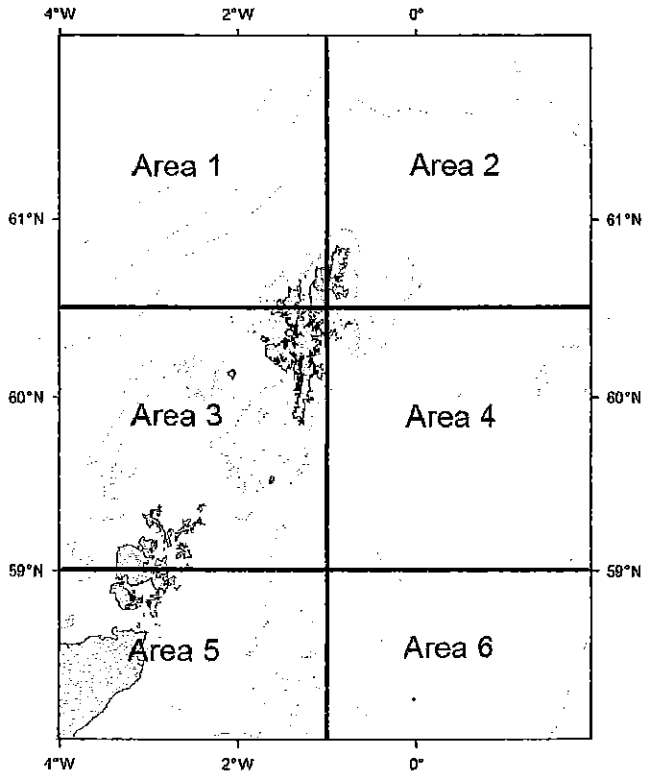

Fig. 1. Study area divisions used in the fishers' knowledge survey, analysis of diary data and NSIBTS data.

Table 1
Questions and response options for fishers' knowledge questionnaire.

Question	Responses
Vessel descriptors	
How long have you been the skipper of this vessel?	Less than 1 year Between 1 and 5 years Between 6 and 10 years More than 10 years
What size is your vessel?	Under 10 m 10–12 m 12–15 m 15–25 m Over 25 m
What type of gear do you fish with for the majority of the year?	Seine net Single rig otter trawl Twin rig otter trawl Other
How long does a typical fishing trip last?	Less than 1 day 2–5 days 6–7 days More than 7 days
How important are each of the following species (monkfish, haddock, cod, whiting, megrim, saithe, ling) to your annual catch?	Very important Important Less important Not important
Fishing tactics	
How often do you fish in each of the six illustrative areas?	Very often Often Not often Never
What influence does available quota have on your choice of fishing grounds?	Absolutely determines where I fish Plays an important role in determining where I fish Is part of a wider process to determine where to fish Does not affect where I choose to fish
What influence did quota have on your choice of fishing grounds when you first became a fishing skipper?	Absolutely determined where I fished Played an important role in determining where I fished Was part of a wider process to determine where to fish Did not affect where I chose to fish
Megrim	
How often is megrim one of your main target species?	Throughout the year Seasonally Rarely or never
Do you believe the quantity of megrim in the northern North Sea in recent years has:	Increased Decreased Stayed the same
Do you believe the spread of megrim in the northern North Sea in recent years has:	Increased Decreased Stayed the same
In general terms, what would you expect the catch per unit effort of megrim to be in each of the 6 areas at present?	Very high High Average Low Do not know
In general terms, what do you believe the catch per unit effort for megrim was in each of the 6 areas when you first became a fishing skipper?	Very high High Average Low Do not know
Do you believe catches of megrim in the northern North Sea in recent years have generally:	Increased Decreased Stayed the same
If you answered 'increased' above, how significant do you think each of the following factors have been to the recent increases in megrim catches (very significant, significant, less significant, not significant, don't know)?	Available quota Changes in fishing grounds Changes in target species Greater numbers of megrim on the grounds Changes to fishing gear Presence of megrim in areas not previously seen

seasonally, or not at all. Skippers' contact details were provided by the Scottish Fishermen's Federation.

All questions were provided with multiple choice answers consisting of between three and five response options. Responses were designed using a Likert-type scale [24]. The Likert scale is a one-dimensional scale from which respondents choose the option which best fits with their views. Questionnaire responses were ranked on a numerical scale for further analysis. Data were analyzed using the

Kruskal–Wallis one-way analysis of variance by ranks to investigate differences between scores within categories i.e. questions. The Mann–Whitney U test was used to determine whether significant differences existed in scores between categories.

Sixty-two of the 261 questionnaires (24%) were returned completed. A further eight skippers reported that vessels had been sold, target species had changed (i.e. to shellfish), or retirement from the industry.

2.2. Fisher's catch data

LPUE (landed fish per unit effort) data were transcribed from the diary of a single mixed species demersal trawler (26.6 m, 241 gross tonnage) that has consistently fished a single net rig demersal trawl around the Shetland Isles between 2000 and 2009. Hauls were undertaken throughout the year for each of the years considered. The duration of each haul varied from 5 to 6 h. Data were recorded in the diary as the number of boxes of gutted megrim per haul. The weight of megrim in a box was assumed to be consistently 30 kg throughout the study. For the purpose of the analysis undertaken here, LPUE was converted from boxes per haul to kg/h. LPUE was calculated and averaged for each area (Fig. 1) over each year of the study. Data for each area were analyzed using the Kruskal–Wallis one-way analysis of variance by ranks to investigate differences between categories i.e. years. The vessel fished a standard single trawl with 120 mm codend. The main target species over the study period were cod, haddock, whiting and saithe, with megrim predominantly a by-catch species.

2.3. NSIBTS survey data

Survey data were downloaded from the ICES DATRAS (DAtabase of TRAwl Surveys: http://datras.ices.dk) database in October 2010. Data were selected from the NSIBTS Quarter 1 (Q1) and Quarter 3 (Q3) surveys. Due to the spatial coverage of the survey, data were considered for the period 1977–2010. Q3 data were available and downloaded for the period 1991–2009. Q3 data for 2010 were not included as the fishers' questionnaire was undertaken prior to this.

International Bottom Trawl Survey data contained a number of recognized 'health' warnings regarding quality and appropriate usage. Inherent weaknesses associated with the data include; differences between surveys that limit the ability to combine data between surveys; no guarantee that survey gear deployed adequately samples all species; and changes to survey sampling procedures, gear design and survey timing. Over the survey period the majority of tows were undertaken using the GOV (Grande Ouverture Verticale) trawl. Data for Q1 were collected using a GOV trawl by all participating nations from 1985 to 2010. Prior to 1985 a number of different trawls were used by different nations and, although designs may be similar, catchability may have varied between trawls. Data for Q3 were collected using the GOV trawl by all participating nations from 1998 to 2010. Prior to 1998 RV Scotia deployed the Aberdeen trawl and prior to 1992 a number of different trawls were deployed by different nations. It should also be noted that data on the type of ground gear deployed with each trawl is not available and may vary between nations and trawl types. The type of ground gear deployed on a trawl can have an effect on the species assemblage captured in the net, and this may result in variable bias in the data. The effect of changes in ground gear on estimates of catchability has not been examined in detail [25]. However, the usage of data in this study is not intended for comparisons between IBTS survey areas or provision of accurate estimates in abundance but rather to investigate trends in distribution and relative abundance.

Following extraction from the DATRAS database, catch per unit effort (CPUE) data were recorded for individual ICES statistical rectangles for each Quarter of each year of the survey. In many instances an individual statistical rectangle was sampled on more than one occasion in a given Quarter. When this occurred, the mean CPUE was calculated and used.

Data were converted into shapefiles using ArcMap 10 GIS software in preparation for visual analysis. Maps showing survey CPUE for each of the statistical rectangles sampled in the study area were produced for each of the years that survey data were available.

For the purpose of comparing temporal trends in survey distribution and relative abundance with fishers' perceptions, the time-series data within each of the six areas represented in Fig. 1 were analyzed. CPUE data from individual ICES rectangles were grouped within each of the six areas for each year and, as the grouped data were not normally distributed, the median annual values were used in the analyses. Analyses were undertaken on data from Areas 1–4 while the data available for Areas 5 and 6 were unsuitable to carry out analyses due to annual median values of zero for every year of the time-series.

Prior to analysis the time-series data from each area were inspected for auto-correlation using the auto-correlation (ACF) and partial auto-correlation (PACF) function. Plots of each time-series were also used to determine whether the time-series was stationary. A time-series is said to be stationary when its joint probability distribution does not change when shifted in time [26]. As a result, parameters such as the mean and variance of the series do not change over time. There was strong evidence of non-stationarity in both Areas 1 and 2 so ARIMA (auto-regressive integrated moving average) models were fitted to these time-series'. An ARIMA (p, d, q) model has three components p, d and q which correspond to the order of the auto-regressive, integrated and moving average component of the model, respectively. Integration is used in time-series modeling to transform a non-stationary time-series into a stationary one by differencing it (subtracting previous values from the current value). Stationarity of the time-series is an important assumption of traditional ARMA models, hence the need for integration. For Areas 1 and 2 a first order integration appeared to give stationary time-series. Inspection of the ACF and PACF plots for these integrated time-series suggested that an order 1 moving average process was suitable to model the auto-correlation in both cases. Therefore, ARIMA (0,1,1) models were fitted to the time-series from Area 1 and Area 2 using the R package 'TSA' [27]. Other possible ARIMA structures were tested, but the original (0,1,1) model was retained as it had the lowest AIC score. To estimate the trend in the time-series each year in the study was numbered sequentially and included as a covariate within the ARIMA model [26].

Due to the large number of zeros in the Areas 3 and 4 time-series it was judged that ARIMA models would not be appropriate for these areas. Instead a zero-inflated poisson hurdle model was fitted to the data to account for the number of zeroes in the Areas 3 and 4 time-series. Zero-inflated hurdle models are mixture models that use a binomial probability model to assess whether a count has a zero or a positive value. If the value is positive then a hurdle is crossed and the distribution of positive values is fitted to a zero-truncated count model. To estimate the trend in these time-series a data vector was created that numbered each year sequentially and included this as a predictor in the hurdle model. To account for the time-series nature of the data a Newey–West estimator using the R package 'sandwich' [28,29] was used. The Newey–West estimator is a type of sandwich estimator that can be used to account for auto-correlation within a time-series. Here, a Newey–West estimator with a lag of 1 was specified for both time-series based on PACF plots. The Newey–West estimator also has the additional advantage that it will account for any heteroscedasticity in both time-series, which could influence the standard error estimates from the model [30]. It was specified that both time-series should be pre-whitened when using the Newey–West estimator using the in-built functions in the 'sandwich' package. Pre-whitening involves filtering the data to generate a white noise process, which was necessary because the original time-series'

were non-stationary [31]. All data analysis was undertaken in R statistical software package [32].

Finally, a Spearman rank-order correlation test was used to determine how well fishers' average annual catch data and median annual NSIBTS survey data (both Q1 and Q3) correlated in each of the illustrative sample areas where data were available.

3. Results

3.1. Fishers' knowledge questionnaire

3.1.1. Vessel descriptors

The largest percentage of respondents (87%) were skippers having more than ten years of experience in the industry. Respondents were predominantly fishing with vessels in the size range 15–25 m (79%) with a further 16% of returns from vessels greater than 25 m. The returns by gear type were highest for twin trawl vessels (52%) while 24% were from single trawl vessels, 15% from seine net vessels and the remaining 9% from vessels fishing with pair trawls. The length of fishing trips undertaken by respondents was predominantly 6–7 days (45%) while 34% undertook trips lasting more than 7 days. The largest single group of respondents (37%) were skippers with more than 10 years of experience fishing twin trawl gear with vessels in the size range 15–25 m.

Megrim was not considered to be the most commercially important species to fishers. The relative importance of the seven main commercial demersal species (monkfish, haddock, cod, whiting, megrim, saithe and ling) was significantly different (Kruskal–Wallis $H=35.25$, $df=6$, $P<0.001$) across vessels with monkfish and haddock reported as being the most important species commercially, followed by cod. Whiting, megrim and saithe were considered less commercially important and ling was the species having the least commercial importance.

3.1.2. Fishing tactics

Skippers were asked to report how much time they spent fishing in each of the six areas shown in Fig. 1. There was a significant difference in the amount of time spent fishing in the six areas (Kruskal–Wallis $H=26.96$, $df=5$, $P<0.001$) with respondents spending more time fishing in Areas 2–4 than in Areas 1, 5 and 6.

Respondents were asked to compare what effect the quota system has on their choice of fishing grounds at present, compared with when they first became a fishing skipper. Available quota was found to play a significantly greater role in determining where vessels fish presently than it did in the past (Mann–Whitney $U=2251.5$, $P<0.001$) with 85% of skippers reporting that availability of quota plays an important or essential role in determining where they choose to fish now. Conversely, 85% reported that quota had little effect on where they chose to fish when they first became skippers.

3.1.3. Megrim

Respondents consisted of a varied group of vessels with respect to the targeting of megrim. Twenty-three percent targeted the species throughout the year, 38% on a seasonal basis and 39% rarely or never.

Seventy-two percent of skippers returning surveys believed that the overall distribution of megrim in the northern North Sea has increased in recent years. Twenty-three percent believed it has stayed the same and 4% believed it has decreased. Skippers had similar views on changes in the abundance of megrim in the recent past with 69% reporting an increase in abundance, 26% reporting no change in abundance and 5% an overall decrease.

Skippers' expectations of megrim CPUE at present and when first becoming a fishing skipper are outlined in Fig. 2. There was a significant difference in the current megrim CPUE expectation between each of the six areas highlighted in Fig. 1 (Kruskal–Wallis $H=120.87$, $df=5$, $P<0.001$). Eighty percent of skippers expect megrim CPUE to be 'very high' or 'high' in Area 2 at present. The expectation for 'very high' and 'high' CPUE in Areas 1, 3 and 4 were 48%, 60% and 32%, respectively. Many of the skippers reported that they were unaware of what the megrim CPUE would be in Areas 5 and 6 both presently (31% and 46%, respectively) and when first becoming skippers (41% and 44%, respectively) although CPUE was typically ranked as 'low' for those that did respond.

There was also a significant difference in the perceived CPUE of megrim between the six areas when fishermen first became skippers (Kruskal–Wallis $H=89.34$, $df=5$, $P<0.001$). Forty-six percent of skippers expected megrim CPUE to be 'very high' or 'high' in Area 2 when first becoming fishing skippers. The expectation for 'very high' and 'high' CPUE in Areas 1, 3 and 4 were 42%, 39% and 14%, respectively. There was no significant change perceived in CPUE in Area 1 (Mann–Whitney $U=1775.5$, $P>0.05$), Area 5 (Mann–Whitney $U=1241.0$, $P>0.05$) and Area 6 (Mann–Whitney $U=801.5$, $P>0.05$) between the present and when respondents first became skippers. Furthermore, respondents reported an increase in megrim CPUE at present compared with when they first became skippers for Area 2 (Mann–Whitney $U=1653.5$, $P<0.001$), Area 3 (Mann–Whitney $U=1873.0$, $P<0.01$) and Area 4 (Mann–Whitney $U=2086.0$, $P<0.01$).

Respondents were asked how they perceived general trends in overall catches of megrim in the northern North Sea. Seventy-two percent reported that overall catches are generally increasing, 20% reported that they are neither increasing nor decreasing and 8% reported a decrease. Those that perceived an increase were asked to further elaborate on what they felt were the apparent causes of the increase. There was a significant difference in the perceived effects of the different factors on megrim catches (Kruskal–Wallis $H=33.83$, $df=5$, $P<0.001$) with the most significant factors affecting the increase in catches reported as 'megrim in areas not previously seen' and 'more megrim on the grounds' (Fig. 3). Available quota was seen as the next most important factor contributing to increased catches followed by changes in fishing grounds and changes in target species. Changes in fishing gear were reported as the least significant of the six factors contributing to increased catches.

3.2. Fishers' catch data

Fishing effort, as transcribed from diary entries, was predominantly distributed in Areas 1, 2 and 4 (Fig. 1), with 28%, 50% and 17% of the total effort over the 10 year time-series allocated to each area, respectively. The remaining 5% of fishing effort was allocated between a number of other fishing grounds within Areas 3, 5 and 6, and out with the overall study area. The average annual megrim LPUE for each of the three areas is outlined in Fig. 4. LPUE in Area 1 fluctuated but remained relatively constant at 0.5 kg/h for the first 7 years of the study and then increased significantly (Kruskal–Wallis $H=29.72$, $df=9$, $P<0.001$) to 1.1–1.4 kg/h during 2007–2009. In Area 2, there was also a significant increase in megrim LPUE over the study period (Kruskal–Wallis $H=74.92$, $df=9$, $P<0.001$). LPUE fluctuated from 0.7 to 1.0 kg/h from 2000 to 2003 and then exhibited a more progressive increase from 2004 onwards, peaking at 2.0 kg/h in 2009. LPUE in Area 2 was consistently higher than in Area 1 throughout the study period. Area 4 exhibited the largest degree of variation in LPUE over the study period. The lowest annual LPUE of 0.3 kg/h was evident in 2003. This was followed by a subsequent overall significant increase (Kruskal–Wallis $H=62.33$, $df=9$, $P<0.001$) until 2009, where there was a considerably higher average LPUE of 3.2 kg/h.

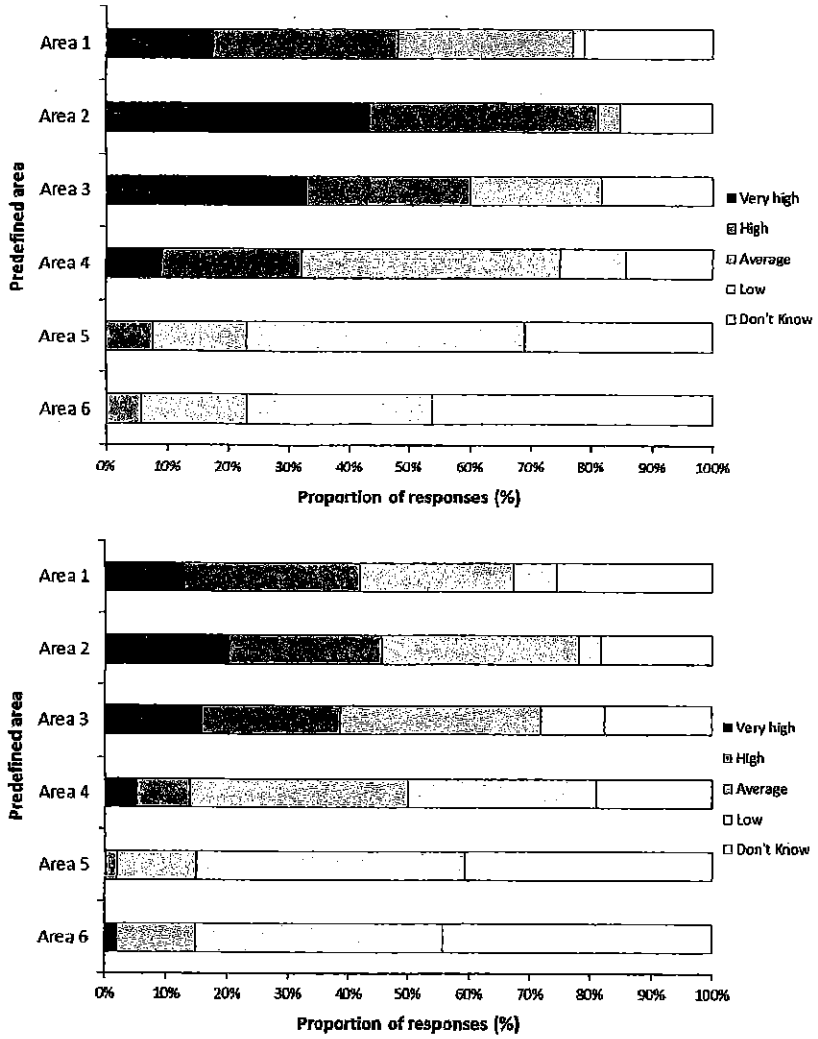

Fig. 2. Fishermen's expectation of catch per unit effort (CPUE) of megrim in six survey study areas of the northern North Sea. Top: CPUE expected at present and bottom: CPUE expected when first becoming fishing skipper (number of responses=58).

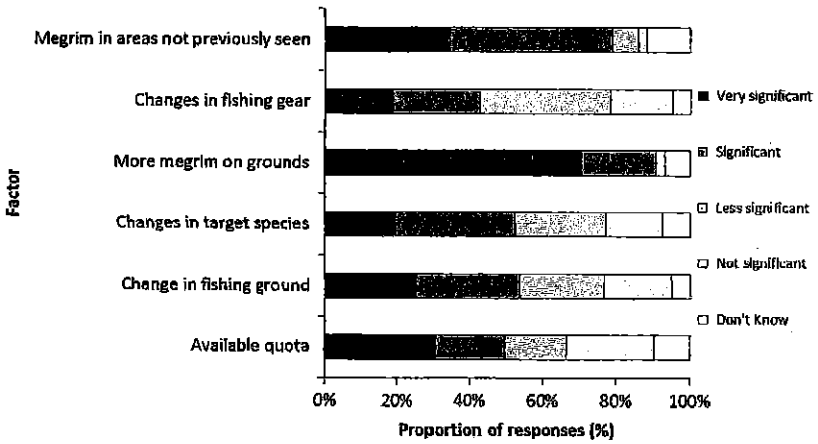

Fig. 3. Fishermen's perceptions on the significance of a number of factors to increased catches of megrim in the northern North Sea (number of responses=45).

3.3. Trends in survey data

Time-series plots of the distribution and abundance of megrim from Q1 and Q3 surveys are shown in Figs. 5 and 6, respectively. Visual inspection of both time-series indicates an increase in survey catches of megrim south and east of the Shetland Isles into the northern North Sea in recent years. Q1 survey data shows limited variation in abundance and distribution from 1977 to 2002. The

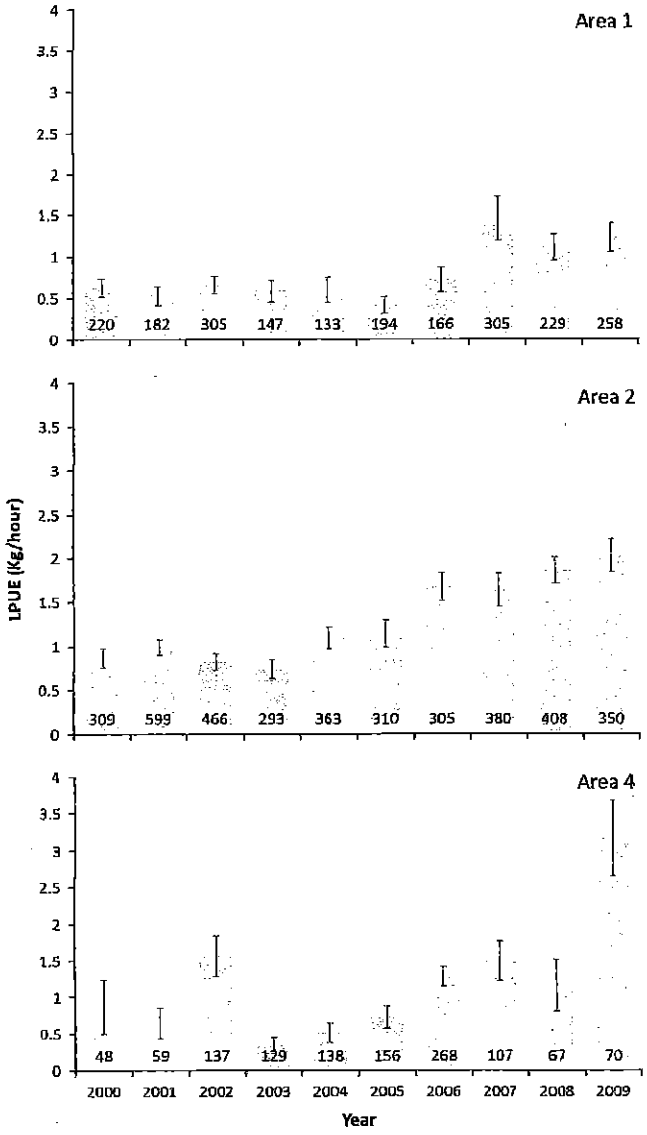

Fig. 4. Average annual megrim LPUE for a single trawl vessel in three study areas within the northern North Sea from 2000–2009 (±s.e. bars and number of hauls for each year are also shown).

highest survey catches during this period were consistently to the north and east of Shetland in Area 2. This was followed by a steady increase in abundance and distribution to the south and east of Shetland, especially in Area 4. In Q3 the increasing trend in survey catches in the North Sea basin, specifically in Areas 2 and 4, is more pronounced than in Q1. A similar trend of limited variation is seen between 1991 and 2002, followed by a steady increase in abundance and distribution until 2009.

Trends in survey catches for Q1 and Q3 in each of the six areas outlined in the fishers' questionnaire are shown in Figs. 7 and 8, respectively. In both surveys median values from Area 1 exhibit large annual fluctuations and there were no significant trends evident in either the Q1 or Q3 survey data (Table 2). Catches in Area 2 during the Q1 survey fluctuated over the time-series with a significant increasing trend ($P<0.05$) in recent years (Table 2). Q3 data for Area 2 exhibited a more pronounced increasing trend ($P<0.05$) with less fluctuation between annual values. Catch values in both Q1 and Q3 were relatively low in Area 3 throughout the time-series and although there were slight increases in CPUE in recent years there is no evidence of a significant trend (Table 2). Area 4 shows a trend of increasing CPUE ($P<0.05$) in both Q1 and Q3 data. In each case there were very low catches prior to 2002 followed by increases in the latter years of the study.

3.4. Comparison of survey and diary data

There was a moderate correlation between fishers' annual average catch data and NSIBTS Q1 data for Area 1 ($r=0.64$, $P<0.05$) and Area 2 ($r=0.75$, $P<0.01$). In Area 2 there was a strong correlation between fishers' annual average catch data and NSIBTS Q3 data ($r=0.96$, $P<0.001$). However, there was a weak correlation between fishers' data and NSIBTS Q3 data for Area 1 ($r=0.12$, $P>0.05$). Finally, there was a moderate correlation between fishers' catch data and both Q1 ($r=0.59$, $P=0.05$) and Q3 ($r=0.62$, $P=0.05$) NSIBTS data for Area 4.

4. Discussion

The results of this study indicate that fishers' perceptions of changes in distribution and abundance of megrim in the northern North Sea are consistent with spatial and temporal trends evident in survey data. NSIBTS survey data showed an increase in abundance to the east of Shetland in Areas 2 and 4 and this was consistent with fishers' perceptions of increased abundance in these areas. The ten year time-series of catch rates from diary data has also highlighted significant increases in relative abundances of megrim in Areas 2 and 4.

There was a significant increase in catches reported from diary data in Area 1 in the latter years of the study, albeit to a lesser degree than Areas 2 and 4. However, there was no significant increase evident in Area 1 in either the fishers' questionnaire or the NSIBTS survey data. Perceived increases in abundance highlighted by the fishers' questionnaire and catch data in Area 3 were also less pronounced in the survey data, with the time-series only showing a slight increase in more recent years. The differences between fishers' perceptions, catch data and survey abundance in Areas 1 and 3 may be due to spatial differences between survey stations and commercially important grounds. Catches of megrim west of Shetland are known to be higher in the deeper water along the shelf edge [33]. The proportion of Area 3 that includes shelf edge fishing grounds is markedly less than Area 1, and, while fishers' catches of megrim are greater along the shelf edge, the survey data is more representative of the entire area. It is, therefore, probable that increased catches along the shelf edge may not necessarily be representative of abundance within the entire area.

Trends in survey data, fishers' perceptions and diary data suggest an increase in abundance and distribution in the northern North Sea basin in recent years, although these increases are more pronounced east of the Shetland Isles. This may be indicative of an increase in the species' range in recent years due to increasing abundance in the northern North Sea. Fishers' have also noted that, in recent years, megrim have been captured in shallower water than previously expected (Johnson, 2010, personal communication). Density-dependent dispersal, driven by factors such as competition and population size, into less favorable environments [34] is one factor that may have led to changes in megrim distribution and greater relative abundance in the shallower water of the North Sea basin. Increases in abundance in recent years are evident in both the Q1 and Q3 NSIBTS data series, highlighting the fact that the increases have not been on a seasonal basis i.e. migration of fish to spawning or feeding grounds.

The proportion of respondents to the fishers' knowledge survey (24%) was relatively good, especially in comparison to similar surveys sent to fishermen. For example, respondents to the annual Fishers' North Sea Stock Survey (an annual survey of Fishers'

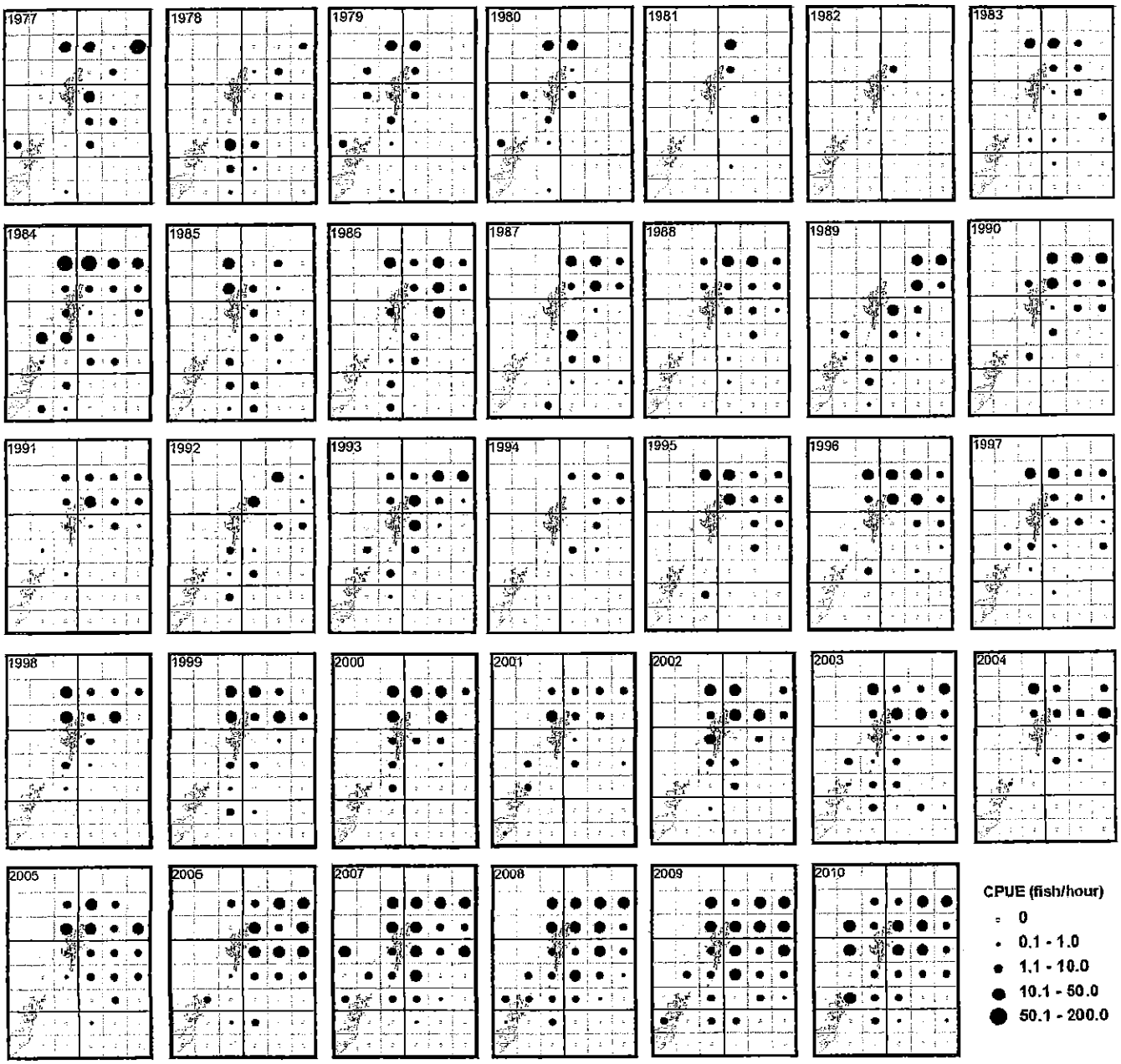

Fig. 5. *Distribution and relative abundance of L. whiffiagonis in ICES Sub Area IVa from 1977 to 2010.*
Source: North Sea International Bottom Trawl Survey (NSIBTS) Quarter 1.

perceptions of the state of fish stocks in the North Sea) from Scottish fishing skippers, are typically less than 12% (Napier, personal communication). In this survey fishermen are asked to record their perceptions of how the abundance, size range, discards and recruitment of eight commercially important species have changed from the previous year. The megrim survey undertaken in the present study was sent out to all members of the Scottish Fishermen's Federation fishing within the whitefish fishery in the North Sea, irrespective of whether megrim was one of their target species. The proportion of respondents from fishers targeting megrim was, therefore, relatively higher than the 24% overall response and possibly highlights the importance of this issue to these fishers. Skippers that declined to respond may have done so for a number of reasons including; megrim not being an important species to them (i.e. *Nephrops norvegicus* trawlers), fishing in areas with low megrim abundance, or concentrating effort on other species such as haddock. There may also be a proportion that were not willing, or had no desire, to engage in the survey. However, there is no reason to suggest that their perceptions of megrim distribution and abundance would be different to those that did respond. The majority of respondents were skippers with more than 10 years' experience and, given the fact that the greatest increases in distribution and abundance occurred in the previous 10 years, the majority of skippers have experienced most, if not all, of these increases first hand.

The fishers' general perceptions on the distribution and abundance of megrim were validated by fishers' diary data. The diary data presented here represents a unique data set with a consistent haul-by-haul account of LPUE over a ten year period. However, one limitation of the diary data presented here is that it is restricted to

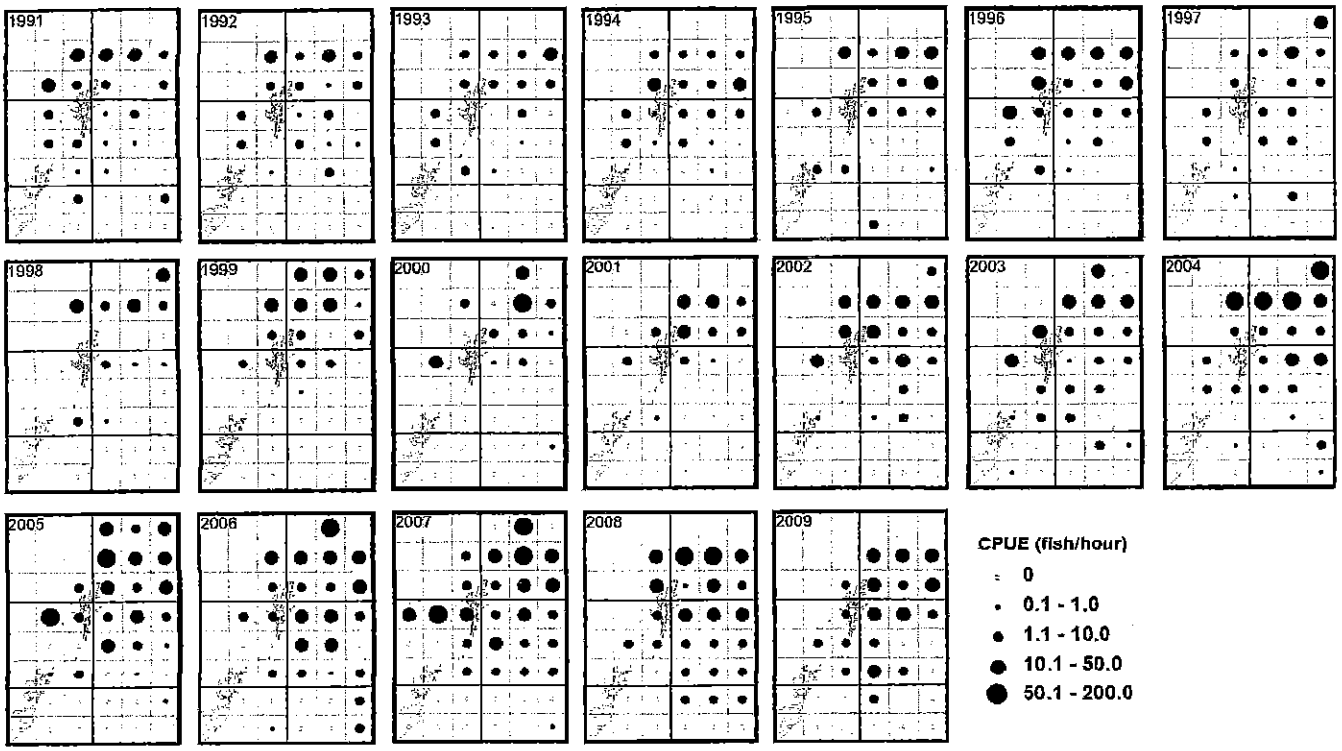

Fig. 6. Distribution and relative abundance of *L. whiffiagonis* in ICES Sub Area IVa from 1991 to 2009.
Source: North Sea International Bottom Trawl Survey (NSIBTS) Quarter 3.

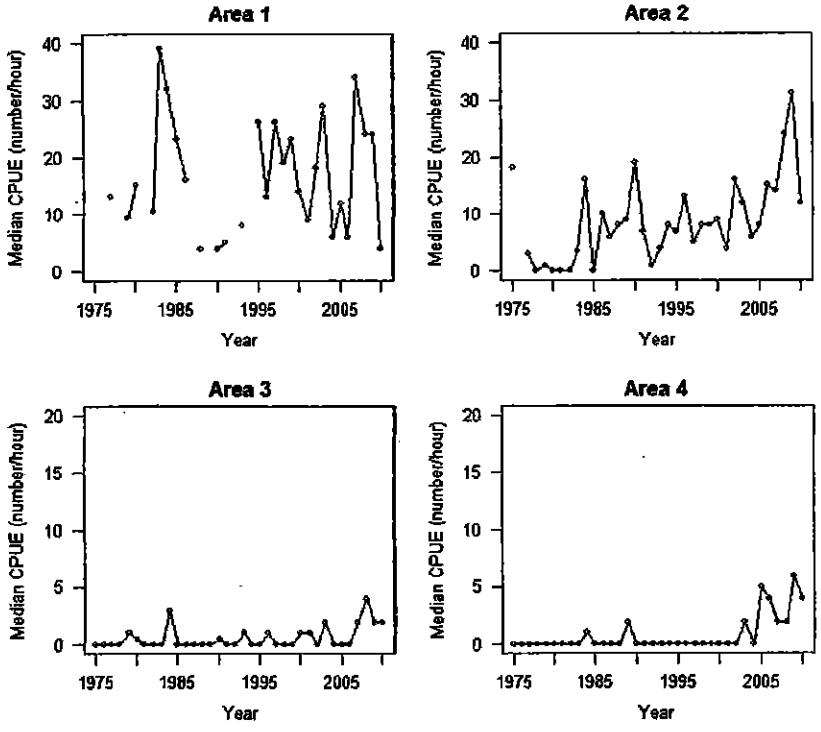

Fig. 7. Median catch per unit effort of megrim from Areas 1–4 of the Q1 survey (NB different *y*-axis scales).

a description of the LPUE rather than the total catch. Discarding of megrim has reportedly been more pronounced in the northern North Sea during the mid-to-late 2000s [21]. As such, there is the potential for the total CPUE to be underestimated in the data presented here due to the absence of any discards from the dataset. However, the issue of discarding has been more pronounced for vessels such as those targeting anglerfish with twin trawls. Megrim has been a species of lesser commercial significance for the sampled vessel here, with catches predominantly incidental. Therefore, the diary data presented here provides a

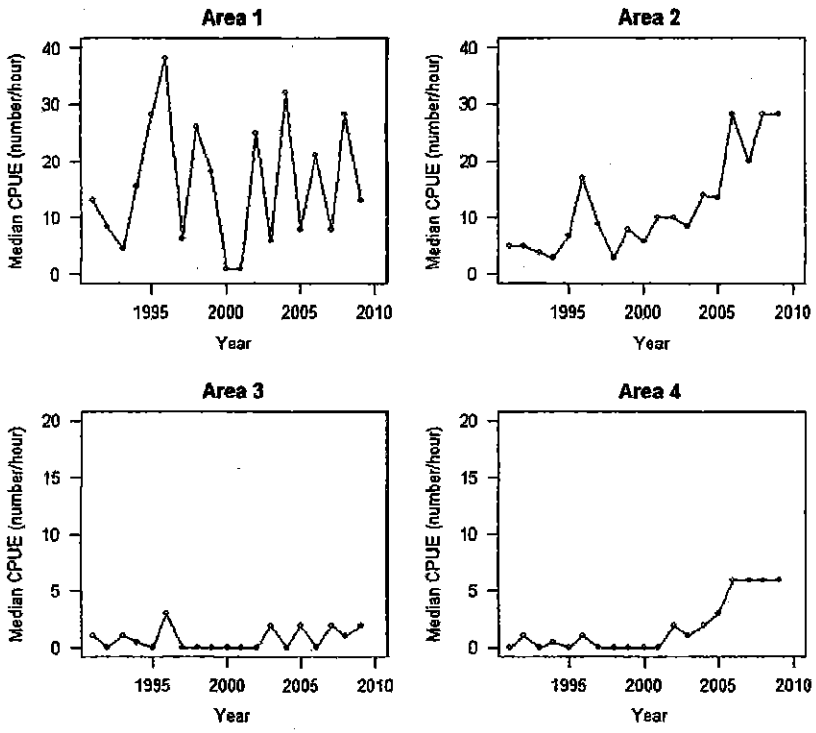

Fig. 8. Median catch per unit effort of megrim from Areas 1–4 of the Q3 survey (NB different *y*-axis scales).

Table 2
Summary of trend co-efficient and associated confidence intervals for models fitted to CPUE data from Areas 1–4 of Q1 and Q3 surveys.

Survey	Area	Model fitted	Trend	Lower 95% CI	Higher 95% CI
Quarter 1	1	ARIMA (0,1,1)	0.016	−0.355	0.388
	2	ARIMA (0,1,1)	0.367[a]	0.167	0.568
	3	Zero-inflated poisson hurdle	0.052	−0.148	0.048
	4	Zero-inflated poisson hurdle	0.761[a]	0.263	1.259
Quarter 3	1	ARIMA (0,1,1)	0.121	−0.787	1.030
	2	ARIMA (0,1,1)	1.310[a]	0.112	2.509
	3	Zero-inflated poisson hurdle	0.023	−0.057	0.104
	4	Zero-inflated poisson hurdle	0.263[a]	0.157	0.369

[a] A significant trend.

useful 'background' overview of trends in abundance over the study period as the vessel was not consistently targeting areas of high megrim abundance.

One of the issues inherent with the use of fishers' historical data is the lack of consistency in the quantity and quality of data collected across vessels. Many of the vessels within the local fishermen's association maintain a regular diary although, for the purposes of this study, only one vessel had the necessary spatial and temporal resolution to estimate catch trends by fishing location on a haul by haul basis. Further, extracting catch data from vessel diaries is time consuming and often references to locally named fishing grounds must be translated on a haul by haul basis to a format consistent with scientific data sources i.e. an ICES statistical rectangle. While fishers may collect long term data sets in a methodical manner, data may not be in a suitable format for collation and analyses. As such, if fishers' catch data is to be considered within a scientific data collection framework, there would be a requirement for it to be collected in a standardised format suitable for scientific analysis. Such attempts have been made at this in the past for both monkfish and megrim by introducing tally book schemes [21,35]. However, one of the problems inherent with these voluntary schemes is the drop-off in participants over time, which can result if fishers' do not see direct benefits from the scheme [36] in terms of utilization of the data and incorporation into the management process.

In recent years modern methods of tracking vessels with vessel monitoring systems (VMS) have allowed for a more streamlined approach to monitoring trends in vessel movement. Currently all European fishing vessels exceeding 15 m are required to transmit vessel position, course and speed for monitoring and enforcement purposes [37]. Vessels are also required to complete daily retained catch weights in logbooks [38]. Routine VMS data can then be linked to catch data to provide spatially resolved catch and effort data [39]. However, the use of VMS is not universal and, where the system is available, historical data is currently limited as it has only been in operation in recent years. Further advances in electronic logbook technology have also resulted in the production of software that allows the user to input biological and ecological data that can be stored and accessed for subsequent analysis (Barkai, personal communication).

A number of novel initiatives between fishermen and scientists have proven to be beneficial. For example, the northern Gulf of St. Lawrence sentinel fishery program enables fishermen to receive training in the collection of data and undertake standardised sampling to collect data on a predetermined range of species [40]. The data collected is relayed to fishermen's association offices and subsequently utilized in assessments on a number of stocks including Atlantic cod (*Gadus morhua*), turbot (*Scophthalmus maximus*) and Atlantic halibut (*Hippoglossus hippoglossus*). However, sentinel surveys could be portrayed as being excessively costly and substantial funding is required to implement them effectively.

Fishers' whole catch data has the potential to inform and improve current assessment methodologies for data poor stocks at a fraction of the cost. The benefits of such data go beyond the ability to provide trends in distribution and abundance and may also provide

opportunities for 'fine tuning' of existing assessments. This is especially true in the case of megrim in Divisions IVa and VIa where fishers' whole catch data, inclusive of discards, has the potential to assist in the current assessment, which presently lacks accurate discard data [22].

If fishers' perceptions and data are consistent with trends of abundance and distribution within scientific data then, due to the time required for scientific data to feed through the assessment process, information from fishers' may act as an early indicator of changes within stocks of fished species. This 'early indication' has been one of the aims of the Fishers' North Sea Stock Survey and agreement exists between fishers' perceptions and survey trends for a number of the species surveyed. The questionnaire also provides fishers' with the opportunity to actively contribute to the assessment and management process for the natural resources they are dependent on.

The results of this study indicate that there is considerable potential for the use of fishers' knowledge and data in the assessment and management process in the demersal fishery in the northern North Sea. To facilitate this, the North Sea Stock Survey, in its current form, could be adapted to include other species of commercial importance, with the resulting species-specific knowledge considered during assessments and benchmarking exercises by appropriate ICES working groups. There is also potential for such a scheme to be expanded to include the utilization of electronic logbooks with the capability of storing biological and ecological data. Furthermore, a standardised approach to the collection and utilization of fishers' data can be achieved if all stakeholders engage in dialog to produce a scientifically robust methodology for the collection of whole catch and distribution and abundance data, consistent with previous tally book schemes. The success of such a scheme would require a formal commitment from all stakeholders to avoid the subsequent drop-off seen in past schemes. An example of one such successful scheme is the Eastern Pacific Ocean skipjack tuna *Katsuwonus pelamis* fishery, where logbook records are mandatory for the international purse-seine tuna fleet [41]. In a recent study, logbook records were used to determine the most productive areas within the fishery as well as long-term spatial and seasonal trends in catches and relative abundance from 1970 to 1995 [41]. Participation in a tally book scheme could be further encouraged by ensuring that the resulting data is utilized in the assessment process and the use of the data is reported back to fishers. Additional incentives have also been recognized as an important element to be considered in the collection of fishery-dependent data [42]. These could be facilitated through the provision of additional effort or quota.

There is a need to ensure that all relevant sources of data are considered if global fisheries are to be assessed and managed robustly and sustainably. The initiatives outlined above have the potential to engage all stakeholders in the production of a robust, structured methodology for collection and utilization of fishers' knowledge and data and also to ensure that necessary feedback exists between stakeholders. An inclusive approach would also serve to instill a greater degree of confidence in the data provided by fishers and its subsequent use within the management process. Further, a structured approach, integrating fishers' knowledge and data, allows for all stakeholders to participate and contribute in the management process and, by ensuring that all available knowledge of a given resource is utilized, provides the most inclusive approach to resource management.

5. Conclusions

The results of this study have shown that trends in the distribution and relative abundance of megrim were broadly comparable between the three data sources, fishers' knowledge, fishers' data and survey data. The utilization of fishers' knowledge and whole catch data, therefore, has the potential to assist in the assessment and management of fish stocks by providing spatially and temporally detailed data on fish distribution and abundance, as well as providing data on key components of assessments such as discards data. A structured approach to fisheries assessment and management requires full transparency and a formal agreement and commitment between all stakeholders to provide and utilize the necessary data required to provide the most effective approach to resource management.

Acknowledgments

This study was carried out during a wider investigation into the biology, ecology and fishery of megrim in the northern North Sea and was partly funded by the Seafish Industry Authority, Scottish Fishermen's Trust and Shetland Islands Council. We are grateful to the members of the Scottish Fishermen's Federation for providing valuable feedback and one anonymous vessel owner for providing diary data. We are also grateful to Ian Napier and Leslie Tait for transcribing and digitizing diary data.

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October 1, 2014

New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Re: Gulf of Maine Atlantic Cod 2014 Assessment Update Report

Council Members,

This new, updated cod assessment from the Science Center is the end result of a fundamentally flawed process, both procedurally and scientifically. By springing a surprise assessment on the public, the Science Center has further alienated those in the scientific and fishing communities who are concerned with the lack of transparency and collaboration in the current assessment process, and has led to flaws in the assessment's models and methods going unaddressed.

The update assessment clearly runs afoul of several of the tenets of the Magnuson-Stevens Act's National Standard 2, raising valid questions about the integrity of the process. Among other requirements, National Standard 2 states that stock assessments should be transparent, inclusive, and undergo peer review. In the case of this update assessment, none of these requirements have been met.

This assessment was not transparent. It was conducted practically in secret, and most of New England's scientific and fishing communities were unaware of the assessment until its results were presented to the public. Only a small number of officials were actively involved in planning and executing this assessment. This has given outside experts and the general public little input into the details of the assessment, and little information on how it was actually conducted.

This breakdown in fostering an open stock assessment process is only likely to increase the levels of mistrust that exist between the government and fishing communities. If fishermen suspect that an assessment was conducted with a lack of transparency and openness, they cannot be expected to support the decisions that are the result of that assessment, especially if it threatens their livelihoods.

This assessment was not inclusive. Only a select group of scientists even had knowledge of the assessment's existence prior to its completion. Collaboration between independent scientists, the industry, and the government has led to some of the greatest successes in

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fisheries management in recent years, and is essential to producing reliable, trusted, and broadly accepted stock assessments. This assessment not only fails to adhere to that proven model, but also takes a giant step backward in encouraging effective collaboration.

This assessment did not go through the appropriate peer review process, nor did it follow the process that was set up to handle precisely these kinds of updates. Gulf of Maine cod was not previously scheduled for an update assessment, the assessment was not conducted under the "operational assessment update" process previously established by the Science Center, and it lacked much of the information that would normally be included in an operational assessment update. The assessment did not go through the usual, established peer review channels, having been reviewed by an ad-hoc SSC panel rather than by the SARC. Of equal importance, there was no meaningful input or consultation from fishermen.

The Science Center also acted improperly by publicizing the results of the assessment before it had completed any peer review. This had the potential to bias the conclusion of the peer review panel, and certainly created the perception among many that it had in fact biased the outcome, further eroding trust in the impartiality of the assessment.

Faith in the integrity of the process is critical for the wider acceptance of the results of any stock assessment. When an assessment violates that process, it weakens the faith that fishermen have in both the assessment and the system, no matter how well intentioned the efforts. To conduct an assessment with such irregular and unprecedented methods on a species like Gulf of Maine cod, which is already mired in controversy and disputes over the veracity of its stock assessments, will only widen the fissures between management and the industry.

Flaws in the process of conducting this assessment has led to flaws in the assessment's models and methods going unaddressed. There remain valid concerns about the assumptions used in the stock assessment model. These include assumptions about the natural mortality rate, the structure and boundaries of the Gulf of Maine cod stock, and rebuilding targets. There are concerns that some of these assumptions, especially with regards to natural mortality, are producing estimates that are inaccurate enough to be considered unreliable for management advice. Developments since the last cod assessment—such as insights suggesting that current stock boundaries should be redrawn—were not factored into this assessment but should be considered when determining future cod management measures.

Fishermen are currently being asked to accept an assessment whose administration and results they have good reasons to distrust, and for which several unaddressed concerns persist. Given the nature of how this assessment was developed, and the potentially dire consequences we face as a result of it, that skepticism is entirely warranted.

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Richie Canastra
BASE New England

(3)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

SEP 30 2014

Mr. E.F. Stockwell III, Chairman
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Terry:

As you know, the status of Gulf of Maine (GOM) haddock, managed under the Northeast Multispecies Fishery Management Plan, has changed as a result of the 59th Northeast Stock Assessment Workshop/Stock Assessment Review Committee Process (SAW/SARC 59). As a result, we are providing the Council official notification of the following stock status changes:

- GOM haddock is no longer subject to overfishing or approaching an overfished condition and is not overfished.

A 2012 operational assessment for GOM haddock determined that the stock was subject to overfishing and approaching an overfished condition, but not overfished. SAW/SARC 59, which took place in July 2014, was a benchmark assessment that utilized a new age structure assessment program. A new status determination for the overfishing criteria, that incorporates the new reference points from SAW/SARC 59, should be included in Framework Adjustment 53 to the Northeast Multispecies Fishery Management Plan. I understand the Council is already developing these measures.

If you have any questions regarding this letter, please contact my staff in the Sustainable Fisheries Division at (978) 281-9315.

Sincerely,

for John K. Bullard,
Regional Administrator

Cc: Tom Nies, Executive Director, New England Fisheries Management Council
Dr. William Karp, Director, Northeast Fisheries Science Center
Alan Risenhoover, Director, Office of Sustainable Fisheries

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New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

October 14, 2014

Dr. William Karp
Science and Research Director
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

Dear Bill:

At the September 30 – October 1, 2014 meeting of the New England Fishery Management Council, the Council passed the following motion:

> *Motion: "to request the Northeast Fisheries Science Center review, summarize and communicate as quickly as possible the most recent updated information on Georges Bank cod (including available survey indices, catch and recruitment indicators)." The motion carried on a show of hands (13/1/4).*

The Council makes this request in light of the current condition of the Eastern Georges Bank cod management unit. The Transboundary Resources Assessment Committee determined that spawning stock biomass for this stock continues to be extremely low, with poor recruitment and lack of rebuilding. The Council understands that an updated assessment of the Georges Bank cod stock will be conducted in the fall of 2015, but having an update on the condition of Georges Bank cod would aid in preparing appropriate future management actions.

The Center recently completed the 2014 assessment update for Gulf of Maine cod that determined the SSB for this stock decreased in 2013 to a time-series low of 3-4%. This result was a surprise to many and the Council is struggling to develop measures to address this situation in time for FY 2015. Providing information on the status of GB cod this fall will help avoid a similar surprise after next year's assessment, and will provide the Council more time to develop appropriate management measures.

Thank you for considering this request of the Council. Please contact me with any questions.

Sincerely,

Thomas A. Nies

Thomas A. Nies
Executive Director

(3)

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

October 15, 2014

Mr. John Bullard
Regional Administrator
Greater Atlantic Regional Fishery Office
NMFS/NOAA Fisheries
55 Great Republic Drive
Gloucester, MA 01930

Dear John:

At the September 30 – October 1, 2014 meeting of the New England Fishery Management Council, the Council passed several motions requesting actions by the Greater Atlantic Regional Administrator.

Emergency Action on Gulf of Maine Cod

> *Motion: "to request an emergency action to reduce mortality on Gulf of Maine cod in FY2014." The motion carried on a roll call vote (14/3/0).*

The Council requests this action in light of the peer-reviewed 2014 assessment update for Gulf of Maine cod, which estimated that the spawning stock biomass for this stock decreased in 2013 to a time-series low of 3-4% of that needed to support maximum sustainable yield. While the Council considered several measures to reduce mortality on Gulf of Maine cod that could be implemented in-season in FY 2014, the approved motion did not recommend specific measures. The Council will consider additional measures for FY 2015 in Framework Adjustment 53, including the recommendation of the Scientific and Statistical Committee (SSC) for a reduced Acceptable Biological Catch.

Rebuilding Period for Gulf of Maine Cod

> *Motion: "to request the Regional Administrator examine the eligibility of extending the rebuilding period for Gulf of Maine cod beyond the ten years according to the criteria in the National Standard 1 Guidelines." The motion carried on a show of hands (16/0/1).*

The Council requests this examination in light of the condition of the Gulf of Maine cod stock. The rebuilding program for Gulf of Maine cod was recently revised (through Framework 51) to rebuild the stock by 2024 with a median probability of reaching the biomass target. In your letter dated September 25, 2014, you indicated that information presented to the SSC indicated that the stock could rebuild to the target biomass recommended by the Stock Assessment Review

Committee within its current rebuilding period. While this statement is accurate for one of the two approved assessment models, it is not accurate for the second model. As noted by the assessment review panel, neither model is preferred and the more pessimistic model cannot be ignored. In addition, the Groundfish Plan Development Team's (PDT) analysis of stock rebuilding, using the only model that suggests rebuilding is possible, indicates that the stock would have to increase at a rate of 37% for each of the next ten years to meet the 2024 deadline. It is the sense of the Council that this rate of increase is unrealistic, in part because it relies on recruitment levels that have not been observed in recent years.

The National Standard Guidelines include guidance that may be relevant to this situation. If the minimum time necessary to rebuild exceeds ten years, then the maximum time allowed for rebuilding is the minimum rebuilding period in the absence of fishing plus one generation time. This provision may apply given the PDT's comments on rebuilding potential under both of the approved assessment models.

Observer Coverage in FY2015

> *Motion: "to send a letter to the NMFS requesting them to support at least the same number of observed trips on directed groundfish trips in the Gulf of Maine in FY2015 as there were on groundfish trips fishing in that broad stock area in FY2014." The motion carried on a show of hands (16/0/1).*

Due to the probable reduction of the Gulf of Maine cod ACL in FY 2015 to low levels, the Council is concerned about the potential for increased discards on trips without an observer. This may jeopardize rebuilding efforts. If this request is fulfilled, the Council does not expect that observer costs would increase. The Council suggests that the number of observed trips remain unchanged, and this will cause the rate of observer coverage to increase, because we expect the number of groundfish trips taken in the Gulf of Maine will decline in FY 2015.

In a related issue, the Council requests an update on the potential for federal funding of at-sea monitoring of the Northeast Multispecies fishery in FY 2015. We are interested in the potential for federal funding of both the NEFOP and ASM programs.

Outreach to Private Anglers

> *Motion: "that the Council Chair send a letter to Regional Administrator requesting that, if emergency action is taken that includes measures that apply to recreational anglers, the regional administrator mail a Greater Atlantic Region bulletin describing the measures to all licensed saltwater anglers in, at a minimum, ME, NH, and MA using address information from the National Saltwater Angler Registry." The motion carried on a show of hands (16/0/1).*

Due to the sizeable proportion of Gulf of Maine cod harvested by private anglers, the Council feels that is very important to inform this component of the fishery of all regulatory changes. Efforts to rebuild Gulf of Maine cod may be compromised if private anglers are unaware of changes in regulations. Typically, the state directors conduct outreach to private anglers, but the Council requests that NMFS assist in this manner due to the urgency of the situation and the limited ability of states to notify anglers of in-season changes.

Thank you for considering these requests of the Council. Please contact me if you have any questions.

Sincerely,

Thomas A. Nies
Executive Director

(3)

October 14, 2014

John Bullard, Regional Administrator
National Marine Fisheries Service (GARFO)

Terry Stockwell, Chairman
New England Fishery Management Council

Dear John and Terry:

After attending and speaking at the New England Fishery Management Council in Hyannis, I feel compelled to offer the following.

The New England fishing industry has a proud and rich history of men and women who did all they could to better their families. When I think of all the history I've read, lived and the people I've known and fished alongside, I feel proud and privileged to not only be a fisherman but to be part of our culture and history.

In the early 1800s boats that normally fish coastal waters ventured to Georges Bank because of low catches inshore. In 1962 in waters off of Rockport you couldn't just catch a cod by 1966 – you could fill your boat. During this time foreign vessels fished as close as 12 miles from our coast and NMFS in Gloucester consisted of one man with an office at the Gloucester post office. There were times in the 1990s cod couldn't be found yet as recently as 2011 there were days I didn't go fishing because there were too many cod.

My point is that it's a misconception that the current cod "problem", if there is one, is caused by fishing because there are other factors at play. Fish follow cycles and not all species of fish are on the same cycle – anyone who studies fish in this area knows this. These cycles happen over years – I have witnessed several. Within these cycles are variables that affect fish on the shorter term, food supply, water temperature and predation are but a few. The fishing fleet is but a fraction of what it was just 20 years ago. Although it has an effect, it isa highly diminished one.

Our industry is comprised of small businesses. A diverse lot – with many vessel size classes and user groups that seldom agree on a solution or a problem. Over the years NMFS has seemingly used this by implementing regulations on different groups at different times and this has brought us to where we are now, not only disagreeing with but in some cases accusing each other.

I consider myself a common sensed and analytical man and in analyzing what I have seen - pipelines built and not used, vessels doing bottom surveys and the push to close areas to fishing where all of this is happening - leads me to believe that it all has more to do with what lies under the ocean floor than what swims above it.

jc/jp - 10/16/14

In the 1990s I attended Council meetings where the formation of the Western Gulf of Maine Closure Area was discussed and ultimately decided. At these meetings science asked for a much smaller area than it is now but with limited tracking technology. At that time law enforcement said a larger area was needed. Therefore, a very large area, which had very little interest to science, was closed and remains so. I am not advocating for closures but if a closure was deemed to be necessary they should be small and focused – based on good science and with clear goals. The process has identified small areas already and now the technology exists to enforce them – you now just need the will.

I am 62 years old fishing a 50 foot vessel alone. My average day starts at 2am and ends around 6pm. As statistics prove, this is a very dangerous business. Although I can still do the physical labor my agility has diminished. Consequently my chance for injury has increased. I hope your upcoming decisions don't force me to do things that add to this risk. Over the years I have lost friends to the sea one was a man that was there when I was born, babysat me as an infant and taught me what it means to be a fisherman. I pray my children never feel the loss that I have. There are many other men and woman in the same position I am and I hope you think of them while making your upcoming decisions.

After almost 50 years of interacting with the environment - I often look back at all the beauty I have seen. The power of the angry sea - the sereneness of a calm moonlit night - the beauty of the northern lights - the violence of a shark feeding frenzy - and the humanism of a whale calf searching for its mother. I think of the things I have seen - think of what is yet to be seen and wonder how any sane person could think of harming any of the beauty nature has given us. And then I read a story or see an advertisement accusing me and my fellow fishermen of being environmental pillagers. . I have even witnessed this information being placed as propaganda on preschoolers' websites. I am sickened by this false and intentionally distorted information – all under the "business" of "environmentalism"?

My industry has given up much - both monetarily and emotionally – over the years. I don't question who the true and real environmental stewards are – my fellow fishermen.

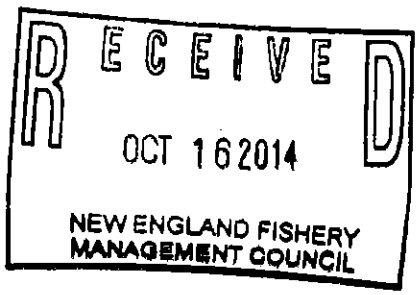
I implore you to think carefully and wisely about your decisions in the days ahead. Conservation and commercial fishing can co-exist – if there is a will by NMFS and the Council to do so.

Richard L. Beal, Lifelong New England Fisherman

NORTHEAST SEAFOOD COALITION

3

October 16, 2014



Dr. Jacob Kritzer, Chair
Scientific and Statistical Committee
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Dr. Kritzer:

The Northeast Seafood Coalition (NSC) appreciates the opportunity afforded by the Science and Statistical Committee (SSC) for the commercial fishing industry to provide estimates of incidental, non-target catch of GOM cod under the prevailing operating conditions and regime shift experienced in the fishery. Although NSC has numerous issues concerning the lack of process and transparency surrounding the trial update delivered by the Northeast Fishery Science Center in August, we are grateful for the SSC's efforts to recommend a provisional ABC until more information was provided.

The Northeast Sector Service Network (NESSN), an organization that provides technical and operational services on behalf of the Northeast Fishery Sectors, prepared an analysis for the PDT upon the SSC's request (see attached). Like other Groundfish Sectors, the NEF Sectors have access to fisheries data, which is managed and reported to NMFS in accordance with the Sector regulations. This unique access enables the sectors to collaborate through the coordination of the NESSN network to provide reports and analysis that could not have been accomplished in the past. The report provided to the PDT is one example.

In their report, NESSN provides an incidental, non-target catch of GOM cod estimate of 205 mt based on fishing activity of the NEF Sectors alone. This estimate, which is based on prevailing conditions, is necessary to allow continued fishing for other stocks and other fisheries in the Gulf of Maine in FY 2015. NESSN also notes that the constant catch ABC strategy of 1,550 mt, established for fishing years 2013-2015, has directly served as a spatial and temporal management tool among and within statistical block areas due to the operational realities of low allocations and high lease costs.

Members of the SSC should be aware that the current ABC for GOM cod of 1,550 mt has greatly altered the behavior and fishing activity of the fleet. Also, large reductions (45-60%) in the ACLs for other important GOM stocks such as CC/GOM yellowtail flounder, witch flounder and American plaice have not only dramatically reduced overall effort in the GOM since 2013 but it has lowered the baseline need for incidental catch of cod. However, NSC cannot overemphasize our concern that 2013 / 14 catch rates on GOM cod may be due to a cyclical environmental effect on catchability and spatial distribution and that these incidental catch estimates are based upon recent conditions and do not account for changes in fish behavior.

As it stands now, the provisional ABC of 200 mt would equate to a groundfish sector sub-ACL of roughly 100 mt. This sub-ACL does not offer enough for GOM cod to serve as incidental catch for the groundfish fishery nor does it allow other fisheries to operate efficiently (e.g. dogfish, monkfish, skates) in the Gulf of Maine. Furthermore, an ABC of 200 mt does not offer a significant biological gain in the projected spawning stock biomass. In the PDT report dated September 11, 2014 to the SSC, Table 4 reveals there is less than a 2% gain in spawning stock biomass between 2015 catch at Fmsy and the 200 mt provisional ABC.

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Jcl/pldbk - 10/17/14

NSC recommends members of the SSC will consider the following when making their final recommendation for the 2015 ABC for GOM cod:

- The 200 mt PDT recommendation is directly linked to an F rebuild to 2024 and the reference point for Bmsy at circa 57,000 mt.
- The PDT notes this requires stock productivity that has not been seen in many years, if at all, ***with a 37% annual compounded stock growth*** necessary to rebuild
- Therefore, at a 200 mt F rebuild we are almost certainty chasing an unattainable target within the 10 year timeframe which started less than 6 months ago.
- Recent recreational catch estimates showed nearly 180 mt of catch in just two months of fishing.
- The commercial fishing industry has offered solid estimates of incidental catches assuming continued low catch rates.

NSC contends, with great certainty, that there will be enormous impacts on the recreational and commercial components of the fleets in the GOM at the 200 mt ABC F rebuild level. We also note that there has never been an economic impact analysis conducted in the past that has attempted to estimate impacts at these (200 mt) levels of catches. To know the true impacts would be to know - with some certainty -, the amount of GOM cod needed as incidental catch to keep the Gulf of Maine open for other species and fisheries.

To conclude, there is a high degree of certainty that huge losses of yield on other stocks and loss of business will occur at the 200 mt catch F rebuild level. Comparatively, what certainty or confidence do we have that fishing at 200 mt F rebuild rather than a level that is safely set below the OFL, will rebuild GOM cod to 57,000 by 2024?

During the SSC meeting on October 20, 2014, NSC hopes the SSC will consider the OFL and ABC control rules in the context of the honest incidental catch levels provided by industry. We hope the SSC will closely examine the M.2 Bmsy reference points which are driving F rebuild catches far below incidental catch estimates.

Lastly, we hope the SSC will consider the plausibility of the notion that prevailing conditions are consistent with and in support of the M.2 model reference points and the existing rebuilding plan. In order to adequately consider prevailing conditions, the SSC may conclude that substantial changes to the reference points may be warranted. However, if this is deemed to be outside the TORs for the upcoming SSC meeting then NSC respectfully suggests that an ABC associated with F rebuild under the current rebuilding scenario is unwarranted and that the OFL and ABC control rule at 75% Fmsy would prevent overfishing and account for scientific uncertainty at least for the 2015 ABC.

Sincerely,

Jackie Odell

Jackie Odell, Executive Director

CC: Terry Stockwell, Chair, New England Fishery Management Council
Elizabeth Etrie, Program Director, Northeast Sector Service Network

October 13, 2014 (updated final version)

Groundfish Plan Development Team
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Groundfish Plan Develop Team members,

The Northeast Sector Service Network (NESSN) offers the following *preliminary* information in response to the SSC's request for industry input for estimates of incidental, non-target catch of GOM cod under the prevailing operating conditions of the fishery.

NESSN has been working with the Northeast Fishery (NEFS) Sectors to gather data in response to the SSC's request. Although this work is ongoing, NESSN wanted to provide the groundfish PDT members with preliminary information in time for the PDT discussion scheduled for October 7, 2015. These analysis were compiled using various data sets available on NMFS Sector Information Management Module (SIMM), the final Fishing Year 2013 (May 1, 2013-April 30,2014) Detail Reports as submitted to NMFS and the Sector Managers extensive knowledge about the fishing activity of their Members.

It is important to recognize that GOM cod incidental catch estimates are based entirely upon the most recent conditions related to the catchability and catch rates of GOM cod throughout the fishing areas where NEF Sector members operate.

Furthermore, the NEF Sectors have also indicated that the low ACL's in 2013 and 2014 have directly served as a spatial management tool among and within statistical block areas. In other words, the ACL reductions have modified fishing activity whereby the more discreet areas where directed fishing on GOM cod would typically be conducted are fished much less frequently due to the operational realities of low allocations and high lease costs The sectors believe that this shift in fishing patterns within statistical block areas and on a much finer spatial and temporal scale than 30 minute squares should be verifiable through VMS track data. Due to the diverse substrates and depth contours that exist throughout the Gulf of Maine, each statistical block contains a broad range of fishing opportunities with regards to species targeting or avoidance strategies. This can be seen in **Appendix 1**, which documents the total annual catch of Gulf of Maine stocks including unit stocks for each Sector that predominantly conduct their fishery in the Gulf of Maine for Fishing Year 2010,2011,2012,2013. Additionally, a similar table that documents the combined annual catch for NEF Sectors who conduct the majority if not all of their fishing activity outside of the Gulf of Maine is provided for reference.

The Gulf of Maine Broad Stock Area (GOM BSA) is comprised of statistical area 514,513,515,512,511,465,464. Sector vessels fishing on a "sector trip" in the GOM BSA may be targeting any of the following allocated stocks:

- Gulf of Maine Cod
- Gulf of Maine Winter Flounder
- Gulf of Maine Haddock
- White Hake
- American Plaice
- Pollock
- Redfish
- Witch Flounder
- Cape Cod/Gulf of Maine Yellowtail (includes stat area 521)

Additionally, it is important to highlight that many vessels also participate in the monkfish, skate, and dogfish fisheries in the Gulf of Maine. Typically, these trips are deemed "sector trips" for ACE accounting purposes when the vessel utilizes a Groundfish Day at Sea. These "sector trips" must adhere to the retention requirements under the groundfish sector system, and any and all catch of allocated stocks (assumed or observed) are deducted from the Sectors Annual Allocation.

The majority of fishing activity in the Gulf of Maine occurs by vessels enrolled in NEFS 2, 3,6,10 and 11[1]. NEFS 5,7,8,9, and 13 have limited activity in the Gulf of Maine and preliminary responses from those sectors have indicated that they do not anticipate any greater activity in the Gulf of Maine in FY 2015 than in previous years. Northeast Fishery Sector 1 and 4 are lease only sectors with no fishing activity. Combined for Fishing Year 2014, the Northeast Fisheries Sectors combined represent 67.72% of the Gulf of Maine Cod Groundfish Sub-ACL, i.e. 1,237,278 live pounds. Of this combined 67.72%, 54.45% is based on permits enrolled in NEFS 2, 3,6,10 and 11 i.e. 996,333 live pounds.

	MRI's Enrolled FY 2014	Declared Active Vessels FY 2014
2-NEFS	81	36
3-NEFS	78	23
6-NEFS	22	5
10-NEFS	43	17
11-NEFS**	56	34
TOTAL	280	115

Compiled using Final FY 2014 Roster and Sector Contracts which designate Active/Non-Active Status

[1]** Up until Fishing Year 2014 Northeast Fishery Sector XI and XII were separate stand along sectors comprised primarily of members fishing out of New Hampshire. For Fishing Year 2014, these two sectors' merged into Northeast Fishery Sector XI. The fishing activity as captured in the FY 2013 Detail Reports for both Sectors was analyzed for the information being presented, but for simplicity the activity that occurred in FY 2013 for these two sectors is simply being referred to NEFS 11 in this preliminary report.

of "Sector Trips" Taken per Fishing Year

	2010	2011	2012	2013
2-NEFS	1605	2199	1944	1038
3-NEFS	2,540	2,959	2,294	1,258
6-NEFS	131	126	119	98
10-NEFS	762	1220	1213	613
11-NEFS**	1467	1970	1912	1315
TOTAL	6505	8474	7482	4322

Of Vessels Annually who took at least one "Sector Trip"

	2010	2011	2012	2013
2-NEFS	42	38	38	31
3-NEFS	38	35	30	25
6-NEFS	6	5	4	5
10-NEFS	20	22	21	11
11-NEFS**	27	27	25	20
TOTAL	136	127	118	92

Compiled using NMFS generated Year End Tables, which are utilized by Sectors when completing their Annual Reports

Each Sector has a distinct geographic and/or gear feature that precludes using the same filters and thresholds across or even within all Sectors. Generally, there are three broad categories of vessel size, gear type and historical fishing patterns contained between and within the sectors that direct all, or a majority of their fishing activity in the Gulf of Maine.

- The gillnet component is mostly comprised of the day gillnet class. NEFS 3 and 11 are primarily in this class while NEFS 10 has several members that are gillnet vessels.
- Day boat or "inshore" trawlers are generally, but not always the smaller of the dragger vessels. This class is defined primarily by their historical fishing patterns rather than by vessel size. The majority of NEFS 2 and 10 members are in this class while NEFS 11/12 in NH has several members in this class also.
- Mid-range and full range trawlers are vessels that have historically fished a substantial portion of their fishing history in the Gulf of Maine including west of 70:15 but their fishing patterns are mostly multi-day trips from 3 to 9 days with the majority of their time spent east of the WGOM closed area north and south of 42:20 on the same trips. NEFS 6 is comprised entirely of this class of vessels while NEFS 2 has a substantial component of membership in this class.

With the above considerations the Sectors who have the majority of fishing activity in the Gulf of Maine approached their analysis in one or a combination the following three ways:

(1) Sectors that have membership that fish both inshore (day vessels) and offshore (trip vessels) in the Gulf of Maine separated FY 2013 fishing activity between the two trip characteristics.
   a. For Offshore Vessel Trips: Trips that averaged 6.5 days at sea and landed 4,000 live pounds or greater of Gulf of Maine Cod were identified as "Directed Gulf of Maine Cod Trips"
   b. For Day Trip Vessels: Trips that had 700 live pounds or more of landings of Gulf of Maine Cod were identified as "Directed Gulf of Maine Cod Trips"
   c. All other trips were identified as "Non-Directed Gulf of Maine Cod Trips"
   d. The total landings/discards in live weight were summed together for the Non-Directed Gulf of Maine Cod Trips to calculated the total amount of Gulf of Maine Cod that would be needed in order to continue persecuting other stocks and fisheries in the Gulf of Maine

	Est. "Incidental" Catch of GOM Cod based FY 2013 Activity **after** Directed GOM Cod Trips were removed
2-NEFS	**163,608**

(2) Sectors that have membership that also participate heavily in fisheries such as dogfish, monkfish and/or skates:
   a. For all trips with a k-all (dogfish, monkfish, skates included) less than 2,000 pounds and Gulf of Maine Cod landings greater than or equal to 50% of the k-all were considered a "Directed Gulf of Maine Cod Trips"
   b. For all trips with a k-all (dogfish, monkfish, skates included) greater than 2,000 pounds and Gulf of Maine Cod landings greater than or equal to 15% or 33% of the k-all were considered a "Directed Gulf of Maine Cod Trips"
   c. The total landings/discards in live weight were summed together for the Non-Directed Gulf of Maine Cod Trips to calculated the total amount of Gulf of Maine Cod that would be needed in order to continue persecuting other stocks and fisheries in the Gulf of Maine

	Est. "Incidental" Catch of GOM Cod based FY 2013 Activity **after** Directed GOM Cod Trips were removed
3-NEFS	92,681
10-NEFS	36,405
11-NEFS**	96,000
TOTAL	225,086

(3) Sectors that have membership comprised of trip vessels that fish both inshore and offshore in the Gulf of Maine separated their "Directed Gulf of Maine Cod Trips" from "Non-Directed Gulf of Maine Cod Trips" based on the portion of Gulf of Maine Cod caught compared to total trip catch. Specifically, trips with a total catch of Gulf of Maine Cod comprising 65% of their total catch and higher were considered "Directed Gulf of Maine Cod Trips"

   a. The total landings/discards in live weight were summed together for the Non-Directed Gulf of Maine Cod Trips to calculate the total amount of Gulf of Maine Cod that would be needed in order to continue persecuting other stocks and fisheries in the Gulf of Maine.

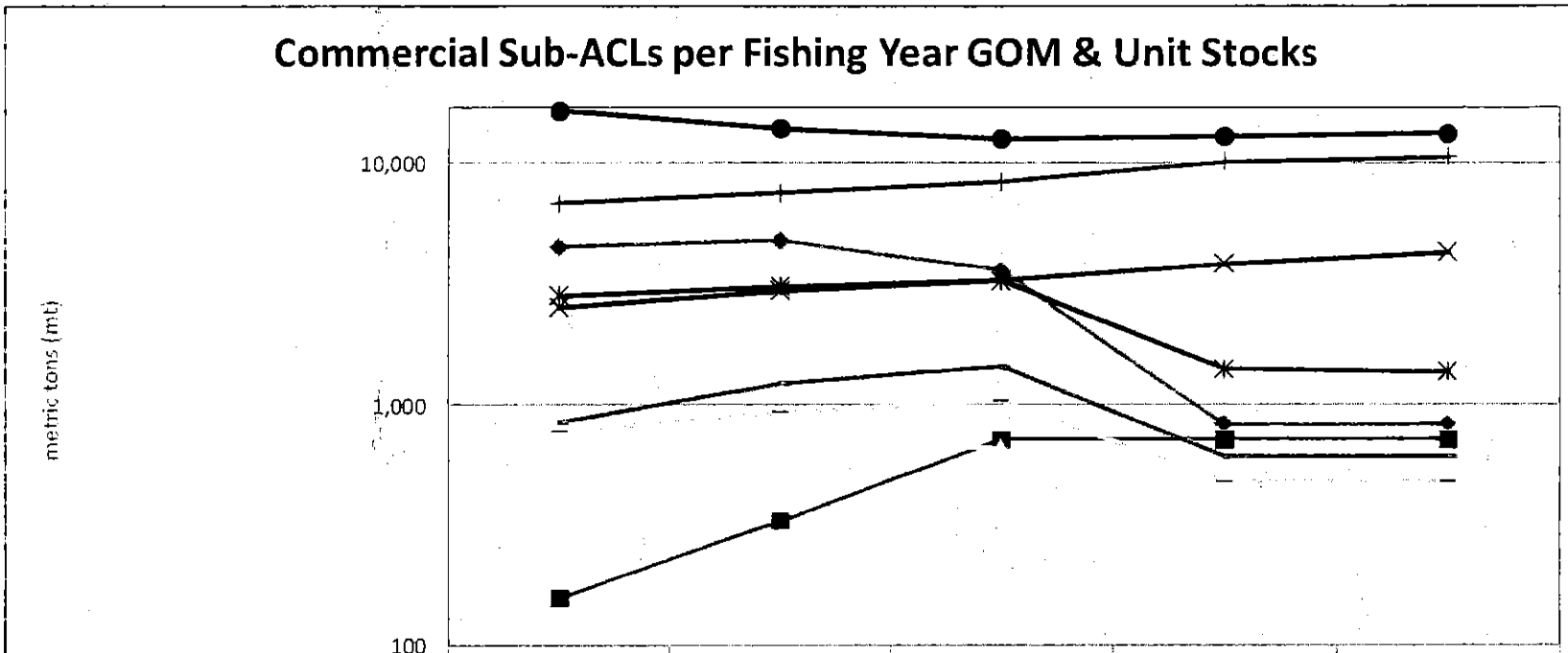
	Est. "Incidental" Catch of GOM Cod based FY 2013 Activity **after** Directed GOM Cod Trips were removed
6-NEFS	**47,137**

Annually, since the expanded sector management system began in Fishing Year 2010 Northeast Fishery Sectors 5,7,8,9 and 13 have had limited or no fishing activity in the Gulf of Maine. Based on conversations with the managers of these Sectors, it is anticipated that any limited fishing activity in the Gulf of Maine will continue to be at most consistent with previous fishing years. In light of this anticipated limited activity a proxy incidental catch was calculated using an average from FY 2010, 2011, 2012, and 2013.

	Est. "Incidental" Catch of GOM Cod based FY 2013 Activity **after** Directed GOM Cod Trips were removed
NEFS 5,7,8,9,and 13	**15,146**

Based on these analysis, and *assuming that current conditions and catch rates of GOM Cod throughout the BSA remain the same* the Northeast Fisheries Sectors estimate that combined they would need 453,961 (live pounds) i.e. 205 mt of GOM Cod to continue fishing for other stocks and other fisheries in the Gulf of Maine in FY 2015.

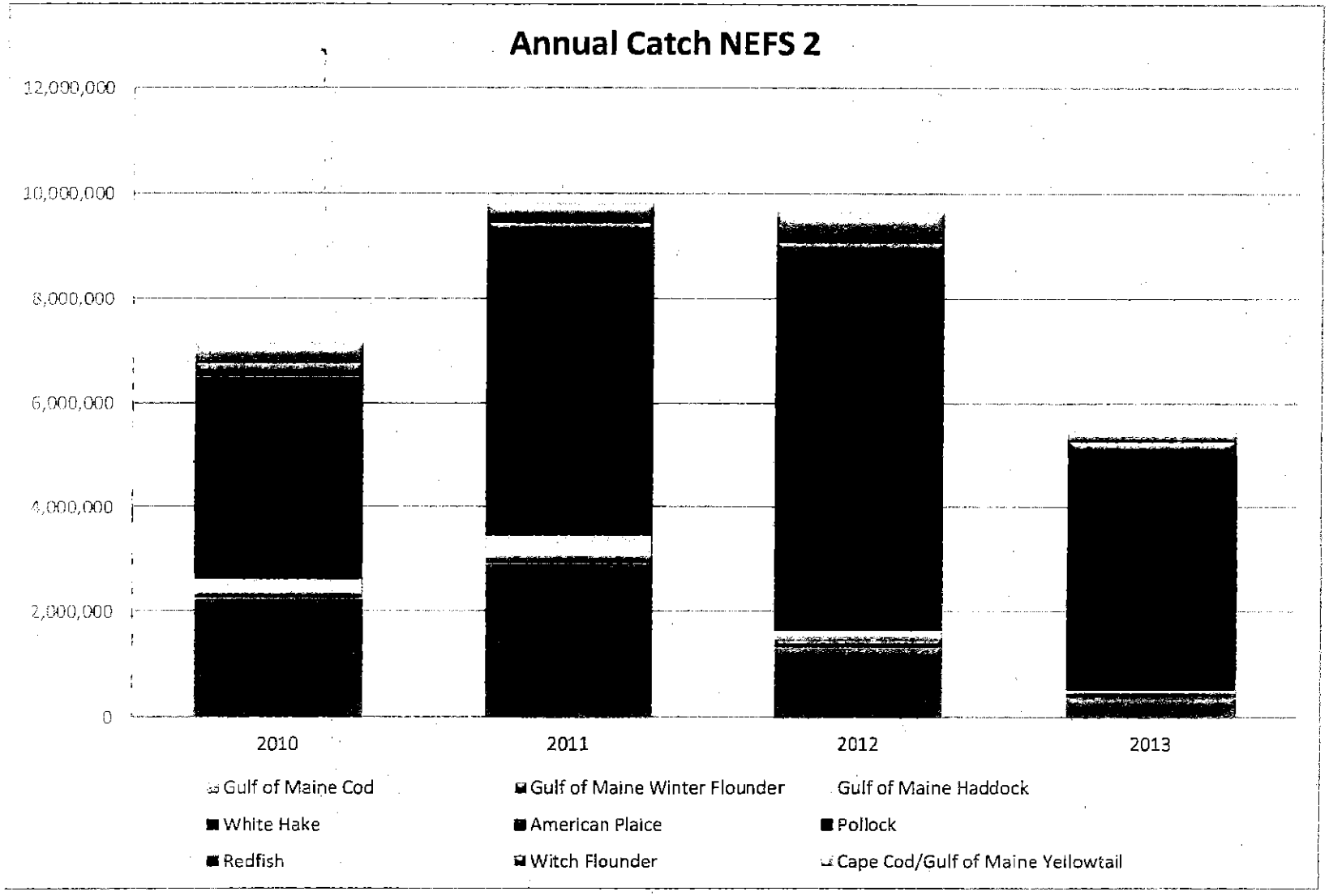
Appendix 1:



	2010	2011	2012	2013	2014
Gulf of Maine Cod	4,567	4,825	3,619	830	830
Gulf of Maine Winter Flounder	158	329	715	714.7	714.7
Gulf of Maine Haddock	825	778	653	187	220
White Hake	2,556	2,974	3,283	3,849	4,278
American Plaice	2,848	3,108	3,278	1,420	1,382
Pollock	16,553	13,952	12,612	12,893	13,224
Redfish	6,846	7,541	8,325	10,132	10,565
Witch Flounder	852	1,236	1,448	610	610
Cape Cod/Gulf of Maine Yellowtail	779	940	1,046	479	479

Data compiled using Commercial Sub-ACL's as documented on NMFS Sector Information Management Module (SIMM)

Appendix 1:


Annual Catch NEFS 2
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
2010
2011
2012
2013
Gulf of Maine Cod
Gulf of Maine Winter Flounder
Gulf of Maine Haddock
White Hake
American Plaice
Pollock
Redfish
Witch Flounder
Cape Cod/Gulf of Maine Yellowtail

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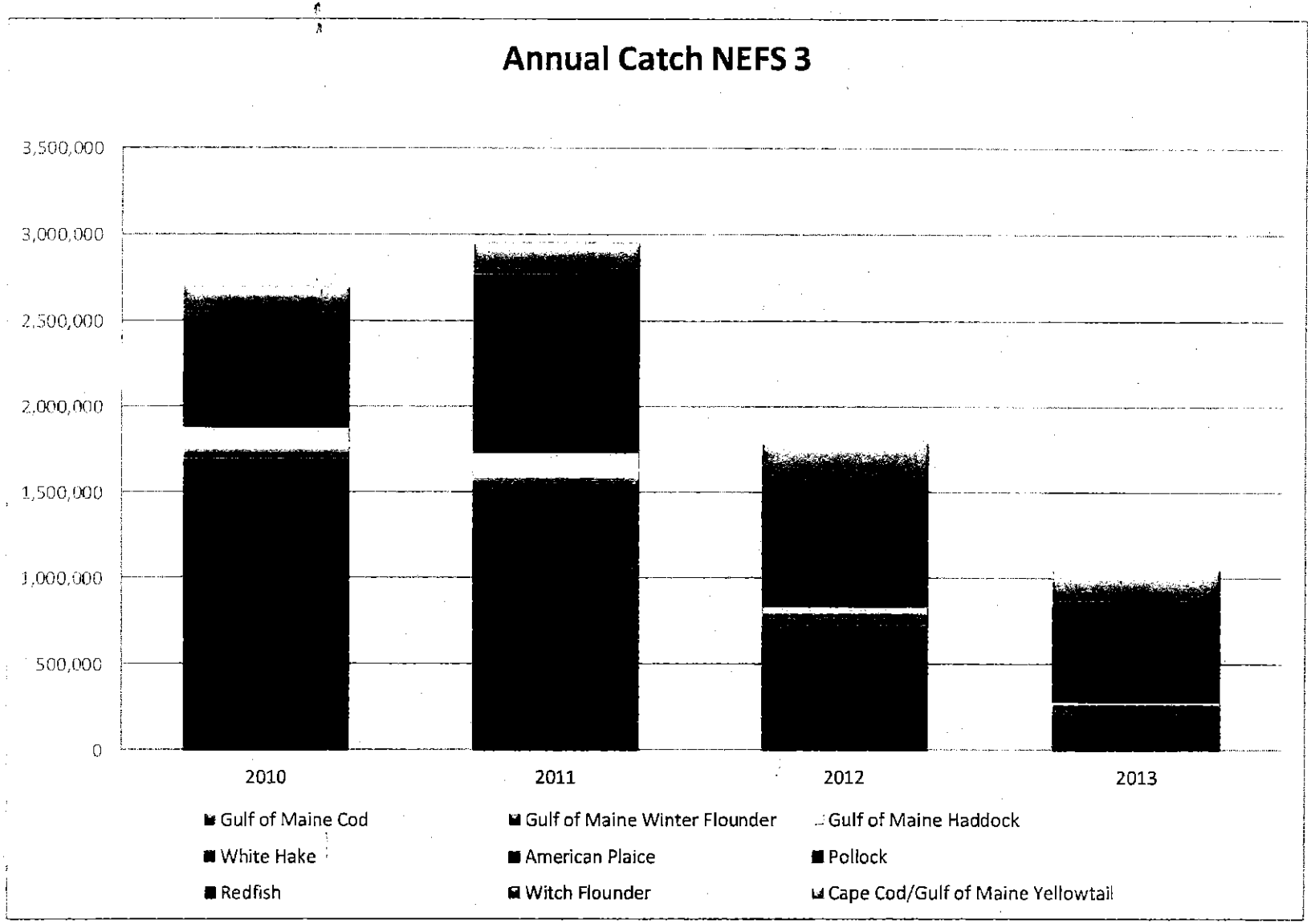
Annual Catch NEFS 3
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2010
2011
2012
2013
Gulf of Maine Cod
Gulf of Maine Winter Flounder
Gulf of Maine Haddock
White Hake
American Plaice
Pollock
Redfish
Witch Flounder
Cape Cod/Gulf of Maine Yellowtail

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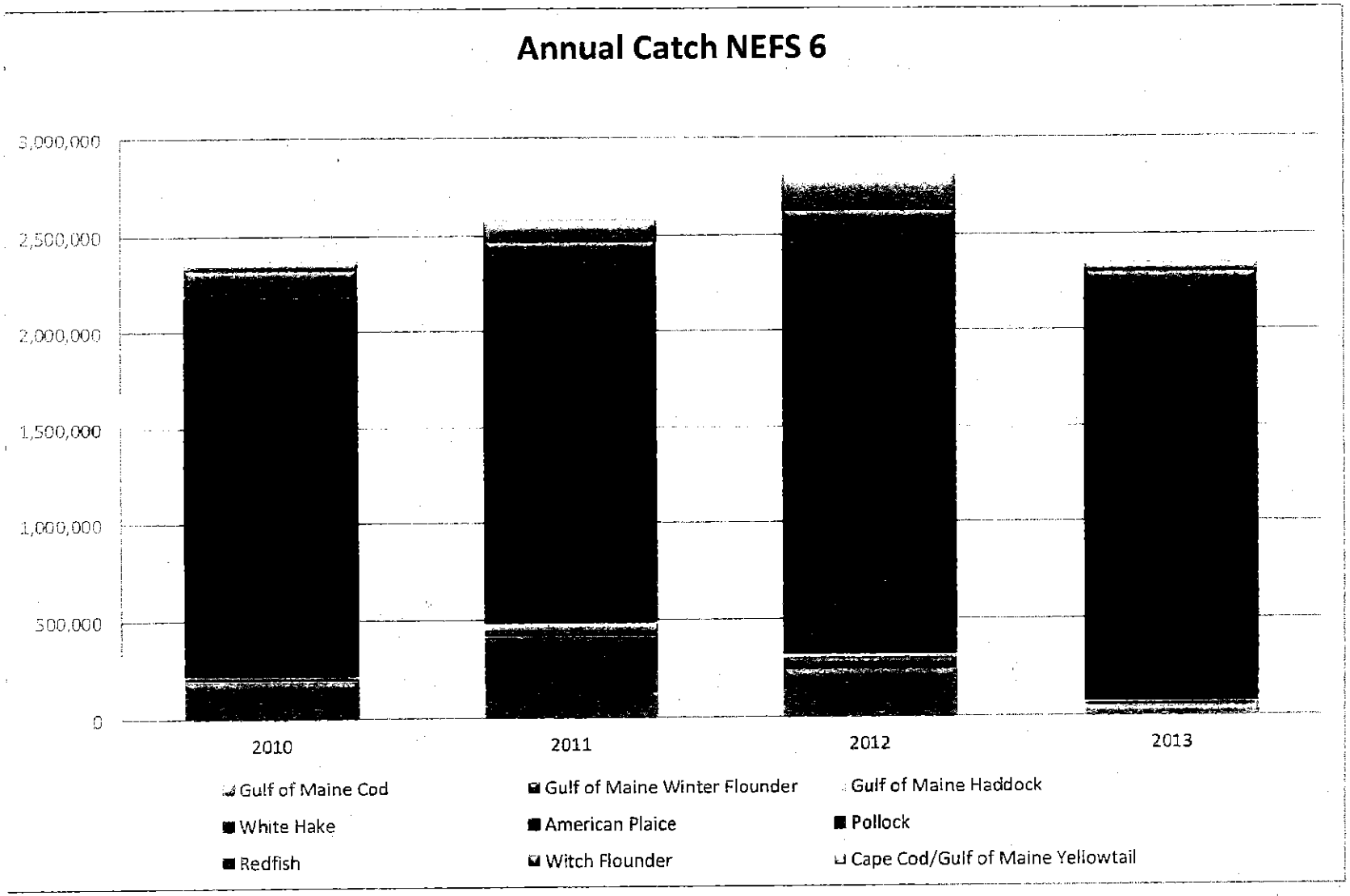
Annual Catch NEFS 6
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2010
2011
2012
2013
Gulf of Maine Cod
Gulf of Maine Winter Flounder
Gulf of Maine Haddock
White Hake
American Plaice
Pollock
Redfish
Witch Flounder
Cape Cod/Gulf of Maine Yellowtail

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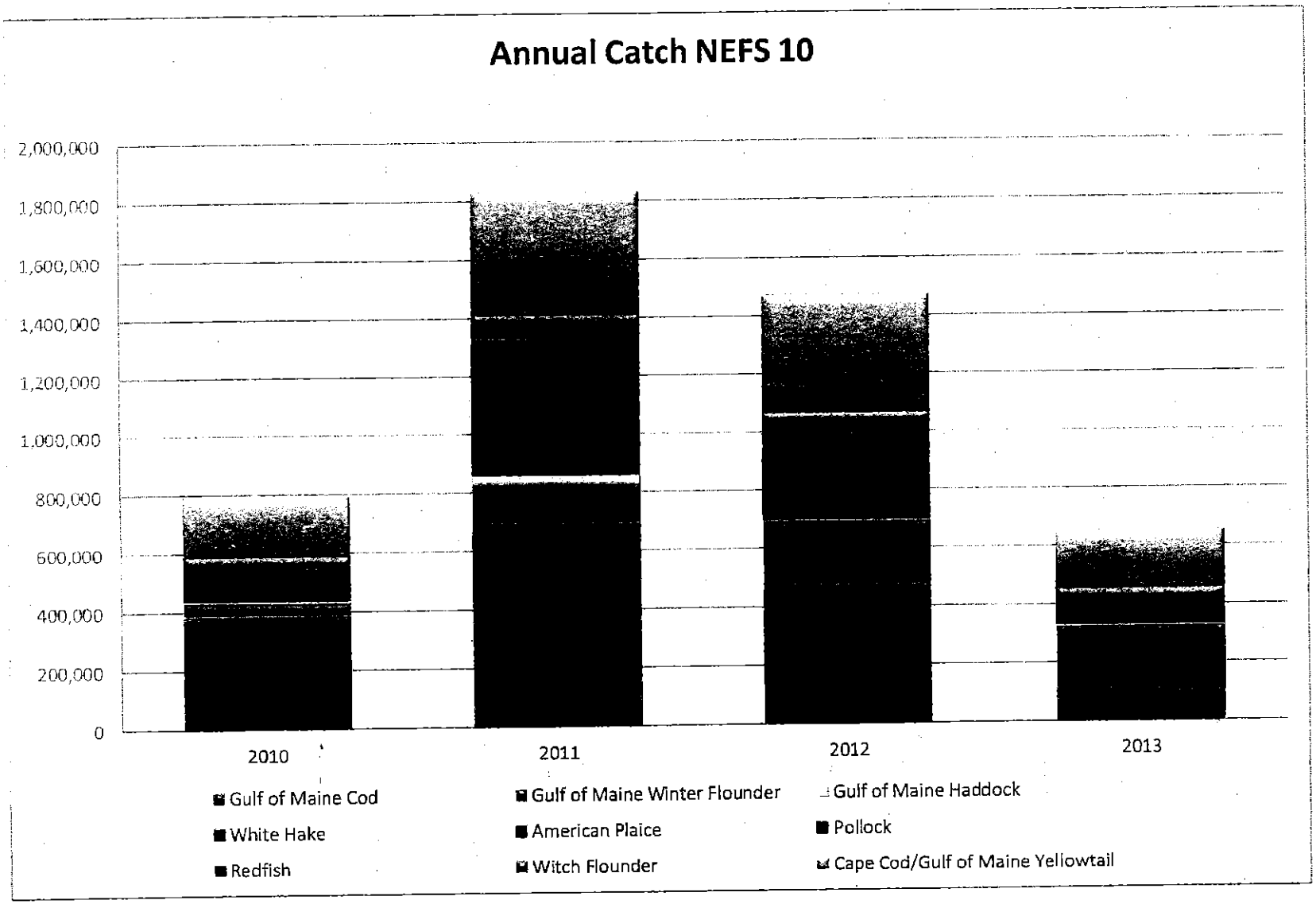
Annual Catch NEFS 10
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2010
2011
2012
2013
Gulf of Maine Cod
Gulf of Maine Winter Flounder
Gulf of Maine Haddock
White Hake
American Plaice
Pollock
Redfish
Witch Flounder
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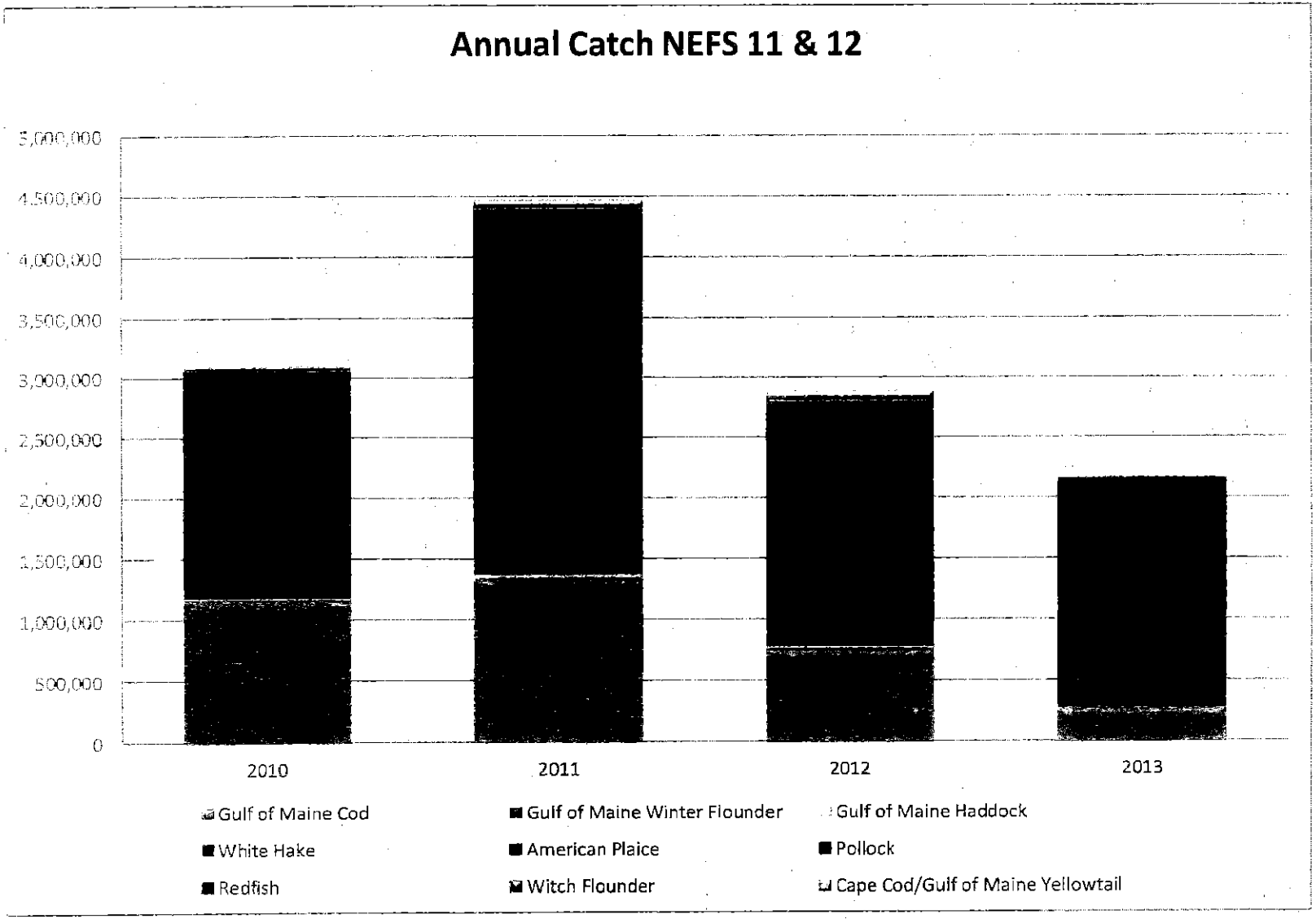
Annual Catch NEFS 11 & 12
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2010
2011
2012
2013
Gulf of Maine Cod
Gulf of Maine Winter Flounder
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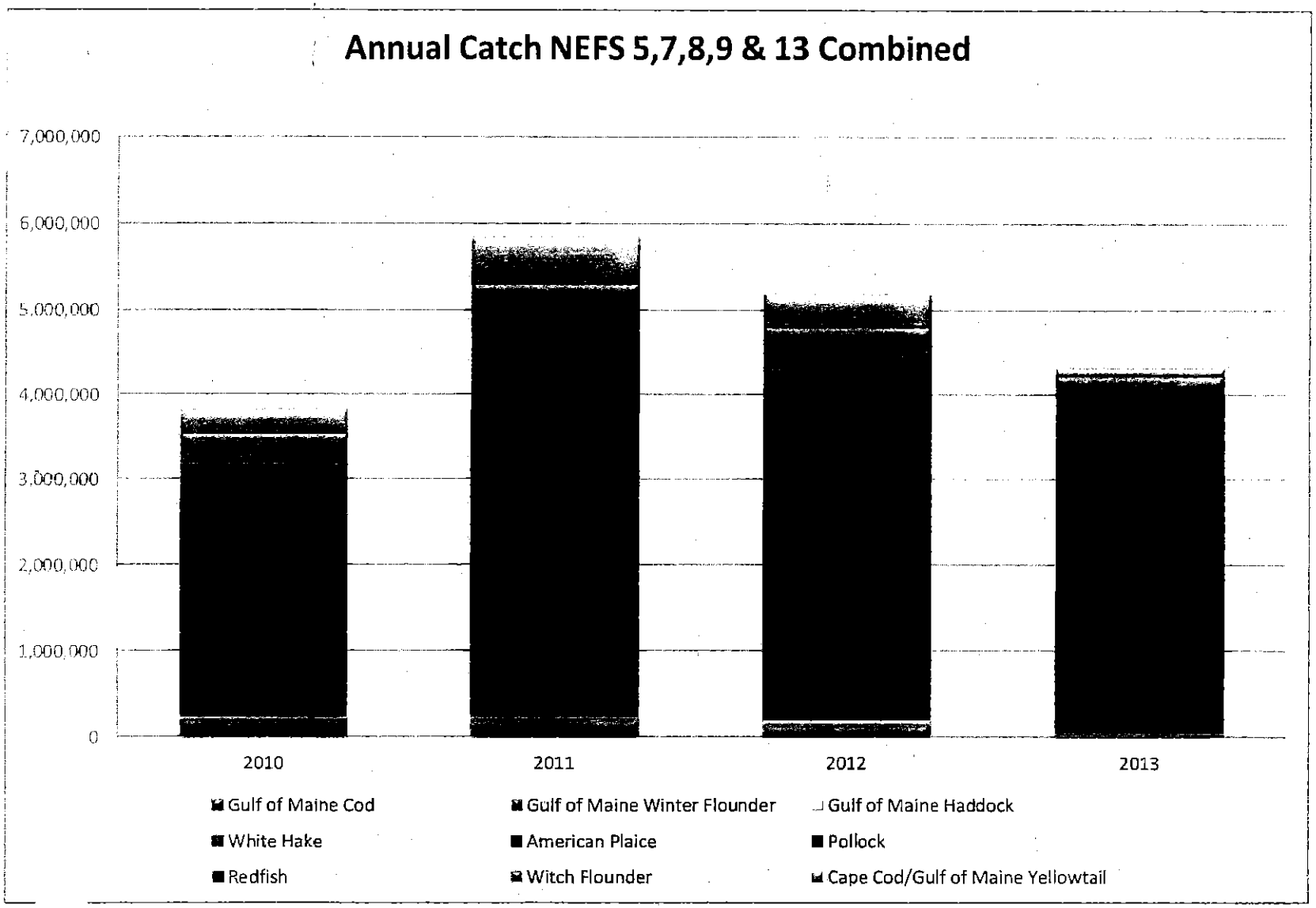
Annual Catch NEFS 5,7,8,9 & 13 Combined
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2010
2011
2012
2013
Gulf of Maine Cod
Gulf of Maine Winter Flounder
Gulf of Maine Haddock
White Hake
American Plaice
Pollock
Redfish
Witch Flounder
Cape Cod/Gulf of Maine Yellowtail

Appendix 1:

Graphs showing Catch of GOM and Unit Stocks on a Fishing Year basis per Sector compiled using NMFS generated Year End Accounting Tables specifically:

- *FY 2010 End of the Year Accounting of NE Multispecies Catch (lbs.) Run Date June 29,2011*
- *FY 2011 End of the Year Accounting of NE Multispecies Catch (lbs.) Run Date June 16,2012*
- *FY 2012 End of the Year Accounting of NE Multispecies Catch (lbs.) Run Date June 14 2013*
- *FY 2013 End of the Year Accounting of NE Multispecies Catch (lbs.) Run Date September 29, 2014*

3

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October 17, 2014

E.F. "Terry" Stockwell III, Chairman
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport MA 01950

Re: Windowpane Flounder Allocation

Dear Chairman Stockwell:

On behalf of the Fisheries Survival Fund ("FSF"), we submit this letter to express our concern regarding the Council's discussion on northern windowpane flounder at its meeting earlier this month in Hyannis, MA. FSF represents the significant majority of the full-time limited access permit holders in the Atlantic scallop fishery. Organized in 1998, FSF's participants include over 200 such permit holders, home-ported from the South Coast of Massachusetts, south through Connecticut, New York, New Jersey, Virginia and North Carolina. We appreciate the opportunity to provide these comments on this critical issue.

The New England Fishery Management Council ("Council") is currently developing Framework 53 to the Northeast Multispecies Fishery Management Plan ("FW 53"). In addition to setting specifications for FY 2015, the Council is considering a range of management options in FW 53 including alternatives for the Gulf of Maine cod inshore spawning closure, provisions for rollover of specifications and sector ACE carryover, and northern windowpane flounder sub-annual catch limits ("sub-ACLs") and accountability measures ("AMs"). The latter set of measures is inappropriate for consideration in this framework, since it would constitute an allocative action and therefore requires an amendment and an Environmental Impact Statement ("EIS") under the National Environmental Policy Act ("NEPA"). Furthermore, even if the Council were to proceed with analyzing allocative measures, it must use the most recent catch data as it has done for other stocks when setting allocations. Any management decisions that would allocate this bycatch-only species must ensure that all fisheries are treated fairly and receive enough quota that their businesses and livelihoods will not be put in jeopardy. Finally, the Council should consider alternative management strategies for northern windowpane flounder that more appropriately reflect the reality that it is a bycatch-only, unmarketable stock.

DB/jc/jp

I. ACTIONS ALLOCATING STOCKS IN A FISHERY REQUIRE AN EIS

Modifications to a Fishery Management Plan ("FMP") are adopted through amendment, framework, or regulatory amendment actions. NEPA requires the drafting of an EIS or an Environmental Assessment ("EA") to accompany the first two types of actions. Typically, the Council prepares an EIS for an FMP amendment and an EA for an FMP framework, although that is not necessarily the required practice. Whether or not an amendment or framework is required, and whether the action is accompanied by an EIS or an EA, depends upon the specific management options considered therein. Any management action that allocates fishery resources, particularly in a way that was unanticipated in the original FMP or any previous amendment, will require an EIS and an amendment. Although Amendment 16 to the Northeast Multispecies FMP did anticipate modification of subcomponents in framework actions, the entire current context of northern windowpane flounder was not foreseeable at the time it was drafted and therefore the FMP lacks the requisite analysis to allow for the creation of a new allocation in a framework.

Actions Requiring an EIS

NOAA Administrative Order 216-6, which contains the primary guidelines for the agency's NEPA implementation, advises that the key relevant factor in determining whether an EIS is required for a fisheries action is whether "significant beneficial or adverse impacts are reasonably expected to occur." Cumulative impacts must also be considered in determining whether to prepare an EIS.[1] The guidance provides specific details on how to determine the significance of fishery management actions. It states that, if significant socioeconomic impacts are interrelated with those of the natural or physical environment, "then an *EIS* should discuss all of the effects on the human environment."[2] Those socioeconomic impacts to the users of the resource must be considered in a significance determination. Furthermore, the degree to which the effects on the quality of the human environment are likely to be highly controversial must be considered in such a determination, and this aspect should be used in determining what level of environmental review is needed.[3]

The Council and NMFS have consistently interpreted the controversiality language to mean that allocations cannot be considered in an EA. Even at the most recent Council meeting in September 2014, the Chair ruled a motion to consider allocating windowpane flounder among

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[1] NOAA, *Administrative Order Series 216-6: Environmental Review Procedures for Implementing the National Environmental Policy Act* 6.03d.2 (May 20, 1999).

[2] *Id.* at 6.02h (emphasis added).

[3] *Id.* at 6.02i.

sectors in FW 53 out of order because such an allocation would require an EIS. Any decision to create a new sub-ACL, and therefore allocate a stock with low biomass levels among two fisheries in which it is caught as bycatch, would similarly be highly controversial. Even small differences in the allocation would have substantial social and economic impacts to both the groundfish and scallop fleets. Therefore, an EIS is required if the Council is to consider creating sub-ACLs for windowpane flounder stocks.

***Actions Requiring an FMP* Amendment**

Whether a fishery management measure may be adopted in a framework, or whether it requires an amendment to the FMP, depends upon the extent to which the measure was anticipated and analyzed in the original FMP or a previous amendment. Only if the measure was adequately described and analyzed in, and is within the scope of, the FMP and implementing regulations, can it be adopted through a framework. Otherwise, the FMP must be amended before the measure may be implemented.[4] NOAA's Operational Guidelines further specify that the "framework concept is not intended to circumvent the FMP amendment process that must take place when circumstances in the fishery change substantially...."[5] Thus, the framework process is reserved only for adjustments that are truly routine and directly derived from the existing FMP and its amendments.

The level to which a proposed action has been described with specificity in previous actions is a key factor in determining what type of action is necessary for the consideration of that action. The FMP itself, as amended, typically specifies what types of adjustments may be completed in follow-on frameworks—in acknowledgment that the analysis has been completed for that category of actions. Downstream actions that cannot be anticipated or adequately analyzed in an FMP amendment are not suitable for adoption in a framework.

The Northeast Multispecies FMP neither describes, nor analyzes, the allocation of windowpane flounder stocks in a way that would allow the stock to be divided into sub-ACLs in a framework action. Amendment 16, which adopted major modifications to the FMP including many of the currently-applicable allocative measures, does list the modification—but not the establishment—of fishery sub-component allocations as a "frameworkable" item. The requisite analysis does not exist because the substantial recent change in fishery conditions and catches was unanticipated.

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[4] National Marine Fisheries Service, *Operational Guidelines Fishery Management Plan Process* A-68 (May 1, 1997).

[5] *Id.*

Amendment 16 gave express permission for only one species—yellowtail flounder—to be divided into sub-ACLs for the groundfish and scallop fisheries. In fact, the amendment explicitly states this fact in describing future management actions for yellowtail flounder:

> Catches of regulated groundfish in the scallop fisheries depend on a wide range of factors: scallop and groundfish abundance, the scallop rotational management program, etc. These factors are variable and cannot be predicted in this action.[6]

Even in more general terms, Amendment 16 provided guidance for only one other stock to be allocated in a framework action:

> Allocation of the SNE/MA winter flounder stock can be considered and adopted in the biennial specification or framework process in the event a future allocation can be made available. If an allocation of SNE/MA winter flounder is made, it will be made in the same manner as for other multispecies stocks.[7]

The omission of similar language for other stocks indicates that the Council's intent was not to allow for any allocation or sub-allocation to be permissible without the complete mandatory analysis.

Although the SNE/MA winter flounder provision related to allocation among groundfish sectors, assignment of sub-ACLs among fisheries is no less allocative a measure. Furthermore, though Amendment 16 states that "[t]he specific sub-components, and percentage assigned to each sub-component, may be changed through the specifications process or another management action (framework or amendment),"[8] windowpane flounder was treated differently in Amendment 16 than the only groundfish species that was sub-divided among the scallop and groundfish fisheries (yellowtail flounder), because sectors were prohibited from landing windowpane.[9] This prohibition, and the resulting lack of a market for the species, necessitates different considerations for determining proper allocations.

Just as allocating to sectors requires an amendment, so too does allocating groundfish to scallopers. The amendment contains detailed language and analysis of the yellowtail flounder

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[6] New England Fishery Management Council, *Amendment 16 to the Northeast Multispecies Fishery Management Plan* 91 (2008). In fact, the Scallop Fishery had received yellowtail flounder allocations for Georges Bank access area fishing, dating back to the development of these access area programs.

[7] *Id.* at 101.

[8] *Id.* at 91.

[9] *Id.* at 106.

allocation process, but none for other stocks—much less for those that are not managed analogously. It cannot be said, then, that the tradeoffs and controversies associated with its allocation were considered in the scope of the amendment and analyzed therein. For all of these reasons, creating an allocation in a framework is contrary to legal and policy guidelines.

II. THE COUNCIL MUST USE THE MOST RECENT PROJECTIONS WHEN SETTING ALLOCATIONS

At its September 2014 meeting, the Council reviewed a Plan Development Team ("PDT") memorandum, dated September 12, 2014, that established the basis for the draft FW 53 document. The PDT examined windowpane flounder catch in the scallop and groundfish fisheries from 2001 through 2010, and used those years to develop a projection for how much of the stock the scallop fishery "needs" to be effectively prosecuted. The catch levels were calculated from the 2012 groundfish assessment updates.

These numbers are not recent enough to constitute the best scientific information available. Moreover, the Council's justification for developing a sub-allocation between the fisheries was based on recent increases in catch—increases that have occurred between 2010 and 2012. If substantial ecosystem changes have recently occurred, which have led to an increase in windowpane flounder bycatch in both fisheries, then those new conditions must inform the development of any potential sub-ACLs. The alternatives currently in the draft FW 53 claim to use "recent catch history as the basis of the allocation, which is consistent with the development of the GB yellowtail flounder and southern windowpane flounder sub-ACLs for the scallop fishery."[10] However, in addition to the objection described above that the yellowtail flounder provisions in Amendment 16 were not adequately precedential to allow a windowpane flounder sub-ACL in a framework, the use of catch data that is more than four years old is even less consistent with an approach that used recent catch data.

III. THE COUNCIL MUST TREAT FISHERIES EQUALLY IN THE ALLOCATION OF A BYCATCH-ONLY SPECIES, IF SUCH AN ALLOCATION OCCURS

National Standard 4 states, in part, that "[i]f it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be fair and equitable to all such fishermen." The Council must consider this principle in any future deliberations regarding allocations.

[10] Memorandum from Groundfish Plan Development Team to Groundfish Committee (Sept. 26, 2014).

Windowpane flounder is a bycatch-only species, meaning that it has no directed fishery, and is not currently allocated. There is no market value for the fish, and no foreseeable possibility of it developing any market demand as it contains very little yield in its fillets; thus the name windowpane. Therefore, any ACL associated with the stock is used only for the purposes of allowing the prosecution of other fisheries, while controlling for inadvertent overfishing on windowpane. The species has the capability to become a "choke stock" and greatly constrain the ability to harvest optimum yield in valuable directed fisheries. If the Council chooses to allocate windowpane stocks in an amendment, therefore, it must do so in a way that maximizes the capacity of the directed fisheries to operate efficiently and profitably.

The yellowtail flounder sub-ACL for the scallop fishery, originally adopted in Framework 44 to the Northeast Multispecies FMP, was determined based on a percentage of the projected "need" of the fishery, with the remainder left available for catch in the groundfish fishery. The rationale behind the measure was two-fold, as it: 1) allowed the scallop fishery to achieve optimum yield while promoting innovation in bycatch reduction; and 2) allowed the groundfish fishery to continue a limited directed fishery on yellowtail flounder. The same rationale could not apply to windowpane flounder. There is no directed fishery, so these criteria are not applicable. Instead, the only possible allocation scheme (should the Council choose to allocate the stock in a future management action) would be one based on equitable bycatch allowance.

IV. THE COUNCIL SHOULD CONSIDER ALTERNATIVE MANAGEMENT STRATEGIES FOR SOUTHERN WINDOWPANE FLOUNDER

If the Council chooses to consider allocation of northern windowpane flounder in an amendment to the FMP, it should also consider a range of strategies to meet the same management objectives. Although the Council is required to specify ACLs for all stocks that are "in the fishery,"[11] the National Standard Guidelines indicate that reconsideration of stock classification is envisioned as a relatively routine task.[12] The original New England groundfish

[11] 16 U.S.C. § 1853(a)(15) (FMPs must "establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability."); 16 U.S.C. § 1853(a)(2) (FMPs must "contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, *the species of fish involved and their location*, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interests in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any.") (emphasis added).

[12] 50 C.F.R. § 600.310(d)(6) ("A Council should monitor the catch resulting from a fishery on a regular basis to determine if the stocks and species are appropriately classified in the FMP. If the criteria previously used to classify

FMP also underscored the need for flexibility in future decisions about what stocks would be included in the fishery.[13] The Council has broad discretion in choosing which stocks to manage–either in the fishery, as ecosystem component species, or not at all.[14]

Ecosystem Component Designation

A Council may exclude a stock from the FMP and thus create flexibility in setting specifications so long as overfishing does not occur on that stock. A Council may also designate a stock as an ecosystem component ("EC") species, in order to facilitate ecosystem based management and address tradeoffs associated with mixed stock fisheries. Once a stock is designated as an EC, ACLs and associated reference points are not required, although measures should be implemented to reduce bycatch and to monitor scientific information including catch trends and vulnerability.[15]

As of the 2012 assessment updates, northern windowpane was overfished and overfishing was occurring. The National Standard ("NS") 1 Guidelines suggest that overfished stocks should not be characterized as EC species, but the Guidelines are not legally binding. Rather, they merely provide guidance on various principles of fishery management that must be carefully balanced—including achievement of optimum yield. The Guidelines state the criteria "should" be met—not that they must. Furthermore, it is explicitly stated in the Magnuson-Stevens Act

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a stock or species is no longer valid, the Council should reclassify it through an FMP amendment, which documents rationale for the decision.").

[13] New England Fishery Management Council, *Northeast Multispecies Fishery Management Plan* (1986) § 4.2 ("An absolute listing of all species for which regulations may, at some time in the future, be necessary is not practical while the need for such flexibility is real given the multi-species approach, changing market circumstances, and other industry and fishery developments.").

[14] The Final Rule for ACLs and National Standard Guidelines states: "The final NS1 guidelines do not require a Council or the Secretary to include all target and non-target species as 'stocks in the fishery,' do not mandate use of the EC species category, and do not require inclusion of particular species in an FMP. The decision of whether conservation and management is needed for a fishery and how that fishery should be defined remains within the authority and discretion of the relevant Council or the Secretary, as appropriate. NMFS presumes that stocks or stock complexes currently listed in an FMP are 'stocks in the fishery,' unless the FMP is amended to explicitly indicate that the EC species category is being used." 74 Fed. Reg. at 3179 (January 16, 2009).

[15] 50 C.F.R. § 600.310(d)(5)(iii) ("While EC species are not considered to be 'in the fishery,' a Council should consider measures for the fishery to minimize bycatch and bycatch mortality of EC species consistent with National Standard 9, and to protect their associated role in the ecosystem. EC species do not require specification of reference points but should be monitored to the extent that any new pertinent scientific information becomes available (e.g., catch trends, vulnerability, etc.) to determine changes in their status or their vulnerability to the fishery.'").

that the NS Guidelines do not have the force of law and are therefore intended to be advisory in nature.[16]

Stock Complex Management

In another example of a flexible management strategy, the ACL final rule allows for the use of indicator stocks or stock complexes to manage mixed stock fisheries, particularly in situations where data-poor stocks prevent reliable single-stock ACLs from being developed.[17] In general, to be managed as a complex or to use a surrogate indicator, stocks should be "similar in geographic distribution, life history, and vulnerability to particular fisheries" so that the impact of management actions on the stocks is similar."[18] The NS Guidelines state that circumstances that may justify grouping stocks into complexes include those in which stocks in a multispecies fishery cannot be targeted independently of one another and in which maximum sustainable yield cannot be defined on a stock-by-stock basis, among others.

If indicator stocks or stock complexes are used in management, the ACL final rule requires Councils, in consultation with their SSCs, to analyze the vulnerability of such stocks. The NS Guidelines define a stock's vulnerability as a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery.[19] Windowpane flounder is a good candidate for management as part of a stock complex. Its vulnerability and productivity indices do not indicate a special need for individual management, based upon a NMFS pilot study.[20]

* * * * *

In summary, if the Council chooses to consider an allocation for northern windowpane flounder, it must do so in an amendment with an associated EIS. Any allocation would need to be equitable amongst managed fisheries, and be based on the most recent projections fully reflecting the current state of the resource. Given that windowpane flounder has no market value and no targeted fishery the Council may also wish to consider alternative management strategies

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[16] 16 U.S.C. § 1851(b) ("The Secretary shall establish advisory guidelines (which shall not have the force and effect of law), based on the national standards, to assist in the development of fishery management plans.").

[17] 74 Fed. Reg. 3178 (January 16, 2009).

[18] 50 C.F.R. § 600.310(d)(8).

[19] 50 C.F.R. § 600.310(d)(10).

[20] Wesley Patrick et al., *Use of Productivity and Susceptibility Indices to Determine Stock Vulnerability, with Example Applications to Six U.S. Fisheries* (2009).

including those described above. Thank you for the opportunity to provide these comments. As always, please do not hesitate to contact us with any questions or concerns.

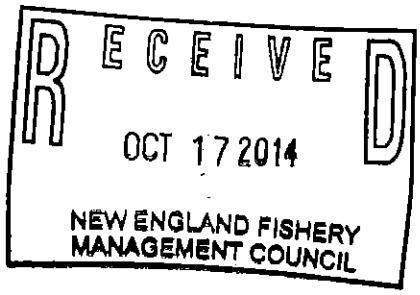
Sincerely,

David E. Frullà
Andrew E. Minkiewicz
Anne E. Hawkins

Counsel for Fisheries Survival Fund

October 17, 2014

John Bullard
Regional Administrator
NOAA Fisheries, Northeast Regional Office
55 Great Republic Drive
Gloucester, MA 01930



Dr. William Karp
Science and Research Director
Northeast Fisheries Science Center
NOAA Fisheries Northeast Region
166 Water Street
Woods Hole, MA 02543

Dear John and Dr. Karp,

In preparation for the Northeast Region Coordinating Council (NRCC) meeting, we wanted to convey our serious discontent over the lack of process and transparency surrounding the Gulf of Maine cod assessment conducted and delivered by the Northeast Fishery Science Center (NEFSC) in August.

At the upcoming NRCC meeting, we truly hope the NRCC will address the *lack of process* which occurred for this update. This includes but is not limited to the NEFSC unilateral decision to conduct an assessment with no prior knowledge by NRCC, GARFO, New England Council or the public; no prior dialog on the recent data utilized in the assessment, and no Terms of Reference (TORs). The action taken by the NEFSC runs contrary to the recent revisions and overall intent of National Standard 2.

- Strengthen the reliability and credibility of NMFS's scientific information;
- Emphasize the importance of transparency in the scientific review process;
- Improve public trust and benefit stakeholders through more effective policy decisions.

In Russell Brown's letter to Terry Stockwell on August 1, 2014, it was noted that the NEFSC conducted this assessment in response to requests made by the industry over the years who have asked for more timely information on stock conditions. Mr. Brown also noted during the Groundfish Committee meeting on August 4, 2014 that the NEFSC has been considering alternative stock assessment approaches to streamline the assessment process.

It is important to note that neither NSC nor the GFCPF has ever advocated for more "assessments" but rather for *improved assessments.* There is also a very big difference between collecting and reviewing fisheries data on a regular basis with the Council versus running assessments with no transparency, no process or any real deliberation over the data being utilized. We strongly support and encourage increasing the quality and density of both fishery

and non-fishery dependent data and we certainly support scientific updates as frequently as information indicates a potential change in stock status that was unanticipated. But sharing information on an ongoing basis does not elevate each intermediate evaluation to a level that should be assumed adequate to require instantaneous management response. It is common knowledge that the trawl survey produces noisy results on an annual basis and even inter-annually and that this information is only informative for trends over a longer period of time. Until such time as the NEFSC survey is sampling exponentially more than 1/3 of 1% of the northeast multispecies complex stock range it is, in our opinion, untenable to be managing the fishery based almost entirely upon relatively short timeline of survey results.

NSC and the GFPF have collaborated with other industry organizations over the years to hire consultants to participate, collaborate and work with NEFSC staff in the assessment process. We have engaged outside consultants - some world renown - that have expertise and knowledge of the modeling and assessment process that can offer real outside expertise. We do this to have more public trust in the process and, as outlined in National Standard 2 guidelines, ensure the best scientific information is being considered for conservation and management.

We have viewed our participation in the scientific assessments as our contribution to the process. Ultimately, this effort should result in an increased confidence in the outcomes by industry stakeholders. Contrary to what some may believe, the core value and purpose of retaining a consultant to participate in the stock assessments is for us to have someone who can help us understand the scientific realities, the distinction between differing viewpoints where and when they exist, and just as often, to explain the typically vast areas of scientific consensus. This helps everyone. We also truly believe this is the only genuine way for industry to participate in the scientific process due to the level of expertise required. The recent GOM cod trial assessment not only set aside the normal NRCC scheduling but it chose to update an assessment on the very stock NSC and GFCPF have been directly participating in through the work of Dr. Butterworth.

It is important to note that NSC and GFCPF have become increasingly alarmed by the degree of uncertainty that exists within the assessments and the degree of change that can occur from one assessment to the next with no accountability on the previous parameters reported. This occurs whether it is done every five years – or via the most recent "test" conducted for GOM cod by the NEFSC. When this volatility gets plugged into management and rebuilding plan requirements it creates chaos. This has and continues to be an extremely unstable environment to operate a fishing business. We have witnessed that the projections quite often have very little to do with catch and much more to do with environmental factors that have yet to be adequately addressed and accounted for in the assessments.

Regardless of whether the industry is meeting or underachieving a TAC, when the scientific parameters change through an updated assessment – stock status can quickly change from being rebuilt to a stock being overfished or overfishing occurring. When this is translated into the public realm it turns into an unhealthy and unconstructive debate concerning "the industry

hasn't taken the pain" or "the industry has been too involved in the management process". Unfortunately, the real issues rarely get resolved.

After the groundfish disaster was declared, NSC wrote a letter to the Council requesting that alternative approaches for setting catch advice be explored. The Groundfish Advisors also passed the following motion during their meeting held in September 2013:

The GAP supports and encourages the GF OSC to pursue, under council priorities, alternative methods for setting catch advice to achieve the following management objectives:

1. Protect fish stocks and commercial / recreational fishermen by stabilizing catch advice within historical catch ranges known to be safe both biologically and economically.
2. Use historical data from past assessments to determine the catch at which point the stock biomass that followed was stable and increasing.
3. Account for volatility in successive assessment results by developing management strategies that are **risk averse to either optimistic or pessimistic** assessments that indicate ACL increases or decreases that are outside these historical "safe" catch levels by slowing the increases or decreases to pre-set, incremental steps upward or downward.
4. **Pursue scientifically based methods that can meet these objectives within NS1 / MSA**

The Council has adopted - as a multi-year priority - this type of approach and is searching for consultants who may be able to assist in the development of alternative methods. We look forward to this work and truly hope this can offer some smoothing effects to the volatile system in which we are currently entrenched.

NSC and GFCPF have participated in good faith in all Council, NEFSC and GARFO related initiatives. We strive for good communication, transparency and true collaboration. We believe in fisheries management and appreciate the complexity associated with stock dynamics. However we see fishing businesses failing and communities crumbling every day under the present process – and clearly see the lack of transparency is at the highest levels. This recent "test" assessment of GOM cod has crumbled whatever fishing stakeholder trust and confidence that existed prior to this. Unfortunately, the current course of events has eroded our own confidence to a point where we no longer believe our participation can be effective unless some real efforts are put forth by GARFO and NEFSC. Workshops and strategic plans are not the answer. Common sense protocol and processes that are transparent, inclusive, respectful and balanced need to be reinforced and rigidly followed.

In summary, the NSC and GFCPF strongly urge the NRCC to emphasize that no "trial" assessments occur by the NEFSC outside of some well-established and vetted process in the future. Again, there is a substantial difference between presenting and informing managers with updated data and unilaterally initiating and completing a stock assessment, asking for and receiving an adhoc peer review causing statutory triggering of devastating management responses.

Thank you for your time and attention to this critical matter.

Jackie Odell
Executive Director
Northeast Seafood Coalition

Vito Giacalone
Executive Director
Gloucester Fishing Community Preservation Fund

Cc: Terry Stockwell, Chair, New England Fishery Management Council
Tom Nies, Executive Director, New England Fishery Management Council

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

(3)

October 20, 2014

Ms. Maggie Raymond
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Ms. Jackie Odell
Northeast Seafood Coalition
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Gloucester Fishing Community Preservation Fund
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Gloucester, MA 01930

Dear Maggie, Jackie, and Vito:

Thank you for your August 20, 2014, letter regarding the Gulf of Maine haddock stock assessment and SAW/SARC59 peer review. I appreciate the concerns you have expressed, and the fact that you took the time to draft this letter, and I apologize for this delayed response.

In your letter, you raise many specific concerns regarding the assessment process, the decisions of the working group, and specific aspects of the role and responsibility of the peer review panel and the conclusions of the panel, especially as they relate to Term of Reference (TOR) 3, "evaluate the hypothesis that haddock migration from Georges Bank influences dynamics of the GOM stock..."

Rather than respond to each of your specific concerns in the body of this letter, we provide detailed responses in the enclosed document. I would, however, like to respond directly to your overarching concern this TOR 3 was not addressed appropriately and adequately by Working Group (WG) and by the SARC review panel.

The WG did, in fact, evaluate the available scientific information and incorporated it into the stock assessment that was brought forward to the SARC for independent peer review. The SARC panel then concluded that the WG used the available information appropriately and pointed out in the SARC reports the kinds of scientific research that would be needed to address

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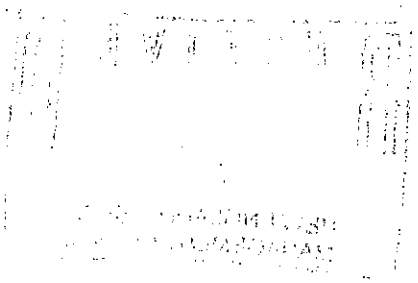
the TOR more fully. We will consider these research recommendations as we set NEFSC science priorities in FY15 and beyond.

Please do not hesitate to contact me if you would like to follow up on this issue.



Sincerely,

Russell W. Brown
for

William A. Karp, Ph.D.
Science and Research Director

Enclosure
cc: T. Stockwell
T. Nies
J. Kritzer
J. Bullard
C. Moore

ENCLOSURE
(*NEFSC comments are below in italics*)

Comment: The letter does not acknowledge that the work presented to the SARC59 peer review panel represents the consensus opinion of the SAW59 working group (WG). Drs. Butterworth and Rademeyer as well as two authors of the letter were WG participants.

We are writing to express our concern that the recent benchmark assessment conducted for Gulf of Maine (GOM) haddock did not adequately address the Term of Reference (TOR) concerning mixing between the Georges Bank (GB) haddock and Gulf of Maine haddock stocks. We also wanted to notify you of our concerns relating to the treatment of the 2012 year class for GOM haddock when setting a future ABC/ACL for this stock.

Response: While the SARC peer review panel concluded that this TOR was only partially met, the review panel concluded "that it would not be possible to determine a mixing rate on the basis of the evidence provided." The panel highlighted that to conclusively address the issue additional work would be needed: "If concerns about mixing rates and stock structure remain, biological analyses such as directed tagging studies, egg dispersal modeling, genetic differentiation determination or otolith microchemistry analysis would be needed to determine the degree of mixing, and hence stock identity." These data were not available at the time of the benchmark assessment, and so it would not have been possible to definitively address this TOR for this benchmark assessment (though it is notable that at least one panelist did consider that the TOR was fully met).

The panel concluded that "[i]n terms of management, the conclusion of low mixing between separate stocks is probably appropriate. In terms of scientific evaluation of mixing or stock structure, the review panel concluded that more work would be required to reach firm conclusions."

One of the reasons why the NEFMC and NRCC prioritized the GOM haddock assessment for 2014 was due to the great disparity between the ABCs for the GB haddock and GOM haddock stocks. In fishing year 2013, the ABC for the Georges Bank haddock stock was approximately 29,335 mt or 100 times greater than the ABC for the Gulf of Maine haddock stock. Concern was expressed by many NEFMC members that the large biomass and newly reported year classes of the GB haddock being recruited into that stock would spill over into the Gulf of Maine, which would prompt a shutdown of fishing in the Gulf of Maine due to the very low ABC prescribed for the GOM haddock stock.

On April 23, 2013 the NEFMC passed a motion to "task the PDT and SSC to examine the issue of GB haddock spillover into the GOM stock area, provide an estimate of the amount of spillover when large year classes of GB haddock occur, and provide suggestions as to how the anticipated spill-over of the strong 2010 year class can be used to adjust the GOM haddock ABC for FY 2013, 2014 and 2015."

After reviewing available data and literature on this topic, the PDT and SSC concluded in their reports to the NEFMC that exchange rates were not well characterized. The SSC further noted in their correspondence to the NEFMC in a Memo dated September 3, 2013 that "although the literature perhaps suggests an upper bound of 10% - this figure is not robust." The SSC also concluded that they could find "no scientific basis for adjusting haddock ACLs based on mixing or spillover."

Both the PDT and the SSC agreed that some mixing was likely but they didn't have enough information available to recommend a specific percentage or number. This prompted the NEFMC to prioritize a GOM haddock benchmark assessment during their subsequent discussions with the NRCC.

Response: What is left off this summary of the PDT and SSC discussions are the following statements from the SSC memo to the NEFMC Executive Director on the issue of Georges Bank spillover into the Gulf of Maine (dated September 3, 2013):

"The SSC commends the work done by the PDT to examine this issue from a variety of approaches, including literature review, diagnosis of assessment results, and projection of stock trends and consequences under alternative decisions about how much to adjust the Gulf of Maine haddock ABC. As a result of its efforts, the PDT developed a series of consensus statements on the issue (section 1.7 of the PDT memo to the SSC)."

"The SSC further noted that the literature perhaps suggests an upper bound of 10%, but that this figure is not robust. ***Also, any exchange that does take place is likely restricted to certain boundary areas, rather than a process operating on a stock-wide level.*** *" (emphasis added)*

"The PDT concluded that, if spillover assumed but is not occurring, the consequences for the Gulf of Maine stock could be severe. This is because the magnitude of the difference in stock sizes and ACLs means that even a small assumed exchange rate could result in catch many times the current Gulf of Maine ACL, and could even approach the entire estimated biomass in the Gulf of Maine. This significant risk, ***coupled with the lack of compelling empirical evidence,*** *was the SSC's primary reasons for agreeing with the PDT conclusion that adjustments are not advisable." (emphasis added)*

"The PDT noted that, if expansion of the Georges Bank stock across its border in response to strong cohorts does occur, then fish from the large 2003 year class on George Bank should have also appeared as a strong cohort in the Gulf of Maine assessment, obscuring cohort tracking in the assessment. ***This was not the case. Moreover, even a small amount of spillover of such a large cohort would have caused a sudden and drastic increase in the Gulf of Maine biomass. This was also not the case.*** *The SSC supported the PDT interpretation of these diagnostics." (emphasis added)*

As was highlighted in the SSC memo above, while the PDT and SSC acknowledge that there is exchange between stocks there is little empirical evidence to support a hypothesis that "even a small amount of spillover of such a large cohort" was occurring. This is not the same as

concluding that they "didn't have enough information available to recommend a specific percentage or number" as the authors of the letter state.

During the recent benchmark assessment for GOM haddock, the only material reviewed to address the mixing TOR was tagging data.

Response: As is well described under TOR 3 in the assessment report there were several lines of evidence examined as part of this TOR. These included:

- *Literature review of Gulf of Maine/Georges Bank exchange rates.*
- *Revisiting past assertions of recruitment synchrony between the Gulf of Maine and Georges Bank stocks.*
- *Year-class tracking in survey data and Gulf of Maine haddock assessment diagnostics.*
- *Analysis of the consequences of setting catch advice based on movement rate assumptions.*
- *SCAA migration models that allowed for mixing between the Gulf of Maine and Georges Bank stocks.*

Using this data Miller and Palmer concluded that "migrating rate estimates imply individuals starting in the Gulf of Maine have approximately a 94% probability of being in the Gulf of Maine for 1 year given they survived the interval. Individuals starting in Georges Bank have approximately 86% probability of being in the Georges Bank 1 year later." In summary, tagging data shows that 6% of the fish tagged in GOM migrating to GB and 14% of the fish tagged in Georges Bank migrating to the Gulf of Maine.

Response: The haddock tagging program data are not useful to inform this TOR because the program was not designed to address movement at the stock level. This was pointed out by the authors of the paper in which the analyses were presented and highlighted in the SARC 59 assessment report.

"The importance of location, size of fish, and timing of the releases cannot be overstated. Many of the releases were near the stock boundaries and in areas closed to groundfish trawling. The proximity to the stock boundaries might cause migration rates to be greater than the general population if there is substantial portions further away from the stock boundaries and they move at similar speeds and directions." (Miller and Palmer 2014)

The peer review panel reached the same conclusion in several of the panelists reports:

"Analyses of the [N]CCHT tagging program data are not useful to inform this ToR because the program was not designed to address movement at the stock level."

Overall, the SAW 59 WG found the tagging data to be insufficient for use in estimating mixing rates and inconsistent with other lines of evidence examined, including the work of Drs. Butterworth and Rademeyer:

"The SAW 59 WG found the mortality rates consistent with other lines of information (e.g., catch-curve analyses, assessment model outputs), but felt that the mixing rate estimates were high and inconsistent with the analyses conducted by the GPDT. The SAW 59 WG did not feel that the tagging exercises conducted to date had been designed in a way that would allow annual interchange proportions to be reliably estimated. The SAW 59 WG also examined assessment models that allowed for estimation of mixing between stocks. These model results are described under TOR 4, but generally, the estimated annual percent

mixing from Georges Bank to the Gulf of Maine from these models was low (<0.8%), and consistent with the GPDT analysis. Given the conflicting information provided by the NCCTP data, the SAW WG recommended that additional research designed to expressly determine between-stock movement rates is needed (see TOR8)."

At the model meeting held for the assessment, Dr. Butterworth and Ms. Rademeyer conducted scientific analyses on GOM haddock, using the SCAA model. The first analyses included an approach whereby the stock was treated as isolated, no mixing was estimated. The second analysis included an approach which allowed for interchanges in the form of permanent migration from (and to) the neighboring Georges Bank haddock population. The third analysis included an approach (known in the IWC Scientific Community as the sabbatical model) that allowed for interchanges which were not permanent in nature. The last analysis considered some GB haddock may visit the GOM area during a year, and perhaps be caught in the Gulf of Maine but if not suffering from mortality in some form, may return to the Georges Bank area (Butterworth and Rademeyer June 2014).

Response: The authors of this letter fail to mention that the analyses of Drs. Butterworth and Rademeyer provided evidence that if mixing was occurring, the spillover from Georges Bank was low (≤0.8%).

From the assessment report:
"The SCAA permanent migration model estimates the annual proportion of Georges Bank fish moving into the Gulf of Maine region at 0.2% where as the SCAA sabbatical model (non-permanent interchange) estimated the movement at 0.75% annually. The statistical evidence for such movement from these analyses point to scenarios involving limited movement being of similar plausibility to that of an isolated stock; however, mixing amongst the stocks has limited impact on assessment results. All three of the SCAA models achieved similar results to the ASAP_final_temp10 model (Fig. A.199)."

Dr. Butterworth and Ms. Rademeyer's model which addressed mixing between stocks was not selected as the final model sent to the Peer Review. The working group decided to only forward the Peer Review the assessment conducted by the NEFSC that did not include any consideration of mixing. Therefore, the only actual scientific model that explored mixing was not reviewed by the Peer Reviewers.

Response: The SAW 59 working group reached a consensus agreement to use the ASAP model as the base model but use the results of the SCAA model projections to inform catch advice decisions (see TOR 7a in the assessment report).

From the assessment report:
"The SAW 59 WG discussed how to interpret the mixing parameter estimates coming from the SCAA movement models. The SCAA movement models do not incorporate specific information to inform the model about migration rates (e.g., tagging); as such, the mixing parameters don't represent actual mixing rates, rather the mixing parameters represent upper bounds on the amount of mixing that could be supported by the data. The mixing

parameters are confounded by other parameters or data observation/process error. It's unclear how well the SCAA mixing models would perform on simulated data sets from an isolated population – i.e., would the movement models still estimate a non-zero mixing parameter? ***Ultimately, the WG supported the use of the ASAP_final_temp10 model as the 'preferred' model, but felt that the SCAA projection results should be carried forward as sensitivities to inform catch advice decisions.***

The 59th SARC supported the use of the ASAP_final_temp10 model as the preferred model on which to determine stock status and base management advice."

The SARC peer review panel was provided full access to Drs. Butterworth and Rademeyers working paper, as it was included in its entirety in Appendix 3 of the assessment report and mentioned throughout the assessment report in response to TORs 3, 4 and 7. It is clear from the SARC peer review panel report that they were keenly aware of the SCAA model and its results:

"An alternative statistical catch-age model (SCAA) was used to explore assumptions about movement between the GoM and GB haddock stocks."

We hope in the days ahead the NEFMC, NEFSC and the SSC will be able to address this issue. We also request the NEFMC and SSC look further into the application of uncertainty when estimating the strength of year classes and their impact on future recruitment estimates, as well as their impact on setting ABCs. This is in specific reference to the 2012 GOM haddock year class where there is a recommendation to down-weight the survey indices by 50%, but it also presents a broader question. Is there consistency in the treatment of the data? Does the scientific process consider uncertainty associated with extraordinarily low survey results in the same manner as it does for optimistic results? Has the process examined the impacts to a fishery when an overly pessimistic result has later proven by an updated assessment to be wrong?

Response: This paragraph primarily deals with decisions made by the PDT. The authors incorrectly state the sensitivity model that was used by the PDT to develop their preferred ABC level 'down-weights' the survey indices by 50%. The model does not explicitly provide any differential weighting on survey indices, but rather constrains the recruitment estimates in the terminal year where the only information available to inform the model are two survey indices (spring and fall 2013). The base model developed by the SAW 59 WG and accepted by the SARC 59 panel did not constrain the terminal estimate of recruitment, though it was extensively highlighted that this was the largest source of uncertainty in the model and that managers may want to consider the sensitivity model when developing catch advice. The PDT used the sensitivity projections as their preferred basis for ABC rather than using the base projections.

(3)

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BRING CODFISH HATCHERIES BACK USING S-K GRANTS

SALVATORE NOVELLO Oct 25 at 12:01 PM

To dave sullian

GLOUCESTER HAD A CODFISH HATCHERY FROM 1897 TO 1954 , WHICH WAS HIGHLY SUCCESSFUL, HALF OF THE EGGS THAT WERE COLLECTED WERE HATCHED INTO FRYS AND THEN DEPOSITED IN NATURAL SPAWNING- GROUNDS. THIS WAS DONE FROM MASSACHUSETTS COAST TO MAINES COAST. THIS WAS DONE BETWEEN DEC. 1 TO APRIL 1 BECAUSE OF WATER TEMPERATURES

THIS GRANT SHOULD BE A TRI-STATE GRANT INCLUDING MASSACHUSETTS,NEW HAMPSHIRE AND MAINE.THE LOCATION OF HATCHERY SHOULD BE LOCATED ON ISLES OF SHOALS OFF THE COAST OF NEW HAMPSHIRE , WHERE THERE IS PRISTINE AND DEEP WATERS CLOSE TO A NATURAL SPAWNING AREA.
,THIS SHOULD BE A MULTI-SPECIES HATCHERY, CODFISH,IN SPAWNING SEASON , LOBSTERS IN THE WARMER WEATHER AND MAYBE TRY TO PUT SALMON BACK IN OUR WATERS .

THIS HATCHERY WILL BE GOOD FOR BOTH COMMERICAL AND RECREATIONAL FISHERMEN. THE ENVIRONMENTALISTS WOULD APPROVE OF THIS ,BECAUSE PUTTING FISH BACK INTO OCEAN.

„I KNOW , THIS WOULD BE COSTLY PROJECT , BUT IT WOULD WELL WORTH IT., BENEFICIAL TO OUR ECONOMY .

THE USA GIVES LOTS OF OUR MONEY TO FOREIGN COUNTRIES TO HELP THEM,BUT IT SEEMS , WHEN COMES TO HELP AMERICANS CONGRESS HAS CLOSED EYES OR JUST DON'T CARE!!!!

OUR NEW ENGLAND POLITICIANS ,SHOULD MAKE THIS HAPPEN!!!!

GOD BLESS AMERICANS

SAM NOVELLO

Note
Technology and Science has come a long way since the Early 1900s So a Codfish Hatchery would be much improved Today!

jc/jpc 10/31/14

Looking down into Cripple Cove, with "Parker's Hill"on the other side, beyond, the head of the harbor and the east end of town.

REARING MARINE FISH FOR COMMERCIAL PURPOSES

JAMES E. SHELBOURNE Fisheries Laboratory, Lowestoft, England

THE MARINE FISH HATCHERY MOVEMENT

The idea that artificial propagation could influence the yield from inshore waters originated in the New World, and was the consequence of achievements in fresh-water fish rearing. Remarkable progress in culturing and transplanting the shad (Alosa sapidis- sima), undoubtedly influenced the first U.S. Commissioner of Fisheries (Spencer F. Baird) in his decision to try artificial propagation as a possible means of counteracting depletion in the food-fisheries of the Atlantic seaboard.

Earll (1880) reported the successful hatching of cod, haddock, herring and pollock eggs during preliminary experiments a t Gloucester, Massachusetts, in 1878. It was not until 1885 that the U.S. Fish Commission built its first commercial fish hatchery at Woods Hole. Facilities for cod propagation were extended at Gloucester Station in 1888, followed by the construction of a third east coast hatchery at Boothbay Harbor, Maine in 1905.

By 1917, the total output of newly-hatched fry from the three American hatcheries had risen to over 3 billion per annum.

.....the American effort continued at a high level of production until 1943, when Woods Hole was taken over by the Navy Department. The Boothbay Harbor hatchery closed down in 1950, followed by Gloucester Station in 1952. The demise of American sea-fish culture was accompanied by the following terse official statement . . . "Hatchery production of marine commercial fish species was terminated in 1952 since research had failed to disclose that worthwhile benefits were obtained from such stocking." (Duncan and Meehean, 1954).

...The Americans preferred to rely on salvaged spawn, particularly at Gloucester and Boothbay Harbor, 'Spawntakers' operating from New England

Gloucester and Boothbay Harbor. Spawntakers, operating from New Eng
fishing vessels, selected ripe fish from the catch, and carried out artificial
fertilizations using a standard technique. Fertile eggs were transported to t
nearest hatchery by first train after the ship docked.
As early as 1883, only five years after the first experimental release of cod-
the US. Fish Commission reported the appearance of gray cod of a size not
previously seen in coastal waters around Gloucester Station. They were
generally accepted as the fruits of hatchery effort and became known locall

"Fish Commission cod." In 1898, Herdman (1889), director of the Manx
hatchery, received a letter from the U.S. Fish Commissioner. which read. . .
"For about ten pears the cod work has been attended with marked success,
and in Massachusetts, has resulted, not only in establishing the inshore cod
fishery on grounds long exhausted, but through favorable distribution of th
fry, in extending the fishery to waters not originally frequented by the cod."
late as 1929, statements were being made to the effect that the winter flound
became more abundant after planting newly-hatched fry.

1893

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
E.F. "Terry" Stockwell III, *Chairman* | Thomas A. Nies, *Executive Director*

October 28, 2014

Mr. John Bullard
Greater Atlantic Regional Administrator
NMFS/NOAA Fisheries
55 Great Republic Drive
Gloucester, MA 01930

RE: Formal Submission of Framework 52 to the Groundfish (Multispecies) FMP

Dear John:

Today, my staff electronically sent the formal submission of Framework Adjustment 52 to the Groundfish (Multispecies) Fishery Management Plan (FMP), including the Environmental Assessment (EA), and associated Appendix to your staff in the Sustainable Fisheries Division at the Greater Atlantic Regional Fisheries Office. Six paper and two CD copies are included with this letter.

The measures proposed in Framework 52 revise the windowpane flounder accountability measure for the commercial groundfish fishery. The Council requests the measures proposed in this framework adjustment be implemented as expeditiously as possible.

After reviewing the comments received by my staff on August 28, 2014 on the preliminary submission sent on July 23, 2014, the document has been updated to incorporate all substantive and suggestive comments. In addition, the economic impacts section was updated due to an error in a calculation in one of the tables in that section.

Upon review of the Framework 52 document, please communicate any comments and/or need for further document revision directly to me. Please contact me if you have questions.

Sincerely,

Thomas A. Nies
Executive Director