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Mr. John Bullard
Regional Administrator NMFS
Northeast Regional Office
55 Great Republic Drive
Gloucester, MA

Comments on the Draft Amendment to "The Standardized Bycatch Reporting Methodology (SBRM) Amendment"

Dear Mr. Bullard,
Notwithstanding the provisions of 303(a)(11) to include provisions to assess the amount and type of bycatch, I believe this amendment should be withdrawn and reworked for the following reasons:

1. There is nothing standardized about bycatch reporting across fisheries.
2. The standard of precision chosen (30% cv) is the wrong standard. Accuracy is more important than precision.
3. The issue of cost is not sufficiently addressed.

In addition to the SBRM document I wish to have the National Marine Fisheries Service review and comment on SBRM in light of:

1. "Design, Implementation and Performance of an Observer Pre-Trip Notification System (PTNS) for the Northeast United States Groundfish Fishery," Michael C. Palmer,et.al., Northeast Fishery Science Center Reference Doc 13-21.
2. "Analysis of Landings/Discards-Proportional Allocation Scheme of the At-Sea Monitoring Program in New England", Jenny Sun, Gulf of Maine Research Institute.
   (See documents attached to the electronic submission)

These papers address many of the issues and short comings surrounding the current system which are detailed below.

First, about the issue of standardization, bycatch is unique to each fishery and should be scored on a fishery by fishery basis to form a prioritization matrix. This is how the Atlantic States Marine Fishery Commission handles the problem. Those fisheries receiving the highest scores get proportionally more of the limited funding available for bycatch observers. Using a standard measure of precision only insures that far more coverage of fisheries with limited bycatch is required than is actually necessary. This prioritization process should be done by a joint effort between the NMFS and the NEFMC.

Precision is the wrong metric for bycatch. Consider this example; two archers each fire six arrows at a target. One archer places all six arrows in a very tight grouping but completely outside the target circles. He is very precise but not accurate. The second archer places two arrows in the bull's-eye with the other four scattered across the concentric circles. He is accurate but not very precise. As a manager and a scientist, I am more interested in accuracy. The current system that is precision oriented causes under coverage of boats catching large amounts of fish and over covers small boats making numerous trips for small amount of fish. Furthermore it is rigid and inflexible and does not allow for placing coverage where large amounts of discards may occur. The alternative way, described in the Sun paper, would produce more accurate bycatch data and be more cost effective and yield more accurate data for stock assessment. For example, the vast majority of fish caught in two New England fisheries are caught by a relatively small amount of vessels. In the herring fishery over ninety percent of the fish are caught by about twenty vessels, the remaining ten percent are caught by literally hundreds of vessel catching small amounts of fish. Similarly, in groundfish, approximately ten percent of the boats catch ninety percent of the fish. Accuracy would be greatly improved by high levels of coverage on these vessels in both groundfish and herring. The remaining vessels could be covered at the NEFOPS level of coverage of about five to seven percent to determine a baseline and detect any major changes in bycatch over time. Placing high levels of coverage on the boats that actually catch the majority of the fish would be both cost effective and greatly improve accuracy.

Finally, the issue of cost is not addressed sufficiently. I believe the cost of collecting bycatch data is a function of government and should be explicitly stated in the document. As such, it will always be subject to budget constraints and hence the need for prioritization mentioned above. I also believe the document should explicitly state that a census of bycatch is not necessary, useful or cost effective with a rationale. A section should be added to the document stating why a census is cost prohibitive and of little scientific value. I believe that the gains in precision and accuracy become negligible. This should be done specifically to avoid legal challenges by Environmental Non-Governmental Organizations trying to require 100% observer coverage.

Last, I would hope that all comments in this letter are fully addressed in detail in the Federal Register by NMFS, with sufficient rationale to ensure they have been seriously considered, analyzed and will hold up in a court of law.

Respectfully submitted,

David T. Goethel

Analysis of Landings/Discards-Proportional Allocation Scheme for the At-Sea Monitoring Program of the Groundfish Fishery in New England

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The report has been uploaded to the GMRI Monitoring Working Group website at www.gmri.org/monitoringworkinggroup. The author thanks comments from Jessica Joyce and Jonathan Labaree in the Community Team at GMRI and help from William Bowman as a GMRI intern sponsored by the Forest Foundation internship program. Any remaining errors are the author's responsibility.

Abstract

The New England groundfish At-Sea Monitoring (ASM) observer program's 30% coefficient of variation (CV) standard deploys observers at an almost equal rate across various groundfish vessel sizes, gear types, and in terms of broad stock area. This results in too many observers being allocated to trips with low landings and discards, lowering the degree of accuracy for overall catch estimates. Continued use of the 30% CV fixed target as a measure of relative standard deviation precision will result in similar coverage levels across vessel categories (size and gear).

Given that funding is limited to support the billable seadays taken by observers in all trips, the purpose of this analysis is to identify whether the groundfish sector ASM observer seadays were equitably assigned across all appropriate strata in fishing year (FY) 2010 and in FY2011. Furthermore, this study focuses on how many billable seadays were taken by observers by trip type and vessel size. The appropriateness of these additional strata as predictors of discards for each stock is examined using a Seemingly Unrelated Regression model. The results of the model are then used to present an alternate monitoring approach for FY2014 and beyond.

Based on the Data Matching and Imputation System (DMIS) dataset for FY2010 and FY2011, more seadays were observed per pound of groundfish catch on smaller vessels, especially gillnetters, than on larger vessels, especially those fishing with otter trawl gear. That is to say, more ASM resources were expended to observe less catch in the former category. Allocation of the observer seadays based on discard volume is proposed as a cost-effective method to ensure an accurate accounting of landings and discards for each sector.

1. Background and Motivation

The current, stated objective for the At-Sea Monitoring (ASM) program in Amendment 16 to the Northeast Multispecies Fishery Management Plan is to “verify area fished, catch, and discards by species, by gear type.” The calculated discards by stock assigned to each sector are assumed to be proportional to landings by fishing area and gear type. However, the current monitoring coverage rate is calculated based on the number of trips in each strata and is not distinguished by the magnitude of landings or discards in each strata, operating vessel size, or the number of billable seadays per trip.

The New England Fishery Management Council (NEFMC) revised certain elements of the groundfish monitoring program through Framework Adjustment 48 (FW 48) to the Northeast Multispecies Fishery Management Plan. These measures were voted on during their December 2012 meeting, and were implemented by the National Marine Fisheries Service (NMFS) for FY2013. Through their vote, NEFMC revised the goals and objectives for the ASM program; clarified the coefficient of variation (CV) standard; removed the requirement for industry-funded ASM in FY2013 (i.e., fund ASM for sectors at the level NMFS can afford); limited the responsibility of the industry to pay for the salary of an at-sea monitor; lowered coverage rates for sector trips on a monkfish day-at-sea (DAS) in the Southern New England Broad Stock Area using extra-large mesh gillnet gear; and eliminated the dockside monitoring program. While the Groundfish Oversight Committee requested that the Plan Development Team (PDT) develop monitoring standards that address both accuracy and precision, ultimately these revisions did not address accuracy or give the industry much flexibility in using various tools to meet the monitoring goals and standards. Further, while FW 48 deferred industry funding of ASM in FY2013, there is no guarantee the NMFS budget will be able to cover this level of monitoring in FY2014, yet the fishery will still be required to meet Amendment 16 standards for monitoring (i.e, 30% CV as determined by the Standardized Bycatch Reporting Methodology [SBRM]).

This analysis attempts to identify the distribution of monitoring effort by estimating the average historical landings and discards that were observed in each seaday among different vessel sizes and fishing gear configurations, in order to see if these categories should serve as appropriate strata to adjust coverage levels. This approach could still include sector/area-fished strata as ASM vendors have broad stock area information, vessel size and gear type prior to embarkation to help them determine the appropriate coverage rate under each category.

During the early developmental stages of FW 48, the Gulf of Maine Research Institute (GMRI) convened a Monitoring Working Group (MWG) with members from industry, NMFS, NEFMC staff, and other non-profit organizations.[1] The purpose of the MWG was to increase industry participation in the development of the revised monitoring standards, and to develop multiple monitoring alternatives for sectors to propose in their operations plans, which were required to meet the new monitoring goals and objectives in FW 48. A MWG meeting on April 19, 2012 identified the need for analysis of alternative monitoring allocations in order to give sectors the necessary time to thoughtfully adapt their monitoring programs to the new goals and standards and negotiate contracts with monitoring providers prior to FY 2013.[2]

As part of this process, the MWG developed several alternatives that each sector could review with their manager and board of directors to determine the ideal option for their operations. Throughout summer and fall of 2012, the PDT vetted setting the coverage rate proportional to discards, although the analysis was not completed in time for further consideration in FW48, primarily due to the lack of available data for the 2011 fishing year. Therefore, having missed the September deadline for sectors to propose any of these alternatives for FY2013, this analysis is now aimed toward FY2014 and beyond, although implementation of this approach may require regulatory changes outside of those included in sector operations plans.

Literature Review

ASM coverage distribution within a fleet is not a topic that is abundant in literature. Most studies were found to focus mainly on the total observer coverage rate, rather than across vessel sizes and gear types. Zollett et al. (2011) gives an extensive overview of effective monitoring programs. In terms of setting the level of observer coverage, guiding principles included a formal threat assessment and/or a cost-benefit analysis, and consideration for the needs of industry. In

[1] For more information about the MWG, visit: www.gmri.org/monitoringworkinggroup
[2] Ultimately NMFS announced funding 100% of the ASM program in FY 2013, and as such, the ASM program continued to be operated by NMFS, and sectors did not propose alternate ASM programs.

terms of program costs, guiding principles included shifting the burden of responsibility to the industry and an aim to implement a program that can fund its own resource. Moving observer program costs to industry is intended to incentivize vessel operators to fish “cleaner”.

Furlong and Patrick (2001) focus on the optimal level of observer coverage in a fishery through which maximum net benefits are realized. The benefits come in the form of reduced illegal and underreported fishing and are measured against the costs of observer coverage. While this paper does not employ a cost-benefit analysis framework to find the optimal overall rate of coverage, multiple scenarios are presented so as to present several possibilities. The tradeoffs here include discards observed (more equals more reliable data) vs. observer costs.

Rossman (2007) highlights the importance of looking at observer coverage and relative bycatch rates for each stratum with respect to marine mammals in the Northeast and Mid-Atlantic bottom trawl and gillnet fisheries. Those vessels responsible for higher marine mammal mortality were deemed a priority in receiving observer coverage. Similarly, those vessels responsible for mortalities of mammal populations in particularly poor shape were also given priority observer coverage.

This analysis expands on these previous studies in showing that while there may be an optimal level of observer coverage within a fishery, there is also an optimal way to disperse those observers among fleet members. Put another way, a certain level of ASM coverage is required to effectively enforce quota controls but that ASM coverage can come in different forms.

Currently, the 30% CV standard applied to GF trips will result in about 30% of trips observed and around 30% of landings and discards observed. However, by targeting those vessels that land and discard the most, fewer trips can carry an observer while observing the same volume of landings and discards. If the goal were to observe the most landings of highly utilized GF species, then using a weighted GF stock utilization rate would be necessary. This model is similar to what Rossman (2007) proposed for protecting marine mammals in the Northeast and Mid Atlantic bottom trawl and gillnet fisheries.

Overview of Groundfish Activity by Trip Type, Vessel Size, and Fishing Gear

The data in this analysis was compiled from the individual trip level DMIS dataset, which was acquired by GMRI through a data access agreement for a project evaluating the viability of sectors as businesses. The sector viability project is funded in part by the Social Sciences Branch of the Northeast Fisheries Science Center, which restricts access of these confidential data to the GMRI staff directly working on the project, except in aggregated form. Since ASM costs are closely associated with sector viability, GMRI was given permission to use the DMIS dataset for this monitoring analysis; however, no funding from the sector viability project was used for this study.

Table 1 shows relevant data for FY2010 and FY2011, including number of trips, number of seadays, landings volume, and discards volume for all groundfish (GF). We considered GF trips to be any trip identified in the DMIS dataset performing groundfish fishing activities. The trips were then categorized by vessel size and gear type. This method yielded a total of 13,982 GF trips in 2010 and 16,609 GF trips in FY2011. These figures are slightly higher than those indicated in Table 1, as trips taken on vessels less than 30 feet in length are not included in the table. Both figures are also slightly higher than those reported in the 2011 NMFS groundfish fishery performance report (Murphy et al., 2012). This discrepancy is due to double counting for a small number of trips in which more than one type of fishing gear was used.[3]

For vessel size, four classes were chosen: class 1 vessels, less than 30 feet in length; class 2 vessels, measuring 30 to 50 feet; class 3 vessels, measuring 50 to 75 feet; and class 4 vessels, those longer than 75 feet. The DMIS dataset indicates that only two trips made on class 1 vessels (landing less than 1% of total GF landings in FY2011) had ASM coverage in for FY2011;[4] thus they are not indicated individually in the tables, but are included in the totals. Those vessels that made less than 30 trips in hand line, longline or Ruhle trawl categories are also not indicated individually in the tables but are included in the totals. In both the 2010 and 2011 fishing years, the majority of trips on class 2 vessels used gillnets, and the majority of trips on larger, class 3 and 4 vessels fished with otter trawl gear. Overall, the majority of GF trips were made by class 2

[3] No deletion was made, but could count only the gear type that landed the most fish if needed.
[4] We understand that smaller vessels, many of which are handgear A or category C vessels, are subject to the default NEFOP rate of 8%, but are not required to call into PTNS and therefore may not be subject to additional ASM coverage.

vessels using gillnets, however the majority of seadays were made by class 3 and class 4 boats using otter trawl gear, as shown in Columns A and B in Table 1.

The number of seadays was calculated in accordance with the definition provided in a request for northeast observer contractors (NMFS, 2011). That is, the first calendar day the vessel leaves port is counted as one seaday regardless of when the vessel leaves or returns, the day the vessel lands is prorated from the beginning of the day to the time landed (unless the vessel lands on the same day it sails), and any interim days are counted as one seaday.[5] The number of observed trips and observed seadays were summed in each sub-category, with all observer data coming from the Northeast Fisheries Observer Program (NEFOP) or the ASM program.

The current ASM observer program defines the coverage rate based on number of trips without considering how the scale of landings and discards vary substantially based on the size of the vessel and the length of the trip. Since the majority of GF seadays were made by class 3 and 4 multiday-trip boats with otter trawls, and their average seadays per trip is about 3 to 7 days, their landings and discards per trip are expected to be much higher than that of the class 2 day-trip boats. This study proposes to evaluate the distribution of observed seadays, GF landings, and GF discards, such as shown in the following section, in order to find a fair and equitable way to allocate the observer on various types of trips.

Estimates of Observer Coverage Rates and Distribution of Seadays, Landings, and Discards

Observer coverage rates in the *j*th category of trips (based on vessel size and gear type) were calculated as follows: a dummy variable was assigned to each trip, where *i* indexes the GF trips in the *j*th sub-category.

$$Observer_{ij} = \begin{cases} 1, & \text{when trip } i \text{ was observed} \\ 0, & \text{otherwise} \end{cases}$$

To find the coverage rate by trip, we simply used the mean of the $Observer_{ij}$ dummy. Note that this is equivalent to dividing the number of observed trips by the total number of trips.

[5] Starting in FY12, NMFS' contracts with ASM providers are transitioning to a new billing structure of quarter-day (i.e., 6-hr) seadays; however this does not affect our historical analysis of FY 2010 and FY 2011 (http://www.nefsc.noaa.gov/fsb/asm/ASM%202012%20Contract%20Information/AIS.Signed.Redacted.Contract-TOs-2.2012.pdf).

The estimated coverage rate weighted by GF landings was then calculated, with the variable L_{ij} being the round weight of all GF landed on the i^{th} trip of the j^{th} sub-category.

$$P_j^L = \frac{\sum_{i=1}^{N} Observer_{ij} \cdot L_{ij}}{\sum_{i=1}^{N} L_{ij}}$$

The coverage rate by trips and by seadays, so as weighted by GF landings and discards, were calculated in a similar manner and defined in Table 2 for each category of vessel size and fishing gear in Columns A-D of Table 2 for FY2010 and FY2011 as the percentage of trips that carried an observer on board (A); the percentage of seadays fished with an observer on board (B); the percentage of total GF landings that were observed (C); and the percentage of total GF discards that were observed (D).

The percentage of trips that carry observers (coverage rate by trip) is the category that the current monitoring system is most concerned with. The result of this method of ASM is similar values for the percentage of trips observed vs. the percentage of total landings or discards observed. However, this does not necessarily indicate equitable distribution of monitoring resources. In 2010, class 3 and 4 otter trawl trips accounted for a total of 73.2% (27.3% and 45.9%, respectively, in Table 2 Column F) of total GF landings and 74.8% (31.3% and 43.5%, respectively, in Table 2 Column G) of total GF discards, but only 55.4% (25.1% and 30.3%, respectively, in Table 2 Column E) of total observed seadays were used to monitor them.

A disparity between monitoring effort and GF landings and discards is generally present for all gear types under various vessel sizes, though it is most pronounced for the large vessels fishing with otter trawl gear and the small vessels using gillnets. These two vessel categories made the majority of GF trips, shown in Table 1 Column A, though their total landings and discards differed greatly.

Table 2 shows the GF landings by class 4 vessels using otter trawls were 3.9 times (45.9% vs. 11.7% in Column F) the GF landings by class 2 vessels using gillnets with large mesh. Large otter trawls also discarded 4.5 times (43.5% vs. 9.6% in Column G) more than the small gillnetters, in FY2010. This is a large discrepancy considering the ASM observed seadays were only 1.5 (30.3% vs. 20.6%) times higher for large otter trawlers than small gillnetters in FY2011, as shown in Column E. A similar disparity between catch/discards and monitoring effort appeared for these vessel categories for FY2011 indicated in Table 2.

Large vessels fishing with otter trawls produce more discards per trip than most of the other fishing activity categories. In addition, by comparing the discards by seadays (shown in Table 3 Column G), what was discarded by an average class 4 otter trawler in one seaday in 2010 would take a class 2 extra-large mesh gillnet vessel an average of 13.03 seadays to discard an equivalent amount of fish (Table 3 Column H). Clearly this is a large discrepancy that is not being accounted for when evaluating the tradeoffs of assigning one observer seaday in various vessel size classes in order to observe the majority of the discards.

This mismatch is caused by the 30% CV precision standard by trip, which is a normalized formal equality measure of dispersion required for all ASM of groundfish sector trips. The 30% CV criteria is a precision measurement by using the ratio of the sample standard deviation(s) to the sample mean ($\bar{x}$). As shown in the coverage rate on seadays indicated in Table 2 Column B, the coverage rate by trip, seaday, landings, and discards for small gillnett and larger otter trawl are all around 30%. Neither the magnitude of the average landings and discards per seaday nor the distribution of total discards across vessel size and gear type category is taken into account in deciding how high of the CV is needed for various fishing activities.

This mismatch suggests two avenues for improvement: first, allocate coverage effectively (and its associated costs) to better reflect the magnitude of GF landings and discards by vessel categories, and increase the amount of both landings and discards that can be monitored; second, achieve the same industry-wide observed magnitude of GF landings and discards with less monitoring effort and at a reduced cost. The first avenue could be approached by adding vessel size as strata under the current ASM program when deciding coverage rates, the second by making coverage rates proportional to the landings or discards produced per seaday within the industry-wide stratified categories. If observing most of the discards is preferable, the higher the discard the higher the coverage rate that would be assigned, i.e. discard-proportional monitoring approach.

CVs measure precision of discard rates in the trip base, which is to say how much they vary around an average of the trip no matter the trip length. However, while the discard rates may be precise in fulfilling the 30% CV requirement, they likely are not accurate across all trip lengths and vessel size categories. In addition, how precise a discard rate is needed depends on how meaningful it is for monitoring Annual Catch Entitlement (ACE). By comparing the relative costs for paying each observer seaday with the outcomes (discards observed), it is not as cost-effective to assign observers on trips that experience so little landings and discards per seaday than those trips discarding at a higher rate.

From a limited monitoring funding point of view, there is a need to reallocate the observers in a more cost-effective way to observe most of the discards and to monitor the majority of the ACE under the quota management objective. Allard and Chouinard (2011), show the importance of a cost-efficient strategy in enforcing regulations against discarding. Therefore, the approach proposed in this paper primarily addresses how to identify whether observed trips are distributed efficiently and equitably and how should the relative magnitude of the landings and discards across vessel size and gear be considered in the monitoring program. There is a compelling and time-sensitive need to have a comprehensive evaluation of the requirement to set the strata to assigning observers with the transition to an industry-funded ASM program on the horizon. If the majority of observers are assigned to observe the majority of the landings and discards, then it would more accurately ensure that a sector does not exceed their ACE.

Utilization Rate of Groundfish Stocks

The PDT report from July 25, 2012 suggests that there may be differences in monitoring coverage levels by various vessel size, fishing gear, and broad stock area for three stocks (GOM cod, GB haddock, and pollock). In order to be comprehensive, all 22 GF stocks are considered in this paper to explore a system multivariate regression model to identify if adding trip type and vessel size as an additional strata to sector, fishing gear, and broad stock area as a significant factor in determining the discard level by stock.

The collective members' landings and discards are counted against a sector's ACE for each GF stock. To maximize the value of catch, sector members wish to catch or utilize a large percentage of the ACE for various species. Table 4 shows that there is great variability in the utilization rate of GF stocks. Stocks such as Georges Bank haddock and redfish were not heavily utilized in FY2011, while others, such as white hake and Georges Bank yellowtail flounder, had almost their entire ACE utilized. To combat this variability, a weighting scheme was introduced for the discards in this analysis in order to put more weight to allocate more observer seadays to observe those stocks that are highly utilized. By using pollock as the equivalent-based stock in standardizing the discard rates for all stocks relative to their utilization rate, GB cod East and GB cod West were assigned with 2.838 and 1.634 times the discards for each pound of discards than the discards of pollock, as shown in Table 4. A weighted discard model will also be specified in the discard system equation model in addition to the discard level by stock.

Correlations of Landings and Discards vs. Trip Length and Vessel Size

As discards are calculated based on the amount of landings for each trip, it is reasonable to believe that landings and discards should have a strong, positive correlation with trip length and vessel size. Indeed, such a correlation appears in FY2011, as shown in Figure 1. A positive correlation also exists between trip duration and discards, shown in Figure 2. Note that for trips shorter than 5 days, discards per trip are strongly concentrated below 1,000 pounds, while trips 5 days or longer do not follow this trend. The relationships between landings, trip duration, and discards are not surprising, nor are they especially useful from a management perspective, as landings and trip duration cannot be known prior to a given trip.

There are, however, variables that can be determined prior to a fishing trip that are strongly correlated with landings and trip duration. Larger vessels have a greater hold capacity, and it is logical to believe that these vessels will have higher landings per trip. Figure 3 shows that in FY2011 there was in fact a strong, positive correlation between vessel length and discards. Also, while the exact length of a multiday trip generally depends on several factors that occur during the trip, it is generally known in advance when a vessel intends to return on the same day it leaves. So while trip duration may be unknown prior to departure, it is reasonable to categorize trips as day trips or multiday trips before they leave port. Therefore, vessel length and trip type (day vs. multiday) serve as proxies for landings and trip duration, which are expected to be strong predictors of discards.

There is also considerable variability in the distribution of landings and discards by vessel size and gear type among different GF stocks. Therefore, allocating ASM observer coverage based on the overall total discards by various vessels and gear types may result in better monitoring coverage for some stocks over others. Figures 4 and 5, which show the distribution of GF landings and discards by stock among different gear types in FY2010 and FY2011, illustrate this variability. By utilizing the preceding simulation model, the overall discard coverage will be improved for stocks having a discard distribution similar to the combined stock distribution in Figure 1 (the rightmost value on the horizontal axis). However, this same model may result in lesser coverage for those stocks with distributions that differ greatly from the total discard distribution. Most notably, GOM cod, GOM pollock, and GBE haddock have lower discard percentages by class 3 otter trawlers compared to other fishing gears and vessel sizes for FY2010.

2. Specification Discard Regression Model

Regression analysis is utilized to show the explanatory power of vessel size and trip length variables in relation to discards, with the best fit being a double-log Seemingly Unrelated Regression (SUR) model. This method accounts for the high correlation of the error terms in the species models resulting from the species being landed together in a multispecies fishery. The SUR model utilizes an aggregate regression to estimate discards for all groundfish stocks combined, and also runs separate regressions for each stock. The data used in this model was compiled from the individual trip level DMIS dataset for FY2011 and contains 14,946 observations. Discards in this dataset have been inputted using the weighted average of the discard rate assigned to each vessel by NOAA using gear type, broad stock area, and sector strata.

The regression dependent variable is discards per trip measured in pounds. The key explanatory variables for this analysis are trip type and vessel size. Vessel size is divided into four classes. Class 1 vessels are dropped because they do not carry observers, and class 2 is used as the base size. The regression therefore indicates how the larger vessels compare to the class 2 category. A positive value on the class 3 or class 4 coefficient would indicate that larger vessels are associated with higher discards. For trip length, a binary variable, *dday*, is used, which takes a value of 1 if the trip is shorter than 24 hours and a value of 0 if the trip is longer than 24 hours. A negative value for this variable would indicate that day trips are associated with lower discards. Dummy variables are also included for the strata currently used by the ASM program: sector, gear type, and broad stock area. All sectors are specified that take the value 0 or 1 as dummy variables to sort data into mutually exclusive categories to indicate the absence or presence of the sector effect that may be expected to shift the discards, which represents differential intercept coefficients in the discard model. For gear type, the base of comparison is the otter trawl, and the broad stock area base group is Southern New England (SNE). The explanatory variables and their definitions appear in Table 5.

The regression results are based on all groundfish trips in FY2011 and are summarized in Table 5. A total of 3,625,779 pounds of groundfish were discarded in FY2011, an average of 226.6 pounds per trip. The average trip duration was 1.4 days. For the dummy variables, the mean value can be interpreted as the percent of trips that belong to that category. For example the variable *dFixedgear* has a mean of 0.18, meaning that 18% of groundfish trips in FY2011 were taken by vessels in the Fixed Gear Sector. Similarly the mean of *dGillnetExtraLargeMesh* is 0.38 indicating that extra-large mesh gillnets were used on 38% of the trips in FY2011. The sum of the mean from various gear type dummy variables shows 61.32% trips were taken by all of the gear type indicated in Table 5 and indicates the rest of the 38.68% trips are taken by otter trawls as the base category.

Regression Results

The log dependent variable SUR results for all stocks combined are displayed in Table 6 and the regression results for all 22 individual stocks is also available upon request from the author. The binary variable *dday* is negative (-1.872) and statistically significant. For specifications with a logged dependent variable and dummy independent variables, the following formula is used to estimate the percentage change associated with the dummy variable category over the base group with exponential of coefficient minus one.

Therefore, the interpretation of the *dday* coefficient is that trips lasting fewer than 24 hours are associated with an 85% ($e^{-1.875}$-1) decrease in discards compared to multiday trips. The coefficients for the vessel size class variables were both positive, but only the coefficient for *dclass4* was statistically significant. The value for *dclass4* can be interpreted as follows: a trip on a vessel greater than 75 feet long is associated with discards 106% higher than trips on vessels shorter than 50 feet.

The R^2 value for the aggregated stock model was 0.401; the model explained about 40% of the variation in discards. However, once the information from the individual stock models was incorporated using the SUR method, the system R^2 value increased to 0.834.

A joint test for significance was conducted on all of the vessel class and trip type variables in the model. The test returned an F statistic value of 66.79 with 69 degrees of freedom in the numerator and 343,114 degrees of freedom in the denominator. The null hypothesis was therefore rejected and we conclude that vessel class and trip type are highly statistically significant in explaining discards.

3. Allocation Proportional to Relative Volume of Discards across Vessel/Gear Categories

The following simulation is based on the premise that the optimal allocation of observed seaday resources should be proportional to the amount of discards recorded in each category for the GF fishery. For reference, Table 2 Column G shows the actual distribution of GF discards for these various categories of GF trips in FY2010 and FY2011. As observed seadays determine most of the cost of the monitoring program, it is identified as the basic unit of observing effort in this simulation.

Two scenarios of the simulated ideal allocation of observed seadays for groundfish trips in FY2010 and FY2011 are shown in Table 7. Scenario 1 re-allocates the actual 7,726 observed seadays in FY2010, shown in Table 1 Column D. Without increasing the monitoring effort, the percentage of weighted discards observed increases to 36% (Column D in Table 7) from the actual average observed GF discard of 29% (Column D in Table 2) in FY2010.

Scenario 2 shows how to achieve the same volume of discards observed in FY2010 (869,044 in Table 1 Column H) while reducing the total observed seadays. The results of this simulation are shown in Columns E through I in Table 7. The overall observed seadays are thereby reduced by 1,477 seadays from 7,726 to 6,249, shown in Column E. The reduction is achieved by increasing monitoring for trawl class 3 vessels by 31 seadays and class 4 vessels by 377 seadays, and reducing the seadays of all other gears by 1,885.

For FY2011 the percentage of GF discards observed could be increased from 30% to 37% while using the same number of observed seadays in Column A under scenario 1, or observer effort could be reduced by 1,616 seadays under scenario 2, shown in Column I, and the same total volume of discards could be observed as the status quo shown in Table 1 Column H under 2011.

Allocation Based on Weighted Volume of Discards across Vessel/Gear Categories

As with the allocation scheme based on total discards, the weighted discard simulation is presented in Table 8 with scenarios 3 and 4 as the corresponding scenarios to scenarios 1 and 2 in Tables 7, respectively, relative to the status quo. Scenario 1 re-allocates the actual 7,726 observed seadays in FY2010, shown in Table 1 Column D. Without increasing the monitoring effort, in scenario 3 the percentage of weighted discards observed increases to 57% in FY2010 (Column D in Table 8) from the average weighted observed GF discard of 29% in FY2010. Such an increase would be of great assistance to fishery managers and scientists in evaluating the impact of discards on GF stocks and fisheries.

Scenario 4 shows how to achieve the same percentage of weighted discards observed in FY2010 (29%) while reducing the total observed seadays. The results of this simulation are shown in Columns E through H in Table 8. The overall observed seadays is thereby reduced by 1,530 seadays from 7,726 to 6,196, shown in Column E. The reduction is achieved by increasing monitoring for trawl (Otter and Ruhle) class 3 vessels by 45 seadays and class 4 vessels by 333 seadays, so the seadays of all other gears could be reduced by 1,908.

For FY2011 the percentage of weighted GF discards observed could be increased from 30% to 47% while using the same number of observed seadays in Table 1 Column D, or observer effort could be reduced by 1,691 seadays and the same volume of weighted discards could be observed as the status quo, shown in Column G.

Costs of Monitoring

While similar to the sector ASM program, the existing NEFOP, which currently provides 8% coverage, will not be replaced by the industry-funded ASM program. Based on FY2010, the overall cost[6] of an ASM seaday is $917.95. The cost for an at-sea monitor can be separated into two components: at-sea and infrastructure. In this case, the industry (or NOAA) could have saved $1,355,812 ($917.95*1,477) in FY2010 and $1,483,407 ($917.95*1,616) in FY2011 by allocating ASM based on the volume of discards across vessel categories (size and gear), as shown in Table 7 under scenario 2.

If ASM were allocated proportional to weighted discard volume of various sizes of vessels, at a cost of $917.95 per ASM seaday, $1,483,407 ($917.95*1,530 seadays) could be saved by allocating ASM more efficiently under scenario 3 in 2010 and $1,552,253 ($917.95*1,691 seadays) could have been saved in FY2011, as shown in Table 8 under scenario 4. Once again, shifting observer seadays away from small gillnetters to class 4 otter trawlers is where most of the savings occur.

If the goal was to reach the FY2011 level of observed discards using the least amount of coverage possible, significant monetary resources could be saved by allocating ASM based on volume of discards by vessel size and trip length.

One potential method to distribute the monitoring burden equitably in scenarios where vessels with higher discards are covered at higher rates could be for individual sectors to develop a transfer scheme. Vessels with lower coverage rates could help compensate the vessels that have higher coverage rates so they could collectively reduce the number of observed seadays but would still be able to effectively monitor the ACE. For example, as shown by the ratio in Column H of Table 3 in FY2010, a sector could increase observed seadays for otter trawl class 4 vessels (accounting for 43.5% of all GF discards), by 1 seaday in order to reduce coverage assigned to class 2 extra-large mesh gillnet vessels (accounting for 1.6% of all GF discards), by 13 seadays.

This compensation scheme would be possible since the overall observed seadays are less than the current status quo for most of the vessels. Nearly all vessels, except class 4 otter trawlers, would be saving substantially with less coverage than the status quo. This savings would be more than enough to compensate the cost to the large otter trawlers. How a sector

[6] An average seaday in FY2010 cost $630.44 + $32.28 in travel + $37.46 in training for a subtotal of $700.19. In addition, there were $217.76 in NEFOP infrastructure and overhead costs for administration of the program, for a combined total of $917.95 (Van Atten, 2001a *as cited in* Northern Economics, Inc. A Review of Observer and Monitoring Programs in the Northeast, the West Coast, and Alaska, prepared for Environmental Defense Fund, September 2011).

would establish their compensation scheme would be at their discretion, and this is merely one possible scenario of many that a sector could develop. Importantly, when all types of vessels and gears are combined in a sector, the percentage of discards observed would not be less than the actual FY2011 percentage.

Monitoring costs will be one of the major factors affecting groundfish sector viability moving forward, especially with decreased federal assistance. Based on "Developing Effective Monitoring for the Northeast Multispecies Fishery: Methods and Considerations," draft white paper for NEFMC on April 12, 2012, sectors are required to monitor their members to ensure compliance with self-regulating measures designed to prevent a sector allocation overage. Currently all sectors employ a sector manager, who typically oversees reporting requirements and implements an ASM program, amongst other duties.

Currently, coverage rates must meet a minimum requirement to get at the precision goal, unless NEFMC removes the 30% CV language following NMFS' 3-year review of the discard rate methodology, or the language is otherwise modified in Amendment 16. Therefore, this approach may need to be used as one component of a monitoring program, and allow precision to be covered by NEFOP or another approach unless these regulations are revised.

However, how to interpret what's fair and equitable at the sector level, and not the vessel level, might also need to be further investigated. CVs measure precision of discard rates, which is to say how much they vary around an average. However, as indicated by a PDT member, while the discard rates may be precise, they do not vary a lot around their central value, and therefore they may not be accurate - their central value may be far from the true discard rate.

Therefore, the approach proposed in this paper primarily addresses the accuracy of the monitoring program (*which was not addressed in FW 48 and will not be addressed in FW 51 either*), and not the precision. In addition, the current flat CV of 30% applies no matter what the distribution of ACE or discards is geographically, temporally, or by vessel size and gear type. This is not the most cost effective method, and doesn't help identify whether observed trips are distributed efficiently and equitably. There is a compelling need to have a comprehensive evaluation of the requirement to set the strata to assigning observers. If more observers were assigned to observe trips with high rates of landings and discards, then the monitoring program could more effectively ensure that a sector does not exceed their ACE, and more accurate data could be integrated into stock assessments and other analyses that utilize catch and discards.

4. Conclusion and Discussion

According to the "Sector Operations Plan, Contract, and Environmental Assessment Requirements for FY 2013," the regulations stated in 50 CFR 648.87(b)(1)(v)(B)(*3*), contain the following objectives for an ASM program:

- Objective 1: It must provide coverage that is fair and equitable.
- Objective 2: It must be distributed in a statistically random manner among all trips.
- Objective 3: Coverage must be representative of fishing activities and operations by all vessels within the sector throughout the entire FY.

The stated goal of ASM is: "To verify area fished and catch (landings and discards), by species and gear type, for the purposes of monitoring sector ACE utilization."

We offer two methods of allocating observer coverage that will be an improvement over the status quo. The first is to assign coverage to vessels based on discard volume; the second is to assign coverage based on discards per seaday. Both distribute costs to those who produce the most discards, and result in collection of data that is more reflective of actual fishing activity. These proposed options are tiered allocation schemes, so observers could still be assigned randomly within each tier. These approaches also incentivize vessels to reduce discards and meet other proposed goals for a monitoring program. While the precision standard is not specifically addressed, it may either be used in conjunction with the current 30% CV, or an alternate precision standard could be developed and implemented to meet the overarching goals of monitoring.[7]

Assigning ASM coverage proportionally to discards meets the FW 48 (78 FR 53363; August 29, 2013) monitoring Goal 1, *improve documentation of catch*, because it increases accuracy (*i.e., the true discard estimates instead of a relative ratio without taking into account*

[7] While the NEFMC clarified how the 30% CV standard is applied in FW48, we understand that this does not represent a change to current practices, and only clarifies the intent in the regulations.

the scale for various GF fishing activity per seaday) over the existing program. The proposed allocation methods therefore meet the objective to determine total catch and effort of target species. The objective to achieve coverage levels sufficient to minimize effects of potential observer bias was analyzed by the PDT, which ultimately concluded that they could not determine how observer bias related to discards on unobserved trips.

The proposed ASM schemes fully meets monitoring Goal 2, *reduce the cost of monitoring*, in that the monitoring costs and coverage levels do not conform to the one-size-fits all approach, which equates to similar costs whether you are landing higher volumes (and getting more of a return per trip) with a large vessel or smaller volumes with a smaller boat. This alternative distributes the costs of monitoring commensurate to the pounds caught, and avoids high coverage rates on small boats that have lower than proportional volume landings/discards than large boats on a daily basis. The proposed ASM schemes support monitoring Goal 3, *incentivize reducing discards*, as vessels that have a lower relative volume of discards (or volume per seaday) would be assigned lower coverage levels. Coverage levels will be assigned to specified vessel categories within a sector, and the status quo, which does not reward individual vessels with low discards, will be improved upon.

The proposed ASM schemes would not provide additional data streams for stock assessments (Goal 4), beyond the data already collected under the existing program. While there could be alterations to accommodate this goal, they could directly contradict Goal 2, unless the government could fund these data streams. The proposed schemes do, however, provide more accurate data streams for stock assessments.

Vessel size would serve as an appropriate strata and would help to determine more suitable coverage rates that would cut costs for the industry and incentivize reducing discards while achieving monitoring goals and providing accounting of ACE for the fishery.

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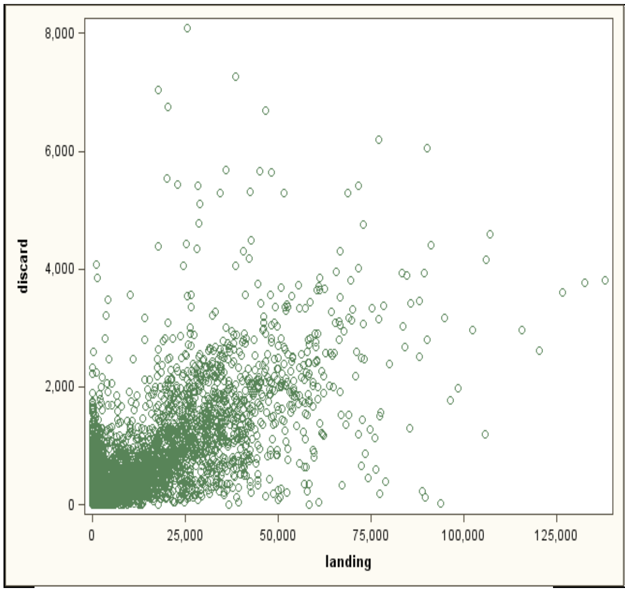

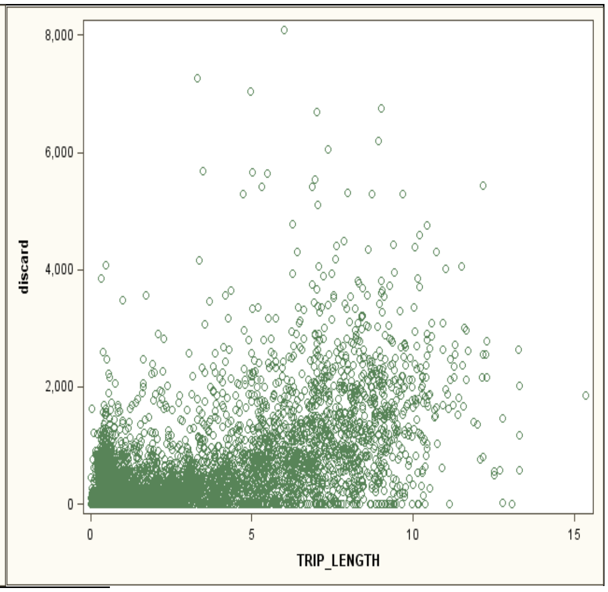

Figure 1 Landings vs. Discards per Trip in FY2011

Figure 2 Trip Length (Seadays) vs. Discards per Trip in FY2011

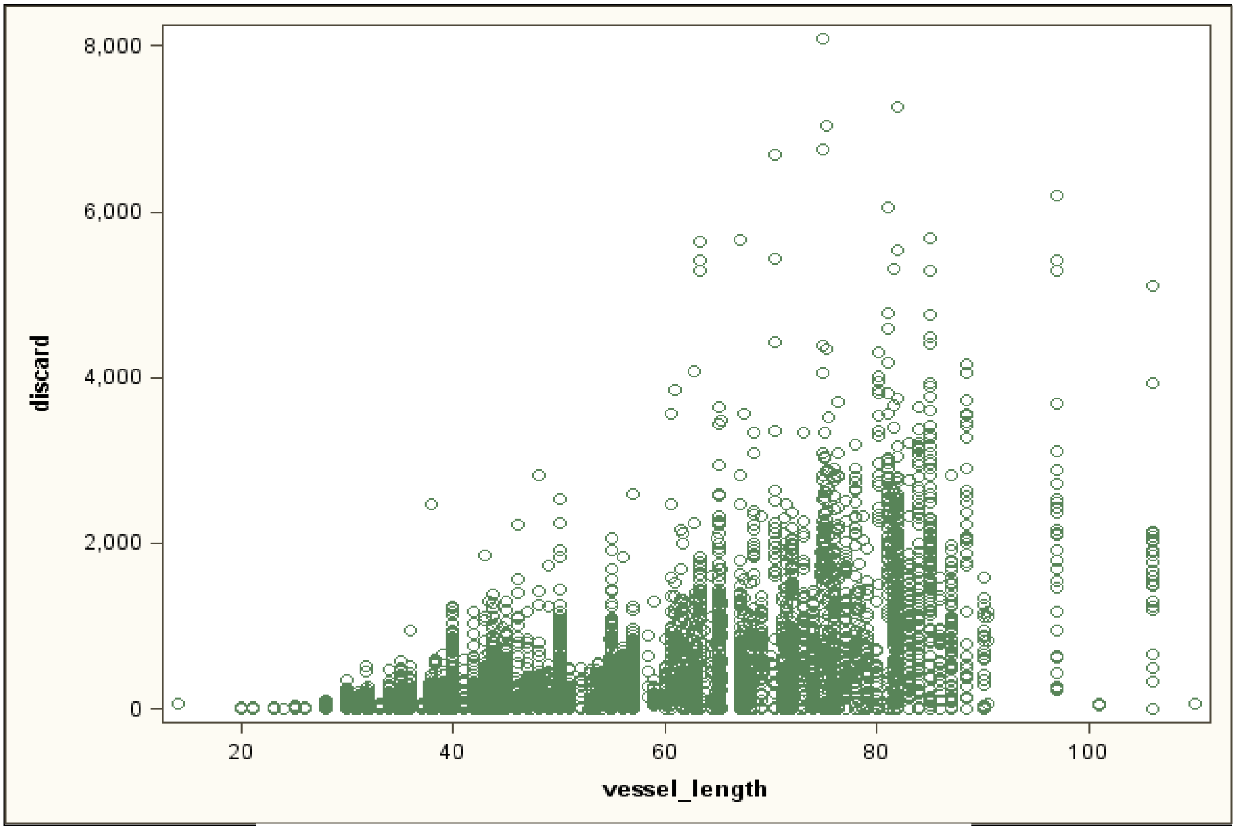

Figure 3 Vessel Length vs. Discards per Trip in FY2011

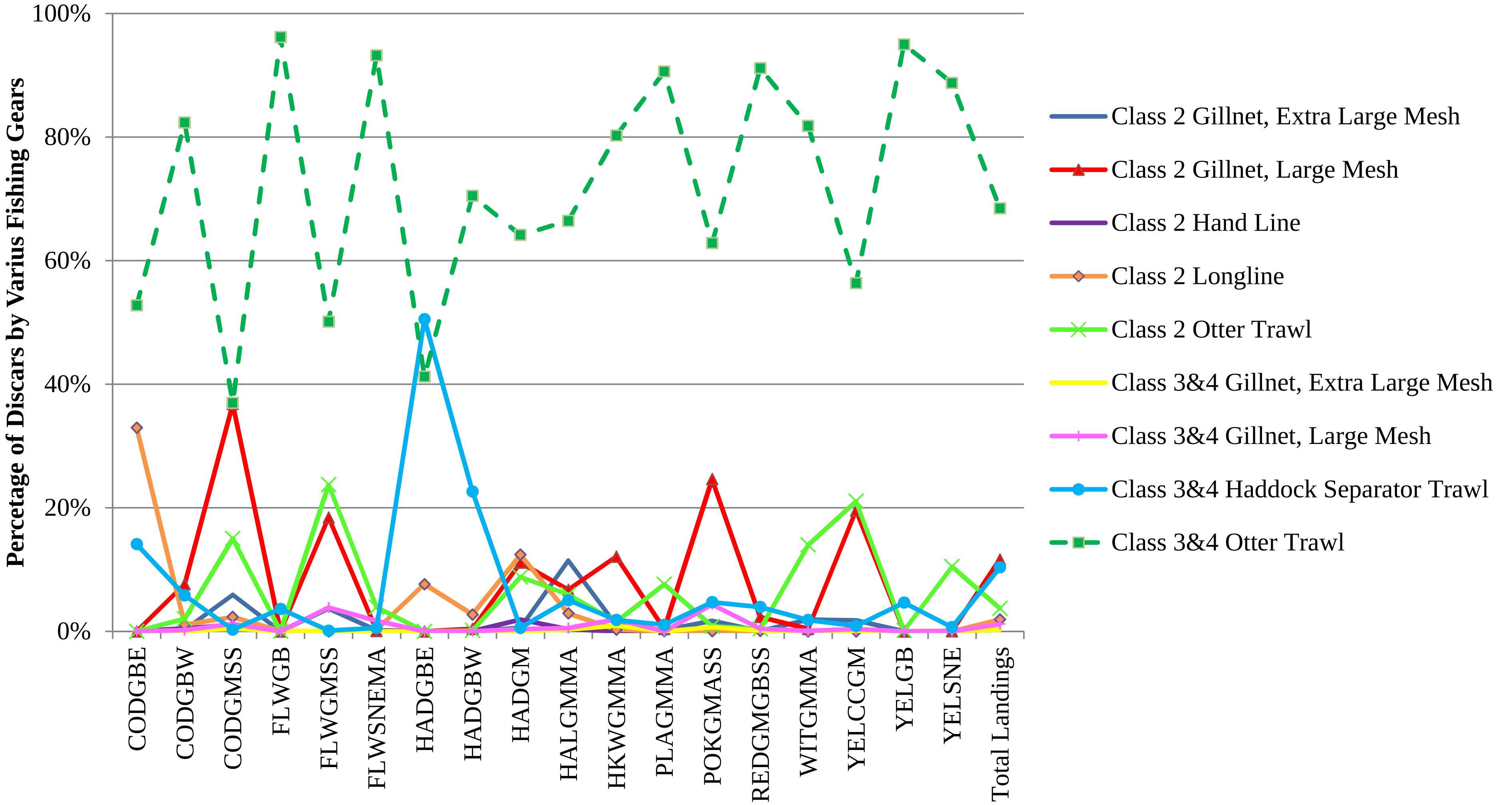

Figure 4(a) Distribution of GF Landings (Live lbs) by Various Gears for Each GF Stock under GF Trips in FY 2010

Note: Abbreviation of Groundfish stock are defined as follows and those stocks with an "*" indicated are zero possession prohibited species under landing/possession limits.
CODGBE: GB Cod East;
CODGBW: GB Cod West;
CODGMSS: GOM Cod;
FLDSNEMA*: Southern Windowpane;
FLGMGBSS*: Northern Windowpane;
FLWGB*: GB Winter Flounder;
FLWGMSS: GOM Winter Flounder;
FLWSNEMA*: SNE Winter Flounder;
HADGBE: GB Haddock East;
HADGBW: GB Haddock West;
HADGM: GOM Haddock;
HALGMMA: Halibut;
HKWGMMA: White Hake;
OPTGMMA*: Ocean Pout;
PLAGMMA: American Plaice;
POKGMASS: Pollock;
REDGMGBSS: Redfish;
WITGMMA: Witch Flounder;
WOLGMMA*:Wolffish;
YELCCGM: CC/GOM Yellowtail Flounder;
YELGB: GB Yellowtail Flounder;
YELSNE: SNE Yellowtail Flounder.

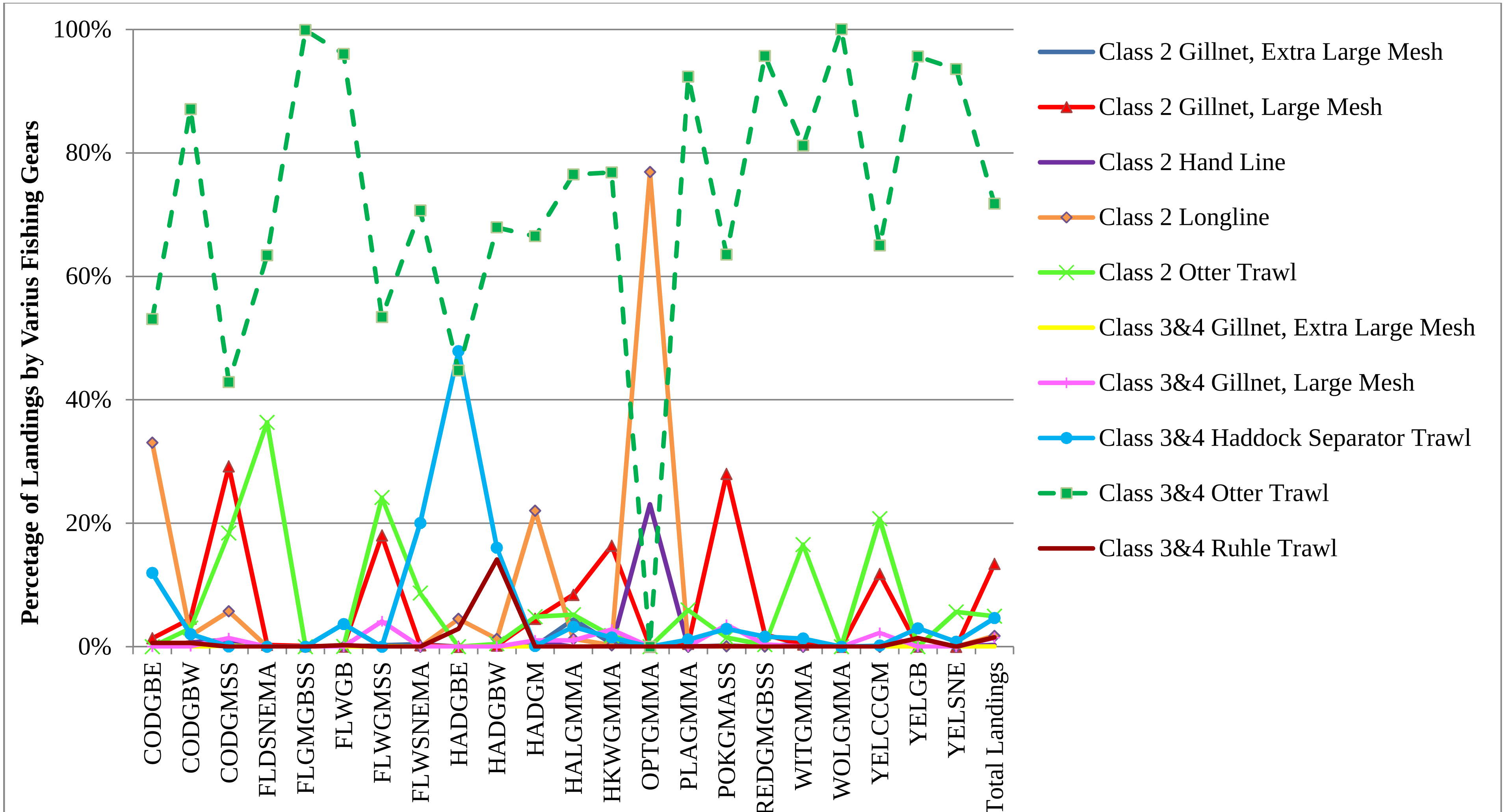

Figure 4(b) Distribution of GF Landings (Live lbs) by Various Gears for Each GF Stock under GF Trips in FY 2011

Note: Abbreviation of Groundfish stock are defined as follows and those stocks with an "*" indicated are zero possession prohibited species under landing/possession limits.

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HADGBE: GB Haddock East;
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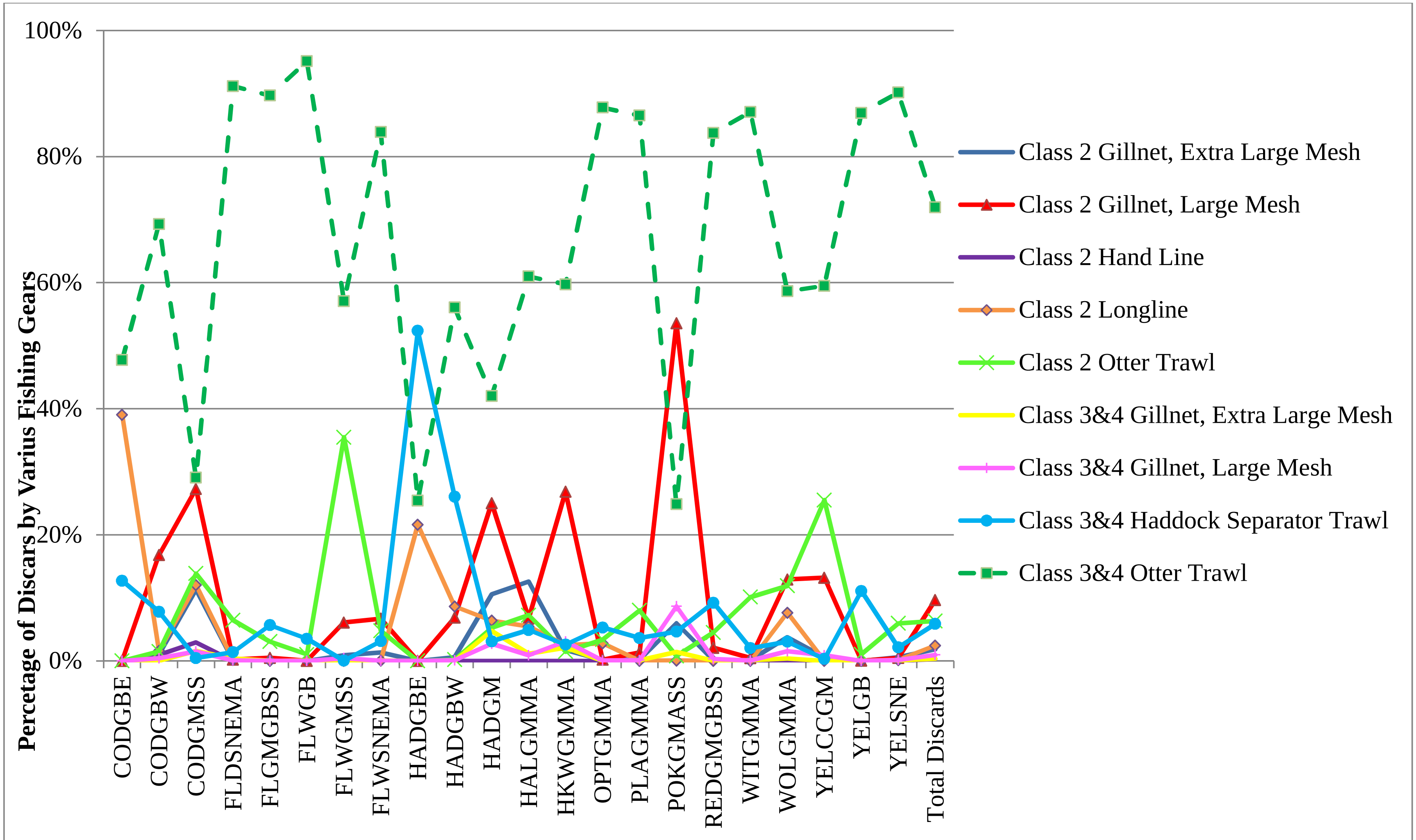

Figure 5(a) Distribution of GF Discards (Live lbs) by Various Gears for Each GF Stock under GF Trips in FY 2010

Note: Abbreviation of Groundfish stock are defined as follows and those stocks with an "*" indicated are zero possession prohibited species under landing/possession limits.

CODGBE: GB Cod East; CODGBW: GB Cod West; CODGMSS: GOM Cod; FLDSNEMA*: Southern Windowpane; FLGMGBSS*: Northern Windowpane; FLWGB*: GB Winter Flounder; FLWGMSS: GOM Winter Flounder; FLWSNEMA*: SNE Winter Flounder; HADGBE: GB Haddock East; HADGBW: GB Haddock West; HADGM: GOM Haddock; HALGMMA: Halibut; HKWGMMA: White Hake; OPTGMMA*: Ocean Pout; PLAGMMA: American Plaice; POKGMASS: Pollock; REDGMGBSS: Redfish; WITGMMA: Witch Flounder; WOLGMMA*:Wolffish; YELCCGM: CC/GOM Yellowtail Flounder; YELGB: GB Yellowtail Flounder; YELSNE: SNE Yellowtail Flounder.

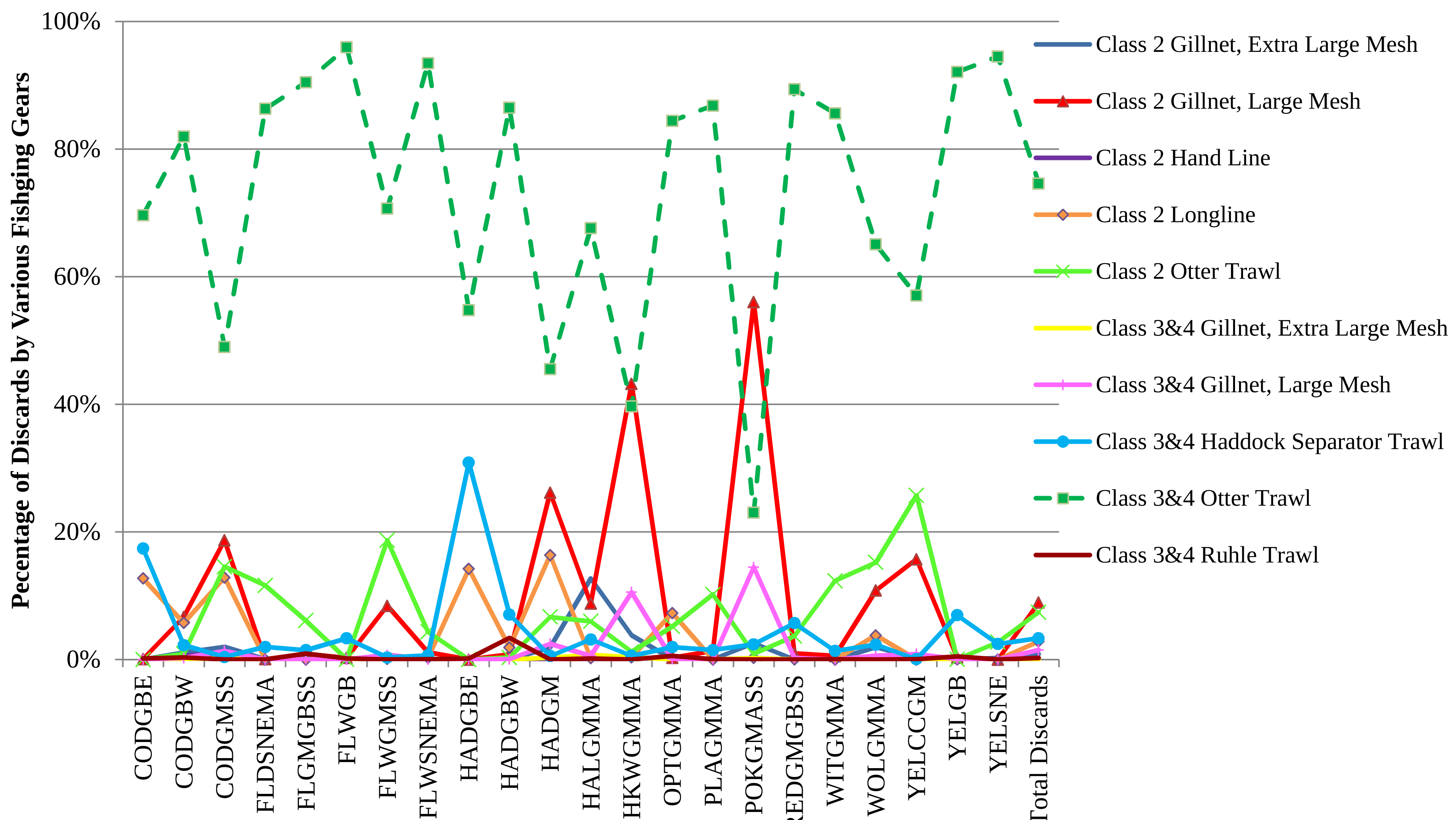

Figure 5(b) Distribution of GF Discards (Live lbs) by Various Gears for Each GF Stock under GF Trips in FY 2011

Note: Abbreviation of Groundfish stock are defined as follows and those stocks with an "*" indicated are zero possession prohibited species under landing/possession limits.

CODGBE: GB Cod East;
CODGBW: GB Cod West;
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WOLGMMA*:Wolffish;
YELCCGM: CC/GOM Yellowtail Flounder;
YELGB: GB Yellowtail Flounder;
YELSNE: SNE Yellowtail Flounder.

Table 1 Number of Trips, Seadays, Landings, and Discards for GF Trips in FY 2010

Size Class	Gear Type	Trips (A)	Seadays (B)	Observed Trips (C)	Observed Seadays (D)	GF Landings (E)	Non-GF Landings (F)	GF Discards (G)	Observed GF Discards (H)
				FY 2010					
2 (0'-50')	Gillnet, XL Mesh	2,955	3,585	564	656	814,477	12,451,412	47,020	9,209
	Gillnet, L Mesh	4,524	5,185	1,367	1,594	7,609,899	5,259,914	286,156	89,358
	Hand Line	271	297	40	43	99,625	158,660	12,556	3844
	Longline	547	745	185	242	1,249,132	386,952	72,371	18,827
	Otter Trawl	1,328	1,643	399	488	2,328,292	687,035	195,397	67,399
3 (50'-75')	Gillnet, XL Mesh	271	502	38	79	170,105	1,018,179	9,605	2130
	Gillnet, L Mesh	172	413	58	120	768,548	291,740	27,978	10,915
	Haddock Sep. Trawl	15	46	4	11	187,285	10,359	5,135	1,157
	Otter Trawl	2,438	6,657	745	1,936	17,783,821	9,350,367	930,740	269,042
	Ruhle Trawl	8	50	0	0	115,547	44,944	5,822	0
4 (75'+)	Haddock Separator Trawl	81	547	24	182	3,318,470	121,026	77,768	25,558
	Otter Trawl	1,214	7,571	361	2,339	29,900,139	6,441,003	1,293,505	369,709
	Ruhle Trawl	17	117	6	36	727,338	26,576	11,461	1,896
	Total*	13,845	27,362	3,791	7,726	65,073,596	36,249,551	2,975,574	869,044
				FY 2011					
2 (30'-50')	Gillnet, XL Mesh	2,854	3,573	379	486	174,417	14,466,542	23,316	4,177
	Gillnet, L Mesh	5,485	6,511	1,520	1,745	9,209,041	7,534,108	324,231	90,349
	Hand Line	444	459	29	29	157,499	109,995	7,982	826
	Longline	745	865	137	154	1,201,593	466,010	105,039	16,974
	Otter Trawl	2,022	2,349	503	601	3,326,165	1,030,607	273,134	76,775
3 (50'-75')	Gillnet, XL Mesh	291	472	29	49	28,114	1,440,591	2,302	639
	Gillnet, L Mesh	269	595	107	240	987,089	457,267	52,890	18,594
	Haddock Sep. Trawl	18	26	4	4	16,289	3,751	6,870	1,653
	Longline	1	1	1	1	13	3,010	0	0
	Otter Trawl	2,903	7,983	794	2,424	20,032,274	11,697,859	1,301,553	424,915
	Ruhle Trawl	4	30	0	0	56,882	14,972	1,679	0
4 (75'+)	Haddock Sep. Trawl	37	263	17	115	1,247,060	79,098	29,178	13,286
	Hand Line	5	7	0	0	739	5,168	279	0
	Otter Trawl	1,196	8,225	400	2,845	30,666,386	9,062,349	1,468,505	427,654
	Ruhle Trawl	49	368	19	139	1,390,287	172,761	28,729	13,500
	Total*	16,326	31,732	3,939	8,831	68,500,349	46,545,612	3,625,779	1,089,342

Table 2 Observer Coverage Rates and Proportion of Observed Seadays, Landings, and Discards during GF Trips in FY 2010

Size Class	Gear Type	Observer Coverage rate (%) by Category				Distribution % across Category		
		Trips (A)	Seadays (B)	GF Landings (C)	GF Discards (D)	Observed Seadays (E)	GF Landings (F)	GF Discards (G)
FY 2010								
2 (30'-50')	Gillnet, XL Mesh	19.1%	18.3%	24.2%	19.6%	8.5%	1.3%	1.6%
	Gillnet, L Mesh	30.2%	30.7%	35.1%	31.2%	20.6%	11.7%	9.6%
	Hand Line	14.8%	14.5%	34.1%	30.6%	0.6%	0.2%	0.4%
	Longline	33.8%	32.5%	28.8%	26.0%	3.1%	1.9%	2.4%
	Otter Trawl	30.0%	29.7%	30.1%	34.5%	6.3%	3.6%	6.6%
3 (50'-70'))	Gillnet, XL Mesh	14.0%	15.7%	28.8%	22.2%	1.0%	0.3%	0.3%
	Gillnet, L Mesh	33.7%	29.1%	28.7%	39.0%	1.6%	1.2%	0.9%
	Haddock Separator Trawl	26.7%	23.9%	34.6%	22.5%	0.1%	0.3%	0.2%
	Otter Trawl	30.6%	29.1%	30.2%	28.9%	25.1%	27.3%	31.3%
	Ruhle Trawl	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
4 (75'+)	Haddock Separator Trawl	29.6%	33.3%	39.6%	32.9%	2.4%	5.1%	2.6%
	Otter Trawl	29.7%	30.9%	30.5%	28.6%	30.3%	45.9%	43.5%
	Ruhle Trawl (Class 3&4)	35.3%	30.8%	27.2%	16.5%	0.5%	1.1%	0.4%
	Average/Total*	27.4%	28.2%	31.1%	29.2%	100.0%	100.0%	100.0%
FY 2011								
2 (30'-50')	Gillnet, XL Mesh	13.3%	13.6%	21.0%	17.9%	5.5%	0.3%	0.6%
	Gillnet, L Mesh	27.7%	26.8%	26.1%	27.9%	19.8%	13.4%	8.9%
	Hand Line	6.5%	6.3%	7.4%	10.3%	0.3%	0.2%	0.2%
	Longline	18.4%	17.8%	13.2%	16.2%	1.7%	1.8%	2.9%
	Otter Trawl	24.9%	25.6%	26.1%	28.1%	6.8%	4.9%	7.5%
3 (50'-75')	Gillnet, XL Mesh	10.0%	10.4%	47.6%	27.8%	0.6%	0.0%	0.1%
	Gillnet, L Mesh	39.8%	40.3%	41.2%	35.2%	2.7%	1.4%	1.5%
	Haddock Sep. Trawl	22.2%	15.4%	20.8%	24.1%	0.0%	0.0%	0.2%
	Longline	100.0%	100.0%	100.0%	-	0.0%	0.0%	0.0%
	Otter Trawl	27.4%	30.4%	31.7%	32.6%	27.4%	29.2%	35.9%
	Ruhle Trawl	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
4 (75'+)	Haddock Separator Trawl	45.9%	43.7%	60.8%	45.5%	1.3%	1.8%	0.8%
	Hand Line	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Otter Trawl	33.4%	34.6%	33.7%	29.1%	32.2%	44.8%	40.5%
	Ruhle Trawl	38.8%	37.8%	34.2%	47.0%	1.6%	2.0%	0.8%
	Total*	24.1%	27.8%	31.8%	30.0%	100.0%	100.0%	100.0%

Table 3 Landings and Discards per Trip and per Seaday for GF Trips in FY 2010

Size Class	Gear Type	GF Landings per Trip (A)	Non-GF Landings per Trip (B)	GF as % of Total Landings (C)	GF Discards per Trip (D)	GF Landings per seaday (E)	Non-GF Landings per seaday (F)	GF Discards per seaday (G)	Relative Seaday Ratio** (H)= [Max(G) /(G)]
				FY 2010					
2 (30'-50')	Gillnet, XL Mesh	276	4,214	6.14%	16	227	3,473	13	13.03
	Gillnet, L Mesh	1,682	1,163	59.13%	63	1,468	1,014	55	3.10
	Hand Line	368	585	38.57%	46	335	534	42	4.04
	Longline	2,284	707	76.35%	132	1,677	519	97	1.76
	Otter Trawl	1,753	517	77.22%	147	1,417	418	119	1.44
3 (50'-75')	Gillnet, XL Mesh	628	3,757	14.32%	35	339	2,028	19	8.93
	Gillnet, L Mesh	4,468	1,696	72.48%	163	1,861	706	68	2.52
	Haddock Sep. Trawl	12,486	691	94.76%	342	4,071	225	112	1.53
	Otter Trawl	7,294	3,835	65.54%	382	2,671	1,405	140	1.22
	Ruhle Trawl	14,443	5,618	72.00%	728	2,311	899	116	1.47
4 (75'+)	Haddock Sep. Trawl	40,969	1,494	96.48%	960	6,067	221	142	1.20
	Otter Trawl	24,629	5,306	82.28%	1065	3,949	851	171	1.00
	Ruhle Trawl	42,785	1,563	96.47%	674	6,217	227	98	1.74
	Total*	4,700	2,618	64.22%	215	2,378	1,325	109	1.57
				FY 2011					
2 (30'-50')	Gillnet, XL Mesh	61	5,069	1.19%	8	49	4,049	7	40.49
	Gillnet, L Mesh	1,679	1,374	55.00%	59	1,414	1,157	50	5.31
	Hand Line	355	248	58.88%	18	343	240	17	15.19
	Longline	1,613	626	72.06%	141	1,389	539	121	2.18
	Otter Trawl	1,645	510	76.34%	135	1,416	439	116	2.27
	Ruhle Trawl	6,466	930	87.43%	62	2,155	310	21	12.79
3 (50'-75')	Gillnet, XL Mesh	97	4,950	1.91%	8	60	3,052	5	54.18
	Gillnet, L Mesh	3,669	1,700	68.34%	197	1,659	769	89	2.97
	Haddock Sep. Trawl	905	208	81.28%	382	627	144	264	1.00
	Longline	13	3,010	0.43%	0	13	3,010	0	-
	Otter Trawl	6,901	4,030	63.13%	448	2,509	1,465	163	1.62
	Ruhle Trawl	14,221	3,743	79.16%	420	1,896	499	56	4.72
4 (75'+)	Haddock Sep. Trawl	33,704	2,138	94.04%	789	4,742	301	111	2.38
	Hand Line	148	1,034	12.51%	56	106	738	40	6.63
	Otter Trawl	25,641	7,577	77.19%	1,228	3,728	1,102	179	1.48
	Ruhle Trawl	28,373	3,526	88.95%	586	3,778	469	78	3.38
	Total*	4,196	2,851	59.54%	222	2,159	1,467	114	2.31

Table 4 Annual Catch Entitlement of Groundfish to Groundfish Sector, Catches, and the Utilization Rate by Species/Stocks

Groundfish Species/stocks	2010 ACE (lb) (A)	2010 Catch (Landings + Discards) (lb) (B)	2011 ACE (lb) (C)	2011 Catch (Landings + Discards)(lb) (D)	Predicted Utilization Rate for 2011 (E=B/C)	Actual Utilization Rate for 2011 (F=D/C)	Standardized Ratio based on Pollock (G)
CC/GOM Yel. Fl.	1,608,084	1,234,074	2,169,519	1,752,995	56.88%	80.80%	1.614
GB Cod East	717,441	558,835	431,357	357,959	100.00%	83.00%	2.838
GB Cod West	6,563,099	5,494,540	9,544,297	6,730,519	57.57%	70.50%	1.634
GB Haddock East	26,262,695	4,019,295	21,122,576	2,337,362	19.03%	11.10%	0.540
GB Haddock West	62,331,182	14,164,402	54,741,830	6,103,776	25.87%	11.20%	0.734
GB Winter Fl.	4,018,496	3,047,725	4,796,109	4,242,164	63.55%	88.50%	1.803
GB Yellowtail Fl.	1,770,451	1,629,253	2,474,662	2,178,073	65.84%	88.00%	1.868
GOM Cod	9,540,389	7,974,284	11,357,677	9,629,834	70.21%	84.80%	1.992
GOM Haddock	1,761,206	816,869	1,871,943	1,066,284	43.64%	57.00%	1.238
GOM Winter Fl.	293,736	177,934	716,989	348,756	24.82%	48.60%	0.704
Plaice	6,058,149	3,315,063	7,302,377	3,597,139	45.40%	49.30%	1.288
Pollock	35,666,741	12,014,768	34,096,310	16,629,760	35.24%	48.80%	1.000
Redfish	14,894,618	4,725,257	18,034,606	5,959,501	26.20%	33.00%	0.744
SNE/MA Yel. Fl.	517,372	336,125	941,762	802,444	35.69%	85.20%	1.013
White Hake	5,522,677	4,884,630	7,038,744	6,645,585	69.40%	94.40%	1.969
Witch Fl.	1,824,125	1,533,027	2,847,251	2,189,017	53.84%	76.90%	1.528
Grand Total	**179,350,461**	**65,926,081**	**179,488,008**	**70,762,673**	**36.73%**	**39.40%**	**-**

Table 5 Variable definitions and descriptive statistics

Variable	**Definition**	**Mean**	**Std. Dev.**
Discards	Discards per trip (Lbs)	226.62	529.25
Landings	Landingss per trip (Lbs)	4,482.43	10,561.93
trip_length	Length of the trip by number of seadays	1.39	2.25
Dday	=1 if trip less than 24 hours, and =0 otherwise	0.76	0.43
• ***Size class*** **(omitted if vessel size is less than 30')**			
class2 (base)	= 0 if vessel size is 30' to <50'		
dclass3	=1 if vessel size is 50' to <75'	0.21	0.41
dclass4	=1 if vessel size is >75'	0.09	0.29
• ***Sectors*** **(NEFS4 and the common pool are omitted)**			
dFixedgear	=1 if vessel belongs to that sector, and = 0 if otherwise	0.18	0.38
dSHS	=1 if vessel belongs to that sector, and = 0 if otherwise	0.08	0.26
dPortclyde	=1 if vessel belongs to that sector, and = 0 if otherwise	0.05	0.22
dNEFS7	=1 if vessel belongs to that sector, and = 0 if otherwise	0.02	0.15
dNEFS8	=1 if vessel belongs to that sector, and = 0 if otherwise	0.01	0.09
dNEFS11	=1 if vessel belongs to that sector, and = 0 if otherwise	0.11	0.32
dNEFS12	=1 if vessel belongs to that sector, and = 0 if otherwise	0.02	0.13
dNEFS2	=1 if vessel belongs to that sector, and = 0 if otherwise	0.14	0.35
dNEFS3	=1 if vessel belongs to that sector, and = 0 if otherwise	0.20	0.40
dNEFS10	=1 if vessel belongs to that sector, and = 0 if otherwise	0.07	0.26
dNEFS13	=1 if vessel belongs to that sector, and = 0 if otherwise	0.03	0.17
dNEFS9	=1 if vessel belongs to that sector, and = 0 if otherwise	0.03	0.17
dNEFS5	=1 if vessel belongs to that sector, and = 0 if otherwise	0.04	0.20
dTristate	=1 if vessel belongs to that sector, and = 0 if otherwise	0.00	0.06
dNEFS6	=1 if vessel belongs to that sector, and = 0 if otherwise	0.01	0.09
dNCCS	=1 if vessel belongs to that sector, and = 0 if otherwise	0.00	0.06
• ***Gear***			
dLongline	= 1 if Longline gear was used to land catch	0.05	0.21
dHandline	= 1 if Hand Line gear was used to land catch	0.01	0.10
dGillnetLargeMesh	= 1 if Large Mesh Gillnet was used to land catch	0.38	0.48
dGillnetExtraLargeMesh	= 1 if Extra Large Gillnet was used to land catch	0.16	0.37
dRuhleTrawl	= 1 if Ruhle Trawl was used to land catch	0.00	0.06
dHaddockSeparatorTrawl	= 1 if Haddock Separator Trawl was used to land catch	0.01	0.10
• ***Broad Stock Areas***			
dGOM	=1 if landings occurred in the Gulf of Maine (515)	0.61	0.49
dGBW	=1 if landings occurred in the George's Bank West (521)	0.20	0.40
dGBE	=1 if landings occurred in the George's Bank East (525)	0.00	0.07

Table 6 Double Log SUR Regression Results

Variables \ Models	Unweighted Discards Model		Weighted Discards Model	
	Parameter Estimate	**t statistic**	**Parameter Estimate**	**t statistic**
dday	-1.872	-15.820	-1.658	-17.190
dclass3	0.072	0.560	0.104	0.990
dclass4	0.723	3.620	0.720	4.430
dFixedgear	3.827	15.740	4.543	22.940
dSHS	4.844	22.910	5.298	30.770
dPortclyde	4.978	19.530	5.506	26.520
dNEFS7	4.746	17.290	5.318	23.800
dNEFS8	4.160	10.020	5.051	14.940
dNEFS11	5.290	22.060	5.652	28.940
dNEFS12	3.814	12.450	4.619	18.520
dNEFS2	4.867	23.580	5.361	31.890
dNEFS3	5.117	21.440	5.657	29.100
dNEFS10	4.783	19.430	5.442	27.140
dNEFS13	5.580	21.240	6.135	28.670
dNEFS9	1.675	6.480	2.977	14.150
dNEFS5	6.242	26.870	6.789	35.890
dTristate	4.979	8.450	5.702	11.890
dNEFS6	4.834	11.840	5.377	16.170
dNCCS	5.060	7.400	5.791	10.400
dLongline	0.007	0.030	0.126	0.680
dHandline	-3.315	-8.810	-2.947	-9.610
dGillnetLargeMesh	-1.726	-11.420	-1.605	-13.040
dGillnetExtraLargeMesh	-3.708	-20.850	-3.308	-22.850
dRuhleTrawl	-2.134	-3.550	-2.169	-4.430
dHaddockSeparatorTrawl	-0.804	-2.300	-0.831	-2.920
dGOM	0.928	5.730	0.729	5.530
dGBW	0.726	4.810	0.587	4.780
dGBE	1.872	3.650	1.578	3.780
Number of Observation	14,946		14,946	
Discard model R-squared	0.401		0.571	
System weighted R-squared	0.834		0.842	

Table 7 Simulation of Possible Allocation of Observed Seadays for GF Trips in FY 2010 and FY2011

Size Class	Gear Type	Scenario 1: Reallocation of Observed Seadays				Scenario 2: Reduce Observed Seadays by 19%				
		Observed Seadays (A)	**Observed Seadays % (B)**	**Observed Discards (C)**	**Observed Discards % (D)**	**Observed Seadays (E)**	**Observed Seadays % (F)**	**Observed Discards (G)**	**Observed Discards % (H)**	**Change in Observed Seadays (I)**
FY 2010										
2 (30' - 50')	Gillnet, XL Mesh	122	3%	1,601	3%	99	3%	1,295	3%	-557
	Gillnet, L Mesh	743	14%	41,005	14%	601	12%	33,164	12%	-993
	Haddock S.Trawl	0	8%	5	8%	0	7%	4	7%	-
	Hand Line	33	11%	1,378	11%	26	9%	1,115	9%	-17
	Longline	188	25%	18,254	25%	152	20%	14,764	20%	-90
	Otter Trawl	507	31%	60,337	31%	410	25%	48,799	25%	-78
3 (50' - 75')	Gillnet, XL Mesh	25	5%	477	5%	20	4%	386	4%	-59
	Gillnet, L Mesh	73	18%	4,921	18%	59	14%	3,980	14%	-61
	Haddock S. Trawl	13	29%	1,488	29%	11	23%	1,203	23%	0
	Otter Trawl	2,417	36%	337,880	36%	1,955	29%	273,267	29%	19
	Ruhle Trawl	15	30%	1,760	30%	12	24%	1,424	24%	12
4 (75' +)	Haddock S. Trawl	202	37%	28,708	37%	163	30%	23,218	30%	-19
	Otter Trawl	3,359	44%	573,808	44%	2,716	36%	464,080	36%	377
	Ruhle Trawl	30	25%	2,915	25%	24	21%	2,358	21%	-12
	Total*	7,726	28%	1,074,523	36%	6,249	23%	869,044	29%	-1,477
FY 2011										
2 (30' - 50')	Gillnet, XL Mesh	57	2%	371	2%	46	1%	303	1%	-440
	Gillnet, L Mesh	790	12%	39,325	12%	645	10%	32,129	10%	-1,100
	Hand Line	19	4%	338	4%	16	3%	276	3%	-13
	Longline	256	30%	31,067	30%	209	24%	25,382	24%	55
	Otter Trawl	665	28%	77,353	28%	544	23%	63,199	23%	-57
	Ruhle Trawl	0	5%	3	5%	0	4%	2	4%	0
3 (50' - 75')	Gillnet, XL Mesh	6	1%	27	1%	5	1%	22	1%	-44
	Gillnet, L Mesh	129	22%	11,451	22%	105	18%	9,356	18%	-135
	Haddock S.Trawl	17	64%	4,421	64%	14	53%	3,612	53%	10
	Longline	0	0%	0	-	0	0%	0	-	-1
	Otter Trawl	3,170	40%	516,852	40%	2,590	32%	422,275	32%	166
	Ruhle Trawl	4	14%	229	14%	3	11%	187	11%	3
4 (75' +)	Haddock S.Trawl	71	27%	7,884	27%	58	22%	6,441	22%	-57
	Otter Trawl	3,577	43%	638,592	43%	2,922	36%	521,738	36%	77
	Ruhle Trawl	70	19%	5,463	19%	57	16%	4,463	16%	-82
	Total*	8,831	28%	1,333,321	37%	7,215	23%	1,089,341	30%	-1,616

Table 8 Weighted Discard Simulation of Observed Seadays for GF Trips in FY 2010

Size Class	Gear Type	Scenario 3: Reallocation of Observed Seadays				Scenario 4: Reduce Observed Seadays by 20%				
		Observed Seadays (A)	**Observed Seadays % (B)**	**Observed Weighted Discards (C)**	**Observed Discards % (D)**	**Observed Seadays (E)**	**Observed Seadays % (F)**	**Observed Weighted Discards (G)**	**Observed Discards % (G)**	**Change in Observed Seadays (I)**
2010										
2 (30'-50')	Gillnet, XL Mesh	135	4%	3,054	6%	108	3%	2,449	5%	-548
	Gillnet, L Mesh	708	14%	58,448	20%	568	11%	46,871	16%	-1,026
	Haddock S. Trawl	0	10%	11	18%	0	8%	9	14%	0
	Hand Line	39	13%	3,036	24%	31	10%	2,435	19%	-12
	Longline	224	30%	40,835	56%	180	24%	32,747	45%	-62
	Otter Trawl	518	32%	98,829	51%	416	25%	79,255	41%	-72
3 (50'-75')	Gillnet, XL Mesh	26	5%	817	9%	21	4%	655	7%	-58
	Gillnet, L Mesh	61	15%	5,428	19%	49	12%	4,353	16%	-71
	Haddock S. Trawl	12	25%	1,788	35%	9	20%	1,434	28%	-2
	Otter Trawl	2,453	37%	546,256	59%	1,967	30%	438,065	47%	31
	Ruhle Trawl	18	36%	3,931	68%	14	29%	3,152	54%	14
4 (75'+)	Haddock S. Trawl	167	31%	30,941	40%	134	25%	24,813	32%	-48
	Otter Trawl	3,332	44%	886,101	69%	2,672	35%	710,600	55%	333
	Ruhle Trawl	32	27%	5,248	46%	26	22%	4,208	37%	-10
	Total*	7,726	28%	1,684,723	57%	6,196	23%	1,351,047	45%	-1,530
2011										
2 (30'-50')	Gillnet, XL Mesh	63	2%	715	3%	51	1%	578	2%	-435
	Gillnet, L Mesh	740	11%	54,093	17%	598	9%	43,734	13%	-1,147
	Hand Line	22	5%	682	9%	18	4%	551	7%	-11
	Longline	292	34%	63,584	61%	236	27%	51,408	49%	82
	Otter Trawl	717	31%	140,734	52%	580	25%	113,783	42%	-21
	Ruhle Trawl	0	6%	8	13%	0	5%	6	10%	0
3 (50'-75')	Gillnet, XL Mesh	6	1%	50	2%	5	1%	41	2%	-44
	Gillnet, L Mesh	105	18%	11,895	22%	85	14%	9,617	18%	-155
	Haddock S. Trawl	20	76%	9,514	138%	16	61%	7,692	112%	12
	Longline	0	0%	0	-	0	0%	0	-	-1
	Otter Trawl	3,281	41%	866,945	67%	2,653	33%	700,925	54%	229
	Ruhle Trawl	5	16%	470	28%	4	13%	380	23%	4
4 (75'+)	Haddock S. Trawl	62	23%	9,305	32%	50	19%	7,523	26%	-65
	Hand Line	1	10%	44	16%	1	8%	36	13%	1
	Otter Trawl	3,442	42%	926,051	63%	2,783	34%	748,712	51%	-62
	Ruhle Trawl	76	21%	9,963	35%	61	17%	8,055	28%	-78
	Total*	8,831	28%	2,094,054	58%	7,140	23%	1,693,043	47%	-1,691

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October 27, 2013

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Submitted via email to: nmfs.ner.draftSBRM@noaa.gov.

Re: Comments on Draft Standardized Bycatch Reporting Methodology Omnibus Amendment

Dear Chairman Stockwell and Chairman Robins:

Oceana thanks you for the opportunity to submit these comments on the Northeast Region Omnibus Standardized Bycatch Reporting Amendment Draft document.[1]

For more than a decade Oceana has advocated and litigated to improve the quality of information available to support Northeast Region fisheries management under the guidance of the New England and the Mid-Atlantic Fishery Management Councils. Modern fisheries management is becoming more data-dependent every year, so access to high-quality, accurate, and precise catch data is essential. As the SBRM document itself explains, "(t)*he primary purpose of bycatch reporting and monitoring is to collect information that can be used reliably as the basis for making sound fisheries management decisions.*"[2]

Oceana's longstanding goal for the SBRM is to establish a program across the Northeast region that collects accurate and precise information about bycatch in all fisheries and then timely reports this information in a useful form to Councils, fisheries scientists, the fishing industry, and other stakeholders. A robust data collection and reporting system will help identify bycatch interactions that need management attention, improve stock assessments, and support efforts to manage the region's fisheries.

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[1] Standardized Bycatch Reporting Methodology Draft Document downloaded from http://www.nero.noaa.gov/mediacenter/2013/09/2013nersbrmdraftamendment.pdf , September 27, 2013. Oceana submits these comment based on the documents available on 9/27/2013 and notes that the document was incomplete at that time with the notable omission of appendices and supporting materials.

[2] *Id* at 3 (Section 1.3)

There is great potential for the Councils and the National Marine Fisheries Service (NMFS) to support these multiple functions. However, the Agency-led SBRM development process has not done the job. Moreover the Agency's revision of the SBRM irrationally ignores how the fisheries work, by using a data-set that is almost 10-years old, when the fishery had vastly different characteristics, and by failing to consider the management changes brought on by important events such as the introduction of Annual Catch Limit (ACLs) and Accountability Measures (AMs) in the fishery management plan amendments that implemented the 2006 reauthorization of the Magnuson Act (MSA) and the establishment of a catch shares fishery for New England groundfish.

Oceana repeats many of the comments that we raised in a May, 2013 letter to the Fishery Management Action Team (FMAT) chair highlighting deficiencies in the document at that time.[3] Despite assurances to the Councils that revisions and modifications would be made prior to public comments[4], it appears that the majority of the promised changes have not been made the document continues to suffer from deficiencies we identified 5 months ago. Oceana encourages the Councils to ensure that the document is complete before proceeding with approval and submission to the Agency.

For these reasons, despite the need to establish the SBRM as quickly as possible, we urge you to delay Council approval of the SBRM document. It is incomplete and inadequate to satisfy the goals and objectives of the amendment or satisfy the various mandates that guide this action. The SBRM simply does not provide the information needed to identify, recognize, describe, and respond to bycatch in the region or assess the effects of this action on the fisheries of the region. Approving a fundamentally flawed document in the name of speed is unacceptable. Oceana looks to you as chairs of your respective Councils to lead your Councils and disapprove the current SBRM document to allow further development and specific action to address the important shortcomings in the document which can then be approved at a later date.

Oceana encourages the Councils to convene an open *Council-led* process in the near future to publicly develop and refine the amendment to meet the needs of the fisheries of the region and provide the information that fisheries managers, scientists and stakeholders need to manage New England and Mid-Atlantic fisheries.

In the interim, Agency can move forward with an observer allocation process for 2014 regardless of Council action on the draft amendment. An interim plan of action that continues the status quo approach is not ideal but will serve the fisheries of the region until a new SBRM amendment can be completed: a short term solution that Oceana reluctantly accepts.

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[3] *See* Oceana letter to Doug Potts, FMAT Chair May 17, 2013.
[4] *See* Testimony and Answers to questions by Doug Potts, NEFMC meeting April, 2013 and June, 2013.

The SBRM is an incomplete response to the Court Order in *Oceana v. Locke*

The SBRM includes measures that specifically respond to the court opinion in *Oceana v. Locke*.[5] As the SBRM document explains, the court found that the 2007 SBRM provided the Agency with undue discretion to determine whether there was insufficient funding and also provided the Agency undue discretion to address insufficient funding to support the goals of the SBRM.

The treatment of funding triggers in the draft document is wholly inadequate. The draft contains only one alternative to the status quo, and does not coherently explain what that alternative is or how it differs from the status quo. The Councils need to take a fresh look at this issue, considering what it really means to have insufficient resources within the context of how fisheries and budgets are actually managed.

The reallocation alternatives presented in the current document are fundamentally incomplete, because they address reallocation observer coverage without addressing reallocating buffers for uncertainty and otherwise modifying management measures to account for the reallocated observer coverage. The Amendment must address this fundamental aspect of the SBRM in order to be consistent with the conservation goals and objectives of the Magunuson Act.

Funding Triggers

While Oceana supports developing a formulaic approach to determine when available funds are insufficient to support the needs of the SBRM observer allocation in order to remove Council and Agency discretion from this portion of the allocation process, the draft document fails to contain such an approach. The draft document purports to consider only one alternative to the status quo, but a review of the text intended to describe that alternative reveals that there is no substance to this approach.

The document starts out by claiming that the Amendment "would identify specific funding sources to be used to fund observer coverage under the SBRM each year."[6] But the document never actually describes an alternative that would do that. The most specific it gets is the claim that "total available funds allocated to the Northeast Region from the Congressional appropriate funding lines listed in Table 66 would be used to support SBRM consistent with historic practice."[7] But the draft document fails to explain why only these funding lines and not others would be considered, fails to explain the relevant aspects of the appropriations and Agency budgeting process, fails to explain whether other discretionary sources of money exist, fails to explain how new or different funding lines that might be applicable would be handled, and fails to explain exactly how much leeway the Agency gives itself in the phrase "consistent

[5] *Oceana, Inc. v. Locke*, 670 F.3d 1238 (D.C. Cir. 2011)
[6] Standardized Bycatch Reporting Methodology Draft Document page 238.
[7] *Id.*

with historic practice." It appears to all intents and purposes that this alternative is the same as the status quo expressed in different words.

So the Councils must develop alternatives that really do confine Agency and Council discretion. In developing these alternatives, the Councils must consider all the relevant factors, not just federal funding from certain named funding lines. Among these factors to be considered would be other potentially applicable funding lines, discretionary money, existing industry-funding opportunities in the Northeast Region, and the possibility of developing industry-funding alternatives within the SBRM amendment.

Prioritization Alternatives

Prioritizing Buffers for Uncertainty in Conjunction with Changing Observer Levels

The SBRM Amendment's discussion of the prioritization process should start from the realization that the prioritization is related to the performance standard which is related to the management needs. These three elements can be balanced in more than one way. A reduction in observer coverage increases scientific and management uncertainty which then causes uncertainty in permissible catch levels. The Agency and Council have already begun to explore these tradeoffs between catch levels and uncertainty. In the 2004 SBRM guidance, the Agency described this basic situation:

> 'as the CV of the estimate increases, the limit on bycatch for the marine mammal species of interest decreases in a predictable manner. Therefore, managers can determine the costs and benefits associated with various levels of the CVs on both the abundance estimate and the bycatch estimate and allocate funding appropriately to improve either or both estimates.[8]'

The Agency then further discussed the effects of increased uncertainty:

> 'if bycatch mortality is not monitored adequately, it increases the uncertainty concerning total fishing-related mortality, which in turn makes it more difficult to assess the status of stocks of fish and other bycatch species, to set the appropriate optimum yields and overfishing levels for fish stocks, to determine acceptable levels of bycatch for other bycatch species, and to ensure that the optimum yields are attained, that overfishing does not occur and that the acceptable levels of bycatch for other species are not exceeded.[9]'

[8] National Marine Fisheries Service. 2004. Evaluating bycatch: a national approach to standardized bycatch monitoring programs. at 59
[9] *Id* at 85

More recently, the Council analyzed this type of reduction of quota to account for uncertainty in the discussion of monitoring in the Multispecies sector fishery.[10] This work summarized the effect of various CV levels on different catch scenarios and suggested requiring catch reductions to account for scientific uncertainty and keep catch below set levels. This approach is a fundamental requirement of management under ACLs and AMs as advised by the National Standard One Guidance[11]

Any observer prioritization process must consider and rationally include the appropriate trade offs between uncertainty and buffers in catch limits to allow for scientific and management uncertainty. If uncertainty is increased as a result of the prioritization, there must be changes to account for this increased uncertainty. The Omnibus SBRM amendment is the appropriate place to develop and consider these necessary changes in every Fishery Management Plan. Without a full consideration of the effect of monitoring prioritization on catch management, the SBRM is incomplete.

What does this mean in terms of alternatives? The SBRM reallocation alternatives section must develop and consider alternatives for *achieving the conservation goals and objectives* of the Magnuson Act prior to considering alternatives for doing the best the Agency can if it *cannot achieve those goals*. Thus, the reallocation alternatives should result not in a simple reallocation of observers but also in a process for rebalancing buffers for uncertainty in the catch limits and management measures that will not receive full funding for their observer needs. It is irrational to completely ignore this vitally important component of the prioritization process.

Reallocation Methodologies

To the extent that one component of reallocation will be reallocation of observers, Oceana offers comments on the incomplete alternatives put forward in the draft. Oceana sees merit in both the Proportional and Penultimate Approaches to prioritizing monitoring resources if funding does not match the needs described by the SBRM analysis. Both approaches are rational and methodical means to reallocate observer coverage – which is only a portion of what a reallocation alternative must do.

Oceana also notes that these prioritization approaches are untested. Without practical application of these tools, there may be unforeseen significant effects on the ability of the SBRM to accomplish its primary purpose to collect information to support management. Oceana suggests that the Councils revise the proportional and penultimate prioritization measures to guard against these shortcomings and improve the transparent oversight of catch

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[10] Northeast Multispecies Framework Adjustment 48, page 413-420: http://www.nefmc.org/nemulti/frame/fw%2048/130307_FW48_Figures_Repaired.pdf
[11] National Marine Fisheries Service National Standard One Final Rule (74 Fed. Reg 3178, January 16, 2009)

monitoring in the region. The product of any prioritization must be subject to public review and comment.

The Draft SBRM Does Not Provide Information Needed to Support Management of the Region's Fisheries

Since 1996, the MSA has required every FMP to 'establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery.'[12] Importantly, the Act also defines a *fishery* as '(A)(O)ne or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and (B) any fishing for such stocks.[13]

When developing an SBRM, the document advises that "(t)he development of an SBRM must consider how, where, and when it is most appropriate to collect information on and monitor bycatch occurring in a fishery, and the most effective SBRM will be designed at the *appropriate operational level*[14]. " It then clarifies that an 'FMP is the operational unit used for managing a fishery (or collection of fisheries) that targets the species specifically addressed in the FMP. FMP is the operational unit for MSA compliance. [15]'

For these reasons, it is logical that the Councils would want an SBRM that collects and reports bycatch using the 'operational unit' for management of the region's fisheries: the FMP. All management actions are at the FMP level. MSA-mandated accountability is at the FMP level.[16] If bycatch issues are taking place or arise, the response at the Council level will be through an FMP action.

However, instead of allowing the Councils to consider and select the appropriate *operational level* for the fisheries of the region relative the management needs of the fisheries, the Agency has forced the Councils to adopt a new concept, known as the 'fishery mode' as the operational unit of the SBRM with emphatic clarity: "While the FMP works very well as the operational unit for devising and implementing fishing regulations, it is not the most efficient or appropriate operational unit for devising and implementing an SBRM[17]" Unlike most other policy decisions, the Councils have not been given the opportunity to consider the effects of the mode approach on the administration of the fisheries of the region or the merits and tradeoffs of this approach. Since the beginning of the previous SBRM, the fishery mode has not been discussed.

[12] Magnuson-Stevens Act Section 303 (a) (11)
[13] Magnuson Stevens Act, Section 104
[14] Standardized Bycatch Reporting Methodology Draft Document, at 9
[15] Id at 47
[16] Magnuson Stevens Act, Section 303 (a)(15)
[17] Standardized Bycatch Reporting Methodology Draft Document, at 47

Instead the Agency simply opines that, "the fishing mode is a more appropriate operational unit than the FMP…"[18]

Oceana has commented in the past that the fishery mode is an ineffective approach to bycatch reporting that provides bycatch data that is of little use to be the 'basis for making sound fisheries management decisions.[19]' Oceana continues to oppose the use of the fishery mode because this approach 1) does not report bycatch relative to FMPs, 2) does not collect or report bycatch in a spatially useful manner and 3) does not consider the data needed to manage the same species in different stock areas. These weaknesses present problems for the Councils as they try to manage fisheries and can be remedied by rejecting the fishery mode in favor of a Fishery Management Plan-level operational unit.

First the aggregation of FMPs or parts of FMPs under a single mode improperly aggregates catch and shields this bycatch from appropriate management scrutiny. Allowing the Agency to continue to aggregate bycatch by the mode stratification will continue to hamper the efforts of the Councils to identify bycatch problems, manage catch and meet the management objectives of each FMP.

Second continuing to collect and report bycatch information by species (e.g. cod) rather than species and stock area (e.g Georges Bank cod) does not provide useful information for assessment or management. The document even notes that "(s)tock areas will not be considered in the analyses, although retrospective data on observed discards would be available at this scale.[20]"

To illustrate the inefficiency of the fishery mode, a recent report from the Agency estimated that across the fisheries of the region, over 71,000 mt (156,500,000 pounds) of discards of the 14 species groups occurred during the July 2010 through June 2011 period[21]. Although the data was reported by species such as yellowtail flounder, the report was unable to parse bycatch by FMP or stock and instead reported it by the more general fishery mode. This lack of clarity does not indicate which stock was caught or which fishery should be held accountable. This lack of clarity leaves all stakeholders and managers unable to respond to this vast volume of discards. If this data were reported by stock and FMP level, the Councils could then consider appropriate management actions in response to ensure accountability.

The Councils' struggle to manage the catch of specific stocks in varying levels of abundance across the region. The Councils should take clear action to include options to define the

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[18] I*d.*
[19] *Id* at 3)
[20] Standardized Bycatch Reporting Methodology Draft Document, at 146
[21] 2012 Discard Estimation, Precision, and Sample Size Analyses for14 Federally Managed Species Groups in the Northeast Region. NEFSC CRD 12-17.

operational unit for the SBRM to be the FMP level with stock area stratification to provide useful information support management.

The Councils must take this action before moving forward with approval of the SBRM.

The SBRM Does Not Meet the Data Needs of Annual Catch Limits and Accountability Measures

Since the advent of Annual Catch Limits (ACLs) and Accountability Measures (AMs) in 2006, the need for robust catch information has become more critical to ensure that all catch, both landings and discards, are accounted for in the effort to end overfishing. Accurate, precise and timely catch information is essential for the Councils to ensure that ACLs are not exceeded. In the absence of robust data, managers are left to use assumptions about catch without any assurances about the quality of these important descriptors of the fisheries.

In the 2007 SBRM, the Agency declined to assess the bycatch reporting that ACLs and AMs would necessitate. Instead the Agency chose to ignore the mandate for ACLs and AMs, treating it as a future change that could be considered at a later date[22]. This responsibility cannot be avoided any longer. Managing the FMPs of the region under ACLs and AMs is now the *status quo* for every FMP. The Councils and Agency must ensure that the data collected and reported match the data needs of the respective FMPs to 'be used reliably as the basis for making sound fisheries management decisions'[23] including in-season closures, overage deductions and the 'off the top' Annual Catch Target (ACT) setting process that is used throughout the Mid-Atlantic. Remarkably this process is described in just two sentences in the document without any discussion of the role of data in the process: "The Council then sets corresponding annual catch targets (ACT) for each fishing sector. The commercial quota and recreational harvest limit are the amount of landings remaining after deducting discards from the respective ACTs.[24]"

The SBRM must include an explicit discussion of the data needed to administer each fishery and its ACLs and AMs. Without this fishery-by-fishery discussion, the SBRM will not support the specification or administration of ACLs and AMs used in the region and cannot be shown to meet the mandates of the MSA.

The Standardized Bycatch Reporting Methodology Must Consider Alternatives to Respond to Management and Scientific Uncertainty Created by the 30% CV Performance Standard

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[22] *See* Agency response to Oceana comments in 2008 Standardized Bycatch Reporting Methodology Final Rule *(73* Fed. Reg. 4741, January 28, 2008)
[23] Standardized Bycatch Reporting Methodology Draft Document, section 1.3 at 3
[24] Id at 39

Uncertainty and assumptions are common and expected in fisheries management. However it is incumbent upon the Agency as part of both NEPA and MSA analysis to fully explore, discuss and account for the effects of this uncertainty on management and science. The document itself recognizes the effects of uncertainty as well, concluding that "(u)ncertainty related to the amount and mortality of discards increases the uncertainty associated with stock assessments, diminishing managers' ability to accurately set and achieve optimum yield from a fishery.[25]"

It is troubling then to see that the SBRM does not discuss the effect of CV-associated uncertainty on both management uncertainty[26] and scientific uncertainty[27] or the need to consider these factors when setting and administering ACLs and AMs. In fact, the SBRM offers just one reference to the stock assessment process as a footnote[28] and generalizes the discussion of ACL specification in each fishery.

Oceana has submitted independent analysis of the effects of a 30% CV on bycatch estimates that show this uncertainty to be as much as +/- 100% of the true value[29]. This is a considerable amount of uncertainty that cannot be ignored. Uncertainty must be discussed in the context of each FMP, an approach that was suggested by the Agency in its 2004 guidance on developing SBRMs: "The appropriate precision standards for the estimates of bycatch depend on the management objectives, the management uses of the estimates, the precision of other information used with the bycatch estimates to make management decisions, and the cost of increasing the precision of the bycatch estimates. [30]"

For these reasons, the SBRM should be rejected by your Councils to allow a full discussion and consideration of the effects of uncertainty associated with the 30% CV Performance Standard and the ability of this information to support current management of each fishery. Further, as discussed above, if the CV standard cannot be met, the effects of this increased uncertainty must be discussed and accounted for in the SBRM.

The Draft SBRM Does Not Use the Best Available Science in its Consideration of Bias and Precision

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[25] Id at 2-3

[26] Management uncertainty occurs because of the lack of sufficient information about catch (*e.g.*, late reporting, underreporting and misreporting of landings or bycatch). National Marine Fisheries Service National Standard One Final Rule (74 Fed. Reg, 3178, January 16, 2009)

[27] Stock assessment models have various sources of scientific uncertainty associated with them and many assessments have shown a repeating pattern that the previous assessment overestimated near-future biomass, and underestimated near future fishing mortality rates (i.e., called retrospective patterns).
National Marine Fisheries Service National Standard One Final Rule (74 Fed. Reg. 3181, January 16, 2009)

[28] Standardized Bycatch Reporting Methodology Draft Document Footnote 36, at 207

[29] McAllister, M. K., 2007. Review of the Northeast Regional Standardized Bycatch Reporting Methodology. Lenfest Ocean Program.

[30] National Marine Fisheries Service. 2004. Evaluating bycatch: a national approach to standardized bycatch monitoring programs. at 58

Catch data that is collected and reported to support assessment and management must be both precise and accurate. Accuracy and precision will ensure that bycatch data is representative of the catch of the fishery as a whole and provide useful information to meet the goals and purpose of the respective FMPs and the SBRM. The Agency has advised that bias may present more significant problems for management than precision: '(i)n some instances decreasing bias (including that caused by the observer effect) will be more important than increasing precision.[31] This necessity for accuracy as well as precision is aptly noted in the objectives of the SBRM: 'to establish, maintain, and utilize biological sampling programs designed to *minimize bias* to the extent practicable, thus *promoting accuracy* while maintaining sufficiently high levels of precision[32].'

The current SBRM however continues the trend started by the 2007 SBRM by inappropriately focusing its design on achieving goals of precision and largely discounts bias. Bias in data is a serious issue that must be accounted for at the risk, in the words of one NEFMC member of being 'precisely wrong.[33]'

The SBRM does a poor job examining and exploring the issue of bias while attempting to justify a conclusion that "there are no bias issues evident[34]" in the monitoring of the region's fisheries. This conclusion advanced to justify the findings of the SBRM is not supported by the analysis and discussion in the document. Furthermore, the publication of external reports demonstrating bias in the region's fisheries questions this conclusion.

The discussion of bias in the document relies on an analysis of 2004 observer data to characterize the accuracy of observer data relative to Fishing Vessel Trip Report (FVTR) data. This analysis concludes that an examination of kept pounds 'compares favorably' and 'indicates no evidence of systematic bias."[35] However, an exploration of other metrics indicates that bias may be present in this data. Trip length was 'different' between the observer and VTR data set with a consistently longer trips with observers[36]. Further when viewed spatially, the document advises that '(t)he null hypothesis of observer proportions equal to FVTR proportions was rejected (P<0.05) in 38 of the 86 comparisons, which suggests that there are some spatial differences in the observed data compared with the FVTR data.[37]' Put a different way, bias exists in the spatial data in 44 percent of comparisons. This additional analysis suggests that a difference exists between observed and unobserved trips and observer data is not representative of the fishery.

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[31] *Id* at vi
[32] Standardized Bycatch Reporting Methodology Draft Document, at iii
[33] Comments of David Goethel on FW48. New England Fishery Management Council Meeting November, 2012.
[34] Standardized Bycatch Reporting Methodology Draft Document Page 177
[35] Id at176
[36] Id at 176
[37] Id at 177

This weakness in the SBRM analysis of bias is further demonstrated with the analysis performed by Chad Demarest in 2012 to examine bias in the NE Multispecies sector fishery[38]. Demarest used a more comprehensive examination of eight metrics of fishing behavior[39] and used a peer reviewed technique to examine for observer bias[40]. Demarest found that 'analyses point towards a highly variable but relatively consistent pattern of different fishing behaviors when an observer is on board and when one is not' and further concluded that 'fishing behavior across the eight metrics was variable, but that statistically significant differences in reporting were observed across all eight metrics and that the strength of the statistical signal varied depending on how the data were parsed.[41]'

The omission of the Demarest analysis comes after Oceana's specific comments describing its findings to the FMAT in May 2012.[42] This omission raises questions of the intent of the Agency to reach predetermined conclusions relative to bias and whether the conclusions are arbitrary, capricious and an abuse of discretion.

It should also be noted that the Standardized Bycatch Reporting Methodology has improperly inserted '*to the extent practicable'* language into the goals for accuracy where it is not warranted. The SBRM is required of all FMPs[43], not where practicable. Conservation and management measures shall be based upon the best scientific information available[44], not where practicable. And ACLs and AMs must be included in each Fishery Management Plan to prevent overfishing[45], not where practicable. Accuracy is therefore necessary for each of these requirements and must be ensured.

The SBRM must be updated with a complete discussion of bias and include measures to assess and account for bias in bycatch monitoring.

The Standardized Bycatch Reporting Methodology Omnibus Amendment Requires an Environmental Impact Statement

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[38] Summary of Analyses Conducted to Determine At-Sea Monitoring Requirements for Multispecies SectorsFY2013 Page 8-9 (http://www.nero.noaa.gov/ro/fso/reports/Sectors/ASM/FY2013_Multispecies_Sector_ASM_Requirements_Summary.pdf).

[39] total landed pounds; total roundfish pounds; total groundfish pounds; total non-groundfish pounds; total cod pounds; total groundfish value; total non-groundfish value; trip duration

[40] Benoit and Allard (2009)

[41] Summary of Analyses Conducted to Determine At-Sea Monitoring Requirements for Multispecies Sectors FY2013 at 8-9 (http://www.nero.noaa.gov/ro/fso/reports/Sectors/ASM/FY2013_Multispecies_Sector_ASM_Requirements_Summary.pdf).

[42] *See* Oceana letter to Doug Potts, FMAT Chair May 17, 2013.

[43] *See* Magnuson Stevens Act Section 303 a(11)

[44] *See* Magnuson Stevens Act National Standard Two, Section 301 a(2)

[45] *See* Magnuson Stevens Acts Section 303 a(15)

In this comment letter, Oceana identifies a number of specific ways in which the SBRM Environmental Assessment (EA) does not satisfy NEPA, the MSA and the Administrative Procedure Act (APA) These flaws are symptoms of a systematic problem: a measure of such major significance and widespread impact requires that the Agency take a hard look at a full spectrum of alternatives through an Environmental Impact Statement (EIS).

As Oceana has explained in prior comment letters on this process and the previous SBRM iterations[46], the information and analysis in the SBRM document will have a significant impact on thirteen fisheries from the Canadian border to North Carolina. The information, analysis, and technical guidance contained in a complete SBRM will affect how these fisheries are managed, their stock assessments, and ultimately the efficacy of the management approaches used to reach the goals of the FMPs through ACLs, AMs and other measures. The Omnibus SBRM amendment is a major federal action significantly affecting the quality of the human environment and cannot satisfy the requirements for a Finding of No Significant Impact, or FONSI.

In bringing the environmental analysis into compliance with NEPA, the Council and the Agency must also give proper consideration to the alternatives preemptively and irrationally rejected for consideration in the draft document *before the Councils have even had the opportunity to rationally consider them*. These alternatives include the important alternative of extending the *bycatch* reporting methodology to *bycatch species* rather than only to target species managed under a plan and alternatives to develop and employ alternative monitoring techniques where observer coverage would not be completely accurate. The scoping process that comes with an EIS should prove invaluable in this regard.

Accordingly, the Agency must disapprove the SBRM Amendment as inconsistent with NEPA and swiftly act to develop an EIS and a revised SBRM Amendment that will comply with the Court's order, NEPA, and the Magnuson-Stevens Act. With a wide range of stakeholders affected by the findings of this process, the Agency should engage in a complete scoping process to educate and engage the public about the issue and seek concerns and ideas to be investigated and developed as part of the document. This scoping should include the narrow range of issues that were vacated by the Court, the new challenges posed by the *status quo* ACLs and AMs requirements for the affected fisheries as well as other issues highlighted by stakeholders.

Conclusion and Recommendations-

In conclusion, while it is disappointing that the Agency has not seized the opportunity to improve catch monitoring and reporting in the NE region with the current SBRM , it is not surprising. Since the beginning of the development of the previous SBRM, it has been clear that the intent of the Agency has been to elaborately codify the Agency's outdated approach to

[46] *See* Oceana comments related to 2007 Standardized Bycatch Reporting Methodology Amendment and Implementing Regulations, submitted September 24, 2007.

monitoring without ever answering the critically important question of *how much observer coverage do the region's fisheries need to be effectively managed under the current management regime?*

Oceana suggests that the Councils take the following actions when it reviews the Standardized Bycatch Reporting Methodology at their upcoming meetings:

1. Disapprove the Standardized Bycatch Reporting Methodology document. The document is not complete and many of the promises made to the Councils have not been fulfilled.
2. Initiate an Environmental Impact Statement process to identify and address issues related to the primary purpose of the SBRM, to *collect information that can be used reliably as the basis for making sound fisheries management decisions.*
3. Convene a joint ad hoc Council committee to explore the data needs of each fishery and how the SBRM can be structured provide the necessary information to support current management.
4. Task the FMAT with developing options in the SBRM that account for uncertainty associated with the CV30 performance standard in ACL specification processes. Additionally management options should be developed to respond when the CV standard cannot be met.
5. Include alternatives and analysis to ensure accuracy of bycatch data.
6. Require the Agency to publish the observer coverage needs that are associated with the assertion that 'NMFS requests funding for the Fisheries Observer Program that it has *determined necessary to meet the needs of the fishery and to comply with statutory mandates*[47]'

Oceana remains committed to ensuring that the fisheries of the NE region are managed with statistically robust data that is accurate, precise and timely to support sound fisheries management decisions.

We agree with the purpose of the SBRM and look forward to working with the Councils as you continue to develop an SBRM that meets these purposes.

Thank you for considering these comments,

Sincerely,

Gilbert A Brogan

Gib Brogan
Oceana
Wayland, MA

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[47] Standardized Bycatch Reporting Methodology Draft Document at 119

December 18, 2013

Mr. John K. Bullard, Regional Administrator
NMFS, NERO
55 Great Republic Drive
Gloucester, MA 01930

Dear Mr. Bullard,

Please accept these comments on the draft SBRM. I work part time for Wallace and Associates, who represent numerous surfclam and ocean quahog fishing vessels and processors. Prior to joining Wallace and Associates I was the Senior Ecologist for the Mid-Atlantic Fishery Management Council (MAFMC) where I worked for 30 years. I was the senior clam staffer from the late 1980s until 2012. I wish to comment on the draft omnibus amendment to all the fishery management plans of the New England and Mid-Atlantic Councils that was noticed in the *Federal Register* on November 19, 2013.

The surfclam and ocean quahog fisheries are extremely clean, as evidenced by the NEFSC clam survey species listing in Table 34 of the MAFMC Amendment 13. Surfclams and ocean quahogs comprise well over 80% of the total catch from the survey with no fish caught by the survey dredge. Only sea scallops, representing other commercially desirable invertebrates were caught at around one-half of one percent by the survey dredge. Commercial clam operations are certainly even cleaner than the scientific surveys (which have liners in the dredges) as all animate and inanimate objects except for surfclams and ocean quahogs are discarded quickly before the clam resource in place in the cages. Processors want only clams and reduce their payments to the boats if “things” other than surfclams or ocean quahogs are in the cages.

Clam Amendment 13 also addressed interactions with marine mammals and sea turtles. Since the start of my interaction with the clam fishery in the early 1980s, I have never heard of an interaction between commercial clam operations and marine mammals or turtles. While marine mammals may occur near surfclam and ocean quahog beds, it is highly unlikely any significant conflict would exist. Commercial clam dredging vessels dredge at very slow speeds and healthy animals should have no difficulty avoiding these vessels. Additionally, surfclam and ocean quahogs are benthic organisms, while marine mammals and marine turtles are pelagic and spend nearly all of their time up in the water column or near the surface. The realized reduction in the number of fishing vessels resulting from the implementation of the ITQ program reduced the potential for the interaction with endangered species from a minimal to a very minimal level.

This draft omnibus amendment is designed to prioritize the allocation of sampling effort. Only a small fraction (about 105 days based on 2012 sea days needed) of effort appears devoted to the clam fisheries. However, I wonder if with the projected very large shortfall in the number of days available, if it might warrant the exclusion of these two fisheries in order to develop more statistically valid data for other fisheries where bycatch and marine mammals and turtle interactions do occur.

Thank you for your consideration of these comments. Should there be any questions, I can readily be reached through this email address or by phone (215-536-3543).

Sincerely,

Thomas B. Hoff Ph.D.