APPENDICES

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Appendix A
NEFSC Bycatch Estimation Methodology: Allocation, Precision, and Accuracy

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Northeast Fisheries Science Center Reference Document 05-09

NEFSC Bycatch Estimation Methodology: Allocation, Precision, and Accuracy

by

Paul J. Rago, Susan E. Wigley, and Michael J. Fogarty

August 2005

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NEFSC Bycatch Estimation Methodology: Allocation, Precision, and Accuracy

by

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Executive Summary

This report describes the standardized methodology used to estimate bycatch rates of finfish by commercial fisheries in the Northeast. In this report, bycatch is defined as the observed discarded catch, summed over from eleven different groundfish species. Estimates of unobserved discards are not considered. All retained catches are included whether or not the catches were incidental to the target species. Emphasis is placed on the methods used to define the sampling frame (i.e., the population of commercial fishing trips to be sampled), appropriate stratification, and efficient allocation of sampling effort to these strata. Efficient allocation of sampling effort within a stratified survey design improves the precision of the estimate of overall discard rates. Accuracy of sample estimates is evaluated by comparing various performance measures (e.g., landings, trip duration) between vessels with and without observers present. Although formal statistical distinctions between accuracy and bias of estimators and estimates can be made, in this report we use the terms interchangeably and less formally. A biased estimator is inaccurate; an accurate estimator is unbiased.

This report focuses on bycatch estimates based on discard to kept ratios. Use of this ratio is appropriate for trawl, gillnet and longline fisheries in the Northeast US. A formal assessment of bycatch estimates based on the ratio of discards to fishing effort is not considered in this report. Estimators based on ratios of total discard to fishing effort are more appropriate for fisheries that do not target groundfish, such as the sea scallop and herring fisheries. Evaluations of groundfish bycatch in these fisheries are being conducted by technical committees for their respective fishery management plans.

The Northeast Fisheries Science Center allocates observer sea days to monitor bycatch in commercial fisheries along the Northeast coast. These fisheries are diverse and therefore it is necessary to stratify commercial trips into fleet sectors (strata) with similar characteristics. Data from Northeast Fisheries Observer Program and the Fishing Vessel Trip Report are used together to define the size of the sample and the size of the strata, respectively. We define a total of 227 fisheries for 2005 observer coverage, consisting of three major gear types, four mesh sizes, two levels of trip durations, six port areas, and four seasonal quarters. The total fishing effort for April 2003 to March 2004 in the defined strata comprises 43,703 trips. Our examination of efficacy of observer coverage included results from 1,103 trips and 2,704 sea days. Every effort has been made to make the sampling program synoptic (i.e., cover all the major fisheries that discard commercially important species) and robust to sources of uncertainty. In particular, we utilize discard information at the trip level as opposed to the tow level. Sampling selection relies on observable properties of the strata, rather than desired outcomes (e.g., a targeted “cod” trip). Trips within strata are also assigned a probability of obtaining useful information relative to the species group of interest. The “usefulness” of a trip is conditional on the likelihood that a trip will catch one or more of the species within a predefined group of species.

Our analysis of sea-day allocations and use of optimization methods to improve allocations rest on two primary assumptions. First, the extant data are sufficient to obtain consistent estimates of the underlying variance of the discard ratio per stratum. Consistency is ensured if the samples are representative. Second, the relative size of the strata, i.e., the total number of trips, remains constant from year to year. This is a more tenuous assumption, as the balance of fishing effort can change in response to changes in resource abundance or regulations. Both of these assumptions are inherent in the use of retrospective data to improve a future sampling program.

The observer sea-day allocation model developed here represents an extension of Neyman optimal allocation (Cochran 1977). Observer trips are allocated to strata as a function of their contribution to the total variance, the expected number of observer days per trip, and the probability that a trip will provide information on one or more of the species groups of interest. The essential features of the sampling design and allocation process are summarized below.

- Strata are defined on the basis of observable properties of the fleet sector
- The sample unit within a stratum is a trip
- The primary response variables are total discards and kept weights of groups of species. Eleven groundfish species constitute one group, monkfish another group, and summer flounder-scup-sea bass, a third group
- The probability of obtaining information on one or more of the species groups from a future trip in a stratum is estimated from analysis of observer data
- An estimate of the probability of not obtaining any information about one of the three species groups is incorporated to allow appropriate increases in sample sizes commensurate with this risk
- Expected average trip durations are defined for each stratum
- Total observer days at sea serve as a constraint on the allocation process
- Additional constraints can be imposed on the minimum and maximum numbers of samples per stratum
- Unsampled strata use imputed (or borrowed) values from adjacent strata to ensure that some information is used for sample selection
- Imputation also identifies gaps in coverage and allows for updates of the population frame as new data are acquired
- Discard ratios and standard errors incorporate the approximate covariance of the ratio
- The precision of the overall discard/kept ratio is the primary performance measure in the allocation process.
- Total variance can be minimized subject to a total observer day constraint, or the number of observer days can be minimized subject to a desired level of precision

Results from the optimization model are used as a tool to improve observer coverage. Some post-processing of the optimized sea days is needed to fine-tune coverage across fleet sectors. Where feasible, the fine-tuning of sea-day allocation capitalizes on the multi-purpose attributes of observer coverage oriented toward assessment of non-finfish species (e.g., acquire data in the sea scallop fishery from trips designed to evaluate turtle bycatch rates.)

Presently the model is based on aggregate Discard/Kept (D/K) ratios. These ratios are relevant to most fisheries but, of course, the Discard/Effort (D/E) ratio is important in others. D/E ratio data have been prepared but not yet implemented in the model. D/E ratios are relevant for fisheries such as sea scallops, northern shrimp, and herring. It should be noted that one of the primary difficulties of implementing the D/E methodology is the selection of an appropriate unit of effort.

The “trip” level of effort may be the most useful but additional work will be necessary before extending the methodology to optimally allocate observer coverage to these fisheries.

The optimization methodology addresses the precision of the overall D/K ratio in the context of multiple objectives and limited resources. The issue of accuracy/bias is addressed by comparing various properties of vessels with and without observers onboard. Bias -- the systematic difference between the estimated and true value -- is addressed by first ensuring that the vessel trips are representative, and that a variety of quality assurance/control procedures are employed to accurately monitor vessel performance. Refusals to take an observer and other forms of non-response by industry are possible sources of bias. These sources are addressed via increased use of Enforcement personnel. For these concerns, the NEFSC observer program is consistent with the recommendations of the NMFS National Working Group on Bycatch (NMFS 2004).

Babcock et al. (2003) assert that increases in sampling effort are sufficient to reduce bias. If the presence of observers onboard alters the vessels fishing patterns, then it can be argued that all observed trips yield potentially biased results. If the unobserved vessel fishes with different methods in different areas and so forth, then the increases in sample size can only reduce but not eliminate the scope for bias. A variety of statistical techniques for inferring bias can be applied, but a review of the literature suggests that these techniques have been only moderately successful. Independent measures of vessel behavior may be possible from Vessel Monitoring System data, but such analyses can only detect gross changes from observed trips. Where possible, verification by independent data sources is encouraged, but one should be careful to avoid the problems of incorrectly assuming that a particular methodology is completely unbiased.

Several tests were conducted to address the potential sources of bias by comparing measures of performance for vessels with and without observers present. Bias can arise if the vessels with observers on board consistently catch more or less than other vessels, if the average trip durations change, or if vessels fish in different areas. Each of these hypotheses was tested by comparing observable properties in strata having vessels with and without observers.
Average catches (pounds landed) for observed and total trips compare favorably, following an expected linear relationship. The expected difference of the stratum specific means and standard deviations for both kept weight of groundfish and total trip duration was near zero. The frequency distribution of these differences provided no evidence of systematic bias. The mean difference between average catch rates of 238 pounds was not significantly different from zero ($p=0.59$, $df=84$). A paired t-test of the stratum specific standard deviations of pounds kept suggested no significant difference from zero ($p=0.08$). A similar analysis of average trip duration revealed a strong correlation between observed and unobserved trips (Figure 7) and a suggestion that the observed trips were about a half-day longer when the observer was on board ($p = 0.01$). A paired t-test of the difference in stratum specific standard deviations of trip length was not significantly different from zero ($p = 0.60$) (Figure 8B). Some skewing of the differences in mean trip durations was observed, with observed trips being slightly longer.

Two measures of spatial coherence suggest that the spatial distribution of fishing effort for trips having observers closely matches the spatial distribution of all trips. The null hypothesis of observer proportions equal to the VTR proportions was rejected (P<0.05) in 20 of 65 comparisons. Of these 20 cases, 10 involved ports in Southern New England and the Mid-Atlantic region where landings of New England groundfish are expected to be low. Of the remaining ten cases, five involved the large and extra-large gill net fisheries that mainly target monkfish. Thus, the null hypothesis of equivalent spatial distribution of sampling was rejected in only 5 of 50 fleet sectors, a rejection rate only slightly higher than due to chance alone.

A paper by Murawski et al. (2005 in press) presents information on the spatial distribution of otter trawl fishing effort for vessels with Vessel Monitoring Systems (VMS) with the distribution of tows on observed trips. Qualitatively, the spatial distributions match very well with high concentrations of effort near the boundaries of the existing closed areas on Georges Bank and within the Gulf of Maine. Moreover, the effort concentration profiles deduced from VMS data coincided almost exactly with the profiles derived from observed trips. Overall, these comparisons suggest strong coherency between the two independent measures of fishing locations.

An assessment of the sources of uncertainty in the design and data collected in the Northeast Fisheries Observer program indicates that the level of precision in the discard ratios (d/k) for the New England Groundfish fisheries as a whole is high and there is little evidence of bias. However, at finer temporal and spatial scales, precision of the discard ratios will generally be lower than the aggregate. Precision of the discards estimates will also be lower for individual species, age groups and size classes.

Introduction

Estimation of bycatch in any commercial fishery is a difficult task. At the level of an individual trip, bycatch occurs sporadically over wide geographical ranges. Proper quantification typically requires presence of trained observers. The commercial marine fisheries of the Northeastern US comprise many vessels of widely different sizes, targeting multiple species in a variety of habitats. Overlaying the complexity of the fleet and target species is a complex regulatory environment that constrains fleet behaviors. Since many stocks are in rebuilding phases, the effects of restrictions on landings per trip, and therefore revenue per trip, are difficult to predict. The Northeast Fisheries Observer Program (NEFOP) addresses this complexity by first ensuring that the data obtained from any trip are of the highest quality. This is achieved through a rigorous training program, standardized on-board data collection protocols, and thorough auditing of data. To allow for extrapolation from the sample data to the fleet as a whole, these procedures must be embedded in a statistical sampling design. This report provides a summary of the issues relevant to the design and analysis of the observer sampling program particularly with respect to the allocation of observer days to achieve desired levels of precision.

The NEFOP program incorporates the following important features:

1. Definition of a sampling frame across all relevant fisheries
2. Identification of strata based on observable properties
3. Development of rules for imputing variance estimates in unsampled strata (i.e., “borrowing” estimates from appropriate strata)
4. Use of a trip as the sample unit (rather than individual tow)
5. Definition of discards by species groups, corresponding to the major finfish species within the Northeast US.
6. Use of discard to kept ratios (d/k) for species groups as the primary response variable.
7. Estimation of approximate variances for d/k for groups of species, rather than individual species
8. Allocation of sampling effort based on reduction in total variance of the d/k estimate, subject to total cost constraints.
9. Allowance for observer coverage in remaining fisheries not included in the sampling frame, owing to other priorities (e.g., protected species concerns).
10. Where feasible, capitalize on the multi-purpose attributes of observer coverage oriented toward assessment of non-finfish species (e.g., acquire data in sea scallop fishery from trips designed to evaluate turtle bycatch rates.)

In this report we describe the foundations of our standardized approach for bycatch reporting methodologies and the primary sources of uncertainty.

Background

The Northeast Fisheries Science Center (NEFSC) routinely allocates observer coverage to monitor bycatch (fish, invertebrates, and protected species) in the commercial fisheries in the Mid-Atlantic and New England regions. The observer coverage is administered in units of ‘sea days'. Based on the daily cost of an observer at sea, the available funds determine the number of potential sea days. However, for the New England groundfish fishery, the number of sea days is presently mandated to be 5% coverage of the fishery. The projected fishing activity (in days) for the year is estimated by the available days-at-sea allowed under the Northeast Multispecies Fishery Management Plan. Thus, in a given year, the NEFSC has a mixture of mandated sea days and non-mandated sea days to monitor bycatch in the Northeast region (North Carolina to Maine) for various fisheries.

Allocation of sea days is guided by an optimization algorithm that is based on generalization of the well-known Neyman allocation principle in survey sampling. Precision of the overall estimate of the discard ratio is improved by allocating samples to strata with the greatest contribution to the total variance, subject to an overall constraint on available resources. In this application, "resources" refers to the total number of observer days available. Improvement of the allocation process requires an evaluation of the current sampling design and precision of estimators. The ability to improve the design is contingent on the reliability of the stratum-specific variances and the persistence of these estimates in the future (or at least the next sampling period).

The optimization algorithm can be used to (1) minimize the variance of the discard estimate subject to a given number of sea days, or (2) minimize the number of sea days subject to a desired level of precision. Results from the optimization model are used as a tool to improve the coverage. However, the model does not incorporate information regarding sampling for protected species, nor does it include information for fisheries where the discard ratio may be more appropriately measured by a discard to effort ratio (d/e). Thus the model predictions are conditioned to exploit the multipurpose utility of the protected species sampling, and coverage in important fisheries (like sea scallops) is ensured by reserving some additional days to "level out" sampling that may be required for either protected species or closed area trips.

This report will describe: 1) the fishery identification and data sources used; 2) imputation rules for unobserved fisheries; 3) sampling theory and optimization methods; 4) application of the model to observer coverage; and 5) address accuracy issues discussed by Babcock et al. (2003)

Definition of Strata -- Fishery Identification

Diverse commercial fisheries are prosecuted off the Northeastern coast of the USA. These fisheries vary in size (number of trips) and have varying bycatch rates. To monitor these fisheries with at-sea observers, it is necessary to stratify the trips into fleet sectors with similar characteristics. For this report, fleet sectors are defined as strata within a survey design.

Commercial fishing trips are partitioned into fleet sectors using five classification variables: calendar quarter, gear type, mesh size, geographical region, and trip length. These classification variables are selected because they are generally known *before* a trip occurs. Using these criteria it is possible to generate a list of candidate vessels for each stratum, which simultaneously enables a random selection process and reduces the number of repeat trips on vessels. This is a critical aspect for both strata definition and sample selection. One cannot base a sampling design on the outcome of a sample observation. In this exercise, it is not possible to select a sampling design that specifically improves the precision of cod discards, since that objective is dependent on the realization of the actual sample. However, it is possible to select samples that will improve the probability of obtaining improved discard estimates by estimating the expected proportion of trips that catch species groups of interest.

Calendar quarter was considered the most feasible temporal unit to capture seasonal variations in fishing activity and bycatch rates over the full range of fisheries. Although some management regulations operate at a finer scale (e.g. weekly), quarterly data can be further subdivided if finer resolution is needed. Otter trawl, gillnet and longline gear were defined as the three major gear types for finfish. Otter trawl and gillnet trips were classified into four mesh size groups: Small (less than 3.99 inch mesh); Medium (between 3.99 and 5.49 inch mesh); Large (between 5.5 and 7.99 inch mesh) and XLarge (8.0 inch mesh or greater). Additionally, trips are classified into six geographical regions based upon the port of departure: ports located within Maine and New Hampshire (ME_NH); Massachusetts (N_MA, excluding Bristol county); Connecticut, RI, and Bristol county, MA (SNE); New Jersey - New York (NJ/NY); Maryland and Delaware (MD/DE); Virginia and North Carolina (VA/NC). Trip length serves as a surrogate for spatial resolution (inshore vs. offshore). Otter trawl trips are further classified into two trip length categories: day trips and multi-day trips. Longline and gillnet gears are not partitioned by trip length.

Due to the mixture of species caught during a trip, it is not sufficient to classify trips with regard to target species because discard of target and non-target species may occur. To account for target and non-target discard, trips in each fleet sector are classified into one or more of three species groups: New England groundfish (NEGF); summer flounder, scup and black sea bass (FSB); and monkfish (MONK). There is often overlap between trips which catch NEGF, FSB and MONK. The estimated number of trips and sea days needed to cover these fleet sectors may be overestimated when the trips are assumed to be independent, therefore the overlapping nature of the fishing fleets are taken into account. Sampling fractions, and how the overlap is accounted for, are described in a later section.

Eleven species constitute the New England groundfish species group: cod, haddock, yellowtail flounder, American plaice, witch flounder, winter flounder, redfish, pollock, white hake, windowpane, and halibut. If a trip catches (retains or discards) at least 1 of the 11 large-mesh regulated species, the trip is categorized as NEGF trip and the hail weights of the 11 species are summed to form an aggregate species total for NEGF. Similarly, if a trip catches (retains or discards) either summer flounder, black sea bass or scup, the trip is categorized as a FSB trip and the hail weights of these species are summed to form an aggregate species total for FSB. If a trip catches (retains or discards) monkfish, then the trip is categorized as a MONK trip. A trip may be categorized to one or more of the three species groups.

Data Sources

Trip characteristics are recorded in both the NEFOP and Fishing Vessel Trip Reports (VTR) data sets. Together, these databases are used to define the size of the sample and the size of the strata, respectively. Data from each source are retrieved and prepared separately before the two sets are combined (Figure 1).

Fishing Vessel Trip Report Data

Beginning in June 1994, the Northeast Region's data collection system was changed from a voluntary to a mandatory reporting system for USA fishermen and dealers who catch and buy/sell groundfish species regulated by the Northeast Multi-species Fishery Management Plan. The mandatory reporting system consists of two components: 1) dealer reporting and 2) vessel trip reporting. Each component contains information needed for fishery management and stock assessment analyses: the dealer reports contain total landings by market category, while the vessel trip reports contain information on area fished, kept and discarded portions of the catch, and fishing effort. The VTR data has been routinely used in management analyses and peer reviewed stock assessments. Details on example applications of the VTR to stock assessments may be found in a large number of reports of the Stock Assessment Review Committee (SARC). Reports prepared since 2000 may be found at http://www.nefsc.noaa.gov/nefsc/saw/. Earlier reports are available by contacting saw_reports@noaa.gov.

In this report, the VTR data are used to: 1) define the sampling frame of the commercial fishing trips, and 2) evaluate the accuracy of the observer data with respect to area fished, kept pounds, and trip length. The VTR data are the only synoptic data source for vessel activity, area fished and fishing effort for commercial fisheries. The Vessel Monitoring System data and the Days-At-Sea data systems cover only portions of the fisheries and therefore are limited in use.

The VTR data can be used as a basis for defining the sampling frame, because all federally permitted vessels are required to file a VTR for each fishing trip (see NMFS-NERO *http://www.nero.noaa.gov/ro/fso/vtr_inst.pdf*). These self-reported data constitute the basis of the fishing activity of the commercial fleets. The VTR trip data are collapsed into fleet sectors and species groups as defined above. For each species group within a fleet sector, the number of trips that caught the species group, the average number of days absent, and the weight of the species in the species group are calculated.

The limitations of self-reported catch data are well known (e.g., Walsh et al. 2002, NMFS 2004). Limitations of the initial data VTR data sets were described by the SARC in 1996 (NMFS 1996). Since then, many of these limitations have been addressed. In particular, subsequent peer-reviews through numerous SARCs and a review by the National Research Council (1998) have identified the strengths, weaknesses, and appropriate uses of the VTR data from the Northeast.

The validity of VTR data as a basis for a sampling frame is supported by comparisons with total landings data from dealer records. All dealers which buy and sell groundfish regulated by federal

FMPs are required to report 100% of the landings. These data are generally thought to constitute a near census of landings of groundfish. The NRC (1998) noted that misreporting of landings is "usually a significant issue only when fisheries are managed by setting a total allowable catch." On this basis, the magnitude of misreporting by dealers would be low as Northeast groundfish stocks have been managed primarily through effort controls. A comparison of total groundfish landings from VTR and Dealer records for calendar year 2003 reveals close agreement between the two sources:

Species	VTR Landings (mt)	Dealer Landings (mt)	Difference (mt)	Pecent Difference
Cod	8240	8692	452	5.2%
Winter flounder	5321	5714	393	6.9%
Witch flounder	2971	3108	137	4.4%
Yellowtail flounder	5208	5530	322	5.8%
American Plaice	2204	2415	211	8.7%
Windowpane flounder	102	60	-42	-70%
Haddock	5778	5874	96	1.6%
White Hake	2268	3305	1037	31.4%
Halibut	11	13	2	15.4%
Redfish	338	360	22	6.1%
Pollock	3839	4188	349	8.3%
Total	36281	39258	2977	7.6%

For the three major species, cod, haddock and yellowtail flounder, the percentage differences range from 1.6% to 5.8%. Only windowpane flounder, white hake and halibut exhibit large percentage differences. Total landings of windowpane flounder and halibut represent small fractions of the total (0.3% of VTR and 0.2% Dealer) landings and these percentage differences are considered negligible. Large percentage differences for white hake may be attributable to confusion between white hake and red hake. White hake can be difficult to distinguish from red hake (sp) and may be identified simply as "hake" by both dealers and fishermen. The overall difference of 7.6% is dominated by large differences in the landings of white hake. Excluding white hake from the comparison reduces the overall percentage difference to 5.4%.

Other measures to ensure the validity of the VTR database include routine auditing procedures, standardized data entry protocols and compliance reviews (pers. comm. Greg Power, Chief, Fisheries Information Section, Northeast Regional Office, NMFS).

Northeast Fisheries Observer Program Data

The NEFOP employs trained, sea-going observers to collect catch data by species and disposition (retained and discarded). Biological samples, gear characteristics data, and economic information are also collected. For the optimization data set, only observed hauls from trips classified as 'standard sea sampling trips' are used. Observed trips that were aborted or which used a ‘limited’ fish sampling protocol (no discard data collected) are excluded. Hail weight can be reported in round or dressed weights; if kept hail weights are reported as ‘dressed’, then the hail weight is converted to round (live) weight using Commercial Fisheries Database System (CFDBS) conversion factors for the species. All discard hail weights are assumed to be round (live) weight.

The NEFOP data are collapsed into strata as defined above. For each stratum, the number of observed trips that caught one or more of the three species groups is calculated. For each fleet sector and species group, the number of observed trips, number of observed hauls, average trip length (in days), kept weight of all species in the species group, discarded weight of all species in species group, and the number of observed days are calculated. A discard ratio and the variance of the ratio are calculated for each stratum (fleet sector and species group).

Optimization Data Set

The VTR and NEFOP data sets are concatenated by fleet sector and species group. A list of variables and their definitions are presented in Table 1. Not all VTR fleet activity may have NEFOP coverage (Table 2). When fleet sectors do not have observer coverage, imputed values are used (Table 3). The imputed values are derived from NEFOP data from similar fleet sectors, thus providing an estimate for the non-observed fleets. Details of the imputation process are provided in the following section.

The optimization tool is flexible and allows the user to select the entire input data set, or a subset. To allocate sea days for an entire year, four calendar quarters of data are used. Using the most recent available data, given the time needed for data entry and auditing, the year consists of calendar quarter 3 and 4 from year -1 and calendar quarter 1 and 2 from the current year.

The three gear types (otter trawl, gillnet, and longline) used in the optimization data set are gear types for which fishing regulations allow finfish to be retained, thus a discard to kept ratio estimator (d/k) is used. Fisheries using other gear types where regulations may prohibit groundfish possession are excluded from the current optimization process because a d/k ratio is not appropriate for these cases.

Imputation rules for unobserved fisheries

Not all of the fishery strata had observed trips between April 2003 and March 2004. To account for the expected variance of the estimates in the missing cells, it was necessary to develop a standardized procedure to handle both missing and minimal levels (e.g., a single trip) of observer coverage. This procedure is referred to hereafter as ‘imputation’ and the estimates derived by the imputation are referred to ‘imputed values’. Imputed values are derived by sequentially relaxing the fleet sector classification. The fleet sectors for each species group (NEGF, FSB, and MONK) are imputed separately. The imputed values fill in missing values for the unobserved strata. Fishery strata are defined with respect to rigid definitions of categorical variables such as region or quarter. A stratum with missing data must be filled with data from similar strata. To identify suitable candidate strata as “donor” or “parent” cells, it is necessary to “relax” the definitions of the strata. For example, if no trips occur in the Jan.-Mar. quarter, one might relax the definition to include data from the Jan-Jun. half year. The objective process of relaxing strata definitions to impute data is described below.

A fleet sector was not imputed if:

> 1) VTR number of trips = 0 (no imputation needed when there is no fleet activity for the species group);
>
> 2) VTR number of trips > 0 and standard error was not missing (no imputation needed when there is fleet activity for the species group and there is a standard error of the observer d/k ratio); and
>
> 3) VTR number of trips > 0 and total observed kept pounds = 0 (no imputation needed when there is fleet activity for the species group and the standard error cannot be calculated); otherwise, the fleet sector was imputed.

The imputation uses three increasing levels of aggregated NEFOP data (using the same data and calculation methods as the original calculations of observed d/k ratio and associated statistics). Three of the five stratification factors are relaxed (region, mesh size and calendar quarter). Gear type and trip length are used, but their stratification is not relaxed. Trip length is not relaxed because the average trip length is used to determine the number of sea days needed to obtain the desired precision level. Gear type is not relaxed because of fundamental differences in catches (retained and discarded) occur using these gear types.

> Level 1: Calendar quarter is relaxed to half year and the six geographic regions are relaxed to two regions (NE region = ME/NH, N_MA, SNE; MA region = NY/NJ, DE/MD, NC/VA); gear, mesh size and trip length categories are maintained.
>
> Level 2: Calendar quarter is relaxed to an entire year, the six geographic regions are relaxed to two regions (as in Level 1), and the four mesh groups are relaxed to two mesh groups (SMALL = small and medium mesh groups; LARGE = none, large, and Xlarge mesh groups); gear and trip length categories are maintained.
>
> Level 3: Calendar quarter is relaxed to an entire year (as in Level 2), the six regions are relaxed to one region (all six regions combined), and the four mesh groups are relaxed into one mesh group. This level served as a ‘catch-all’ for all remaining fleets sectors that required imputation.

The VTR-NEFOP data set is merged with Level 1 NEFOP data; if a fleet sector needs imputed values, based on the criteria list above, then the imputed values from the observed trips in Level 1 are transferred to the corresponding VTR-NEFOP fleet sector and species group only if the trips in the Level 1 data set are greater than 1. Data from Level 2 and Level 3 are subsequently merged with the VTR-NEFOP. When imputed values are used in the VTR-NEFOP data set, the fleet sector and species group is ‘flagged’ with the imputation level used. All fleet sectors that need imputation obtain values at one of the three levels.

Below is a summary of the number of fleet sectors, by imputation level and species group used in the 2005 sea day allocation.

	Species group		
Imputation Level	NEGF	FSB	MONK
Level 0 (no imputation)	150	116	111
Level 1	30	51	44
Level 2	27	41	35
Level 3	20	19	37
Total	227	227	227

To include all fisheries using otter trawl, gillnet and longline gear in the optimization, approximately 33% to 50% of the mean discard rates and variances are imputed or ‘borrowed’.

When a fleet sector and species group is imputed, five variables (number of observed trips, observed d/k ratio, total observed kept pounds, standard error of the d/k ratio, and number of observed days) are estimated with imputed values. Because the aggregated NEFOP data at each level have more observations than the original VTR-NEFOP fleet sector, the imputed values need to be rescaled before they are used. Except for the imputed d/k ratio, the imputed values for the number of observed trips, the total observed kept pounds, the standard error and the number of observed days are re-scaled using a sampling fraction represented by the ratio of the total NEFOP trips for that level, fleet sector and species group to the total VTR trips for that level, fleet sector and species group. Equations used to re-scale imputed values within stratum h are:

T_{vtr} = total VTR trips of $Level_i$
T_{obs} = total NEFOP trips for $Level_i$
$T_{imp,h} = (T_{obs} / T_{vtr}) * Trips_{vtr,h}$;
$Kept_{imp} = (T_{imp,h} / T_{obs})$ * NEFOP kept pounds sum in $Level_i$
$SE_{imp} = (T_{obs} / T_{imp,h})^{1/2}$ * NEFOP standard error in $Level_i$
$Days_{imp} = (T_{imp,h} / T_{obs})$ * total number of NEFOP days in $Level_i$
$T_{imp,h}$ is rounded to a whole number, if $T_{imp,h} < 1$, then $T_{imp,h} = 1$;

where $Level_i$ denotes Imputation Level 1, Level 2 or Level 3.

Sampling Theory and Optimization Methods

Fishing trips are considered the primary sample unit in estimating d/k ratios. Fishing trips generally catch multiple species, some of which are not landed owing to various regulations or market conditions. We defined three major groups of species: (1) New England groundfish, (2) summer flounder, scup and sea bass, and (3) monkfish. Fishing trips in a given stratum may catch species from one or more of these groups. The degree of overlap among species groups has important implications for the efficacy of sampling within strata, i.e., the number of samples necessary to achieve a desired level of precision. Because some fraction of trips provide information on more than one species group, estimates of sample size based on the assumption of independence, will overestimate the number of required trips. Developing estimators that explicitly account for the magnitude of overlap can circumvent this potential inefficiency. There are two ways to approach this estimation. One is based on the pattern of overall trips from the vessel trip reports. The second is based on the pattern in observer sampled trips. In theory, if the observed trips are a representative sample, the proportions in the vessel trip reports and observer trips should be the same. In practice, the proportions in the observed trips will deviate from those in the VTRs due to sampling variability and other factors. The selection of observed trips reflects a practical mix of vessel availability, knowledge of vessel operations, familiarity, and safety considerations. These are, of course, important factors for program management, but it must be recognized that these factors introduce bias into estimates.

Both approaches follow the algorithm described below. Let I_{hij} be an indicator variable denoting the presence or absence of species group j within trip i in stratum h. Then I_{hij} =1 if species group j is present, else 0. A design matrix can be used to describe each unique trip within a stratum. The design matrix appends to each trip record a set of indicator variables that identify the presence/absence of species groups caught. The following table illustrates a hypothetical case with 7 trips in stratum h.

Example 1

Trip ID	I_{h_1} j=1 NEGF	I_{h_2} j=2 Monk	I_{h_3} j=3 FSB
1	1	0	0
2	1	1	0
3	1	1	1
4	1	0	1
5	0	1	1
6	0	1	0
7	0	0	1
Sum	4	4	4
n_h=7	n_{h1}	n_{h2}	n_{h3}

In this simple example, four of the seven trips caught New England groundfish, four trips caught monkfish, and four caught summer flounder, scup or sea bass. If all of these trips (or trip types) are equally likely, then the probability of obtaining a sample that yields information on NEGF is 4/7 and so forth. The probability of obtaining information on species j is the sum of the species group specific trips within the stratum (i.e., n_{hj}) divided by the total number of unique trips within the stratum (n_h). Note that

$$n_h \neq \sum_{j=1}^{3} n_{hj}$$

owing to the overlap in coverage for some trips. The probability that a random trip provides information on species group j is defined as

$$\hat{p}_{hj} = \frac{n_{hj}}{n_h} \qquad (1)$$

For each stratum, the probabilities can be computed that a random sample will contain information about species group j. The basis for the probability estimator can either be the observed set of trips within a stratum <u>or</u> the total set of trips represented in the VTRs. Applying the same set of indicator variables to the VTR data, one can obtain the population estimates of these quantities as

$$\hat{P}_{hj} = \frac{N_{hj}}{N_h} \qquad (2)$$

Eq. 1 establishes the basis for a random sample from the set of observed trips. Eq. 2 establishes the same basis from the VTR. On first principles, Eq. 2 is a better estimator if a representative sample can be taken in a stratum. Eq. 1 is more appropriate if the set of observed trips within a stratum is representative of those trips available for observation.

Using Eq. 1 or 2, it is now possible to examine the effects of altered sample sizes. Let n'_h represent the new total number of trips to be taken in stratum h. For the purpose of evaluating the expected change in variance in the component species groups, the n'_{hj} for each species group need to be redefined. This is accomplished using the equation

$$n'_{hj} = \hat{p}_{hj} n'_h \qquad (3)$$

if Eq. 1 is used , or

$$n'_{hj} = \hat{P}_{hj} n'_h \qquad (4)$$

if Eq. 2 (based on VTR) is used to estimate the expected probabilities that a trip in stratum h will capture fish from species group j.

Another worked example will reinforce the basic concept of the expected proportions of samples likely to sample species group j. Consider a stratum with 10 observed trips with Eq.1 used to estimate p'_{hj}.

Example 2

Trip ID	I_{h_1} j=1 NEGF	I_{h_2} j=2 Monk	I_{h_3} j=3 FSB
1	1	1	0
2	1	0	0
3	1	0	1
4	1	1	0
5	1	1	1
6	0	0	1
7	0	0	1
8	1	0	1
9	0	1	0
10	0	1	0
Sum	7	4	5
n_h=10	n_{h1}	n_{h2}	n_{h3}
p_{hj}	7/10	4/10	5/10

If the n_h were increased to n'_h=30 then the revised estimates of n'_{hj} would be

$$\hat{n}_{h1}^{'} = \left(\frac{7}{10}\right)30 = 21$$

$$\hat{n}_{h2}^{'} = \left(\frac{4}{10}\right)30 = 12$$

$$\hat{n}_{h1}^{'} = \left(\frac{5}{10}\right)30 = 15$$

Thus, adding 20 trips to stratum h would translate into an expected increase of 14 trips for NEGF (i.e., 21-7), 8 trips for monkfish (i.e., 12-8) and 10 trips for FSB (i.e., 15-5). The increase in the total number of trips for a stratum differs with respect to the pattern of information in the sample. The allowance for non-integer numbers of trips is considered to have a negligible effect. In practice, the actual implementation of a sampling strategy would be based on rounding to the nearest integer, and subject to a lower bound constraint, say n_{hj}= 2.

Example 2 could be repeated for estimates derived from the VTR data. For such an example, the universe of trips would be much larger.

Measures of Overlap

Venn diagrams of the number of trips in the VTR and NEFOP depict the degree of overlap between the three species groups in the two data sets. In the April 2003-March 2004 VTR database, half of the trips (22,274 trips out of 43,703 trips) are unique to the species groups (Figure 2), while in the NEFOP database, a third of the trips (286 trips out of 1,103 trips) are unique to the species groups (Figure 3). The sampling fractions (NEFOP trips divided by VTR trips) are given in Figure 4. The numbers of trips (and days) in the Venn diagrams are based on whole trips, and therefore slight differences occur in the number of trips between the Venn diagram and d/k ratio analyses (e.g. there are trips in d/k ratio analysis which used two different mesh sizes during a trip).

Observers Days at Sea Constraints

While trips constitute the sampling unit, the total number of sampling units is constrained by the total number of days available during any interval. To consider this component of the sampling design, it is necessary to consider the average trip duration in stratum h. Let t_{hi} be the trip duration (days) for the i-th trip in stratum h. The total number of observed trips in stratum h is n_h and the total number of observed days is Σt_{hi} The average trip duration is estimated as

$$\bar{t}_h = \frac{\sum_{i=1}^{n_h} t_{hi}}{n_h} \qquad (5)$$

The actual number of future observer days that will be required under some new sampling intensity (n'_h) is proportional to n'_h / n_h . Eq. 5 can also be defined in terms of the durations of the trips in the VTR database. The expected total number of days allocated to stratum h is defined as

$$T_h = \bar{t}_h n_h = \sum_{i=1}^{n_h} t_{hi} \qquad (6)$$

regardless of whether observer or VTR data are used. The average trip duration in stratum h is not influenced by the number of trips allocated, as long as the trips selected are representative of the basis used to define the species composition of the trips. Recall that either the observer database or the VTR database can be used. Thus the total number of observer days allocated to stratum h under some new allocation is

$$T'_h = \bar{t}_h n'_h \qquad (7)$$

The grand total number of days at sea that would be allocated given some new set $\{n'_h\}$ would be

$$T' = \sum_{h=1}^{H} \bar{t}_h n'_h \qquad (8)$$

Some key points in this derivation are:

- It is not possible to derive any real-world sampling program without considering the key uncertainties related to the probability that the trip will be "successful" and that the cost of sea days may vary.
- The number of successful trips, relative to the objective of reducing the variance of the estimate, is a random variable, based on a probability estimate. The expected number of actual trips may not actually result in information necessary to improve the precision of the estimate.
- The "cost" per trip is expressed as the expected duration. Actual duration may also vary within strata, although the stratification is designed reduce the variation in this component.

Optimization is a technique for maximizing (or minimizing) some quantity of interest subject to one or more constraints. Constraints are the key concept. In this application, we consider upper and lower bounds on the size of the sample within a strata, a total constraint on the number of available days, and a constraints related to acceptable levels of precision. For problems that do not explicitly consider dynamic (i.e., time dependent) processes, a variety of optimization methods can be used including linear and nonlinear programming. For this project, the optimization program, Premium Solver Platform (Version 5.5) developed by Frontline Systems, Inc. (2003) was used.

To address the optimization problem, the overall variance of the discard to kept ratio must first be estimated. The discard ratio for species group j in stratum h is the sum of discard weight over all trips divided by sum of kept weights over all trips:

$$\hat{R}_{jh} = \frac{\sum_{i=1}^{n_h} d_{ijh}}{\sum_{i=1}^{n_h} k_{ijh}} \qquad (9)$$

where d_{ijh} is the discards for species group j within trip i in stratum h and k_{ijh} is the kept portion of the catch. R_{jh} is the discard rate for species group j in stratum h. The stratum weighted discard to kept ratio for species group j is obtained by weighted sum of discard ratios over all strata:

$$\hat{R}_j = \sum_{h=1}^{H} \left(\frac{N_h}{\sum_{h=1}^{H} N_h} \right) \hat{R}_{jh} I_h \qquad (10)$$

The variable I_h is a zero/one indicator of whether or not a stratum is included in the computation. The indicator variable can be considered as a composite measure of the suitability of stratum h in the estimator. The indicator variable allows a stratum to be filtered on the basis of one or more metrics. A more complete description of the various types of filtering is described in the next section.

The approximate variance of the estimate of R_{jh} is obtained from a first order Taylor series expansion about the mean:

$$V\left(\hat{R}_{jh}\right)=\frac{1}{(n_{jh}-1)n_{jh}\bar{k}_{jh}^{2}}\left[\left(\sum_{i=1}^{n_{jh}}d_{ijh}\right)^{2}+\hat{R}_{jh}^{2}\left(\sum_{i=1}^{n_{jh}}k_{ijh}\right)^{2}-2\hat{R}_{jh}\left(\sum_{i=1}^{n_{jh}}d_{ijh}\right)\left(\sum_{i=1}^{n_{jh}}k_{ijh}\right)\right] \quad (11)$$

where d_{ijh} is the total discard weight of species group j in trip i within stratum h, k_{ijh} is the total kept weight of species group j in trip i within stratum h, nj_h is the sample size (number of trips) that caught species group j in stratum h, and k_{jh} bar is the mean kept landing of species group j within stratum h. Note that in this formulation of the variance, the finite population correction factor (fpc), i.e., one minus the sampling fraction within the stratum, has been omitted. This has been done to improve readability. The fpc is included however, in Eq. 11 for the total variance of the d/k ratio.

The variance of the d/k ratio for species group j over the entire set of strata is estimated using standard sampling theory methodology for a stratified random design as

$$V\left(\hat{R}_{j}\right)=\sum_{h=1}^{H}\left(\frac{N_h-n_{jh}}{N_h}\right)\left(\frac{N_h}{\sum_{h=1}^{H}N_h}\right)^{2}V\left(\hat{R}_{jh}\right)I_h \quad (12)$$

The overall coefficient of variation for the discard/kept ratio is defined as

$$CV_j=\frac{\sqrt{V(\hat{R}_j)}}{\hat{R}_j} \quad (13)$$

It is now possible to define an overall estimate of the relative precision of the d/k ratio across all species groups as

$$CV = \sum_{j=1}^{3} \lambda_j CV_j \qquad (14)$$

where λ_j is an arbitrary weighting factor for species group j. In this formulation, the λ_j can be used as binary factors (0,1) to examine the allocations individually for species groups.

The optimization tool evaluates the potential improvements in the precision of the discard ratio through reallocation of the number of trips to individual strata. Equation 11 illustrates that the variance of the ratio decreases as the number of trips (n_h) increases. Assuming that the data yield representative estimates of the stratum specific variances, then the reduction in total variance can be examined as a function of alternative allocation schemes for each stratum. If n^*_h is defined as the optimal number of trips taken in stratum h, then the variance of the overall ratio is estimated as

$$V\left(\hat{R}_j^*\right) = \sum_{h=1}^{H} \left(\frac{N_h - n_{jh}}{N_h} \right) \left(\frac{N_h}{\sum_{h=1}^{H} N_h} \right)^2 \left(\frac{n_{jh}}{n_{jh}^*} \right) V\left(\hat{R}_{jh}\right) I_h \qquad (15)$$

The optimization problem can now be posed as the minimization of the CV of the composite ratio estimate, subject to a total days at sea constraint (T_C) and constraints on the number of trips per stratum.

$$\begin{aligned}
&\min \sum_{j=1}^{3} \lambda_j CV_j \\
&\textit{subject to} \\
&2 \le n_{jh}^* \le N_h \qquad , \forall_h \qquad (16) \\
&T_C^* \ge \sum_{h=1}^{H} \bar{t}_h n_h^*
\end{aligned}$$

Alternatively, the optimization problem can be defined with the objective of minimizing the total number of days at sea, subject to an acceptable coefficient of variation (CV_{CRIT}). This version of the model can be written as:

$$
\begin{aligned}
&\min \sum_{h=1}^{H} \bar{t}_h n_h^* \\
&\textit{subject to} \\
&2 \le n_{jh}^* \le N_h \qquad , \forall_h \\
&CV_{CRIT} \ge \sum_{j=1}^{3} \lambda_j CV_j
\end{aligned}
\tag{17}
$$

Another relevant consideration is that a trip may not yield information on any of the target species groups. In some strata, for example, a number of trips fail to capture groundfish, monkfish or the summer flounder, scup and sea bass mixture. To protect against this possibility, it is desirable to inflate the optimal number of trip estimates by the ratio of N_h to N'_h where N_h is the total number of trips in stratum h and N'_h is the number of trips that obtained information on one or more of the species groups.

Application of the Model

Using the optimization algorithm to minimize the variance of the discard estimates subject to a given number of sea days, the allocation of observer sea days for the Mid-Atlantic (M-A) and New England (NE) regions was optimized separately and the resulting allocated sea days combined. Separate analyses were conducted because of differential sea days constraints (mandated sea days for New England groundfish versus non-mandated sea days for the Mid-Atlantic region). Before the optimization began, a portion of the available sea days were set aside to cover fisheries which do not enter the optimization process (e.g. scallop dredge fishery). For these fisheries, sea days are allocated proportional to fishing effort (number of trips or number of days fished).

The Mid-Atlantic optimization used data from the SNE, NJ/NY, DE/MD and VA/NC regions with the species weighting coefficients set to 1 for both FSB and MONK and to 0 for NEGF. The NE optimization used data from the SNE, N_MA, and ME-NH regions, with the species weighting coefficients set to 1 for NEGF and to 0 for both FSB and MONK. Data from the SNE region were included in both optimizations due to the intersection of the NE and M-A regions. Stratum indexes were applied to reduce the data set to contain only the relevant fisheries.

Below is a summary of the indexes and thresholds used in the NE and M-A sea day optimizations.

NE region trip and landings setting and thresholds

Switch	***Setting***	***Threshold (fraction)***	***Description of Filters that Operate on Entire Strata***
I(L_negf%)	1	0.0025	Landings of NEGF<Threshold=>0, else 1
I(L_fsb%)	(All)	0.0001	Landings of FSB<Threshold=>0, else 1
I(L_monk%)	(All)	0.0001	Landings of Monk<Threshold=>0, else 1
sum(I(L_all%))	(All)	NA	If any of Landings indices for NEGF,FSB or Monk=1 then =>1, else 0
I(Nh_negf%)	1	0.0001	Trips of NEGF<Threshold=>0, else 1
I(Nh_fsb%)	(All)	0.0001	Trips of FSB<Threshold=>0, else 1
I(Nh_monk%)	(All)	0.0001	Trips of Monk<Threshold=>0, else 1
I(%TotVTR_3sp)	1	0.00005	Filter on % of total landings of 3 species groups
Filter on All Trips	0	NA	Excludes entire Strata if value=0

M-A region trip and landings settings and thresholds

Switch	***Setting***	***Threshold (fraction)***	***Description of Filters that Operate on Entire Strata***
I(L_negf%)	(All)	0.0025	Landings of NEGF<Threshold=>0, else 1
I(L_fsb%)	1	0.0001	Landings of FSB<Threshold=>0, else 1
I(L_monk%)	1	0.0001	Landings of Monk<Threshold=>0, else 1
sum(I(L_all%))	(All)	NA	If any of Landings indices for NEGF,FSB or Monk=1 then =>1, else 0
I(Nh_negf%)	(All)	0.0001	Trips of NEGF<Threshold=>0, else 1
I(Nh_fsb%)	1	0.0001	Trips of FSB<Threshold=>0, else 1
I(Nh_monk%)	1	0.0001	Trips of Monk<Threshold=>0, else 1
I(%TotVTR_3sp)	1	0.00005	Filter on % of total landings of 3 species groups
Filter on All Trips	0	NA	Excludes entire Strata if value=0

NE and M-A regions d/k ratio thresholds

	Threshold (d/k ratio)	***Description of Filters that Operate on Individual Cells (Species within Strata)***	***Number of Cells Included***	***Number of Cells Excluded***
Max d/k_NEGF	1	Maximum d/k ratio used for NEGF. Values>Threshold excluded	25	11
Max d/k_FSB	2	Maximum d/k ratio used for FSB. Values>Threshold excluded	32	4
Max d/k_Monk	2	Maximum d/k ratio used for Monkfish. Values>Threshold excluded	33	3

Some 'post-processing' of the allocation of optimized sea days was necessary. Even though one or more indicator variables (i.e., filters) were applied during optimization, it was necessary to fine-tune the sea day allocations by applying a minimum and maximum amount of coverage, and to maintain coverage of fishing activity throughout the year. The optimized sea days were multiplied by the average trip duration for each stratum to estimate the projected number of observed trips. If the projected number of observed trips was less than 3 trips per strata, then the sea days were redistributed to other strata representing more relevant fisheries. If the number of potential observed trips in a stratum exceeded 15% of the VTR trips, then the sea days in that stratum were reduced to the number of sea days representing 15% (potential observer trips/VTR trips) coverage. The sea days from strata exceeding the 15% coverage cap were reassigned to other strata.

The number of unique vessels and the vessel selection protocols in a stratum limit the number of trips that can be observed in that stratum. The number of unique vessels varies among strata; in the 2005 sea day optimization, the number of unique vessels in a stratum ranged between 1 and 146 vessels, with 85% of the strata having 50 vessels or less. The vessel selection protocols state a vessel is not to be observed more than twice during a month. As an approximate guide for balancing between the potential number of observed trips and the number of unique vessels in a stratum, a 15% trip coverage cap was selected to prevent assigning more sea days to a stratum than the number of vessels could support. The 15% cap prevented clustering of sampling effort, particularly in instances where the estimate of the variance of d/k might be imprecise. In these instances, the optimization model will tend to allocate large number of trips to such strata to reduce the standard error of the estimate. When the analysis was restricted to the relevant strata for the New England groundfish fisheries, the 15% cap was binding in only 4 of 33 strata for the observer coverage allocation scheme based on 2,708 observer days.

The diagnostics within the optimization tool were used to evaluate the imputation process. The optimization algorithm calculates the d/k ratios and the variance estimates for 'all data' and for 'data without imputed values'. Generally, the d/k ratios and variance estimates were similar between the 'all data' and 'data without imputed values' for each species groups. This indicates that the imputation generally provided consistent values across the three levels of aggregation.

Precision, Bias and Sampling Intensity: A Rebuttal to E.A Babcock et al. (2003)

Understanding the sampling properties of estimates of bycatch derived from observer programs and other sources with respect to accuracy and bias is critical. This section reviews issues related to bycatch estimation in observer programs with an emphasis on potential biases that may exist. The NMFS national bycatch report (NMFS 2004) emphasizes that wherever possible, attempts to detect and guard against bias should be made in observer programs. The report strongly advocates the development of rigorous randomization procedures in sample selection to help ensure representative sampling. All can agree that with unlimited resources, the more observer coverage the better. The real issue however is how to allocate finite resources to meet multiple requirements for stock assessment and protected species evaluation. The cases that Babcock et al. (2003) point to as success stories typically have relative few boats involved compared to many other fisheries. These cases are not representative overall of the issues facing program managers.

Babcock et al. (2003) insufficiently distinguish between two very different types of bias. The first type arises when non-representative sampling occurs. The second type is related to the statistical properties of the consistency of the estimators. These two types of bias are very different and it is important to be clear which type of bias is under consideration. The second type of bias is typically reduced with sufficiently large sample size. However, this may not be addressed by increases in sample size if fishermen refuse to take observers, if certain classes of boats cannot accommodate observers, etc. Babcock et al. (2003) take as an article of faith that increasing the number of trips will reduce bias. Some of the solutions identified by Babcock et al. (2003) for correcting bias (e.g. the use of bootstrap estimators) apply to correcting bias of the second type. However, no amount of bootstrapping will overcome non-representative sampling.

The mean square error (MSE) of an estimate is composed of two elements, the variance of the estimate and the square of the bias (defined as the difference between the mean of the sample and the true population value). The MSE therefore comprises two additive elements. Cochran (1977) notes that if bias is less than 10% of the standard deviation of the estimate, the effect of this bias on the accuracy of the estimate is negligible. As noted by Babcock et al. (2003), most work on the properties of estimates derived from observer programs have focused on the variance component, with far fewer studies examining bias. For reasons described in detail below, we believe that estimating the bias of the first type is more difficult than intimated by Babcock et al. (2003). It is nonetheless important to try to estimate this quantity. Focusing on the precision part of the MSE in certain analyses does not imply that bias is unimportant, or that it should be dismissed as insolvable as suggested by Babcock et al. (2003)

A critical element of the arguments developed by Babcock et al. (2003) appears to be that increasing the number of trips sampled will, by itself, reduce bias of the first type. This assertion, if true, is important. However, no corroborative evidence is provided. The argument is that fishermen will change behavior if they are subjected to a higher probability of being included in a sample, or of being sampled more frequently by observers. In essence, fishermen will be less likely to fish in a non-typical manner when an observer is on board if the probability of selection is higher. This may not be true if say a particular fishing trip has a 20% chance of being selected vs. a 10% chance and if the fishermen do not know in advance how many trips they may have to accommodate within a specified time period. In any event, we doubt that this can be calculated unless a model of human behavior is part of the estimation procedure.

Babcock et al. (2003) report that Sampson (2002) detected statistically significant differences between a multivariate indicator of landings composition by participants in the Enhanced Data Collection Project (EDCP) of the Oregon Department of Fish and Wildlife and the composition of landings by the entire groundfish trawl fleet. This analysis is used to indicate that biases exist in voluntary programs such as the EDCP and that it is possible to use similar approaches to identify bias in observer programs in general. What Babcock et al. do not report is that Sampson indicated that the multivariate analysis employed (Principal Components Analysis) was only "moderately successful" in capturing the properties of the data. The first three principal components accounted for 15.4, 12.0, and 8.0 % of the variance `respectively for trips landing more than 10,000 lbs in which hake comprised less than 50% of the total (designated "Big" trips by Sampson). For trips less than 10,000 lbs in which hake comprised less than 50% of the total ("Small" trips), the first three principal components accounted for 13.7, 10.4, and 9.0% of the variance. Sampson (2002) reported significant differences between the participants in the EDCP and the total fleet in the 1st and 3rd principal components for both Big and Small trips and concluded that the EDCP fleet may not be representative of the entire fleet. However, because the first three PCs captured only a moderate fraction of the variance, these analyses should be viewed with caution. It is worth noting that Sampson provided canonical variable plots of PCA 1 against PCA 2 (Figure 6a and 6b of his report) in which both the information from the EDCP and the whole fleet are superimposed and these show that the data from the EDCP do not appear to be markedly different from the total fleet. A truly important bias should show up clearly in these plots, which take into account more of the variance of the samples than the individual t-tests actually used in the report.

The general issue of testing for bias in observer data using landings data raises some important questions concerning the inferences that can be drawn. In particular, if no significant differences are detected between observer and landings data, this does not guarantee that there is no bias in the estimates of discards.

The other major source of information that could be used to test the representativeness of observer data is to test against self-reported estimates by fishermen. Sampson (2002) made such an analysis for the EDCP data and detected differences. In this case, it was inferred that the self-reported estimates were not accurate. In contrast, Liggens (1997) found no differences between observer data for catch and discards against fleet wide estimates. In general, self-reported estimates are rightly viewed with caution and this is the most commonly available type of discard information against which to compare observer data.

To deal with logistical constraints and their effect on observer programs, Babcock et al. (2003) cite the work of Cotter et al. (2002) using a probability proportional to size (PPS) sampling allocation procedure. However, Cotter et al. (2002) concluded that this approach did not markedly improve the performance of the estimators.

Babcock et al. (2003) refer to the method of collapsing strata as an *ad hoc* procedure when, in fact, it is a very well established method (see Cochran 1977). Bias can occur using this method if an investigator deliberately chooses similar strata to combine. However, methods in which objective rules for combining strata are employed are much less likely to cause bias.

Babcock et al. (2003) assert that Fogarty and Gabriel (2002) assumed that the sampling fraction did not matter. In fact, Fogarty and Gabriel (2002) noted that the sampling fraction does affect the precision of the estimate through the finite population correction factor. The effect indicated by Babcock et al. (2003) is a very well established property of the statistical estimators employed. Fogarty and Gabriel (2002) noted in their analysis that “Ignoring the finite population correction factor results in an overestimate of the standard error…” Fogarty and Gabriel (2002) did not include the FPC in their estimates so as to provide a conservative estimate of the variance (e.g. biased on the high side). This is very different than assuming that the sampling fraction does not matter.

Recommendations made by the NMFS National Working Group on Bycatch (NMFS 2004) largely address the issues of major concern – the importance of obtaining representative sampling, careful consideration of stratification, etc. We recommend that information from observer trips (catch, trip duration, number of hauls/tows, fishing location etc.) also be checked against independent sources of information to see if differences can be detected. The only solution that Babcock et al. (2003) provide when such a bias is detected is to increase the number of trips covered by observers. As noted above, this may or may not be effective. Other solutions to the problem need to be explored, as well as increasing observer coverage when analyses indicate it is cost-effective to do so given finite resources and competing programmatic needs.

An Evaluation of Bias in the Northeast Fisheries Observer (Sea Sampling) Program

Several tests were conducted to address the potential sources of bias. We compared several measures of performance for vessels with and without observers present. Bias can arise if the observed trips within a stratum are not representative of the other vessels within the stratum. Such bias could arise if the vessels with observers on board consistently catch more or less than other vessels, if the average trip durations change, or if vessels fish in different areas. Each of these hypotheses was tested by comparing observable properties in strata having data from vessels with and without observers.

All vessels are required to report the total trip landings, the number of days absent from port, and the primary statistical area fished. Average catches (pounds landed) for observed and total trips compare favorably (Figure 5), and follow an expected linear relationship. If the observed and unobserved trips within a stratum measure the same underlying process, one would expect no statistical difference in the average catches (and the standard deviations) between the VTR and observer data sets. An examination of the distribution of these differences (Figures 6A and 6B) indicates no evidence of systematic bias. The mean difference of 238 pounds in average catch rates between the two data sets is not significantly different from zero ($p=0.59$, $df=84$). As well, a paired t-test of the stratum specific standard deviations of pounds kept showed no significant difference from zero ($p=0.08$). A strong correlation was detected in trip duration between observed and unobserved trips (Figure 7), with observed trips averaging about a half-day longer ($p = 0.01$) (Figure 8A). However, the difference in stratum specific standard deviations of trip length was not significantly different from zero ($p = 0.60$) (Figure 8B). Some skewing of the differences in mean trip durations is evident, with observed trips being slightly longer.

Two measures of spatial coherence were also examined. Within stratum $\mathbf{h}$ the expected number of observer trips by statistical area $\mathbf{j}$ as the product of the proportion of VTR trips in Statistical Area $\mathbf{j}$ and stratum $\mathbf{h}$ ($\mathbf{V_{jh}}$) and the number of observed trips in stratum $\mathbf{n_h}$. Thus, $\mathbf{E_{jh} = V_{jh} * n_h}$. These expectations can then be compared to the actual frequencies ($\mathbf{O_{jh}}$) of observed trips by statistical area. Results of these analyses indicate that the spatial distribution of fishing effort for trips with observers on board closely matches the spatial distribution of trips for the stratum as a whole (Table 4). It was possible to compute chi-square statistics for 65 strata. The null hypothesis of observer proportions equal to VTR proportions was rejected ($P<0.05$) in 20 of the 65 comparisons. Of these 20 cases, 11 were from ports in Southern New England and Mid-Atlantic states. Of the remaining nine cases, five involved the large and extra-large gill net fisheries that land both groundfish and monkfish. Thus, the null hypothesis of equivalent spatial distribution of sampling was rejected in only 4 of 50 cases, a rejection rate only slightly higher than expected from chance alone.

As a final measure of the potential spatial bias, a paper by Murawski et al. (2005 in press) is instructive. In this paper, information is presented on the spatial distribution of otter trawl fishing effort for vessels with Vessel Monitoring Systems (VMS) and compared with the distribution of fishing effort from observed trips (Figure 9). Qualitatively, the spatial distributions match very well with high concentrations of effort near the boundaries of existing closed areas on Georges Bank and within the Gulf of Maine. Moreover, the effort concentration profiles deduced from VMS data coincide almost exactly with the profiles derived from the observed trips. Overall, these comparisons suggest strong coherency between these two independent measures of fishing locations.

Sources of Uncertainty

In the Northeast, every effort is made to ensure representative observer coverage. This is accomplished by stratifying the fleet into homogeneous spatial, temporal and gear groups and by randomly selecting vessels from these strata. Stratification and randomization of sampling units are basic principles of survey design (e. g. Cochran 1977; Thompson 2002) and have been used in previous studies of bycatch to improve both “knowledge of the fleet” (Cotter et al. 2002) and precision of estimates (Allen et al. 2002; Borges et al. 2004). VTR data are used to produce a list of fishing vessels, by quarter and fleet sector. The vessel list contains a randomly ordered list of all vessels that participated in each fleet sector. To obtain a representative sample of the fleet, the NEFOP Area Coordinators use this vessel list, in addition to their local knowledge of fleet activity, to identify vessels on which to place observers. Vessels are required to take an observer if requested to do so. The NEFOP has standard protocols regarding vessel selection. A vessel, using the same gear, is not observed more than twice in the same month— this prevents repeated observations from the same vessel. The NEFOP Area Coordinators have protocols for documenting refusals; a refusal occurs when a vessel owner/captain is asked to take an observer and the owner/captain declines — or agrees but does not follow through (i.e. the vessel leaves the dock without the observer on board). Refusals are forwarded to Law Enforcement. A vessel owner can be prosecuted for failing to take an observer.

An objective process is used for imputation of missing values in unsampled strata. The imputation methodology helps identify gaps in sampling strategy and is an important component for ongoing improvements of the survey design. Stratoudakis et al. (1999) employed a post-stratification technique of “collapsing strata” as a way of dealing with unsampled strata. Our method of imputing means and variances for unsampled strata builds on this approach by utilizing information in comparable strata as a basis for initial sample allocation. Imputation represents a tradeoff between a realistic survey consistent with known fishing patterns and a less realistic pooled survey. Excessive imputation, however, can be indicative of an overly ambitious stratification approach; utilizing the observer data at an unrealistically fine temporal or spatial scale (say daily estimates in a small area) not only leads to an excessive extrapolation, but also violates the premise that observations in the current year are sufficient to predict patterns in the following year.

Persistence of annual patterns is critical to the estimation of an ‘optimal’ scheme. As regulations change and fishing patterns shift, using data based on fleet activity in the preceding year may be problematic. Using the current year’s fishing activity pattern to predict future fishing patterns within strata cannot account for changes induced by variations in resource abundance, revenues, or management regimens. In a study of discards in the North Sea, Statoudakis et al. (1998)

reported immediate increases in discarding rates following increases in minimum size limits, but noted consistent patterns over time and among gears for higher value species such as cod and haddock. Without a predictive model of human behavior, it is not possible to anticipate fine-scale changes in fishing patterns. Rochet et al. (2002) were unable to find reliable predictor variables for prediction of bycatch but it should be noted that their study examined only 26 trips, about two orders of magnitude less than the number of trips considered in this report.

A related source of uncertainty is the ability to make inferences about specific species, stocks or age groups. Our evaluation of the Northeast Observer Program considers discard to kept ratios at the level of species groups. This approach is consistent with recent literature (Allen et al. 2001, Borges et al. 2004). An optimal strategy for New England Groundfish as a group however, will not necessarily be optimal for age 2 haddock on Georges Bank. The precision of discard information required at this level will typically exceed the nominal levels predicted as a result of optimal sampling. Figure 10 illustrates the relationship between the coefficient of variation for the overall New England groundfish discard ratio estimate as a function of total observer days allotted to this fishery. Assuming that 2,708 sea days can be allocated in an optimal manner in 2005, the predicted CV of the d/k ratio is well below 4%. The predicted CV drops to 2.5% at about 4,000 days and drops to about 1% at 20,000 days (about 50% coverage). The continuously decreasing slope of the relationship between CV and observer sea days reflects the reduced effectiveness of additional days as a way of improving overall precision.

Several important points are relevant to the interpretation of Figure 10. First, any non-optimal allocation of sampling effort will tend to increase the overall CV of the d/k ratio. Non-optimal allocations occur when the desired sampling plan cannot be followed, or when the pattern of landings among the strata in the current year differs from the pattern used as a basis for the optimal allocation scheme. Second, the CV of the overall d/k ratio is smaller than the precision of the individual components. Thus, the CV of the d/k ratio for a particular gear type or for a d/k ratio based on a finer temporal or spatial scale will generally be greater than the composite estimate. This property is illustrated in Figures 11 and 12 for quarterly estimates in the New England groundfish otter trawl and gillnet fisheries, respectively. Note that the number of observed otter trawl trips would need to be tripled to reduce the CV of the d/k ratio from 20% to 10%.

The coefficient of variation (CV) of the d/k ratios for New England groundfish are well below the 20% - 30% CV range established by the Atlantic Coastal Cooperative Statistics Program (ACCSP) for high priority commercial fisheries (ACCSP 2001) and by NMFS's National Working Group on Bycatch (NWGB) (NMFS 2004). The NWGB recommends: "For fishery resources, excluding protected species, caught as bycatch in a fishery, the recommended precision goal is a 20-30% CV for estimates of total discards (aggregated over all species) for the fishery; or if total catch cannot be divided into discards and retained catch then the recommended goal for estimates of total catch is a CV of 20-30% (NMFS 2004). Assuming that landings are known without error, the precision of estimated total discard for New England groundfish equals the precision of the d/k ratio for this fishery.

A decrease in precision of the d/k ratio is also expected for any single species analysis. For example, the CV of the d/k ratio for haddock alone will probably be much greater than the CV of the d/k ratio for the overall groundfish complex. Once again, it is important to remember that the sampling program must be based on observable properties of the strata, not on the outcome of the experiment. Any efforts to improve the precision of the d/k ratio for a single species will come at the expense of reduced precision for other species. Moreover, oversampling of a particular group of vessels may introduce undesirable properties (e.g., repeat trips on a single vessel) that can make the sampling less representative.

An exact definition of an acceptable level of bias and precision depends on the objectives of the analyses and the levels of acceptable risk to the fishery resource and the fishery. The acceptable level of risk must be defined externally by managers but should, at a minimum, consider the risk of stock collapse if management actions are compromised by imprecise information on discards. From the analyses presented in this report, it would appear that the level of precision is high for the groundfish resource as a whole and that there little evidence of bias in the discard rates.

Presently the optimization model uses aggregate d/k ratios, which are appropriate for most fisheries; however, for other fisheries, d/e ratios are more appropriate. The optimization algorithm can handle datasets containing either type of ratio, but not both in the same set (without external weighting). Input data sets with d/e ratios have been developed, but have not yet been incorporated into the overall process. A comparison of the precision of alternative estimators of discard ratios is the subject of ongoing research.

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Table 1. The variables, their description, their associated species group, data source, and units of the input data set of the optimization algorithm.

Variable Name	***Definition***	***Species Group***	***Data Source***	***Units***
year	Year			categories
negear	gear type			categories
qtr	quarter of year			number
mesh	mesh size			categories
region	state grouping, port of departure			categories
trp	Trip Duration (days)			categories
alltrips	Total number of trips, all species	ALL	VTR	trip
allmnda	Ave number of days absent, all species	ALL	VTR	days
vcount	Total number of VTR trips for 3 sp. Groups	3 Sp Grp	VTR	trip
ocount	Total number of observed trips that caught one or more of the 3 sp groups	3 Sp Grp	VTR	trip
vnegfntrips	Number of VTR trips that caught NEGF	NEGF	VTR	trip
vgfda	Total VTR days absent for trips that caught Groundfish	NEGF	VTR	days
vgftotal	Total VTR pounds(all sp) landed for trips landing groundfish	NEGF	VTR	pounds
vgflb	VTR pounds landed—groundfish	NEGF	VTR	pounds
vgfmnda	VTR average days absent—groundfish	NEGF	VTR	days
onegf	Sum of the "0/1 flags" for observed trips that caught NEGF	NEGF	OBS	trip
ogfntrips	Number of observed trips that caught NEGF	NEGF	OBS	trip
ogfparent	Flag indicating if values of d/k are observed (=1) or imputed (=0)	NEGF	OBS	flag
ogfnewcv	Desired CV closest to 0.30--intermediate value	NEGF	OBS	number
ogfnewntrips	Number of Observed trips necessary to achieve CV=ogfxnewcv	NEGF	OBS	trip
ogfxnewcv	Desired CV=0.30 --exact value	NEGF	OBS	number
ogfavgtriplen	Ave Trip Length in days for observed trips	NEGF	OBS	days
ogfntows	Number of observed Tows	NEGF	OBS	tows
ogfksums	Kept—observed	NEGF	OBS	pounds
ogfdsums	Discarded—observed	NEGF	OBS	pounds
ogfdkratio	d/k ratio	NEGF	OBS	number
ogfse	SE of d/k ratio	NEGF	OBS	number
ogfcv	CV of mean d/k ratio	NEGF	OBS	number
ogfseadays	Number of sea days needed to achieve CV=0.3 (=avg triplen x newntrips)	NEGF	OBS	days
ogfndays	Number of observed days	NEGF	OBS	days
vfsbntrips	Number of VTR Trips that caught FSB	FSB	VTR	trip
vfsbda	Total VTR days absent for trips that caught FSB	FSB	VTR	days
vfsbtotal	Total VTR pounds (all sp) landed for trips landing FSB	FSB	VTR	pounds
vfsblb	VTR pounds landed—FSB	FSB	VTR	pounds
vfsbmnda	VTR average days absent—FSB	FSB	VTR	days
ofsb	Sum of the "0/1 flags" for observed trips that caught FSB	FSB	OBS	trip
ofsbntrips	Number of observed trips that caught FSB	FSB	OBS	trip
ofsbparent	Flag indicating if values of d/k are observed (=1) or imputed (=0)	FSB	OBS	flag
ofsbnewcv	Desired CV closest to 0.30--intermediate value	FSB	OBS	number
ofsbnewntrips	Number of Observed trips necessary to achieve CV=ofsbxnewcv	FSB	OBS	trip
ofsbxnewcv	Desired CV=0.30 --exact value	FSB	OBS	number

ofsbavgtriplen	Ave Trip Length in days for observed trips	FSB	OBS	days
ofsbntows	Number of observed Tows	FSB	OBS	Tows
ofsbksums	Kept—observed	FSB	OBS	pounds
ofsbdsums	Discarded—observed	FSB	OBS	pounds
ofsbdkratio	d/k ratio	FSB	OBS	number
ofsbse	SE of d/k ratio	FSB	OBS	number
ofsbcv	CV of mean d/k ratio	FSB	OBS	number
ofsbseadays	Number of sea days needed to achieve CV=0.3 (=avg triplen x newntrips)	FSB	OBS	days
ofsbndays	Number of observed days	FSB	OBS	days
vmonkntrips	Number of VTR Trips that caught Monk	Monk	VTR	trip
vmonkda	Total VTR days absent for trips that caught monk	Monk	VTR	days
vmonktotal	Total VTR pounds (all sp) landed for trips landing Monkfish	Monk	VTR	pounds
vmonklb	VTR pounds landed---Monk	Monk	VTR	pounds
vmonkmnda	VTR average days absent—Monk	Monk	VTR	days
omonk	Sum of the "0/1 flags" for observed trips that caught Monkfish	Monk	OBS	trip
omkntrips	Number of observed trips that caught Monk	Monk	OBS	trip
omkparent	Flag indicating if values of d/k are observed (=1) or imputed (=0)	Monk	OBS	flag
omknewcv	Desired CV closest to 0.30--intermediate value	Monk	OBS	number
omknewntrips	Number of Observed trips necessary to achieve CV=omkxnewcv	Monk	OBS	trip
omkxnewcv	Desired CV=0.30 --exact value	Monk	OBS	number
omkavgtriplen	Ave Trip Length in days for observed trips	Monk	OBS	days
omkntows	Number of observed Tows	Monk	OBS	Tows
omkksums	Kept—observed	Monk	OBS	pounds
omkdsums	Discarded—observed	Monk	OBS	pounds
omkdkratio	d/k ratio	Monk	OBS	number
omkse	SE of d/k ratio	Monk	OBS	number
omkcv	CV of mean d/k ratio	Monk	OBS	number
omkseadays	Number of sea days needed to achieve CV=0.3 (=avg triplen x newntrips)	Monk	OBS	days
omkndays	Number of observed days	Monk	OBS	days
onegfcpue	Observer Catch(kept) per unit effort (lbs/day) for NEGF	NEGF	OBS	lbs/day
ofsbcpue	Observer Catch (kept) per unit effort (lbs/day) for FSB	FSB	OBS	lbs/day
omkcpue	Observer Catch (kept) per unit effort (lbs/day) for Monk	Monk	OBS	lbs/day
alltotal	Total number of pounds of all species landed in this cell	ALL	VTR	pounds
vnegfcpue	VTR Landings per unit effort (lbs/day) for NEGF	NEGF	VTR	lbs/day
vfsbcpue	VTR Landings per unit effort (lbs/day) for FSB	FSB	VTR	lbs/day
vmkcpue	VTR Landings per unit effort (lbs/day) for Monk	Monk	VTR	lbs/day
L_negf%	Fraction of NEGF landings in stratum h	NEGF	VTR	unitless
L_fsb%	Fraction of FSB landings in stratum h	FSB	VTR	unitless
L_monk%	Fraction of Monk landings in stratum h	Monk	VTR	unitless
Nh_negh%	Fraction of NEGF trips in stratum h	NEGF	VTR	unitless
Nh_fsb%	Fraction of FSB trips in stratum h	FSB	VTR	unitless
Nh_monk%	Fraction of Monk trips in stratum h	Monk	VTR	unitless
I(L_negf%)	Indicator {0,1} for Fraction of NEGF landings in stratum h	NEGF	VTR	switch
I(L_fsb%)	Indicator {0,1} for Fraction of FSB landings in stratum h	FSB	VTR	switch
I(L_monk%)	Indicator {0,1} for Fraction of Monk landings in stratum h	Monk	VTR	switch
sum(I(L_all%))	Indicator {0,1} for composite landings. =0 if all species specific indicators=0,else 1	3 Sp Grp	VTR	switch
I(Nh_negf%)	Indicator {0,1} for Fraction of NEGF trips in stratum h	NEGF	VTR	switch
I(Nh_fsb%)	Indicator {0,1} for Fraction of FSB trips in stratum h	FSB	VTR	switch

I(Nh_monk%)	Indicator {0,1} for Fraction of Monk trips in stratum h	Monk	VTR	switch
sum(I(Nh_all%)	Indicator {0,1} for composite TRIPS. =0 if all species specific indicators=0,else 1	3 Sp Grp	VTR	switch
I(onegfcpue)	Indicator {0,1} for observer CPUE in stratum h for NEGF. 1=> exceeds threshold, else 0	NEGF	OBS	switch
I(ofsbcpue)	Indicator {0,1} for observer CPUE in stratum h for FSB. 1=> exceeds threshold, else 0	FSB	OBS	switch
I(omkcpue)	Indicator {0,1} for observer CPUE in stratum h for Monk. 1=> exceeds threshold, else 0	Monk	OBS	switch
I(vnegfcpue)	Indicator {0,1} for VTR CPUE in stratum h for NEGF. 1=> exceeds threshold, else 0	NEGF	VTR	switch
I(vfsbcpue)	Indicator {0,1} for VTR CPUE in stratum h for FSB. 1=> exceeds threshold, else 0	FSB	VTR	switch
I(vmkcpue)	Indicator {0,1} for VTR CPUE in stratum h for Monk. 1=> exceeds threshold, else 0	Monk	VTR	switch
I(d/k_negf)	Indicator {0,1} for Obsvr d/k ratio in stratum h for NEGF. 1=> exceeds threshold,else 0	NEGF	OBS	switch
I(d/k_fsb)	Indicator {0,1} for Obsvr d/k in stratum h for FSB. 1=> exceeds threshold, else 0	FSB	OBS	switch
I(d/k_monk)	Indicator {0,1} for Obsvr d/k in stratum h for Monk. 1=> exceeds threshold, else 0	Monk	OBS	switch
Total VTR 3spgroup	Sum of landings by strata for each species group	3 Sp Grp	VTR	switch
%Total VTR 3 group	Percent of landings of sum of 3 sp groups in strata	3 Sp Grp	VTR	switch
I(%TotVTR_3sp)	flag for total landings of 3 species groups	3 Sp Grp	VTR	switch
ogfimp_level	Indicator {0,1,2,3} of imputation level	NEGF	OBS	category
ofsbimp_level	Indicator {0,1,2,3} of imputation level	FSB	OBS	category
omonkimp_level	Indicator {0,1,2,3} of imputation level	Monk	OBS	category

Table 2. Number of trips, by strata, in the Fishing Vessel Trip Reports (VTR) and Northeast Fisheries Observer Program (NEFOP) data sets used in the 2005 sea day optimization.

				QUARTER							
				1		2		3		4	
Region	**Gear**	**Mesh**	**Trip length**	VTR	NEFOP	VTR	NEFOP	VTR	NEFOP	VTR	NEFOP
DE/MD	Otter Trawl	Large	day			95	0	188	0	52	0
			multi-day	17	0	31	0	8	1	21	0
		Medium	day							1	0
			multi-day	8	2	5	0			5	0
		Small	day	3	0	14	0	3	0	24	0
			multi-day			1	0				
	Gillnet	Medium		1	0	1	0				
		Small		4	0	1	0	1	0		
		XLarge		12	0	19	0	2	0	8	0
ME_NH	Longline	None		20	0	68	0	6	0	5	0
	Otter Trawl	Large	day	187	0	102	2	512	6	568	1
			multi-day	315	9	279	5	479	9	439	15
		Medium	day							1	0
			multi-day			1	0				
		Small	day					1	1	1	0
			multi-day							1	0
		XLarge	day			3	0	1	0	10	0
			multi-day	1	0						
	Gillnet	Large		75	0	242	0	823	10	375	3
		Medium								1	0
		None				1	0	10	0	1	0
		Small						3	0		
		XLarge		19	0	77	0	573	14	247	0
N_MA	Longline	None		407	6	28	1	186	0	243	0
	Otter Trawl	Large	day	789	20	739	21	2015	54	1232	34
			multi-day	501	7	382	13	551	10	613	9
		Medium	day			11	1	1	0		
			multi-day			2	4	3	0	2	1
		Small	day	13	0	119	2	3	1	15	2
			multi-day	12	2	57	2	3	3	15	2
		XLarge	day			1	0				
			multi-day					2	0	1	0
	Gillnet	Large		1061	81	367	83	1481	94	1024	64
		Medium		1	0					2	0
		None		2	0	1	0	22	0	1	0
		Small		4	0	1	0	3	0	8	0
		XLarge		191	11	174	37	694	33	540	35
NC/VA	Otter Trawl	Large	day	2	0	5	0			3	0
			multi-day	542	17	117	0			226	3
		Medium	day	4	0	3	0				
			multi-day	35	7	20	0			15	2
		Small	multi-day	12	4	4	0	2	0	13	0
		XLarge	multi-day	4	0	4	0				
	Gillnet	Large		9	0	46	0	11	0	43	0
		Medium		19	0	5	0			10	0
		Small		2	0	8	0	4	1	15	0
		XLarge		38	0	161	0			35	0
NJ/NY	Longline	None		45	0	5	0				
	Otter Trawl	Large	day	426	4	1878	6	936	0	847	0
			multi-day	342	4	421	3	580	0	199	1
		Medium	day	13	1	267	21	464	5	458	4
			multi-day	170	22	42	5	4	1	64	3
		Small	day	29	0	629	5	894	0	465	0
			multi-day	209	8	99	3	105	1	150	5
		XLarge	day			4	0	31	0	20	0
			multi-day	7	0	2	0	1	0	2	0
	Gillnet	Large				72	0	70	0	29	0
		Medium				49	0	81	0	31	0
		None				2	0			4	0
		Small		2	0	8	0	49	0	51	0
		XLarge		418	0	699	1	166	0	995	0
SNE	Otter Trawl	Large	day	273	2	996	20	1399	2	731	2
			multi-day	571	37	515	8	621	21	525	25
		Medium	day			72	3	41	1	158	2
			multi-day	25	1	19	1	4	2	23	0
		Small	day	11	0	104	6	304	2	333	10
			multi-day	503	12	269	8	188	5	373	7
		XLarge	day			2	0			7	0
			multi-day	3	0	1	0	4	0	11	0
	Gillnet	Large		21	1	124	9	170	3	66	2
		Medium						1	0		
		None		1	0	1	0			1	0
		Small				4	0				
		XLarge		314	13	684	38	202	10	582	28

Table 3. Summary of fleet sectors (strata), by species group, that are imputed (1) and not imputed (0); blank cells indicate no fleet activity.

				QUARTER											
				1			2			3			4		
Region	Gear	Mesh	Trip length	NEGF	FSB	MONK	NEGF	FSB	MONK	NEGF	FSB	MONK	NEGF	FSB	MONK
DE/MD	Otter Trawl	Large	day				0	1	1	0	1	1	0	1	1
			multi-day	0	1	1	0	1	1	0	1	1	0	1	1
		Medium	day										0	1	0
			multi-day	0	0	1	0	1	1				0	1	0
		Small	day	0	1	1	0	1	1	0	1	0	0	1	1
			multi-day				0	1	0						
	Gillnet	Medium		0	1	0	0	1	0						
		Small		0	1	0	0	1	0	0	0	1			
		XLarge		0	0	1	0	1	1	0	0	1	0	0	1
ME_NH	Longline	None		1	0	0	1	0	0	1	0	0	1	0	0
	Otter Trawl	Large	day	1	0	1	0	1	0	0	1	0	1	1	1
			multi-day	0	0	0	0	0	0	0	1	0	0	1	0
		Medium	day										0	1	0
			multi-day				1	0	1						
		Small	day							1	0	0	1	0	1
			multi-day										1	0	1
		XLarge	day				1	0	1	1	0	1	0	0	1
			multi-day	0	0	1									
	Gillnet	Large		1	0	1	1	1	1	0	1	0	0	1	1
		Medium											1	0	1
		None					1	0	1	1	0	1	1	0	1
		Small								1	0	1			
		XLarge		1	0	1	1	1	1	0	0	0	1	1	1
N_MA	Longline	None		0	0	0	1	0	0	1	0	0	1	0	0
	Otter Trawl	Large	day	0	1	0	0	0	0	0	1	0	0	1	0
			multi-day	0	1	0	0	0	0	0	0	0	0	1	0
		Medium	day				1	1	1	1	0	1			
			multi-day				0	0	0	1	0	1	1	0	1
		Small	day	1	0	1	0	0	0	0	1	0	0	0	0
			multi-day	0	1	0	0	1	0	0	0	0	0	0	0
		XLarge	day				0	1	0						
			multi-day							1	0	1	1	0	1
	Gillnet	Large		0	1	0	0	0	0	0	0	0	0	1	0
		Medium		1	0	0							1	0	1
		None		1	0	1	0	0	1	1	0	1	1	0	0
		Small		1	0	0	1	0	1	1	0	1	1	0	1
		XLarge		0	0	0	0	0	0	0	0	0	0	0	0
NC/VA	Otter Trawl	Large	day	0	1	0	0	1	1				1	1	1
			multi-day	0	0	0	0	1	1				1	0	0
		Medium	day	0	1	0	0	1	0						
			multi-day	0	0	0	0	1	1				0	0	1
		Small	multi-day	0	0	0	0	1	1	0	1	0	0	1	0
		XLarge	multi-day	0	1	1	0	1	1						
	Gillnet	Large		0	1	1	0	1	1	0	1	0	0	1	1
		Medium		0	1	1	0	1	1				0	1	1
		Small		0	0	1	0	1	1	0	0	0	0	1	1
		XLarge		0	1	1	0	1	1				0	1	1
NJ/NY	Longline	None		1	0	0	1	0	0						
	Otter Trawl	Large	day	0	0	0	0	0	0	1	1	1	1	1	1
			multi-day	0	0	0	1	0	0	1	1	1	0	1	1
		Medium	day	1	1	0	0	0	0	0	0	0	0	0	0
			multi-day	0	0	0	0	0	0	1	0	0	0	0	0
		Small	day	1	1	1	0	0	0	1	1	1	1	1	1
			multi-day	0	0	0	0	0	0	1	0	0	1	0	0
		XLarge	day				1	1	1	0	1	1	0	1	1
			multi-day	0	1	1	0	0	1	0	1	0	0	1	0
	Gillnet	Large					1	1	1	0	1	1	0	1	1
		Medium					1	1	1	1	1	1	1	1	0
		None					0	1	1				0	1	1
		Small		0	0	1	1	1	0	1	1	0	1	1	1
		XLarge		0	1	1	1	1	1	1	1	1	1	1	1
SNE	Otter Trawl	Large	day	0	0	0	0	0	0	1	0	1	0	0	0
			multi-day	0	0	0	0	0	0	0	0	0	0	0	0
		Medium	day				0	0	1	0	1	1	0	0	0
			multi-day	0	1	1	1	1	1	0	1	0	1	1	1
		Small	day	1	1	1	0	0	0	0	0	1	0	0	0
			multi-day	0	0	0	0	0	0	0	1	0	0	0	0
		XLarge	day				0	1	1				0	1	1
			multi-day	1	1	1	0	1	1	1	0	1	0	1	1
	Gillnet	Large		1	0	1	0	0	0	1	0	1	1	0	1
		Medium								0	1	0			
		None		1	0	1	0	0	1				0	1	0
		Small					0	1	1						
		XLarge		0	0	0	0	0	0	0	0	0	0	0	0

Table 4. Summary of contingency table analyses of spatial distribution of VTR and observed trips. Expected value of observed trips is based on proportions of VTR trips by Statistical Area. Critical value of Chi-Square statistics is based on alpha level of 0.05. Degrees of freedom are based on number of Statistical Areas reported in VTR database.

Quarter	Gear	Mesh	Region	Trip Duration	Chi Sqr Test Statistic	df	Chi Sqr Crit Value	Signif Level
3	Gill Net	Large	ME_NH	all	41.92	6	12.59	0.000
3	Gill Net	XLarge	ME_NH	all	32.19	4	9.49	0.000
3	Gill Net	Large	N_MA	all	36.92	11	19.68	0.000
3	Gill Net	XLarge	NJ/NY	all	20.30	5	11.07	0.001
4	Gill Net	XLarge	N_MA	all	16.89	4	9.49	0.002
4	Gill Net	Large	ME_NH	all	14.76	4	9.49	0.005
4	Gill Net	XLarge	NJ/NY	all	10.46	2	5.99	0.005
2	Gill Net	XLarge	ME_NH	all	12.06	7	14.07	0.098
2	Gill Net	Large	NC/VA	all	3.06	2	5.99	0.216
1	Gill Net	XLarge	NC/VA	all	2.15	2	5.99	0.341
1	Gill Net	Large	SNE	all	0.40	1	3.84	0.527
4	Gill Net	Large	N_MA	all	2.69	4	9.49	0.611
2	Gill Net	Large	N_MA	all	6.10	8	15.51	0.636
2	Gill Net	XLarge	N_MA	all	1.48	3	7.81	0.687
1	Gill Net	XLarge	N_MA	all	1.23	3	7.81	0.746
3	Gill Net	XLarge	N_MA	all	2.29	5	11.07	0.808
1	Gill Net	Large	N_MA	all	1.29	4	9.49	0.862
2	Longline	None	ME_NH	all	1.15	3	7.81	0.764
1	Longline	None	N_MA	all	1.63	7	14.07	0.977
2	Trawl	Large	N_MA	1day	243.29	6	12.59	0.000
2	Trawl	Medium	SNE	2+day	120.00	3	7.81	0.000
3	Trawl	Large	NJ/NY	1day	80.97	13	22.36	0.000
2	Trawl	Large	NJ/NY	1day	61.00	5	11.07	0.000
4	Trawl	Large	ME_NH	2+day	49.91	9	16.92	0.000
1	Trawl	Small	NJ/NY	1day	32.36	3	7.81	0.000
4	Trawl	Medium	NJ/NY	2+day	28.00	2	5.99	0.000
3	Trawl	Large	N_MA	1day	37.19	9	16.92	0.000
4	Trawl	Small	NJ/NY	1day	15.00	2	5.99	0.001
4	Trawl	Small	N_MA	2+day	14.00	2	5.99	0.001
1	Trawl	Large	NC/VA	2+day	29.65	13	22.36	0.005
2	Trawl	Small	DE/MD	1day	8.67	3	7.81	0.034
1	Trawl	Medium	SNE	2+day	4.00	1	3.84	0.046
2	Trawl	Large	NC/VA	2+day	14.28	8	15.51	0.075
2	Trawl	Large	N_MA	2+day	22.66	15	25.00	0.092
2	Trawl	Small	NJ/NY	1day	13.22	8	15.51	0.105
2	Trawl	Large	DE/MD	2+day	13.03	8	15.51	0.111
4	Trawl	Large	SNE	2+day	2.00	1	3.84	0.157
3	Trawl	Large	ME_NH	1day	14.30	10	18.31	0.160
4	Trawl	Large	NC/VA	2+day	19.92	15	25.00	0.175
2	Trawl	Small	NJ/NY	2+day	7.58	5	11.07	0.181
3	Trawl	Small	NJ/NY	1day	1.00	1	3.84	0.317
1	Trawl	Large	SNE	2+day	3.81	4	9.49	0.432
4	Trawl	Small	N_MA	1day	0.60	1	3.84	0.439
2	Trawl	Medium	N_MA	1day	0.50	1	3.84	0.480
4	Trawl	Large	NC/VA	1day	7.45	8	15.51	0.489
2	Trawl	Large	DE/MD	1day	0.41	1	3.84	0.520
4	Trawl	Small	NJ/NY	2+day	8.01	9	16.92	0.533
4	Trawl	Medium	NC/VA	2+day	0.33	1	3.84	0.564
2	Trawl	Small	SNE	1day	1.00	2	5.99	0.607
4	Trawl	Large	N_MA	1day	5.25	7	14.07	0.630
1	Trawl	Small	N_MA	2+day	1.67	3	7.81	0.644
1	Trawl	Large	NJ/NY	1day	3.08	5	11.07	0.687
4	Trawl	Large	NJ/NY	2+day	0.71	2	5.99	0.700
1	Trawl	Large	N_MA	1day	6.29	10	18.31	0.790
3	Trawl	Large	ME_NH	2+day	3.02	6	12.59	0.807
4	Trawl	Large	N_MA	2+day	5.87	10	18.31	0.826
1	Trawl	Large	N_MA	2+day	1.08	4	9.49	0.897
1	Trawl	Large	ME_NH	1day	3.40	8	15.51	0.907
3	Trawl	Large	N_MA	2+day	2.06	6	12.59	0.914
1	Trawl	Large	NJ/NY	2+day	2.00	6	12.59	0.920
4	Trawl	Large	ME_NH	1day	0.39	3	7.81	0.943
2	Trawl	Large	ME_NH	2+day	4.43	11	19.68	0.956
1	Trawl	Large	ME_NH	2+day	0.85	6	12.59	0.991
3	Trawl	Large	DE/MD	1day	0.81	6	12.59	0.992
2	Trawl	Large	ME_NH	1day	1.67	9	16.92	0.996

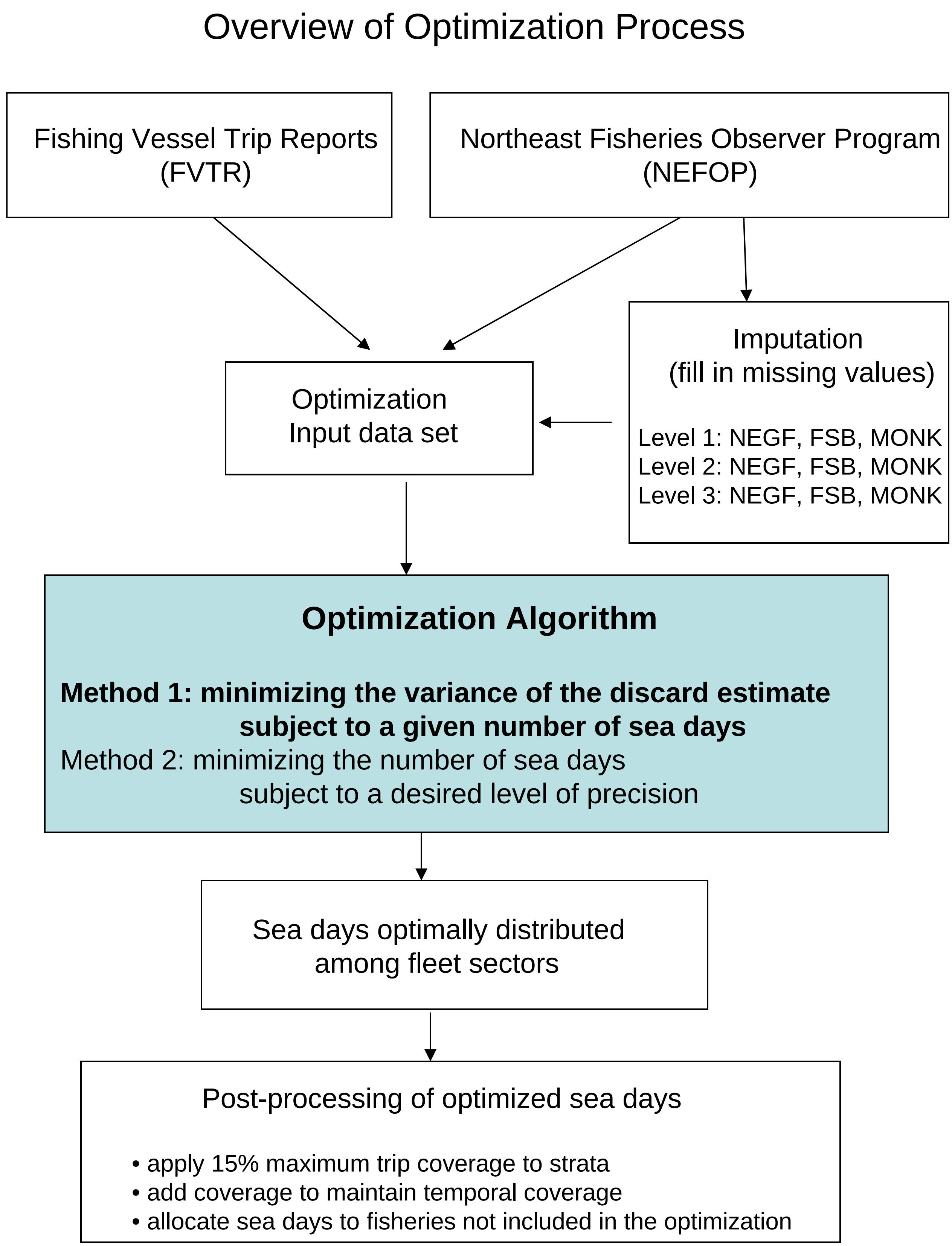


Figure 1. An overview of the optimization process used to allocate sea days to fisheries in the Northeast region.

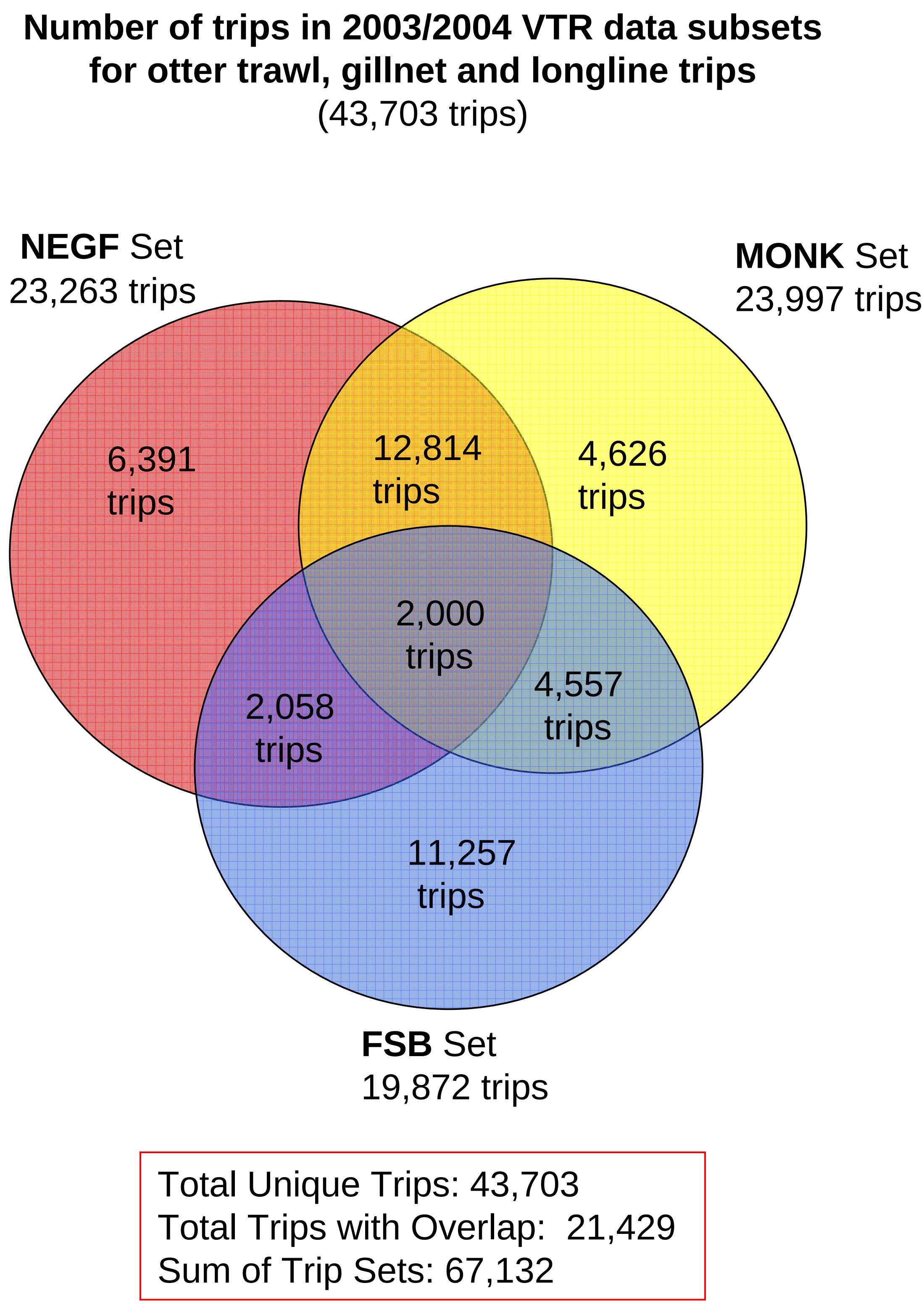
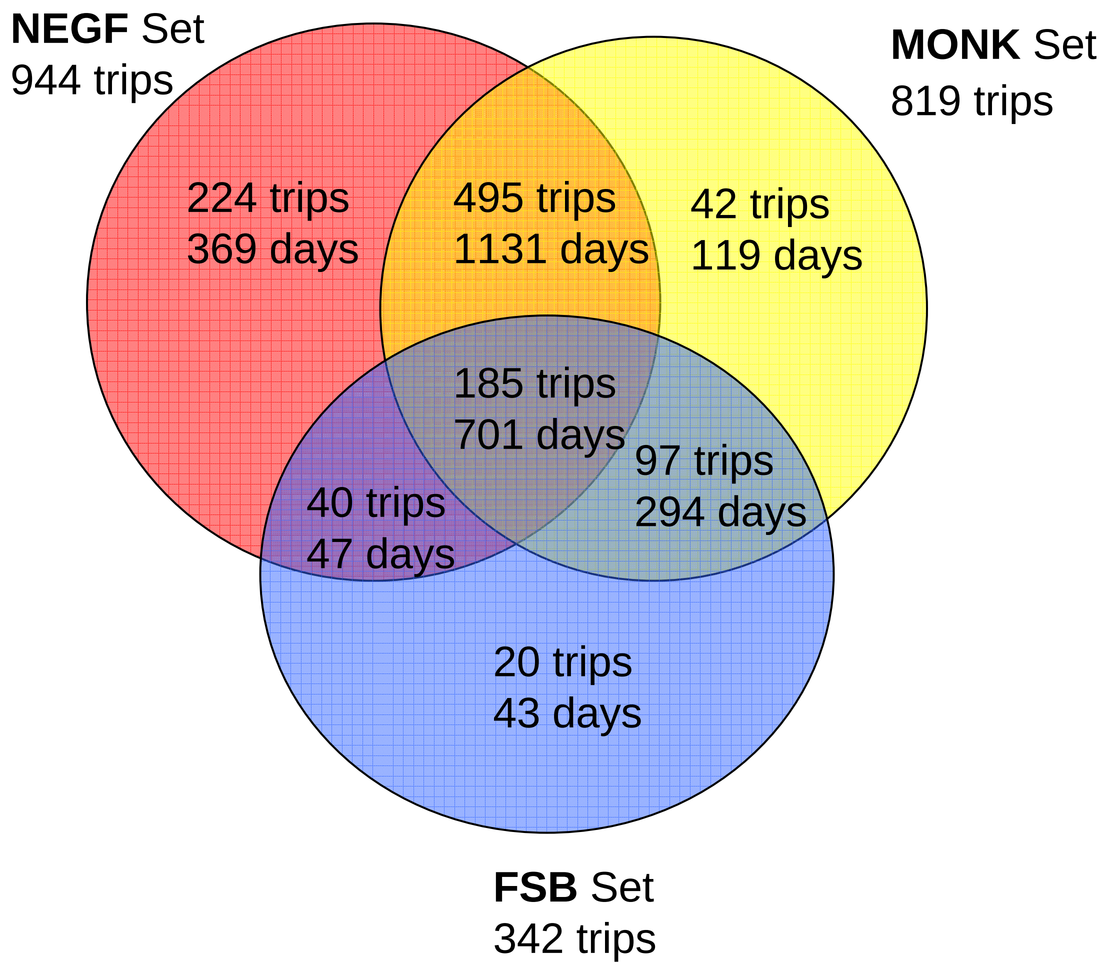


Figure 2. Number of trips in the 2003/2004 Vessel Trip Report (VTR), by data subsets (New England groundfish -NEGF; Monkfish - MONK; and summer flounder, scup and black sea bass - FSB) for otter trawl, gillnet and longline trips.

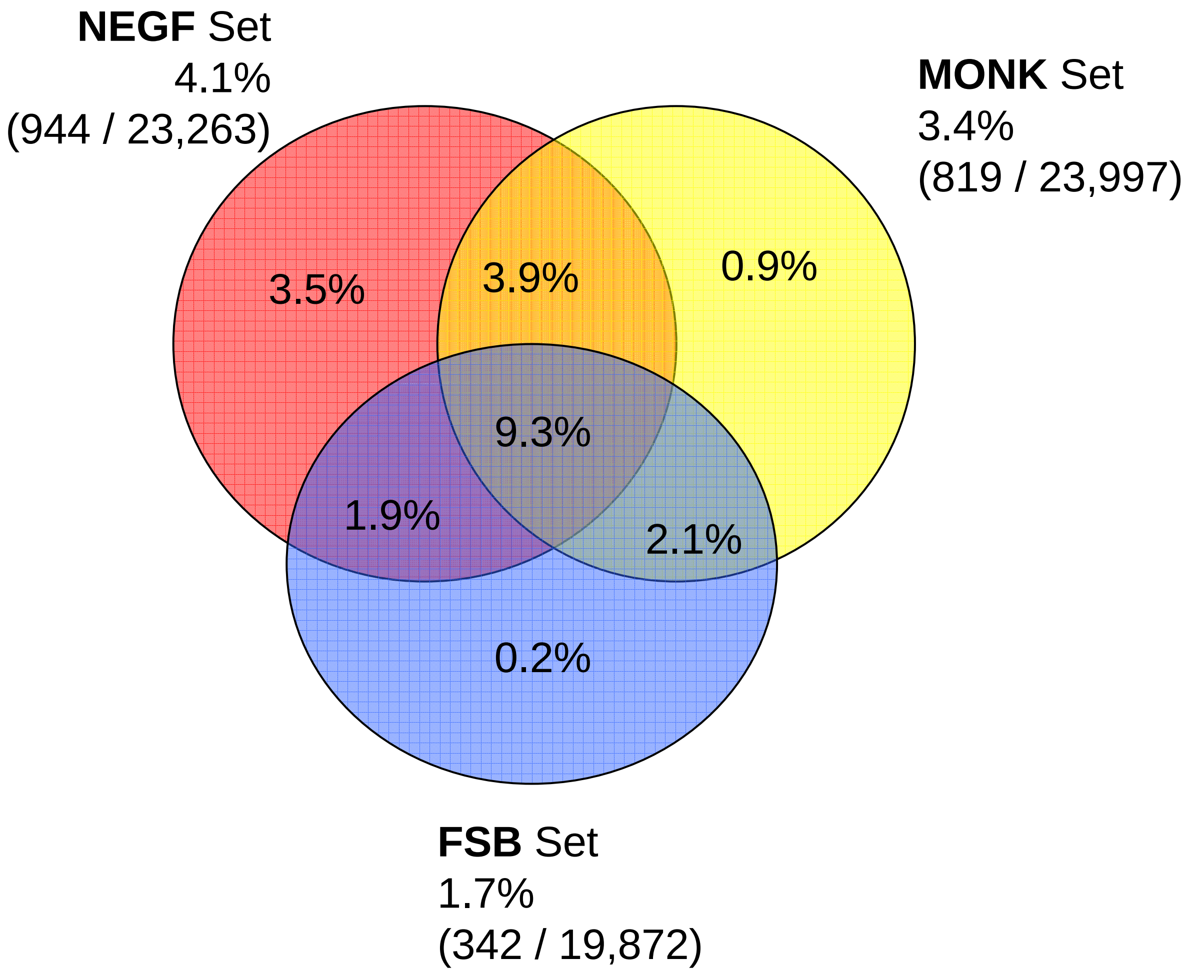
Number of trips and sea days in the 2003/2004 Observer data subsets for otter trawl, gillnet and longline trips
(1,103 trips and 2,704 sea days)



Total Unique Trips: 1,103
Total Trips with Overlap: 817
Sum of Trip Sets: 2,105

Figure 3. Number of trips and sea days in the 2003/2004 Northeast Fisheries Observer Program, by data subsets (New England groundfish - NEFG; Monkfish - MONK; and summer flounder, scup and black sea bass - FSB) for otter trawl, gillnet and longline trips.

Sampling Fraction: 2003/2004 Observer trips/VTR trips for otter trawl, gillnet and longline trips
(43,703 unique trips)



Total Unique Trips: 2.5% (1,103 / 43,703)
Total Trips with Overlap: 3.8% (817/ 21,429)
Sum of Trip Sets: 3.1% (2,105 / 67,132)

Figure 4. The sampling fraction of 2003/2004 Observed trips to Vessel Trip Report trips, by data subset (New England groundfish - NEGF; Monkfish - MONK; and summer flounder, scup and black sea bass - FSB) for otter trawl, gillnet and longline trips.

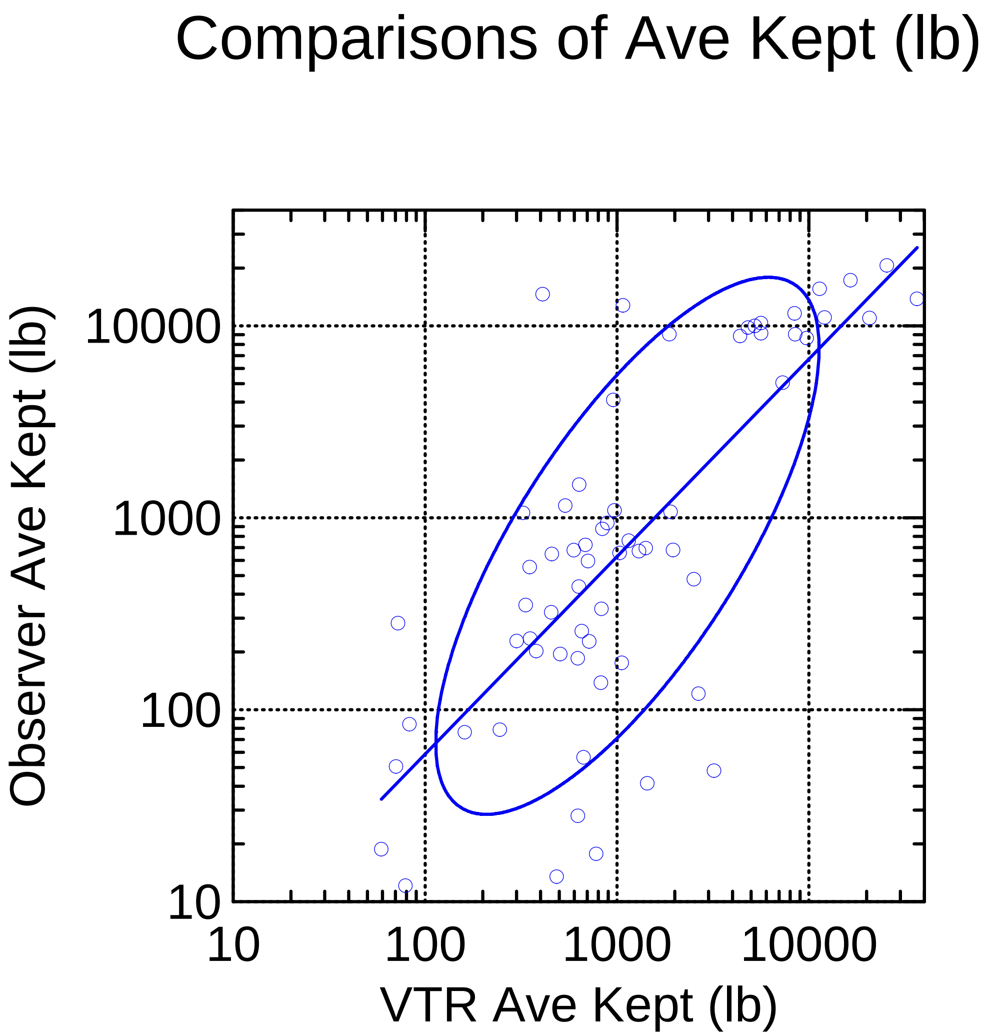
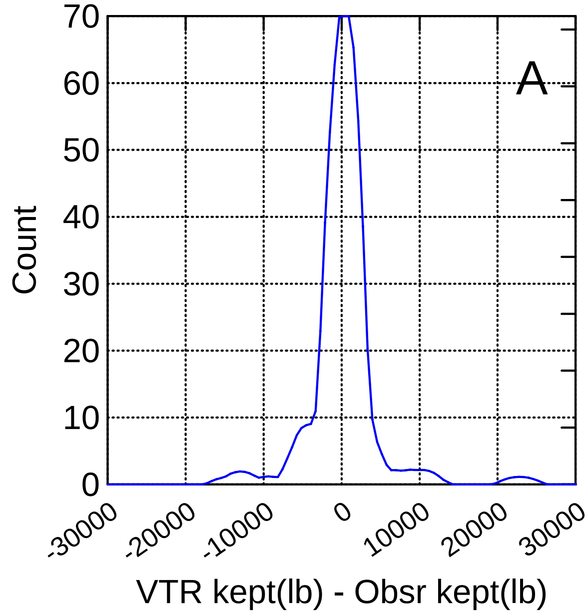


Figure 5. Comparison of average kept pounds of groundfish (natural log scale) in the Northeast Fisheries Observer Program and Vessel Trip Report data sets for 2003/2004. Each point represents the mean of an individual stratum.

VTR vs Obsrvr Ave Kept Comparison



VTR vs Obsrvr SD Kept Comparison

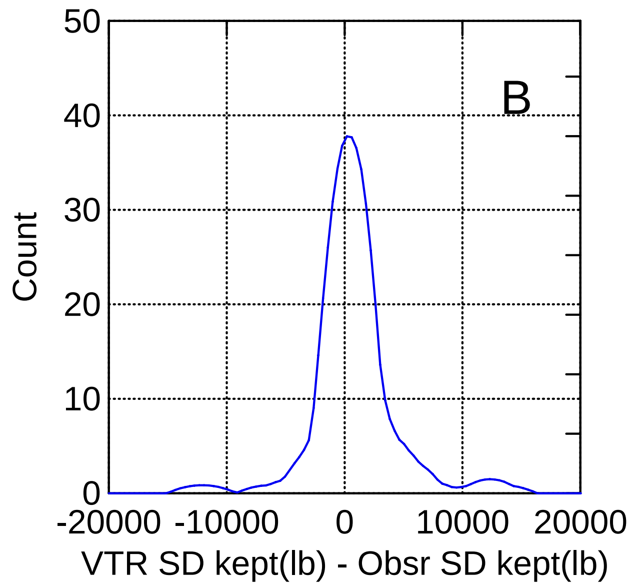


Figure 6. The distribution of differences between the average kept pounds (A) and the standard deviation (SD) of average kept pounds (B) of groundfish in the Northeast Fisheries Observer Program (Obsrvr) and the Vessel Trip Report (VTR) data for 2003/2004. Histograms are non-parametric smooths of the stratum specific differences.

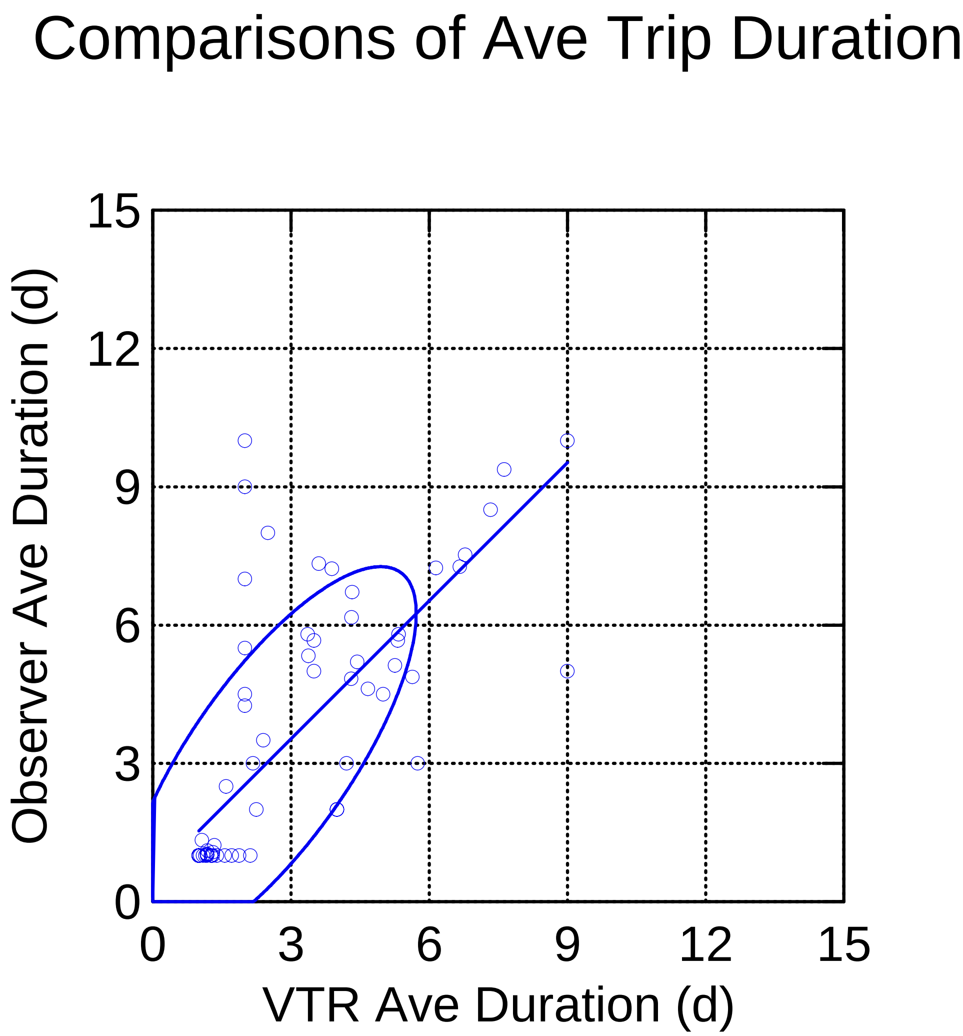


Figure 7. Comparison of average trip duration (in days) for trips that caught groundfish in the Northeast Fisheries Observer Program and Vessel Trip Report (VTR) data sets for 2003/2004. Each point represents the mean of an individual stratum.

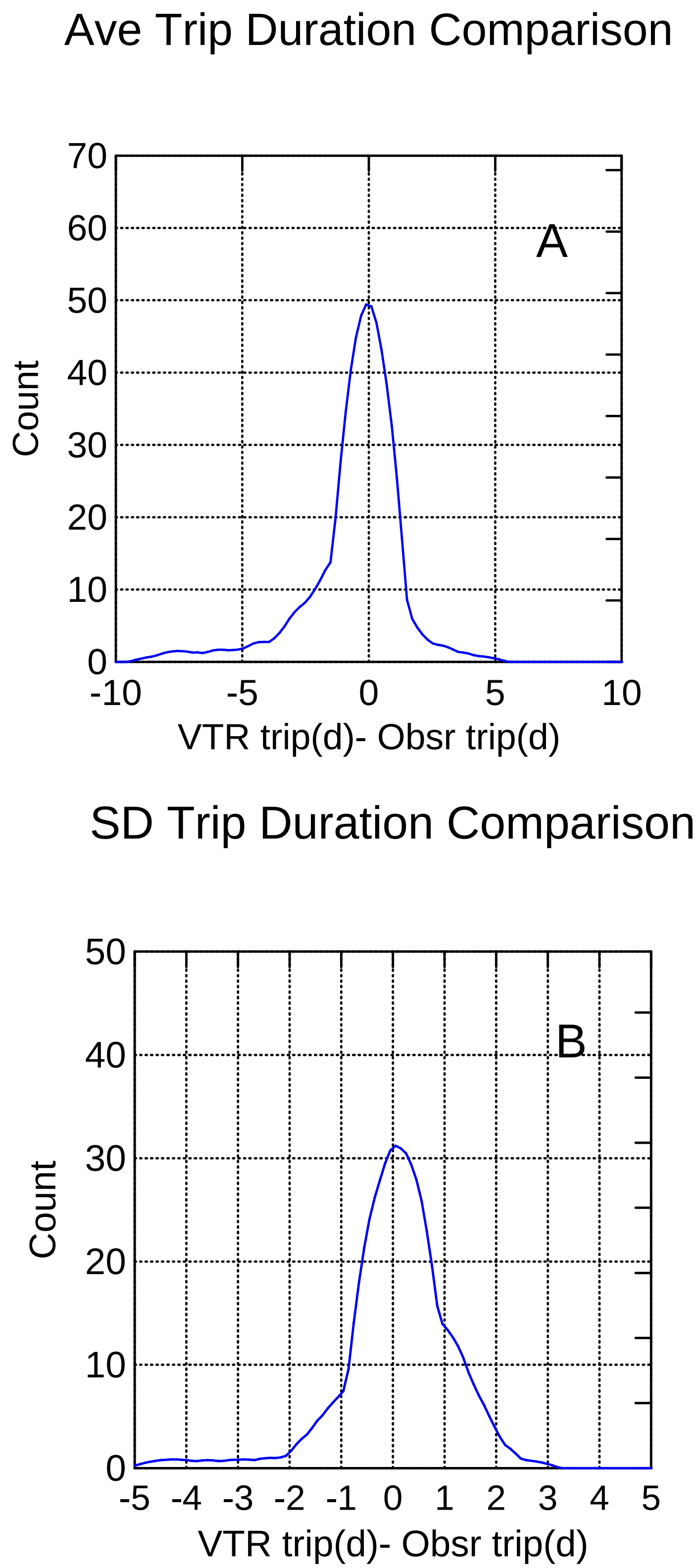


Figure 8. The distribution of differences in average trip duration (in days) (A) and the standard deviation of average trip duration (B) of trips that caught groundfish in the Northeast Fisheries Observer Program (Obsrvr) and the Vessel Trip Report (VTR) data for 2003/2004. Histograms are non-parametric smooths of the stratum specific differences.

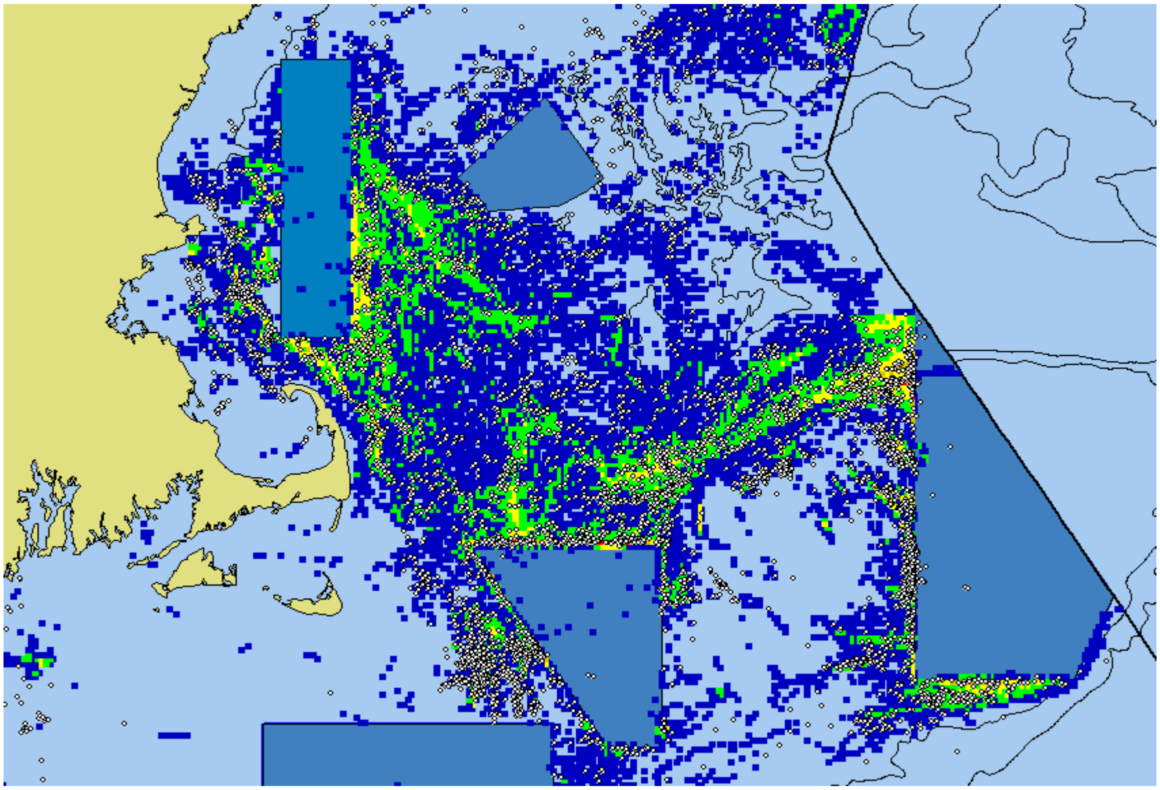


Figure 9. Locations of otter trawl fishing effort (color squares) in 2003 from vessels using VMS (vessel monitoring systems). Locations are plotted only for vessels speeds <= 3.5 knots and data are aggregated to 1' square. Blue squares represent 1-8 hours, green 9 – 25 hours; yellow 26-63 hours; orange 64 – 145 hours, and red 146 – 309 hours. Observed otter trawl tows (white circles) in 2003. Locations are the starting positions of each tow. Taken from Murawski et al. (article in press).

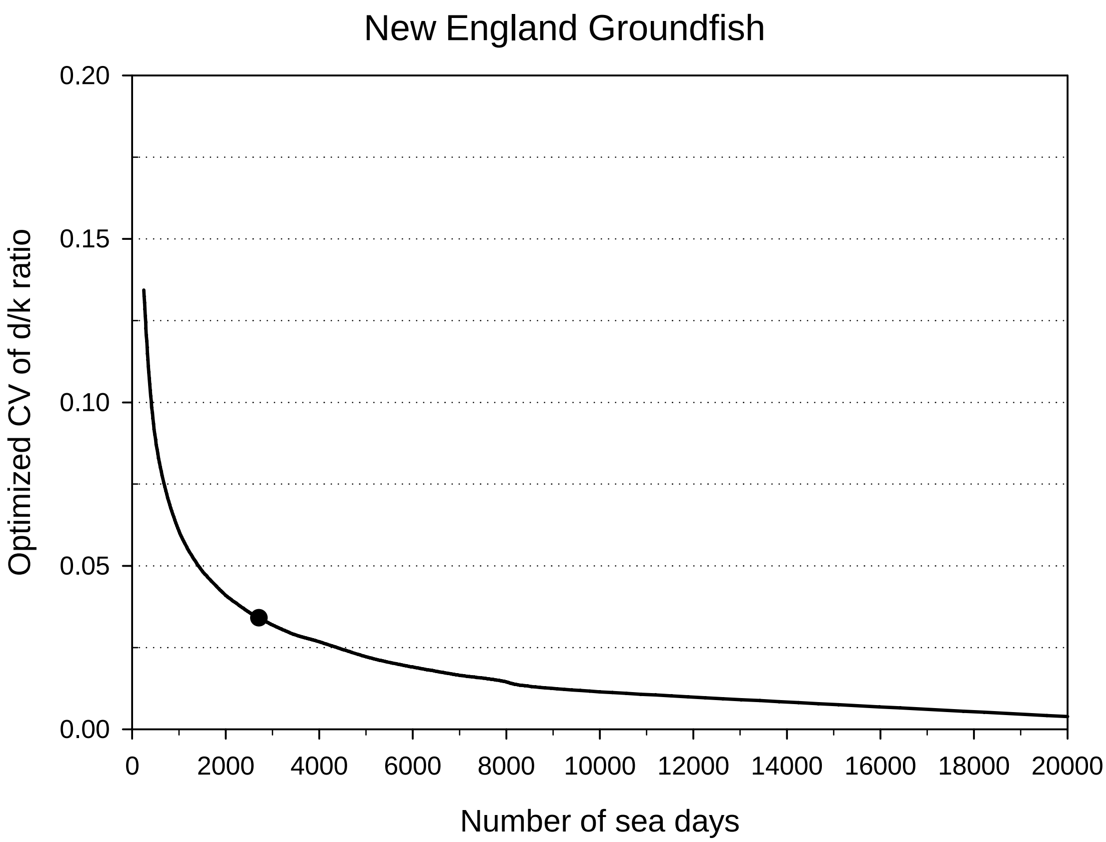


Figure 10. The optimized coefficient of variation (CV) of the discard to kept ratio (d/k) for New England groundfish over a range of sea days; 2,708 sea days (solid circle) are allocated to cover New England groundfish fisheries in 2005.

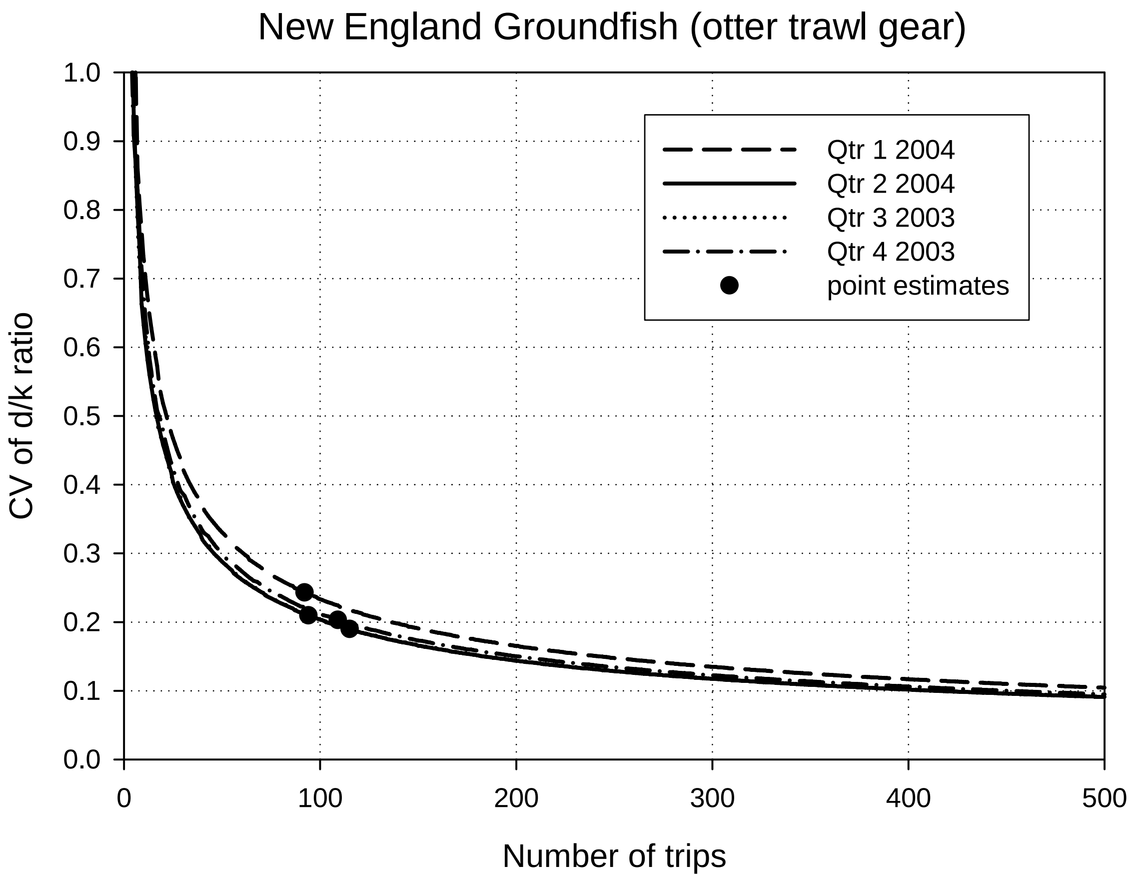


Figure 11. The 2003/2004 point estimates of the coefficient of variation (CV) of the discard to kept (d/k) ratio for New England groundfish caught with otter trawl gear, and the expected coefficient of variation of the discard to kept ratio over a range of sample sizes (number of trips).

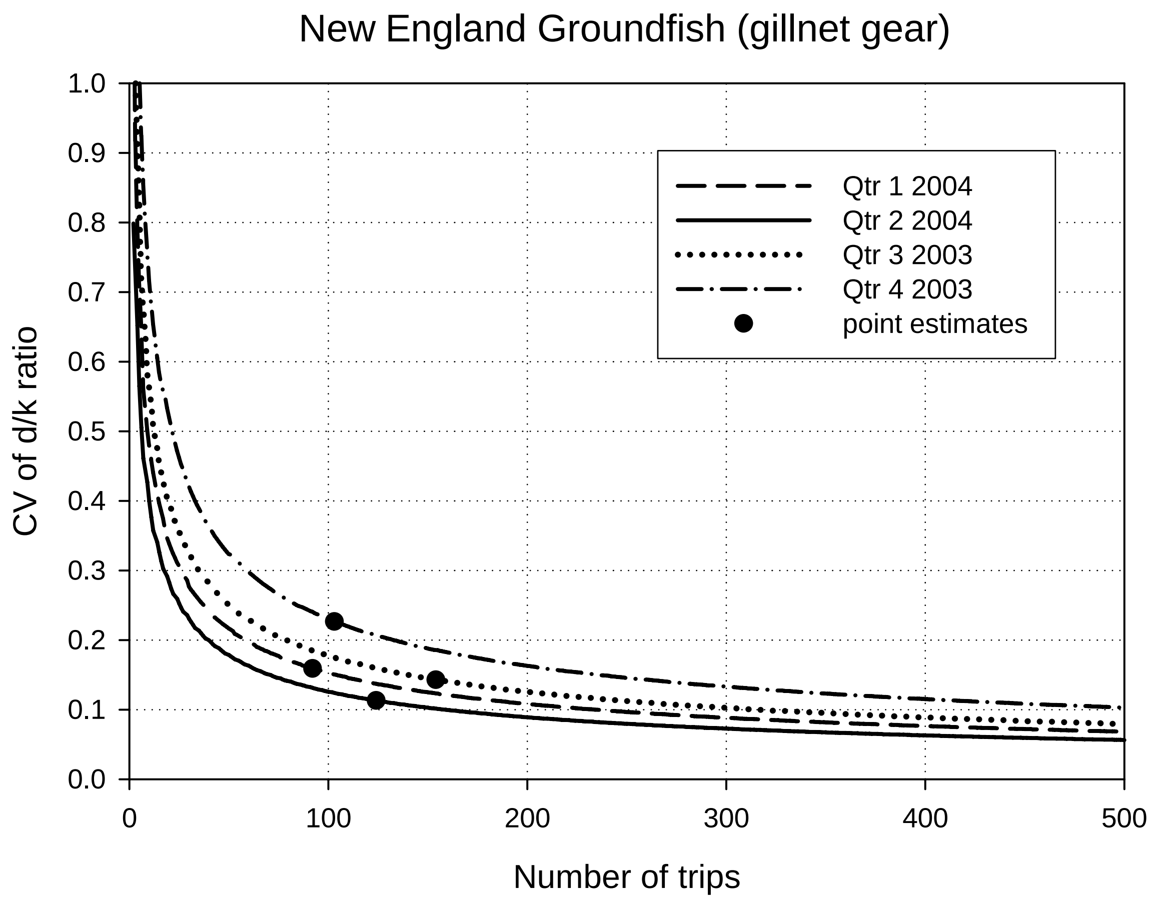


Figure 12. The 2003/2004 point estimates of the coefficient of variation (CV) of the discard to kept (d/k) ratio for New England groundfish caught with gillnet gear, and the expected coefficient of variation of the discard to kept ratio over a range of sample sizes (number of trips).

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Appendix B
Detailed Tables and Figures from Chapter 5

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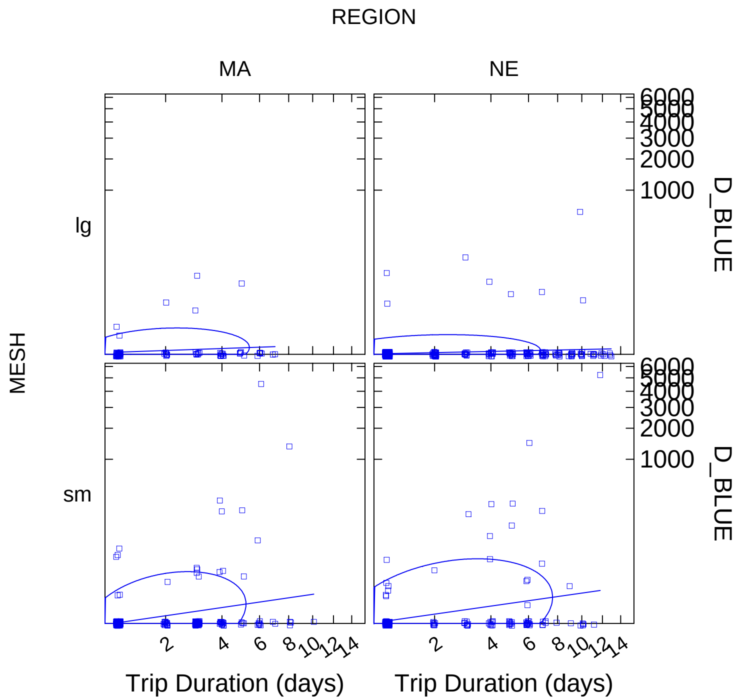


Figure B-1a. Comparison of bluefish discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

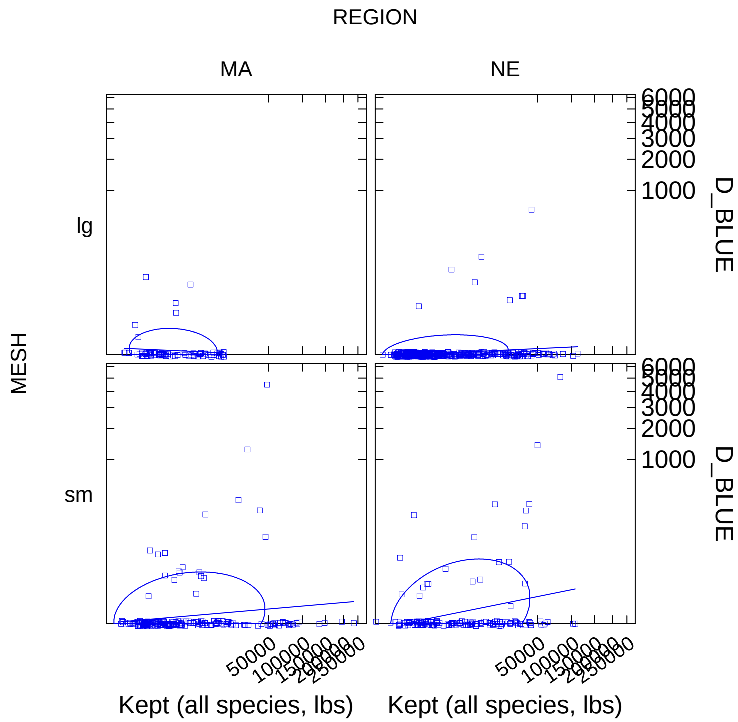


Figure B-1b. Comparison of bluefish discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

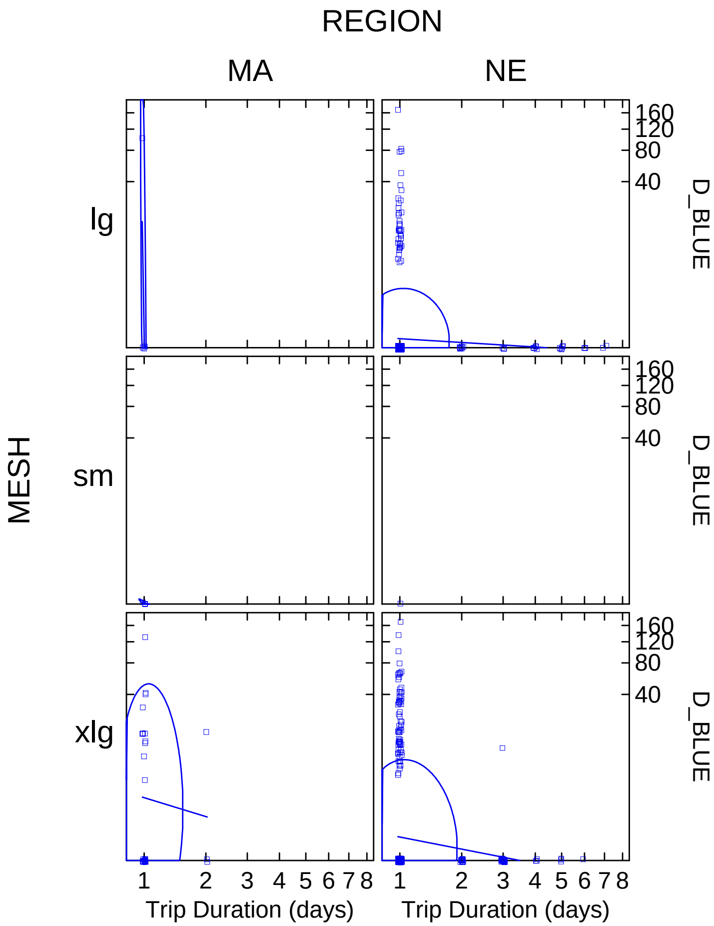


Figure B-1c. Comparison of bluefish discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

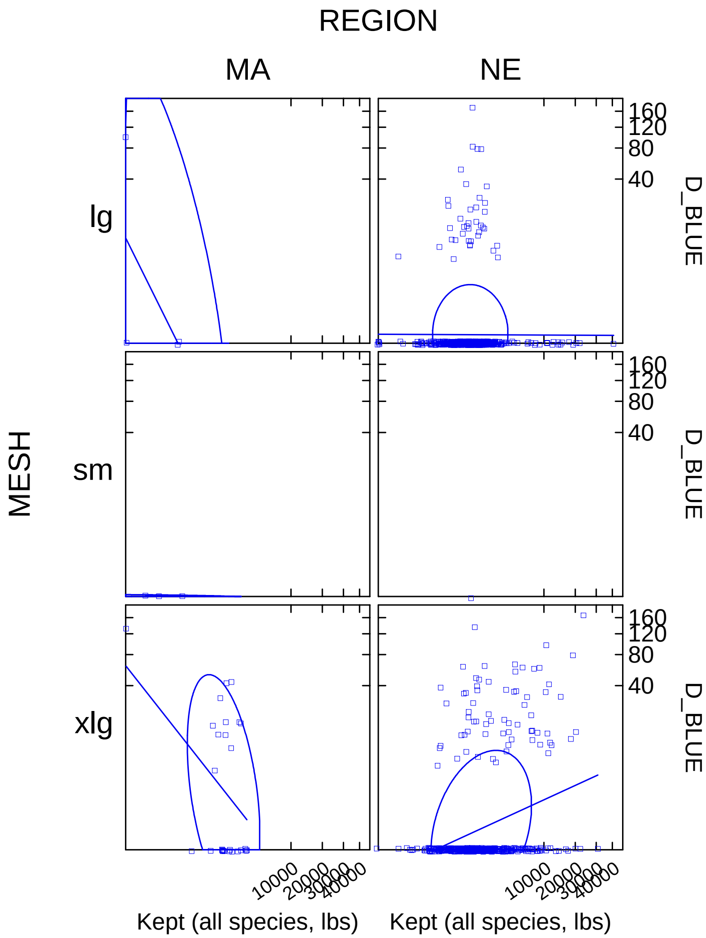


Figure B-1d. Comparison of bluefish discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

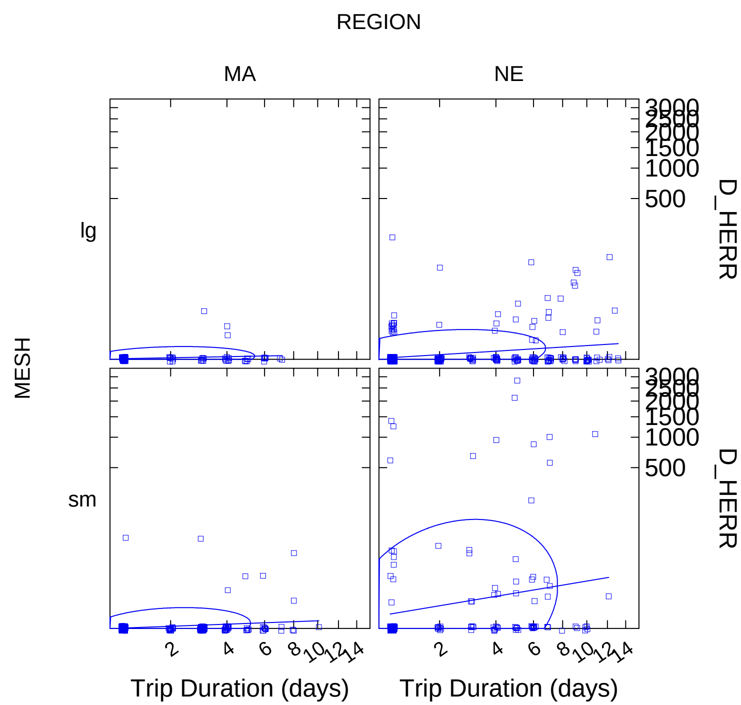


Figure B-1e. Comparison of herring discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

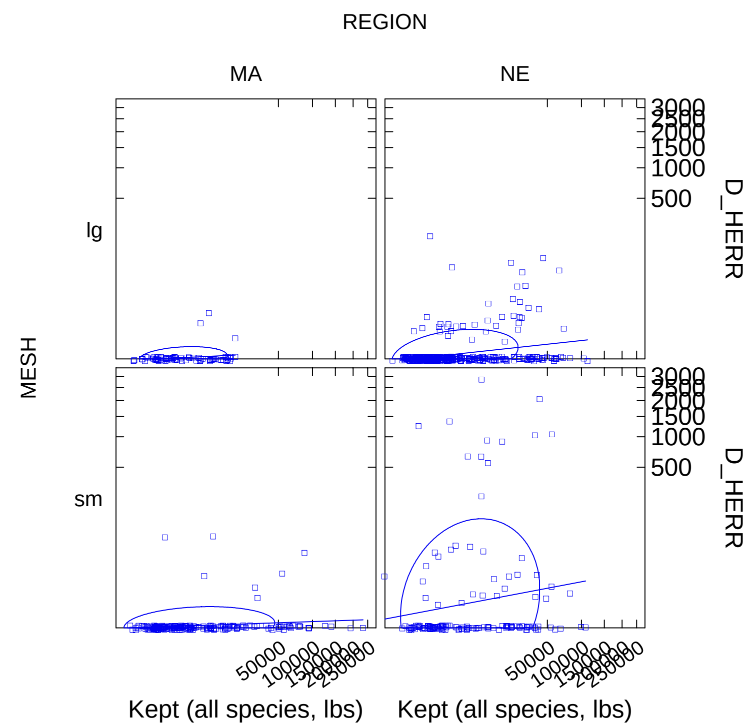


Figure B-1f. Comparison of herring discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

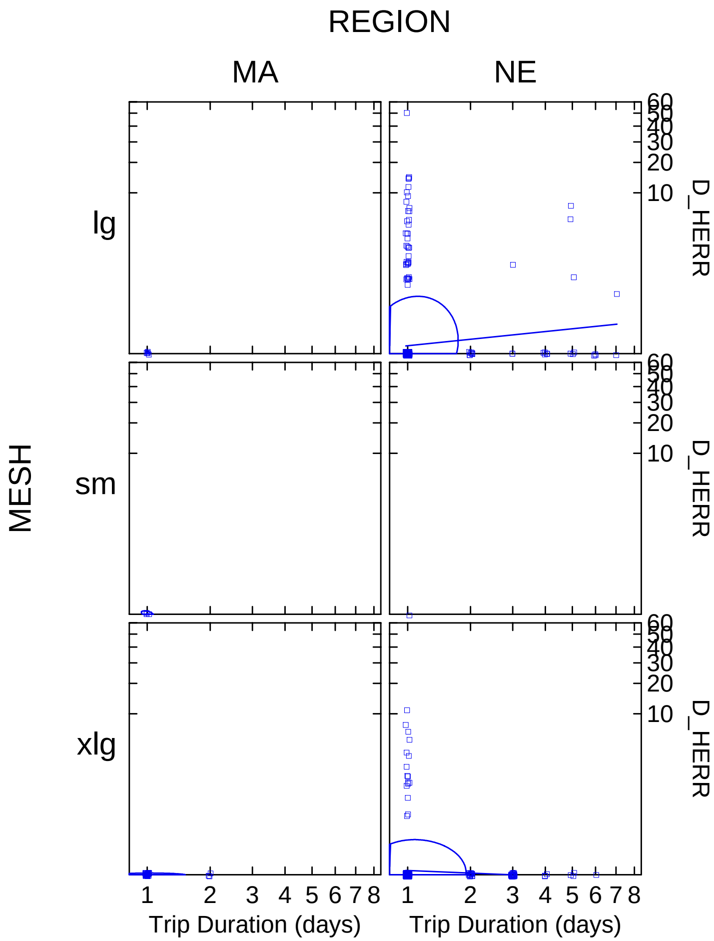


Figure B-1g. Comparison of herring discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

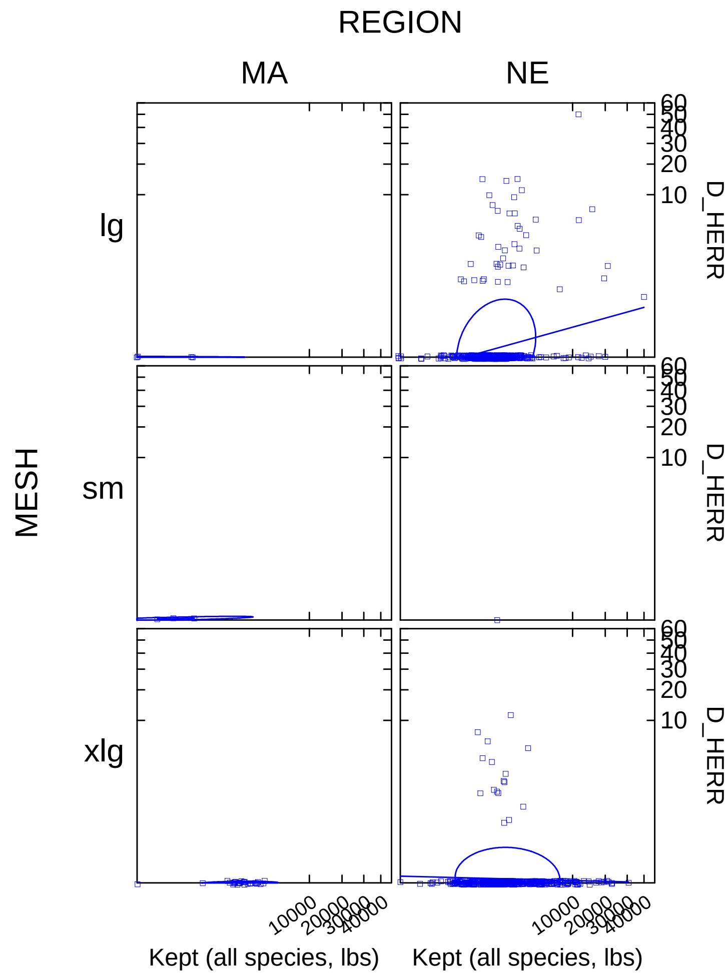


Figure B-1h. Comparison of herring discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

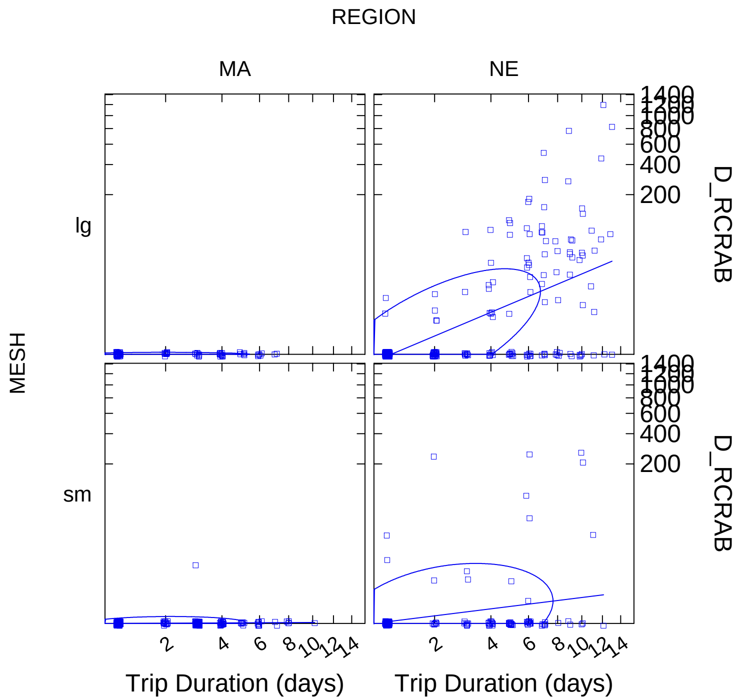


Figure B-1i. Comparison of red crab discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

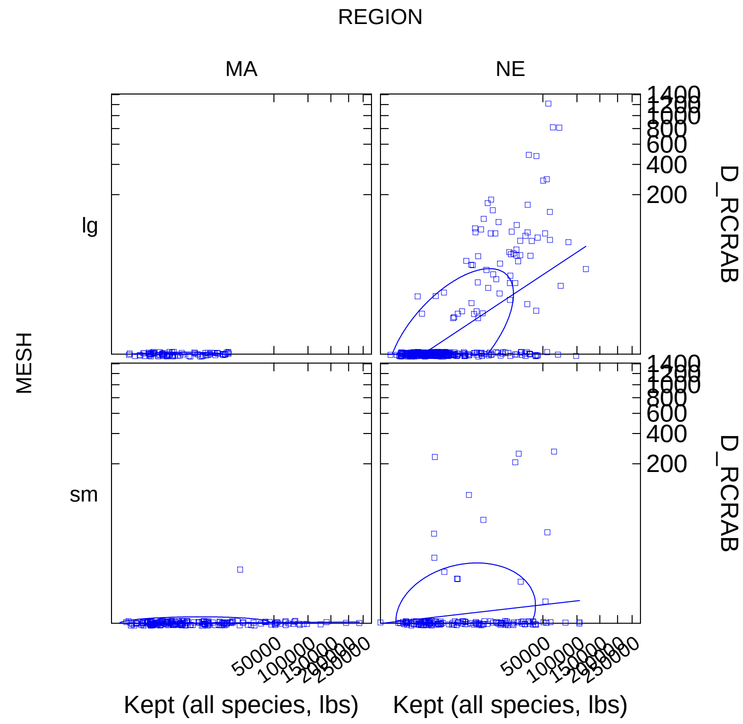


Figure B-1j. Comparison of red crab discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

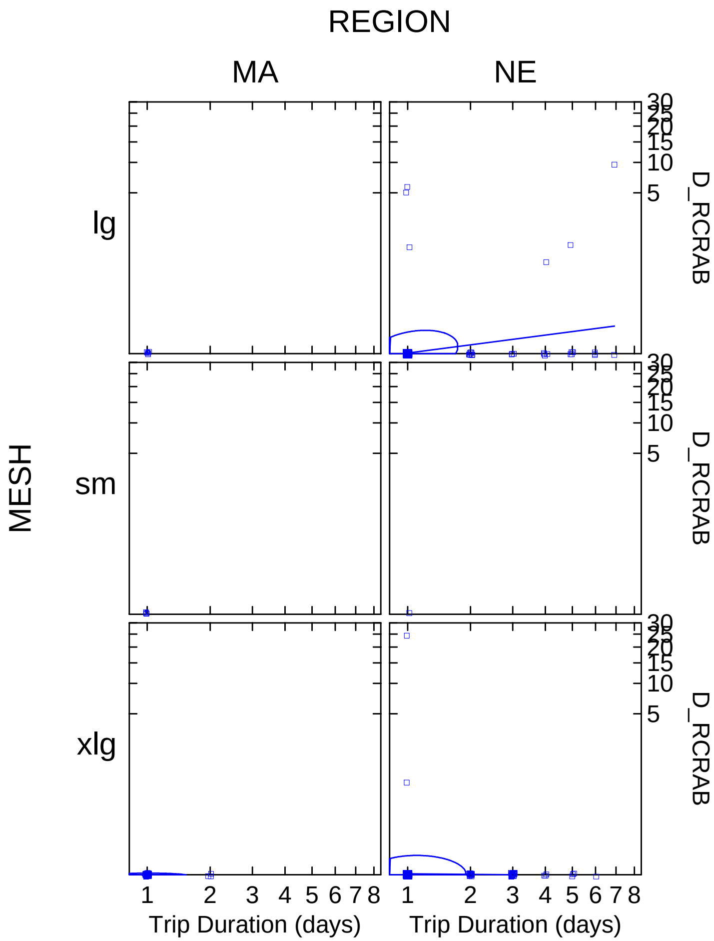


Figure B-1k. Comparison of red crab discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

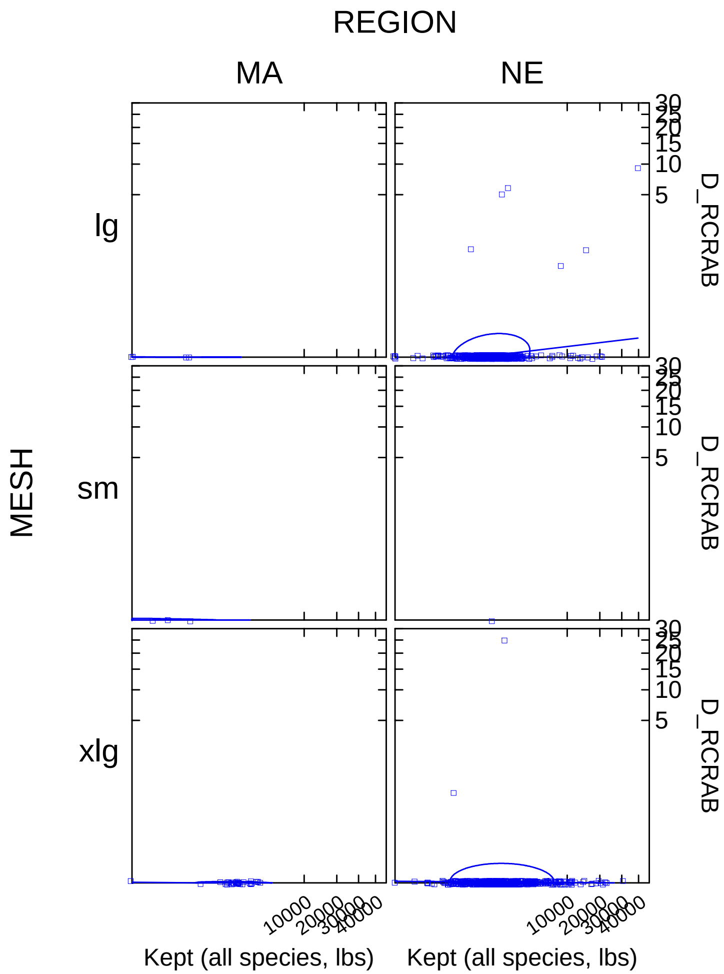


Figure B-1l. Comparison of red crab discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

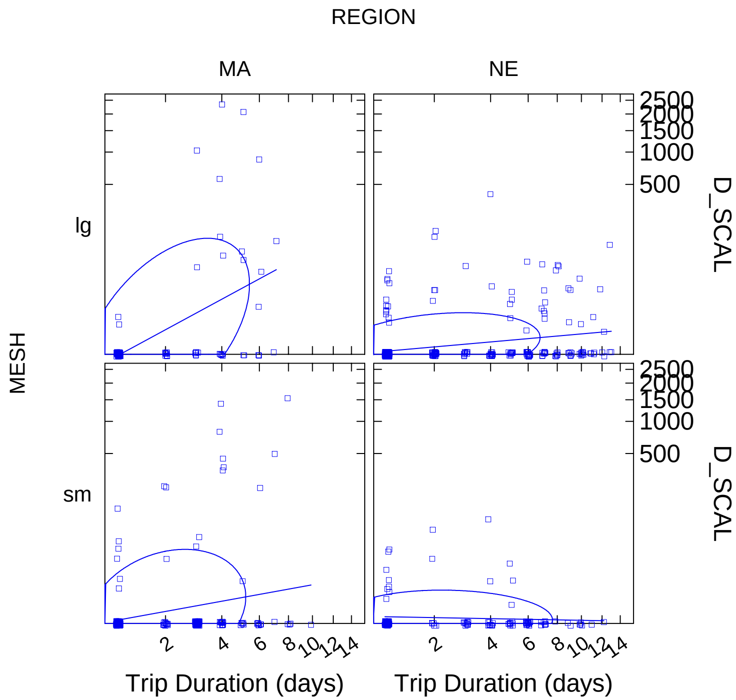


Figure B-1m. Comparison of scallop discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

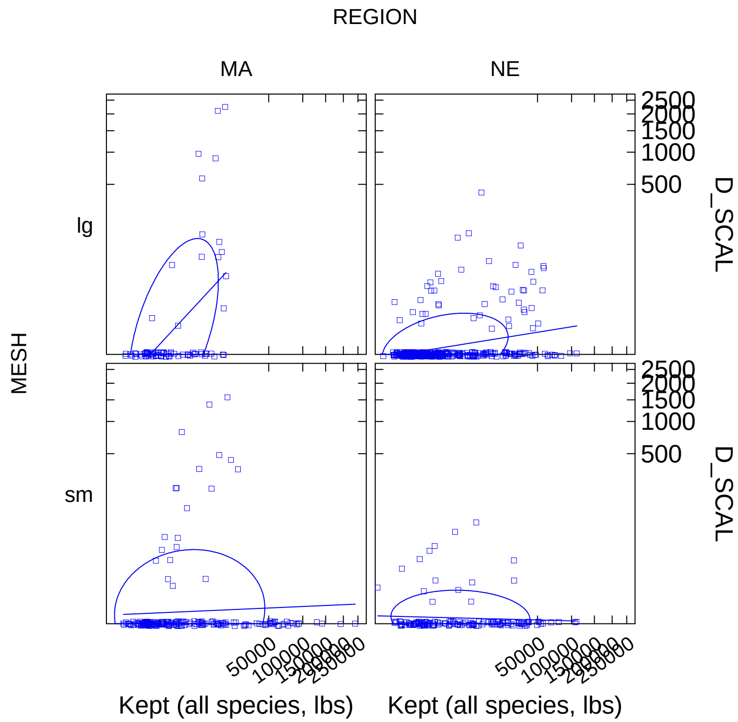


Figure B-1n. Comparison of scallop discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

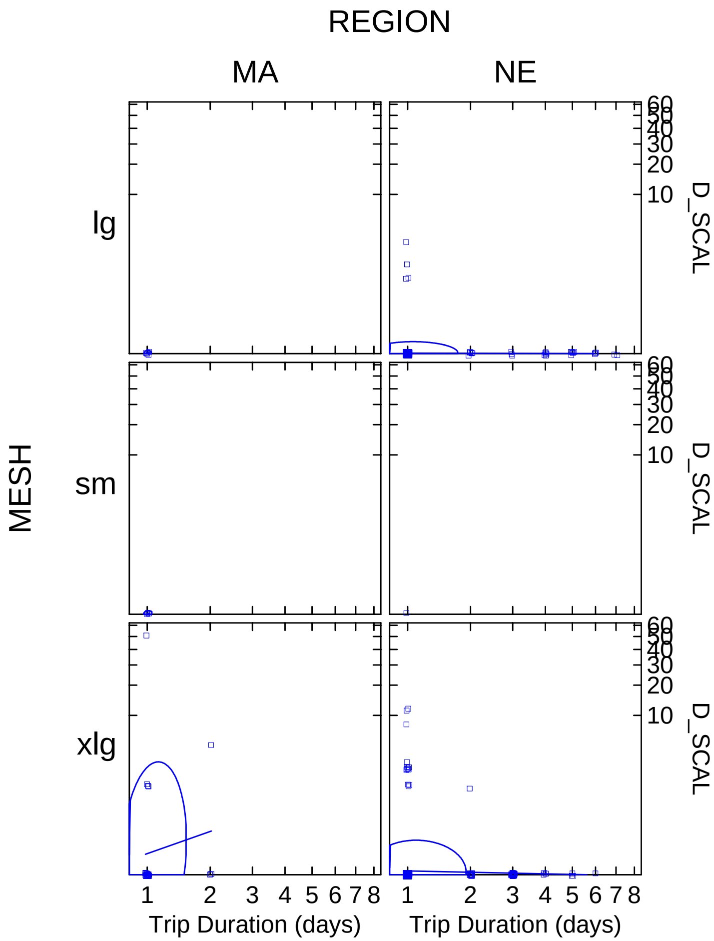


Figure B-1o. Comparison of scallop discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

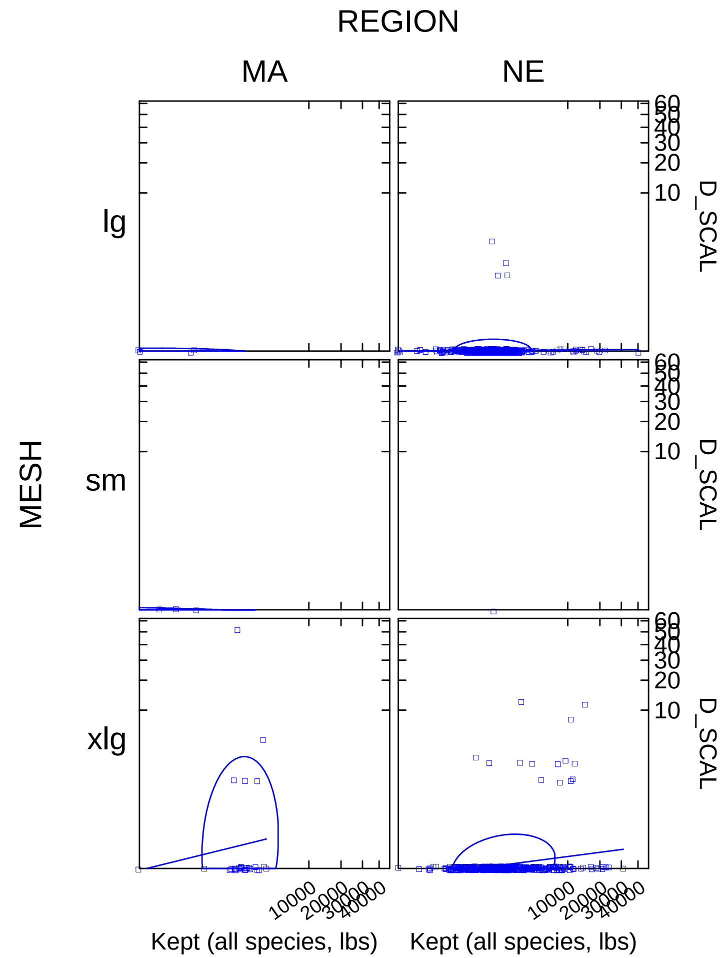


Figure B-1p. Comparison of scallop discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

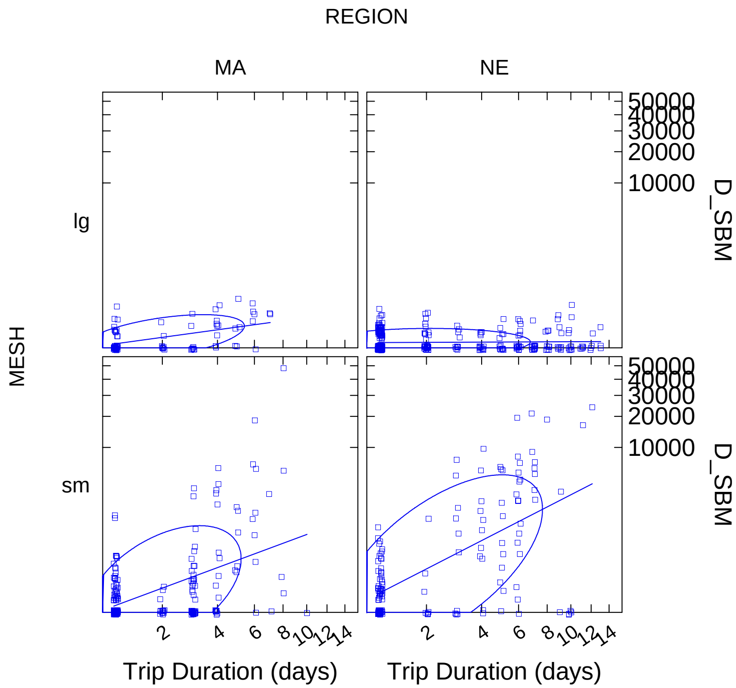


Figure B-1q. Comparison of squid-butterfish-mackerel discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

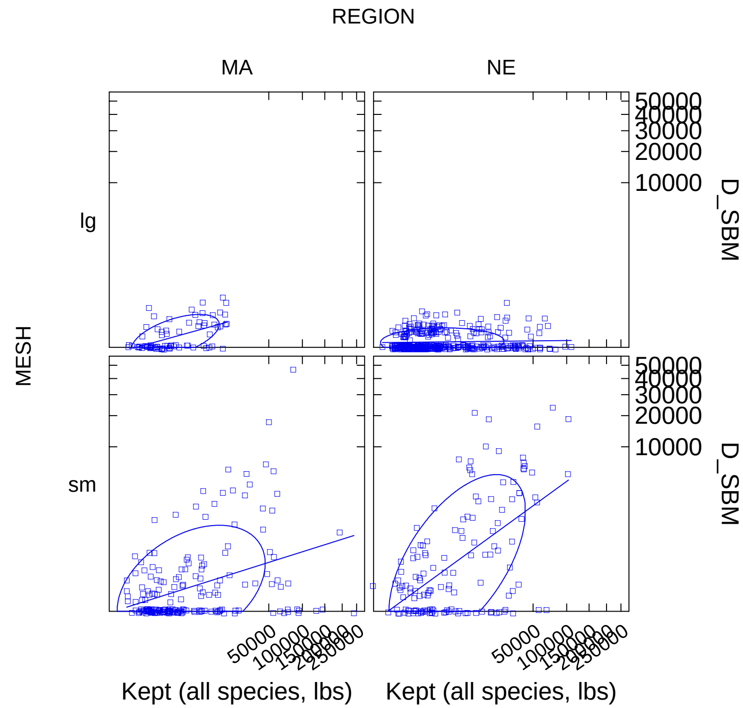


Figure B-1r. Comparison of squid-butterfish-mackerel discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

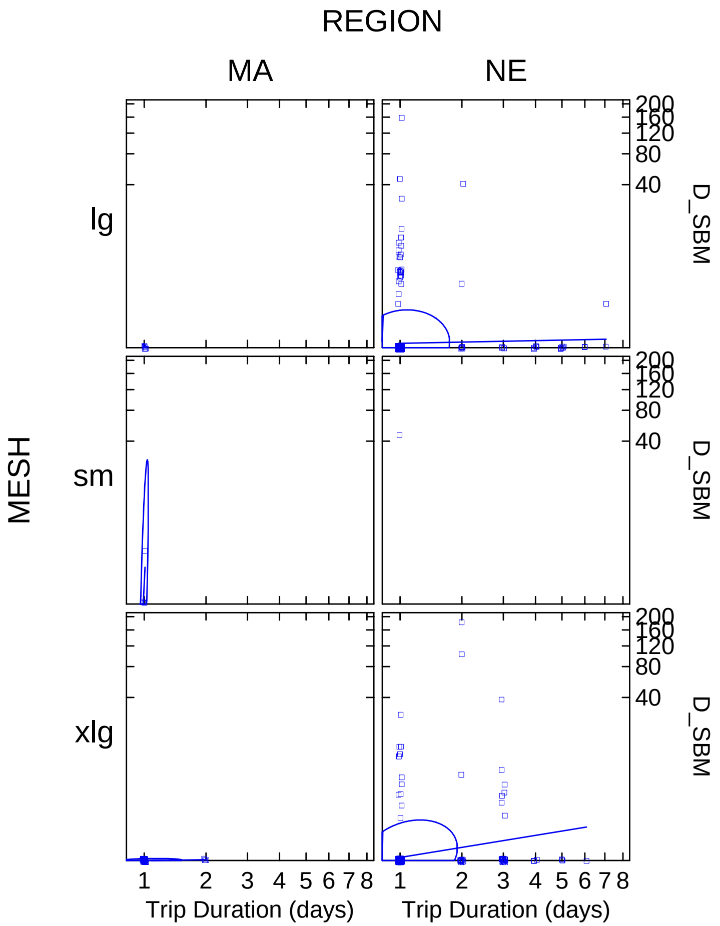


Figure B-1s. Comparison of squid-butterfish-mackerel discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

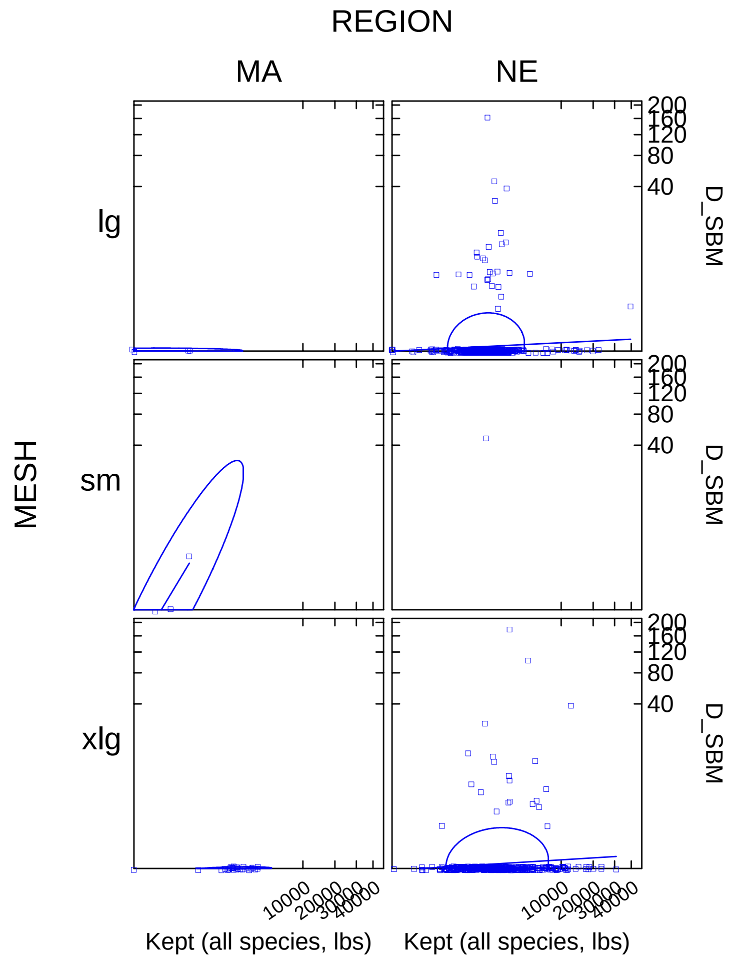


Figure B-1t. Comparison of squid-butterfish-mackerel discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

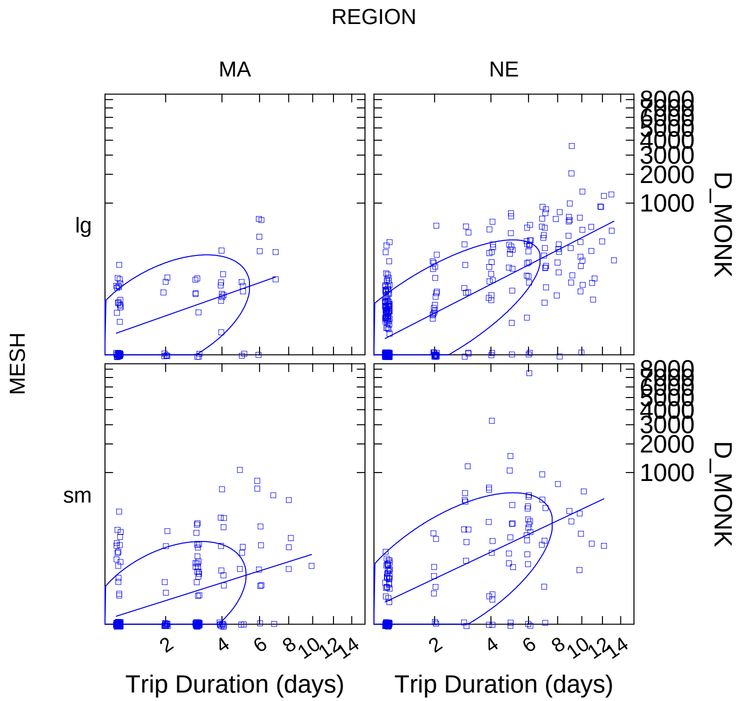


Figure B-1u. Comparison of monkfish discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

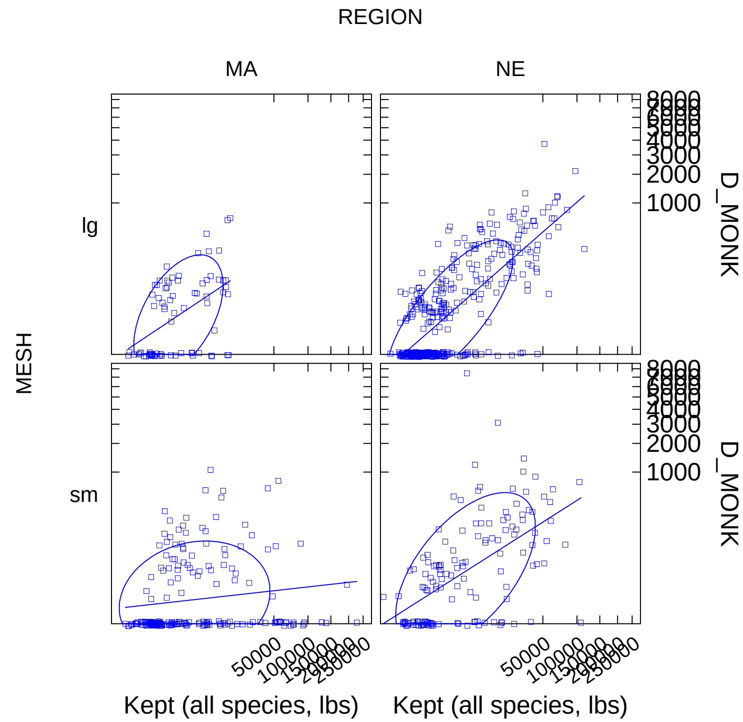


Figure B-1v. Comparison of monkfish discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches)); fourth root transformation used, each dot represents a trip.

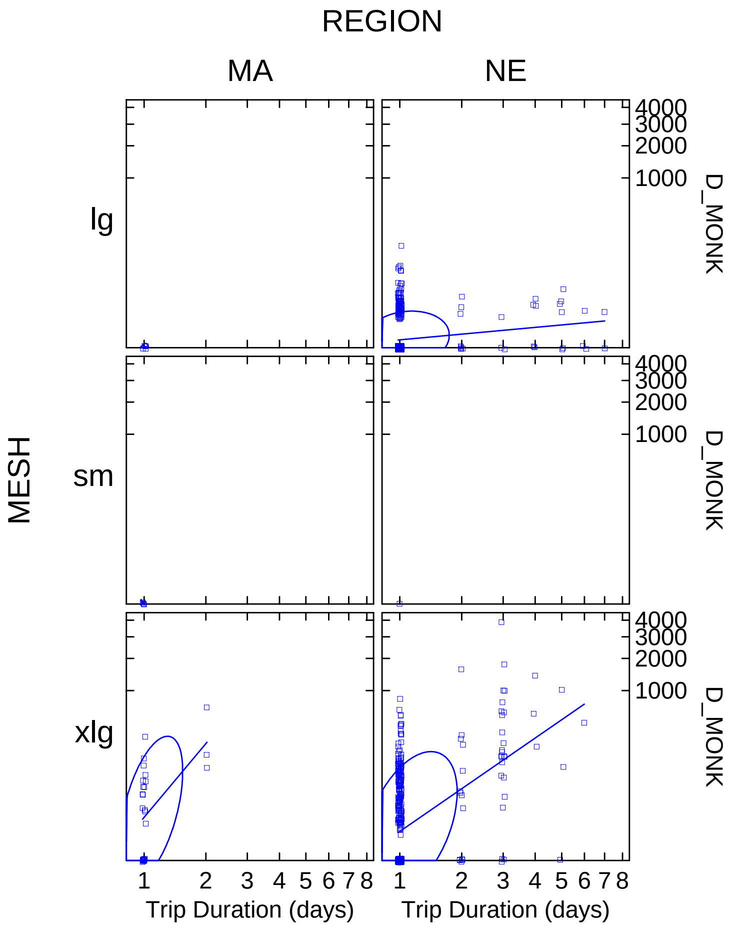


Figure B-1w. Comparison of monkfish discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

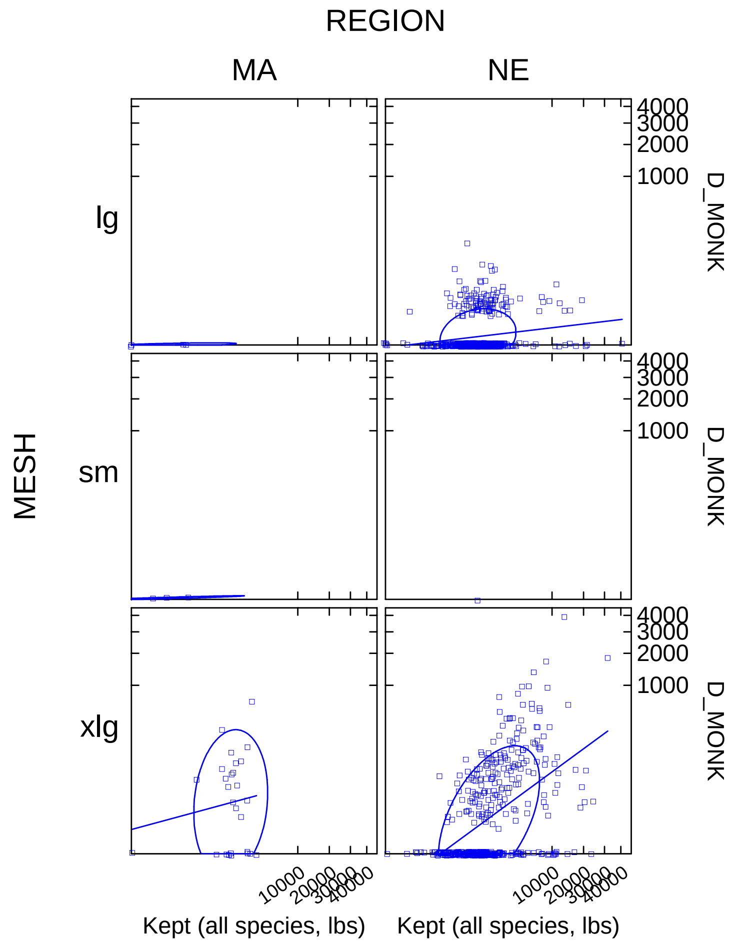


Figure B-1x. Comparison of monkfish discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

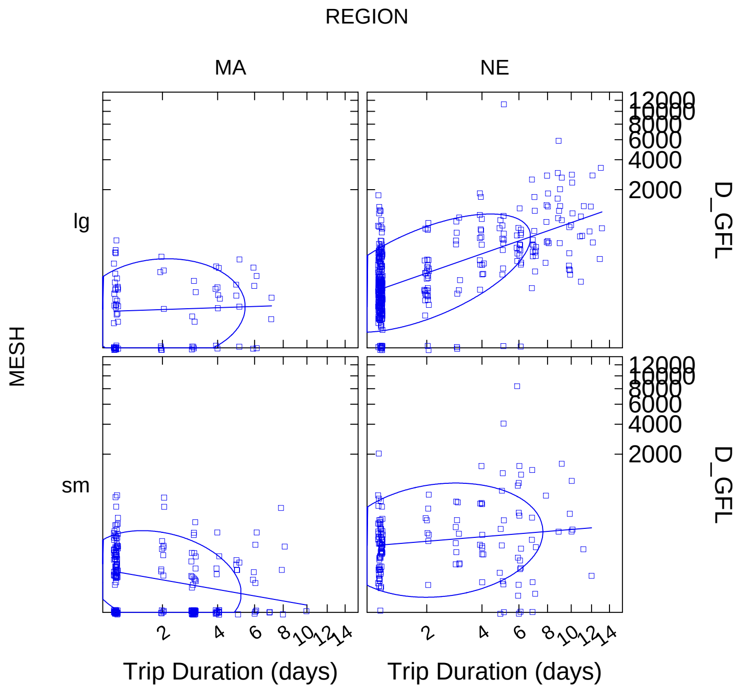


Figure B-1y. Comparison of Northeast multispecies (large-mesh) discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

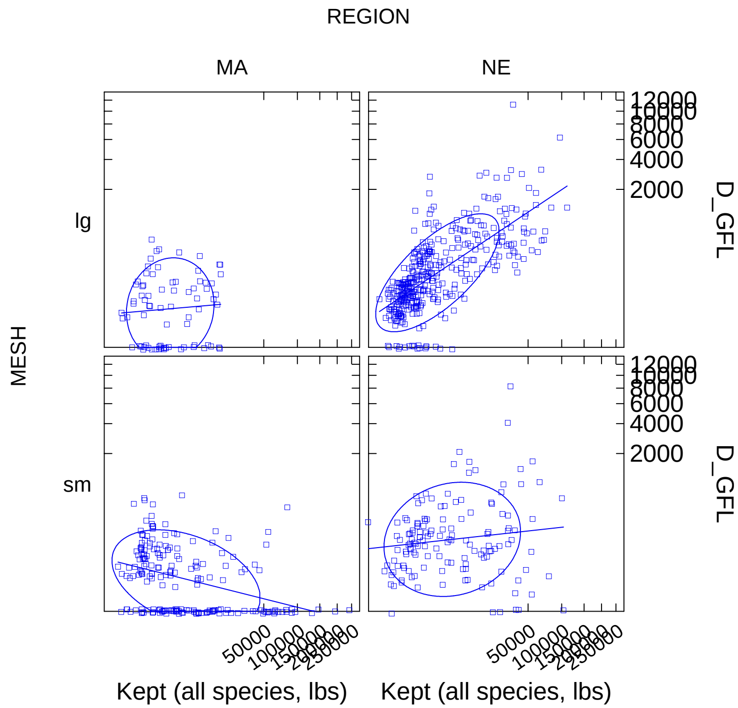


Figure B-1z. Comparison of Northeast multispecies (large-mesh) discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

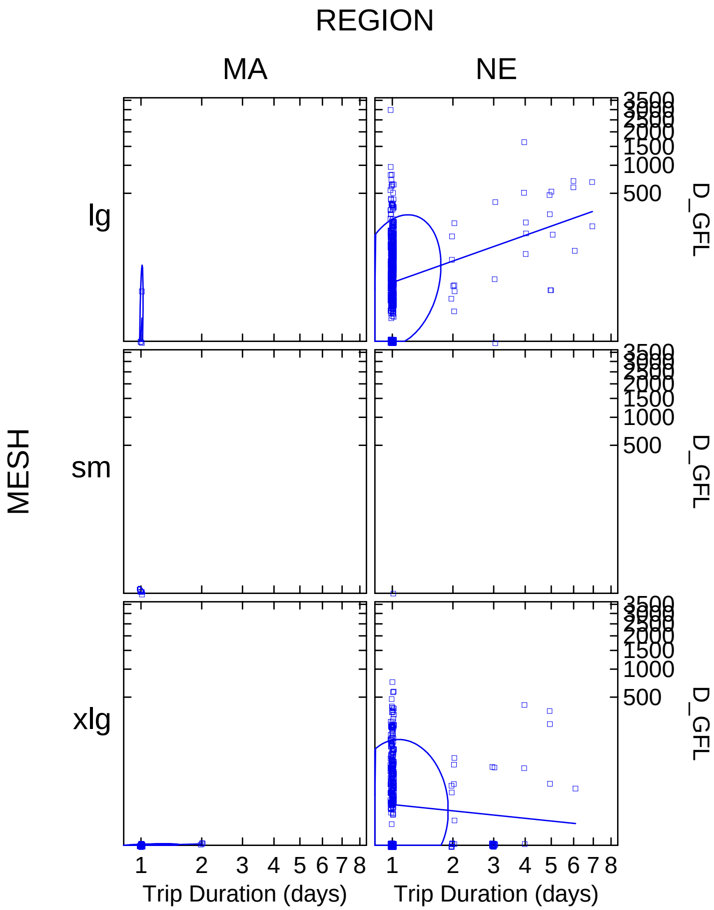


Figure B-1aa. Comparison of Northeast multispecies (large-mesh) discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

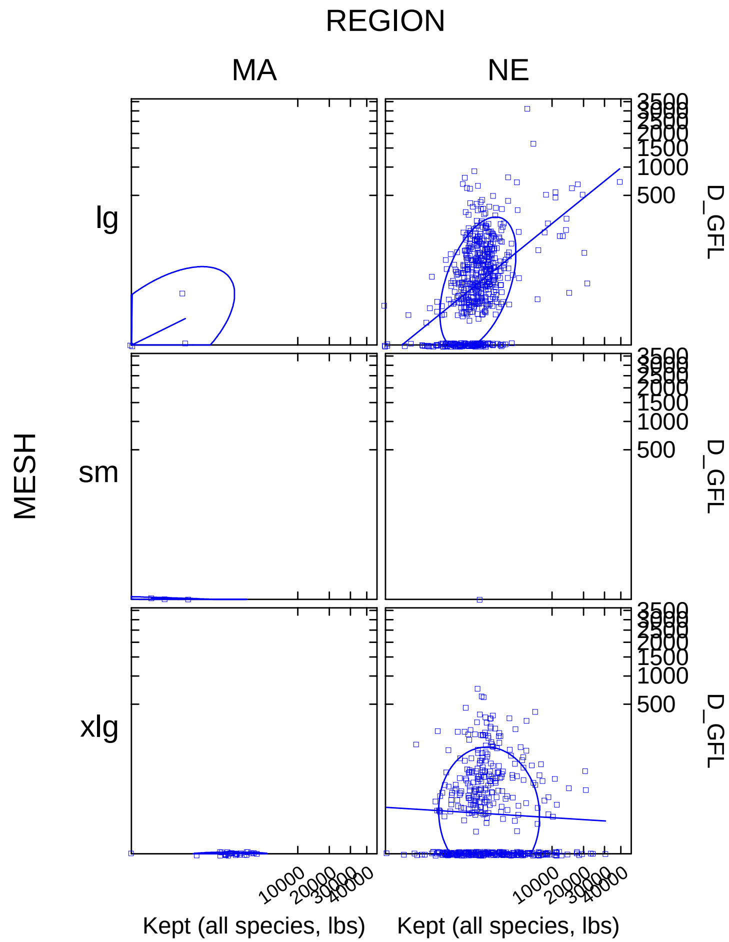


Figure B-1bb. Comparison of Northeast multispecies (large-mesh) discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

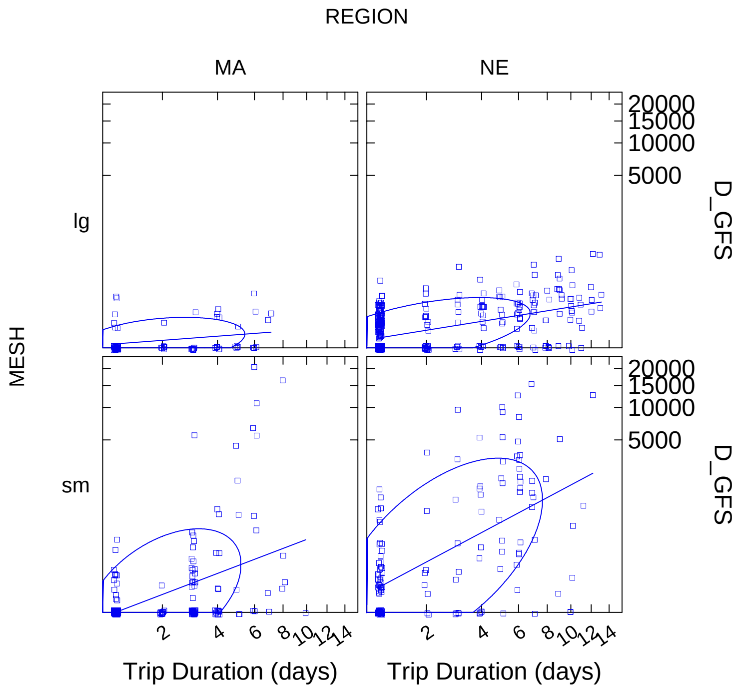


Figure B-1cc. Comparison of Northeast multispecies (small-mesh) discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

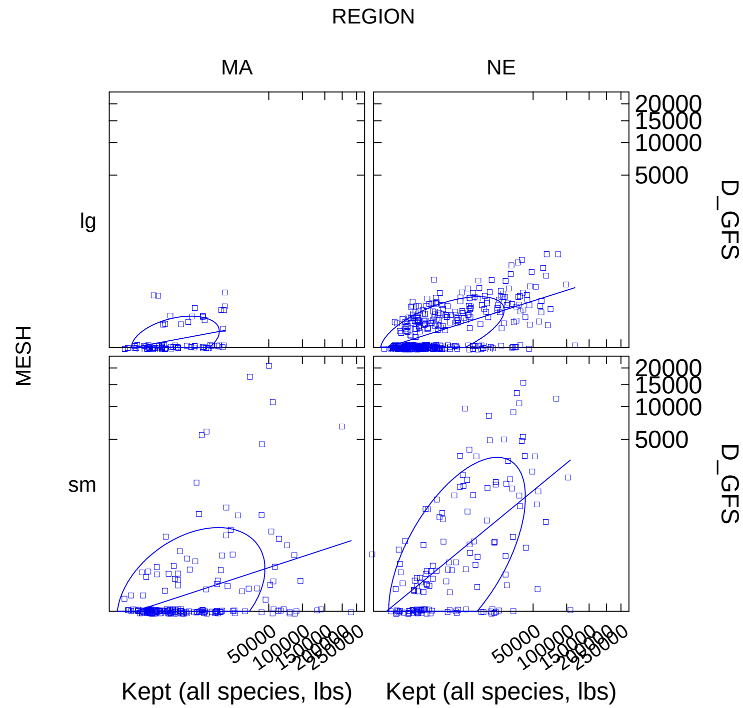


Figure B-1dd. Comparison of Northeast multispecies (small-mesh) discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

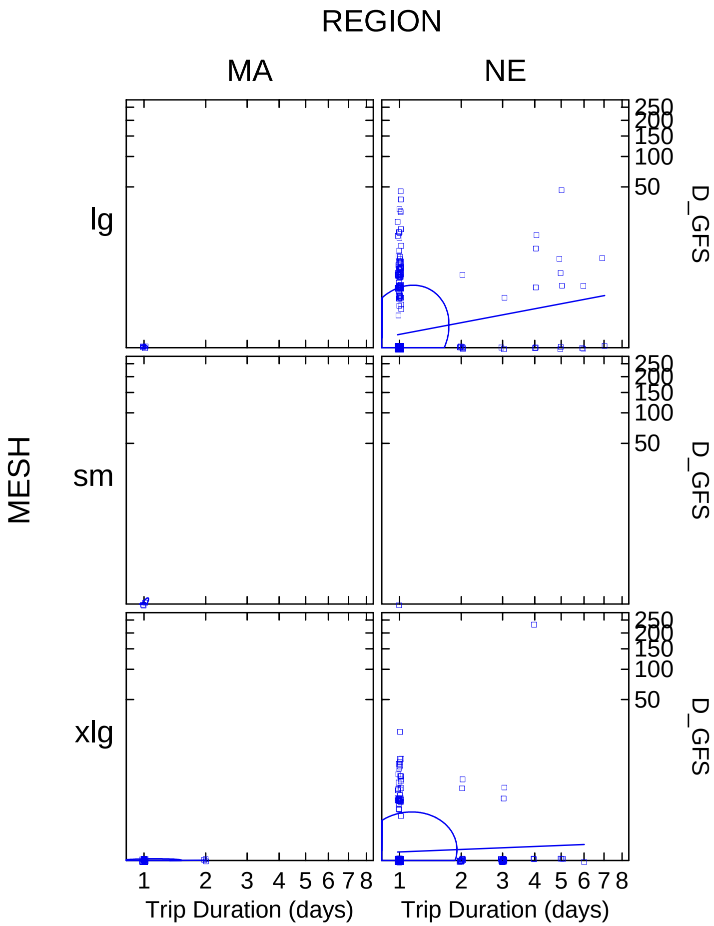


Figure B-1ee. Comparison of Northeast multispecies (small-mesh) discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

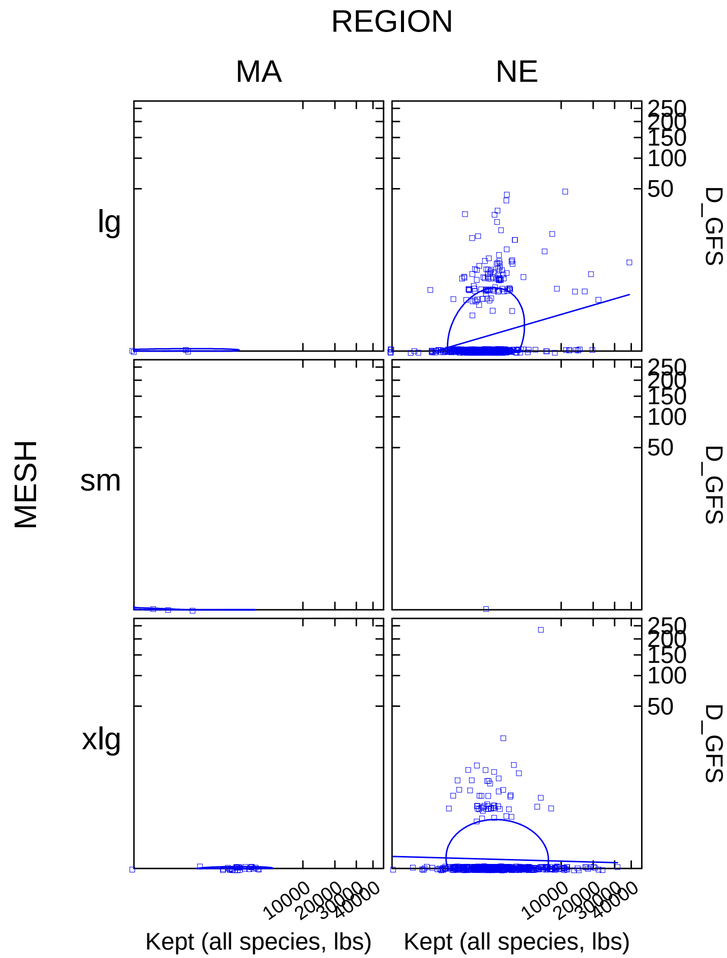


Figure B-1ff. Comparison of Northeast multispecies (small-mesh) discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

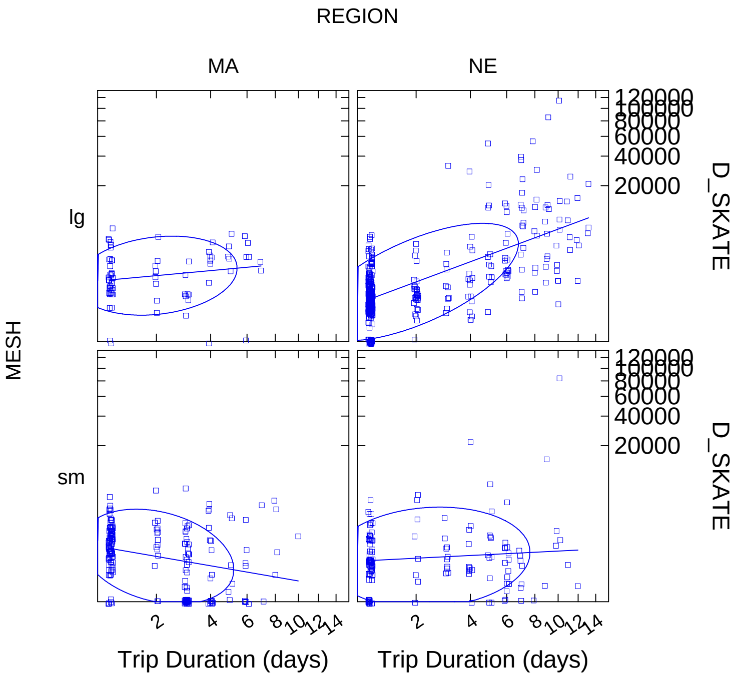


Figure B-1gg. Comparison of skates discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

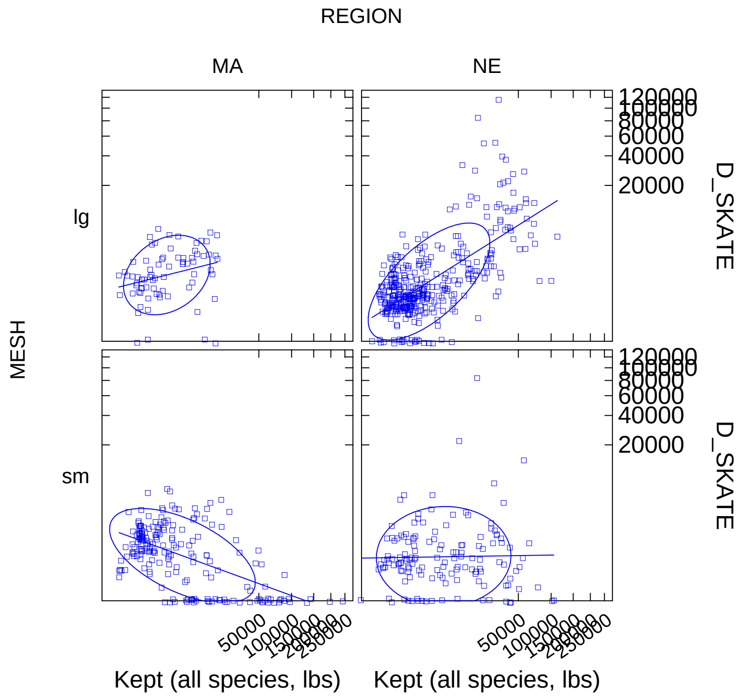


Figure B-1hh. Comparison of skates discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

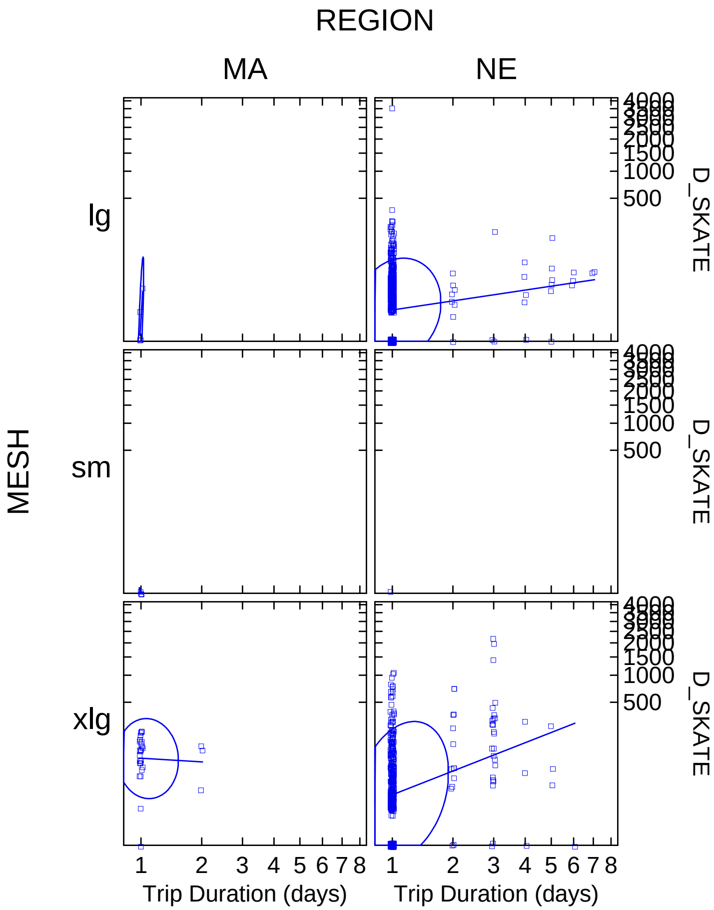


Figure B-1ii. Comparison of skates discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

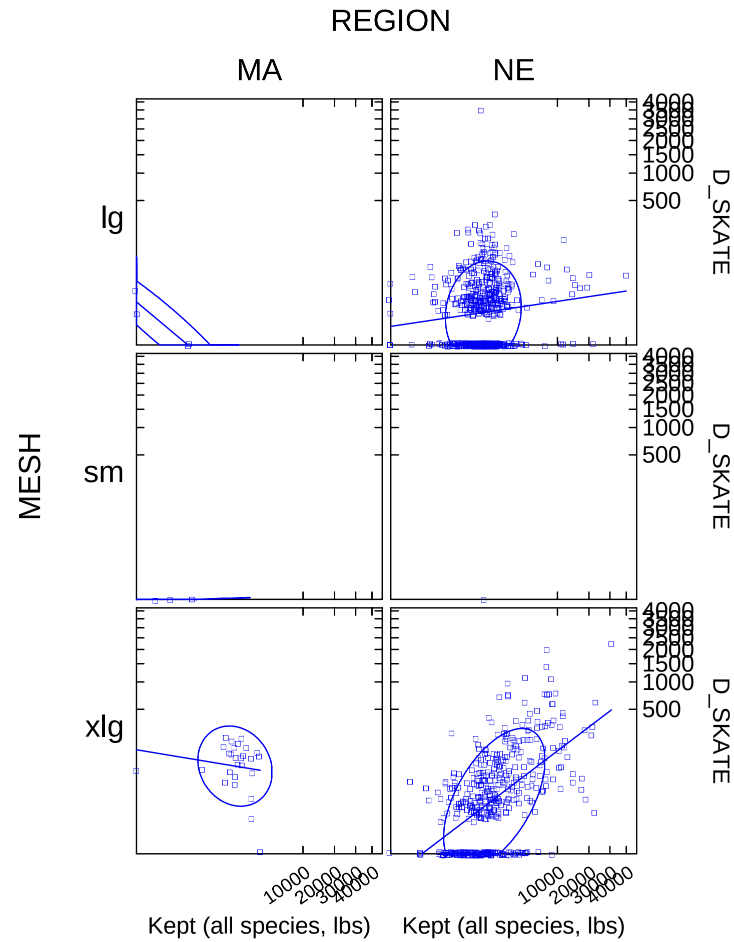


Figure B-1jj. Comparison of skates discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

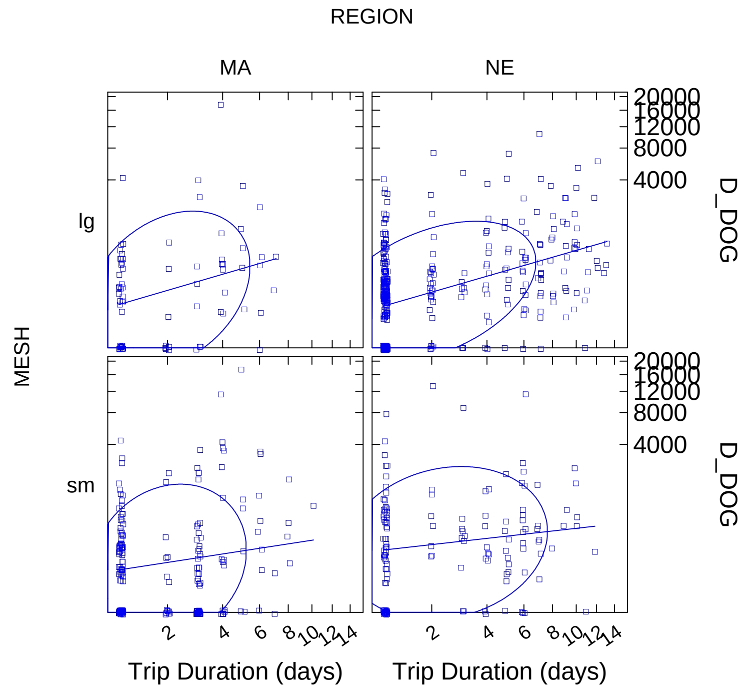


Figure B-1kk. Comparison of spiny dogfish discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

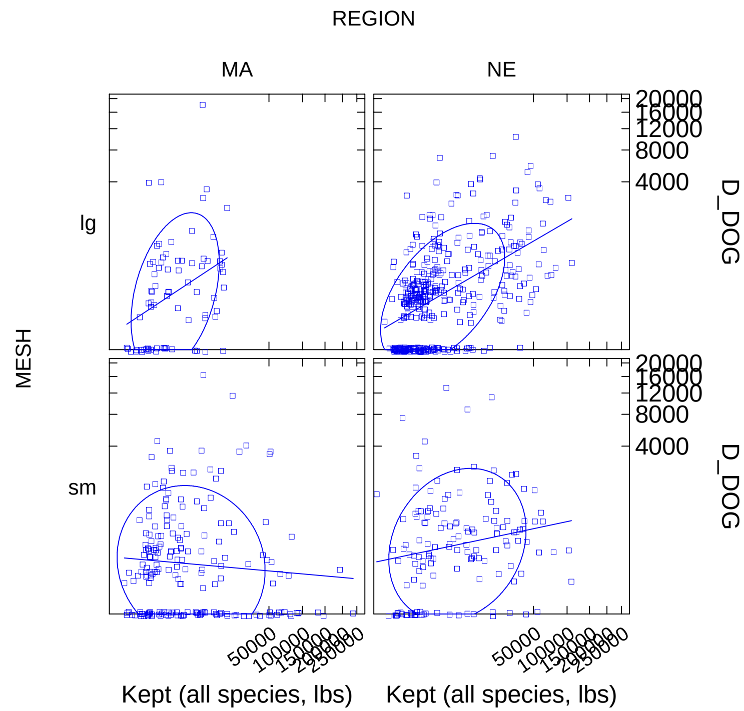


Figure B-1ll. Comparison of spiny dogfish discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

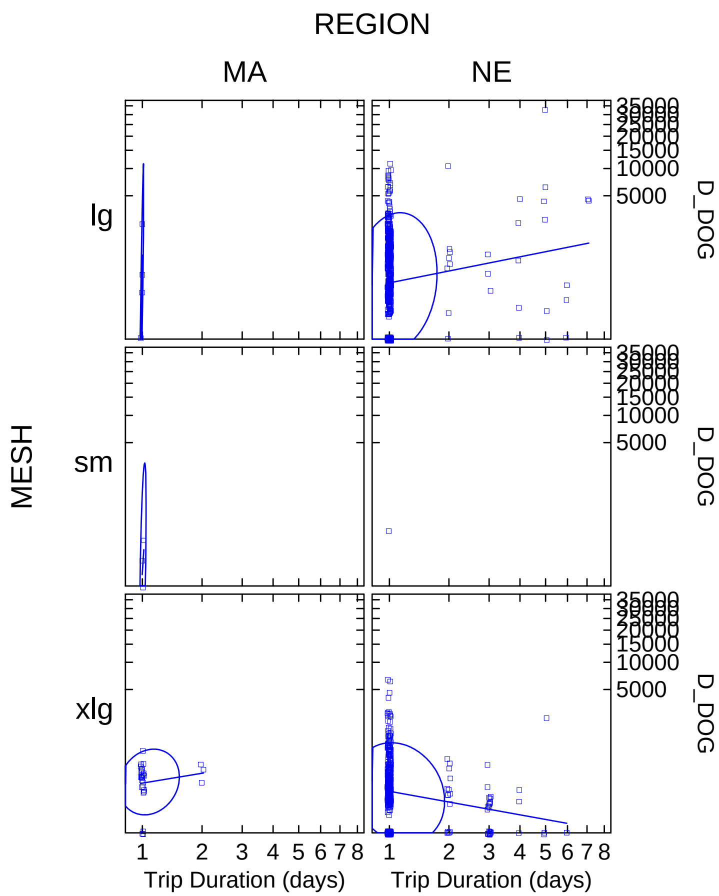


Figure B-1mm. Comparison of spiny dogfish discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

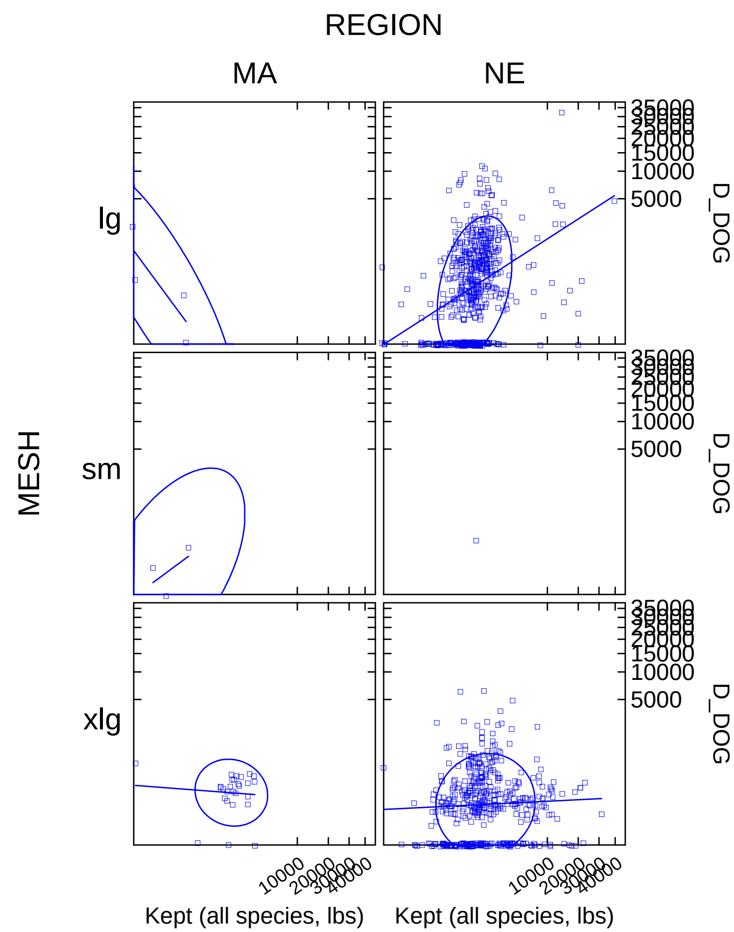


Figure B-1nn. Comparison of spiny dogfish discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

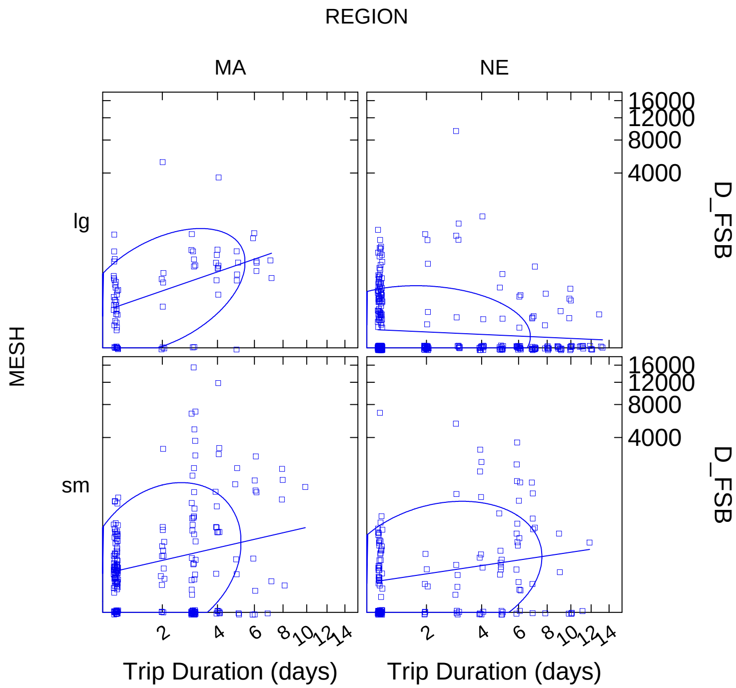


Figure B-1oo. Comparison of fluke-scup-black sea bass discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (; sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

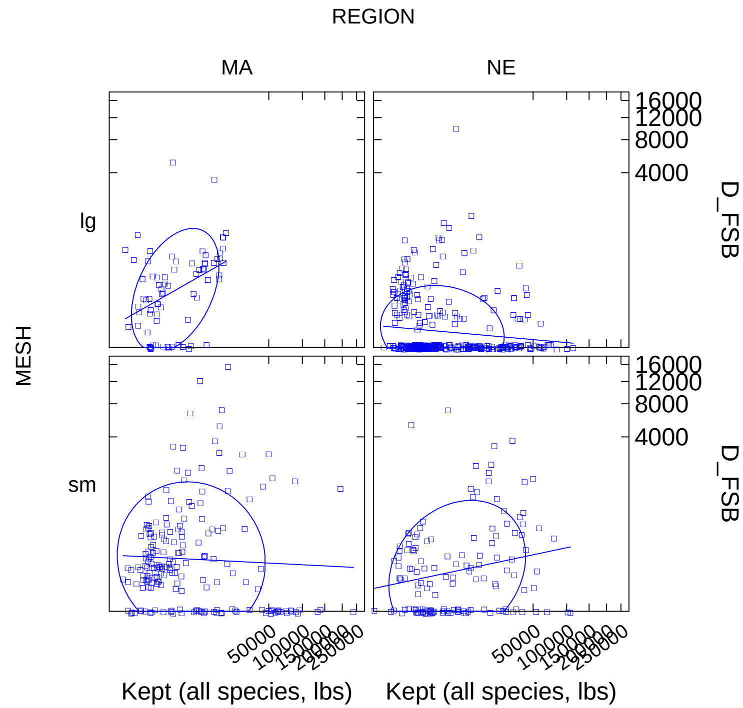


Figure B-1pp. Comparison of fluke-scup-black sea bass discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

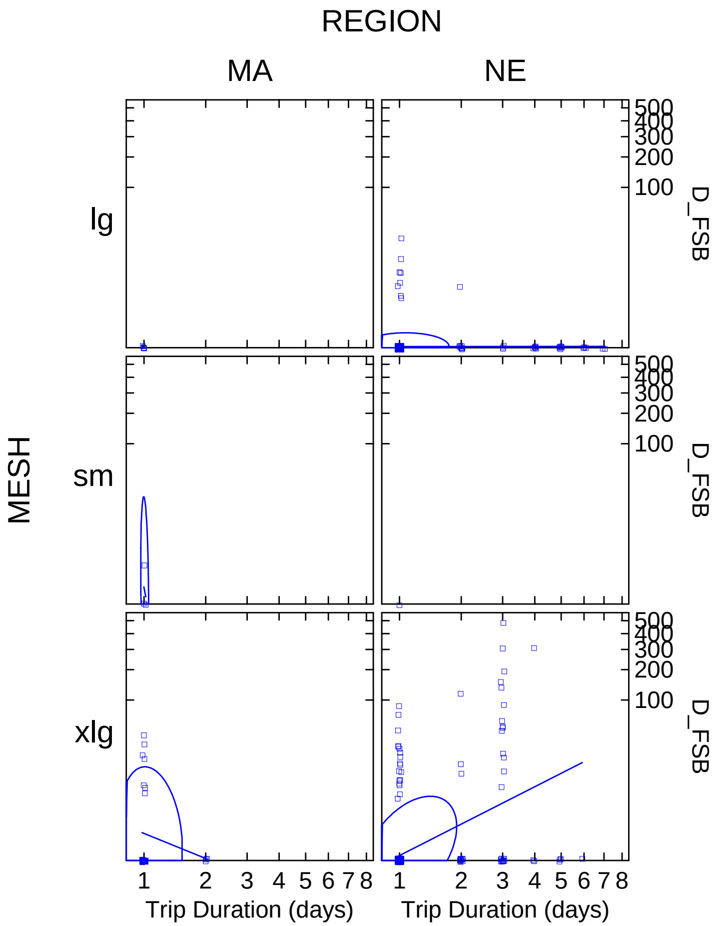


Figure B-1qq. Comparison of fluke-scup-black sea bass discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

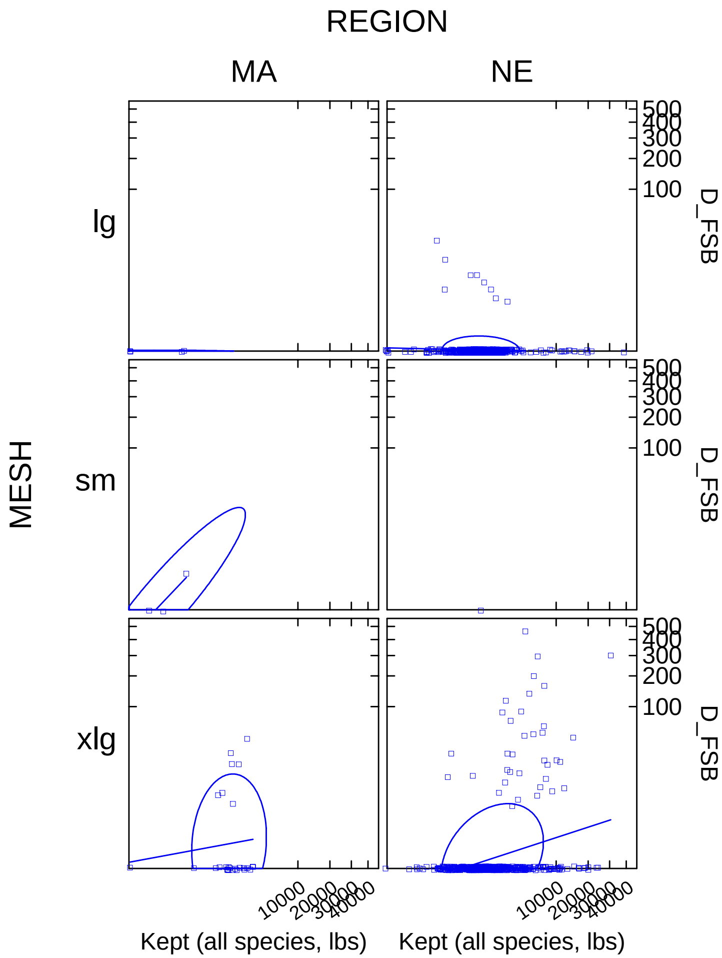


Figure B-1rr. Comparison of fluke-scup-black sea bass discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

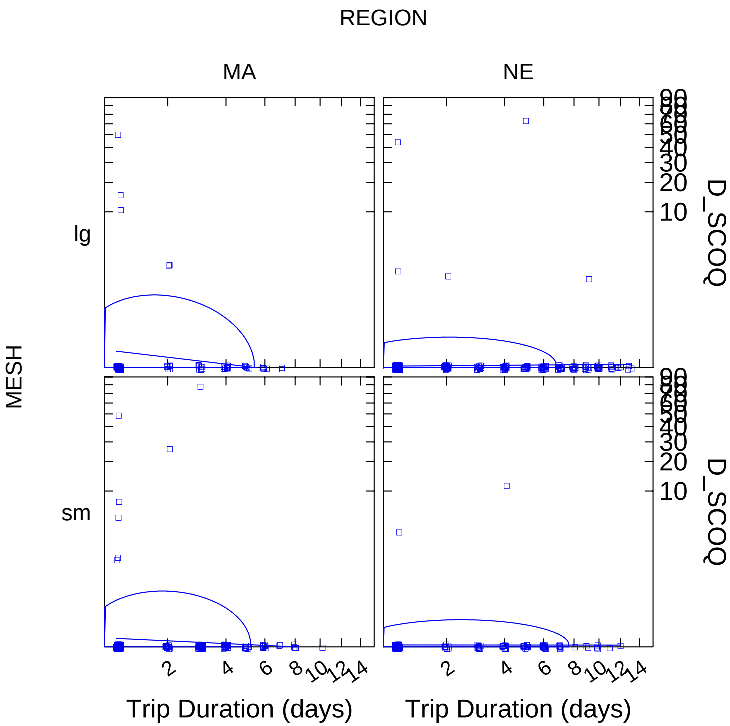


Figure B-1ss. Comparison of surfclams/quahogs discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

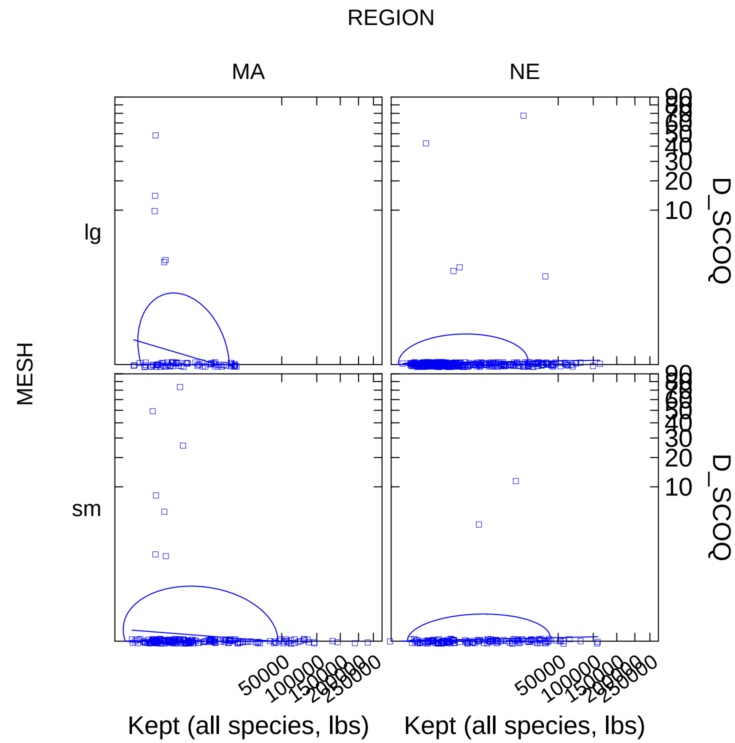


Figure B-1tt. Comparison of surfclams/quahogs discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

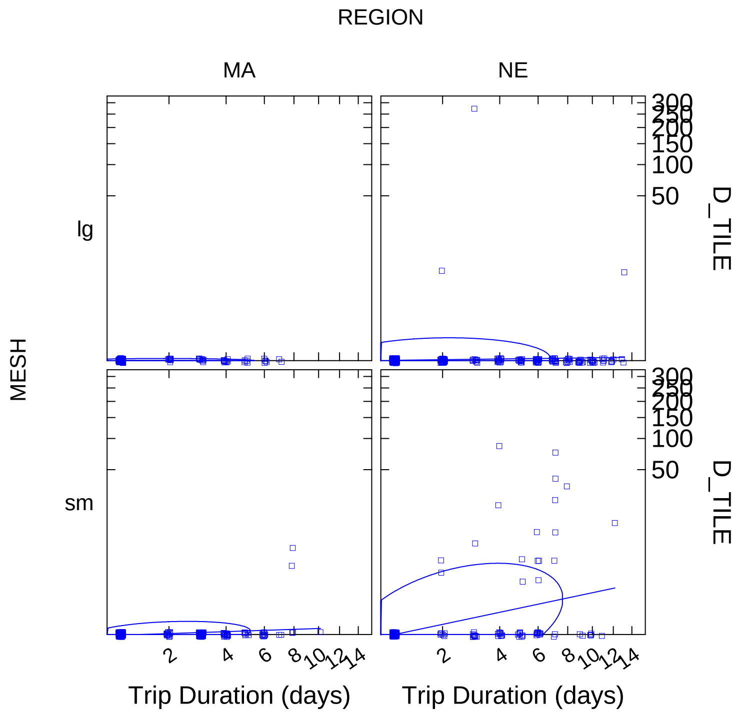


Figure B-1uu. Comparison of tilefish discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

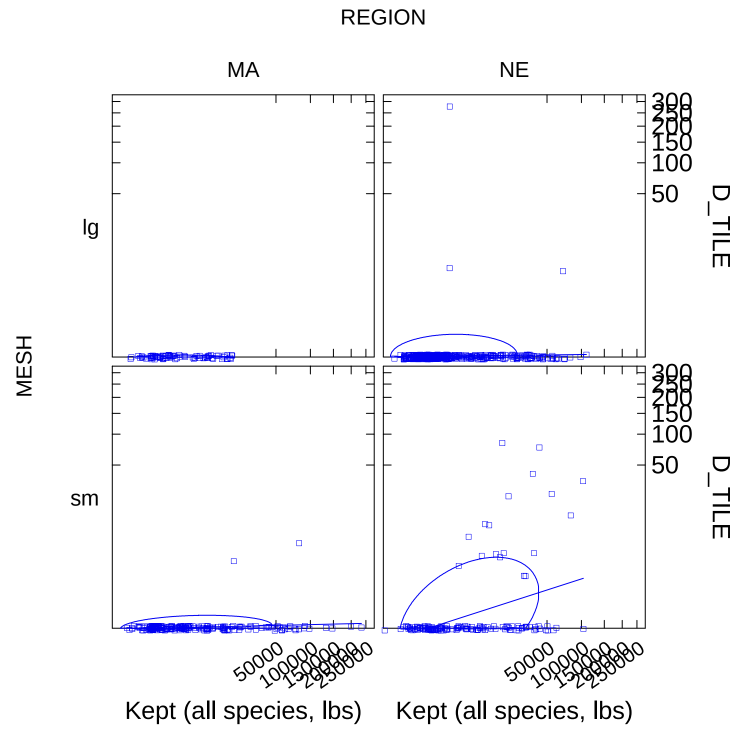


Figure B-1vv. Comparison of tilefish discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip.

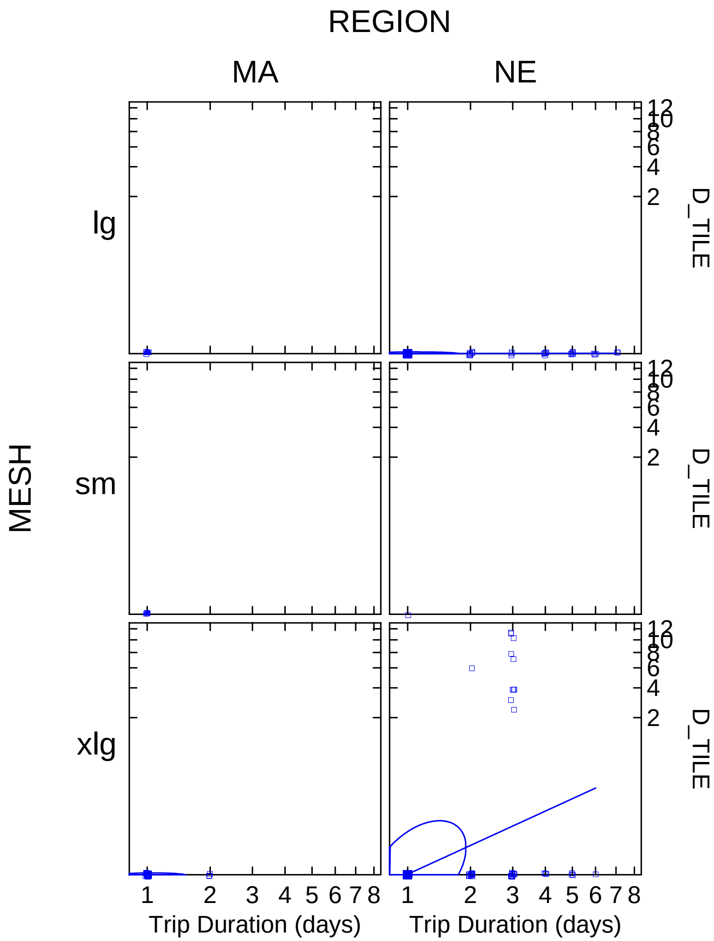


Figure B-1ww. Comparison of tilefish discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

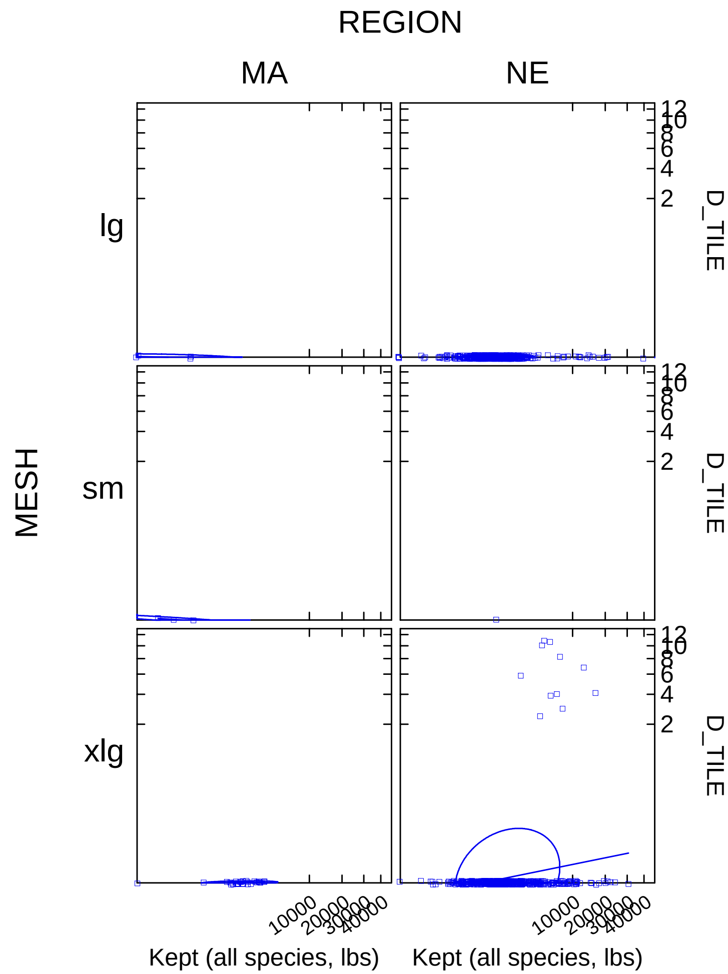


Figure B-1xx. Comparison of tilefish discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip.

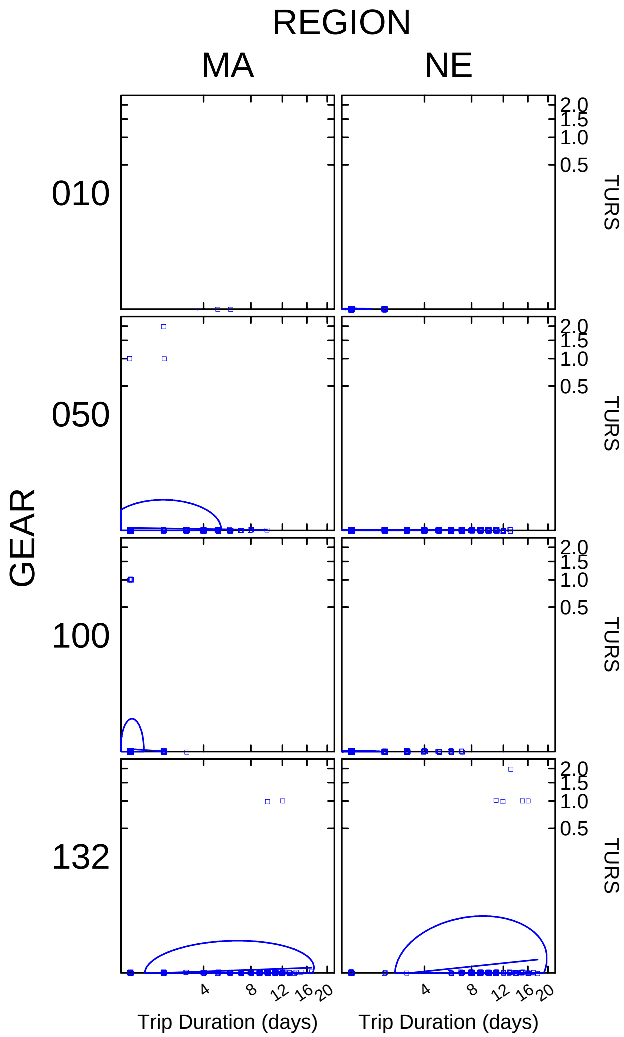


Figure B-2a. Comparison of sea turtles and trip duration (days) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

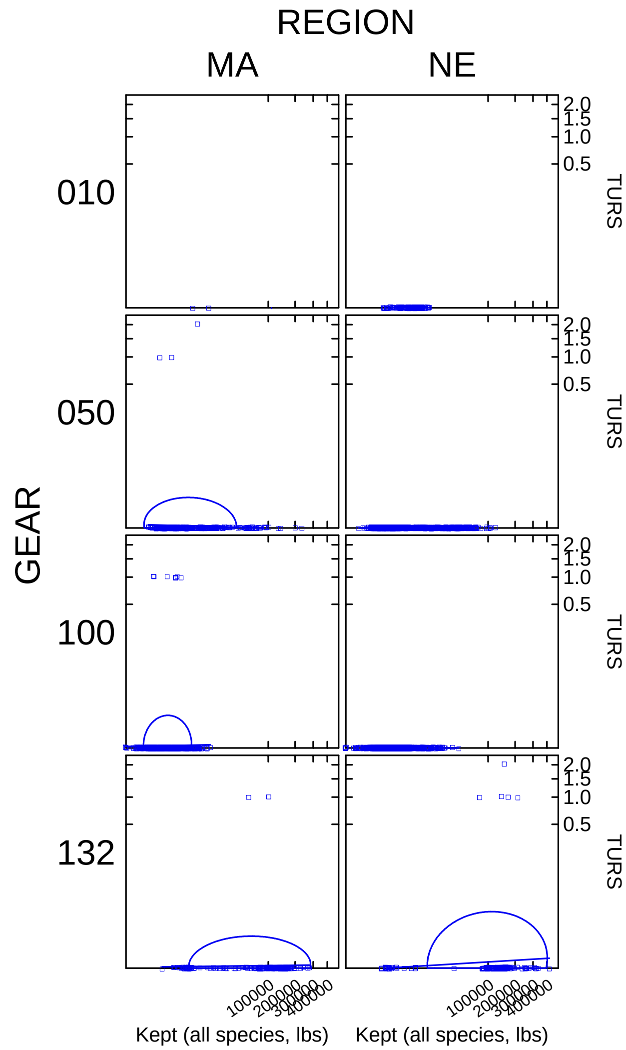


Figure B-2b. Comparison of sea turtles and kept weight of all species (pounds) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

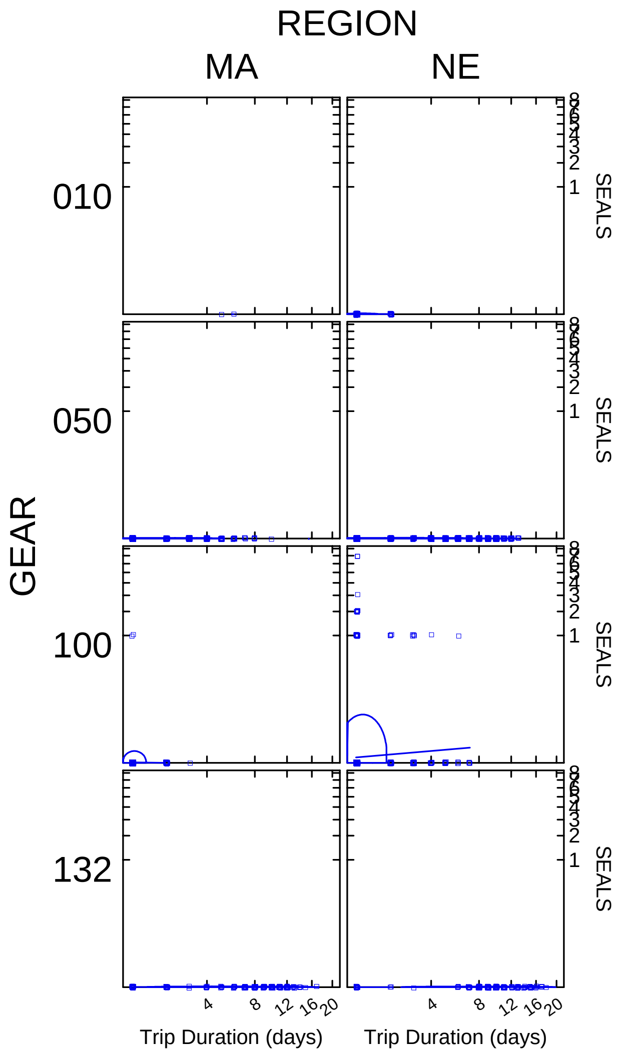


Figure B-2c. Comparison of seals and trip duration (days) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

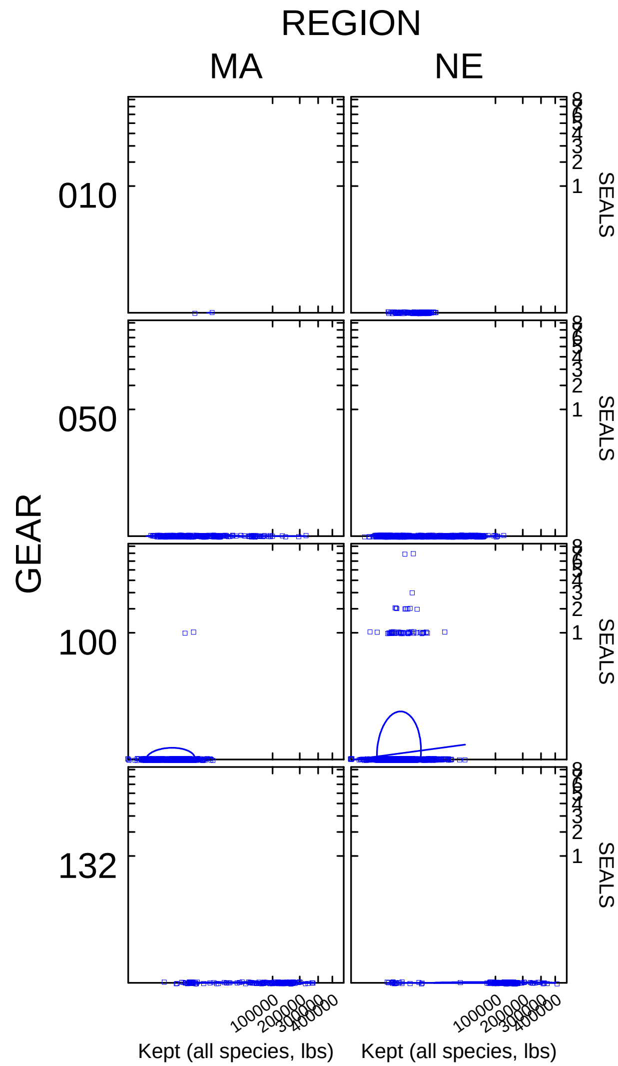


Figure B-2d. Comparison of seals and kept weight of all species (pounds) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

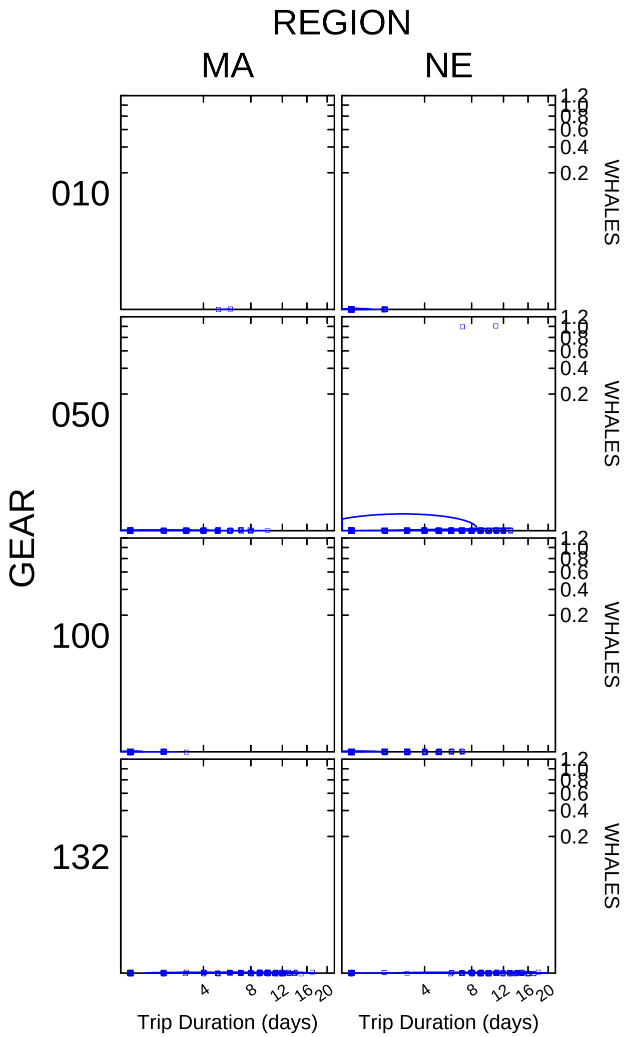


Figure B-2e. Comparison of whales and trip duration (days) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

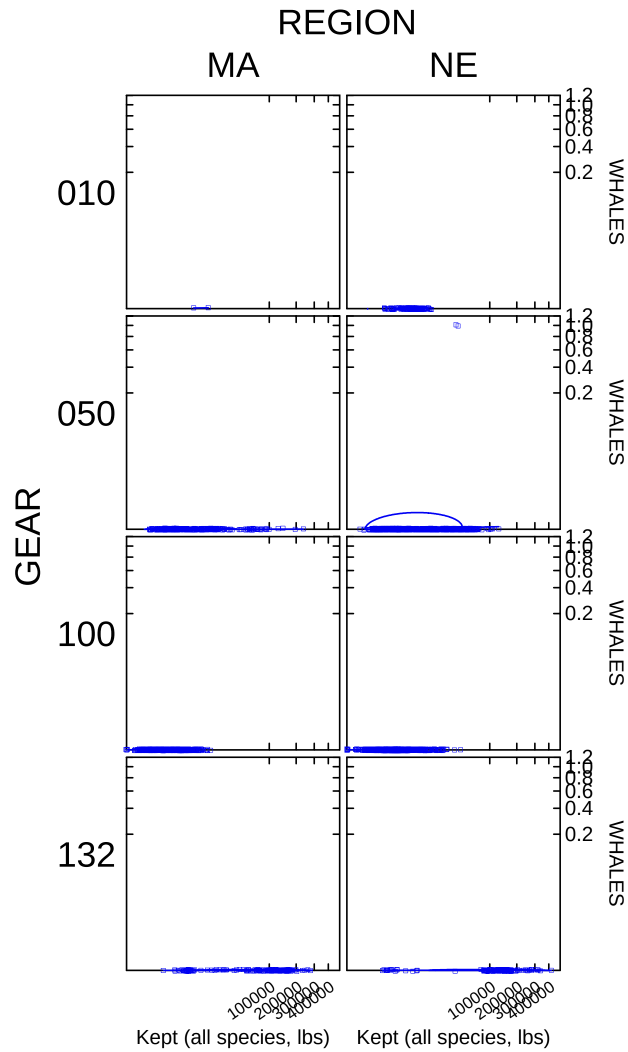


Figure B-2f. Comparison of whales and kept weight of all species (pounds) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

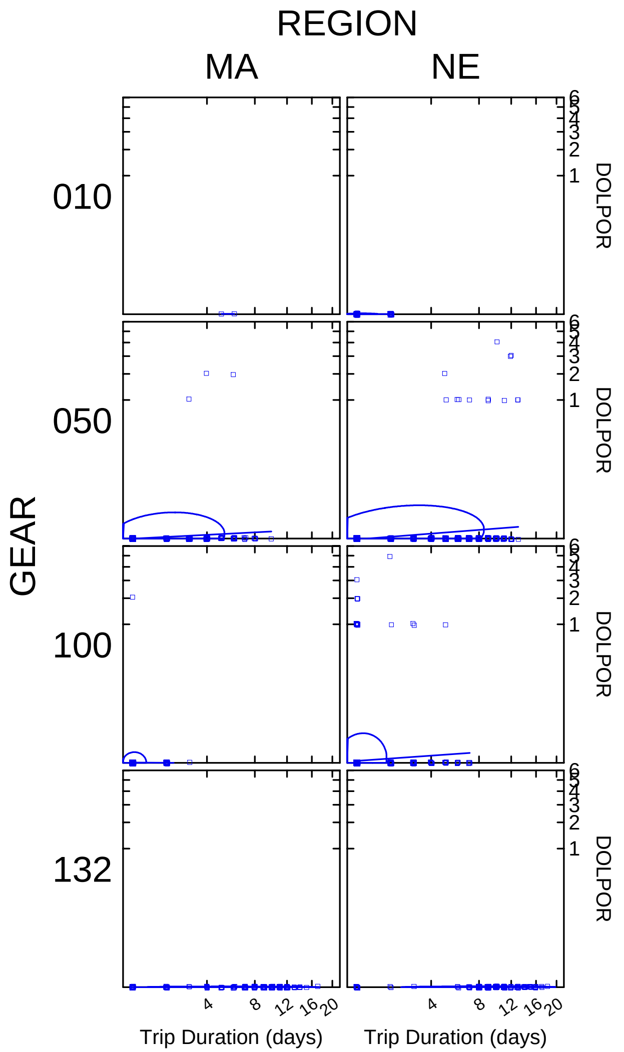


Figure B-2g. Comparison of dolphins/porpoises and trip duration (days) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

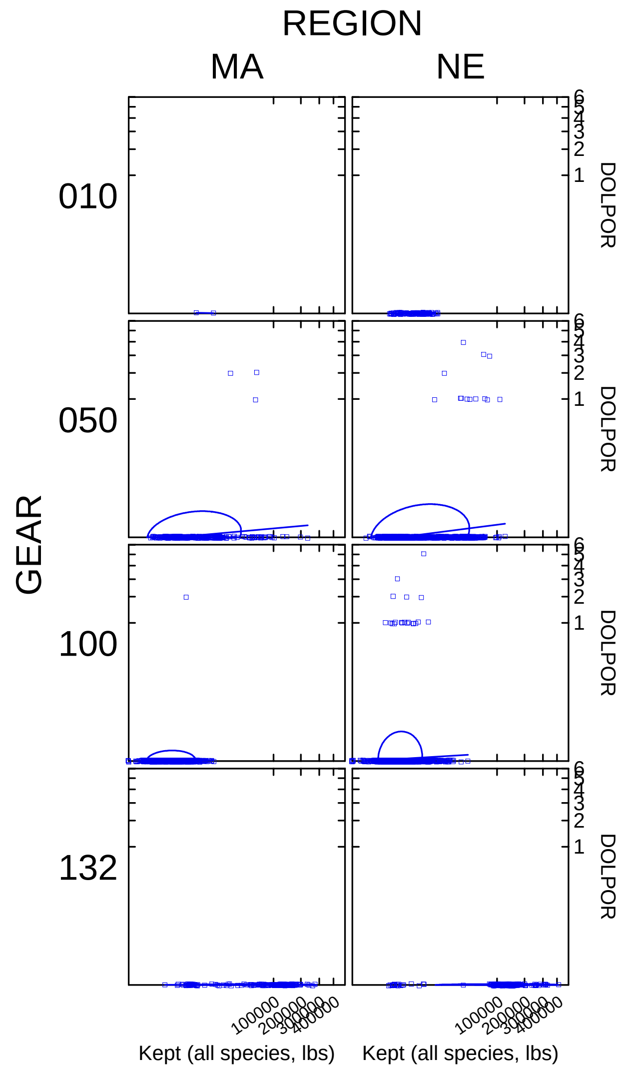


Figure B-2h. Comparison of dolphins/porpoises and kept weight of all species (pounds) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

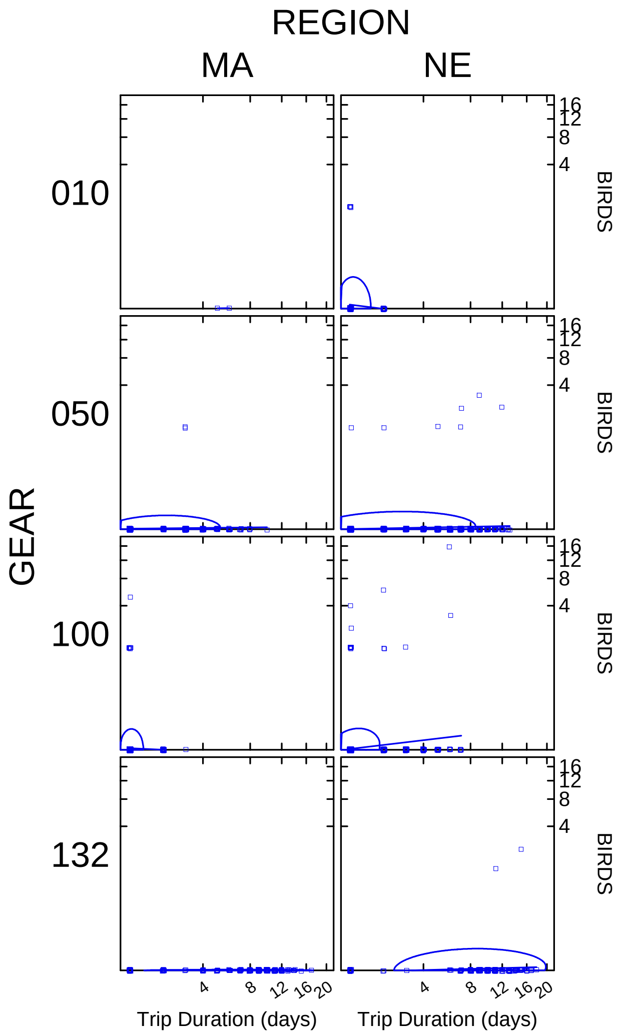


Figure B-2i. Comparison of sea birds and trip duration (days) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

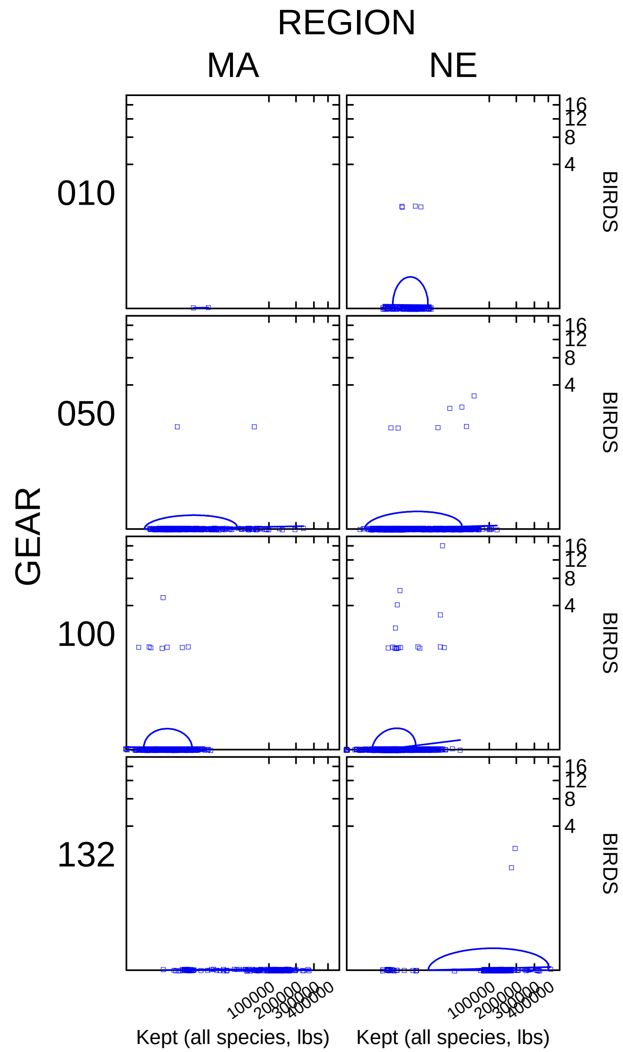


Figure B-2j. Comparison of sea birds and kept weight of all species (pounds) from 2004 observed longline (010), otter trawl (050), gillnet (100) and scallop dredge (132) trips, by region; each dot represents a trip.

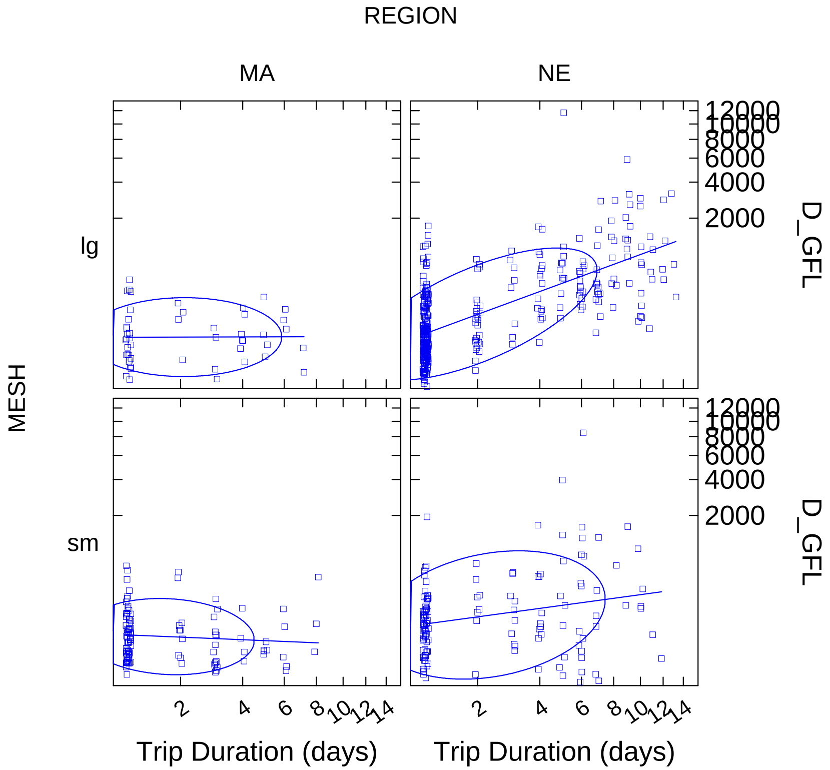


Figure B-3a. Comparison of Northeast multispecies (large-mesh) discards (pounds) and trip duration (days) from 2004 observed otter trawl trips, by region and mesh size group (sm <5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip. Trips with zero discards of Northeast multispecies (large-mesh) are excluded.

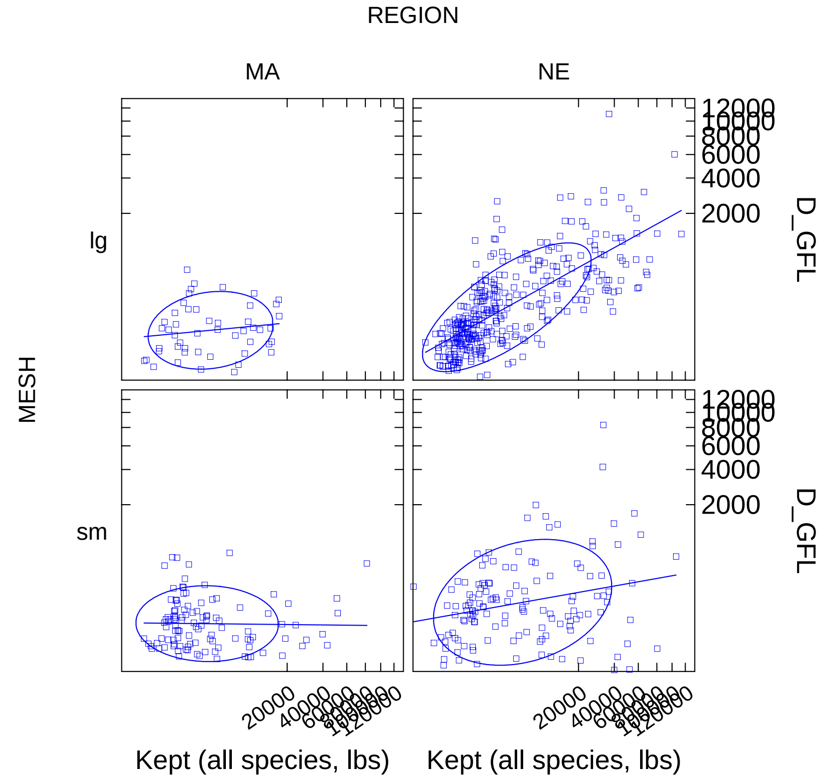


Figure B-3b. Comparison of Northeast multispecies (large-mesh) discards (pounds) and kept weight of all species (pounds) from 2004 observed otter trawl trips by region and mesh size group (sm < 5.5 inches, and lg => 5.5 inches); fourth root transformation used, each dot represents a trip. Trips with zero discards of Northeast multispecies (large-mesh) are excluded

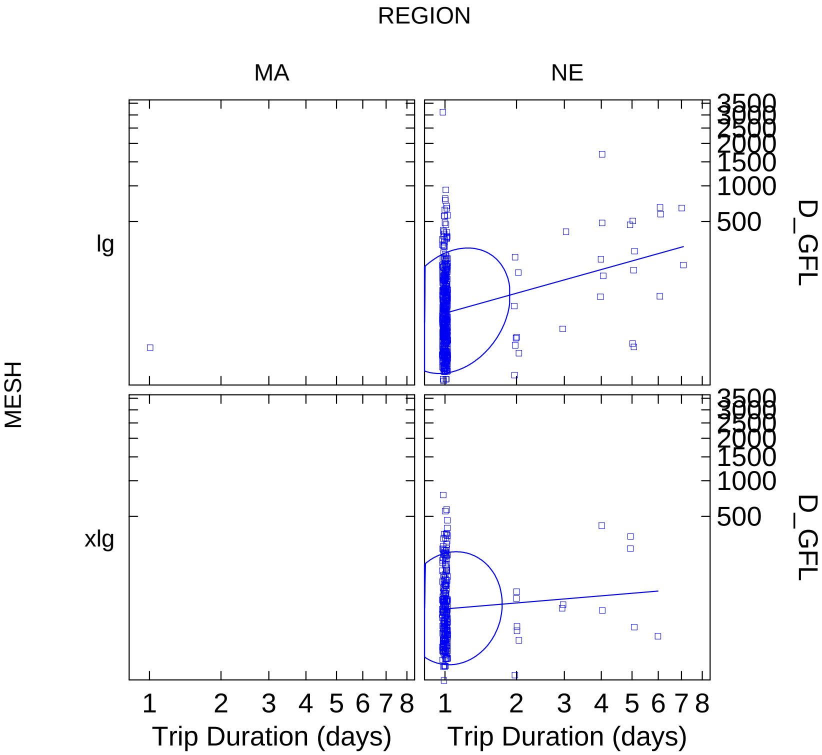


Figure B-3c. Comparison of Northeast multispecies (large-mesh) discards (pounds) and trip duration (days) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip. Trips with zero discards of Northeast multispecies (large-mesh) are excluded.

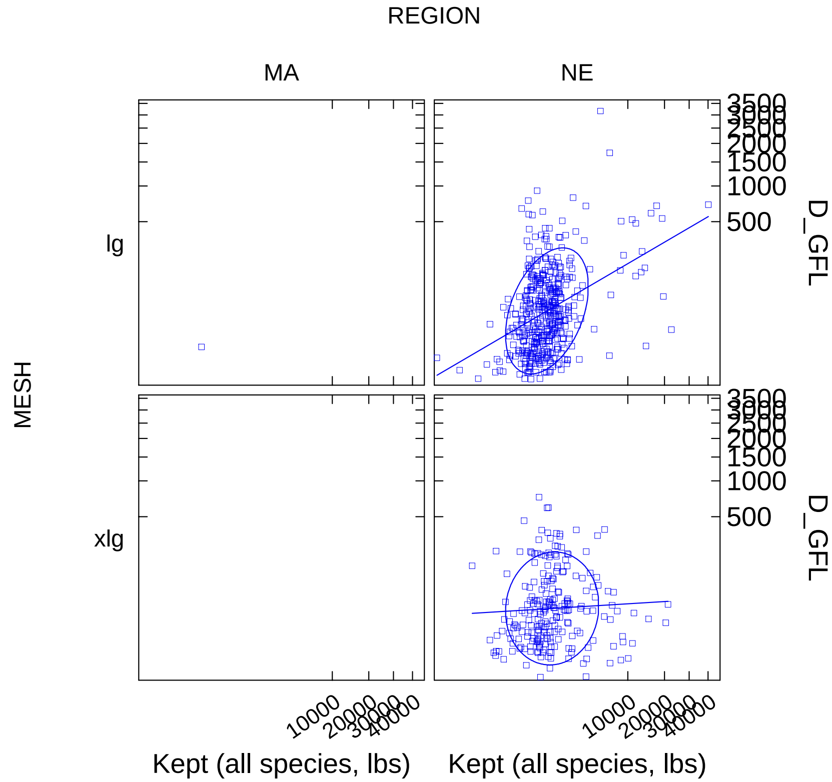


Figure B-3d. Comparison of Northeast multispecies (large-mesh) discards (pounds) and kept weight of all species (pounds) from 2004 observed gillnet trips by region and mesh size group (lg = 5.5 to 7.99 inches; sm < 5.5 inches, and xlg > 8 inches); fourth root transformation used, each dot represents a trip. Trips with zero discards of Northeast multispecies (large-mesh) are excluded.

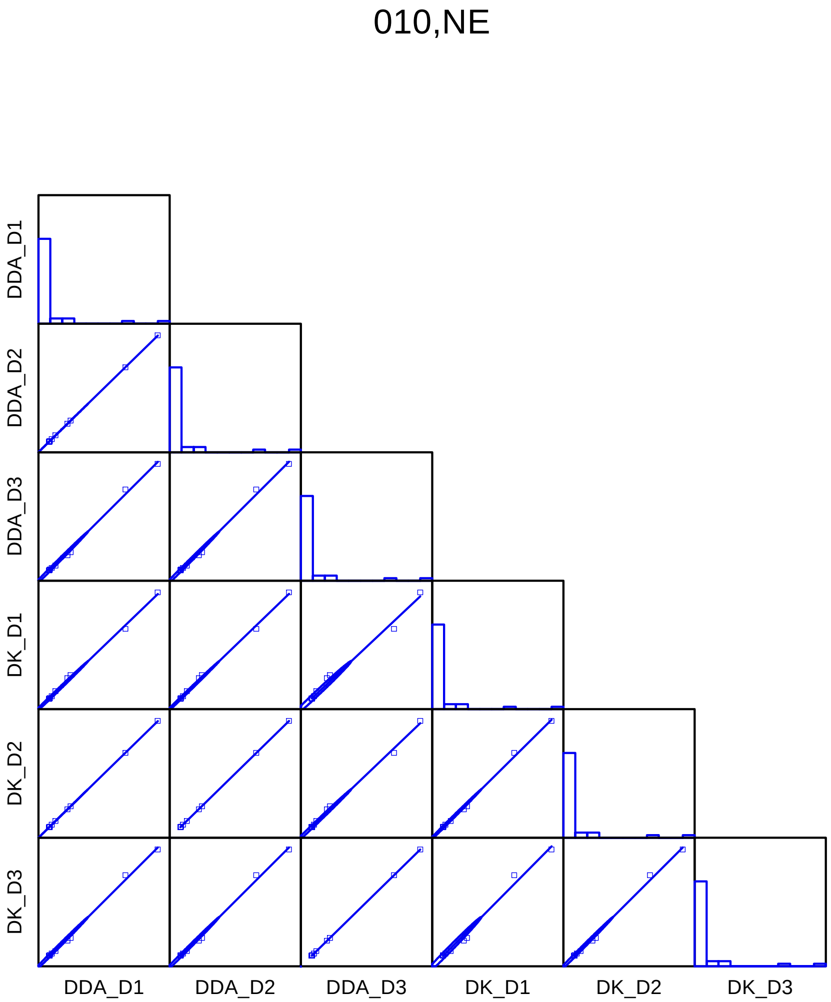


Figure B-4a. Comparisons of the total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England longline; each dot represents a species group and mesh size.

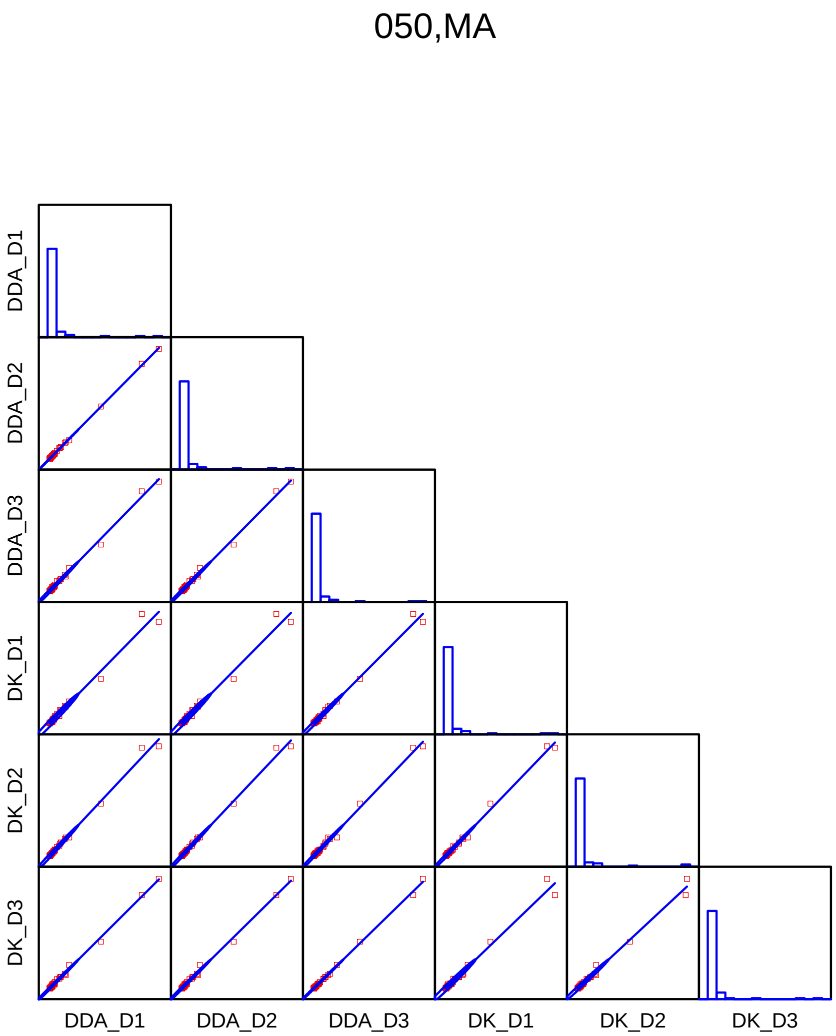


Figure B-4b. Comparisons of the total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic otter trawl; each dot represents a species group and mesh size.

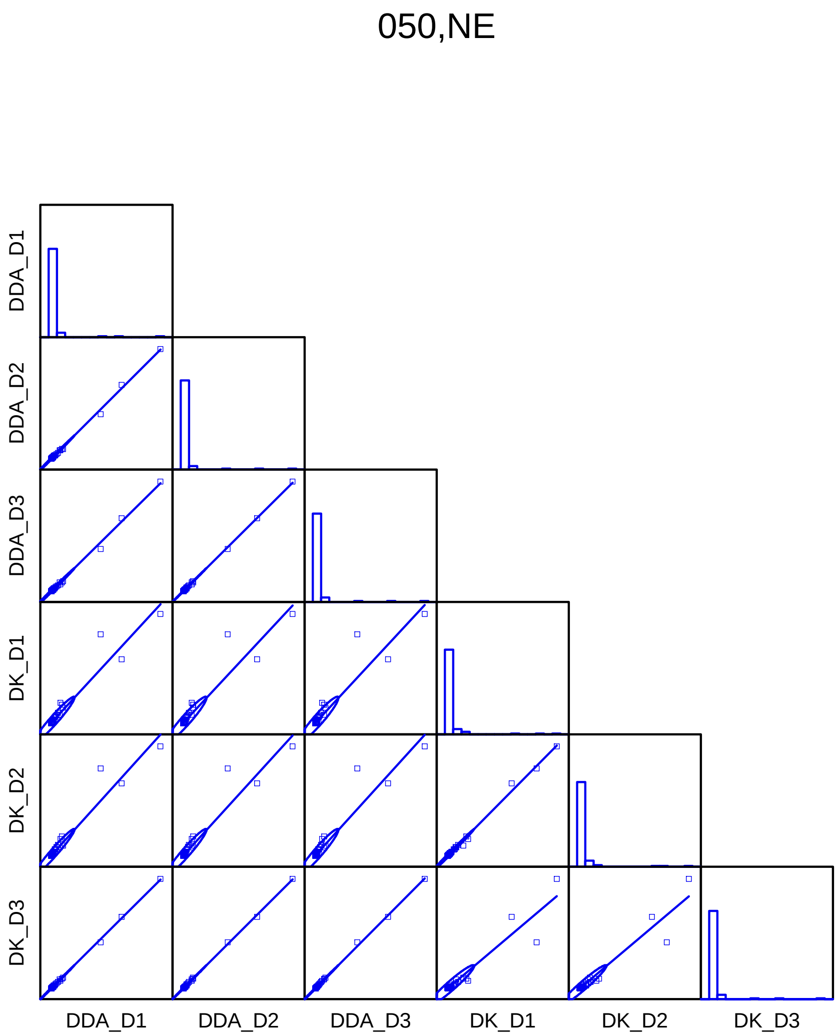


Figure B-4c. Comparisons of the total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England otter trawl; each dot represents a species group and mesh size.

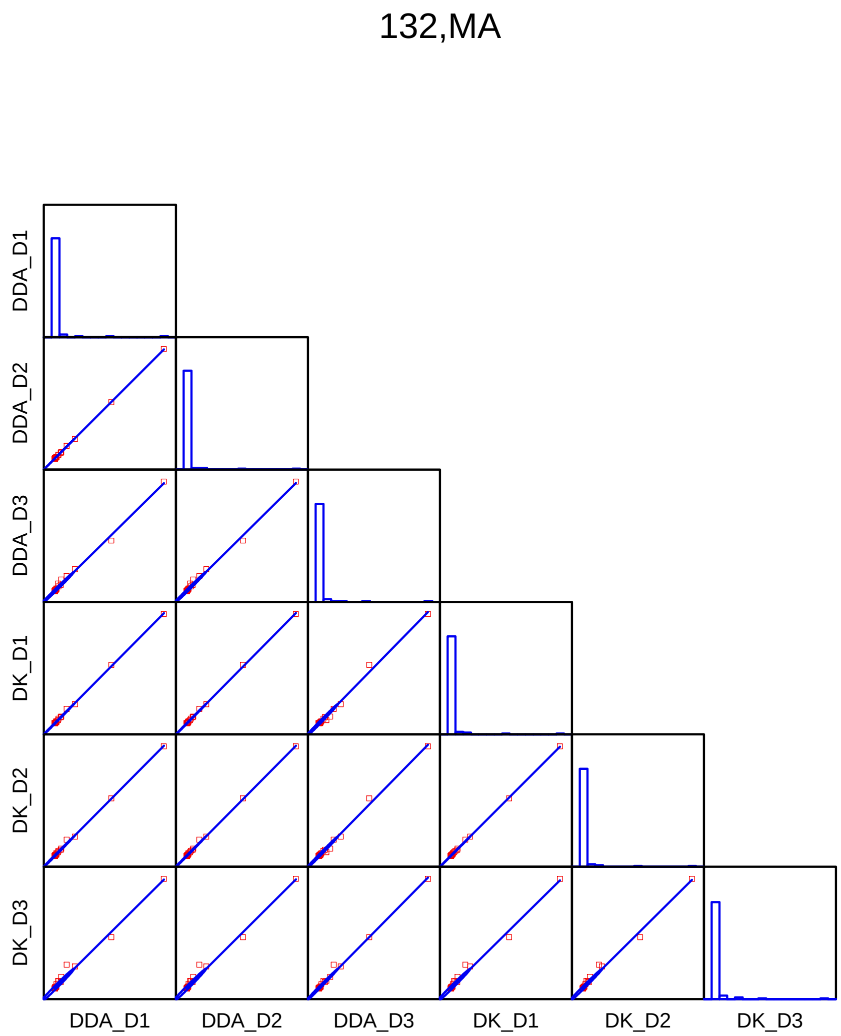


Figure B-4d. Comparisons of the total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic scallop dredge; each dot represents a species group and mesh size.

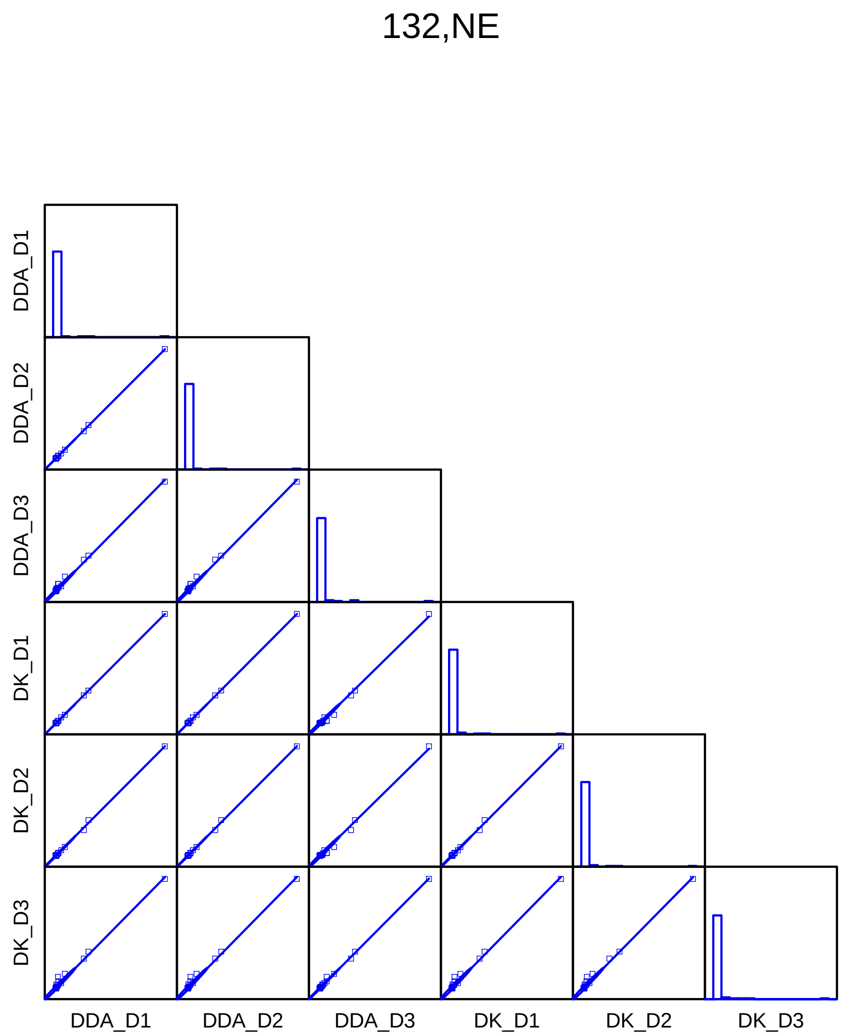


Figure B-4e. Comparisons of the total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England scallop dredge; each dot represents a species group and mesh size.

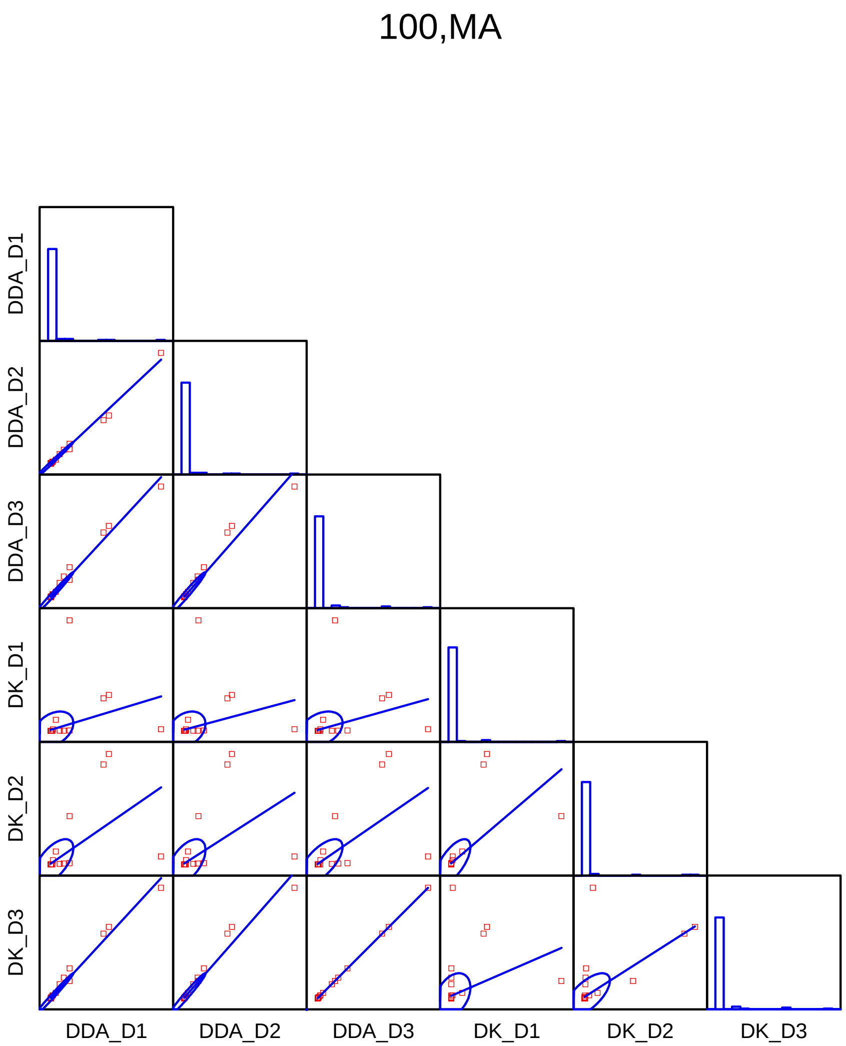


Figure B-4f. Comparisons of the total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic gillnet; each dot represents a species group and mesh size.

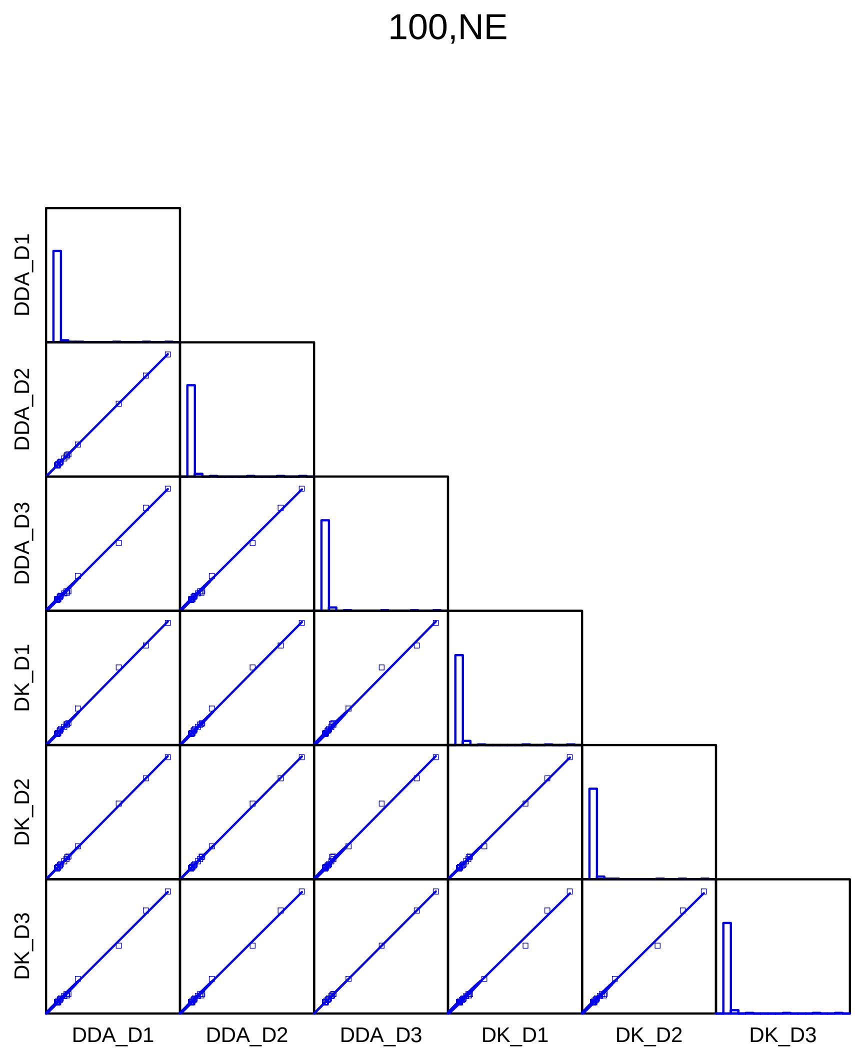


Figure B-4g. Comparisons of the total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England gillnet; each dot represents a species group and mesh size.

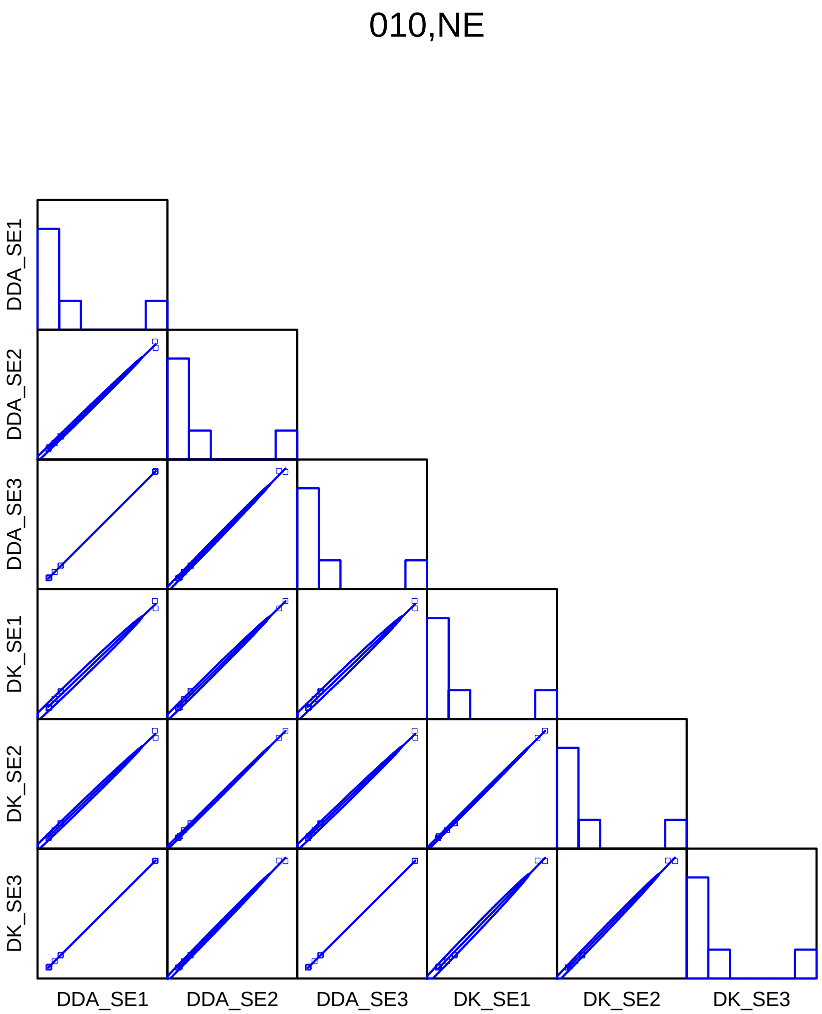


Figure B-5a. Comparisons of the standard error (SE) of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England longline; each dot represents a species group and mesh size.

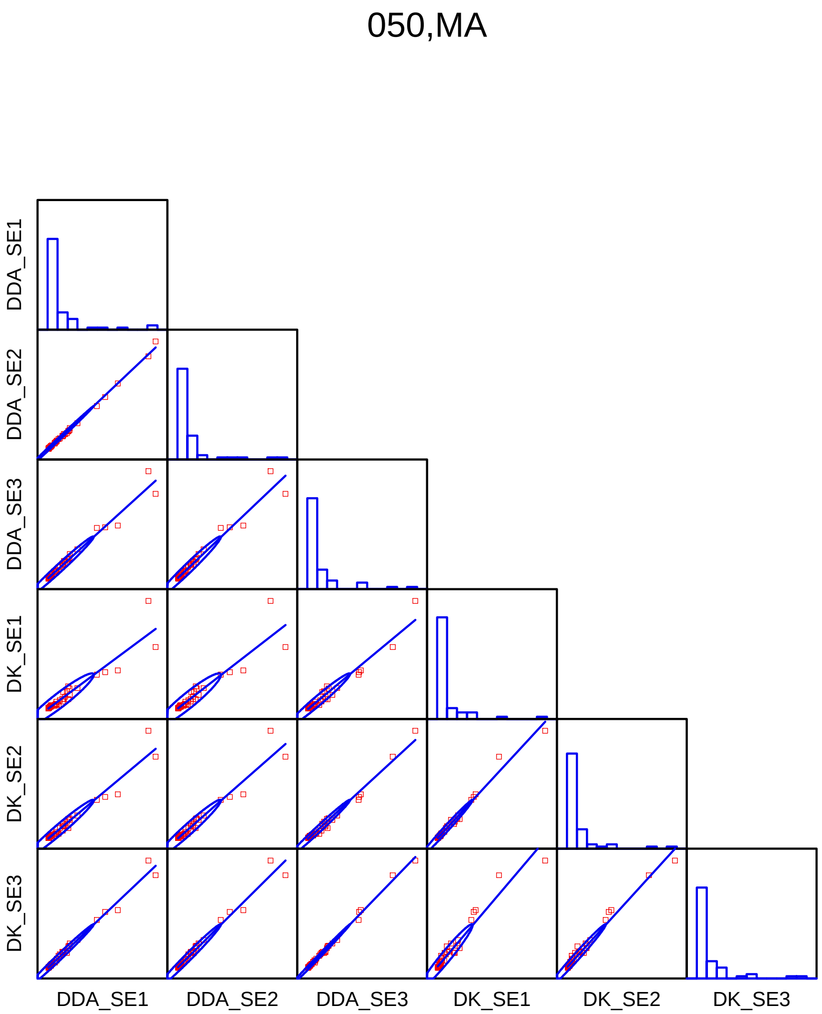


Figure B-5b. Comparisons of the standard error (SE) of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic otter trawl; each dot represents a species group and mesh size.

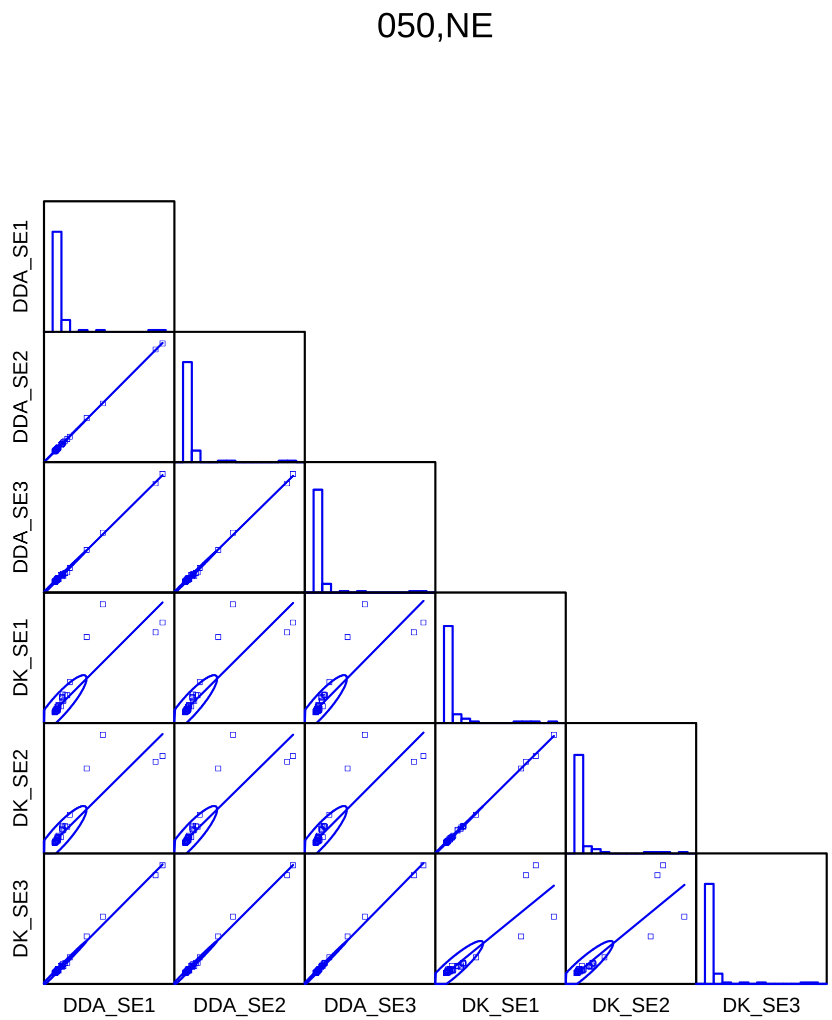


Figure B-5c. Comparisons of the standard error (SE) of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England otter trawl; each dot represents a species group and mesh size.

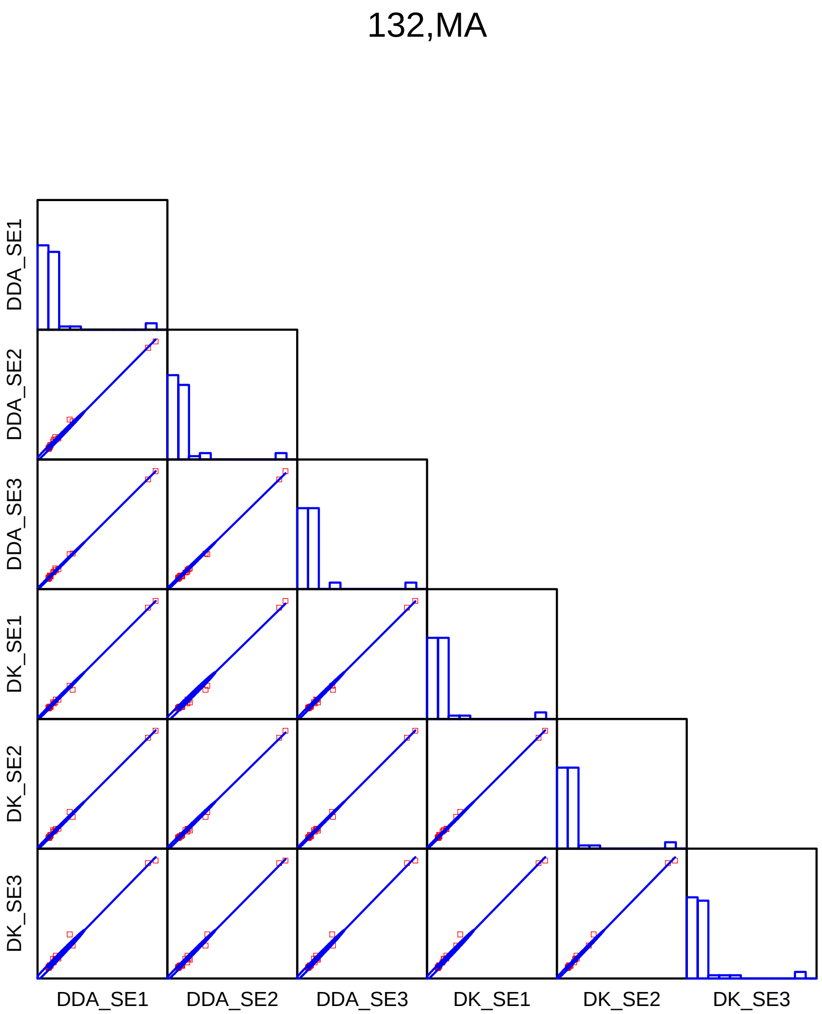


Figure B-5d. Comparisons of the standard error (SE) of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic scallop dredge each dot represents a species group and mesh size

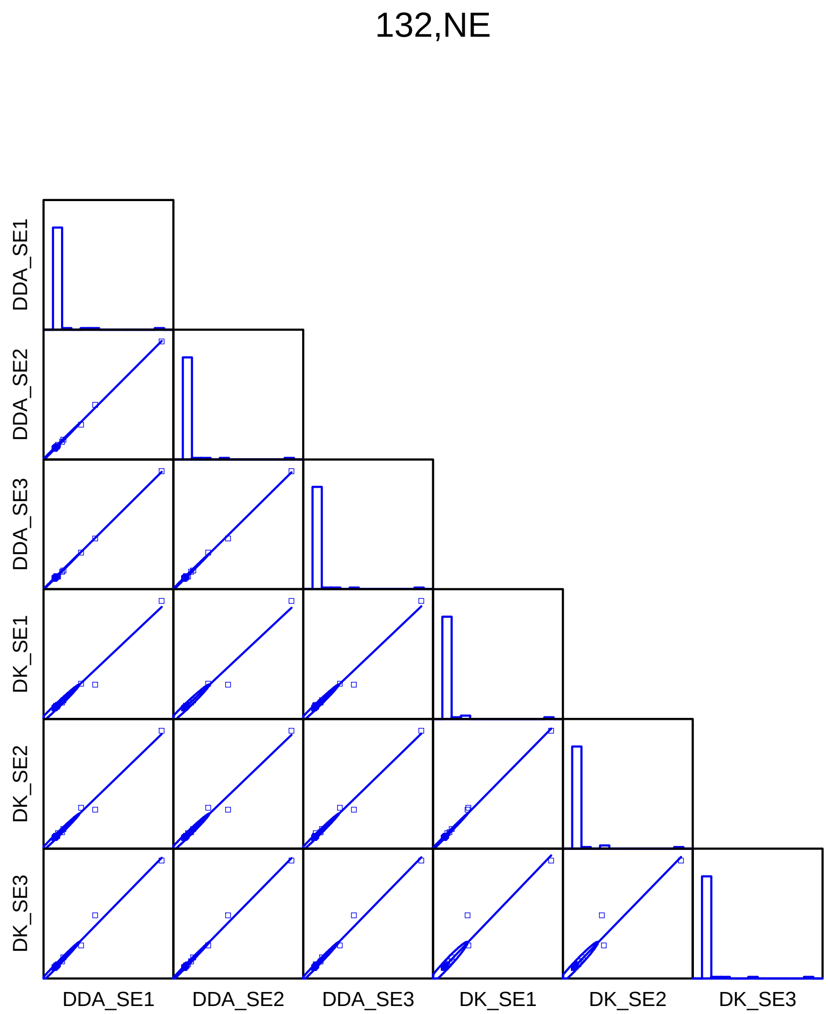


Figure B-5e. Comparisons of the standard error (SE) of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England scallop dredge each dot represents a species group and mesh size

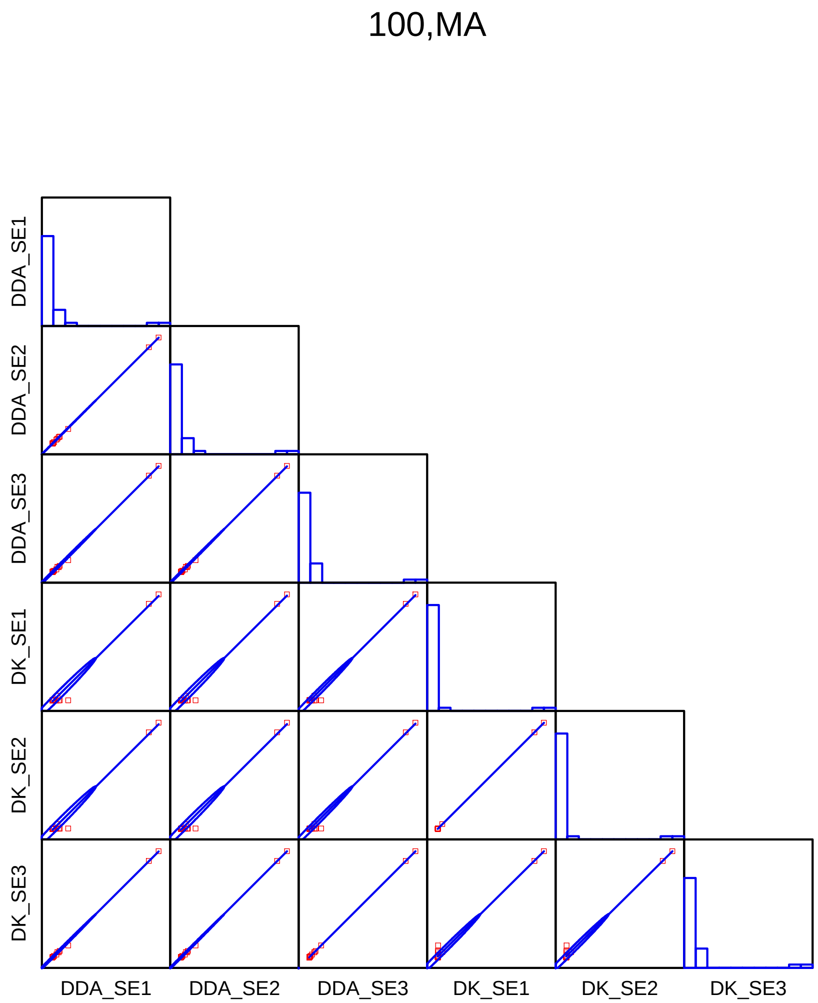


Figure B-5f. Comparisons of the standard error (SE) of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic gillnet each dot represents a species group and mesh size.

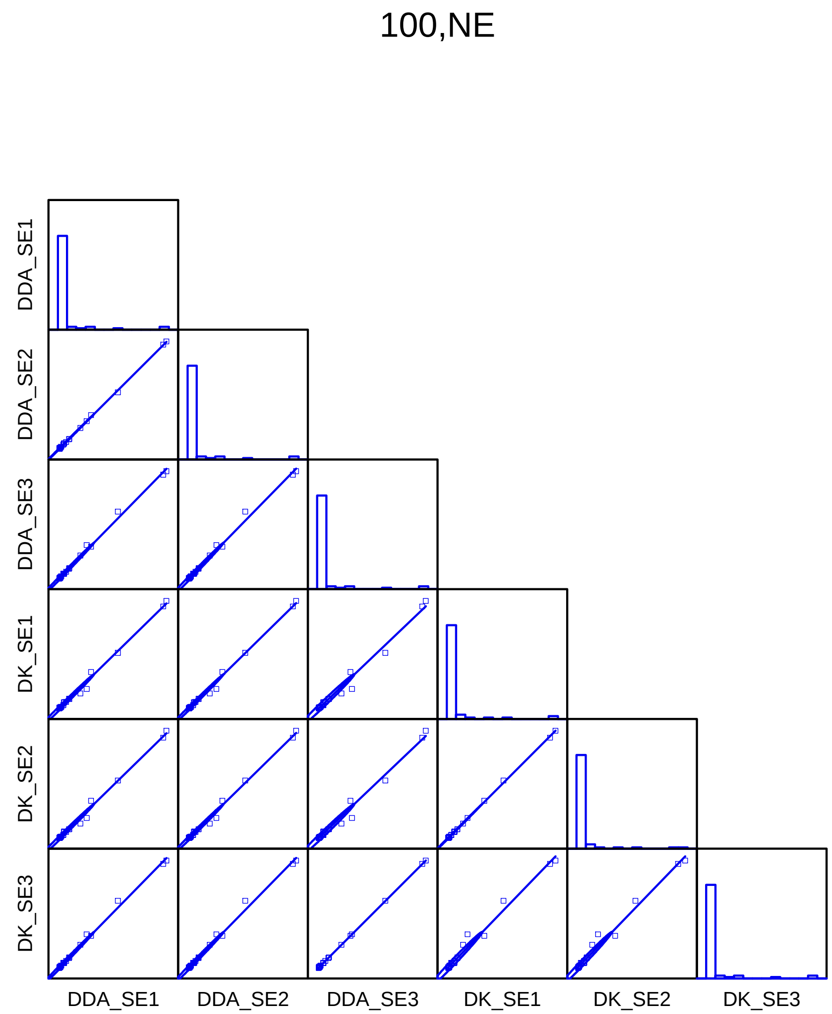


Figure B-5g. Comparisons of the standard error (SE) of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England gillnet each dot represents a species group and mesh size.

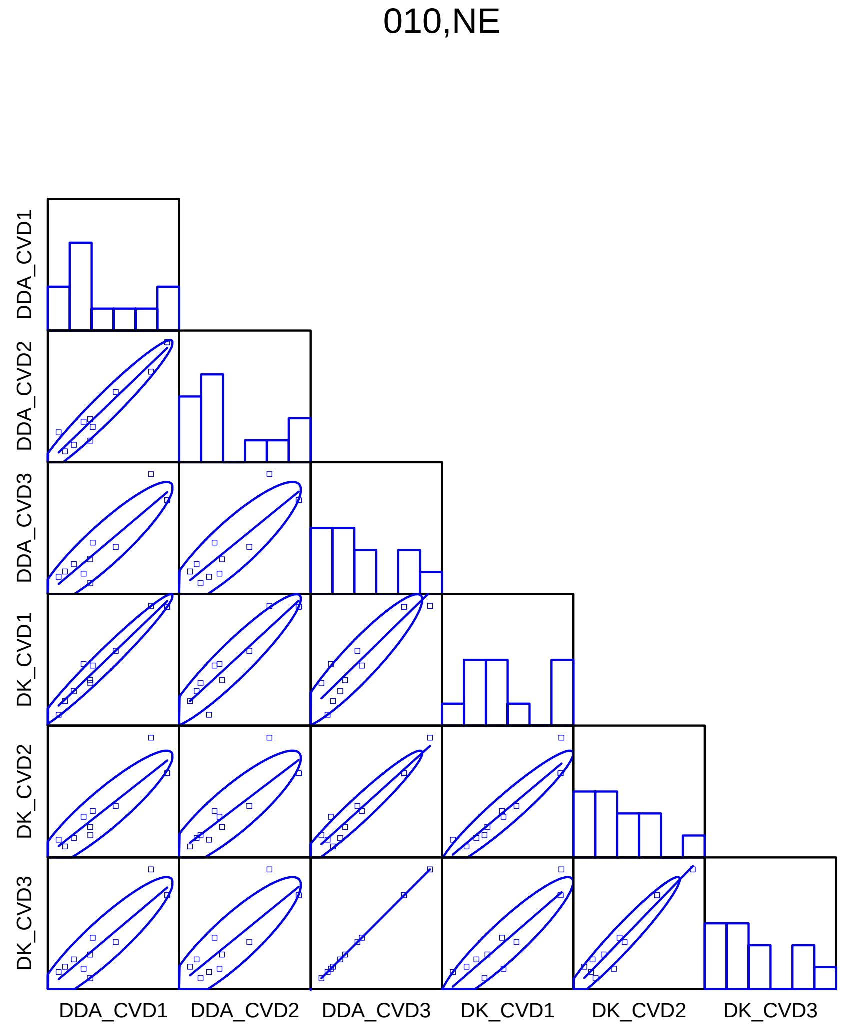


Figure B-5h. Comparisons of the CV of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England longline; each dot represents a species group and mesh size.

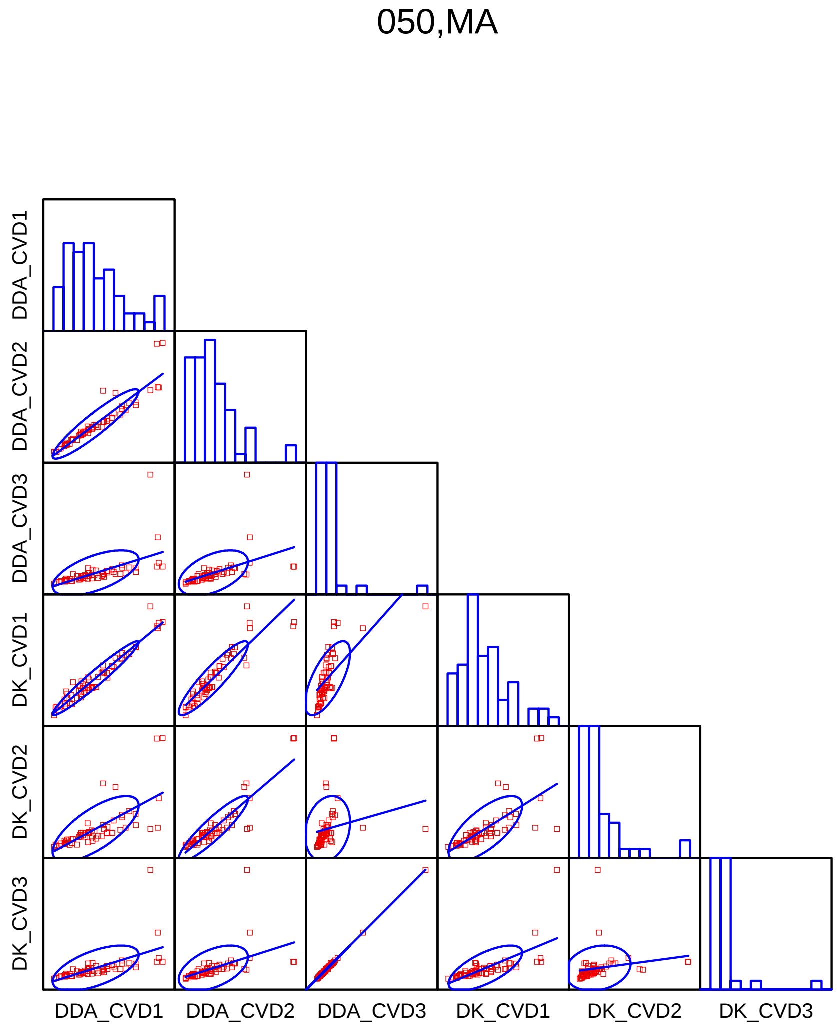


Figure B-5i. Comparisons of the CV of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic otter trawl; each dot represents a species group and mesh size.

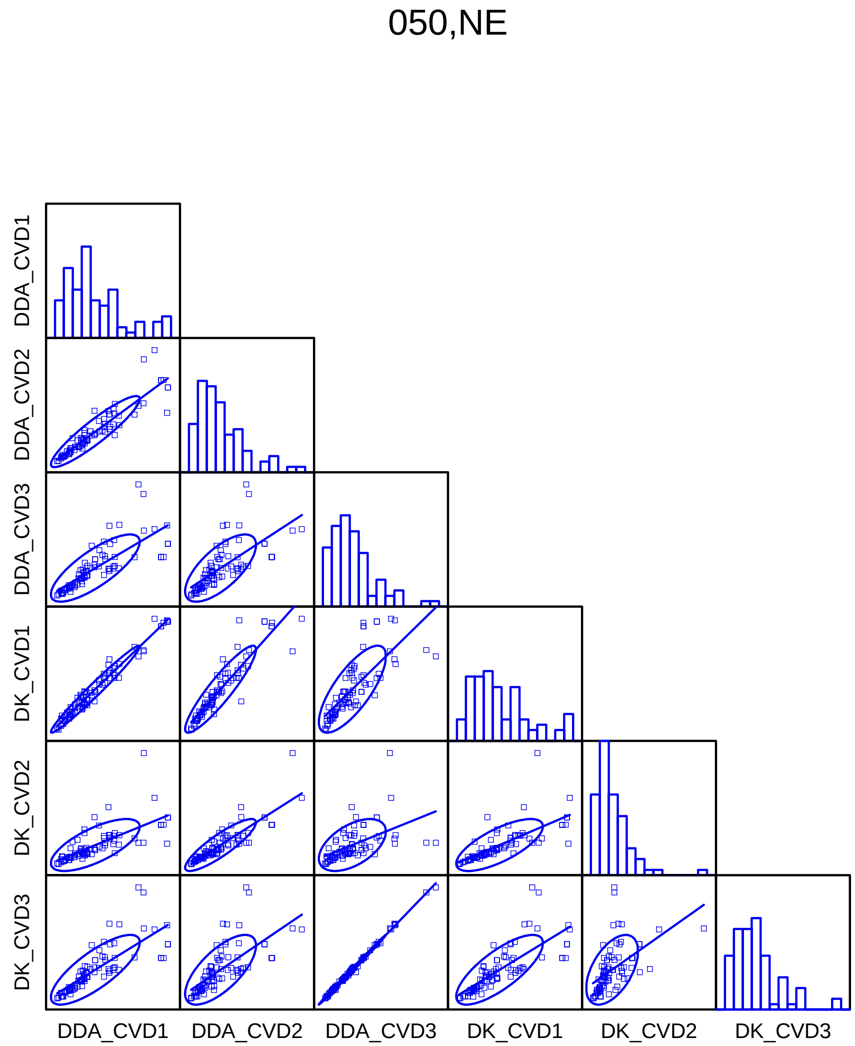


Figure B-5j Comparisons of the CV of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England otter trawl; each dot represents a species group and mesh size.

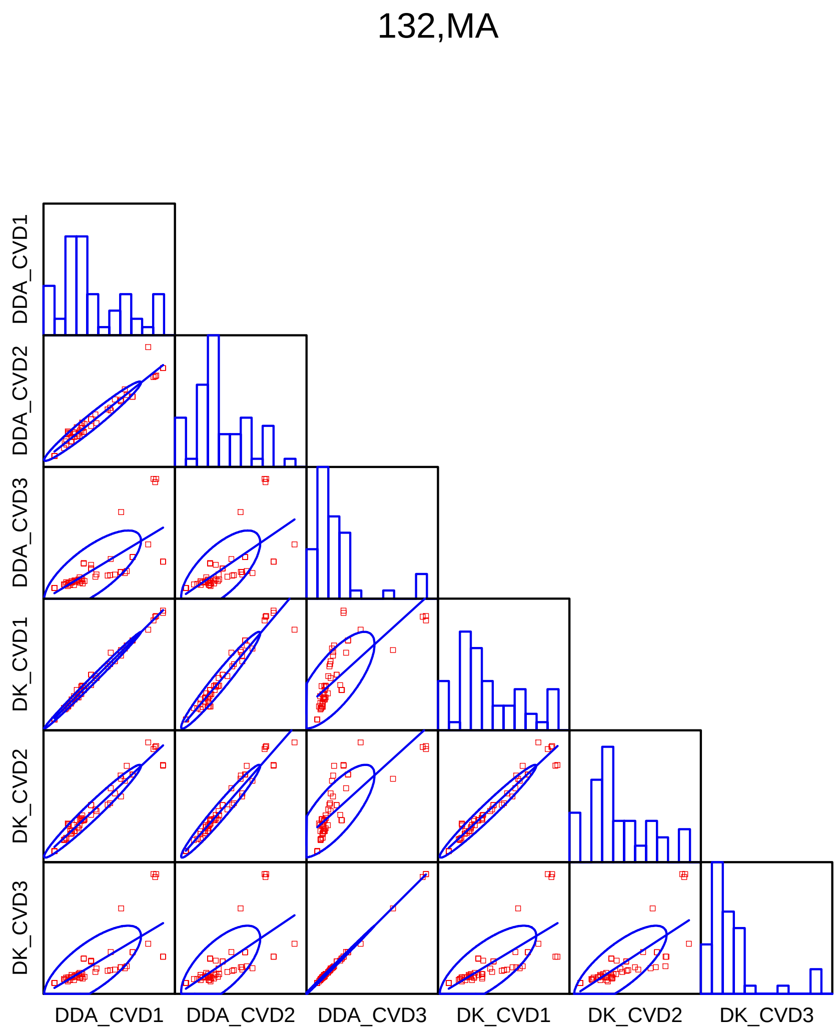


Figure B-5k. Comparisons of the CV of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic scallop dredge each dot represents a species group and mesh size

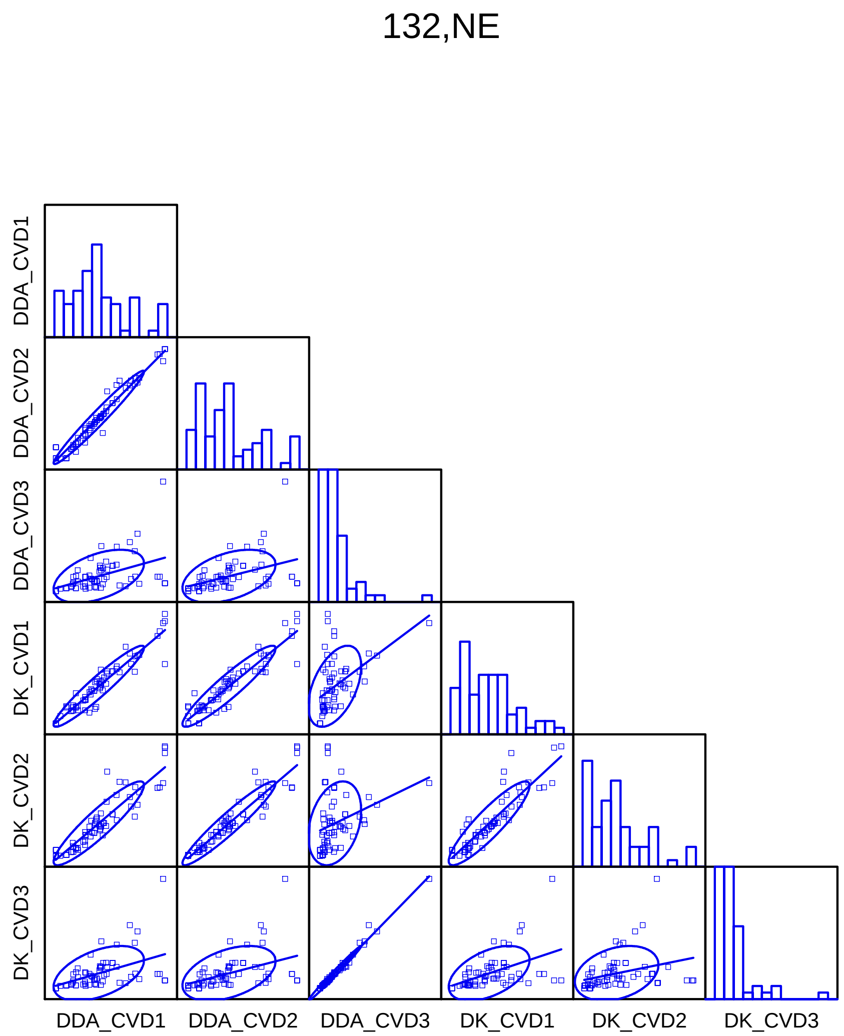


Figure B-5l. Comparisons of the CV of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England scallop dredge each dot represents a species group and mesh size

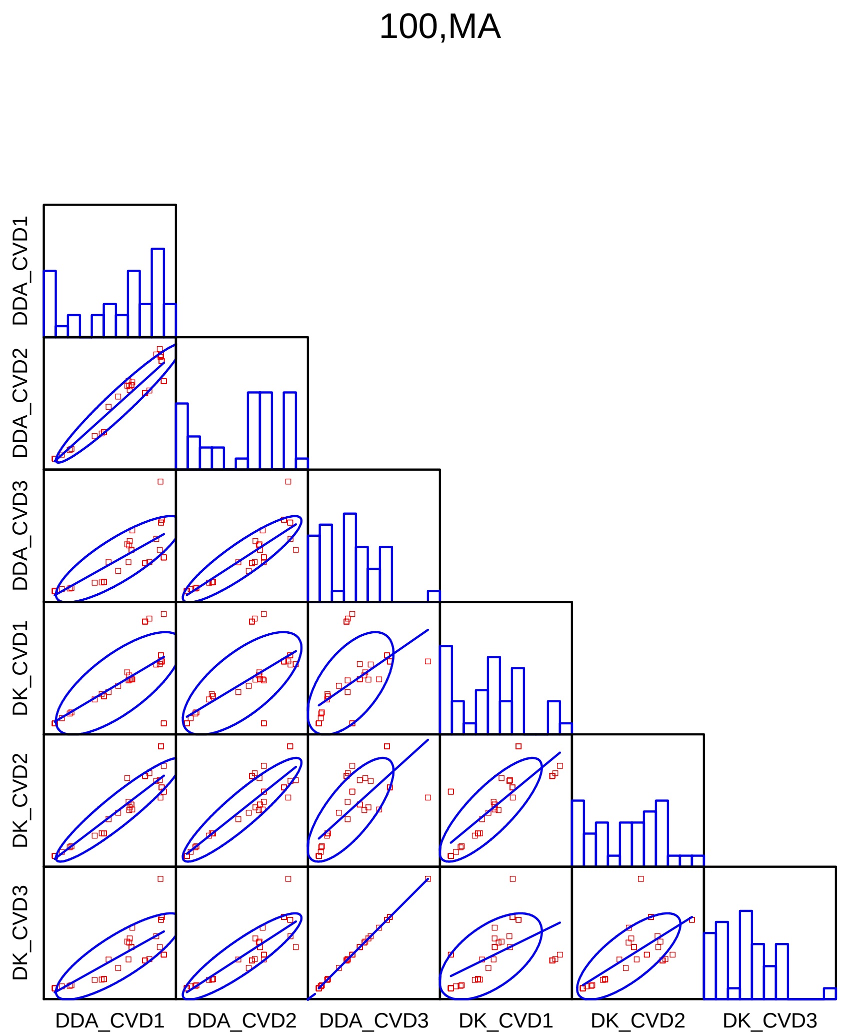


Figure B-5m. Comparisons of the CV of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for Mid-Atlantic gillnet each dot represents a species group and mesh size.

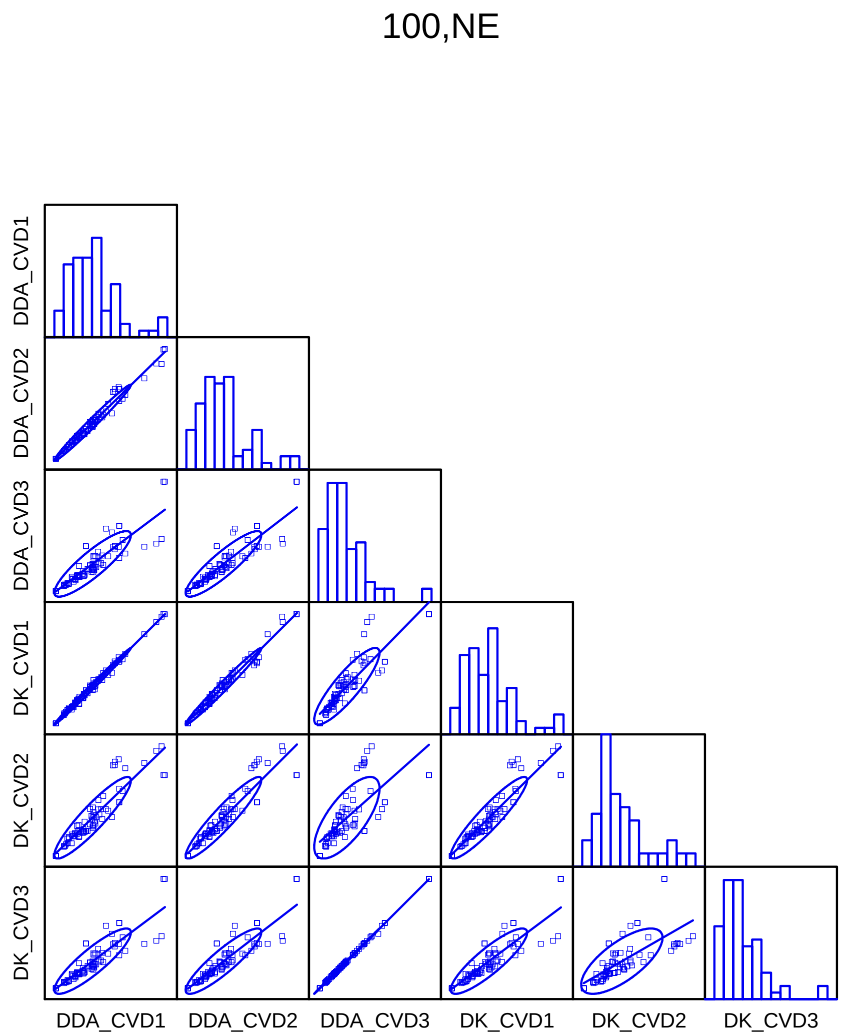
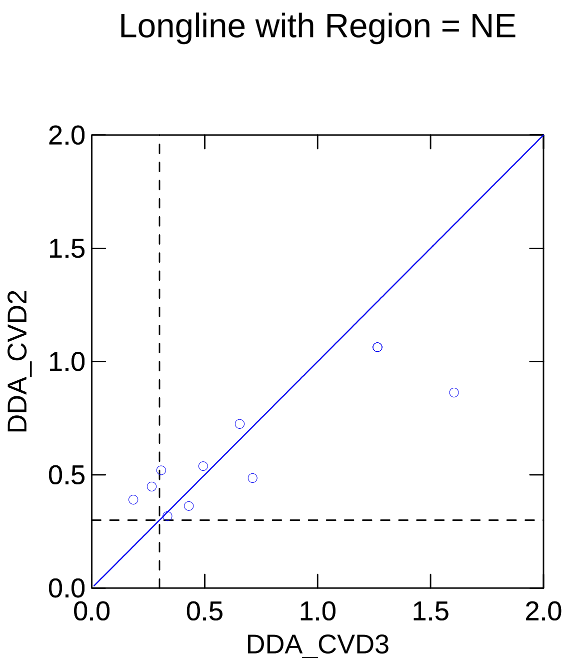


Figure B-5n. Comparisons of the CV of total discards derived by the two bycatch ratios (discard-to-days-absent [DDA] and discard-to-kept [DK]) and the three methods (separate ratio [D1], combined ratio [D2] and simple expansion [D3]) for New England gillnet each dot represents a species group and mesh size.



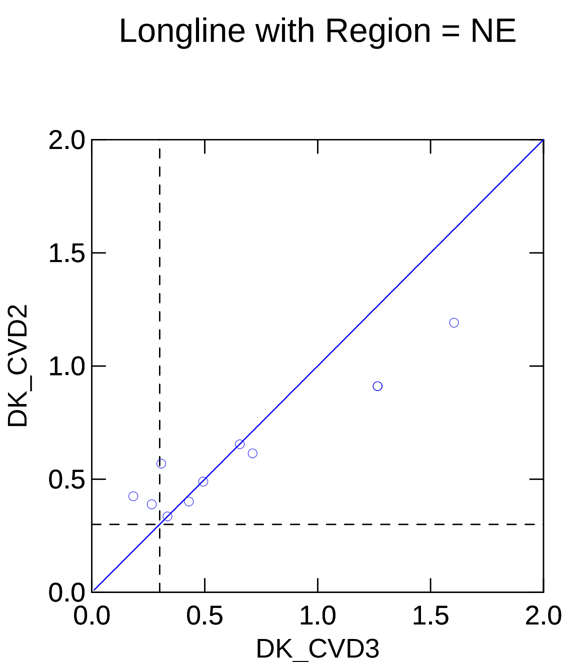


Figure B-6a. Comparisons of CV of total discards estimated via the combined ratio method (CVD2) and the simple expansion method (CVD3) for discard-to-days-absent (DDA), top panel, and discard-to-kept (DK), bottom panel, for New England longline; each dot represents a species group and mesh size.

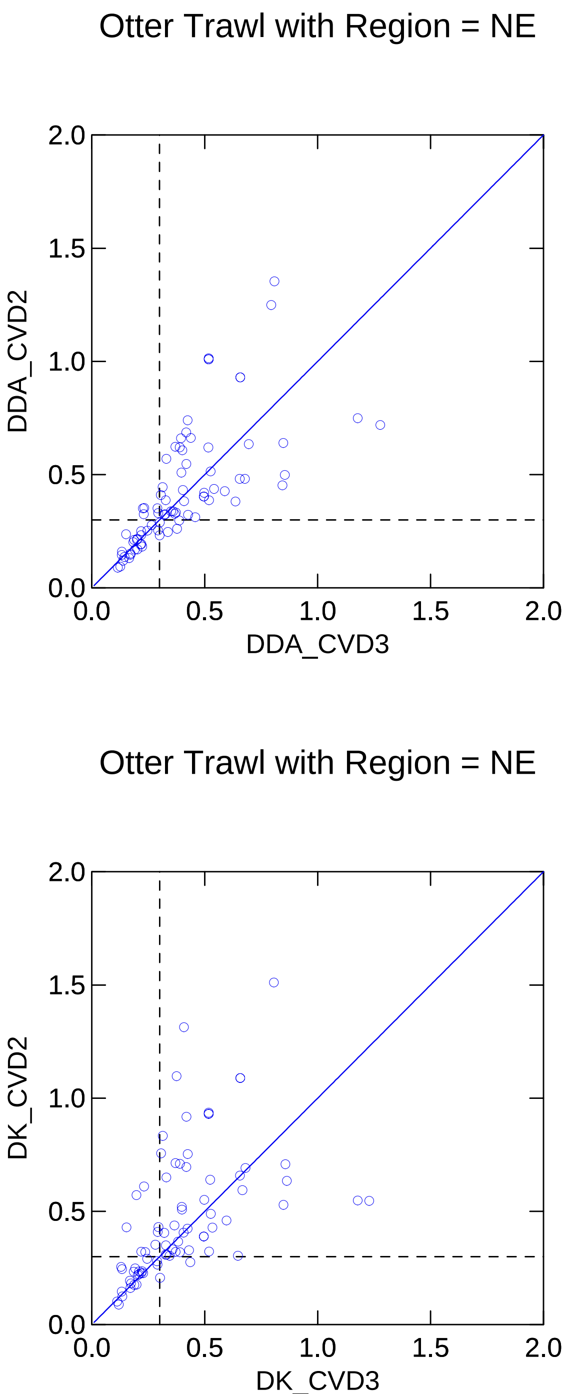


Figure B-6b. Comparisons of CV of total discards estimated via the combined ratio method (CVD2) and the simple expansion method (CVD3)for discard-to-days-absent (DDA), top panel, and discard-to-kept (DK), bottom panel, for New England otter trawl; each dot represents a species group and mesh size.

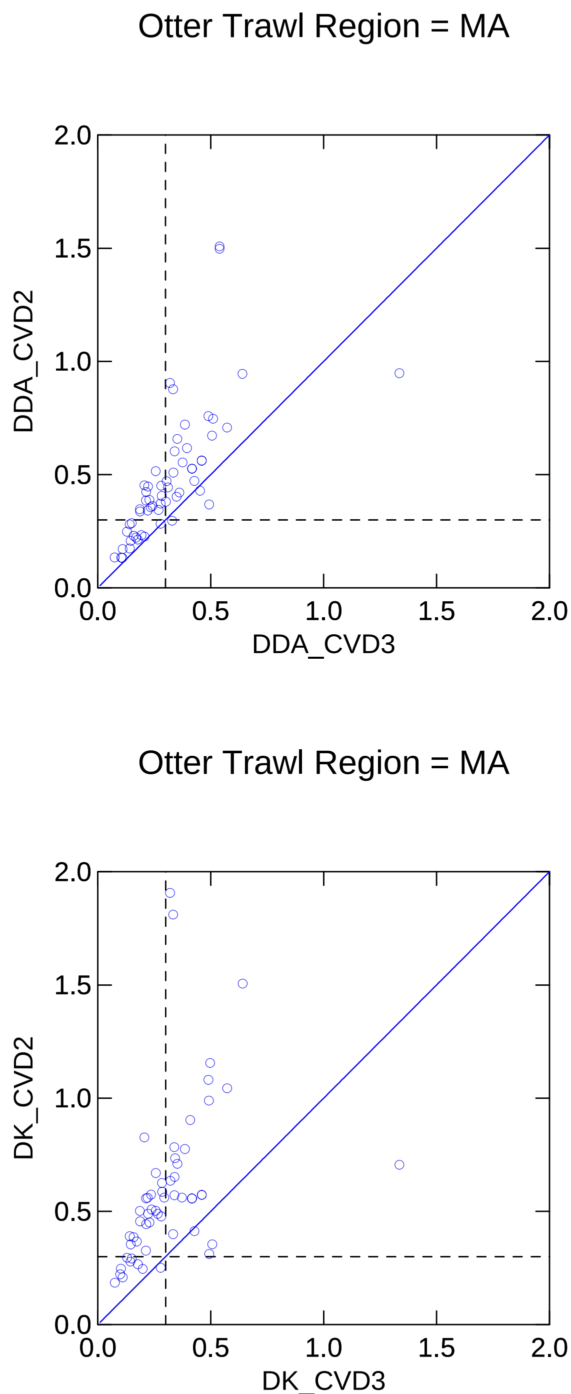


Figure B-6c. Comparisons of CV of total discards estimated via the combined ratio method (CVD2) and the simple expansion method (CVD3)for discard-to-days-absent (DDA), top panel, and discard-to-kept (DK), bottom panel, for Mid-Atlantic otter trawl; each dot represents a species group and mesh size.

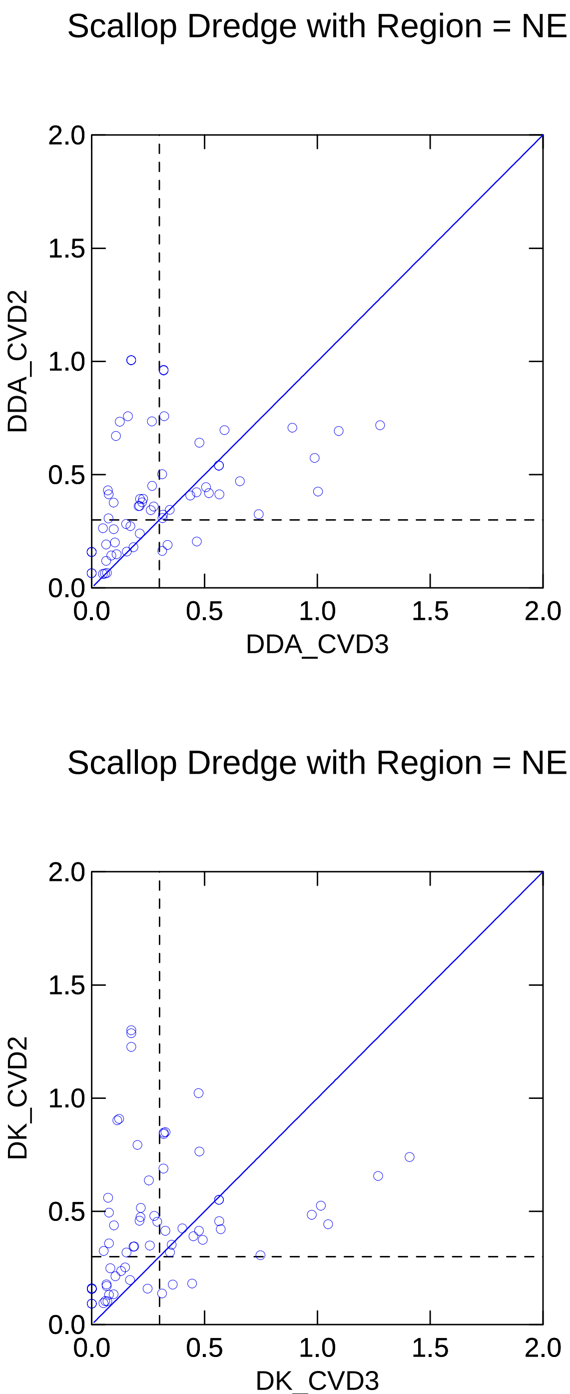


Figure B-6d. Comparisons of CV of total discards estimated via the combined ratio method (CVD2) and the simple expansion method (CVD3) for discard-to-days-absent (DDA), top panel, and discard-to-kept (DK), bottom panel, for New England scallop dredge; each dot represents a species group and mesh size.

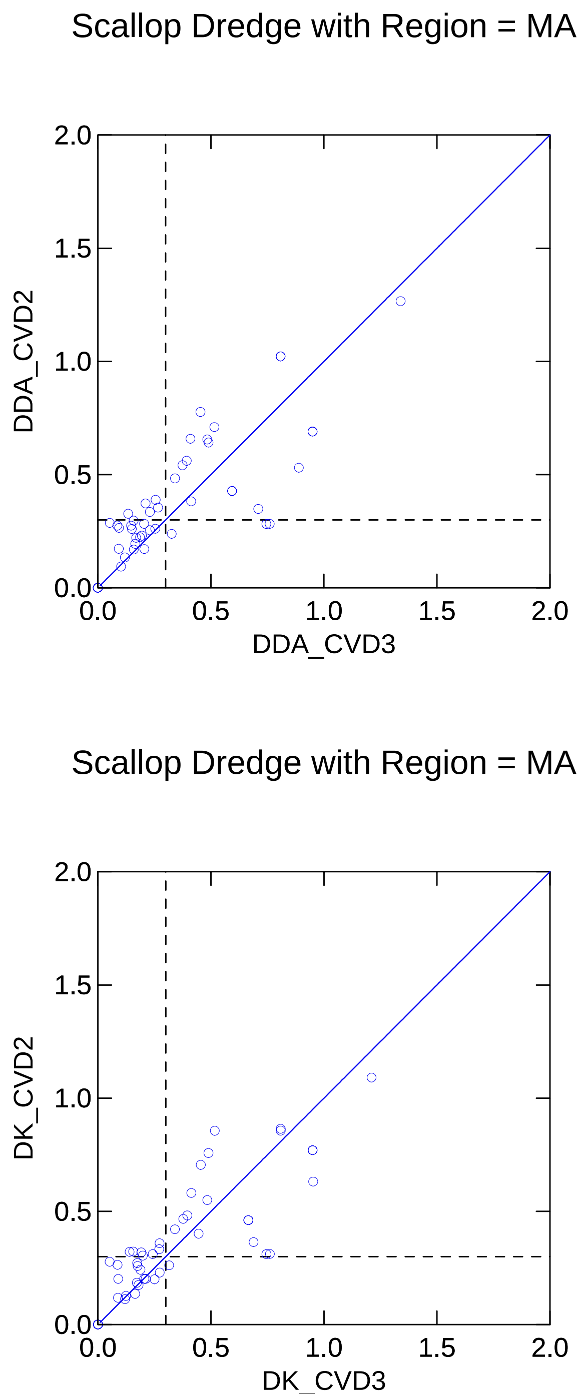


Figure B-6e. Comparisons of CV of total discards estimated via the combined ratio method (CVD2) and the simple expansion method (CVD3) for discard-to-days-absent (DDA), top panel, and discard-to-kept (DK), bottom panel, for Mid-Atlantic otter trawl; each dot represents a species group and mesh size.

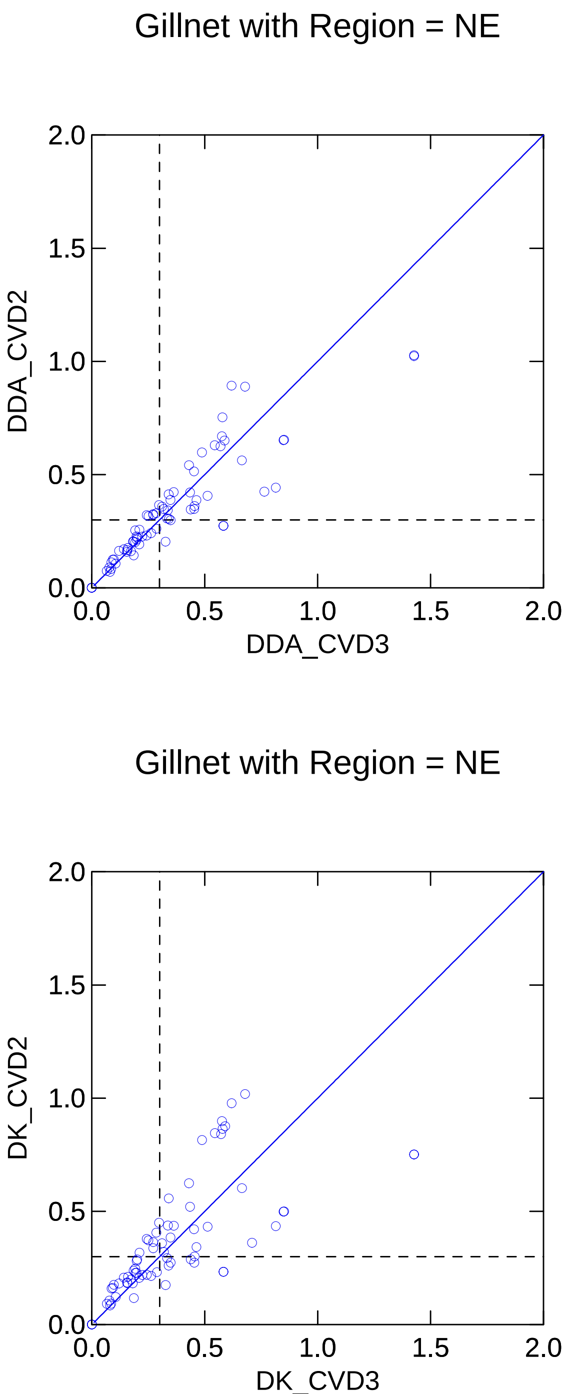


Figure B-6f. Comparisons of CV of total discards estimated via the combined ratio method (CVD2) and the simple expansion method (CVD3) for discard-to-days-absent (DDA), top panel, and discard-to-kept (DK), bottom panel, for New England gillnet; each dot represents a species group and mesh size.

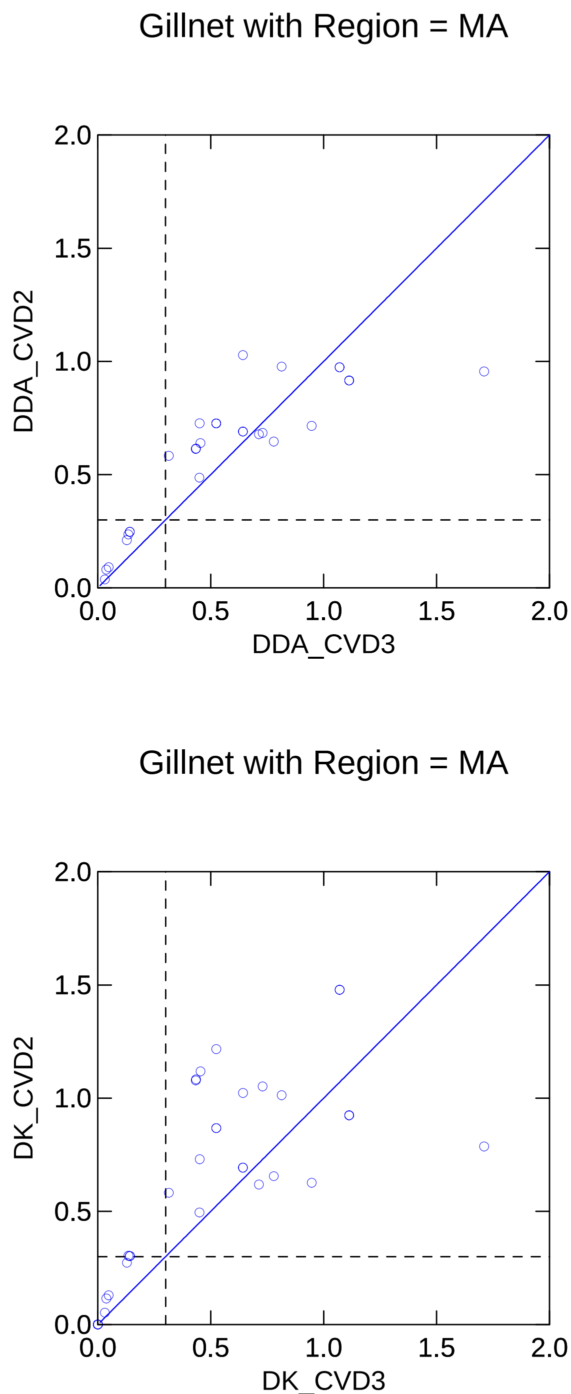
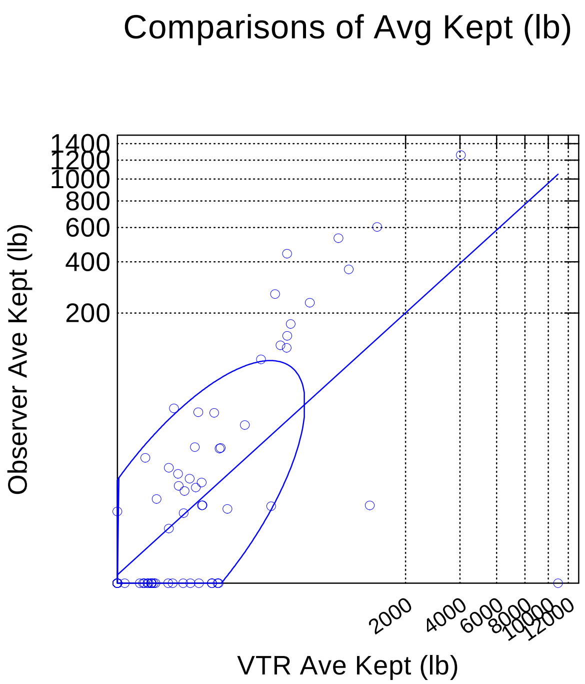
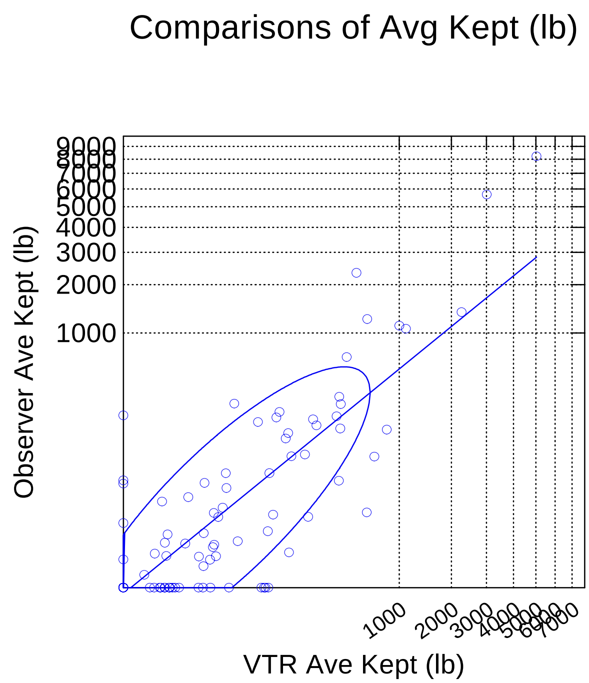


Figure B-6g. Comparisons of CV of total discards estimated via the combined ratio method (CVD2) and the simple expansion method (CVD3) for discard-to-days-absent (DDA), top panel, and discard-to-kept (DK), bottom panel, for Mid-Atlantic gillnet; each dot represents a species group and mesh size.

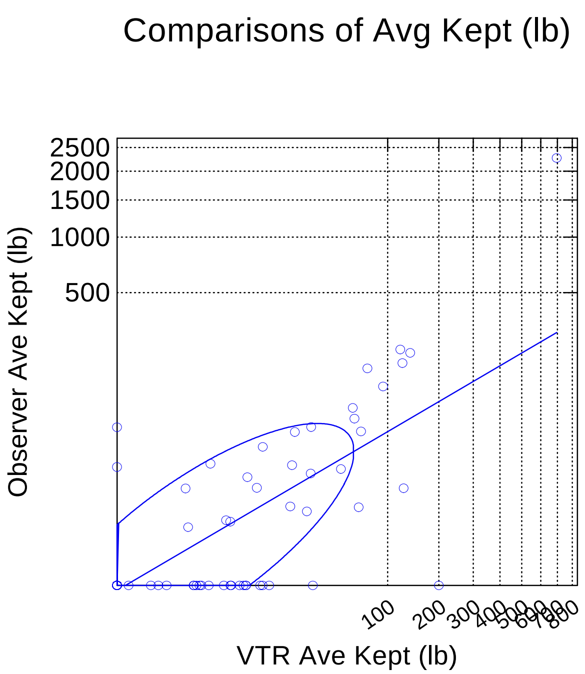
Bluefish



Fluke-Scup-Black Sea Bass



Spiny Dogfish



Northeast multispecies (Large-mesh)

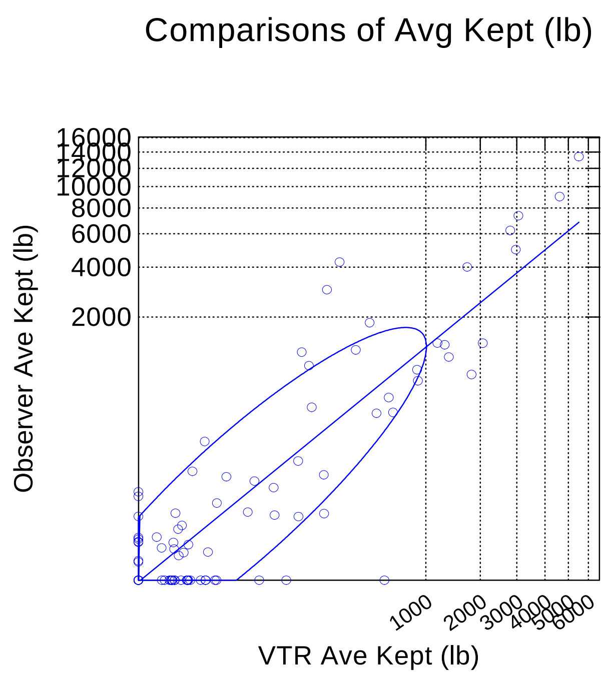
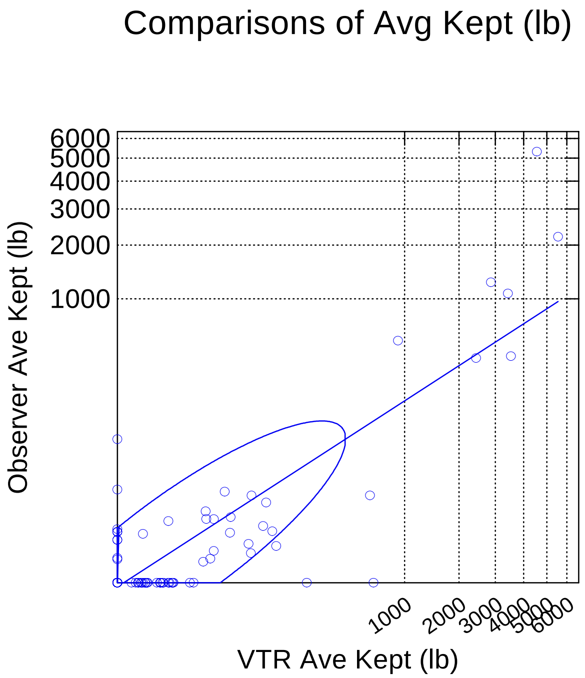
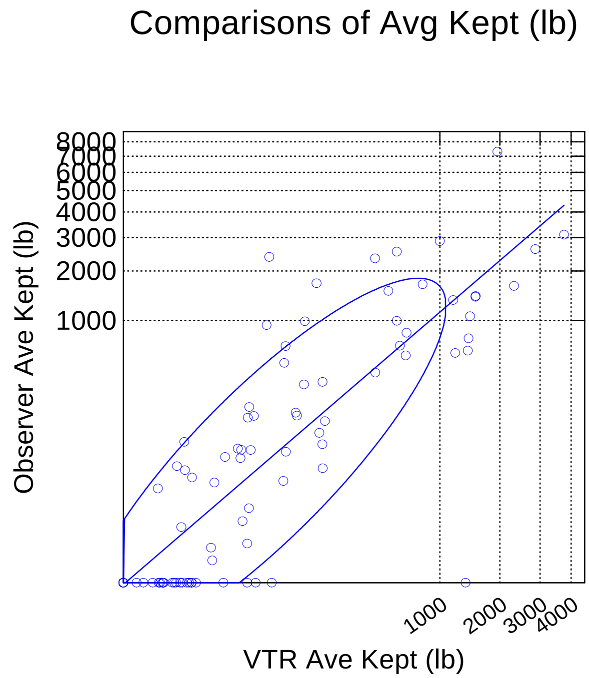


Figure B-7. Comparisons of average kept pounds (fourth root transformation used), by species group, in the Northeast Fisheries Observer Program and FVTR data sets for 2004. Each dot represents the mean of an individual stratum (fleet).

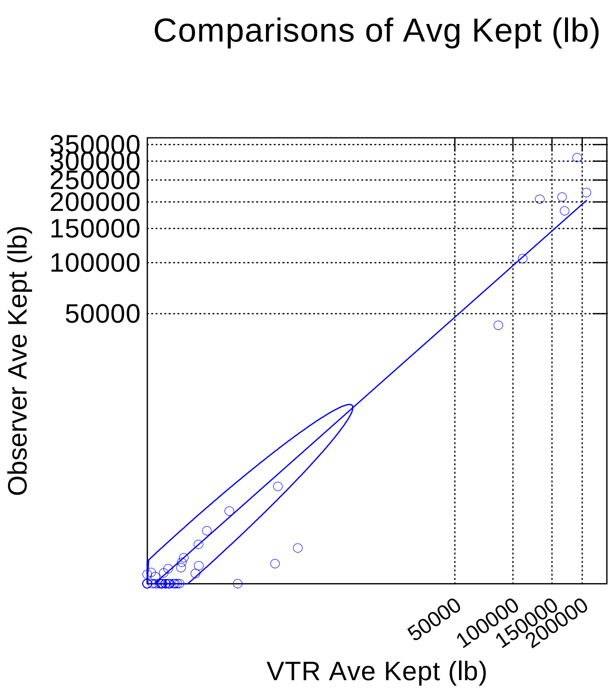
Northeast multispecies (Small-mesh)



Monkfish



Herring



Red Crab

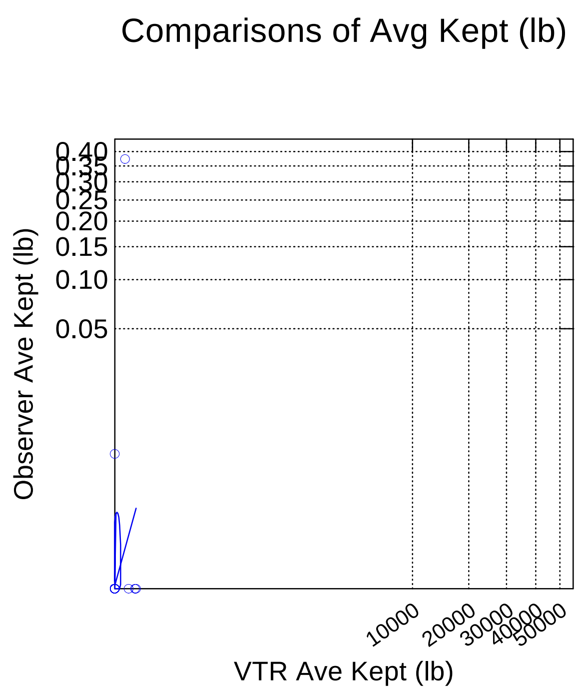
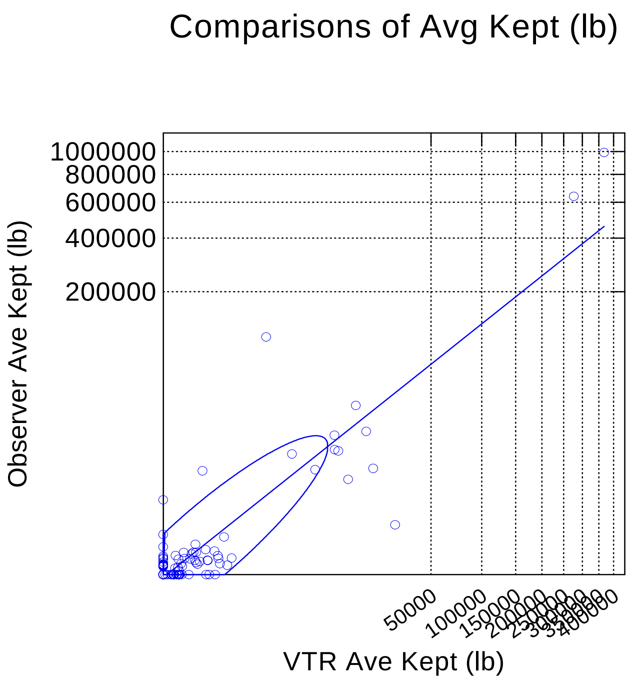
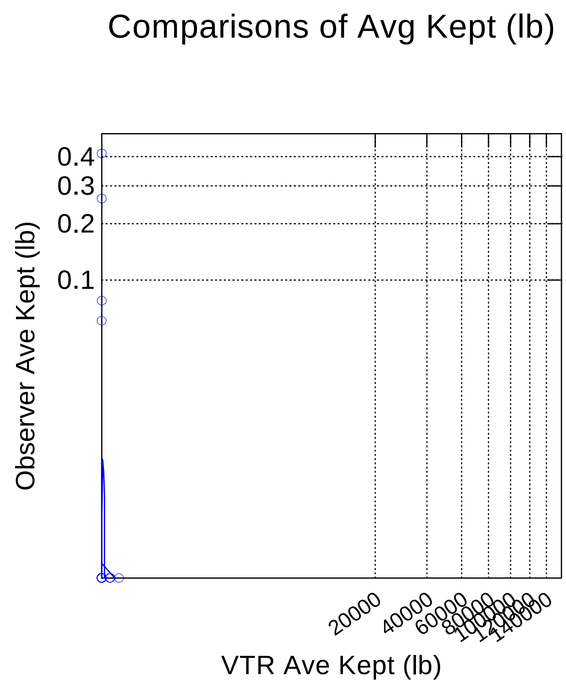


Figure B-7 continued. Comparisons of average kept pounds (fourth root transformation used), by species group, in the Northeast Fisheries Observer Program and FVTR data sets for 2004. Each dot represents the mean of an individual stratum (fleet).

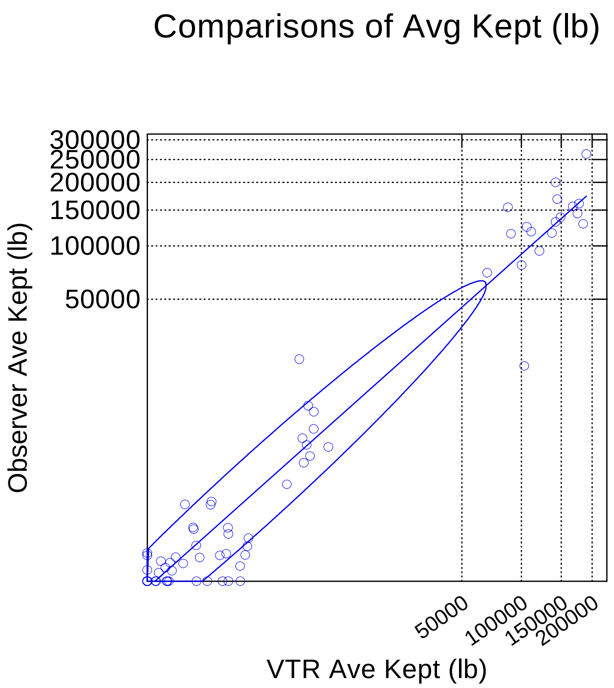
Mackerel-Squid-Butterfish



Surfclam – Ocean Quahog



Scallops



Skate Complex

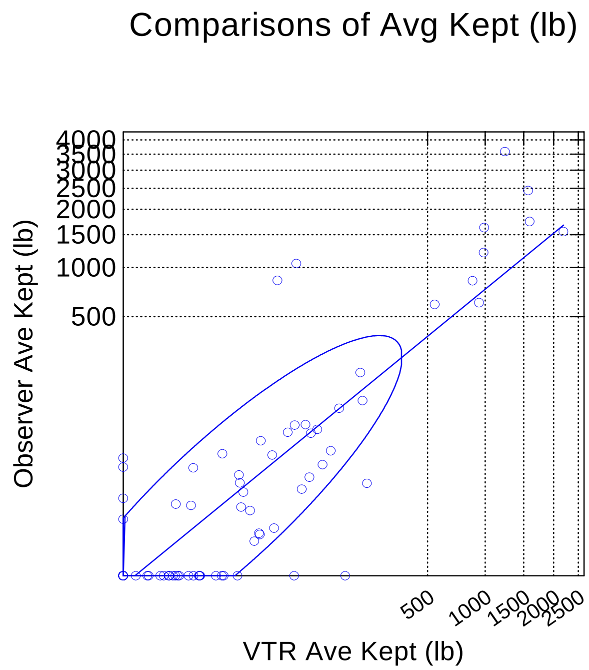
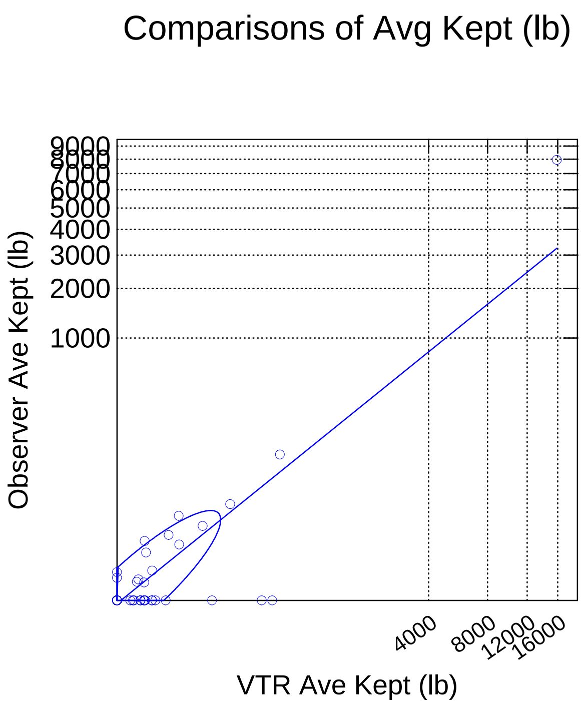


Figure B-7 continued. Comparisons of average kept pounds (fourth root transformation used), by species group, in the Northeast Fisheries Observer Program and FVTR data sets for 2004. Each dot represents the mean of an individual stratum (fleet).

Tilefish



All Species

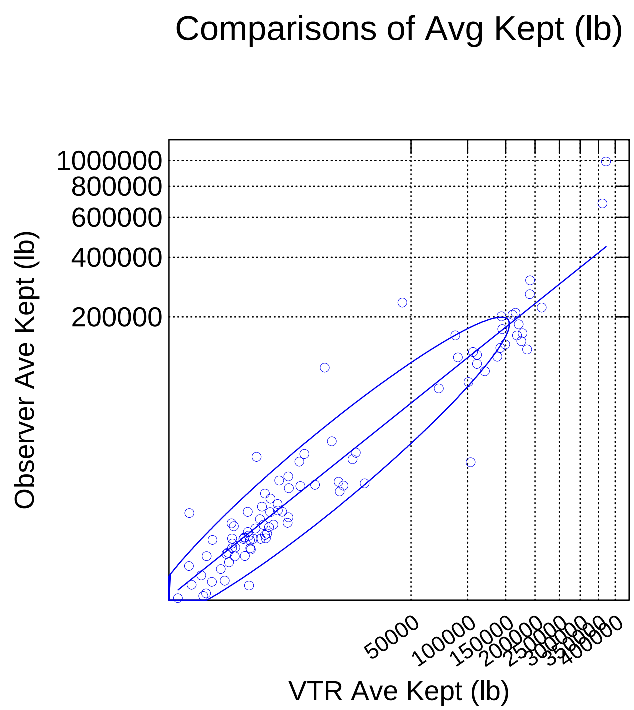
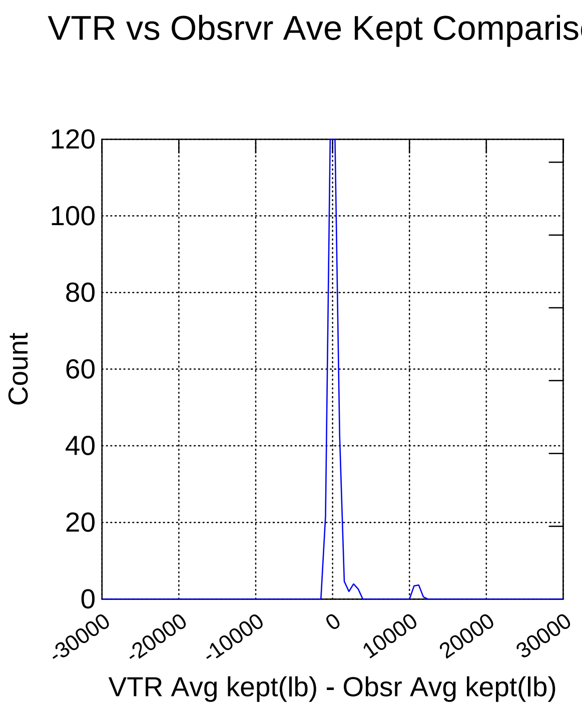
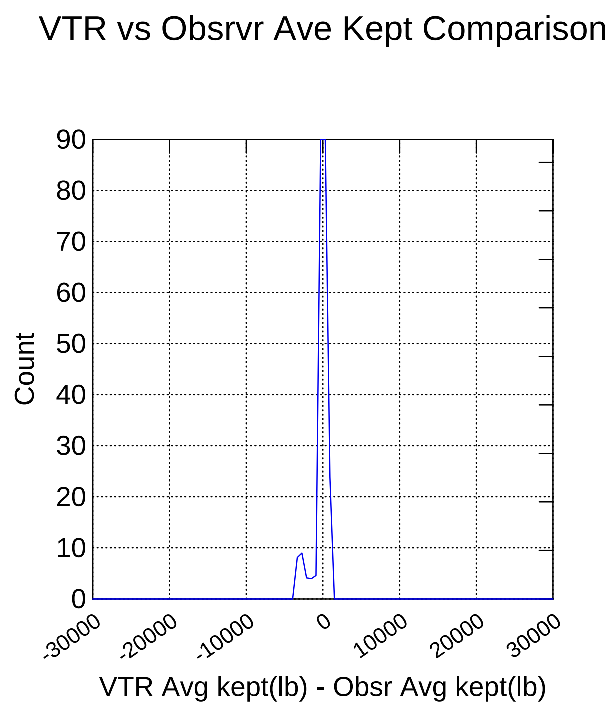


Figure B-7 continued. Comparisons of average kept pounds (fourth root transformation used), by species group, in the Northeast Fisheries Observer Program and FVTR data sets for 2004. Each dot represents the mean of an individual stratum (fleet).

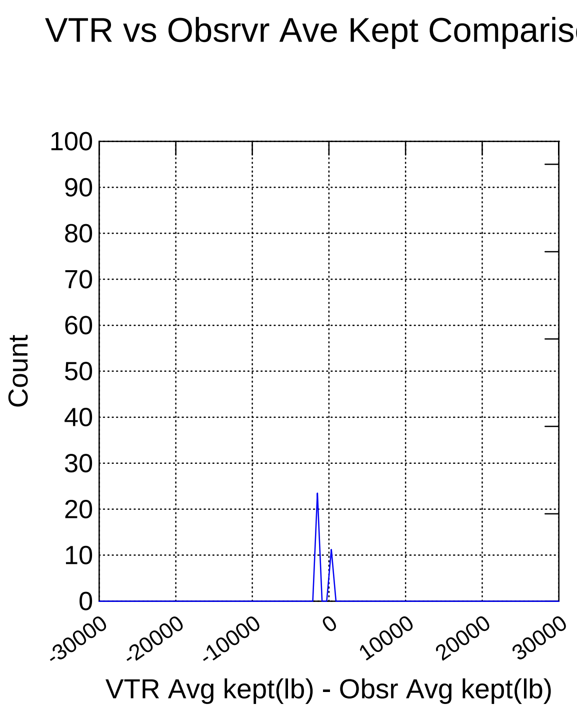
Bluefish



Fluke-Scup-Black Sea Bass



Spiny Dogfish



Northeast multispecies (Large-mesh)

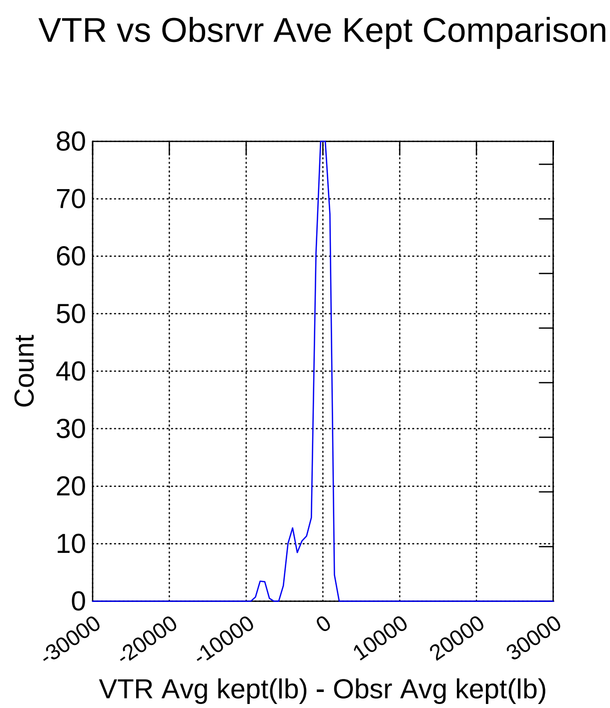
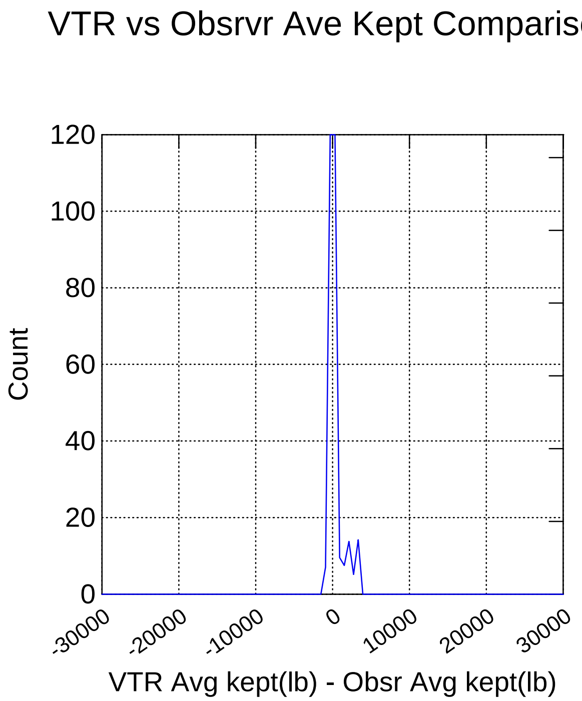
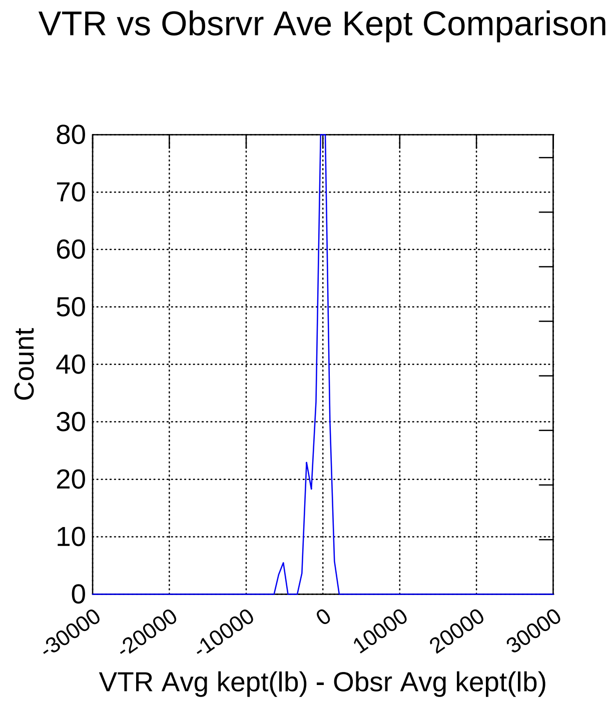


Figure B-8. The distribution of differences in the average kept pounds of species groups in the Northeast Fisheries Observer Program and the FVTR data for 2004.

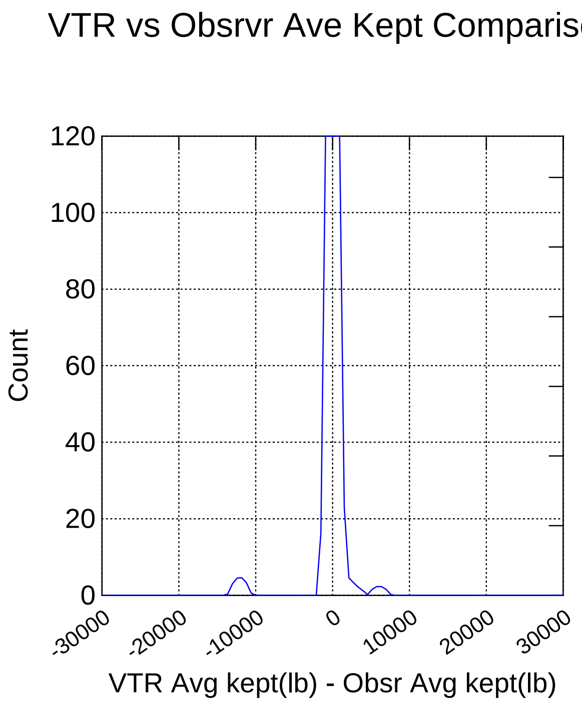
Northeast multispecies (Small-mesh)



Monkfish



Herring



Mackerel-Squid-Butterfish

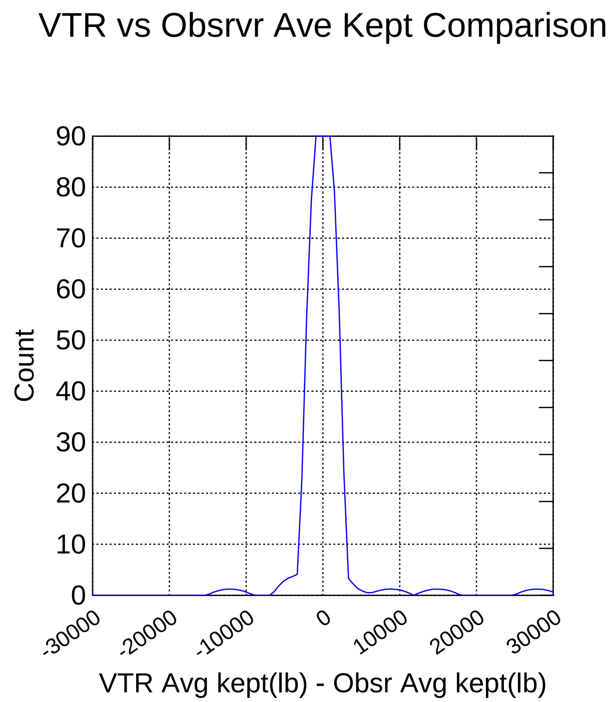
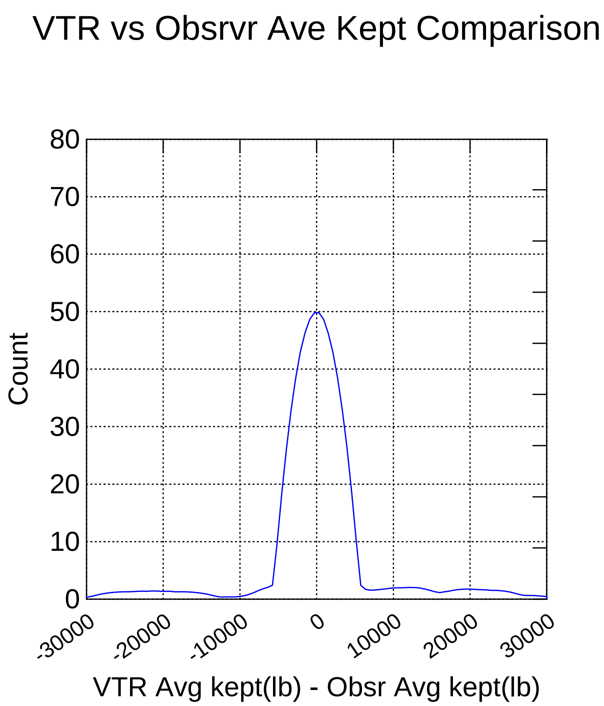
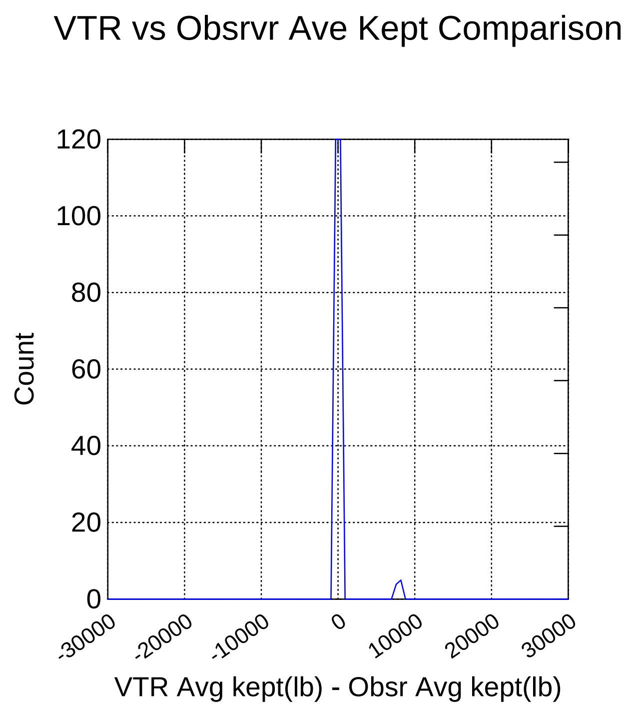


Figure B-8 continued. The distribution of differences in the average kept pounds of species groups in the Northeast Fisheries Observer Program and the FVTR data for 2004.

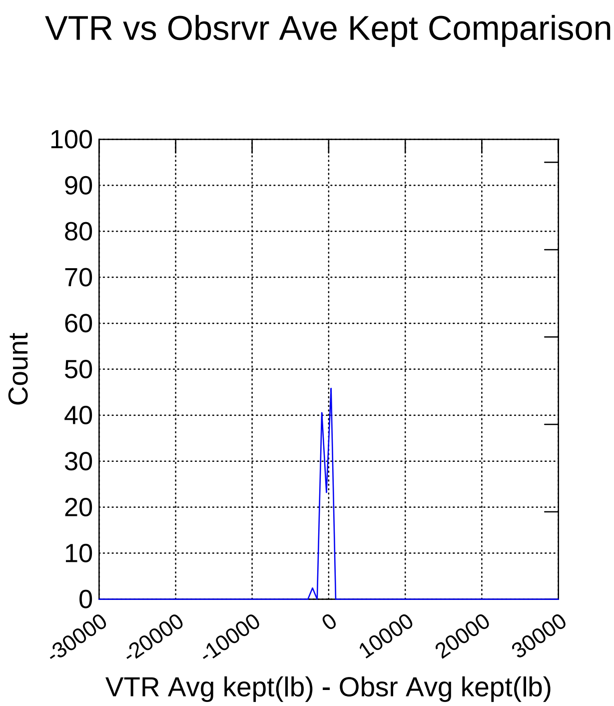
Scallops



Tilefish



Skate Complex



All species

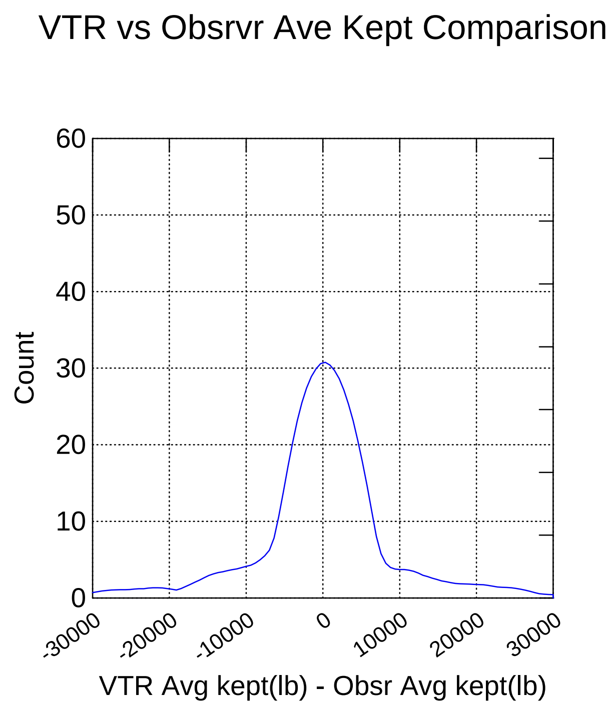
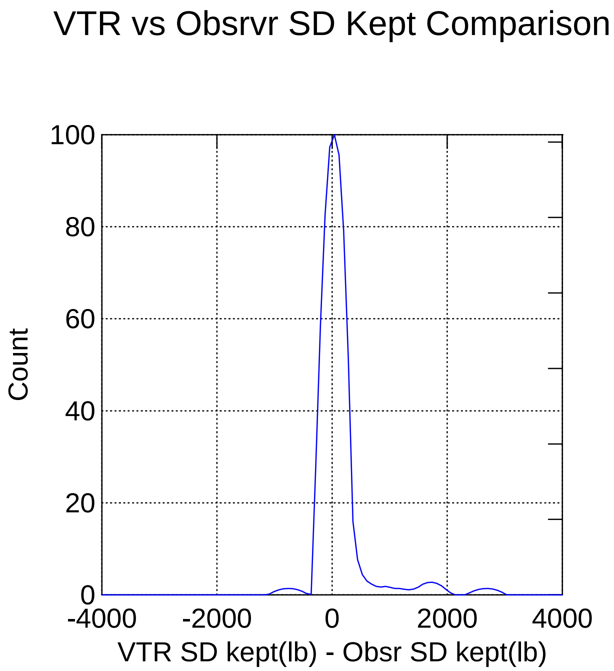
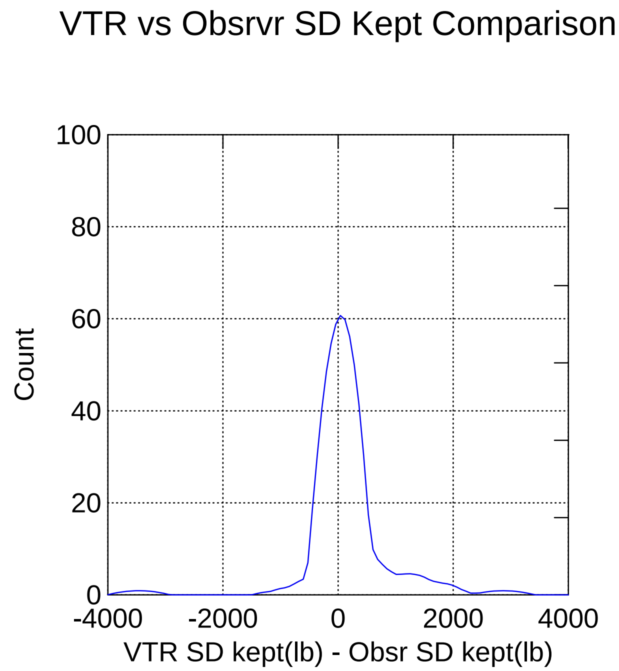


Figure B-8 continued. The distribution of differences in the average kept pounds of species groups in the Northeast Fisheries Observer Program and the FVTR data for 2004.

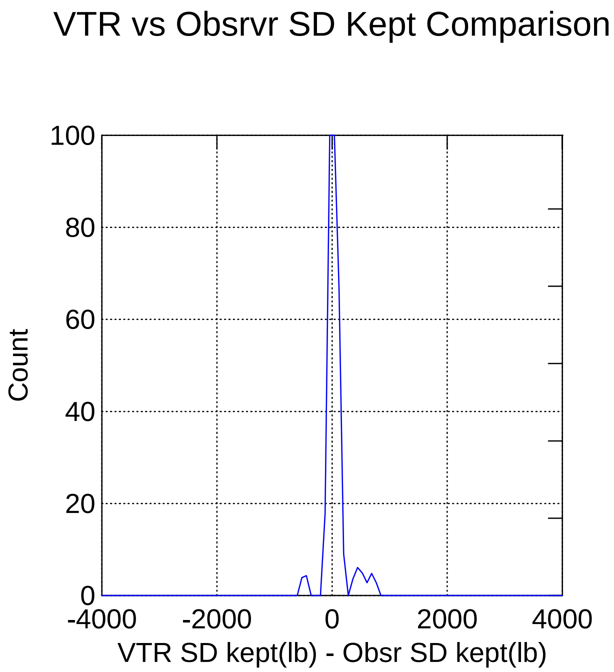
Bluefish



Fluke-Scup-Black Sea Bass



Spiny Dogfish



Northeast multispecies (Large-mesh)

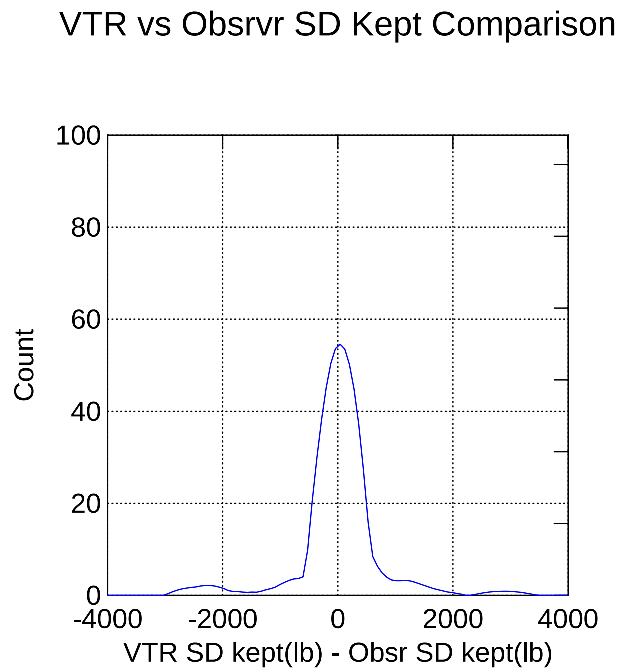
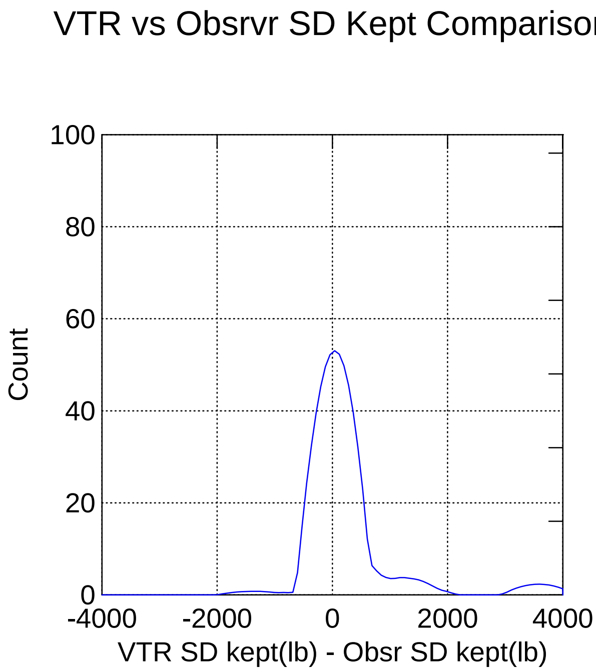
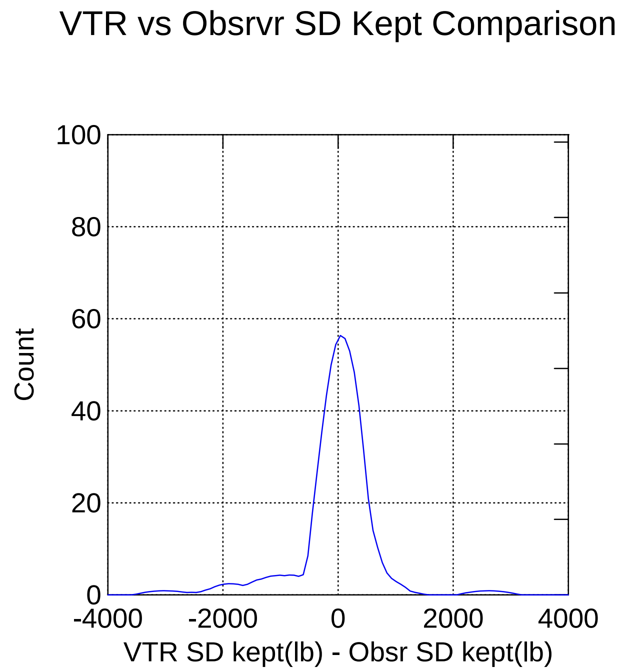


Figure B-9. The distribution of difference between the standard deviation of average kept pounds of species groups in the Northeast Fisheries Observer Program and the FVTR data for 2004.

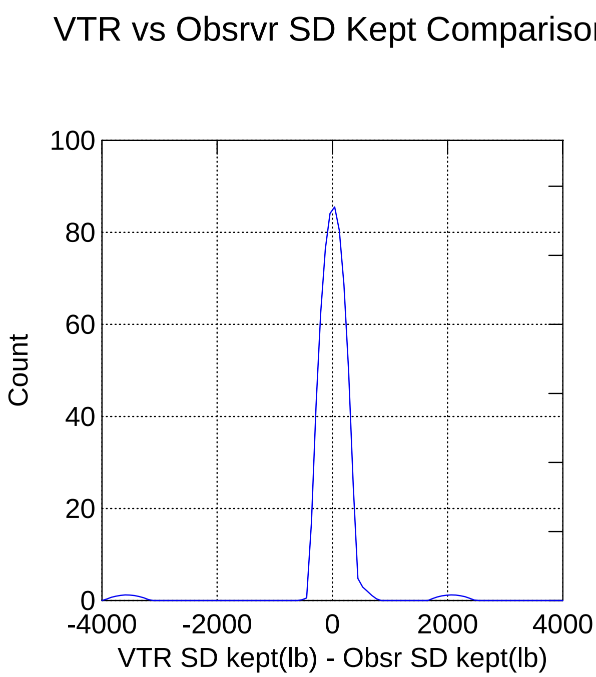
Northeast multispecies (small-mesh)



Monkfish



Herring



Mackerel-Squid-butterfish

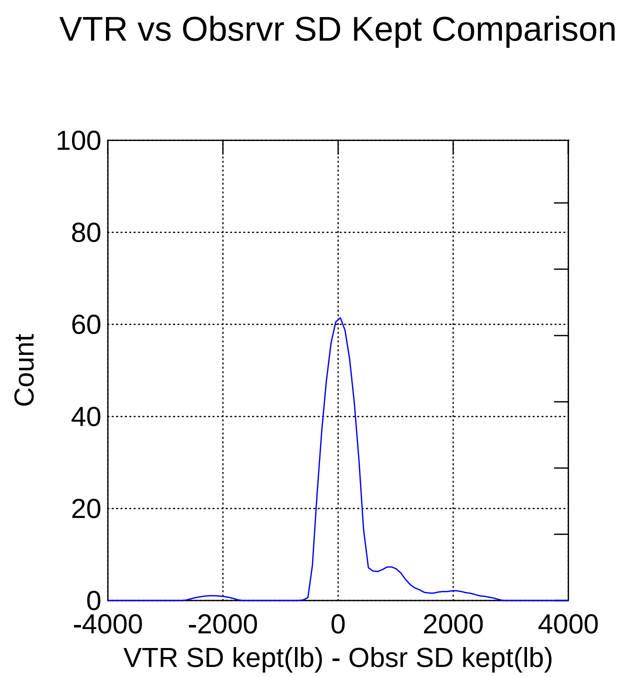
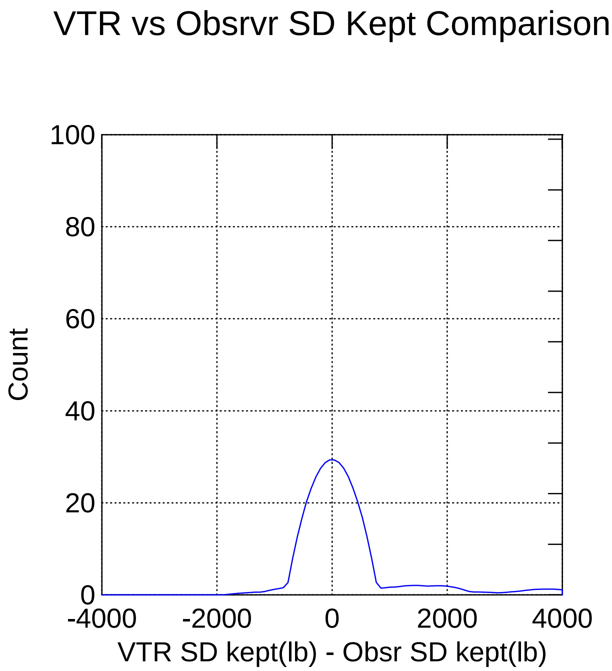
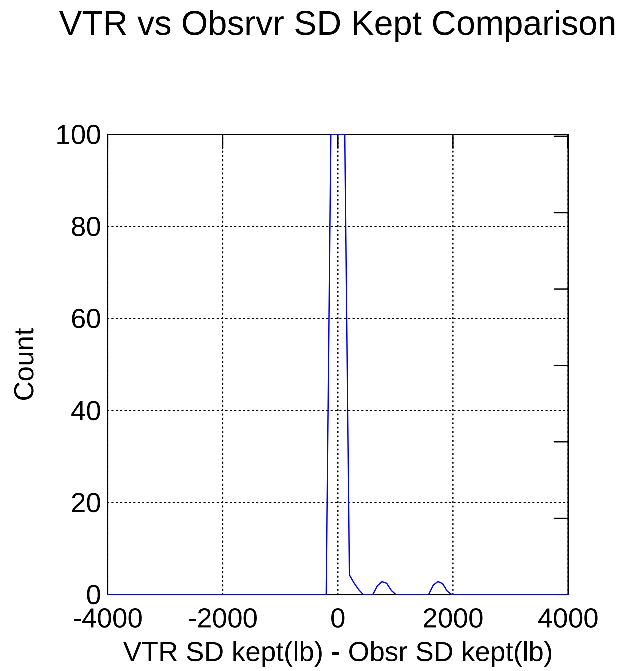


Figure B-9 continued. The distribution of difference between the standard deviation of average kept pounds of species groups in the Northeast Fisheries Observer Program and the FVTR data for 2004.

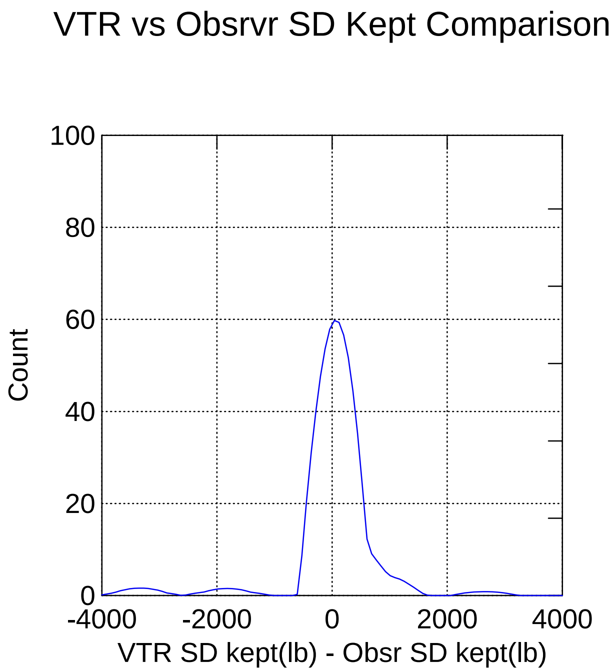
Scallop



Tilefish



Skate Complex



All Species

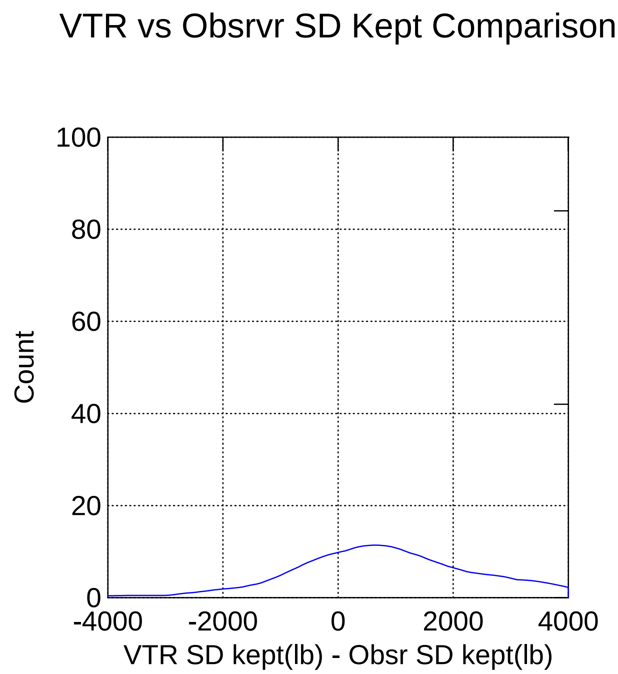


Figure B-9 continued. The distribution of difference between the standard deviation of average kept pounds of species groups in the Northeast Fisheries Observer Program and the FVTR data for 2004.

ALL TRIPS

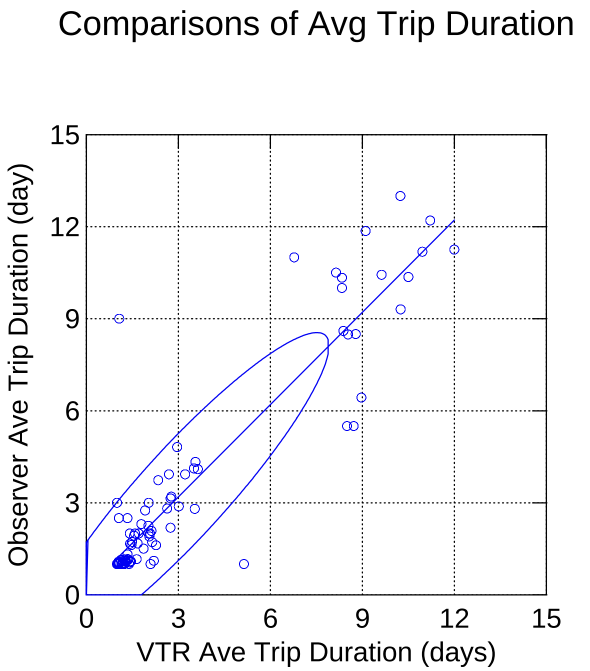
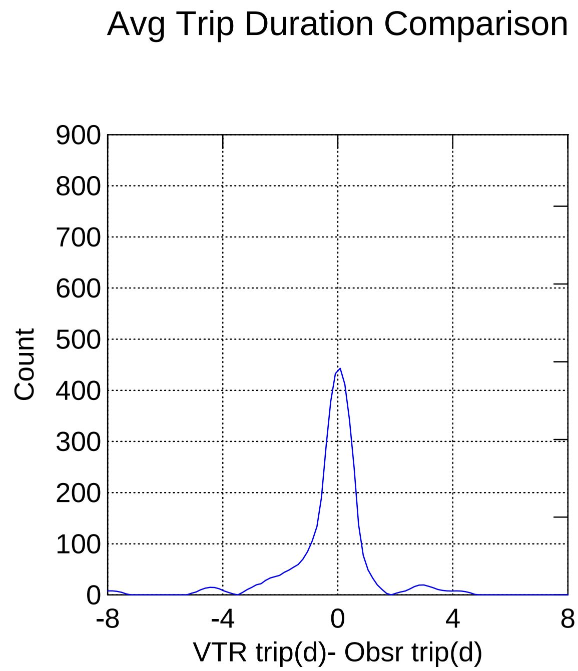


Figure B-10. Comparison of average trip duration (days) for all trips in the Northeast Fisheries Observer Program and FVTR data sets for 2004. Each dot represents the mean of an individual stratum (fleet).

ALL TRIPS



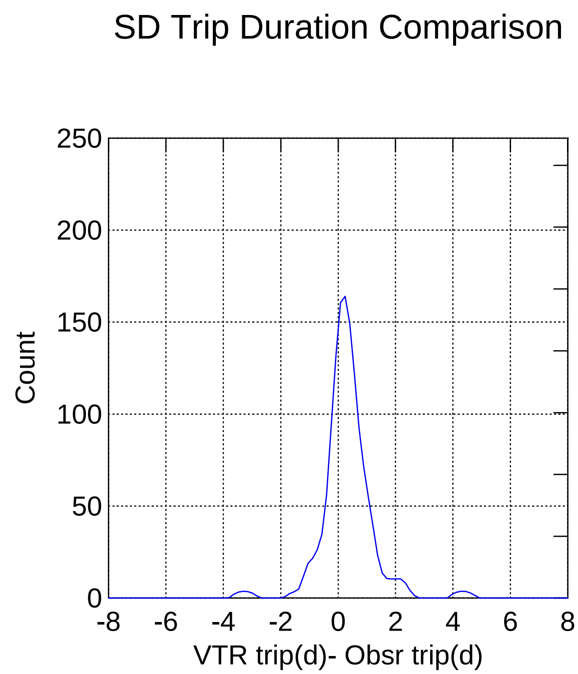


Figure B-11. The distribution of differences between the average trip duration (top), and standard deviation of average trip duration (bottom), for trips in the Northeast Fisheries Observer Program and the FVTR data for 2004

Table B-1. Precision (CV) of total composite discards, by species and fleet, based on 2004 observer data .

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	BLUEFISH	HERRING	SALMON	RED CRAB	SCALLOP	MACK-/SQUID-/BUTTERFISH	Mackerel	Illex	Loligo	Butterfish	MONKFISH
Longline	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*
Longline	all	all	MA	all											
Otter Trawl	all	all	NE	small	0.508	0.437	*	0.428	0.710	**0.227**	0.634	0.320	0.309	0.366	0.405
Otter Trawl	all	all	NE	large	2.474	1.313	*	**0.280**	0.350	0.572	0.520	1.097	0.610	0.756	**0.088**
Otter Trawl	all	all	MA	small	0.903	0.784	*	1.394	0.574	0.561	1.044	0.635	0.735	0.571	0.354
Otter Trawl	all	all	MA	large	1.906	0.775	*	*	0.444	0.390	0.489	0.710	0.456	0.502	**0.295**
Scallop Trawl	open	limited	MA	all	*	*	*	*	**0.000**	**0.000**	*	*	**0.000**	*	**0.000**
Scallop Trawl	open	general	MA	all	1.141	*	*	0.640	**0.224**	0.354	*	0.343	**0.252**	0.976	**0.194**
Shrimp Trawl	all	all	NE	all	*	0.479	*	*	0.965	0.981	*	*	*	0.981	**0.235**
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	**0.000**	**0.000**	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	large	**0.220**	**0.229**	*	0.625	0.969	0.841	0.876	1.067	*	1.520	**0.210**
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	**0.181**	0.378	*	0.998	0.421	0.498	0.500	*	*	0.906	**0.174**
Sink, Anchor, Drift Gillnet	all	all	MA	small	*	*	*	*	*	**0.000**	*	*	*	**0.000**	*
Sink, Anchor, Drift Gillnet	all	all	MA	large	1.216	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	0.304	*	*	*	0.587	*	*	*	*	*	**0.273**
Scallop Dredge	open	limited	NE	all	*	*	*	0.842	**0.159**	0.689	*	0.490	1.112	1.662	0.319
Scallop Dredge	open	limited	MA	all	*	*	*	1.304	**0.200**	0.305	1.304	0.514	0.383	0.620	**0.174**
Scallop Dredge	open	general	NE	all	*	*	*	*	**0.094**	1.274	*	1.274	*	*	0.560
Scallop Dredge	open	general	MA	all	*	*	*	*	0.359	0.865	*	*	0.865	*	**0.202**
Scallop Dredge	closed	limited	NE	all	1.077	**0.168**	*	0.482	**0.135**	0.421	**0.167**	**0.255**	0.468	**0.158**	**0.222**
Scallop Dredge	closed	limited	MA	all	1.208	0.660	*	0.357	**0.198**	0.310	0.648	0.338	0.638	0.303	**0.280**
Scallop Dredge	closed	general	NE	all											
Scallop Dredge	closed	general	MA	all	*	*	*	*	**0.000**	*	*	*	*	*	**0.000**
Mid-water paired & single Trawl	all	all	NE	all	0.770	0.770	*	*	1.464	0.429	0.430	0.872	1.457	1.387	0.724
Mid-water paired & single Trawl	all	all	MA	all	0.539	0.982	*	*	*	0.545	0.539	0.546	0.539	0.539	1.048
Fish Pots/ Traps	all	all	NE	all											
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	0.408
Purse Seine	all	all	NE	all	*	0.981	*	*	*	0.935	*	0.935	*	*	*
Purse Seine	all	all	MA	all											
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*
Hand Line	all	all	MA	all											
Scottish Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*
Clam Quahog Dredge	all	all	NE	all											
Clam Quahog Dredge	all	all	MA	all											
Crab Pots	all	all	NE	all											
Crab Pots	all	all	MA	all											
Lobster Pots	all	all	NE	all											
Lobster Pots	all	all	MA	all											

Note: when discard ratio = 0, CV is null (*); Gray-shaded cells indicate unlikely species/gear combinations.

Table B-1 *continued.* Precision (CV) of total composite discards, by species and fleet, based on 2004 observer data .

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	NE MULTI-SPP (LARGE-MESH)	Cod	Haddock	Yellowtail fld	American plaice	Witch fld	Winter fld	Pollock	Redfish	White hake	Windowpane	Halibut	Ocean pout
Longline	all	all	NE	all	0.335	0.401	0.389	*	*	*	*	1.191	*	*	*	*	0.569
Longline	all	all	MA	all													
Otter Trawl	all	all	NE	small	**0.233**	0.658	0.696	0.409	0.304	0.332	0.430	0.546	0.593	0.459	**0.291**	0.753	0.321
Otter Trawl	all	all	NE	large	**0.101**	**0.176**	**0.265**	**0.222**	**0.254**	**0.145**	0.429	0.640	**0.248**	**0.235**	**0.206**	0.424	**0.161**
Otter Trawl	all	all	MA	small	0.326	*	*	1.081	1.476	0.489	0.561	*	0.905	0.989	0.399	*	1.506
Otter Trawl	all	all	MA	large	**0.251**	3.122	*	0.669	*	**0.292**	0.413	3.122	0.974	3.133	0.312	*	0.477
Scallop Trawl	open	limited	MA	all	**0.000**	*	*	*	*	*	*	*	*	*	**0.000**	*	*
Scallop Trawl	open	general	MA	all	**0.170**	*	*	1.036	*	0.471	0.464	*	*	0.640	**0.237**	*	*
Shrimp Trawl	all	all	NE	all	**0.224**	0.352	0.659	0.552	0.305	0.928	**0.269**	0.473	0.374	**0.232**	**0.207**	*	0.960
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	large	**0.092**	**0.121**	**0.186**	**0.198**	**0.281**	0.406	**0.288**	**0.182**	**0.261**	**0.231**	0.432	0.449	0.437
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	**0.159**	**0.175**	**0.246**	0.361	0.337	1.018	0.557	0.317	0.364	0.372	0.815	0.436	0.421
Sink, Anchor, Drift Gillnet	all	all	MA	small	*	*	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	large	0.868	*	*	*	*	*	*	*	*	*	0.868	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	*	*	*	*	*	*	*	*	*	*	*	*	*
Scallop Dredge	open	limited	NE	all	0.480	0.850	0.848	0.637	0.848	0.485	1.022	0.848	*	0.525	0.454	*	0.656
Scallop Dredge	open	limited	MA	all	**0.242**	*	*	0.705	0.809	0.496	0.581	*	*	0.521	0.323	*	1.091
Scallop Dredge	open	general	NE	all	0.358	1.226	*	0.494	0.908	0.902	**0.213**	*	*	*	0.438	*	1.287
Scallop Dredge	open	general	MA	all	0.311	*	*	0.865	0.857	0.650	0.421	*	*	0.653	0.333	*	*
Scallop Dredge	closed	limited	NE	all	**0.159**	0.510	0.423	**0.211**	0.829	**0.188**	**0.200**	*	*	0.478	0.355	**0.179**	0.427
Scallop Dredge	closed	limited	MA	all	0.712	*	*	1.256	0.320	0.350	1.269	*	*	0.602	0.886	*	1.239
Scallop Dredge	closed	general	NE	all													
Scallop Dredge	closed	general	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Mid-water paired & single Trawl	all	all	NE	all	0.669	1.198	0.951	*	1.155	1.203	1.298	0.967	0.996	1.604	*	*	*
Mid-water paired & single Trawl	all	all	MA	all	0.708	*	*	*	*	1.146	*	*	*	0.541	*	*	*
Fish Pots/ Traps	all	all	NE	all													
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Purse Seine	all	all	NE	all	0.973	*	*	*	*	*	*	*	0.973	*	*	*	*
Purse Seine	all	all	MA	all													
Hand Line	all	all	NE	all	4.030	4.030	*	*	*	*	*	*	*	*	*	*	*
Hand Line	all	all	MA	all													
Scottish Seine	all	all	NE	all	**0.289**	**0.279**	**0.279**	*	**0.279**	*	0.543	*	*	**0.279**	0.354	*	*
Clam Quahog Dredge	all	all	NE	all													
Clam Quahog Dredge	all	all	MA	all													
Crab Pots	all	all	NE	all													
Crab Pots	all	all	MA	all													
Lobster Pots	all	all	NE	all													
Lobster Pots	all	all	MA	all													

Note: when discard ratio = 0, CV is null (*); Gray-shaded cells indicate unlikely species/gear combinations.

Table B-1 *continued*. Precision (CV) of total composite discards, by species and fleet, based on 2004 observer data .

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	NE MULTI-SPP (SMALL-MESH)	Silver hake	Offshore hake	Red hake	SKATE	DOGFISH	FLUKE/-SCUP/-BLK SEA BASS	Fluke	Scup	Black sea bass	SURF CLAM/-OCEAN QUAHOG	TILEFISH
Longline	all	all	NE	all	0.910	*	*	0.910	0.614	0.654	*	*	*	*	*	*
Longline	all	all	MA	all												
Otter Trawl	all	all	NE	small	**0.235**	**0.219**	1.511	0.406	0.691	0.322	0.309	**0.276**	0.551	0.708	1.028	0.304
Otter Trawl	all	all	NE	large	**0.182**	**0.227**	0.322	0.353	**0.175**	**0.245**	0.319	0.328	0.918	0.833	1.512	0.529
Otter Trawl	all	all	MA	small	0.508	0.625	0.683	0.587	**0.222**	0.367	0.386	**0.278**	0.560	0.502	0.464	1.155
Otter Trawl	all	all	MA	large	0.827	0.451	*	1.811	**0.209**	0.557	**0.246**	**0.266**	0.354	0.652	0.609	*
Scallop Trawl	open	limited	MA	all	*	*	*	*	**0.000**	*	**0.000**	**0.000**	*	**0.000**	*	*
Scallop Trawl	open	general	MA	all	0.496	0.508	*	1.141	0.347	0.675	0.505	0.608	0.731	0.638	*	*
Shrimp Trawl	all	all	NE	all	0.557	0.567	*	0.537	0.799	0.960	*	*	*	*	*	*
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	**0.000**	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	large	**0.183**	**0.238**	*	**0.219**	**0.228**	**0.106**	0.845	0.898	*	1.602	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	0.624	**0.207**	*	0.864	**0.117**	**0.162**	**0.233**	**0.233**	0.904	*	*	**0.256**
Sink, Anchor, Drift Gillnet	all	all	MA	small	*	*	*	*	*	**0.000**	**0.000**	**0.000**	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	large	*	*	*	*	1.118	1.083	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	*	*	*	*	**0.115**	**0.129**	0.303	0.303	*	*	*	*
Scallop Dredge	open	limited	NE	all	0.414	0.764	1.173	0.352	**0.236**	0.515	0.458	0.474	0.322	0.622	0.391	*
Scallop Dredge	open	limited	MA	all	0.758	0.856	0.738	0.402	**0.126**	**0.230**	**0.259**	**0.272**	0.704	0.558	0.771	*
Scallop Dredge	open	general	NE	all	**0.104**	1.300	*	**0.103**	**0.177**	0.318	**0.092**	**0.092**	*	*	1.287	*
Scallop Dredge	open	general	MA	all	0.482	0.467	*	0.857	**0.202**	0.550	0.461	0.461	*	*	0.830	*
Scallop Dredge	closed	limited	NE	all	0.396	0.403	0.489	0.448	**0.126**	0.326	**0.291**	**0.293**	**0.218**	**0.161**	**0.198**	*
Scallop Dredge	closed	limited	MA	all	**0.268**	0.323	*	**0.282**	**0.142**	0.425	0.383	0.385	1.011	0.333	0.321	*
Scallop Dredge	closed	general	NE	all												
Scallop Dredge	closed	general	MA	all	*	*	*	*	**0.000**	*	**0.000**	**0.000**	*	*	*	*
Mid-water paired & single Trawl	all	all	NE	all	0.994	1.000	*	0.748	1.177	0.418	0.628	*	0.671	1.626	*	*
Mid-water paired & single Trawl	all	all	MA	all	0.539	0.539	*	0.539	*	**0.246**	1.165	1.142	*	1.176	*	*
Fish Pots/ Traps	all	all	NE	all												
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	**0.161**	*	**0.163**	**0.161**	*	*
Purse Seine	all	all	NE	all	*	*	*	*	*	0.972	*	*	*	*	*	*
Purse Seine	all	all	MA	all												
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*
Hand Line	all	all	MA	all												
Scottish Seine	all	all	NE	all	**0.279**	**0.279**	*	**0.279**	0.319	*	**0.253**	**0.259**	0.808	0.808	*	*
Clam Quahog Dredge	all	all	NE	all												
Clam Quahog Dredge	all	all	MA	all												
Crab Pots	all	all	NE	all												
Crab Pots	all	all	MA	all												
Lobster Pots	all	all	NE	all												
Lobster Pots	all	all	MA	all												

Note: when discard ratio = 0, CV is null (*); Gray-shaded cells indicate unlikely species/gear combinations.

Table B-1 *continued.* Precision (CV) of total composite discards, by species and fleet, based on 2004 observer data .

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	TURTLES	TURTLE, GREEN	TURTLE, LEATHERBACK	TURTLE, LOGGERHEAD	TURTLE, KEMP'S RIDLEY	TURTLE, NK	SEALS	SEAL, HARP	SEAL, HOODED	SEAL, HARBOR	SEAL, GRAY	SEAL, NK	WHALES
Longline	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Longline	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Otter Trawl	all	all	NE	small	*	*	*	*	*	*	*	*	*	*	*	*	0.931
Otter Trawl	all	all	NE	large	*	*	*	*	*	*	*	*	*	*	*	*	1.089
Otter Trawl	all	all	MA	small	0.573	*	*	0.573	*	*	*	*	*	*	*	*	*
Otter Trawl	all	all	MA	large	*	*	*	*	*	*	*	*	*	*	*	*	*
Scallop Trawl	open	limited	MA	all	0.381	*	*	0.381	*	*	*	*	*	*	*	*	*
Scallop Trawl	open	general	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Shrimp Trawl	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	large	*	*	*	*	*	*	**0.206**	**0.293**	*	**0.273**	0.520	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	*	*	*	*	*	*	**0.215**	0.435	0.751	0.320	**0.273**	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	small	0.626	*	0.787	*	*	1.013	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	large	1.052	1.479	*	1.478	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	0.495	*	0.730	0.656	*	*	0.692	*	*	1.023	0.924	*	*
Scallop Dredge	open	limited	NE	all	0.551	*	*	0.551	*	*	*	*	*	*	*	*	*
Scallop Dredge	open	limited	MA	all	0.770	*	*	0.770	*	*	*	*	*	*	*	*	*
Scallop Dredge	open	general	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Scallop Dredge	open	general	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Scallop Dredge	closed	limited	NE	all	**0.165**	*	*	**0.165**	*	*	*	*	*	*	*	*	*
Scallop Dredge	closed	limited	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Scallop Dredge	closed	general	NE	all													
Scallop Dredge	closed	general	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Mid-water paired & single Trawl	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	1.114
Mid-water paired & single Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Fish Pots/ Traps	all	all	NE	all													
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Purse Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Purse Seine	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Hand Line	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Scottish Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Clam Quahog Dredge	all	all	NE	all													
Clam Quahog Dredge	all	all	MA	all													
Crab Pots	all	all	NE	all													
Crab Pots	all	all	MA	all													
Lobster Pots	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	*	*	*
Lobster Pots	all	all	MA	all													

Note: when discard ratio = 0, CV is null (*); Gray-shaded cells indicate unlikely species/gear combinations.

Table B-1 *continued*. Precision (CV) of total composite discards, by species and fleet, based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	WHALE, PILOT, LONG-FIN	WHALE, MINKE	WHALE, NK	DOLPHINS/ PORPOISE	DOLPHIN WHITE-SIDED	DOLPHIN-COMMON	DOLPHIN- BOTTLE-NOSE	PORPOISE, HARBOR	PORPOISE/ DOLPHIN, NK	SEA BIRDS (ALL)	ALL SPECIES	PILOT coverage
Longline	all	all	NE	all	*	*	*	*	*	*	*	*	*	0.425	0.489	
Longline	all	all	MA	all	*	*	*	*	*	*	*	*	*	*		pilot
Otter Trawl	all	all	NE	small	0.931	*	*	0.650	0.936	0.713	*	*	*	0.548	**0.193**	
Otter Trawl	all	all	NE	large	1.089	*	*	0.389	0.389	*	*	*	*	0.489	**0.124**	
Otter Trawl	all	all	MA	small	*	*	*	0.557	*	0.557	*	*	*	0.706	**0.247**	
Otter Trawl	all	all	MA	large	*	*	*	*	*	*	*	*	*	0.672	**0.185**	
Scallop Trawl	open	limited	MA	all	*	*	*	*	*	*	*	*	*	*	**0.000**	pilot
Scallop Trawl	open	general	MA	all	*	*	*	*	*	*	*	*	*	*	**0.243**	pilot
Shrimp Trawl	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	0.310	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	**0.052**	pilot
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	*	*	*	*	*	**0.000**	pilot
Sink, Anchor, Drift Gillnet	all	all	NE	large	*	*	*	0.359	0.977	*	*	0.384	*	0.342	**0.092**	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	*	*	*	**0.288**	*	*	0.751	0.300	*	0.602	**0.085**	
Sink, Anchor, Drift Gillnet	all	all	MA	small	*	*	*	*	*	*	*	*	*	0.582	**0.000**	pilot for fish
Sink, Anchor, Drift Gillnet	all	all	MA	large	*	*	*	*	*	*	*	*	*	0.618	1.078	pilot for fish
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	*	*	*	0.924	*	*	*	0.924	*	0.693	**0.052**	pilot for fish
Scallop Dredge	open	limited	NE	all	*	*	*	*	*	*	*	*	*	0.896	**0.197**	
Scallop Dredge	open	limited	MA	all	*	*	*	*	*	*	*	*	*	*	**0.112**	
Scallop Dredge	open	general	NE	all	*	*	*	*	*	*	*	*	*	*	0.325	pilot
Scallop Dredge	open	general	MA	all	*	*	*	*	*	*	*	*	*	*	**0.184**	
Scallop Dredge	closed	limited	NE	all	*	*	*	*	*	*	*	*	*	**0.163**	**0.119**	
Scallop Dredge	closed	limited	MA	all	*	*	*	*	*	*	*	*	*	*	**0.119**	
Scallop Dredge	closed	general	NE	all												pilot
Scallop Dredge	closed	general	MA	all	*	*	*	*	*	*	*	*	*	*	**0.000**	pilot
Mid-water paired & single Trawl	all	all	NE	all	1.114	*	*	0.786	0.786	*	*	*	*	0.554	0.317	
Mid-water paired & single Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	0.408	
Fish Pots/ Traps	all	all	NE	all												pilot
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	**0.137**	pilot
Purse Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	0.715	
Purse Seine	all	all	MA	all	*	*	*	*	*	*	*	*	*	*		pilot
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	4.030	pilot
Hand Line	all	all	MA	all	*	*	*	*	*	*	*	*	*	*		pilot
Scottish Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	0.423	pilot
Clam Quahog Dredge	all	all	NE	all												pilot
Clam Quahog Dredge	all	all	MA	all												pilot
Crab Pots	all	all	NE	all												pilot
Crab Pots	all	all	MA	all												pilot
Lobster Pots	all	all	NE	all	*	*	*	*	*	*	*	*	*	*		pilot
Lobster Pots	all	all	MA	all												pilot

Note: when discard ratio = 0, CV is null (*); Gray-shaded cells indicate unlikely species/gear combinations.

Table B-2. Ranking of total discards within fleet (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	BLUEFISH	HERRING	SALMON	RED CRAB	SCALLOP	Mackerel	Illex	Loligo	Butterfish	MONKFISH	
Longline	all	all	NE	all	8	8	*	8	8	8	8	8	8	8	
Longline	all	all	MA	all											
Otter Trawl	all	all	NE	small	16	12	*	25	29	6	5	8	4	7	
Otter Trawl	all	all	NE	large	22	23	*	12	20	29	27	31	30	3	
Otter Trawl	all	all	MA	small	14	22	*	26	15	5	7	11	4	13	
Otter Trawl	all	all	MA	large	16	24	*	26	6	21	20	12	15	8	
Scallop Trawl	open	limited	MA	all	8	8	*	8	1	8	8	6	8	4	
Scallop Trawl	open	general	MA	all	15	20	*	12	2	20	16	9	11	4	
Shrimp Trawl	all	all	NE	all	20	1	*	20	17	20	20	20	19	14	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Sink, Anchor, Drift Gillnet	all	all	NE	small	3	3	*	3	3	2	3	3	3	3	
Sink, Anchor, Drift Gillnet	all	all	NE	large	9	15	*	22	24	12	23	27	25	8	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	6	19	*	21	18	8	27	27	23	3	
Sink, Anchor, Drift Gillnet	all	all	MA	small	4	4	*	4	4	4	4	4	2	4	
Sink, Anchor, Drift Gillnet	all	all	MA	large	2	5	*	5	5	5	5	5	5	5	
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	4	7	*	7	6	7	7	7	7	3	
Scallop Dredge	open	limited	NE	all	26	26	*	24	1	26	17	16	18	3	
Scallop Dredge	open	limited	MA	all	24	24	*	22	1	23	14	12	18	3	
Scallop Dredge	open	general	NE	all	17	17	*	17	3	17	14	17	17	1	
Scallop Dredge	open	general	MA	all	16	16	*	16	2	16	16	13	16	3	
Scallop Dredge	closed	limited	NE	all	19	28	*	25	1	27	20	13	24	3	
Scallop Dredge	closed	limited	MA	all	20	19	*	24	1	15	14	12	23	3	
Scallop Dredge	closed	general	NE	all											
Scallop Dredge	closed	general	MA	all	5	5	*	5	1	5	5	5	5	3	
Mid-water paired & single Trawl	all	all	NE	all	9	3	*	23	21	1	10	15	7	12	
Mid-water paired & single Trawl	all	all	MA	all	11	10	*	15	15	14	2	7	9	3	
Fish Pots/ Traps	all	all	NE	all											
Fish Pots/ Traps	all	all	MA	all	4	4	*	4	4	4	4	4	4	3	
Purse Seine	all	all	NE	all	5	2	*	5	5	5	4	5	5	5	
Purse Seine	all	all	MA	all											
Hand Line	all	all	NE	all	2	2	*	2	2	2	2	2	2	2	
Hand Line	all	all	MA	all											
Scottish Seine	all	all	NE	all	13	13	*	13	13	13	13	13	13	13	
Clam Quahog Dredge	all	all	NE	all											
Clam Quahog Dredge	all	all	MA	all											
Crab Pots	all	all	NE	all											
Crab Pots	all	all	MA	all											
Lobster Pots	all	all	NE	all											
Lobster Pots	all	all	MA	all											

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-2 *continued*. Ranking of total discards within fleet (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	Cod	Had-dock	Yellowtail fld	American plaice	Witch fld	Winter fld	Pollock	Redfish	White hake	Window-pane	Halibut	Ocean pout	
Longline	all	all	NE	all	2	4	8	8	8	8	6	8	8	8	8	5	
Longline	all	all	MA	all													
Otter Trawl	all	all	NE	small	18	13	22	20	14	15	28	24	17	26	30	21	
Otter Trawl	all	all	NE	large	8	10	7	9	5	14	16	13	18	4	21	11	
Otter Trawl	all	all	MA	small	28	28	24	25	17	16	28	21	23	12	28	19	
Otter Trawl	all	all	MA	large	22	26	17	26	9	10	19	25	23	7	26	11	
Scallop Trawl	open	limited	MA	all	8	8	8	8	8	8	8	8	8	3	8	8	
Scallop Trawl	open	general	MA	all	20	20	18	20	17	8	20	20	13	5	20	20	
Shrimp Trawl	all	all	NE	all	8	15	7	3	13	5	6	12	11	9	20	16	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*	
Sink, Anchor, Drift Gillnet	all	all	NE	small	3	3	3	3	3	3	3	3	3	3	3	3	
Sink, Anchor, Drift Gillnet	all	all	NE	large	2	10	5	13	21	7	4	11	6	20	18	17	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	4	13	10	20	26	15	7	22	9	25	17	12	
Sink, Anchor, Drift Gillnet	all	all	MA	small	4	4	4	4	4	4	4	4	4	4	4	4	
Sink, Anchor, Drift Gillnet	all	all	MA	large	5	5	5	5	5	5	5	5	5	4	5	5	
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	7	7	7	7	7	7	7	7	7	7	7	7	
Scallop Dredge	open	limited	NE	all	19	22	11	23	7	6	25	26	20	10	26	15	
Scallop Dredge	open	limited	MA	all	24	24	16	21	8	15	24	24	10	6	24	17	
Scallop Dredge	open	general	NE	all	13	17	4	12	10	5	17	17	17	8	17	14	
Scallop Dredge	open	general	MA	all	16	16	13	13	11	6	16	16	10	4	16	16	
Scallop Dredge	closed	limited	NE	all	15	14	4	10	11	9	29	29	16	6	26	21	
Scallop Dredge	closed	limited	MA	all	25	25	6	18	7	11	25	25	16	8	25	22	
Scallop Dredge	closed	general	NE	all													
Scallop Dredge	closed	general	MA	all	5	5	5	5	5	5	5	5	5	5	5	5	
Mid-water paired & single Trawl	all	all	NE	all	16	6	23	13	18	19	8	5	14	23	23	23	
Mid-water paired & single Trawl	all	all	MA	all	15	15	15	15	13	15	15	15	12	15	15	15	
Fish Pots/ Traps	all	all	NE	all													
Fish Pots/ Traps	all	all	MA	all	4	4	4	4	4	4	4	4	4	4	4	4	
Purse Seine	all	all	NE	all	5	5	5	5	5	5	5	3	5	5	5	5	
Purse Seine	all	all	MA	all													
Hand Line	all	all	NE	all	1	2	2	2	2	2	2	2	2	2	2	2	
Hand Line	all	all	MA	all													
Scottish Seine	all	all	NE	all	7	11	13	8	13	9	13	13	11	2	13	13	
Clam Quahog Dredge	all	all	NE	all													
Clam Quahog Dredge	all	all	MA	all													
Crab Pots	all	all	NE	all													
Crab Pots	all	all	MA	all													
Lobster Pots	all	all	NE	all													
Lobster Pots	all	all	MA	all													

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-2 *continued*. Ranking of total discards within fleet (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	Silver hake	Offshore hake	Red hake	SKATE	DOGFISH	Fluke	Scup	Black sea bass	SURF CLAM/-OCEAN QUAHOG	TILEFISH	
Longline	all	all	NE	all	8	8	7	3	1	8	8	8	8	8	
Longline	all	all	MA	all											
Otter Trawl	all	all	NE	small	2	23	9	1	3	10	11	19	31	27	
Otter Trawl	all	all	NE	large	15	26	19	1	2	6	17	24	28	25	
Otter Trawl	all	all	MA	small	6	20	8	1	2	10	3	9	18	27	
Otter Trawl	all	all	MA	large	14	26	18	1	2	3	4	5	13	26	
Scallop Trawl	open	limited	MA	all	8	8	8	2	8	5	8	7	8	8	
Scallop Trawl	open	general	MA	all	7	20	14	1	3	6	10	19	20	20	
Shrimp Trawl	all	all	NE	all	2	20	10	4	18	20	20	20	20	20	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Sink, Anchor, Drift Gillnet	all	all	NE	small	3	3	3	3	1	3	3	3	3	3	
Sink, Anchor, Drift Gillnet	all	all	NE	large	14	27	16	3	1	19	27	26	27	27	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	16	27	11	2	1	5	23	27	27	14	
Sink, Anchor, Drift Gillnet	all	all	MA	small	4	4	4	4	1	3	4	4	4	4	
Sink, Anchor, Drift Gillnet	all	all	MA	large	5	5	5	3	1	5	5	5	5	5	
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	7	7	7	2	1	5	7	7	7	7	
Scallop Dredge	open	limited	NE	all	13	14	8	2	9	4	21	12	5	26	
Scallop Dredge	open	limited	MA	all	9	20	13	2	5	4	19	11	7	24	
Scallop Dredge	open	general	NE	all	16	17	9	2	6	7	17	17	11	17	
Scallop Dredge	open	general	MA	all	9	16	12	1	8	5	16	16	7	16	
Scallop Dredge	closed	limited	NE	all	12	22	7	2	8	5	23	17	18	29	
Scallop Dredge	closed	limited	MA	all	10	25	13	2	5	4	17	9	21	25	
Scallop Dredge	closed	general	NE	all											
Scallop Dredge	closed	general	MA	all	5	5	5	2	5	4	5	5	5	5	
Mid-water paired & single Trawl	all	all	NE	all	4	23	17	11	2	23	20	22	23	23	
Mid-water paired & single Trawl	all	all	MA	all	6	15	5	15	1	8	15	4	15	15	
Fish Pots/ Traps	all	all	NE	all											
Fish Pots/ Traps	all	all	MA	all	4	4	4	4	4	4	2	1	4	4	
Purse Seine	all	all	NE	all	5	5	5	5	1	5	5	5	5	5	
Purse Seine	all	all	MA	all											
Hand Line	all	all	NE	all	2	2	2	2	2	2	2	2	2	2	
Hand Line	all	all	MA	all											
Scottish Seine	all	all	NE	all	5	13	3	4	13	1	10	6	13	13	
Clam Quahog Dredge	all	all	NE	all											
Clam Quahog Dredge	all	all	MA	all											
Crab Pots	all	all	NE	all											
Crab Pots	all	all	MA	all											
Lobster Pots	all	all	NE	all											
Lobster Pots	all	all	MA	all											

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-2 *continued*. Ranking of total discards within fleet (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	TURTLE, GREEN	TURTLE, LEATHERBACK	TURTLE, LOGGERHEAD	TURTLE, KEMP'S RIDLEY	TURTLE, NK	SEAL, HARP	SEAL, HOODED	SEAL, HARBOR	SEAL, GRAY	SEAL, NK	
Longline	all	all	NE	all	2	2	2	*	2	2	2	2	2	*	
Longline	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Otter Trawl	all	all	NE	small	5	5	5	*	5	5	5	5	5	*	
Otter Trawl	all	all	NE	large	4	4	4	*	4	4	4	4	4	*	
Otter Trawl	all	all	MA	small	4	4	2	*	4	4	4	4	4	*	
Otter Trawl	all	all	MA	large	2	2	2	*	2	2	2	2	2	*	
Scallop Trawl	open	limited	MA	all	2	2	1	*	2	2	2	2	2	*	
Scallop Trawl	open	general	MA	all	*	*	*	*	*	*	*	*	*	*	
Shrimp Trawl	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	*	*	*	*	*	
Sink, Anchor, Drift Gillnet	all	all	NE	large	7	7	7	*	7	2	7	3	4	*	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	8	8	8	*	8	4	6	1	3	*	
Sink, Anchor, Drift Gillnet	all	all	MA	small	4	2	4	*	3	4	4	4	4	*	
Sink, Anchor, Drift Gillnet	all	all	MA	large	2	4	2	*	4	4	4	4	4	*	
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	7	4	1	*	7	7	7	6	5	*	
Scallop Dredge	open	limited	NE	all	3	3	1	*	3	3	3	3	3	*	
Scallop Dredge	open	limited	MA	all	2	2	1	*	2	2	2	2	2	*	
Scallop Dredge	open	general	NE	all	*	*	*	*	*	*	*	*	*	*	
Scallop Dredge	open	general	MA	all	*	*	*	*	*	*	*	*	*	*	
Scallop Dredge	closed	limited	NE	all	3	3	2	*	3	3	3	3	3	*	
Scallop Dredge	closed	limited	MA	all	*	*	*	*	*	*	*	*	*	*	
Scallop Dredge	closed	general	NE	all											
Scallop Dredge	closed	general	MA	all	*	*	*	*	*	*	*	*	*	*	
Mid-water paired & single Trawl	all	all	NE	all	4	4	4	*	4	4	4	4	4	*	
Mid-water paired & single Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Fish Pots/ Traps	all	all	NE	all											
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Purse Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	
Purse Seine	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	
Hand Line	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Scottish Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	
Clam Quahog Dredge	all	all	NE	all											
Clam Quahog Dredge	all	all	MA	all											
Crab Pots	all	all	NE	all											
Crab Pots	all	all	MA	all											
Lobster Pots	all	all	NE	all	*	*	*	*	*	*	*	*	*	*	
Lobster Pots	all	all	MA	all											

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-2 *continued*. Ranking of total discards within fleet (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	WHALE, PILOT, LONG-FIN	WHALE, MINKE	WHALE, NK	DOLPHIN WHITE-SIDED	DOLPHIN-COMMON	DOLPHIN-BOTTLE-NOSE	PORPOISE, HARBOR	PORPOISE/DOLPHIN, NK	SEA BIRDS (ALL)	PILOT coverage
Longline	all	all	NE	all	2	*	*	2	2	2	2	*	1	
Longline	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Otter Trawl	all	all	NE	small	3	*	*	3	1	5	5	*	2	
Otter Trawl	all	all	NE	large	3	*	*	1	4	4	4	*	2	
Otter Trawl	all	all	MA	small	4	*	*	4	1	4	4	*	3	
Otter Trawl	all	all	MA	large	2	*	*	2	2	2	2	*	1	
Scallop Trawl	open	limited	MA	all	2	*	*	2	2	2	2	*	2	pilot
Scallop Trawl	open	general	MA	all	*	*	*	*	*	*	*	*	*	pilot
Shrimp Trawl	all	all	NE	all	*	*	*	*	*	*	*	*	*	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	*	*	*	*	pilot
Sink, Anchor, Drift Gillnet	all	all	NE	large	7	*	*	6	7	7	5	*	1	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	8	*	*	8	8	6	2	*	5	
Sink, Anchor, Drift Gillnet	all	all	MA	small	4	*	*	4	4	4	4	*	1	pilot for fish
Sink, Anchor, Drift Gillnet	all	all	MA	large	4	*	*	4	4	4	4	*	1	pilot for fish
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	7	*	*	7	7	7	1	*	3	pilot for fish
Scallop Dredge	open	limited	NE	all	3	*	*	3	3	3	3	*	2	
Scallop Dredge	open	limited	MA	all	2	*	*	2	2	2	2	*	2	
Scallop Dredge	open	general	NE	all	*	*	*	*	*	*	*	*	*	pilot
Scallop Dredge	open	general	MA	all	*	*	*	*	*	*	*	*	*	
Scallop Dredge	closed	limited	NE	all	3	*	*	3	3	3	3	*	1	
Scallop Dredge	closed	limited	MA	all	*	*	*	*	*	*	*	*	*	
Scallop Dredge	closed	general	NE	all										pilot
Scallop Dredge	closed	general	MA	all	*	*	*	*	*	*	*	*	*	pilot
Mid-water paired & single Trawl	all	all	NE	all	3	*	*	2	4	4	4	*	1	
Mid-water paired & single Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	
Fish Pots/ Traps	all	all	NE	all										pilot
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Purse Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	
Purse Seine	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	pilot
Hand Line	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Scottish Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	pilot
Clam Quahog Dredge	all	all	NE	all										pilot
Clam Quahog Dredge	all	all	MA	all										pilot
Crab Pots	all	all	NE	all										pilot
Crab Pots	all	all	MA	all										pilot
Lobster Pots	all	all	NE	all	*	*	*	*	*	*	*	*	*	pilot
Lobster Pots	all	all	MA	all										pilot

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-3. Ranking of total discards within species group (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	BLUEFISH	HERRING	SALMON	RED CRAB	SCALLOP	Mackerel	Illex	Loligo	Butterfish	MONKFISH	
Longline	all	all	NE	all	14	13	*	11	19	13	15	14	16	21	
Longline	all	all	MA	all											
Otter Trawl	all	all	NE	small	2	2	*	2	13	2	1	1	1	4	
Otter Trawl	all	all	NE	large	4	5	*	1	11	7	4	8	7	3	
Otter Trawl	all	all	MA	small	3	7	*	6	10	3	2	2	2	11	
Otter Trawl	all	all	MA	large	8	9	*	11	7	8	8	3	5	10	
Scallop Trawl	open	limited	MA	all	14	13	*	11	3	13	15	6	16	13	
Scallop Trawl	open	general	MA	all	11	13	*	3	8	13	13	9	8	14	
Shrimp Trawl	all	all	NE	all	14	3	*	11	16	13	15	14	12	19	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	
Sink, Anchor, Drift Gillnet	all	all	NE	small	14	13	*	11	19	6	15	14	16	21	
Sink, Anchor, Drift Gillnet	all	all	NE	large	7	6	*	4	17	5	10	14	11	15	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	5	8	*	5	15	4	15	14	13	5	
Sink, Anchor, Drift Gillnet	all	all	MA	small	14	13	*	11	19	13	15	14	3	21	
Sink, Anchor, Drift Gillnet	all	all	MA	large	1	13	*	11	19	13	15	14	16	21	
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	6	13	*	11	14	13	15	14	16	12	
Scallop Dredge	open	limited	NE	all	14	13	*	7	2	13	5	5	6	1	
Scallop Dredge	open	limited	MA	all	14	13	*	8	1	10	7	4	9	2	
Scallop Dredge	open	general	NE	all	14	13	*	11	9	13	12	14	16	6	
Scallop Dredge	open	general	MA	all	14	13	*	11	6	13	15	13	16	9	
Scallop Dredge	closed	limited	NE	all	10	12	*	9	4	12	14	7	14	7	
Scallop Dredge	closed	limited	MA	all	13	11	*	10	5	9	11	11	15	8	
Scallop Dredge	closed	general	NE	all											
Scallop Dredge	closed	general	MA	all	14	13	*	11	12	13	15	14	16	16	
Mid-water paired & single Trawl	all	all	NE	all	9	1	*	11	18	1	6	10	4	17	
Mid-water paired & single Trawl	all	all	MA	all	12	10	*	11	19	11	3	12	10	18	
Fish Pots/ Traps	all	all	NE	all											
Fish Pots/ Traps	all	all	MA	all	14	13	*	11	19	13	15	14	16	20	
Purse Seine	all	all	NE	all	14	4	*	11	19	13	9	14	16	21	
Purse Seine	all	all	MA	all											
Hand Line	all	all	NE	all	14	13	*	11	19	13	15	14	16	21	
Hand Line	all	all	MA	all											
Scottish Seine	all	all	NE	all	14	13	*	11	19	13	15	14	16	21	
Clam Quahog Dredge	all	all	NE	all											
Clam Quahog Dredge	all	all	MA	all											
Crab Pots	all	all	NE	all											
Crab Pots	all	all	MA	all											
Lobster Pots	all	all	NE	all											
Lobster Pots	all	all	MA	all											

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-3 *continued*. Ranking of total discards within species group (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	Cod	Had-dock	Yellowtail fld	American plaice	Witch fld	Winter fld	Pollock	Redfish	White hake	Window-pane	Halibut	Ocean pout
Longline	all	all	NE	all	3	3	15	15	17	17	8	10	17	18	6	5
Longline	all	all	MA	all												
Otter Trawl	all	all	NE	small	5	1	3	2	2	1	4	2	1	10	3	2
Otter Trawl	all	all	NE	large	1	2	1	1	1	2	1	1	2	1	1	1
Otter Trawl	all	all	MA	small	14	11	12	10	6	4	10	5	7	4	6	6
Otter Trawl	all	all	MA	large	10	11	9	15	4	5	7	9	13	3	6	3
Scallop Trawl	open	limited	MA	all	14	11	15	15	17	17	10	10	17	2	6	14
Scallop Trawl	open	general	MA	all	14	11	14	15	14	13	10	10	12	11	6	14
Shrimp Trawl	all	all	NE	all	7	8	7	3	10	7	5	6	6	14	6	10
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	small	14	11	15	15	17	17	10	10	17	18	6	14
Sink, Anchor, Drift Gillnet	all	all	NE	large	2	5	4	5	12	10	2	4	4	16	4	8
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	4	6	8	8	16	12	3	8	5	17	2	7
Sink, Anchor, Drift Gillnet	all	all	MA	small	14	11	15	15	17	17	10	10	17	18	6	14
Sink, Anchor, Drift Gillnet	all	all	MA	large	14	11	15	15	17	17	10	10	17	6	6	14
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	14	11	15	15	17	17	10	10	17	18	6	14
Scallop Dredge	open	limited	NE	all	8	9	5	13	3	3	9	10	9	9	6	4
Scallop Dredge	open	limited	MA	all	14	11	11	12	5	11	10	10	3	5	6	9
Scallop Dredge	open	general	NE	all	13	11	6	7	9	8	10	10	17	12	6	11
Scallop Dredge	open	general	MA	all	14	11	13	11	11	9	10	10	10	8	6	14
Scallop Dredge	closed	limited	NE	all	9	7	2	4	7	6	10	10	11	7	5	12
Scallop Dredge	closed	limited	MA	all	14	11	10	14	8	14	10	10	14	15	6	13
Scallop Dredge	closed	general	NE	all												
Scallop Dredge	closed	general	MA	all	14	11	15	15	17	17	10	10	17	18	6	14
Mid-water paired & single Trawl	all	all	NE	all	11	4	15	6	13	16	6	3	8	18	6	14
Mid-water paired & single Trawl	all	all	MA	all	14	11	15	15	15	17	10	10	15	18	6	14
Fish Pots/ Traps	all	all	NE	all												
Fish Pots/ Traps	all	all	MA	all	14	11	15	15	17	17	10	10	17	18	6	14
Purse Seine	all	all	NE	all	14	11	15	15	17	17	10	7	17	18	6	14
Purse Seine	all	all	MA	all												
Hand Line	all	all	NE	all	6	11	15	15	17	17	10	10	17	18	6	14
Hand Line	all	all	MA	all												
Scottish Seine	all	all	NE	all	12	10	15	9	17	15	10	10	16	13	6	14
Clam Quahog Dredge	all	all	NE	all												
Clam Quahog Dredge	all	all	MA	all												
Crab Pots	all	all	NE	all												
Crab Pots	all	all	MA	all												
Lobster Pots	all	all	NE	all												
Lobster Pots	all	all	MA	all												

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-3 *continued*. Ranking of total discards within species group (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	Silver hake	Offshore hake	Red hake	SKATE	DOGFISH	Fluke	Scup	Black sea bass	SURF CLAM/-OCEAN QUAHOG	TILEFISH
Longline	all	all	NE	all	18	7	13	17	10	20	14	16	11	5
Longline	all	all	MA	all										
Otter Trawl	all	all	NE	small	1	1	1	3	4	1	2	4	8	1
Otter Trawl	all	all	NE	large	3	3	3	1	3	2	4	7	6	2
Otter Trawl	all	all	MA	small	2	4	2	6	7	6	1	2	5	4
Otter Trawl	all	all	MA	large	8	7	8	5	5	3	3	3	3	5
Scallop Trawl	open	limited	MA	all	18	7	19	8	23	11	14	10	11	5
Scallop Trawl	open	general	MA	all	11	7	16	10	13	16	5	14	11	5
Shrimp Trawl	all	all	NE	all	4	7	10	18	22	20	14	16	11	5
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	small	18	7	19	22	20	20	14	16	11	5
Sink, Anchor, Drift Gillnet	all	all	NE	large	9	7	11	15	2	17	14	13	11	5
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	13	7	9	11	8	9	13	16	11	3
Sink, Anchor, Drift Gillnet	all	all	MA	small	18	7	19	22	6	13	14	16	11	5
Sink, Anchor, Drift Gillnet	all	all	MA	large	18	7	19	16	1	20	14	16	11	5
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	18	7	19	14	12	15	14	16	11	5
Scallop Dredge	open	limited	NE	all	7	2	4	2	16	4	7	5	1	5
Scallop Dredge	open	limited	MA	all	6	5	6	4	14	5	8	6	2	5
Scallop Dredge	open	general	NE	all	17	7	7	13	19	14	14	16	7	5
Scallop Dredge	open	general	MA	all	12	7	15	7	21	10	14	16	4	5
Scallop Dredge	closed	limited	NE	all	10	6	5	9	17	7	12	12	9	5
Scallop Dredge	closed	limited	MA	all	15	7	18	12	18	8	11	8	10	5
Scallop Dredge	closed	general	NE	all										
Scallop Dredge	closed	general	MA	all	18	7	19	19	23	18	14	16	11	5
Mid-water paired & single Trawl	all	all	NE	all	5	7	14	20	9	20	10	15	11	5
Mid-water paired & single Trawl	all	all	MA	all	16	7	17	22	15	19	14	11	11	5
Fish Pots/ Traps	all	all	NE	all										
Fish Pots/ Traps	all	all	MA	all	18	7	19	22	23	20	6	1	11	5
Purse Seine	all	all	NE	all	18	7	19	22	11	20	14	16	11	5
Purse Seine	all	all	MA	all										
Hand Line	all	all	NE	all	18	7	19	22	23	20	14	16	11	5
Hand Line	all	all	MA	all										
Scottish Seine	all	all	NE	all	14	7	12	21	23	12	9	9	11	5
Clam Quahog Dredge	all	all	NE	all										
Clam Quahog Dredge	all	all	MA	all										
Crab Pots	all	all	NE	all										
Crab Pots	all	all	MA	all										
Lobster Pots	all	all	NE	all										
Lobster Pots	all	all	MA	all										

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-3 *continued*. Ranking of total discards within species group (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	TURTLE, GREEN	TURTLE, LEATHERBACK	TURTLE, LOGGERHEAD	TURTLE, KEMP'S RIDLEY	TURTLE, NK	SEAL, HARP	SEAL, HOODED	SEAL, HARBOR	SEAL, GRAY	SEAL, NK
Longline	all	all	NE	all	2	3	8	*	2	3	2	4	4	*
Longline	all	all	MA	all	*	*	*	*	*	*	*	*	*	*
Otter Trawl	all	all	NE	small	2	3	8	*	2	3	2	4	4	*
Otter Trawl	all	all	NE	large	2	3	8	*	2	3	2	4	4	*
Otter Trawl	all	all	MA	small	2	3	4	*	2	3	2	4	4	*
Otter Trawl	all	all	MA	large	2	3	8	*	2	3	2	4	4	*
Scallop Trawl	open	limited	MA	all	2	3	1	*	2	3	2	4	4	*
Scallop Trawl	open	general	MA	all	*	*	*	*	*	*	*	*	*	*
Shrimp Trawl	all	all	NE	all	*	*	*	*	*	*	*	*	*	*
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	*	*	*	*	*
Sink, Anchor, Drift Gillnet	all	all	NE	large	2	3	8	*	2	1	2	2	2	*
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	2	3	8	*	2	2	1	1	1	*
Sink, Anchor, Drift Gillnet	all	all	MA	small	2	2	8	*	1	3	2	4	4	*
Sink, Anchor, Drift Gillnet	all	all	MA	large	1	3	6	*	2	3	2	4	4	*
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	2	1	5	*	2	3	2	3	3	*
Scallop Dredge	open	limited	NE	all	2	3	2	*	2	3	2	4	4	*
Scallop Dredge	open	limited	MA	all	2	3	3	*	2	3	2	4	4	*
Scallop Dredge	open	general	NE	all	*	*	*	*	*	*	*	*	*	*
Scallop Dredge	open	general	MA	all	*	*	*	*	*	*	*	*	*	*
Scallop Dredge	closed	limited	NE	all	2	3	7	*	2	3	2	4	4	*
Scallop Dredge	closed	limited	MA	all	*	*	*	*	*	*	*	*	*	*
Scallop Dredge	closed	general	NE	all										
Scallop Dredge	closed	general	MA	all	*	*	*	*	*	*	*	*	*	*
Mid-water paired & single Trawl	all	all	NE	all	2	3	8	*	2	3	2	4	4	*
Mid-water paired & single Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	*
Fish Pots/ Traps	all	all	NE	all										
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	*
Purse Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*
Purse Seine	all	all	MA	all	*	*	*	*	*	*	*	*	*	*
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	*
Hand Line	all	all	MA	all	*	*	*	*	*	*	*	*	*	*
Scottish Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	*
Clam Quahog Dredge	all	all	NE	all	*	*	*	*	*	*	*	*	*	*
Clam Quahog Dredge	all	all	MA	all										
Crab Pots	all	all	NE	all										
Crab Pots	all	all	MA	all										
Lobster Pots	all	all	NE	all	*	*	*	*	*	*	*	*	*	*
Lobster Pots	all	all	MA	all										

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-3 *continued*. Ranking of total discards within species group (fish and protected species ranked separately) based on 2004 observer data.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	WHALE, PILOT, LONG-FIN	WHALE, MINKE	WHALE, NK	DOLPHIN WHITE-SIDED	DOLPHIN-COMMON	DOLPHIN-BOTTLE-NOSE	PORPOISE, HARBOR	PORPOISE/DOLPHIN, NK	SEA BIRDS (ALL)	PILOT coverage
Longline	all	all	NE	all	4	*	*	5	3	2	4	*	12	
Longline	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Otter Trawl	all	all	NE	small	1	*	*	3	1	2	4	*	6	
Otter Trawl	all	all	NE	large	2	*	*	1	3	2	4	*	5	
Otter Trawl	all	all	MA	small	4	*	*	5	2	2	4	*	11	
Otter Trawl	all	all	MA	large	4	*	*	5	3	2	4	*	3	
Scallop Trawl	open	limited	MA	all	4	*	*	5	3	2	4	*	14	pilot
Scallop Trawl	open	general	MA	all	*	*	*	*	*	*	*	*	*	pilot
Shrimp Trawl	all	all	NE	all	*	*	*	*	*	*	*	*	*	
Shrimp Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Sink, Anchor, Drift Gillnet	all	all	NE	small	*	*	*	*	*	*	*	*	*	pilot
Sink, Anchor, Drift Gillnet	all	all	NE	large	4	*	*	4	3	2	2	*	1	
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	4	*	*	5	3	1	1	*	9	
Sink, Anchor, Drift Gillnet	all	all	MA	small	4	*	*	5	3	2	4	*	8	pilot for fish
Sink, Anchor, Drift Gillnet	all	all	MA	large	4	*	*	5	3	2	4	*	7	pilot for fish
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	4	*	*	5	3	2	3	*	10	pilot for fish
Scallop Dredge	open	limited	NE	all	4	*	*	5	3	2	4	*	4	
Scallop Dredge	open	limited	MA	all	4	*	*	5	3	2	4	*	14	
Scallop Dredge	open	general	NE	all	*	*	*	*	*	*	*	*	*	pilot
Scallop Dredge	open	general	MA	all	*	*	*	*	*	*	*	*	*	
Scallop Dredge	closed	limited	NE	all	4	*	*	5	3	2	4	*	13	
Scallop Dredge	closed	limited	MA	all	*	*	*	*	*	*	*	*	*	
Scallop Dredge	closed	general	NE	all										pilot
Scallop Dredge	closed	general	MA	all	*	*	*	*	*	*	*	*	*	pilot
Mid-water paired & single Trawl	all	all	NE	all	3	*	*	2	3	2	4	*	2	
Mid-water paired & single Trawl	all	all	MA	all	*	*	*	*	*	*	*	*	*	
Fish Pots/ Traps	all	all	NE	all										pilot
Fish Pots/ Traps	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Purse Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	
Purse Seine	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Hand Line	all	all	NE	all	*	*	*	*	*	*	*	*	*	pilot
Hand Line	all	all	MA	all	*	*	*	*	*	*	*	*	*	pilot
Scottish Seine	all	all	NE	all	*	*	*	*	*	*	*	*	*	pilot
Clam Quahog Dredge	all	all	NE	all	*	*	*	*	*	*	*	*	*	pilot
Clam Quahog Dredge	all	all	MA	all										pilot
Crab Pots	all	all	NE	all										pilot
Crab Pots	all	all	MA	all										pilot
Lobster Pots	all	all	NE	all	*	*	*	*	*	*	*	*	*	pilot
Lobster Pots	all	all	MA	all										pilot

Gray-shaded cells indicate unlikely combinations of species/gear; * indicate no discards of these species.

Table B-4. Number of sea days needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	BLUEFISH	HERRING	SALMON	RED CRAB	SCALLOP	MACK-/SQUID-/BUTTERFISH	Mackerel	Illex	Loligo	Butterfish	MONKFISH
Longline	all	all	NE	all	35	35	35	35	35	35	35	35	35	35	35
Longline	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76
Otter Trawl	all	all	NE	small	1103	882	211	848	1998	249	1748	487	454	633	757
Otter Trawl	all	all	NE	large	26644	12864	730	798	1233	3159	2582	9820	3561	5259	81
Otter Trawl	all	all	MA	small	2231	1869	196	5417	1162	1125	2841	1362	1697	1160	497
Otter Trawl	all	all	MA	large	3625	883	342	342	311	242	374	753	327	394	140
Scallop Trawl	open	limited	MA	all	95	95	95	95	95	95	95	95	95	95	95
Scallop Trawl	open	general	MA	all	155	51	51	399	119	181	51	277	200	270	115
Shrimp Trawl	all	all	NE	all	42	92	42	42	353	364	42	42	42	364	22
Shrimp Trawl	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	443	486	141	2592	4357	3758	3929	5405	141	6119	408
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	267	1004	144	3266	1255	1701	1708	144	144	4216	238
Sink, Anchor, Drift Gillnet	all	all	MA	small	62	62	62	62	62	62	62	62	62	62	62
Sink, Anchor, Drift Gillnet	all	all	MA	large	105	29	29	29	29	29	29	29	29	29	29
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	131	68	68	68	301	68	68	68	68	68	104
Scallop Dredge	open	limited	NE	all	269	269	269	1596	80	1380	269	709	3260	6097	320
Scallop Dredge	open	limited	MA	all	329	329	329	8713	280	641	8713	1662	986	2528	213
Scallop Dredge	open	general	NE	all	92	92	92	92	204	176	92	176	92	92	117
Scallop Dredge	open	general	MA	all	96	96	96	96	54	293	96	96	293	96	17
Scallop Dredge	closed	limited	NE	all	3861	344	139	1473	167	1301	327	564	1531	273	429
Scallop Dredge	closed	limited	MA	all	1777	772	108	341	157	337	764	370	989	324	283
Scallop Dredge	closed	general	NE	all	24	24	24	24	24	24	24	24	24	24	24
Scallop Dredge	closed	general	MA	all	21	21	21	21	21	21	21	21	21	21	21
Mid-water paired & single Trawl	all	all	NE	all	699	747	56	56	1793	346	347	829	1786	1712	718
Mid-water paired & single Trawl	all	all	MA	all	182	453	35	35	35	167	181	165	182	182	492
Fish Pots/ Traps	all	all	NE	all	20	20	20	20	20	20	20	20	20	20	20
Fish Pots/ Traps	all	all	MA	all	40	40	40	40	40	40	40	40	40	40	103
Purse Seine	all	all	NE	all	19	219	19	19	19	206	19	206	19	19	19
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	72	72	72	72	72	72	72	72	72	72	72
Hand Line	all	all	MA	all	133	133	133	133	133	133	133	133	133	133	133
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12
Clam Quahog Dredge	all	all	NE	all	50	50	50	50	50	50	50	50	50	50	50
Clam Quahog Dredge	all	all	MA	all	84	84	84	84	84	84	84	84	84	84	84
Crab Pots	all	all	NE	all	101	101	101	101	101	101	101	101	101	101	101
Crab Pots	all	all	MA	all	28	28	28	28	28	28	28	28	28	28	28
Lobster Pots	all	all	NE	all	439	439	439	439	439	439	439	439	439	439	439
Lobster Pots	all	all	MA	all	89	89	89	89	89	89	89	89	89	89	89
Total Sea Days					43,547	23,025	4,573	27,698	15,384	17,200	25,658	24,643	17,279	31,311	6,541
Total Sea Days excluding shaded cells					35,867	19,828	0	5,547	6,049	15,522	24,114	17,398	15,185	19,567	5,528

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-4 *continued*. Number of sea days needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	NE MULTI-SPP (LARGE-MESH)	Cod	Haddock	Yellowtail fld	American plaice	Witch fld	Winter fld	Pollock	Redfish	White hake	Windowpane	Halibut	Ocean pout
Longline	all	all	NE	all	27	39	36	35	35	35	35	310	35	35	35	35	76
Longline	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	76	76
Otter Trawl	all	all	NE	small	266	1861	1892	774	442	523	852	1351	1507	969	405	2129	490
Otter Trawl	all	all	NE	large	107	321	719	505	663	219	1837	3732	630	568	440	1793	268
Otter Trawl	all	all	MA	small	429	196	196	2763	3849	904	1172	196	2272	2580	633	196	3911
Otter Trawl	all	all	MA	large	101	5866	342	677	342	137	272	5866	1315	5882	156	342	358
Scallop Trawl	open	limited	MA	all	95	95	95	95	95	95	95	95	95	95	95	95	95
Scallop Trawl	open	general	MA	all	85	51	51	505	51	255	423	51	51	399	170	51	51
Shrimp Trawl	all	all	NE	all	20	50	171	121	38	328	29	89	56	22	17	42	349
Shrimp Trawl	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	76	76
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	83	142	320	360	693	1325	724	315	607	488	1500	1532	1504
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	206	249	473	963	833	3315	1829	750	948	979	2892	1281	1245
Sink, Anchor, Drift Gillnet	all	all	MA	small	62	62	62	62	62	62	62	62	62	62	62	62	62
Sink, Anchor, Drift Gillnet	all	all	MA	large	19	29	29	29	29	29	29	29	29	29	19	29	29
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	68	68	68	68	68	68	68	68	68	68	68	68	68
Scallop Dredge	open	limited	NE	all	708	1855	1611	1077	1611	728	2851	1611	269	848	633	269	1298
Scallop Dredge	open	limited	MA	all	411	329	329	2708	3159	1660	2108	329	329	1687	715	329	6549
Scallop Dredge	open	general	NE	all	82	120	92	85	110	146	92	92	92	92	90	92	190
Scallop Dredge	open	general	MA	all	40	96	96	293	288	171	73	96	96	173	46	96	96
Scallop Dredge	closed	limited	NE	all	227	1735	1311	390	3105	315	355	139	139	1576	988	439	1332
Scallop Dredge	closed	limited	MA	all	1136	108	108	1819	333	404	1829	108	108	800	1409	108	1803
Scallop Dredge	closed	general	NE	all	24	24	24	24	24	24	24	24	24	24	24	24	24
Scallop Dredge	closed	general	MA	all	21	21	21	21	21	21	21	21	21	21	21	21	21
Mid-water paired & single Trawl	all	all	NE	all	688	1451	855	56	1437	1037	1616	1217	1219	1128	56	56	56
Mid-water paired & single Trawl	all	all	MA	all	281	35	35	35	35	547	35	35	35	176	35	35	35
Fish Pots/ Traps	all	all	NE	all	20	20	20	20	20	20	20	20	20	20	20	20	20
Fish Pots/ Traps	all	all	MA	all	40	40	40	40	40	40	40	40	40	40	40	40	40
Purse Seine	all	all	NE	all	217	19	19	19	19	19	19	19	217	19	19	19	19
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	137	137	72	72	72	72	72	72	72	72	72	72	72
Hand Line	all	all	MA	all	133	133	133	133	133	133	133	133	133	133	133	133	133
Scottish Seine	all	all	NE	all	14	12	12	12	12	12	18	12	12	12	15	12	12
Clam Quahog Dredge	all	all	NE	all	50	50	50	50	50	50	50	50	50	50	50	50	50
Clam Quahog Dredge	all	all	MA	all	84	84	84	84	84	84	84	84	84	84	84	84	84
Crab Pots	all	all	NE	all	101	101	101	101	101	101	101	101	101	101	101	101	101
Crab Pots	all	all	MA	all	28	28	28	28	28	28	28	28	28	28	28	28	28
Lobster Pots	all	all	NE	all	439	439	439	439	439	439	439	439	439	439	439	439	439
Lobster Pots	all	all	MA	all	89	89	89	89	89	89	89	89	89	89	89	89	89
Total Sea Days					6,712	16,129	10,194	14,724	18,580	13,608	17,695	17,846	11,464	19,958	11,769	10,382	21,169
Total Sea Days excluding shaded cells					6,450	15,330	5,143	13,481	9,033	9,941	16,768	7,934	5,380	15,652	10,603	7,758	20,321

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-4 *continued*. Number of sea days needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	NE MULTI-SPP (SMALL-MESH)	Silver hake	Offshore hake	Red hake	SKATE	DOGFISH	FLUKE/-SCUP/-BLK SEA BASS	Fluke	Scup	Black sea bass	SURF CLAM/-OCEAN QUAHOG	TILEFISH
Longline	all	all	NE	all	185	35	35	185	89	99	35	35	35	35	35	35
Longline	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	76
Otter Trawl	all	all	NE	small	269	233	5131	762	2024	492	455	365	1344	2115	3822	441
Otter Trawl	all	all	NE	large	341	530	1053	1255	316	614	1034	1091	7275	6224	15593	2692
Otter Trawl	all	all	MA	small	944	1324	1690	1198	202	532	584	314	1120	952	836	3057
Otter Trawl	all	all	MA	large	998	321	342	3401	70	481	98	114	201	643	584	342
Scallop Trawl	open	limited	MA	all	95	95	95	95	95	95	95	95	95	95	95	95
Scallop Trawl	open	general	MA	all	292	297	51	155	80	443	408	75	102	396	51	51
Shrimp Trawl	all	all	NE	all	123	128	42	115	247	349	42	42	42	42	42	42
Shrimp Trawl	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	76
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	313	514	141	439	482	109	3767	4020	141	6294	141	141
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	2059	345	144	2902	109	214	417	418	4204	144	144	502
Sink, Anchor, Drift Gillnet	all	all	MA	small	62	62	62	62	62	62	62	62	62	62	62	62
Sink, Anchor, Drift Gillnet	all	all	MA	large	29	29	29	29	99	96	29	29	29	29	29	29
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	68	68	68	68	55	58	120	120	68	68	68	68
Scallop Dredge	open	limited	NE	all	534	1706	3605	390	177	807	649	693	325	1172	478	269
Scallop Dredge	open	limited	MA	all	3080	3657	3443	1081	114	371	465	512	2642	2077	2958	329
Scallop Dredge	open	general	NE	all	135	204	92	148	120	120	92	92	92	92	190	92
Scallop Dredge	open	general	MA	all	96	90	96	288	17	124	88	88	96	96	271	96
Scallop Dredge	closed	limited	NE	all	1180	1214	1618	1434	145	857	703	712	452	252	375	139
Scallop Dredge	closed	limited	MA	all	287	339	108	298	88	567	481	485	1568	378	334	108
Scallop Dredge	closed	general	NE	all	24	24	24	24	24	24	24	24	24	24	24	24
Scallop Dredge	closed	general	MA	all	21	21	21	21	21	21	21	21	21	21	21	21
Mid-water paired & single Trawl	all	all	NE	all	1218	1226	56	826	1034	316	697	56	797	1134	56	56
Mid-water paired & single Trawl	all	all	MA	all	182	182	35	182	35	43	557	544	35	563	35	35
Fish Pots/ Traps	all	all	NE	all	20	20	20	20	20	20	20	20	20	20	20	20
Fish Pots/ Traps	all	all	MA	all	40	40	40	40	40	40	40	40	73	40	40	40
Purse Seine	all	all	NE	all	19	19	19	19	19	217	19	19	19	19	19	19
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	72	72	72	72	72	72	72	72	72	72	72	72
Hand Line	all	all	MA	all	133	133	133	133	133	133	133	133	133	133	133	133
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	30	30	30	30	12	12
Clam Quahog Dredge	all	all	NE	all	50	50	50	50	50	50	50	50	50	50	50	50
Clam Quahog Dredge	all	all	MA	all	84	84	84	84	84	84	84	84	84	84	84	84
Crab Pots	all	all	NE	all	101	101	101	101	101	101	101	101	101	101	101	101
Crab Pots	all	all	MA	all	28	28	28	28	28	28	28	28	28	28	28	28
Lobster Pots	all	all	NE	all	439	439	439	439	439	439	439	439	439	439	439	439
Lobster Pots	all	all	MA	all	89	89	89	89	89	89	89	89	89	89	89	89
Total Sea Days					13,792	13,902	19,241	16,616	6,965	8,351	12,200	11,286	22,079	24,187	27,502	9,984
Total Sea Days excluding shaded cells					12,562	12,637	6,272	15,136	4,901	6,943	9,850	9,591	10,416	10,673	133	6,703

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-4 *continued*. Number of sea days needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	TURTLES	TURTLE, GREEN	TURTLE, LEATHERBACK	TURTLE, LOGGERHEAD	TURTLE, KEMP'S RIDLEY	TURTLE, NK	SEALS	SEAL, HARP	SEAL, HOODED	SEAL, HARBOR	SEAL, GRAY	SEAL, NK
Longline	all	all	NE	all	35	35	35	35	35	35	35	35	35	35	35	35
Longline	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	76
Otter Trawl	all	all	NE	small	211	211	211	211	211	211	211	211	211	211	211	211
Otter Trawl	all	all	NE	large	730	730	730	730	730	730	730	730	730	730	730	730
Otter Trawl	all	all	MA	small	1229	196	196	1229	196	196	196	196	196	196	196	196
Otter Trawl	all	all	MA	large	342	342	342	342	342	342	342	342	342	342	342	342
Scallop Trawl	open	limited	MA	all	95	95	95	95	95	95	95	95	95	95	95	95
Scallop Trawl	open	general	MA	all	51	51	51	51	51	51	51	51	51	51	51	51
Shrimp Trawl	all	all	NE	all	42	42	42	42	42	42	42	42	42	42	42	42
Shrimp Trawl	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	76
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	141	141	141	141	141	141	531	1007	141	889	2518	141
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	144	144	144	144	144	144	470	1694	3812	973	731	144
Sink, Anchor, Drift Gillnet	all	all	MA	small	1259	62	1841	62	62	1757	62	62	62	62	62	62
Sink, Anchor, Drift Gillnet	all	all	MA	large	653	913	29	913	29	29	29	29	29	29	29	29
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	468	68	799	764	68	68	804	68	68	1175	1272	68
Scallop Dredge	open	limited	NE	all	1261	269	269	1261	269	269	269	269	269	269	269	269
Scallop Dredge	open	limited	MA	all	3956	329	329	3956	329	329	329	329	329	329	329	329
Scallop Dredge	open	general	NE	all	92	92	92	92	92	92	92	92	92	92	92	92
Scallop Dredge	open	general	MA	all	96	96	96	96	96	96	96	96	96	96	96	96
Scallop Dredge	closed	limited	NE	all	414	139	139	414	139	139	139	139	139	139	139	139
Scallop Dredge	closed	limited	MA	all	108	108	108	108	108	108	108	108	108	108	108	108
Scallop Dredge	closed	general	NE	all	24	24	24	24	24	24	24	24	24	24	24	24
Scallop Dredge	closed	general	MA	all	21	21	21	21	21	21	21	21	21	21	21	21
Mid-water paired & single Trawl	all	all	NE	all	56	56	56	56	56	56	56	56	56	56	56	56
Mid-water paired & single Trawl	all	all	MA	all	35	35	35	35	35	35	35	35	35	35	35	35
Fish Pots/ Traps	all	all	NE	all	20	20	20	20	20	20	20	20	20	20	20	20
Fish Pots/ Traps	all	all	MA	all	40	40	40	40	40	40	40	40	40	40	40	40
Purse Seine	all	all	NE	all	19	19	19	19	19	19	19	19	19	19	19	19
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	72	72	72	72	72	72	72	72	72	72	72	72
Hand Line	all	all	MA	all	133	133	133	133	133	133	133	133	133	133	133	133
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Clam Quahog Dredge	all	all	NE	all	50	50	50	50	50	50	50	50	50	50	50	50
Clam Quahog Dredge	all	all	MA	all	84	84	84	84	84	84	84	84	84	84	84	84
Crab Pots	all	all	NE	all	101	101	101	101	101	101	101	101	101	101	101	101
Crab Pots	all	all	MA	all	28	28	28	28	28	28	28	28	28	28	28	28
Lobster Pots	all	all	NE	all	439	439	439	439	439	439	439	439	439	439	439	439
Lobster Pots	all	all	MA	all	89	89	89	89	89	89	89	89	89	89	89	89
Total Sea Days					12,721	5,457	7,083	12,079	4,573	6,269	6,025	6,990	8,241	7,257	8,741	4,573
Total Sea Days excluding shaded cells					12,721	3,082	6,142	12,079	3,632	6,269	4,742	5,706	5,319	5,436	6,920	3,290

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-4 *continued*. Number of sea days needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	WHALES	WHALE, PILOT, LONG-FIN	WHALE, MINKE	WHALE, NK	DOLPHINS/-PORPOISE	DOLPHIN WHITE-SIDED	DOLPHIN-COMMON	DOLPHIN- BOTTLE-NOSE	PORPOISE, HARBOR	PORPOISE/ DOLPHIN, NK	SEA BIRDS (ALL)	ALL SPECIES
Longline	all	all	NE	all	35	35	35	35	35	35	35	35	35	35	267	57
Longline	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	76
Otter Trawl	all	all	NE	small	3082	3082	211	211	2265	3099	2594	211	211	211	1870	183
Otter Trawl	all	all	NE	large	10526	10526	730	730	2111	2111	730	730	730	730	3237	159
Otter Trawl	all	all	MA	small	196	196	196	196	1164	196	1164	196	196	196	1880	250
Otter Trawl	all	all	MA	large	342	342	342	342	342	342	342	342	342	342	727	55
Scallop Trawl	open	limited	MA	all	95	95	95	95	95	95	95	95	95	95	95	95
Scallop Trawl	open	general	MA	all	51	51	51	51	51	51	51	51	51	51	51	38
Shrimp Trawl	all	all	NE	all	42	42	42	42	42	42	42	42	42	42	42	39
Shrimp Trawl	all	all	MA	all	76	76	76	76	76	76	76	76	76	76	76	55
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	141	141	141	141	1398	3642	141	141	1557	141	1306	82
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	144	144	144	144	806	144	144	3816	871	144	2661	59
Sink, Anchor, Drift Gillnet	all	all	MA	small	62	62	62	62	62	62	62	62	62	62	880	62
Sink, Anchor, Drift Gillnet	all	all	MA	large	29	29	29	29	29	29	29	29	29	29	311	95
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	68	68	68	68	1272	68	68	68	1272	68	806	51
Scallop Dredge	open	limited	NE	all	269	269	269	269	269	269	269	269	269	269	3194	123
Scallop Dredge	open	limited	MA	all	329	329	329	329	329	329	329	329	329	329	329	89
Scallop Dredge	open	general	NE	all	92	92	92	92	92	92	92	92	92	92	92	88
Scallop Dredge	open	general	MA	all	96	96	96	96	96	96	96	96	96	96	96	14
Scallop Dredge	closed	limited	NE	all	139	139	139	139	139	139	139	139	139	139	407	130
Scallop Dredge	closed	limited	MA	all	108	108	108	108	108	108	108	108	108	108	108	61
Scallop Dredge	closed	general	NE	all	24	24	24	24	24	24	24	24	24	24	24	24
Scallop Dredge	closed	general	MA	all	21	21	21	21	21	21	21	21	21	21	21	21
Mid-water paired & single Trawl	all	all	NE	all	1606	1606	56	56	1464	1464	56	56	56	56	808	193
Mid-water paired & single Trawl	all	all	MA	all	35	35	35	35	35	35	35	35	35	35	35	111
Fish Pots/ Traps	all	all	NE	all	20	20	20	20	20	20	20	20	20	20	20	20
Fish Pots/ Traps	all	all	MA	all	40	40	40	40	40	40	40	40	40	40	40	37
Purse Seine	all	all	NE	all	19	19	19	19	19	19	19	19	19	19	19	143
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	72	72	72	72	72	72	72	72	72	72	72	137
Hand Line	all	all	MA	all	133	133	133	133	133	133	133	133	133	133	133	133
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	20
Clam Quahog Dredge	all	all	NE	all	50	50	50	50	50	50	50	50	50	50	50	50
Clam Quahog Dredge	all	all	MA	all	84	84	84	84	84	84	84	84	84	84	84	84
Crab Pots	all	all	NE	all	101	101	101	101	101	101	101	101	101	101	101	101
Crab Pots	all	all	MA	all	28	28	28	28	28	28	28	28	28	28	28	28
Lobster Pots	all	all	NE	all	439	439	439	439	439	439	439	439	439	439	439	439
Lobster Pots	all	all	MA	all	89	89	89	89	89	89	89	89	89	89	89	89
Total Sea Days					18,791	18,791	4,573	4,573	13,507	13,752	7,923	8,245	7,920	4,573	20,503	3,513
Total Sea Days excluding shaded cells					17,714	17,714	2,593	3,497	13,507	13,752	7,923	7,708	7,829	4,573	20,503	3,513

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-5. Number of trips needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	BLUEFISH	HERRING	SALMON	RED CRAB	SCALLOP	MACK-/SQUID-/BUTTERFISH	Mackerel	Illex	Loligo	Butterfish	MONKFISH
Longline	all	all	NE	all	26	26	26	26	26	26	26	26	26	26	26
Longline	all	all	MA	all	12	12	12	12	12	12	12	12	12	12	12
Otter Trawl	all	all	NE	small	364	291	70	280	659	82	576	161	150	209	250
Otter Trawl	all	all	NE	large	11227	5420	304	336	520	1331	1088	4138	1501	2216	34
Otter Trawl	all	all	MA	small	1189	995	104	2885	619	599	1513	725	904	618	265
Otter Trawl	all	all	MA	large	1879	458	177	177	161	125	194	390	170	204	72
Scallop Trawl	open	limited	MA	all	12	12	12	12	12	12	12	12	12	12	12
Scallop Trawl	open	general	MA	all	72	25	25	196	56	85	25	132	94	129	54
Shrimp Trawl	all	all	NE	all	42	91	42	42	350	361	42	42	42	361	22
Shrimp Trawl	all	all	MA	all	13	13	13	13	13	13	13	13	13	13	13
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	327	359	104	1913	3216	2774	2900	3990	104	4517	301
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	175	657	94	2139	822	1114	1119	94	94	2760	156
Sink, Anchor, Drift Gillnet	all	all	MA	small	58	58	58	58	58	58	58	58	58	58	58
Sink, Anchor, Drift Gillnet	all	all	MA	large	100	27	27	27	27	27	27	27	27	27	27
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	94	51	51	51	211	51	51	51	51	51	76
Scallop Dredge	open	limited	NE	all	25	25	25	146	7	126	25	65	298	558	29
Scallop Dredge	open	limited	MA	all	36	36	36	966	31	71	966	184	109	280	24
Scallop Dredge	open	general	NE	all	71	71	71	71	149	130	71	130	71	71	89
Scallop Dredge	open	general	MA	all	69	69	69	69	39	210	69	69	210	69	12
Scallop Dredge	closed	limited	NE	all	449	40	15	171	19	151	38	66	178	32	50
Scallop Dredge	closed	limited	MA	all	194	84	12	37	17	37	83	40	108	35	31
Scallop Dredge	closed	general	NE	all	12	12	12	12	12	12	12	12	12	12	12
Scallop Dredge	closed	general	MA	all	15	15	15	15	15	15	15	15	15	15	15
Mid-water paired & single Trawl	all	all	NE	all	266	285	21	21	683	132	132	316	681	652	274
Mid-water paired & single Trawl	all	all	MA	all	52	130	12	12	12	48	52	47	52	52	141
Fish Pots/ Traps	all	all	NE	all	19	19	19	19	19	19	19	19	19	19	19
Fish Pots/ Traps	all	all	MA	all	37	37	37	37	37	37	37	37	37	37	97
Purse Seine	all	all	NE	all	10	108	10	10	10	102	10	102	10	10	10
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	68	68	68	68	68	68	68	68	68	68	68
Hand Line	all	all	MA	all	126	126	126	126	126	126	126	126	126	126	126
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12
Clam Quahog Dredge	all	all	NE	all	69	69	69	69	69	69	69	69	69	69	69
Clam Quahog Dredge	all	all	MA	all	69	69	69	69	69	69	69	69	69	69	69
Crab Pots	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12
Crab Pots	all	all	MA	all	27	27	27	27	27	27	27	27	27	27	27
Lobster Pots	all	all	NE	all	353	353	353	353	353	353	353	353	353	353	353
Lobster Pots	all	all	MA	all	75	75	75	75	75	75	75	75	75	75	75
Total Trips					17,678	10,260	2,306	10,588	8,647	8,594	10,019	11,808	5,891	13,889	3,015
Total Trips excluding shaded cells					15,925	9,034	0	1,539	2,468	7,333	8,922	6,413	4,300	5,539	2,219

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-5 *continued*. Number of trips needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	NE MULTI-SPP (LARGE-MESH)	Cod	Haddock	Yellowtail fld	American plaice	Witch fld	Winter fld	Pollock	Redfish	White hake	Windowpane	Halibut	Ocean pout
Longline	all	all	NE	all	21	30	28	26	26	26	26	242	26	26	26	26	59
Longline	all	all	MA	all	12	12	12	12	12	12	12	12	12	12	12	12	12
Otter Trawl	all	all	NE	small	88	614	624	255	146	173	281	446	497	319	133	702	161
Otter Trawl	all	all	NE	large	45	135	303	213	279	92	774	1572	266	239	185	755	113
Otter Trawl	all	all	MA	small	229	104	104	1472	2050	481	624	104	1210	1374	337	104	2083
Otter Trawl	all	all	MA	large	52	3040	177	351	177	71	141	3040	681	3048	81	177	185
Scallop Trawl	open	limited	MA	all	12	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Trawl	open	general	MA	all	41	25	25	244	25	125	207	25	25	196	81	25	25
Shrimp Trawl	all	all	NE	all	20	49	169	120	37	325	29	89	56	22	17	42	346
Shrimp Trawl	all	all	MA	all	13	13	13	13	13	13	13	13	13	13	13	13	13
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	61	105	236	266	512	978	534	232	448	360	1107	1131	1110
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	135	163	310	631	545	2171	1197	491	621	641	1893	839	815
Sink, Anchor, Drift Gillnet	all	all	MA	small	58	58	58	58	58	58	58	58	58	58	58	58	58
Sink, Anchor, Drift Gillnet	all	all	MA	large	17	27	27	27	27	27	27	27	27	27	17	27	27
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	51	51	51	51	51	51	51	51	51	51	51	51	51
Scallop Dredge	open	limited	NE	all	65	170	147	99	147	67	261	147	25	78	58	25	119
Scallop Dredge	open	limited	MA	all	46	36	36	300	350	184	234	36	36	187	79	36	726
Scallop Dredge	open	general	NE	all	64	91	71	66	84	109	71	71	71	71	70	71	140
Scallop Dredge	open	general	MA	all	29	69	69	210	206	123	53	69	69	124	33	69	69
Scallop Dredge	closed	limited	NE	all	26	202	152	45	361	37	41	15	15	183	115	51	155
Scallop Dredge	closed	limited	MA	all	124	12	12	199	36	44	200	12	12	87	154	12	197
Scallop Dredge	closed	general	NE	all	12	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Dredge	closed	general	MA	all	15	15	15	15	15	15	15	15	15	15	15	15	15
Mid-water paired & single Trawl	all	all	NE	all	262	553	326	21	548	395	616	464	465	430	21	21	21
Mid-water paired & single Trawl	all	all	MA	all	81	12	12	12	12	157	12	12	12	50	12	12	12
Fish Pots/ Traps	all	all	NE	all	19	19	19	19	19	19	19	19	19	19	19	19	19
Fish Pots/ Traps	all	all	MA	all	37	37	37	37	37	37	37	37	37	37	37	37	37
Purse Seine	all	all	NE	all	107	10	10	10	10	10	10	10	107	10	10	10	10
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	129	129	68	68	68	68	68	68	68	68	68	68	68
Hand Line	all	all	MA	all	126	126	126	126	126	126	126	126	126	126	126	126	126
Scottish Seine	all	all	NE	all	14	12	12	12	12	12	18	12	12	12	15	12	12
Clam Quahog Dredge	all	all	NE	all	69	69	69	69	69	69	69	69	69	69	69	69	69
Clam Quahog Dredge	all	all	MA	all	69	69	69	69	69	69	69	69	69	69	69	69	69
Crab Pots	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	12	12
Crab Pots	all	all	MA	all	27	27	27	27	27	27	27	27	27	27	27	27	27
Lobster Pots	all	all	NE	all	353	353	353	353	353	353	353	353	353	353	353	353	353
Lobster Pots	all	all	MA	all	75	75	75	75	75	75	75	75	75	75	75	75	75
Total Trips					2,641	6,572	3,902	5,630	6,641	6,657	6,407	8,167	5,730	8,536	5,495	5,198	7,437
Total Trips excluding shaded cells					2,464	6,143	2,403	4,676	2,717	5,239	5,685	3,669	2,618	7,001	4,602	3,710	6,881

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-5 *continued*. Number of trips needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	NE MULTI-SPP (SMALL-MESH)	Silver hake	Offshore hake	Red hake	SKATE	DOGFISH	FLUKE/-SCUP/- BLK SEA BASS	Fluke	Scup	Black sea bass	SURF CLAM/- OCEAN QUAHOG	TILEFISH
Longline	all	all	NE	all	144	26	26	144	69	78	26	26	26	26	26	26
Longline	all	all	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Otter Trawl	all	all	NE	small	89	77	1692	251	668	162	150	120	443	698	1260	146
Otter Trawl	all	all	NE	large	143	223	444	529	133	259	436	460	3065	2623	6570	1134
Otter Trawl	all	all	MA	small	503	705	900	638	108	283	311	167	596	507	445	1628
Otter Trawl	all	all	MA	large	517	166	177	1762	36	249	51	59	104	333	303	177
Scallop Trawl	open	limited	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Trawl	open	general	MA	all	142	144	25	72	39	216	200	36	48	195	25	25
Shrimp Trawl	all	all	NE	all	122	127	42	114	245	346	42	42	42	42	42	42
Shrimp Trawl	all	all	MA	all	13	13	13	13	13	13	13	13	13	13	13	13
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	231	380	104	324	356	81	2780	2967	104	4646	104	104
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	1348	226	94	1900	71	140	273	273	2753	94	94	329
Sink, Anchor, Drift Gillnet	all	all	MA	small	58	58	58	58	58	58	58	58	58	58	58	58
Sink, Anchor, Drift Gillnet	all	all	MA	large	27	27	27	27	95	91	27	27	27	27	27	27
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	51	51	51	51	42	44	87	87	51	51	51	51
Scallop Dredge	open	limited	NE	all	49	156	330	36	16	74	59	63	30	107	44	25
Scallop Dredge	open	limited	MA	all	342	406	382	120	13	41	52	57	293	230	328	36
Scallop Dredge	open	general	NE	all	102	149	71	111	91	91	71	71	71	71	140	71
Scallop Dredge	open	general	MA	all	69	65	69	206	12	89	63	63	69	69	194	69
Scallop Dredge	closed	limited	NE	all	137	141	188	167	17	100	82	83	52	29	44	15
Scallop Dredge	closed	limited	MA	all	31	37	12	33	10	62	53	53	171	41	37	12
Scallop Dredge	closed	general	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Dredge	closed	general	MA	all	15	15	15	15	15	15	15	15	15	15	15	15
Mid-water paired & single Trawl	all	all	NE	all	464	467	21	315	394	121	266	21	304	432	21	21
Mid-water paired & single Trawl	all	all	MA	all	52	52	12	52	12	12	160	156	12	161	12	12
Fish Pots/ Traps	all	all	NE	all	19	19	19	19	19	19	19	19	19	19	19	19
Fish Pots/ Traps	all	all	MA	all	37	37	37	37	37	37	37	37	69	37	37	37
Purse Seine	all	all	NE	all	10	10	10	10	10	107	10	10	10	10	10	10
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	68	68	68	68	68	68	68	68	68	68	68	68
Hand Line	all	all	MA	all	126	126	126	126	126	126	126	126	126	126	126	126
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	30	30	30	30	12	12
Clam Quahog Dredge	all	all	NE	all	69	69	69	69	69	69	69	69	69	69	69	69
Clam Quahog Dredge	all	all	MA	all	69	69	69	69	69	69	69	69	69	69	69	69
Crab Pots	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Crab Pots	all	all	MA	all	27	27	27	27	27	27	27	27	27	27	27	27
Lobster Pots	all	all	NE	all	353	353	353	353	353	353	353	353	353	353	353	353
Lobster Pots	all	all	MA	all	75	75	75	75	75	75	75	75	75	75	75	75
Total Trips					5,584	4,647	5,688	7,873	3,447	3,658	6,227	5,872	9,332	11,423	10,788	4,971
Total Trips excluding shaded cells					4,637	3,673	2,211	6,842	2,243	2,511	4,981	4,874	4,476	4,543	139	3,180

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-5 *continued*. Number of trips needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	TURTLES	TURTLE, GREEN	TURTLE, LEATHERBACK	TURTLE, LOGGERHEAD	TURTLE, KEMP'S RIDLEY	TURTLE, NK	SEALS	SEAL, HARP	SEAL, HOODED	SEAL, HARBOR	SEAL, GRAY	SEAL, NK
Longline	all	all	NE	all	26	26	26	26	26	26	26	26	26	26	26	26
Longline	all	all	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Otter Trawl	all	all	NE	small	70	70	70	70	70	70	70	70	70	70	70	70
Otter Trawl	all	all	NE	large	304	304	304	304	304	304	304	304	304	304	304	304
Otter Trawl	all	all	MA	small	654	104	104	654	104	104	104	104	104	104	104	104
Otter Trawl	all	all	MA	large	177	177	177	177	177	177	177	177	177	177	177	177
Scallop Trawl	open	limited	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Trawl	open	general	MA	all	25	25	25	25	25	25	25	25	25	25	25	25
Shrimp Trawl	all	all	NE	all	42	42	42	42	42	42	42	42	42	42	42	42
Shrimp Trawl	all	all	MA	all	13	13	13	13	13	13	13	13	13	13	13	13
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	104	104	104	104	104	104	392	743	104	656	1859	104
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	94	94	94	94	94	94	308	1109	2496	637	479	94
Sink, Anchor, Drift Gillnet	all	all	MA	small	1195	58	1747	58	58	1668	58	58	58	58	58	58
Sink, Anchor, Drift Gillnet	all	all	MA	large	604	845	27	845	27	27	27	27	27	27	27	27
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	351	51	600	573	51	51	604	51	51	882	955	51
Scallop Dredge	open	limited	NE	all	115	25	25	115	25	25	25	25	25	25	25	25
Scallop Dredge	open	limited	MA	all	439	36	36	439	36	36	36	36	36	36	36	36
Scallop Dredge	open	general	NE	all	71	71	71	71	71	71	71	71	71	71	71	71
Scallop Dredge	open	general	MA	all	69	69	69	69	69	69	69	69	69	69	69	69
Scallop Dredge	closed	limited	NE	all	48	15	15	48	15	15	15	15	15	15	15	15
Scallop Dredge	closed	limited	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Dredge	closed	general	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Dredge	closed	general	MA	all	15	15	15	15	15	15	15	15	15	15	15	15
Mid-water paired & single Trawl	all	all	NE	all	21	21	21	21	21	21	21	21	21	21	21	21
Mid-water paired & single Trawl	all	all	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Fish Pots/ Traps	all	all	NE	all	19	19	19	19	19	19	19	19	19	19	19	19
Fish Pots/ Traps	all	all	MA	all	37	37	37	37	37	37	37	37	37	37	37	37
Purse Seine	all	all	NE	all	10	10	10	10	10	10	10	10	10	10	10	10
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	68	68	68	68	68	68	68	68	68	68	68	68
Hand Line	all	all	MA	all	126	126	126	126	126	126	126	126	126	126	126	126
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Clam Quahog Dredge	all	all	NE	all	69	69	69	69	69	69	69	69	69	69	69	69
Clam Quahog Dredge	all	all	MA	all	69	69	69	69	69	69	69	69	69	69	69	69
Crab Pots	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Crab Pots	all	all	MA	all	27	27	27	27	27	27	27	27	27	27	27	27
Lobster Pots	all	all	NE	all	353	353	353	353	353	353	353	353	353	353	353	353
Lobster Pots	all	all	MA	all	75	75	75	75	75	75	75	75	75	75	75	75
Total Trips					5,397	3,124	4,543	4,722	2,306	3,916	3,360	3,961	4,708	4,232	5,349	2,306
Total Trips excluding shaded cells					5,397	2,096	4,169	4,722	1,933	3,916	3,023	3,623	3,579	3,613	4,730	1,969

Gray-shaded cells indicate unlikely combinations of species/gear.

Table B-5 *continued*. Number of trips needed to achieve a CV of 30 percent based on the total composite discards.

Gear Type	Access Area (Open-Closed)	Trip Category (General/ Limited)	Region	mesh groups	WHALES	WHALE, PILOT, LONG-FIN	WHALE, MINKE	WHALE, NK	DOLPHINS/-PORPOISE	DOLPHIN WHITE-SIDED	DOLPHIN-COMMON	DOLPHIN- BOTTLE-NOSE	PORPOISE, HARBOR	PORPOISE/ DOLPHIN, NK	SEA BIRDS (ALL)	ALL SPECIES
Longline	all	all	NE	all	26	26	26	26	26	26	26	26	26	26	208	44
Longline	all	all	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Otter Trawl	all	all	NE	small	1016	1016	70	70	747	1022	855	70	70	70	617	60
Otter Trawl	all	all	NE	large	4435	4435	304	304	890	890	304	304	304	304	1364	67
Otter Trawl	all	all	MA	small	104	104	104	104	620	104	620	104	104	104	1001	133
Otter Trawl	all	all	MA	large	177	177	177	177	177	177	177	177	177	177	377	29
Scallop Trawl	open	limited	MA	all	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Trawl	open	general	MA	all	25	25	25	25	25	25	25	25	25	25	25	18
Shrimp Trawl	all	all	NE	all	42	42	42	42	42	42	42	42	42	42	42	38
Shrimp Trawl	all	all	MA	all	13	13	13	13	13	13	13	13	13	13	13	9
Sink, Anchor, Drift Gillnet	all	all	NE	small	12	12	12	12	12	12	12	12	12	12	12	12
Sink, Anchor, Drift Gillnet	all	all	NE	large	104	104	104	104	1032	2688	104	104	1149	104	964	61
Sink, Anchor, Drift Gillnet	all	all	NE	xlg	94	94	94	94	528	94	94	2499	570	94	1742	38
Sink, Anchor, Drift Gillnet	all	all	MA	small	58	58	58	58	58	58	58	58	58	58	835	58
Sink, Anchor, Drift Gillnet	all	all	MA	large	27	27	27	27	27	27	27	27	27	27	288	91
Sink, Anchor, Drift Gillnet	all	all	MA	xlg	51	51	51	51	955	51	51	51	955	51	605	39
Scallop Dredge	open	limited	NE	all	25	25	25	25	25	25	25	25	25	25	292	11
Scallop Dredge	open	limited	MA	all	36	36	36	36	36	36	36	36	36	36	36	10
Scallop Dredge	open	general	NE	all	71	71	71	71	71	71	71	71	71	71	71	69
Scallop Dredge	open	general	MA	all	69	69	69	69	69	69	69	69	69	69	69	10
Scallop Dredge	closed	limited	NE	all	15	15	15	15	15	15	15	15	15	15	47	15
Scallop Dredge	closed	limited	MA	all	12	12	12	12	12	12	12	12	12	12	12	7
Scallop Dredge	closed	general	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Scallop Dredge	closed	general	MA	all	15	15	15	15	15	15	15	15	15	15	15	15
Mid-water paired & single Trawl	all	all	NE	all	612	612	21	21	558	558	21	21	21	21	308	73
Mid-water paired & single Trawl	all	all	MA	all	12	12	12	12	12	12	12	12	12	12	12	32
Fish Pots/ Traps	all	all	NE	all	19	19	19	19	19	19	19	19	19	19	19	19
Fish Pots/ Traps	all	all	MA	all	37	37	37	37	37	37	37	37	37	37	37	34
Purse Seine	all	all	NE	all	10	10	10	10	10	10	10	10	10	10	10	71
Purse Seine	all	all	MA	all	9	9	9	9	9	9	9	9	9	9	9	9
Hand Line	all	all	NE	all	68	68	68	68	68	68	68	68	68	68	68	129
Hand Line	all	all	MA	all	126	126	126	126	126	126	126	126	126	126	126	126
Scottish Seine	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	20
Clam Quahog Dredge	all	all	NE	all	69	69	69	69	69	69	69	69	69	69	69	69
Clam Quahog Dredge	all	all	MA	all	69	69	69	69	69	69	69	69	69	69	69	69
Crab Pots	all	all	NE	all	12	12	12	12	12	12	12	12	12	12	12	12
Crab Pots	all	all	MA	all	27	27	27	27	27	27	27	27	27	27	27	27
Lobster Pots	all	all	NE	all	353	353	353	353	353	353	353	353	353	353	353	353
Lobster Pots	all	all	MA	all	75	75	75	75	75	75	75	75	75	75	75	75
Total Trips					7,975	7,975	2,306	2,306	6,887	6,965	3,607	4,711	4,731	2,306	9,877	1,992
Total Trips excluding shaded cells					7,720	7,720	1,550	2,051	6,887	6,965	3,607	4,429	4,698	2,306	9,877	1,992

Gray-shaded cells indicate unlikely combinations of species/gear.

Appendix C
Importance Filter Worksheets for All Fishing Modes

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Northeast Region SBRM Importance Filter Worksheet -- Option A
New England Clam Dredge

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	3,466	0%	Fish
0	0	3,466	0%	Protected Species

Top Species:	scallop	monkfish	surfclam quahog	sea turtles
Projected observer days needed:	***50***	***50***	***50***	***50***
Average trip length (days):	0.70			
Estimated % coverage level required:	2%	2%	2%	2%
Realized CV for 2004:	N/A	N/A	N/A	N/A
Percent of trips w/ zero discard:	N/A	N/A	N/A	N/A
Encounter rate:	N/A	N/A	N/A	N/A
Rank of total discards (out of 13):	N/A	N/A	N/A	N/A
Observed discards (lb):	N/A	N/A	N/A	N/A
Obs. discard percent of all obs. discards:	N/A	N/A	N/A	N/A
2004 commercial landings (lb, all gears):	64,506,000	23,036,000	101,717,000	N/A
2004 recreational landings (lb, all gears):	0	0	0	N/A
Obs. discards as % of comm landings:	N/A	N/A	N/A	N/A
Discards as % of comm landings:	N/A	N/A	N/A	N/A
Discards as % ot total landings:	N/A	N/A	N/A	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Clam Dredge

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	3,461	0%	Fish
0	0	3,461	0%	Protected Species

Top Species:	scallop	monkfish	surfclam quahog	sea turtles
Projected observer days needed:	***84***	***84***	***84***	***84***
Average trip length (days):	1.20			
Estimated % coverage level required:	2%	2%	2%	2%
Realized CV for 2004:	N/A	N/A	N/A	N/A
Percent of trips w/ zero discard:	N/A	N/A	N/A	N/A
Encounter rate:	N/A	N/A	N/A	N/A
Rank of total discards (out of 13):	N/A	N/A	N/A	N/A
Observed discards (lb):	N/A	N/A	N/A	N/A
Obs. discard percent of all obs. discards:	N/A	N/A	N/A	N/A
2004 commercial landings (lb, all gears):	64,506,000	23,036,000	101,717,000	N/A
2004 recreational landings (lb, all gears):	0	0	0	N/A
Obs. discards as % of comm landings:	N/A	N/A	N/A	N/A
Discards as % of comm landings:	N/A	N/A	N/A	N/A
Discards as % ot total landings:	N/A	N/A	N/A	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Crab Pots

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	103	0%	Fish
0	0	103	0%	Protected Species

Top Species:	red crab	sea turtles
Projected observer days needed:	***101***	***101***
Average trip length (days):	6.00	
Estimated % coverage level required:	16%	16%
Realized CV for 2004:	N/A	N/A
Percent of trips w/ zero discard:	N/A	N/A
Encounter rate:	N/A	N/A
Rank of total discards (out of 13):	N/A	N/A
Observed discards (lb):	N/A	N/A
Obs. discard percent of all obs. discards:	N/A	N/A
2004 commercial landings (lb, all gears):	3,952,000	N/A
2004 recreational landings (lb, all gears):	0	N/A
Obs. discards as % of comm landings:	N/A	N/A
Discards as % of comm landings:	N/A	N/A
Discards as % ot total landings:	N/A	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
Mid-Atlantic Crab Pots

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	1,133	0%	Fish
0	0	1,133	0%	Protected Species

Top Species:	red crab												sea turtles
Projected observer days needed:	***28***												***28***
Average trip length (days):	0.30												
Estimated % coverage level required:	8%												8%
Realized CV for 2004:	N/A												N/A
Percent of trips w/ zero discard:	N/A												N/A
Encounter rate:	N/A												N/A
Rank of total discards (out of 13):	N/A												N/A
Observed discards (lb):	N/A												N/A
Obs. discard percent of all obs. discards:	N/A												N/A
2004 commercial landings (lb, all gears):	3,952,000												N/A
2004 recreational landings (lb, all gears):	0												N/A
Obs. discards as % of comm landings:	N/A												N/A
Discards as % of comm landings:	N/A												N/A
Discards as % ot total landings:	N/A												N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Fish Pots/Traps

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	973	0%	Fish
0	0	973	0%	Protected Species

Top Species:	herring	red crab	large-mesh mults	small-mesh mults	skates	SF/S/BSB	tilefish						sea turtles
Projected observer days needed:	***20***	***20***	***20***	***20***	***20***	***20***	***20***						***20***
Average trip length (days):	0.40												
Estimated % coverage level required:	5%	5%	5%	5%	5%	5%	5%						5%
Realized CV for 2004:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Percent of trips w/ zero discard:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Encounter rate:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Rank of total discards (out of 13):	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Observed discards (lb):	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Obs. discard percent of all obs. discards:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
2004 commercial landings (lb, all gears):	187,387,000	3,952,000	83,523,000	19,387,000	20,388,000	30,616,000	2,316,000						N/A
2004 recreational landings (lb, all gears):	27,000	0	5,383,000	35,000	0	17,982,000	0						N/A
Obs. discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Discards as % ot total landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Fish Pots/Traps

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
6	6	1,750	0%	Fish
9	8	1,750	0%	Protected Species

Top Species:	herring	red crab	large-mesh mults	small-mesh mults	skate	SF/S/BSB	tilefish						sea turtles
Projected observer days needed:	***40***	***40***	***40***	***40***	***40***	***40***	***40***						***40***
Average trip length (days):	0.60												
Estimated % coverage level required:	4%	4%	4%	4%	4%	4%	4%						4%
Realized CV for 2004:	*	*	*	*	*	16.1%	*						*
Percent of trips w/ zero discard:	100%	100%	100%	100%	100%	0%	100%						100%
Encounter rate:	0%	0%	0%	0%	0%	100%	0%						0%
Rank of total discards (out of 13):	3	3	3	3	3	1	3						N/A
Observed discards (lb):	0	0	0	0	0	7,031	0						0
Obs. discard percent of all obs. discards:	0.00%	0.00%	0.00%	0.00%	0.00%	90.47%	0.00%						N/A
2004 commercial landings (lb, all gears):	187,387,000	3,952,000	83,523,000	19,387,000	20,388,000	30,616,000	2,316,000						N/A
2004 recreational landings (lb, all gears):	27,000	0	5,383,000	35,000	0	17,982,000	0						N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%						N/A
Discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	5.39%	0.00%						N/A
Discards as % ot total landings:	0.00%	0.00%	0.00%	0.00%	0.00%	3.40%	0.00%						N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Small-Mesh Gillnet

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
1	1	42	2%	Fish
1	1	42	2%	Protected Species

Top Species:	bluefish	herring	M/S/B	monkfish	large-mesh mults	small-mesh mults	skates	dogfish	SF/S/BSB				sea turtles
Projected observer days needed:	***12***	***12***	***12***	***12***	***12***	***12***	***12***	***12***	***12***				***12***
Average trip length (days):	0.80												
Estimated % coverage level required:	36%	36%	36%	36%	36%	36%	36%	36%	36%				36%
Realized CV for 2004:	*	*	0.0%	*	*	*	*	0.0%	*				*
Percent of trips w/ zero discard:	100%	100%	0%	100%	100%	100%	100%	0%	100%				100%
Encounter rate:	0%	0%	100%	0%	0%	0%	0%	100%	0%				0%
Rank of total discards (out of 13):	3	3	2	3	3	3	3	1	3				N/A
Observed discards (lb):	0	0	47	0	0	0	0	97	0				0
Obs. discard percent of all obs. discards:	0.00%	0.00%	27.73%	0.00%	0.00%	0.00%	0.00%	57.23%	0.00%				N/A
2004 commercial landings (lb, all gears):	7,512,000	187,387,000	212,528,000	23,036,000	83,523,000	19,387,000	20,388,000	1,965,000	30,616,000				N/A
2004 recreational landings (lb, all gears):	15,146,000	27,000	1,134,000	0	5,383,000	35,000	0	0	0				N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%				N/A
Discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%				N/A
Discards as % ot total landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%				N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Large-Mesh Gillnet

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
657	577	5,189	11%	Fish
876	772	5,189	15%	Protected Species

Top Species:	SF/S/BSB	S/M/B	herring	skates	bluefish	monkfish	small-mesh mults	dogfish	large-mesh mults				sea turtles
Projected observer days needed:	3,767	3,758	486	482	443	408	313	109	83				141
Average trip length (days):	0.90												
Estimated % coverage level required:	81%	80%	10%	10%	9%	9%	7%	2%	2%				3%
Realized CV for 2004:	84.5%	84.1%	22.9%	22.8%	22.0%	21.0%	18.3%	10.6%	9.2%				*
Percent of trips w/ zero discard:	98%	95%	93%	44%	93%	81%	81%	28%	22%				100%
Encounter rate:	2%	5%	7%	56%	7%	19%	19%	72%	78%				0%
Rank of total discards (out of 13):	9	7	8	3	5	4	6	1	2				N/A
Observed discards (lb):	3	346	208	11,989	849	878	495	460,442	41,669				0
Obs. discard percent of all obs. discards:	0.00%	0.06%	0.04%	2.16%	0.15%	0.16%	0.09%	82.83%	7.50%				N/A
2004 commercial landings (lb, all gears):	30,616,000	212,528,000	187,387,000	20,388,000	7,512,000	23,036,000	19,387,000	1,965,000	83,523,000				N/A
2004 recreational landings (lb, all gears):	17,982,000	1,134,000	27,000	0	15,146,000	0	35,000	0	5,383,000				N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.06%	0.01%	0.00%	0.00%	23.43%	0.05%				N/A
Discards as % of comm landings:	0.00%	0.00%	0.00%	0.73%	0.14%	0.05%	0.03%	265.91%	0.63%				N/A
Discards as % ot total landings:	0.00%	0.00%	0.00%	0.73%	0.05%	0.05%	0.03%	265.91%	0.60%				N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Extra-Large-Mesh Gillnet

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
533	445	4,712	9%	Fish
701	569	4,712	12%	Protected Species

Top Species:	small-mesh mults	M/S/B	herring	SF/S/BSB	bluefish	dogfish	monkfish	large-mesh mults	skates				sea turtles
Projected observer days needed:	2,059	1,701	1,004	417	267	214	238	206	109				144
Average trip length (days):	0.40												
Estimated % coverage level required:	109%	90%	53%	22%	14%	11%	13%	11%	6%				8%
Realized CV for 2004:	62.4%	49.8%	37.8%	23.3%	18.1%	16.2%	17.4%	15.9%	11.7%				*
Percent of trips w/ zero discard:	88%	95%	96%	92%	85%	29%	57%	48%	30%				100%
Encounter rate:	12%	5%	4%	8%	15%	71%	43%	52%	70%				0%
Rank of total discards (out of 13):	8	7	11	5	6	1	3	4	2				N/A
Observed discards (lb):	373	0	46	0	1,935	100,388	29,933	16,705	36,016				0
Obs. discard percent of all obs. discards:	0.15%	0.00%	0.02%	0.00%	0.80%	41.55%	12.39%	6.91%	14.91%				N/A
2004 commercial landings (lb, all gears):	19,387,000	212,528,000	187,387,000	30,616,000	7,512,000	1,965,000	23,036,000	83,523,000	20,388,000				N/A
2004 recreational landings (lb, all gears):	35,000	1,134,000	27,000	17,982,000	15,146,000	0	0	5,383,000	0				N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.03%	5.11%	0.13%	0.02%	0.18%				N/A
Discards as % of comm landings:	0.02%	0.00%	0.00%	0.24%	0.32%	64.66%	2.76%	0.27%	3.34%				N/A
Discards as % ot total landings:	0.02%	0.00%	0.00%	0.15%	0.10%	64.66%	2.76%	0.26%	3.34%				N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Small-Mesh Gillnet

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
3	3	2,924	0%	Fish
375	358	2,924	12%	Protected Species

Top Species:	bluefish	herring	M/S/B	monkfish	large-mesh mults	skates	dogfish	SF/S/BSB					sea turtles
Projected observer days needed:	***62***	***62***	***62***	***62***	***62***	***62***	***62***	***62***					1,259
Average trip length (days):	1.10												
Estimated % coverage level required:	2%	2%	2%	2%	2%	2%	2%	2%					39%
Realized CV for 2004:	*	*	0.0%	*	*	*	0.0%	0.0%					62.6%
Percent of trips w/ zero discard:	100%	100%	67%	100%	100%	100%	33%	67%					99%
Encounter rate:	0%	0%	33%	0%	0%	0%	67%	33%					1%
Rank of total discards (out of 13):	4	4	2	4	4	4	1	3					N/A
Observed discards (lb):	0	0	1	0	0	0	64	0					Yes
Obs. discard percent of all obs. discards:	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	31.25%	0.15%					N/A
2004 commercial landings (lb, all gears):	7,512,000	187,387,000	212,528,000	23,036,000	83,523,000	20,388,000	1,965,000	30,616,000					N/A
2004 recreational landings (lb, all gears):	15,146,000	27,000	1,134,000	0	5,383,000	0	0	17,982,000					N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					N/A
Discards as % of comm landings:	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	99.70%	0.03%					N/A
Discards as % ot total landings:	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	99.70%	0.02%					N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Large-Mesh Gillnet

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
4	4	1,293	0%	Fish
85	81	1,293	6%	Protected Species

Top Species:	bluefish	skate	dogfish	herring	M/S/B	monkfish	SF/S/BSB	large-mesh mults					sea turtles
Projected observer days needed:	105	99	96	***29***	***29***	***29***	***29***	19					653
Average trip length (days):	0.40												
Estimated % coverage level required:	20%	19%	19%	6%	6%	6%	6%	4%					126%
Realized CV for 2004:	121.6%	111.8%	108.3%	*	*	*	*	86.8%					105.2%
Percent of trips w/ zero discard:	75%	50%	25%	100%	100%	100%	100%	75%					98%
Encounter rate:	25%	50%	75%	0%	0%	0%	0%	25%					3%
Rank of total discards (out of 13):	2	3	1	5	5	5	5	4					N/A
Observed discards (lb):	102	11	2,302	0	0	0	0	6					Yes
Obs. discard percent of all obs. discards:	4.02%	0.43%	90.65%	0.00%	0.00%	0.00%	0.00%	0.24%					N/A
2004 commercial landings (lb, all gears):	7,512,000	20,388,000	1,965,000	187,387,000	212,528,000	23,036,000	30,616,000	83,523,000					N/A
2004 recreational landings (lb, all gears):	15,146,000	0	0	27,000	1,134,000	0	17,982,000	5,383,000					N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%					N/A
Discards as % of comm landings:	8.93%	0.35%	770.42%	0.00%	0.00%	0.00%	0.00%	0.05%					N/A
Discards as % ot total landings:	2.96%	0.35%	770.42%	0.00%	0.00%	0.00%	0.00%	0.04%					N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
Mid-Atlantic Extra-Large-Mesh Gillnet

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
30	27	2,568	1%	Fish
152	142	2,568	6%	Protected Species

Top Species:	bluefish	SF/S/BSB	monkfish	herring	M/S/B	large-mesh mults	dogfish	skates					sea turtles
Projected observer days needed:	131	120	104	***68***	***68***	***68***	58	55					468
Average trip length (days):	0.60												
Estimated % coverage level required:	9%	8%	7%	4%	4%	4%	4%	4%					30%
Realized CV for 2004:	30.4%	30.3%	27.3%	*	*	*	12.9%	11.5%					49.5%
Percent of trips w/ zero discard:	56%	74%	37%	100%	100%	100%	11%	4%					97%
Encounter rate:	44%	26%	63%	0%	0%	0%	89%	96%					3%
Rank of total discards (out of 13):	4	5	3	7	7	7	1	2					N/A
Observed discards (lb):	328	113	1,712	0	0	0	3,620	2,500					Yes
Obs. discard percent of all obs. discards:	2.45%	0.84%	12.79%	0.00%	0.00%	0.00%	27.05%	18.68%					N/A
2004 commercial landings (lb, all gears):	7,512,000	30,616,000	23,036,000	187,387,000	212,528,000	83,523,000	1,965,000	20,388,000					N/A
2004 recreational landings (lb, all gears):	15,146,000	17,982,000	0	27,000	1,134,000	5,383,000	0	0					N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.18%	0.01%					N/A
Discards as % of comm landings:	0.26%	0.02%	0.45%	0.00%	0.00%	0.00%	11.19%	0.74%					N/A
Discards as % ot total landings:	0.09%	0.01%	0.45%	0.00%	0.00%	0.00%	11.19%	0.74%					N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
New England Handline

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
6	6	3,378	0%	Fish
18	9	3,378	0%	Protected Species

Top Species:	large-mesh mults	bluefish	dogfish	SF/S/BSB								sea turtles
Projected observer days needed:	137	***72***	***72***	***72***								***72***
Average trip length (days):	0.40											
Estimated % coverage level required:	10%	5%	5%	5%								5%
Realized CV for 2004:	403.0%	*	*	*								*
Percent of trips w/ zero discard:	67%	100%	100%	100%								100%
Encounter rate:	33%	0%	0%	0%								0%
Rank of total discards (out of 13):	1	2	2	2								N/A
Observed discards (lb):	8	0	0	0								0
Obs. discard percent of all obs. discards:	100.00%	0.00%	0.00%	0.00%								N/A
2004 commercial landings (lb, all gears):	83,523,000	7,512,000	1,965,000	30,616,000								N/A
2004 recreational landings (lb, all gears):	5,383,000	15,416,000	0	17,982,000								N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%								N/A
Discards as % of comm landings:	0.01%	0.00%	0.00%	0.00%								N/A
Discards as % ot total landings:	0.01%	0.00%	0.00%	0.00%								N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
Mid-Atlantic Handline

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	6,283	0%	Fish
11	3	6,283	0%	Protected Species

Top Species:	large-mesh mults												sea turtles
Projected observer days needed:	***133***												133
Average trip length (days):	0.30												
Estimated % coverage level required:	7%												7%
Realized CV for 2004:	N/A												*
Percent of trips w/ zero discard:	N/A												100%
Encounter rate:	N/A												0%
Rank of total discards (out of 13):	N/A												N/A
Observed discards (lb):	N/A												0
Obs. discard percent of all obs. discards:	N/A												N/A
2004 commercial landings (lb, all gears):	83,523,000												N/A
2004 recreational landings (lb, all gears):	5,383,000												N/A
Obs. discards as % of comm landings:	N/A												N/A
Discards as % of comm landings:	N/A												N/A
Discards as % ot total landings:	N/A												N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
New England Lobster Pots

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	34,101	0%	Fish
3	3	34,101	0%	Protected Species

Top Species:	red crab	large-mesh mults											sea turtles
Projected observer days needed:	***439***	***439***											***439***
Average trip length (days):	0.60												
Estimated % coverage level required:	2%	2%											2%
Realized CV for 2004:	N/A	N/A											*
Percent of trips w/ zero discard:	N/A	N/A											100%
Encounter rate:	N/A	N/A											0%
Rank of total discards (out of 13):	N/A	N/A											N/A
Observed discards (lb):	N/A	N/A											0
Obs. discard percent of all obs. discards:	N/A	N/A											N/A
2004 commercial landings (lb, all gears):	3,952,000	83,523,000											N/A
2004 recreational landings (lb, all gears):	0	5,383,000											N/A
Obs. discards as % of comm landings:	N/A	N/A											N/A
Discards as % of comm landings:	0.00%	0.00%											N/A
Discards as % ot total landings:	0.00%	0.00%											N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Lobster Pots

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	3,750	0%	Fish
0	0	3,750	0%	Protected Species

Top Species:	red crab	large-mesh mults											sea turtles
Projected observer days needed:	***89***	***89***											***89***
Average trip length (days):	0.60												
Estimated % coverage level required:	4%	4%											4%
Realized CV for 2004:	N/A	N/A											N/A
Percent of trips w/ zero discard:	N/A	N/A											N/A
Encounter rate:	N/A	N/A											N/A
Rank of total discards (out of 13):	N/A	N/A											N/A
Observed discards (lb):	N/A	N/A											0
Obs. discard percent of all obs. discards:	N/A	N/A											N/A
2004 commercial landings (lb, all gears):	3,952,000	83,523,000											N/A
2004 recreational landings (lb, all gears):	0	5,383,000											N/A
Obs. discards as % of comm landings:	N/A	N/A											N/A
Discards as % of comm landings:	N/A	N/A											N/A
Discards as % ot total landings:	N/A	N/A											N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Longline

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
12	12	1,234	1%	Fish
133	119	1,234	10%	Protected Species

Top Species:	small-mesh mults	dogfish	skates	monkfish	tilefish	large-mesh mults							sea turtles
Projected observer days needed:	185	99	89	35	35	27							35
Average trip length (days):	0.80												
Estimated % coverage level required:	6%	10%	9%	4%	4%	7%							4%
Realized CV for 2004:	91.0%	65.4%	61.4%	*	*	33.5%							*
Percent of trips w/ zero discard:	92%	33%	25%	100%	100%	0%							100%
Encounter rate:	8%	67%	75%	0%	0%	100%							0%
Rank of total discards (out of 13):	4	1	3	5	5	2							N/A
Observed discards (lb):	7	8,270	0	0	0	1,667							0
Obs. discard percent of all obs. discards:	0.07%	77.04%	0.00%	0.00%	0.00%	15.53%							N/A
2004 commercial landings (lb, all gears):	19,387,000	1,965,000	20,388,000	23,036,000	2,316,000	83,523,000							N/A
2004 recreational landings (lb, all gears):	35,000	0	0	0	0	5,383,000							N/A
Obs. discards as % of comm landings:	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%							N/A
Discards as % of comm landings:	0.00%	42.71%	0.35%	0.00%	0.00%	0.28%							N/A
Discards as % ot total landings:	0.00%	42.71%	0.35%	0.00%	0.00%	0.27%							N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Longline

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	205	0%	Fish
11	2	205	1%	Protected Species

Top Species:	monkfish	large-mesh mults	skate	dogfish	tilefish	sea turtles
Projected observer days needed:	***76***	***76***	***76***	***76***	***76***	***76***
Average trip length (days):	5.40					
Estimated % coverage level required:	7%	7%	7%	7%	7%	7%
Realized CV for 2004:	N/A	N/A	N/A	N/A	N/A	*
Percent of trips w/ zero discard:	N/A	N/A	N/A	N/A	N/A	100%
Encounter rate:	N/A	N/A	N/A	N/A	N/A	0%
Rank of total discards (out of 13):	N/A	N/A	N/A	N/A	N/A	N/A
Observed discards (lb):	N/A	N/A	N/A	N/A	N/A	0
Obs. discard percent of all obs. discards:	N/A	N/A	N/A	N/A	N/A	N/A
2004 commercial landings (lb, all gears):	23,036,000	83,523,000	20,388,000	1,965,000	2,316,000	N/A
2004 recreational landings (lb, all gears):	0	5,383,000	0	0	0	N/A
Obs. discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A
Discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A
Discards as % ot total landings:	N/A	N/A	N/A	N/A	N/A	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
New England Mid-Water Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
165	66	1,061	6%	Fish
242	99	1,061	9%	Protected Species

Top Species:	small-mesh mults	herring	monkfish	bluefish	large-mesh mults	M/S/B	dogfish						sea turtles
Projected observer days needed:	1,218	747	718	699	688	346	316						56
Average trip length (days):	1.50												
Estimated % coverage level required:	77%	47%	45%	44%	43%	22%	20%						4%
Realized CV for 2004:	99.4%	77.0%	72.4%	77.0%	66.9%	42.9%	41.8%						*
Percent of trips w/ zero discard:	79%	86%	85%	89%	73%	62%	30%						100%
Encounter rate:	21%	14%	15%	11%	27%	38%	70%						0%
Rank of total discards (out of 11):	5	3	8	6	4	1	2						N/A
Observed discards (lb):	4,080	97,352	269	611	0	0	131,699						0
Obs. discard percent of all obs. discards:	1.01%	24.20%	0.07%	0.15%	0.00%	0.00%	32.74%						N/A
2004 commercial landings (lb, all gears):	19,387,000	187,387,000	23,036,000	7,512,000	83,523,000	212,528,000	1,965,000						0
2004 recreational landings (lb, all gears):	35,000	27,000	0	15,146,000	5,383,000	1,134,000	266,657						N/A
Obs. discards as % of comm landings:	0.02%	0.05%	0.00%	0.01%	0.00%	0.00%	6.70%						N/A
Discards as % of comm landings:	0.23%	0.37%	0.01%	0.05%	0.06%	2.43%	58.04%						N/A
Discards as % ot total landings:	0.23%	0.37%	0.01%	0.02%	0.06%	2.41%	51.10%						N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Mid-Water Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
39	13	121	11%	Fish
42	14	121	12%	Protected Species

Top Species:	monkfish	herring	large-mesh mults	bluefish	small-mesh mults	M/S/B	dogfish	sea turtles
Projected observer days needed:	492	453	281	182	182	167	43	35
Average trip length (days):	3							
Estimated % coverage level required:	116%	92%	116%	11%	14%	14%	16%	11%
Realized CV for 2004:	104.8%	98.2%	70.8%	53.9%	53.9%	54.5%	24.6%	*
Percent of trips w/ zero discard:	77%	92%	38%	92%	77%	69%	54%	100%
Encounter rate:	23%	8%	62%	8%	23%	31%	46%	0%
Rank of total discards (out of 13):	3	6	7	8	5	2	1	N/A
Observed discards (lb):	94	5	43	100	1,024	11,794	2,716	0
Obs. discard percent of all obs. discards:	0.50%	0.03%	0.23%	0.54%	5.49%	63.28%	14.57%	N/A
2004 commercial landings (lb, all gears):	23,036,000	187,387,000	83,523,000	7,512,000	19,387,000	212,528,000	1,965,000	N/A
2004 recreational landings (lb, all gears):	0	27,000	5,383,000	15,146,000	35,000	1,134,000	0	N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.14%	N/A
Discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.18%	N/A
Discards as % ot total landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.18%	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Small-Mesh Otter Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
449	142	3,484	4%	Fish
577	200	3,484	6%	Protected Species

Top Species:	skates	scallop	bluefish	herring	red crab	monkfish	dogfish	SF/S/BSB	tilefish	small-mesh mults	large-mesh mults	M/S/B	sea turtles
Projected observer days needed:	2,024	1,998	1,103	882	848	757	492	455	441	269	266	249	211
Average trip length (days):	1.90												
Estimated % coverage level required:	31%	30%	17%	13%	13%	11%	7%	7%	7%	4%	4%	4%	3%
Realized CV for 2004:	69.1%	71.0%	50.8%	43.7%	42.8%	40.5%	32.2%	30.9%	30.4%	23.5%	23.3%	22.7%	*
Percent of trips w/ zero discard:	14%	89%	85%	74%	90%	36%	21%	41%	87%	34%	4%	35%	100%
Encounter rate:	86%	11%	15%	26%	10%	64%	79%	59%	13%	66%	96%	65%	0%
Rank of total discards (out of 13):	2	12	9	8	10	7	4	5	11	3	6	1	N/A
Observed discards (lb):	178,362	180	7,934	13,687	1,143	26,577	93,129	37,034	316	0	41,122	229,443	0
Obs. discard percent of all obs. discards:	16.10%	0.02%	0.72%	1.24%	0.10%	2.40%	8.40%	3.34%	0.03%	0.00%	3.71%	20.71%	N/A
2004 commercial landings (lb, all gears):	20,388,000	64,506,000	7,512,000	187,387,000	3,952,000	23,036,000	1,965,000	30,616,000	2,316,000	19,387,000	83,523,000	212,528,000	0
2004 recreational landings (lb, all gears):	35,405	0	15,146,000	27,000	0	0	266,657	17,982,000	0	35,000	5,383,000	1,134,000	N/A
Obs. discards as % of comm landings:	0.87%	0.00%	0.11%	0.01%	0.03%	0.12%	4.74%	0.12%	0.01%	0.00%	0.05%	0.11%	N/A
Discards as % of comm landings:	38.71%	0.01%	2.56%	0.28%	1.14%	4.93%	160.90%	5.54%	0.81%	26.55%	1.81%	4.28%	N/A
Discards as % ot total landings:	38.64%	0.01%	0.85%	0.28%	1.14%	4.93%	141.67%	3.49%	0.81%	26.50%	1.70%	4.25%	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Small-Mesh Otter Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
471	194	5,222	4%	Fish
499	205	5,222	4%	Protected Species

Top Species:	tilefish	bluefish	herring	scallop	M/S/B	small-mesh mults	SF/S/BSB	dogfish	monkfish	large-mesh mults	skate		sea turtles
Projected observer days needed:	3,057	2,231	1,869	1,162	1,125	944	584	532	497	429	202		1,229
Average trip length (days):	0.90												
Estimated % coverage level required:	65%	47%	40%	25%	24%	20%	12%	11%	11%	9%	4%		26%
Realized CV for 2004:	115.5%	90.3%	78.4%	57.4%	56.1%	50.8%	38.6%	36.7%	35.4%	32.6%	22.2%		57.3%
Percent of trips w/ zero discard:	99%	90%	96%	90%	55%	73%	28%	37%	67%	44%	23%		99%
Encounter rate:	1%	10%	4%	10%	45%	27%	72%	63%	33%	56%	77%		2%
Rank of total discards (out of 13):	13	8	11	9	2	5	4	3	7	6	1		N/A
Observed discards (lb):	6	6,645	144	6,303	119,995	75,491	bsb	94,574	7,744	7,560	110,445		Yes
Obs. discard percent of all obs. discards:	0.00%	0.86%	0.02%	0.81%	15.45%	9.72%	#VALUE!	12.18%	1.00%	0.97%	14.22%		N/A
2004 commercial landings (lb, all gears):	2,316,000	7,512,000	187,387,000	64,506,000	#########	19,387,000	30,616,000	1,965,000	23,036,000	83,523,000	20,388,000		N/A
2004 recreational landings (lb, all gears):	0	15,146,000	27,000	0	1,134,000	35,000	17,982,000	0	0	5,383,000	0		NA
Obs. discards as % of comm landings:	7.25%	7.82%	0.00%	7.56%	6.22%	7.48%	#VALUE!	6.20%	7.02%	3.98%	5.29%		N/A
Discards as % of comm landings:	0.00%	1.13%	0.00%	0.13%	0.91%	5.20%	4.56%	77.63%	0.48%	0.23%	10.24%		N/A
Discards as % ot total landings:	0.00%	0.38%	0.00%	0.13%	0.90%	5.19%	2.87%	77.63%	0.48%	0.21%	10.24%		N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
New England Large-Mesh Otter Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
1,076	386	16,156	2%	Fish
1,947	539	16,156	3%	Protected Species

Top Species:	bluefish	herring	M/S/B	tilefish	scallop	SF/S/BSB	red crab	dogfish	small-mesh mults	skates	large-mesh mults	monkfish	sea turtles
Projected observer days needed:	26,644	12,864	3,159	2,692	1,233	1,034	798	614	341	316	107	81	730
Average trip length (days):	1.90												
Estimated % coverage level required:	87%	42%	10%	9%	4%	3%	3%	2%	1%	1%	0%	0%	2%
Realized CV for 2004:	247.4%	131.3%	57.2%	52.9%	35.0%	31.9%	28.0%	24.5%	18.2%	17.5%	10.1%	8.8%	*
Percent of trips w/ zero discard:	98%	90%	70%	99%	88%	72%	82%	28%	53%	6%	5%	49%	100%
Encounter rate:	2%	10%	30%	1%	12%	28%	18%	72%	47%	94%	95%	51%	0%
Rank of total discards (out of 13):	9	10	11	12	8	5	6	2	7	1	3	4	N/A
Observed discards (lb):	854	563	357	285	1,191	0	6,660	149,701	0	0	124,760	41,061	0
Obs. discard percent of all obs. discards:	0.06%	0.04%	0.02%	0.02%	0.08%	0.00%	0.43%	9.69%	0.00%	0.00%	8.07%	2.66%	N/A
2004 commercial landings (lb, all gears):	7,512,000	187,387,000	212,528,000	2,316,000	64,506,000	30,616,000	3,952,000	1,965,000	19,387,000	20,388,000	83,523,000	23,036,000	0
2004 recreational landings (lb, all gears):	15,146,000	27,000	1,134,000	0	0	17,982,000	0	266,657	35,000	35,405	5,383,000	0	N/A
Obs. discards as % of comm landings:	0.01%	0.00%	0.00%	0.01%	0.00%	0.00%	0.17%	7.62%	0.00%	0.00%	0.15%	0.18%	N/A
Discards as % of comm landings:	0.42%	0.01%	0.01%	0.38%	0.06%	2.35%	5.58%	244.01%	0.90%	167.01%	4.79%	5.70%	N/A
Discards as % ot total landings:	0.14%	0.01%	0.01%	0.38%	0.06%	1.48%	5.58%	214.85%	0.90%	166.72%	4.50%	5.70%	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
Mid-Atlantic Large-Mesh Otter Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
183	75	8,850	1%	Fish
186	76	8,850	1%	Protected Species

Top Species:	bluefish	small-mesh mults	herring	dogfish	tilefish	scallop	M/S/B	monkfish	large-mesh mults	SF/S/BSB	skate		sea turtles
Projected observer days needed:	3,625	998	883	481	342	311	242	140	101	98	70		342
Average trip length (days):	0.90												
Estimated % coverage level required:	46%	13%	11%	6%	4%	4%	3%	2%	1%	1%	1%		4%
Realized CV for 2004:	190.6%	82.7%	77.5%	55.7%	*	44.4%	39.0%	29.5%	25.1%	24.6%	20.9%		*
Percent of trips w/ zero discard:	92%	77%	96%	31%	100%	80%	59%	44%	35%	20%	5%		100%
Encounter rate:	8%	23%	4%	69%	0%	20%	41%	56%	65%	80%	95%		0%
Rank of total discards (out of 13):	10	8	11	2	12	5	7	6	4	3	1		N/A
Observed discards (lb):	102	0	5	44,140	0	7,202	407	3,629	3,523	0	88,540		0
Obs. discard percent of all obs. discards:	0.05%	0.00%	0.00%	21.21%	0.00%	3.46%	0.20%	1.74%	1.69%	0.00%	42.54%		N/A
2004 commercial landings (lb, all gears):	7,512,000	19,387,000	187,387,000	1,965,000	2,316,000	64,506,000	212,528,000	23,036,000	83,523,000	30,616,000	20,388,000		N/A
2004 recreational landings (lb, all gears):	15,146,000	35,000	27,000	0	0	0	1,134,000	0	5,385,000	17,982,000	0		N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	2.25%	0.00%	0.01%	0.00%	0.02%	0.00%	0.00%	0.43%		N/A
Discards as % of comm landings:	0.06%	0.05%	0.00%	106.69%	0.00%	0.46%	0.01%	0.72%	0.37%	3.76%	29.24%		N/A
Discards as % ot total landings:	0.02%	0.05%	0.00%	106.69%	0.00%	0.46%	0.01%	0.72%	0.35%	2.37%	29.24%		N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Purse Seine

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
33	16	264	6%	Fish
53	26	264	10%	Protected Species

Top Species:	herring	dogfish	large-mesh mults	M/S/B	bluefish	small-mesh mults	skates						sea turtles
Projected observer days needed:	219	217	217	206	19	19	19						19
Average trip length (days):	0.80												
Estimated % coverage level required:	104%	103%	103%	98%	9%	9%	9%						9%
Realized CV for 2004:	98.1%	97.2%	97.3%	93.5%	*	*	*						*
Percent of trips w/ zero discard:	88%	44%	94%	88%	100%	100%	100%						100%
Encounter rate:	12%	56%	6%	12%	0%	0%	0%						0%
Rank of total discards (out of 13):	2	1	3	4	5	5	5						N/A
Observed discards (lb):	5,200	11,817	20	14	0	0	0						0
Obs. discard percent of all obs. discards:	29.55%	67.15%	0.11%	0.08%	0.00%	0.00%	0.00%						N/A
2004 commercial landings (lb, all gears):	187,387,000	1,965,000	83,523,000	212,528,000	7,512,000	35,000	20,388,000						N/A
2004 recreational landings (lb, all gears):	27,000	0	5,383,000	1,134,000	15,146,000	19,387,000	0						N/A
Obs. discards as % of comm landings:	0.00%	0.60%	0.00%	0.00%	0.00%	0.00%	0.00%						N/A
Discards as % of comm landings:	0.06%	13.86%	0.00%	0.00%	0.00%	0.00%	0.00%						N/A
Discards as % ot total landings:	0.06%	13.86%	0.00%	0.00%	0.00%	0.00%	0.00%						N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Purse Seine

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	76	0%	Fish
2	2	76	3%	Protected Species

Top Species:	bluefish	herring	M/S/B	large-mesh mults	small-mesh mults	skates	dogfish	SF/S/BSB					sea turtles
Projected observer days needed:	***9***	***9***	***9***	***9***	***9***	***9***	***9***	***9***					***9***
Average trip length (days):	0.40												
Estimated % coverage level required:	30%	30%	30%	30%	30%	30%	30%	30%					30%
Realized CV for 2004:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					*
Percent of trips w/ zero discard:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					100%
Encounter rate:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					0%
Rank of total discards (out of 13):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Observed discards (lb):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					0
Obs. discard percent of all obs. discards:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
2004 commercial landings (lb, all gears):	7,512,000	187,387,000	212,528,000	83,523,000	19,387,000	20,388,000	1,965,000	30,616,000					N/A
2004 recreational landings (lb, all gears):	15,146,000	27,000	1,134,000	5,383,000	35,000	0	0	17,982,000					N/A
Obs. discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Discards as % ot total landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Scallop Dredge, Open Access Area, Limited Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
344	26	1,229	2%	Fish
457	36	1,229	3%	Protected Species

Top Species:	red crab	M/S/B	dogfish	large-mesh mults	SF/S/BSB	small mesh mults	monkfish	skate	scallop				sea turtles
Projected observer days needed:	1,596	1,380	807	708	649	534	320	177	80				N/A
Average trip length (days):	10.90												
Estimated % coverage level required:	12%	10%	6%	5%	5%	4%	2%	1%	1%				N/A
Realized CV for 2004:	84.2%	68.9%	51.5%	48.0%	45.8%	41.4%	31.9%	23.6%	15.9%				55.1%
Percent of trips w/ zero discard:	96%	50%	46%	0%	35%	38%	8%	0%	19%				89%
Encounter rate:	4%	50%	54%	100%	65%	62%	92%	100%	81%				11%
Rank of total discards (out of 13):	10	9	8	5	4	7	3	2	1				N/A
Observed discards (lb):	3	0	871	0	0	817	37,877	28,515	270,249				Yes
Obs. discard percent of all obs. discards:	0.00%	0.00%	0.11%	0.00%	0.00%	0.10%	4.69%	3.53%	33.50%				N/A
2004 commercial landings (lb, all gears):	3,952,000	212,528,000	1,965,000	83,823,000	30,616,000	19,387,000	23,036,000	20,388,000	64,506,000				N/A
2004 recreational landings (lb, all gears):	0	1,134,000	0	5,383,000	17,982,000	35,000	0	0	0				N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.16%	0.14%	0.42%				N/A
Discards as % of comm landings:	0.00%	0.01%	1.66%	0.27%	1.57%	0.32%	12.58%	64.85%	28.58%				N/A
Discards as % ot total landings:	0.00%	0.01%	1.66%	0.25%	0.99%	0.32%	12.58%	64.85%	28.58%				N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Scallop Dredge, Open Area Access, Limited Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
591	69	1,822	4%	Fish
675	78	1,822	4%	Protected Species

Top Species:	small-mesh mults	M/S/B	SF/S/BSB	large-mesh mults	dogfish	scallop	monkfish	skates					sea turtles
Projected observer days needed:	3,080	641	465	411	371	280	213	114					N/A
Average trip length (days):	9.00												
Estimated % coverage level required:	19%	4%	3%	3%	2%	2%	1%	1%					N/A
Realized CV for 2004:	75.8%	30.5%	25.9%	24.2%	23.0%	20.0%	17.4%	12.6%					77.0%
Percent of trips w/ zero discard:	57%	42%	33%	25%	62%	26%	1%	0%					97%
Encounter rate:	43%	58%	67%	75%	38%	74%	99%	100%					3%
Rank of total discards (out of 11):	8	9	4	5	2	1	3	2					N/A
Observed discards (lb):	869	0	0	0	2,037	367,166	45,211	156,844					Yes
Obs. discard percent of all obs. discards:	0.11%	0.00%	0.00%	0.00%	0.26%	46.65%	5.74%	19.93%					N/A
2004 commercial landings (lb, all gears):	19,387,000	212,528,000	30,616,000	83,523,000	1,965,000	64,506,000	23,036,000	20,388,000					0
2004 recreational landings (lb, all gears):	35,000	1,134,000	17,982,000	5,383,000	266,657	0	0	35,405					N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.000%	0.10%	0.57%	0.20%	0.77%					N/A
Discards as % of comm landings:	0.15%	0.00%	1.42%	0.12%	4.68%	29.66%	8.80%	31.32%					N/A
Discards as % ot total landings:	0.15%	0.00%	0.90%	0.12%	4.12%	29.66%	8.80%	31.27%					N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Scallop Dredge, Closed Area Access, Limited Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
805	86	292	29%	Fish
805	86	292	29%	Protected Species

Top Species:	red crab	M/S/B	small-mesh mults	dogfish	SF/S/BSB	monkfish	large-mesh mults	scallop	skates				sea turtles
Projected observer days needed:	1,473	1,301	1,180	857	703	429	227	167	145				N/A
Average trip length (days):	9.70												
Estimated % coverage level required:	52%	46%	42%	30%	25%	15%	8%	6%	5%				N/A
Realized CV for 2004:	48.2%	42.1%	39.6%	32.6%	29.1%	22.2%	15.9%	13.5%	12.6%				16.5%
Percent of trips w/ zero discard:	98%	43%	16%	51%	26%	5%	1%	20%	0%				99%
Encounter rate:	2%	57%	84%	49%	74%	95%	99%	80%	100%				1%
Rank of total discards (out of 13):	11	8	6	7	5	3	4	1	2				N/A
Observed discards (lb):	5	0	0	3,948	36,678	123,827	0	706,435	331,549				Yes
Obs. discard percent of all obs. discards:	0.00%	0.00%	0.00%	0.27%	2.48%	8.38%	0.00%	47.81%	22.44%				N/A
2004 commercial landings (lb, all gears):	3,952,000	212,528,000	19,387,000	1,965,000	30,616,000	23,036,000	83,523,000	64,506,000	20,388,000				N/A
2004 recreational landings (lb, all gears):	0	1,134,000	35,000	266,657	17,982,000	0	5,383,000	0	35,405				N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.20%	0.12%	0.54%	0.00%	1.10%	1.63%				N/A
Discards as % of comm landings:	0.00%	0.00%	0.12%	0.77%	0.33%	1.64%	0.26%	2.09%	6.16%				N/A
Discards as % ot total landings:	0.00%	0.00%	0.12%	0.68%	0.21%	1.64%	0.24%	2.09%	6.15%				N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Scallop Dredge, Closed Area Access, Limited Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
373	35	78	45%	Fish
373	35	78	45%	Protected Species

Top Species:	large-mesh mults	dogfish	SF/S/BSB	M/S/B	small-mesh mults	monkfish	scallop	skates					sea turtles
Projected observer days needed:	1,136	567	481	337	287	283	157	88					N/A
Average trip length (days):	9.00												
Estimated % coverage level required:	162%	81%	69%	48%	41%	40%	22%	13%					N/A
Realized CV for 2004:	71.2%	42.5%	38.3%	31.0%	26.8%	28.0%	19.8%	14.2%					*
Percent of trips w/ zero discard:	9%	46%	29%	26%	23%	0%	17%	0%					100%
Encounter rate:	91%	54%	71%	74%	77%	100%	83%	100%					0%
Rank of total discards (out of 13):	6	5	4	8	7	3	1	2					N/A
Observed discards (lb):	1,213	2,019	0	164	317	67,163	631,764	159,899					0
Obs. discard percent of all obs. discards:	0.13%	0.21%	0.00%	0.02%	0.03%	6.99%	65.77%	16.65%					N/A
2004 commercial landings (lb, all gears):	83,523,000	1,965,000	30,616,000	212,528,000	19,387,000	23,036,000	64,506,000	20,388,000					N/A
2004 recreational landings (lb, all gears):	5,383,000	0	17,982,000	1,134,000	35,000	0	0	0					N/A
Obs. discards as % of comm landings:	0.00%	0.10%	0.00%	0.00%	0.00%	0.29%	0.98%	0.78%					N/A
Discards as % of comm landings:	0.01%	0.66%	0.24%	0.00%	0.00%	1.07%	1.88%	2.74%					N/A
Discards as % ot total landings:	0.01%	0.66%	0.15%	0.00%	0.00%	1.07%	1.88%	2.74%					N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Scallop Dredge, Open Area Access, General Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
11	9	3,566	0%	Fish
24	20	3,566	1%	Protected Species

Top Species:	scallop	small-mesh mults	skate	dogfish	monkfish	red crab	SF/S/BSB	large-mesh mults	sea turtles
Projected observer days needed:	204	135	120	120	117	***92***	***92***	82	N/A
Average trip length (days):	1.30								
Estimated % coverage level required:	4%	3%	3%	3%	3%	2%	2%	2%	N/A
Realized CV for 2004:	9.4%	10.4%	17.7%	31.8%	56.0%	*	9.2%	35.8%	*
Percent of trips w/ zero discard:	67%	56%	11%	78%	33%	100%	89%	0%	100%
Encounter rate:	33%	44%	89%	22%	67%	0%	11%	100%	0%
Rank of total discards (out of 13):	3	7	2	5	1	10	6	4	N/A
Observed discards (lb):	114	6	1,123	33	3,330	0	4	225	0
Obs. discard percent of all obs. discards:	1.15%	0.06%	11.32%	0.33%	33.57%	0.00%	0.04%	2.27%	N/A
2004 commercial landings (lb, all gears):	64,506,000	19,387,000	20,388,000	1,965,000	23,036,000	3,952,000	30,616,000	83,523,000	N/A
2004 recreational landings (lb, all gears):	0	35,000	0	0	0	0	17,982,000	5,383,000	N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	N/A
Discards as % of comm landings:	0.22%	0.02%	1.80%	0.50%	1.75%	0.00%	0.02%	0.04%	N/A
Discards as % ot total landings:	0.22%	0.02%	1.80%	0.50%	1.75%	0.00%	0.01%	0.04%	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Scallop Dredge, Open Access Area, General Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
33	22	3,433	1%	Fish
55	39	3,433	1%	Protected Species

Top Species:	dogfish	small-mesh mults	SF/S/BSB	scallop	large-mesh mults	skates	monkfish	sea turtles
Projected observer days needed:	124	96	88	54	40	17	17	N/A
Average trip length (days):	1.40							
Estimated % coverage level required:	3%	2%	2%	1%	1%	0%	0%	N/A
Realized CV for 2004:	55.0%	48.2%	46.1%	35.9%	31.1%	20.2%	20.2%	*
Percent of trips w/ zero discard:	86%	77%	73%	41%	41%	9%	18%	100%
Encounter rate:	14%	23%	27%	59%	59%	91%	82%	0%
Rank of total discards (out of 13):	7	8	5	2	4	1	3	N/A
Observed discards (lb):	18	0	0	6,039	0	2,284	1,307	0
Obs. discard percent of all obs. discards:	0.05%	0.00%	0.00%	18.08%	0.00%	6.84%	3.91%	N/A
2004 commercial landings (lb, all gears):	1,965,000	19,387,000	30,616,000	64,506,000	83,523,000	20,388,000	23,036,000	N/A
2004 recreational landings (lb, all gears):	0	35,000	17,982,000	0	5,383,000	0	0	N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%	0.01%	N/A
Discards as % of comm landings:	0.12%	0.01%	0.08%	1.30%	0.05%	8.30%	0.91%	N/A
Discards as % ot total landings:	0.12%	0.01%	0.05%	1.30%	0.05%	8.30%	0.91%	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
New England Scallop Dredge, Closed Area Access, General Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
0	0	50	0%	Fish
0	0	50	0%	Protected Species

Top Species:	red crab	scallop	monkfish	large-mesh mults	small-mesh mults	skate	dogfish	SF/S/BSB					sea turtles
Projected observer days needed:	***24***	***24***	***24***	***24***	***24***	***24***	***24***	***24***					N/A
Average trip length (days):	2.00												
Estimated % coverage level required:	24%	24%	24%	24%	24%	24%	24%	24%					N/A
Realized CV for 2004:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Percent of trips w/ zero discard:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Encounter rate:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Rank of total discards (out of 13):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Observed discards (lb):	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Obs. discard percent of all obs. discards:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
2004 commercial landings (lb, all gears):	3,952,000	64,506,000	23,036,000	83,523,000	19,387,000	20,388,000	1,965,000	30,616,000					N/A
2004 recreational landings (lb, all gears):	0	0	0	5,383,000	35,000	0	0	17,982,000					N/A
Obs. discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Discards as % of comm landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A
Discards as % ot total landings:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
Mid-Atlantic Scallop Dredge, Closed Area Access, General Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
2	1	546	0%	Fish
2	1	546	0%	Protected Species

Top Species:	scallop	monkfish	large-mesh mults	small-mesh mults	skate	dogfish	SF/S/BSB						sea turtles
Projected observer days needed:	***21***	***21***	***21***	***21***	***21***	***21***	***21***						N/A
Average trip length (days):	1.30												
Estimated % coverage level required:	3%	3%	3%	3%	3%	3%	3%						N/A
Realized CV for 2004:	0.0%	0.0%	*	*	0.0%	*	0.0%						*
Percent of trips w/ zero discard:	0%	0%	100%	100%	0%	100%	0%						100%
Encounter rate:	100%	100%	0%	0%	100%	0%	100%						0%
Rank of total discards (out of 13):	1	3	5	5	2	5	4						N/A
Observed discards (lb):	70	11	0	0	21	0	1						0
Obs. discard percent of all obs. discards:	17.77%	2.79%	0.00%	0.00%	5.33%	0.00%	0.25%						N/A
2004 commercial landings (lb, all gears):	64,506,000	23,036,000	83,523,000	19,387,000	20,388,000	1,965,000	30,616,000						N/A
2004 recreational landings (lb, all gears):	0	0	5,383,000	35,000	0	0	17,982,000						N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%						N/A
Discards as % of comm landings:	0.06%	0.03%	0.00%	0.00%	0.06%	0.00%	0.00%						N/A
Discards as % ot total landings:	0.06%	0.03%	0.00%	0.00%	0.06%	0.00%	0.00%						N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Scallop Trawl, Open Area Access, Limited Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
11	1	198	1%	Fish
22	3	198	2%	Protected Species

Top Species:	bluefish	scallop	M/S/B	monkfish	large-mesh mults	small-mesh mults	skates	dogfish	SF/S/BSB				sea turtles
Projected observer days needed:	***95***	***95***	***95***	***95***	***95***	***95***	***95***	***95***	***95***				***95***
Average trip length (days):	7.90												
Estimated % coverage level required:	6%	6%	6%	6%	6%	6%	6%	6%	6%				6%
Realized CV for 2004:	*	0.0%	0.0%	0.0%	0.0%	*	0.0%	*	0.0%				38.1%
Percent of trips w/ zero discard:	100%	0%	0%	0%	0%	100%	0%	100%	0%				67%
Encounter rate:	0%	100%	100%	100%	100%	0%	100%	0%	100%				33%
Rank of total discards (out of 13):	7	1	6	4	3	7	2	7	5				N/A
Observed discards (lb):	0	7,280	9	275	979	0	5,790	0	82				Yes
Obs. discard percent of all obs. discards:	0.00%	45.45%	0.06%	1.72%	6.11%	0.00%	36.14%	0.00%	0.51%				N/A
2004 commercial landings (lb, all gears):	7,512,000	64,506,000	212,528,000	23,036,000	83,523,000	19,387,000	20,388,000	1,965,000	30,616,000				N/A
2004 recreational landings (lb, all gears):	15,146,000	0	1,134,000	0	5,383,000	35,000	0	0	17,982,000				N/A
Obs. discards as % of comm landings:	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%				N/A
Discards as % of comm landings:	0.00%	3.12%	0.00%	0.33%	0.32%	0.00%	7.86%	0.00%	0.07%				N/A
Discards as % ot total landings:	0.00%	3.12%	0.00%	0.33%	0.30%	0.00%	7.86%	0.00%	0.05%				N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Scallop Trawl, Open Area Access, General Trip Category

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
56	31	1,088	3%	Fish
71	39	1,088	4%	Protected Species

Top Species:	dogfish	SF/S/BSB	small-mesh mults	M/S/B	bluefish	scallop	monkfish	large-mesh mults	skates	sea turtles
Projected observer days needed:	443	408	292	181	155	119	115	85	80	51
Average trip length (days):	2.10									
Estimated % coverage level required:	19%	18%	13%	8%	7%	5%	5%	4%	4%	2%
Realized CV for 2004:	67.5%	50.5%	49.6%	35.4%	114.1%	22.4%	19.4%	17.0%	34.7%	*
Percent of trips w/ zero discard:	77%	74%	77%	58%	97%	35%	29%	32%	3%	100%
Encounter rate:	23%	26%	23%	42%	3%	65%	71%	68%	97%	0%
Rank of total discards (out of 13):	3	6	7	8	10	2	4	5	1	N/A
Observed discards (lb):	3,201	106	64	30	2	4,672	585	160	17,773	0
Obs. discard percent of all obs. discards:	8.45%	0.28%	0.17%	0.08%	0.01%	12.33%	1.54%	0.42%	46.90%	N/A
2004 commercial landings (lb, all gears):	1,965,000	30,616,000	19,387,000	212,528,000	7,512,000	64,506,000	23,036,000	83,523,000	20,388,000	N/A
2004 recreational landings (lb, all gears):	0	17,982,000	35,000	1,134,000	15,146,000	0	0	5,383,000	0	N/A
Obs. discards as % of comm landings:	0.16%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.09%	N/A
Discards as % of comm landings:	7.52%	0.02%	0.02%	0.00%	0.00%	0.35%	0.12%	0.01%	4.06%	N/A
Discards as % ot total landings:	7.52%	0.01%	0.02%	0.00%	0.00%	0.35%	0.12%	0.01%	4.06%	N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A
Scottish Seine

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
5	5	95	5%	Fish
8	8	95	8%	Protected Species

Top Species:	SF/S/BSB	large-mesh mults	bluefish	herring	scallop	M/S/B	monkfish	small-mesh mults	skates	dogfish			sea turtles
Projected observer days needed:	30	14	***12***	***12***	***12***	***12***	***12***	***12***	***12***	***12***			***12***
Average trip length (days):	0.30												
Estimated % coverage level required:	105%	49%	42%	42%	42%	42%	42%	42%	42%	42%			42%
Realized CV for 2004:	25.3%	28.9%	*	*	*	*	*	27.9%	31.9%	*			*
Percent of trips w/ zero discard:	60%	0%	100%	100%	100%	100%	100%	80%	40%	100%			100%
Encounter rate:	40%	100%	0%	0%	0%	0%	0%	20%	60%	0%			0%
Rank of total discards (out of 13):	1	2	5	5	5	5	5	3	4	5			N/A
Observed discards (lb):	269	218	0	0	0	0	0	130	32	0			0
Obs. discard percent of all obs. discards:	3.39%	2.74%	0.00%	0.00%	0.00%	0.00%	0.00%	1.64%	0.40%	0.00%			N/A
2004 commercial landings (lb, all gears):	30,616,000	83,523,000	7,512,000	187,387,000	64,506,000	212,528,000	23,036,000	19,387,000	20,388,000	1,965,000			N/A
2004 recreational landings (lb, all gears):	17,982,000	5,383,000	15,146,000	27,000	0	1,134,000	0	35,000	0	0			N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			N/A
Discards as % of comm landings:	0.04%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%			N/A
Discards as % ot total landings:	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%			N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

New England Shrimp Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
12	12	1,968	1%	Fish
12	12	1,968	1%	Protected Species

Top Species:	M/S/B	skate	small-mesh mults	herring	monkfish	large-mesh mults							sea turtles
Projected observer days needed:	364	247	123	92	22	20							42
Average trip length (days):	1.00												
Estimated % coverage level required:	18%	13%	6%	5%	1%	1%							2%
Realized CV for 2004:	98.1%	79.9%	55.7%	47.9%	23.5%	22.4%							*
Percent of trips w/ zero discard:	92%	50%	50%	0%	17%	0%							100%
Encounter rate:	8%	50%	50%	100%	83%	100%							0%
Rank of total discards (out of 13):	8	4	3	1	5	2							N/A
Observed discards (lb):	0	84	285	1,072	2	299							0
Obs. discard percent of all obs. discards:	0.01%	3.85%	13.10%	49.28%	0.10%	13.73%							N/A
2004 commercial landings (lb, all gears):	212,528,000	20,388,000	19,387,000	187,387,000	23,036,000	83,523,000							N/A
2004 recreational landings (lb, all gears):	1,134,000	0	35,000	27,000	0	5,383,000							N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							N/A
Discards as % of comm landings:	0.00%	0.08%	0.29%	0.11%	0.00%	0.07%							N/A
Discards as % ot total landings:	0.00%	0.08%	0.29%	0.11%	0.00%	0.07%							N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Northeast Region SBRM Importance Filter Worksheet -- Option A

Mid-Atlantic Shrimp Trawl

2004 Observed Sea Days	2004 Observed Trips	2004 FVTR Trips	Percent Covered	
2	2	334	1%	Fish
2	2	334	1%	Protected Species

Top Species:	herring	M/S/B	monkfish	large-mesh mults	small-mesh mults	skates	SF/S/BSB						sea turtles
Projected observer days needed:	***76***	***76***	***76***	***76***	***76***	***76***	***76***						***76***
Average trip length (days):	5.80												
Estimated % coverage level required:	4%	4%	4%	4%	4%	4%	4%						4%
Realized CV for 2004:	*	*	*	*	*	*	*						*
Percent of trips w/ zero discard:	100%	100%	100%	100%	100%	100%	100%						100%
Encounter rate:	0%	0%	0%	0%	0%	0%	0%						0%
Rank of total discards (out of 13):	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
Observed discards (lb):	0	0	0	0	0	0	0						N/A
Obs. discard percent of all obs. discards:	N/A	N/A	N/A	N/A	N/A	N/A	N/A						N/A
2004 commercial landings (lb, all gears):	187,387,000	212,528,000	23,036,000	83,523,000	19,387,000	20,388,000	30,616,000						N/A
2004 recreational landings (lb, all gears):	27,000	1,134,000	0	5,383,000	35,000	0	17,982,000						N/A
Obs. discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%						N/A
Discards as % of comm landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%						N/A
Discards as % ot total landings:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%						N/A

N/A = No observations in 2004.

* = Zero (0) discards observed in 2004.

Note: Projected observer days needed in ***bold/italics*** represent PILOT LEVEL coverage, rather than the level calculated to achieve a CV of 30 percent.

Fishing Mode	Baseline Levels (No Filters)	Grey-Cell Filter	CV-Target Met Filter	Discard % of Discards Filter			Discard % of Catch Filter		
				0.5%	1.0%	3.0%	0.5%	1.0%	3.0%
NE Clam Dredge	50	50	50	50	50	50	50	50	50
MA Clam Dredge	84	84	84	84	84	84	84	84	84
NE Crab Pot	101	101	101	101	101	101	101	101	101
MA Crab Pot	28	28	28	28	28	28	28	28	28
NE Fish Pot	20	20	20	20	20	20	20	20	20
MA Fish Pot	103	40	40	40	40	40	40	40	40
NE Small-mesh Gillnet	12	12	12	12	12	12	12	12	12
MA Small-mesh Gillnet	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259
NE Large-mesh Gillnet	4,357	3,767	3,767	482	482	141	482	141	141
MA Large-mesh Gillnet	653	653	653	653	653	653	653	653	653
NE X-Large-mesh Gillnet	3,266	2,059	2,059	267	214	214	214	214	214
MA X-Large-mesh Gillnet	468	468	468	468	468	468	468	468	468
NE Handline	137	137	137	137	137	137	72	72	72
MA Handline	133	133	133	133	133	133	133	133	133
NE Lobster Pot	439	439	439	439	439	439	439	439	439
MA Lobster Pot	89	89	89	89	89	89	89	89	89
NE Longline	185	185	185	99	99	99	99	99	99
MA Longline	76	76	76	76	76	76	76	76	76
NE Mid-Water Trawl	1,793	1,218	1,218	1,218	1,218	747	346	346	346
MA Mid-Water Trawl	557	492	492	492	182	182	43	43	35
NE Small-mesh Trawl	3,822	2,024	2,024	2,024	2,024	2,024	2,024	2,024	2,024
MA Small-mesh Trawl	5,417	3,057	3,057	2,231	1,229	1,229	1,229	1,229	1,229
NE Large-mesh Trawl	26,644	26,644	26,644	730	730	730	730	730	730
MA Large-mesh Trawl	3,625	3,625	3,625	481	481	481	481	481	481
NE Purse Seine	219	219	219	219	219	219	217	217	217
MA Purse Seine	9	9	9	9	9	9	9	9	9
NE Scallop Dredge OL	1,596	1,596	1,596	320	320	320	320	320	320
MA Scallop Dredge OL	8,713	3,080	3,080	280	280	280	280	280	280
NE Scallop Dredge CL	3,861	1,473	1,473	703	703	429	703	429	145
MA Scallop Dredge CL	1,777	1,136	1,136	283	283	283	283	283	88
NE Scallop Dredge OG	204	204	120	117	117	117	117	117	92
MA Scallop Dredge OG	293	124	124	54	54	54	54	54	17
NE Scallop Dredge CG	24	24	24	24	24	24	24	24	24
MA Scallop Dredge CG	21	21	21	21	21	21	21	21	21
MA Scallop Trawl OL	95	95	95	95	95	95	95	95	95
MA Scallop Trawl OG	443	443	443	443	443	443	443	443	443
NE Scottish Seine	30	30	12	12	12	12	12	12	12
NE Shrimp Trawl	364	364	364	247	247	247	42	42	42
MA Shrimp Trawl	76	76	76	76	76	76	76	76	76
Total Sea Days Needed:	**71,043**	**55,554**	**55,452**	**14,516**	**13,151**	**12,065**	**11,868**	**11,253**	**10,704**

Summary results (at-sea fisheries observer sea days needed) of applying the proposed importance filters (Option A) to the 39 fishing modes subject to the Northeast Region SBRM.

Fishing Mode	Baseline Levels (No Filters)	Grey-Cell Filter	Discard % of Discards Filter			Discard % of Mortality Filter		
			99.0%	95.0%	90.0%	99.0%	95.0%	90.0%
NE Clam Dredge	50	50	50	50	50	50	50	50
MA Clam Dredge	84	84	84	84	84	84	84	84
NE Crab Pot	101	101	101	101	101	101	101	101
MA Crab Pot	28	28	28	28	28	28	28	28
NE Fish Pot	20	20	20	20	20	20	20	20
MA Fish Pot	103	40	40	40	40	40	40	40
NE Small-mesh Gillnet	12	12	12	12	12	12	12	12
MA Small-mesh Gillnet	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259
NE Large-mesh Gillnet	4,357	3,767	443	141	141	141	141	141
MA Large-mesh Gillnet	653	653	653	653	653	653	653	653
NE X-Large-mesh Gillnet	3,266	2,059	417	267	238	214	214	144
MA X-Large-mesh Gillnet	468	468	468	468	468	468	468	468
NE Handline	137	137	72	72	72	72	72	72
MA Handline	133	133	133	133	133	133	133	133
NE Lobster Pot	439	439	439	439	439	439	439	439
MA Lobster Pot	89	89	89	89	89	89	89	89
NE Longline	185	185	99	35	35	99	35	35
MA Longline	76	76	76	76	76	76	76	76
NE Mid-Water Trawl	1,793	1,218	1,218	747	747	316	316	56
MA Mid-Water Trawl	557	492	35	35	35	35	35	35
NE Small-mesh Trawl	3,822	2,024	2,024	2,024	2,024	2,024	2,024	2,024
MA Small-mesh Trawl	5,417	3,057	2,231	2,231	2,231	1,229	1,229	1,229
NE Large-mesh Trawl	26,644	26,644	26,644	26,644	2,692	798	730	730
MA Large-mesh Trawl	3,625	3,625	481	481	481	481	481	481
NE Purse Seine	219	219	219	219	19	217	19	19
MA Purse Seine	9	9	9	9	9	9	9	9
NE Scallop Dredge OL	1,596	1,596	708	708	708	320	177	177
MA Scallop Dredge OL	8,713	3,080	3,080	465	280	280	114	114
NE Scallop Dredge CL	3,861	1,473	703	429	429	145	139	139
MA Scallop Dredge CL	1,777	1,136	481	283	108	108	108	108
NE Scallop Dredge OG	204	204	120	117	117	92	92	92
MA Scallop Dredge OG	293	124	88	17	17	17	17	17
NE Scallop Dredge CG	24	24	24	24	24	24	24	24
MA Scallop Dredge CG	21	21	21	21	21	21	21	21
MA Scallop Trawl OL	95	95	95	95	95	95	95	95
MA Scallop Trawl OG	443	443	119	51	51	80	51	51
NE Scottish Seine	30	30	12	12	12	12	12	12
NE Shrimp Trawl	364	364	123	92	92	42	42	42
MA Shrimp Trawl	76	76	76	76	76	76	76	76
Total Sea Days Needed:	**71,043**	**55,554**	**42,995**	**38,749**	**14,208**	**10,400**	**9,726**	**9,395**

Summary results (at-sea fisheries observer sea days needed) of applying the proposed importance filters (Option B) to the 39 fishing modes subject to the Northeast Region SBRM. Note that in this option, there is no "CV-met filter."

Fishing Mode	Baseline Levels (No Filters)	Grey-Cell Filter	95% of Discards & 98% of Mortality	95% of Discards & 99% of Mortality	98% of Discards & 99% of Mortality
NE Clam Dredge	50	50	50	50	50
MA Clam Dredge	84	84	84	84	84
NE Crab Pot	101	101	101	101	101
MA Crab Pot	28	28	28	28	28
NE Fish Pot	20	20	20	20	20
MA Fish Pot	103	40	40	40	40
NE Small-mesh Gillnet	12	12	12	12	12
MA Small-mesh Gillnet	1,259	1,259	1,259	1,259	1,259
NE Large-mesh Gillnet	4,357	3,767	141	141	141
MA Large-mesh Gillnet	653	653	653	653	653
NE X-Large-mesh Gillnet	3,266	2,059	214	214	214
MA X-Large-mesh Gillnet	468	468	468	468	468
NE Handline	137	137	72	72	72
MA Handline	133	133	133	133	133
NE Lobster Pot	439	439	439	439	439
MA Lobster Pot	89	89	89	89	89
NE Longline	185	185	35	35	99
MA Longline	76	76	76	76	76
NE Mid-Water Trawl	1,793	1,218	316	316	316
MA Mid-Water Trawl	557	492	35	35	35
NE Small-mesh Trawl	3,822	2,024	2,024	2,024	2,024
MA Small-mesh Trawl	5,417	3,057	1,229	1,229	1,229
NE Large-mesh Trawl	26,644	26,644	730	798	798
MA Large-mesh Trawl	3,625	3,625	481	481	481
NE Purse Seine	219	219	19	19	217
MA Purse Seine	9	9	9	9	9
NE Scallop Dredge OL	1,596	1,596	320	320	320
MA Scallop Dredge OL	8,713	3,080	114	280	280
NE Scallop Dredge CL	3,861	1,473	145	145	145
MA Scallop Dredge CL	1,777	1,136	108	108	108
NE Scallop Dredge OG	204	204	92	92	92
MA Scallop Dredge OG	293	124	17	17	17
NE Scallop Dredge CG	24	24	24	24	24
MA Scallop Dredge CG	21	21	21	21	21
MA Scallop Trawl OL	95	95	95	95	95
MA Scallop Trawl OG	443	443	51	51	80
NE Scottish Seine	30	30	12	12	12
NE Shrimp Trawl	364	364	42	42	42
MA Shrimp Trawl	76	76	76	76	76
Total Sea Days Needed:	**71,043**	**55,554**	**9,874**	**10,108**	**10,400**

Summary results (at-sea fisheries observer sea days needed) of applying the proposed importance filters to the 39 fishing modes subject to the Northeast Region SBRM (continued). This table indicates the specific combinations of filter thresholds considered, after refining the broader threshold levels identified on the previous table. The recommendation of the SBRM FMAT is to set the filters at 95% of discards and 98% of mortality.

Appendix D
Northeast Region Fishery Observer Program
Data Flow Process

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Summary of
Northeast Fisheries Observer Program
DATA FLOW

The Northeast Fisheries Observer Program collects, maintains, and distributes data to be used for scientific and management purposes. The flow of data can be very complex as it migrates from various sources before it is loaded to the main database. Since 1989, the Northeast Fisheries Observer Program has deployed an average of 35 observers a year in various commercial fisheries. These observers completed an average of 2300 days at sea annually. Due to new regulations, the observer program now deploys an average of 100 observers on about 12,000 days at sea annually. This, in turn, has increased the number of trips received on a daily basis by the observer program. The Fisheries Sampling Branch now receive an average of 40 trips per day, up from eight trips per day in the recent past. Trips can range from 1 to 15 days. The trips consist of data logs containing a variety of information including but not limited to:

- Trip information (target species, dates, primary species landed, etc.)
- Economic information (insurance costs, repair costs, engine type, etc.)
- Haul information (times, dates, weather, water depth, location, etc.)
- Species information (species, disposition, weights, etc.)
- Sampling information (lengths, weights, # of age structures collected, etc.)
- Incidental Take information (species, samples collected, lengths, weights, etc.)
- Safety information (EPRB on board, Coast Guard Doc sticker, etc.)

Not every trip includes all of the above mentioned information, however, a typical trip does include most of these variables. The outline below describes what happens to these data once an observer returns to port from an observed trip.

1. OBSERVER COMPLETES DATA – The observer verifies that the data sheets are filled out completely and accurately, calls in the data to the OBSCON system, and sends the data sheets to NEFSC.

2. OBSCON – This program consists of a total of 44 crucial fields (port, dates, target species, incidental takes, etc.) that provide users with real-time data. The data in OBSCON are called in by the observer working with the area coordinator and entered into an ORACLE-based table.

3. DATA LOGS – Before the data are entered, they go through a series of review and editing steps. There are three separate reviews conducted by data analysts and data editors once the data are appropriately logged in. These: (1) Verify the correct program code has been recorded for each trip and calculate the average mesh size of each trip; (2) review each individual trip against OBSCON and

verify all fields called in to OBSCON match up with actual data logs; and (3) verify all logs are as complete and accurate as possible, all errors are corrected throughout the trip, all age structures for that trip have been logged in, and no new errors have occurred.

4. AUDIT CHECKS – Before the data are loaded into the database, they go through a series of audit checks to verify certain fields or values are entered properly. Preliminary audit is handed over to staff fishery biologists who review audit or pass on to data editors for review. The audit continues until it is as clean as possible before the data are uploaded to entry tables. A second round of audits is performed and fishery biologist/data editor verifies all errors and has entry staff make corrections as necessary. Once complete, the fishery biologist signs off on audit as "Approved to Load." Data are loaded to the main database and confirmation is sent that data have been uploaded to main database. Once all gear types for a month have been loaded to the main database, the appropriate personnel are notified that an entire month has been loaded to the database.

***** At this point the data have been loaded in the database and are accessible to end users*****

5. FINAL CHECK – Once data have gone through the final audit process they go through a series of data checks one last time before being filed.

6. DATA ERROR REPORTS – If errors are found after data has been loaded to the main database, error reports are generated, and the appropriate changes are made directly to the main database.

7. DATA ARCHIVING PROJECT – All data collected from the Fisheries Sampling Branch are scanned in order to alleviate space and enable observer data to be viewed on a computer screen by end users. To identify logs, a uniquely identified bar code is attached to every single sheet that is scanned.

Note: ***This is not a complete description of the data flow process used by the Northeast Fisheries Observer Program, but is instead a summary intended to provide an overview for how the data are reviewed, edited, and processed. More detail is available in the "Fisheries Observer Program Manual."***

Appendix E
Comments and Responses on the Draft Amendment

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Summary of Comments Received on the Draft Amendment

Comment Period: October 31-December 29, 2006

NOAA's National Marine Fisheries Service (NMFS), on behalf of the Mid-Atlantic and New England Fishery Management Councils, published a Federal Register notice on October 31, 2006, to announce the availability of the draft SBRM Amendment and associated environmental assessment (EA) for review and to solicit comments on the document. The Federal Register notice announced two public hearings held on November 14, 2006, in Gloucester, MA, and on December 13, 2006, in New York, NY. Written comments were accepted through December 29, 2006.

A total of 48 individuals attended the public hearings, and 9 individuals offered public testimony on the amendment. In addition to those speaking at the public hearings, NMFS received seven comment letters. Several of these letters restated opinions voiced at the public hearings. One letter was submitted on behalf of six fishing industry organizations, with a second letter endorsing the first. Three of the letters were from conservation organizations, two of which endorsed the more detailed comments of the third. The two remaining letters were submitted by private citizens.

Several comment letters recognized the considerable effort expended to date on the development of the amendment and applauded the progress that has been made. However, with the exception of two letters, one focused entirely on the cost estimates for electronic monitoring and one on the state of fisheries in general and recommending improved enforcement, the comment letters indicated dissatisfaction with a variety of elements of the draft amendment and several expressed doubt that the amendment would satisfy the Court orders stemming from the Amendment 10 and Amendment 13 lawsuits. The following summarizes all comments provided during testimony at the public hearings and in the written letters; however, in cases where the same individual or organization provided the same comment more than once (e.g., during a public hearing and also in a follow-up letter), the comment is summarized once.

General Comments on the Amendment

Comment 1. One commenter expressed concern that the SBRM Amendment does not strike an adequate balance between specificity and generality. The commenter suggested that it is overly specific when it stratifies the bycatch reporting regime into "tens of hundreds" of strata, and it is too general in that it prescribes a uniform precision target across all fisheries.

> Response: The commenter's claim of "tens of hundreds" of strata is incorrect. The SBRM Amendment stratifies fishing activities into 39 fishing modes that represent

the appropriate gear type and area-based divisions to best serve as the basis for assigning observer coverage. Against these 39 strata, the implications of observer coverage are assessed for each species and species group managed under the Councils 13 FMPs, plus sea turtles, encountered by each fishing mode. While this creates a matrix composed of 585 cells, the Councils consider this to be an appropriate framework for the analysis conducted in support of the SBRM and with the appropriate level of specificity. The Councils do not consider the CV-based performance standard to be too general in its application across all fisheries. The CV-based methodology establishes the process by which observer coverage levels are determined and allocated across the wide variety of fisheries managed under the Northeast Region FMPs. Using a global standard (a CV of 30 percent) across all fisheries does not mean that all fisheries would be allocated the same level of observer coverage (as would occur under a process by which all fisheries were required to achieve, for example, 20 percent coverage), but recognizes inherently that some fisheries—those that have more highly variable catches—require higher levels of observer coverage than those with more consistent (less variable) catches. In this way, the differences among fisheries that would affect observer coverage levels are accounted for while ensuring that the data collected by observers on discards in all fisheries achieve a consistent and standard level of precision.

Given that the expectations for the discard data obtained by at-sea fisheries observers should be consistent across all fisheries for which the data are used in similar ways (e.g., to obtain reasonably precise and accurate estimates of discards for use in stock assessments and to determine the stock-level implications of discarding), it stands to reason that a generally-derived performance standard is appropriate, particularly given the overlaps and inter-relationships among fisheries and species caught (see chapter 3). When the discard data are used for different purposes in certain specific fisheries (e.g., for real-time area-based quota monitoring), the generally-derived performance standard may need to be supplemented to more appropriately reflect the needs of the specific application. This amendment would not preclude either Council from modifying the SBRM process established through this amendment to accomplish such a change on an FMP-by-FMP basis as management needs dictate. In fact, the SBRM Amendment has been designed to ensure such flexibility remains available to the Councils (see section 6.5). The ability of the Councils to develop changes to the SBRM through the framework adjustment and/or annual specifications process preserves the flexibility suggested by the commenter.

Comment 2. The same commenter further stated that the SBRM Amendment does not comport with NMFS's nationwide bycatch reporting technical guidance because it establishes blanket standards of precision across all fishing modes, rather than considering the needs and requirements of each fishery.

Response: The Councils intend to establish a rigorous methodology with which to ensure that the discard data obtained by at-sea observers is of the highest quality possible, with high levels of precision and accuracy to meet the needs of the scientists and managers that utilize the data. Establishing a uniform, global CV level is warranted to ensure a consistent and standard minimum level of precision in the data collected by at-sea fisheries observers under the SBRM. As noted in the response to comment 1, using a global standard (a CV of 30 percent) across all fisheries does not mean that all fisheries would be allocated the same level of observer coverage (as would occur under a process by which all fisheries were required to achieve, for example, 20 percent coverage), but recognizes inherently that some fisheries—those that have more highly variable catches—require higher levels of observer coverage than those with more consistent (less variable) catches. Also, the use of the importance filters (section 6.2.3) provides a mechanism to accommodate differences in discard levels among the subject fishing modes and to account for the overall mortality to a stock associated with discards in the various fishing modes. In this way, the differences among fisheries that would affect observer coverage levels are accounted for while ensuring that the data collected by observers on discards in all fisheries achieve a consistent and standard level of precision.

The option of evaluating and setting the CV-based performance standard on a cell-by-cell basis was considered during the development of the SBRM Amendment, but ultimately rejected as an unnecessary and impracticable approach to address the need for establishing a minimum level of precision (see section 6.8.4). The process proposed in this amendment does not preclude adjusting the fishery-specific CV levels as conditions in any fisheries warrant (this ability is created in the proposed framework adjustment provisions, see section 6.5). In effect, this amendment establishes a baseline CV level that applies to all fisheries to serve as an initial minimum level of precision, and provides a mechanism to adjust the standard as appropriate.

<u>Comment 3.</u> The same commenter stated that the SBRM Amendment should provide the Councils and NMFS with a process only and some ground rules that can be used to develop and implement fisheries-specific monitoring systems in fishery management plan (FMP) specific contexts. The SBRM Amendment, he wrote, should establish a broad program structure with the details left to development by plan development teams (PDTs) (or some other knowledgeable working group) in the context of the individual FMPs and with full consideration of specific FMP needs.

Response: The Councils disagree with the suggestion that the SBRM Amendment should implement a process only and not actually establish the SBRM to be implemented in the fisheries. The Court order clearly remanded to the agency the responsibility to establish the actual SBRM, not simply create a framework or guidelines for establishing an SBRM at some later date. The Councils considered addressing the Court order on an FMP-by-FMP basis, but ultimately decided it would be more effective and efficient to handle this requirement in an omnibus amendment to all Northeast Region FMPs.

<u>Comment 4.</u> A commenter expressed dissatisfaction with the process used by the Fishery Management Action Team (FMAT), with concern that it disengaged interested parties from the development of the amendment except for periodic updates to the Councils.

Response: NMFS and the Councils disagree that the use of the FMAT disengaged interested parties from the development of the amendment. The FMAT served as a technical working group of NMFS and Council staff to develop the technical elements of the SBRM Amendment and provide input to the Joint SBRM Oversight Committee and the Councils for their consideration. Public input from interested parties was encouraged and accepted at seven meetings of the Joint SBRM Oversight Committee, six meetings of the Mid-Atlantic Council, seven meetings of the New England Council, two public hearings on the draft amendment, and a meeting of members of the two Councils' Science and Statistical Committees (SSC). This represents a total of 23 meetings at which members of the public were welcome to engage the Councils on issues related to the development of the amendment. By contrast, there were nine meetings of the FMAT. For a complete list of all public meetings at which the SBRM Amendment was discussed, see chapter 9.

<u>Comment 5.</u> One commenter was critical of the objectives identified for the amendment, citing that the public hearing document did not define the objectives for the SBRM program. This commenter stated that it was insufficient to prescribe a blanket CV requirement and term this an objective.

Response: Section 1.4 has been clarified to identify the purpose of both the SBRM Amendment and the resulting SBRM itself. The SBRM is intended to ensure that the biologic sampling programs used to obtain discard data minimize bias and maximize precision to the extent practicable. The CV of 30 percent is not, in itself, an objective of the SBRM, but is rather an objective criterion to be used to gauge the level of success in achieving the objectives of the SBRM.

<u>Comment 6.</u> A commenter stated that NMFS should ensure the amendment document undergoes external peer review by a party such as the Center for Independent Experts. The peer review panel, he wrote, should be given the opportunity to comment on the technical issues and issues related to management and integration of the SBRM into stock assessments.

Response: The Councils agree that this amendment is an important document warranting external peer-review. On August 22, 2006, four members of the Mid-Atlantic and New England Councils' SSCs (two members from each SSC) met to conduct a review of the technical components of the SBRM Amendment. In a report prepared by the SSC reviewers, they concluded that the document does "a commendable job of formulating a comprehensive approach to the problem of assessing bycatch rates in multiple fisheries." The overall consensus of the reviewers is that the document "provides a rigorous objective framework for addressing the problem of bycatch monitoring."

Regarding the proposed CV of 30 percent, the reviewers concluded that this was "a reasonable objective from a statistical perspective" but they did caution the Councils that "it may not be possible to achieve this objective for all species and fleet sectors simply by reallocating the present number of trip days observed" and that "additional observations may be needed." The focus of the report was on several technical changes in the formulas used to estimate discards and calculate the CV that the reviewers suggested be made, as well as the suggestion that an "importance filter" be developed to prioritize coverage levels and account for situations where the magnitude of the discards are inconsequential relative to the level of observer coverage that would be necessary to achieve the performance standard.

All technical changes suggested by the SSC reviewers have now been made to the analyses described in the SBRM Amendment, and the amendment now includes provisions implementing the suggested "importance filter" process (see chapters 5 and 6 of the amendment for more discussion on these items).

Comment 7. Several commenters concluded that the amendment fails to meet the legal requirements of the Magnuson-Stevens Act, the National Environmental Policy Act (NEPA), and relevant Court orders. One commenter called for the SBRM Amendment to be withdrawn and for the Secretary of Commerce to implement emergency regulations to establish adequate levels of observer coverage until a "legally-compliant SBRM" is developed.

Response: The Councils disagree with the assertion that the amendment fails to meet the legal requirements of the Magnuson-Stevens Act, NEPA, and the relevant Court orders. The Councils were advised of the legal obligations under the applicable laws at each step in the development of this amendment. The Councils assert that this amendment fully complies with all applicable legal standards under the Magnuson-Stevens Act, NEPA, and other applicable laws (see chapter 8), and that the amendment fully complies with the relevant Court orders stemming from the Amendment 10 and Amendment 13 lawsuits.

There are no grounds on which to withdraw this amendment from development, nor any need or legal authority to promulgate emergency regulations regarding observer coverage levels at this time.

Comment 8. A commenter described the draft amendment as fatally flawed because it fails to incorporate the necessary requirements relating to "how" the bycatch data are to be collected; i.e., whether by observers and if so, the nature of the observer coverage. The SBRM should also specify, the commenter continued, how the data are to be analyzed and reported in support of management decisions.

Response: As a result of this comment, the amendment has been clarified to stipulate that, under the preferred alternatives, discard data are to be collected by at-sea fishery observers operating under the aegis of the NEFOP. For a detailed explanation of how the appropriate data are obtained by at-sea observers, refer to the Fisheries Observer Program Manual (NEFOP 2006a) and the Biological Sampling Manual (NEFOP 2006b). Chapter 5 and Appendix A explain, in detail, how the data are analyzed, and chapter 6 describes the SBRM reporting procedures proposed in this amendment.

Comment 9. Several commenters stated that NMFS will be fiscally unable to fulfill the requirements for observer coverage specified in the SBRM Amendment. The commenters expressed concern that failure to fulfill the precision or observer level targets may result in litigation affecting the agency's ability to manage fisheries and perhaps bearing on the conduct of the fisheries.

> Response: Based on the results of the analysis supporting this amendment, it is expected that observer coverage levels will need to increase in some fisheries from recent levels. It may be possible to decrease observer coverage in other fisheries, and this decrease may offset some of the increase needed, but not necessarily all. The Councils do not feel that the SBRM established by this amendment should be constrained to current or past levels of observer coverage, and acknowledge that observer coverage levels may need to increase overall to meet the SBRM performance standard. The purpose of this SBRM, as required by the Magnuson-Stevens Act and the Court orders, is to establish a methodology for assessing bycatch that is independent of the means available to fund the process. The SBRM Amendment recognizes that the agency's budget available to fund observer coverage is subject to change according to the appropriations authorized by Congress and the President, but it would not be appropriate to modify the SBRM based on expected funding levels that cannot be predicted. There may be years in which the available budget is insufficient to fully fund the observer coverage levels that result from the SBRM. The SBRM Amendment outlines a process for prioritizing available funding (see section 6.6).

<u>Comment 10.</u> A commenter noted that forms used for the reporting of bycatch should be standardized.

> Response: The forms used by at-sea fisheries observers to report discards are standardized and are described in the Fisheries Observer Program Manual (NEFOP 2006a) and Biological Sampling Manual (NEFOP 2006b).

<u>Comment 11.</u> Several commenters were concerned about how the SBRM can be adapted to support the bycatch information needs of each FMP and how the SBRM will be updated to respond to (or in anticipation of) changes in the fishery. These commenters suggested the SBRM should contemplate the changing dynamics of each fishery by gear type and species and be integrated into each FMP.

> Response: By definition, this omnibus amendment fully and adequately integrates the resulting SBRM into each FMP amended by this action. The Councils shared the concern raised by the commenter, so the SBRM Amendment includes provisions to allow changes to be made to elements of the SBRM through framework adjustments and/or specifications (see section 6.5). This is intended to preserve the ability of the Councils to make changes to the SBRM as needed to adapt to changes in the management programs of the various FMPs.

<u>Comment 12.</u> Commenters said that to ensure the SBRM can provide adequate information to support existing and future management needs, the amendment document should include a discussion of each fishery, its gear types, management scheme, and bycatch species.

Response: Chapter 2 of the SBRM Amendment provides a description of each FMP subject to the amendment that includes identifying the primary gear types used, the management scheme in place, the history and context for the FMP, the value of the fishery, and the primary ports of landing. Chapter 3 provides an overview of each fishing mode affected by one or more of the subject FMPs, including the major species caught, primary ports, and primary areas fished. The tables provided in Appendix C of the amendment identify the primary discard species for each fishing mode in 2004. These sections of the amendment address all items suggested in the comment.

Comment 13. The same commenters also suggested there should be a mechanism in place to update the allocation analysis annually or more frequently, in order to address changes in each fishery; i.e., gear innovations, changes in the total allowable catch, and other management changes.

Response: The Councils agree that the allocation analysis should be updated annually. The process established by this amendment includes an annual update to the analysis used to generate observer coverage levels and allocations. As a result of this amendment, the Councils would have the ability to change, through the framework adjustment process, certain aspects of the SBRM in order to address changes in each fishery.

Comment 14. One commenter suggested that the SBRM Amendment provide for future FMP-specific changes to be made by annual specifications, framework adjustment, regulatory action alone, or FMP amendment.

Response: The Councils agree and changes to the SBRM Amendment have been made to incorporate this flexibility (see section 6.5).

Comment 15. A commenter suggested that each FMP include a set of diagnostics, perhaps simply the coefficient of variation (CV) for bycatch estimate by mode, to gauge whether the FMP-specific SBRM is providing sufficiently precise information for management purposes.

Response: One of the primary outcomes of the SBRM Amendment is to establish a performance standard (a CV of no more than 30 percent) to function both as a mechanism to determine the level of observer coverage required in each fishing mode and as a diagnostic tool after the fact to evaluate whether the observer coverage provided data of the desired precision. This is described in detail in chapters 5 and 6 of the amendment, including a detailed discussion of the proposed SBRM reporting process intended to provide a periodic evaluation of the effectiveness of the SBRM at achieving its objectives. This evaluation would include determining the degree to which the observer coverage levels have been adequate to provide data of sufficient precision to achieve the CV-based performance standard (see section 6.4.2).

Comment 16. Several commenters stated that, despite observer allocation measures identified in the SBRM, the actual allocation of observers in any year will ultimately depend on available funding. They noted that while the amendment document acknowledges the potential for funding shortfalls, it does not explain how the funding-delimited allocation will occur and what standards will be used to set minimum levels of observer coverage. One commenter suggested the SBRM Amendment include a set of non-discretionary priorities for allocation of observer resources and that whatever approach was used, it take into account the available resources.

> Response: The commenters are correct that in any given year, the costs to fully implement the observer coverage levels calculated through the SBRM proposed in this amendment may exceed available funding provided by Congress. However, the amendment proposes to address this contingency through a prioritization process to be set by the Councils (see section 6.6). It would be premature to establish non-discretionary priorities in this amendment, as management and scientific needs can and do change with time. There already exist, through some of the FMPs addressed by this amendment, prescribed observer coverage levels for certain programs (e.g., Northeast multispecies fishery SAPs and the B-Regular DAS program). Nothing in this amendment alters any current prescribed levels of observer coverage.

Comments on the Amendment and the Court Order

<u>Comment 17.</u> Several commenters expressed the opinion that the SBRM would not satisfy the remand orders. The Court ruling, they said, requires NMFS to specify the level and allocation of observer coverage in each fishery, and the actual level of observer coverage may not be left to the agency's discretion. Commenters opined that the SBRM establishes only a target performance standard (observer sea days sufficient to achieve a CV $\leq$ 30 percent for bycatch estimates), leaving the actual level of observer coverage as a matter of agency discretion, and therefore, the SBRM Amendment does not satisfy the Court's order.

> Response: With respect to establishing an SBRM, the Court's orders only require that NMFS establish an SBRM that is non-discretionary, which the proposed SBRM does. The Councils disagree that the SBRM leaves the allocation of observer coverage to the discretion of the agency. The methodology established by and described in the SBRM Amendment dictates the level of observer coverage necessary in each fishing mode to meet the performance standard. Once established, the analyses that comprise the SBRM remove discretion from the process to determine observer coverage levels and allocations across fishing modes. In cases where there are insufficient resources (i.e., the agency budget cannot support) to fully allocate the levels of observer coverage required, the agency and the Councils will determine the appropriate prioritization of available observer coverage given the most pressing scientific and management needs (see section 6.6). The performance standard is not proposed to serve as a mere target, but is an objective measure of the level of observer coverage necessary to achieve the level of precision specified in the amendment. Moreover, the Court's order in *Oceana* v. *Evans* (II) explicitly rejected the need for specific percentage levels of coverage in footnote 38 of its opinion:

> Contrary to plaintiff's interpretation (*see, e.g.*, Mot. at 29), *Oceana I* did *not* require that an FMP mandate a specific level of observer coverage. Rather, the Court held that an FMP may not delegate the development of a standardized bycatch reporting methodology to the Regional Administrator.

<u>Comment 18.</u> Another of the commenters, noting the Court's reference to the bycatch monitoring plan in the Pacific Highly Migratory Species FMP as an example of a legally compliant SBRM, suggested that a similarly compliant SBRM will have to contemplate the dynamics of each fishery and be integrated into each FMP. The writer noted that the SBRM Amendment, as written, will not anticipate and adapt to future fishery conditions and management needs.

Response: This amendment already contemplates the dynamics of each fishery and will be integrated into each FMP. Chapters 2 and 3 provide information specific to each FMP and fishing mode subject to the SBRM. Chapter 4 contemplates discard reporting mechanisms (both those currently used and potential additional methods) and in the context of the various fisheries in the Northeast Region. By developing an omnibus amendment, the Councils and NMFS are integrating this SBRM into all 13 Northeast Region FMPs. The provisions in the SBRM Amendment that make changes to certain elements of the SBRM through annual specifications or framework adjustments to the individual FMPs provide a mechanism to allow the Councils to adapt the SBRM on an FMP-by-FMP basis, as needed, to future fishery conditions and management needs in a relatively time-effective manner without the need to go through the full amendment process.

<u>Comment 19.</u> A commenter asserted that the draft SBRM Amendment exceeds the requirements laid out by the Court and is far more comprehensive than the example bycatch monitoring plans cited by the Court. The writer agreed that the rulings require the SBRM's implementation to be non-discretionary, but the commenter argued for flexibility in the new program, asserting that the Court did not mandate any particular approach or set of performance requirements.

Response: The Councils agree that the SBRM Amendment is more extensive and comprehensive than would be necessary to minimally satisfy the Court's concerns, but this is hardly a flaw and is certainly legal and appropriate under the Magnuson-Stevens Act and the Court opinions. While the Court did not mandate any particular approach or set of performance requirements, the approach and performance requirements proposed in the amendment are entirely consistent with the Court opinions and fulfill the requirements under the Magnuson-Stevens Act. By establishing the performance requirements described in this amendment, the resulting SBRM would be more robust than if the performance requirements did not exist.

<u>Comment 20.</u> The same commenter noted that by establishing a target CV for bycatch estimates in hundreds of various mode-species combinations, the SBRM Amendment would require specific application of a generally-derived standard. The writer urged NMFS to recast the omnibus amendment as a broader set of standards and methods, perhaps adopting a CV target for more broadly aggregated bycatch estimates, under

which PDTs would establish fishery specific observer coverage requirements and, thus, removing from the agency the discretion for establishing observer coverage levels. The commenter asserted that such flexibility would be consistent with both Court decisions.

Response: The CV-based methodology establishes the process by which observer coverage levels are determined and allocated across the wide variety of fisheries managed under the Northeast Region FMPs. Using a global standard (a CV of 30 percent) across all fisheries does not mean that all fisheries would be allocated the same level of observer coverage (as would occur under a process by which all fisheries were required to achieve, for example, 20 percent coverage), but recognizes inherently that some fisheries—those that have more highly variable catches—require higher levels of observer coverage than those with more consistent catches. In this way, the differences among fisheries that would affect observer coverage levels are accounted for while ensuring that the data collected by observers on discards in all fisheries achieve a consistent and standard level of precision.

Given that the expectations for the discard data obtained by at-sea fisheries observers should be consistent across all fisheries for which the data are used in similar ways (e.g., to obtain reasonably precise and accurate estimates of discards for use in stock assessments and to determine the stock-level implications of discarding), it stands to reason that a generally-derived performance standard is appropriate, particularly given the overlap and inter-relationships among fisheries and species caught (see chapter 3). When the discard data are used for different purposes in certain specific fisheries (e.g., for real-time area-based quota monitoring), it may be that the generally-derived performance standard may need to be supplemented to more appropriately reflect the needs of the specific application. Nothing in this amendment precludes either Council from modifying the SBRM process established through this amendment to accomplish such a change on an FMP-by-FMP basis as management needs dictate. In fact, the SBRM Amendment has been designed to ensure such flexibility remains with the Councils (see section 6.5). The ability of the Councils to develop changes to the SBRM through the framework adjustment and/or annual specifications process preserves the flexibility suggested by the commenter.

Comment 21. Several commenters stated that the Court decision requires the SBRM to clearly establish that an observer program will be developed and made mandatory in each fishery.

Response: The Councils disagree that the Court decision requires that an observer program be *developed*; the Northeast Fisheries Observer Program is well established and has proven to be a successful observer program for over 15 years. Observer coverage is currently mandatory in all Northeast Region FMPs subject to this amendment (i.e., vessels with Federal permits are required to carry an observer any time they are requested to do so). This amendment will formalize the SBRM in place in the Northeast Region and reinforce the importance and necessity of at-sea fisheries observers for collecting data on discards.

Comments on the Amendment and NEPA

Comment 22. Several commenters stated that the Omnibus SBRM Amendment should be subjected to the scoping and development process of an Environmental Impact Statement (EIS). They argued that the environmental impacts of the SBRM Amendment are likely to be significant, since the SBRM ultimately would affect widespread marine life, as data collected under the SBRM would influence fisheries management decisions throughout the region for years to come.

Response: The Councils disagree that an EIS is necessary for this action. Section 7.2 of the amendment analyzes the direct, indirect, and cumulative impacts expected to result from the implementation of this amendment and section 8.9.2 supports the conclusion that no significant impacts to the human environment are expected. While data collected under the SBRM may influence fisheries management decisions throughout the region for years to come, each of those future management decisions would be the subject of its own environmental review under NEPA. This separate environmental review would be based on the specific management measures under consideration for the specific stock(s) and fishery(ies) for which the action has been deemed necessary.

The purpose of this action is not to directly or even indirectly alter fishing practices or levels of fishing effort. This action is specifically designed to establish the methodology to be used to obtain, analyze, and report information regarding discards occurring in Northeast Region fisheries. It does not directly or indirectly affect the physical environment and, therefore, an EIS is not necessary. Nevertheless, the process for developing this amendment involves extensive public input and involvement by the two Councils.

Comment 23. The same commenters stated that the SBRM Amendment document contemplates too few and too narrow a range of alternatives to satisfy NEPA. They suggested that additional alternatives should have been considered with respect to the importance filters, bycatch reporting and monitoring mechanisms, the performance standard, and bycatch program review and reporting.

Response: The Councils disagree that the SBRM Amendment contemplates too few and too narrow a range of alternatives to satisfy NEPA. NEPA does not require a minimum number of alternatives be analyzed, other than the proposed action relative to taking no action, and the breadth of what is considered a reasonable range is dependent on the nature of the action. This amendment provides a range of possible outcomes as alternative courses of action, but is organized for the sake of clarity such that for each of seven relatively independent decision points the status quo is compared to between one and three additional alternatives (some alternatives include an additional one to three options). Given the structure of the SBRM Amendment in categorizing the actions under consideration, there are actually 1,464 distinct outcomes possible for the SBRM to be adopted by the Councils, ignoring sub-options within some of the alternatives. Accounting for the sub-options, the number of different possible outcomes climbs to 2,160.

Comment 24. One commenter indicated that the lack of an EIS limited the opportunities for public participation and stymied involvement by the Councils in the development of the amendment.

Response: The Councils disagree that the preparation of an EA has in any way limited the opportunities for the public to participate in the process to develop the SBRM Amendment. NMFS and the Councils have endeavored to provide the public with numerous opportunities to participate in the process to develop this amendment, through a variety of fora and media. In addition to 13 Council meetings, 7 oversight committee meetings, and 1 meeting of members of the Councils' SSCs at which the SBRM Amendment was discussed in a public forum with opportunities for members of the public to provide input into the process, there were two formal public hearings held on the draft amendment for which the sole purpose was to solicit and obtain input from the public on the SBRM Amendment. The public hearings were held during a 59-day comment period that followed publication in the *Federal Register* of a notice soliciting input from the public on the draft amendment. Copies of the draft amendment, and a companion summary document, were distributed at Council meetings and the public hearings, were available by mail to anyone requesting a copy, and were posted on the Internet with instructions for how to provide comments.

In addition to these opportunities, upon submission by the Councils to the Secretary of Commerce for review, a notice of availability will be published in the *Federal Register* with a comment period prior to any decision by the agency to approve or disapprove the amendment. Publication of a proposed rule will provide yet another opportunity for the public to review and comment on the proposed regulations designed to implement the SBRM Amendment. These public meetings and review/comment periods meet or exceed the requirements of all applicable laws, including the Magnuson-Stevens Act, NEPA, and the Administrative Procedure Act.

Comment 25. Several commenters insisted that alternative threshold levels for the importance filter mechanism should be identified and analyzed in the NEPA document, as should a range of alternative CV levels, as the performance standard for the SBRM.

Response: The SBRM Amendment, at section 6.3.2, identifies ranges of alternative threshold levels considered to apply to the proposed importance filters. Although considered during the early development of the amendment, a range of alternative CV levels was not formally proposed (see section 6.8.4) due to the lack of a scientific basis for any CV other than the 20-30 percent encouraged in NMFS (2004). The Councils contend that the decision to adopt a performance standard of 30 percent is explained adequately in section 6.3.2. The only potential outcome of selecting a different threshold level for the importance filter (higher or lower) or selecting a different CV level for the performance standard (higher or lower) would be to change the resulting observer coverage levels necessary to comply with the SBRM (more or fewer days observed), which would, as explained in section 7.2.3, have no direct, indirect, or cumulative effect on the environment.

Comment 26. One commenter suggested that the purpose, need, and scope of the document are too vague. This commenter also suggested that the entire document, particularly the analytical sections, needs to be easily accessible to the public, stakeholders, and decision makers.

Response: As stated in section 1.4 of the amendment, the purpose and need of the document are to ensure that all Northeast Region FMPs comply with the SBRM requirements of the Magnuson-Stevens Act and to address the concerns raised by the Court in the *Oceana* v. *Evans I* and *II* decisions. The scope of the amendment is similarly explained in section 1.4 and Table 1, which identifies the 13 FMPs and 39 fishery species to which this amendment applies.

The Councils and NMFS intend for this document be easily accessible to the public, stakeholders, and decision makers. As noted in the response to comment 24, the document has been widely available in different media and through different means in order to ensure that all those interested in the SBRM Amendment would have access to it. The document is written in plain language (to the extent that issues of such a technical nature allow) so as to be understood by non-experts.

Comment 27. The same commenter argued that the environmental assessment (EA) ignores the indirect and cumulative environmental effects of the SBRM Amendment, and that attention should be paid to the relationship of precision of bycatch estimates to the risks to the environment.

Response: The Councils disagree that the EA "ignores" the indirect and cumulative environmental effects of the SBRM Amendment. Sections 7.2 and 7.3 of the amendment specifically analyze the potential direct, indirect, and cumulative effects of the action on the environment, as required under NEPA. Section 8.9.2 concludes that no significant direct, indirect, or cumulative impacts to the environment are expected to occur, as required for an EA under NEPA.

Comment 28. Also, the commenter suggested that through an EIS, NMFS should discuss the effect of the SBRM Amendment on the drafting and issuance of Incidental Take Statements and Biological Opinions under the Endangered Species Act.

Response: It is not necessary under NEPA to include a discussion of the effect of the amendment on the drafting and issuance of Incidental Take Statements and Biological Opinions under the ESA. An SBRM is a requirement of the Magnuson-Stevens Act, not the ESA, and an approved SBRM is not a prerequisite of preparing or implementing Incidental Take Statements or Biological Opinions.

Comments on the Species Addressed by the Amendment

Comment 29. Several commenters addressed the range of species that would be considered under the SBRM, asserting that without a method to assess and report bycatch of all species, the SBRM is incomplete. Commenters claimed the Magnuson-Stevens

Act's definition of bycatch includes more species than those contemplated in the amendment, and includes non-commercial and unregulated fish species (especially those considered at risk, such as wolfish, cusk, and corals), as well as highly migratory species and fish managed by the Atlantic States Marine Fisheries Commission.

Response: The Councils agree that without a method to assess and report bycatch of all species encountered by a fishing vessel, the SBRM would be incomplete. However, as explained in section 4.5 and section 6.8.1, the NEFOP currently recognizes and accounts for all species encountered by a fishing vessel, whether or not the species is managed under a Council FMP. The intent of the amendment is to establish an SBRM that accounts for *all species* encountered by a fishing vessel, by requiring that data on all species are obtained and recorded by at-sea observers and other data collections tools utilized under the SBRM, while ensuring that the data utilized by stock assessment biologists and the Councils to develop FMPs under the Magnuson-Stevens Act are of sufficient precision and accuracy.

Comment 30. The same commenters argued endangered species and marine mammals should also be addressed, and there should be a discussion of the bycatch of corals and sponges as indicators of impacts on marine habitat, particularly in those areas designated as essential fish habitat.

Response: Data on all species brought onto the deck of a fishing vessel are reported by at-sea fisheries observers, as explained in section 4.5 and section 6.8.1 of this amendment and in the Observer Program Manual (NEFOP 2006a) and Biological Sampling Manual (NEFOP 2006b). These include endangered species, marine mammals, sponges, and corals. However, marine mammals are not considered bycatch under the Magnuson-Stevens Act and are, therefore, not directly relevant to the design of the SBRM, as required by the Magnuson-Stevens Act. Also, although data on discards of sponges and corals are collected by observers and are available for use by scientists, managers, and others, assessing the implications of corals and sponges as indicators of impacts on marine habitat is outside the scope of this amendment.

Comment 31. One of the letters expressed concern for the "chronic imprecision and inaccuracy" of estimates of bycatch of sea turtles and other protected species.

Response: The Councils disagree with the contention that there exists "chronic imprecision and inaccuracy" of bycatch estimates for sea turtles and other protected species. The commenter provided no evidence to support their contention. The analysis conducted in support of the amendment indicates that the precision of the discard data collected by at-sea observers varied, but overall was relatively strong (of the non-gray cells in Table 44 for which there was observer coverage in 2004, 54 cells had no bycatch, 82 cells had CVs of 30 percent or less, 40 had CVs between 30 percent and 50 percent, and 56 had CVs in excess of 50 percent). While there is certainly room for improvement in many fisheries, the evidence appears to contradict the commenter's assertion of "chronic" imprecision. As to the accuracy, section 5.6.2 of the amendment summarizes the accuracy analyses performed to date, and these conclude that there is no evidence of systematic or significant bias in the observer program.

Comments on the Observer Coverage Levels

Comment 32. One commenter stated their opinion that the amendment does not establish an allocation of observer coverage and does not explain how one would be established. This commenter also expressed concern over whether there was an automatic mechanism to update the allocation analysis every year.

Response: The Councils disagree with the contention that the amendment does not establish an allocation of observer coverage. The primary purpose of the amendment is to establish just such a methodology by which observer coverage allocations are made. Chapter 5 describes, in detail, the methodology by which discard data are obtained and analyzed to, in turn, determine the necessary observer coverage allocations in each fishery. Chapter 6 describes, in detail, the proposed actions of the Councils to adopt this methodology as the basis to allocate observer coverage for all the FMPs. The intent of this methodology is to provide the mechanism to determine the observer coverage allocations on an annual basis, each year using the most recent complete year of observer data as an input into the process. The SBRM Amendment, in setting up a methodology for determining observer coverage allocations, rather than absolute coverage levels, used data from 2004 as an example dataset input into the proposed methodology.

Comments on the Level of Precision of Bycatch Estimates

Comment 33. One commenter asked to what units or level of aggregation would the CV target be applied; that is, would the 30 percent CV be an overall bycatch estimate for all species aggregated, or would it apply by fishing mode, species, or species group?

Response: The stratification used in the proposed methodology would be applied at the level of species or species group for each fishing mode (a gear- and area-based delineation of fisheries at the appropriate level for assigning observer coverage). This is described and explained in detail in chapter 5.

Comment 34. Another commenter stated that the performance standard must be mandatory, rather than a target, and that the SBRM must clearly establish how the standard is going to be applied for fishery, gear type/sector, and/or species.

Response: The Councils agree that the performance standard should be mandatory, and the SBRM Amendment proposes a mandatory performance standard (achieving a CV of 30 percent or less). However, while the performance standard is used to determine the level of observer coverage *expected* to achieve the standard, whether this standard is actually met can only be determined after fishing is concluded for the year. The CV is a measure of the variability in the data obtained in the sampling program. There are many factors that affect the variability of the discard data obtained by at-sea observers (e.g., changes in stock distribution) and many of these factors remain outside the control of NMFS or the Councils. Thus, meeting the appropriate observer coverage levels is not a guarantee that the CV will be 30 percent or less. As noted in the preceding comment, the stratification used in the proposed methodology to apply the performance standard is described and explained in detail in chapter 5.

Comment 35. Several commenters stated that the target CV does too little to limit the Agency's discretion in determining whether and how to allocate observers. They argued that the SBRM Amendment should require specific levels of observers in each fishery.

Response: The Councils disagree that the use of the CV-based performance standard leaves to the agency the discretion to decide whether and how to allocate observers. The CV level is the minimum standard necessary to estimate bycatch with the desired level of precision, and as long as the minimum level is attained, the SBRM meets the Magnuson-Stevens Act requirements. Any discretion used by NMFS to attain lower CVs only enhances the results derived from the SBRM, which is entirely consistent with the Magnuson-Stevens Act. The purpose of the CV-based performance standard and the methodology proposed in this amendment is to stipulate the specific analytical process by which the observer coverage levels required in each fishery would be determined. Nothing in this methodology would substitute agency discretion for achieving the minimum CV level as described in chapters 5 and 6. As noted, there may be years in which the budget available to the agency with which to fund at-sea observers is insufficient to meet the resulting observer coverage levels; however, the amendment includes a process by which the agency would consult with the Councils in order to develop priorities for how to apply the available funding.

Comment 36. Another commenter argued that the application of the same precision standard (CV $\leq$ 30 percent) to all mode-species combinations is impracticable and ignores the issues and objectives of each individual FMP. The commenter also stated that it runs counter to NMFS's own technical guidance calling for more general application of the CV standard across all bycatch species.

Response: While the proposed application of the performance standard at the species or species complex level for each fishing mode may exceed the minimum standard suggested in the NMFS technical guidance on this issue (NMFS 2004), the Councils assert there is nothing wrong with exceeding this minimum level for application of the performance standard. The rationale for proposing a CV of 30 percent is described in section 6.3 and section 6.9.3. It is the intent of this amendment to establish a rigorous methodology to ensure that the discard data obtained by at-sea observers are of the highest possible quality, with high levels of precision and accuracy to meet the needs of the scientists and managers that utilize the data.

The Councils disagree that application of the same performance standard to all mode-species combinations is impracticable. The analysis presented in the SBRM

Amendment utilizes this performance standard in its application of the proposed methodology. The proposed methodology successfully determined observer coverage levels that would be expected to achieve this level of precision, confirming that this approach is reasonable and practicable.

The Councils also disagree with the commenter's contention that this approach ignores the issues and objectives of each FMP. One of the reasons the CV-based performance standard is the preferred basis for determining observer coverage levels is that it implicitly accounts for the variability associated with each fishery by requiring higher levels of coverage in fisheries for which there is relatively higher bycatch variability and lower levels of coverage in fisheries with less variability. In contrast, the non-preferred alternative would require a specific *level* of observer coverage (e.g., 20 percent of all trips) in all fisheries. The non-preferred approach would not account for the inherent differences among fisheries and would likely result in over-sampling some fisheries while under-sampling others. By establishing a global CV-standard, the proposed methodology accepts that there is a certain objective minimum level of precision that is desirable across all fisheries, but that the actual level of observer coverage necessary to achieve that standard will vary according to the unique parameters of each fishery. In addition, this amendment would enable the Councils to modify certain aspects of the SBRM on a fishery-by-fishery basis though the use of framework adjustments to the FMPs. In this way, should a Council determine that a higher level of precision is needed in certain circumstances (for example, for adequate real-time monitoring of a quota in some fisheries), the performance standard could be changed to accommodate these situations with relative ease (see section 6.5).

<u>Comment 37.</u> The same commenter suggested that days-at-sea estimates to meet the target CV for all mode-species combinations would be likely to exceed current levels of observer coverage, and worried that the SBRM may oblige the agency to observer days-at-sea levels that cannot be met, perhaps resulting in litigation.

Response: Based on the results of the analysis supporting this amendment, it is expected that observer coverage levels will need to increase in some fisheries. It may be possible to decrease observer coverage in other fisheries, and this decrease may offset some of the increase needed, but not necessarily all. The Councils do not intend for the SBRM established by this amendment to be constrained to current or past levels of observer coverage, and acknowledge that observer coverage levels may need to increase overall to meet the SBRM performance standard. The SBRM Amendment merely establishes the methodology for assessing bycatch but does not establish funding or operational mandates for meeting SBRM objectives. Neither the Magnuson-Stevens Act nor the Court orders require that the SBRM resolve all potential funding and/or operational problems (e.g., an insufficient number of certified observers) that may arise in implementing the SBRM. If problems arise in implementing the SBRM due to funding or operational issues, the prioritization process described in section 6.6 would be utilized.

Comment 38. One commenter, in calling for the Secretary of Commerce to establish observer requirements through an emergency rule, stated that NMFS should establish observers on at least 20 percent of all days fished, except in cases wherein analysis of the best available science indicates otherwise.

> Response: The Court order in *Oceana* v. *Evans* II explicitly rejected the need for specific percentage levels of observer coverage (see response to comment 17). Nevertheless, this approach was considered in the SBRM Amendment, but is not preferred for the reasons explained in section 6.9.2. Also, the Councils disagree with the assertion that regulations establishing an SBRM should be implemented through an emergency rule. As noted above in response to other comments, there is no basis to assume the Secretary would or should disapprove this amendment, which fully complies with all SBRM-provisions of the Magnuson-Stevens Act and, therefore, there is no need or justification for emergency regulations.

Comments on the Importance Filters

Comment 39. In general, commenters supported the use of importance filters as a means of removing from consideration, for determining target observer sea day allocations, those mode-species combinations that are unlikely to occur or likely to be of minimal consequence, but urged caution in their refinement and use. One commenter characterized the use of importance filters for observer resource allocation as reasoned, practicable, and consistent with the law.

> Response: The Councils agree with the comment and continue to propose the use of importance filters as part of the process to determine observer coverage levels.

Comment 40. One commenter stated that the filtering mechanisms need to be clarified and expanded to ensure all of the criteria used as filters are fully identified.

> Response: The Councils agree and the final version of the SBRM Amendment clarifies and expands the discussion of the importance filters, including specifying the criteria to be used in implementing the filters (see sections 6.2 and 6.9.2).

Comment 41. Three commenters expressed concern that the importance filters rely on poor existing observer data as the foundation for calculation of the allocations. They suggested that a baseline level of observer coverage be established for a period of years to support future appropriate use of statistical filters.

> Response: The Councils disagree with the commenters' assertion that the importance filters rely on "poor" data as the foundation for calculating the observer coverage allocations. The commenters provide no evidence to support this claim. The measure of the CV, as described in chapter 5, is an unbiased indicator of the precision of the data. As noted above in response to comment 31, less than 25 percent of the non-gray cells for which there was observer coverage in 2004 had CVs in excess of 50 percent. The majority (58 percent) of cells had either no discards or CVs of 30 percent or less.

By definition, those cells that had either no discards or CVs less than 30 percent were of sufficient quality to meet the performance standard proposed to be implemented through this amendment. The remainder of cells (18 percent) had CVs between 30 percent and 50 percent. The Councils and NMFS agree, in principle, with the suggestion to establish a "baseline" level of observer coverage for a period of years in order to provide data for more comprehensive analysis. Section 5.3.3.2 of the amendment describes the concept of "pilot" coverage that would address this suggestion for cells for which there was no observer coverage available.

Comment 42. Commenters generally supported the first tier gray-box filter, but several insisted that each decision to gray out a mode-species combination be explained in the amendment document. Also, the same commenters said that the gray-box filter should not be applied to any mode-species combination, wherein the species is a "protected species," or a species considered "at risk." They suggested that only after a robust observer program is in place can it be determined that an interaction between a mode and protected species is unlikely to occur.

Response: The Councils support the use of the gray-cell filter approach as a reasonable way to focus on particular combinations of fishing modes and species that occur in nature with sufficient frequency as to warrant inclusion in the SBRM. The need for this filter is particularly evident due to the approach, taken for ease and consistency of presenting the data, to use a matrix (species across the top; fishing modes along the side) as the basic model for the SBRM. This approach results in all species appearing as cells for all fishing modes, even if the species is never encountered in the fishing mode. The gray-cell filter is a recognition that many species are either never encountered by a fishing mode, or are encountered so rarely as to be *de minimus*. The process used to determine which cells should be included is explained in section 5.3.3.1. This section addresses both fish species and protected species.

The Councils reject the commenters' characterization that the current NEFOP is not "robust." The NEFOP is a well-established at-sea fishery observer program that has been in place for over 15 years. While the level of observer coverage has varied during this time in response to changing Federal budgets, and the program's objectives have evolved, the program itself has grown and developed in response to the needs of management and the scientists. The NEFOP observer program manual, biological sampling manual, training manuals, data handling procedures, and formal training facility and training program serve as a model for other observer programs around the country and around the world.

Comment 43. Several commenters claimed that the third level filter could be used to mask the real effects of bycatch in high volume fishery modes; i.e., when the discard rate for a species is small relative to a high volume fishery, but still of significant environmental consequence. The commenters asked for the third level filter to be removed from the amendment.

Response: Upon further consideration, the Councils have revised the third level filter to eliminate the potential that it could inadvertently mask the real effects of bycatch in high volume fishing modes. Section 6.2.3.2 of the amendment explains what changes were made to the filter and how these changes address this concern.

Comment 44. The same commenters expressed concern that the third and fourth level filters rely on threshold values (ratios) which are not specifically identified and analyzed in the amendment document. They stated that the SBRM Amendment must develop and address the specific fixed threshold alternatives through an EIS process before the public can properly assess the usefulness of the SBRM.

Response: The draft amendment included a range of potential threshold values from 0.5 percent to 3 percent, and the analysis in the document demonstrated the effects of these potential thresholds on observer coverage levels across the fishing modes. However, based on comments, the Councils have revised the importance filters to address concerns such as this comment. Section 6.2.3.2 explains the revisions made to the importance filters, and how the proposed threshold values were determined. Regarding the need for an EIS, see responses to earlier comments on this issue. The Councils are not preparing an EIS, but the revised EA that incorporates the changes made to the importance filters will be made available to the public for review prior to implementation.

Comment 45. A commenter suggested that the Councils consider adding an importance filter for any mode of fishing whose overall contribution to total landings falls below some threshold and, accordingly, for which the contribution to total discards can be considered *de minimus*. The commenter also suggested that the SBRM Amendment provide a means for the reduction of target observer sea days when gear improvements have reduced or eliminated the potential for bycatch.

Response: Regarding the first part of the comment, this is, in effect, the intent of the fourth level filter, which functions by comparing the total estimated discards of a species within a fishing mode with the total fishing mortality (commercial and recreational landings, plus discards) of that species among all fishing modes. In this way, species for which the total discards in a fishing mode is a *de minimus* amount of the total mortality of that species would not be used to determine the appropriate level of observer coverage needed in that fishing mode.

Regarding the second part of the comment, there are three ways in which changes in bycatch rates due to gear improvements could be accounted for under the proposed SBRM. First, the CV-based performance standard implicitly accounts for the variability associated with each fishery, by requiring higher coverage levels in fisheries for which there is relatively higher bycatch variability and lower coverage levels in fisheries with less variability. Thus, as conditions in a fishery change, whether as a result of gear improvements or not, and the variability of bycatch is reduced, the level of observer coverage necessary to achieve the performance standard would automatically decrease. However, the magnitude and the variability of bycatch are not necessarily directly related, as the magnitude relates to the overall amount of bycatch occurring in a fishery, and the variability tracks the relative amounts of bycatch on trips within a fishery. It is possible that as the overall magnitude of bycatch decreases as a result of a gear modification or other change in the fishery, the variability among trips could actually increase. This could be particularly true as the magnitude approaches zero, where even relatively small amounts of bycatch could appear as substantially different than zero. This concern could be addressed by the fourth-level filter, which is intended to control for *de minimus* amounts of bycatch, as explained above.

The third way in which the proposed SBRM could address this issue is in the gray-cell filter process. As explained in section 5.3.3, this filter accounts for infrequent or infeasible interactions (combinations of species and gear types), by filtering these cells. The initial allocation to the gray-cell filter was based on a technical review of 16 years worth of NEFOP data, but the intention is that the gray-cell filter would be updated as new information becomes available that may change the initial distribution. A rationale for expanding the gray-cell filter would include such things as changes in regulations that effectively reduce potential bycatch interactions to the level of being highly infrequent or infeasible.

Comments on the Analysis of Accuracy and Precision

<u>Comment 46.</u> One commenter stated that the amendment document sufficiently addresses the issue of accuracy, and its inclusion of the Rago et al. analysis of observer program accuracy rectifies previous Court-identified deficiencies.

Response: The Councils agree with the comment.

<u>Comment 47.</u> Another commenter stated that the treatment of accuracy in the document is limited to a dismissal of current science and suggested that the amendment document consider methods to retrospectively assess the accuracy of bycatch in periodic bycatch reports.

Response: The Councils disagree with the commenter's assertion that the treatment of accuracy in the document is limited to a dismissal of current science. A discussion of accuracy as it relates to precision is provided in section 5.2, and a summary of the analyses of accuracy conducted in support of the amendment is provided in section 5.6.2 and in Appendix A. The Court order in *Oceana* v. *Evans* I stipulated that the agency consider the information presented in Babcock et al. (2003), and this paper is discussed in Appendix A and in section 6.9.2. The commenter also suggests consideration of methods to periodically retrospectively assess the accuracy (bias) associated with the bycatch data collection program. This is an appropriate element of the proposed periodic SBRM Report, and the proposed contents of this report have been updated to include updating the accuracy analyses conducted in support of this amendment to evaluate the sources and magnitude of bias in the observer program data (see section 6.4.2).

Comment 48. A commenter, arguing for FMP-specific bycatch monitoring programs developed under a more general omnibus SBRM structure, suggested the amendment mandate that sampling designs minimize bias to the greatest extent practicable.

Response: The Councils agree that the development and implementation of sampling designs to minimize bias to the extent practicable is a valid objective for the SBRM, and the document has been clarified to identify this as an objective of the SBRM implemented under this amendment (see section 1.4).

Comment 49. The same commenter warned that the SBRM should not result in an undue fiscal burden on the public or the industry, and that precision and accuracy are matters of policy that should be left for the Councils to determine on an FMP basis. The commenter stated that the document should consider not only a scientific perspective on precision and accuracy, but should also include a discussion of the benefits and costs associated with varying levels of precision and accuracy.

Response: The Councils disagree with the commenter's assertion that precision and accuracy are matters of policy to be determined on an FMP-by-FMP basis. As discussed in the responses to comment 20 and comment 36, the proposed methodology is based on the premise that there is a certain objective minimum level of precision that is desirable across all fisheries, but that the actual level of observer coverage necessary to achieve that standard will vary according to the unique parameters of each fishery. As noted in chapter 5, accuracy is a measure of the bias associated with the sampling design. Improving the sampling design to minimize bias is not a policy issue but is a matter of science and is critical to the development of a reliable statistically-based biological sampling program. Likewise, while there are real costs associated with increased levels of precision, the precision associated with bycatch data has implications for the science conducted in support of fishery management decisions. The lower the precision of the data used, the less reliable are the results of stock assessments and the greater the risk to the resource (and the fishing industry) that results from management decisions. While uncertainty and risk are unavoidable in fisheries science and management, it is the position of the Councils that these can be minimized and balanced by improving the precision and accuracy of the data used in the process.

The costs and benefits associated with varying levels of precision are an important consideration, and can best be illustrated through an examination of the relationship of expected CVs over a range of observer coverage levels. Figure E-1 is excerpted from the Rago et al. (2004) paper as an example of this analysis. It demonstrates that at low levels of coverage, there is most often a substantial benefit (as indicated by decreasing CVs) from a small increase in observer coverage. However, as observer coverage levels increase, the returns (improvements in precision) diminish rapidly. Thus, in Figure E-1, there is an initial rapid improvement in precision up to approximately 100 observed trips, then the improvements taper off to the point that quadrupling the observer coverage up to 400 trips only improves the precision by 10 percent. Understanding this relationship and the diminishing returns that are expected as coverage levels increase are important considerations in evaluating the costs and benefits associated with varying levels of precision. There is not similar relationship in regards to varying levels of accuracy, as the accuracy of the data is a direct result of the amount of bias in the sampling program (see sections 5.2 and 5.6 for a complete discussion of accuracy, bias, and precision).

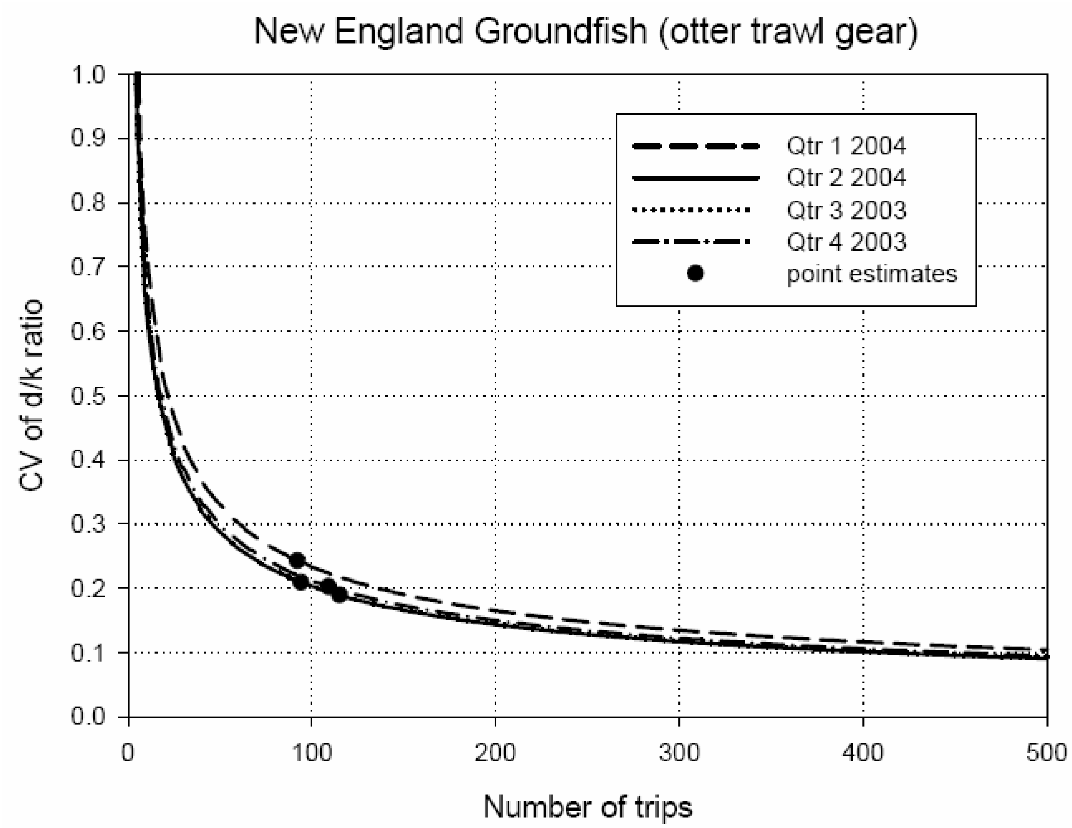

Figure E-1. The 2003/2004 point estimates of the coefficient of variation (CV) of the discard to kept (d/k) ratio for New England groundfish caught with otter trawl gear, and the expected coefficient of variation of the discard to kept ratio over a range of sample sizes (number of trips) (from Rago et al. 2004).

The commenter appears to suggest that observer coverage levels should be derived from target precision levels that are set by the Councils as an outcome of policy choices regarding the costs associated. The Councils disagree with this approach, but consider the SBRM to be a process that determines the observer coverage levels necessary to achieve the minimum precision level performance standard in order to provide the most robust discard data possible, without regard to the annual budgets available to fund such levels of observer coverage. The SBRM Amendment merely establishes the methodology for assessing bycatch but does not establish funding or operational mandates for meeting SBRM objectives (see response to comment 37). Once the available budgets are known, additional consideration of management priorities may be necessary by the Councils if the budget is insufficient to provide the full level of coverage desired.

Comment 50. A commenter stated that NMFS's bycatch mortality estimates are perceived by industry as inequitable from mode to mode and the document should better explain how discard mortality estimates are determined.

Response: The SBRM Amendment does not address discard mortality estimates. These estimates are derived on a stock-by-stock basis and utilized in stock assessments to determine total fishing-related mortality. The discard mortality estimates used in stock assessments are often based on a variety of sources, and are subject to the stock assessment peer-review process prior to being accepted as the basis for making determinations about fishing-related mortality. These estimates change over time as new information is utilized in the stock assessment process and as new assessment models are developed and refined. It would not be appropriate or practicable for the SBRM Amendment to address the issue of discard mortality estimates.

Comment 51. One commenter, providing a technical review on behalf of several fishing industry organizations, suggested that a typical assumption in the calculation of CVs based on observer coverage is that every tow is independent, but the truth is that sequential tows are clearly correlated and should not treated as statistically independent.

Response: While it is correct that sequential tows could be correlated and should not be treated as statistically independent, the proposed methodology is structured in recognition that the information content of tows is reduced by the inter-correlation; therefore, the tow was not used as the sampling unit. Instead, the SBRM analysis uses the fishing trip as the sampling unit. For a more detailed explanation, see chapter 5 and Appendix A.

Comment 52. This same commenter indicated that the "observer effect," the degree to which vessel operators behave differently when an observer is aboard, needs to be accounted for in the calculation of the CV.

Response: An analysis of the "observer effect" was conducted to explicitly evaluate the effect of bias, including the spatial patterns of fishing locations, the average trip length, and the average landings (kept pounds) of observed and unobserved fishing trips. These analyses indicated that the effect of observer bias is expected to be small and, therefore, the "observer effect" is not expected to contribute to the variance in the observer data. For a more detailed explanation, see chapter 5 and Appendix A.

Comment 53. This commenter also suggested that the CV calculation should account for observer downtime, those periods of fishing operations when the embarked observer is off duty.

Response: The bycatch ratio is based on the sum of the discarded pounds divided by the sum of the kept pounds of observed hauls and is, therefore, not influenced by the unobserved hauls. The bycatch ratio based on discarded pounds divided by days absent accounts for all hauls (observed and unobserved) by expanding the discarded pounds by the ratio of the number of total hauls to the number of observed hauls. For more information on this issue, see chapter 5.

Comment 54. This same commenter suggested that the method of calculating the CV is, to some extent, fishery/stratum dependent. For example, different methods should be applied to day boat fisheries versus longer trip oriented fisheries.

Response: A finer-scale stratification could improve the estimation; however, trade-offs have been made throughout the stratification scheme to accommodate the diversity of fleets and species groups. The heterogeneity in the relationship between the discard pounds to kept pounds may be evidence of this. Post-stratification is possible and a finer-scale division between day trips and multi-day trips is, in fact, made for observer deployment within otter trawl fleets.

Comments on Electronic Monitoring

Comment 55. A commenter who works in the field of video monitoring agreed with the amendment document's rather high estimates of the costs associated with fishery video monitoring program. He attributed the high costs to the market dominance of a single contractor and he suggested that costs would likely come down should video monitoring requirements become more widespread and more contractors enter the field.

Response: The Councils agree with the commenter that the costs associated with electronic video monitoring would be expected to decrease as more contractors enter the marketplace. The costs provided in the document are based on the most widely available cost data. While this cost information may not be reflective of the costs that would be expected in a market environment in which there are many participants competing for customers, it is considered a valid indicator of the likely initial costs to the industry in the Northeast under current market conditions.

Comment 56. Another commenter agreed with the document's discussion of analytical difficulties that would be involved in video monitoring, and expressed support for the finding that use of such systems be deferred, pending further development.

Response: The Councils agree with the comment.

Comments on the SBRM Reporting Process

Comment 57. Two commenters stated that the maximum report period should be annual, and the report should present the bycatch data by fishery, gear type, sector, area fished, species, and any other variable, as determined by the Councils.

Response: The Councils agree with the commenter that the frequency, format, and content of the SBRM Review Reports should be determined by the Councils for their

FMPs. Both Councils considered requiring SBRM Review Reports on an annual basis, every 3 years, every 5 years, or in conjunction with other required reports (such as SAFE reports or monitoring committee reports), but ultimately directed the SBRM Review Reports to be provided every 3 years (see section 6.4.2).

Comment 58. One commenter argued that various reporting content, format, and frequency alternatives should be described and analyzed in an EIS. Also, the commenter expressed disappointment at the examples provided in the appendices, suggesting that the Councils require "estimates of overall bycatch and bycatch mortality by species/stock within a fishery and/or fishery mode or gear sector in a particular area."

Response: Although the Councils are not preparing an EIS for this action, the SBRM Amendment complies with the commenter's request that options for the content, format, and frequency of the SBRM Review Reports be described and analyzed in the document. The example SBRM Review Report provided in Appendix F is an *example* of the type of information that would be available to the Councils in an SBRM Review Report for a specific FMP. It is not intended to represent the only possible format or content for the SBRM Review Report. As explained in section 6.4.2, the Councils are free to determine the type of information, format, and content they require. However, the example report does provide much of the information suggested by the commenter, such as the observed monkfish discards in each fishing mode, the ratio of monkfish discards to total discards of all species, estimates of total monkfish discards in each fishing mode, the percent of total monkfish discards associated with each fishing mode, and the CVs of the estimates of total discards in each fishing mode.

Comment 59. This commenter also expressed concern that the amendment did not require reporting on the SBRM, but provided only for the Councils to request a query of the appropriate databases.

Response: The Councils disagree with the commenter's assertion that the SBRM Amendment does not require reporting on the SBRM. The Councils developed and considered several alternatives regarding a formal SBRM Review Report, all of the which but the no action alternative would require a periodic SBRM Review Report to be prepared by NMFS. The document does, however, stipulate that regardless of the decisions of the Councils regarding the specific content, format, and frequency of the SBRM Review Report, they are always free to request any additional queries of NMFS' databases that they consider appropriate and necessary.

Miscellaneous

Comment 60. A commenter insisted the SBRM must address how data will be collected on sea turtle impacts in the scallop dredge fishery, noting that turtle-chains prevent sea turtles from being captured and hauled on deck in the dredge, and there is no mechanism for observing sea turtle interactions with the gear underwater.

Response: The Councils disagree with the comment. There is an important distinction between what is defined as a "take" under the Endangered Species Act (ESA) and what is defined as "bycatch" under the Magnuson-Stevens Act. Under the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 U.S.C. 1532(19)). This is a much broader definition than that of bycatch in the Magnuson-Stevens Act, which is defined as "fish which are *harvested* in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards [emphasis added]." The distinction hinges upon the term "harvested," which, while it is not defined in the Magnuson-Stevens Act, is accepted to mean an animal that is brought on board the vessel or otherwise removed from the ocean in the act of fishing. The activity described by the commenter regarding potential interactions between sea turtles and scallop dredge gear underwater that does *not* result in the turtles being captured and hauled on deck in the dredge could be considered a take under the ESA, but does not qualify as bycatch under the Magnuson-Stevens Act. Because the SBRM required to be established under the Magnuson-Stevens Act only pertains to the monitoring of *bycatch*, non-bycatch takes of sea turtles are outside the scope and purview of the SBRM. However, NMFS is obligated to monitor and address takes if required by the ESA or any applicable biological opinions associated with the FMPs amended by this omnibus amendment. Thus, while NMFS takes seriously the need to monitor interactions of fishing activity with sea turtles, such interactions that do not result in bycatch, as defined by the Magnuson-Stevens Act, are not explicitly addressed by the SBRM proposed in this amendment.

Comment 61. A commenter, arguing for greater FMP orientation of the SBRM, suggested that the amendment authorize and encourage a variety of cooperative research aimed at reducing bycatch and improving bycatch data quality.

Response: Including provisions to authorize and encourage cooperative research is outside the scope and purpose of the SBRM and this amendment. Nevertheless, the Councils support a wide variety of cooperative research programs, including many projects aimed at reducing bycatch. Bycatch reduction is frequently a priority research area of the Northeast Consortium, Cooperative Research Partners Program, and the various research set-aside programs. The Councils intend to continue to provide support for such projects, as resources allow.

Comment 62. A commenter stated that NMFS needs, as practical matter, to ensure the observer program is affordable and effective and enjoys stable funding and workforce.

Response: The NEFOP strives to maintain an effective and cost-efficient at-sea fishery observer program, including a stable, well-trained workforce. Funding levels vary and are dependent upon the annual Federal budget developed by the U.S. Congress and signed by the President.

Comment 63. A commenter suggested that NMFS should make use of industry and government resource surveys to estimate bycatch. The commenter noted that prior to opening an area to scallop fishing, the area is surveyed by observed commercial vessels and that the pre-opening surveys may support sufficient discard estimates and provide for reduced observer coverage in the fishery.

> Response: All available information is considered and used, as appropriate, in stock assessments and management decisions. While the focus of this amendment is development of a standardized methodology for obtaining and utilizing discard data in a programmatic way across all Northeast Region fisheries, nothing in this amendment would preclude the use of additional data as they become available.

Comment 64. The same commenter expressed concern that the SBRM's reliance on gear and area fished to identify modes may result in an unmanageable number of separate modes for scallop vessels under the SBRM.

> Response: A detailed explanation of the purpose and procedures for stratifying the fisheries according to gear type, port, and fishery program is provided in section 5.3. While the number of strata may change as conditions in the management system change, the stratification is an important component of the SBRM used to differentiate fishing modes so that the variability inherent in most fisheries can be minimized to the extent practicable, thus reducing potential sources of bias and improving the precision of the resulting data collected in the fishing mode.

Comment 65. A commenter stated that the amendment document does too little to standardize how observers conduct themselves and their data collection aboard fishing vessels.

> Response: While this comment addresses two very important aspects of any successful at-sea fishery observer program, these issues are well addressed by the NEFOP in the Observer Program Manual (NMFS 2006a), the Biological Sampling Manual (NMFS 2006b), and the Observer Training Program, and are beyond the scope and purpose of this amendment.

Comment 66. Another commenter wondered if NMFS had the resources to support the analysis obligations made by the SBRM Amendment.

> Response: The Councils expect that NMFS will complete all analyses required under the SBRM proposed in this amendment, to the extent that resources will allow.

Comment 67. One commenter suggested that law enforcement be increased "to 10 percent, not less than 1 percent."

> Response: Enforcement of fishing regulations is not within the scope or purview of this amendment. The Councils expect that the commenter may have misunderstood the discussion of at-sea observer coverage levels to relate to fisheries enforcement. At-sea fisheries enforcement is conducted by the U.S. Coast Guard, as one of several important missions. The ability of the Coast Guard to provide an on-the-water presence and to engage in fisheries enforcement is dependent upon annual budgets

and competing priorities such as drug interdiction, search and rescue, and homeland security.

Public Hearing Summary

Gloucester, MA
November 14, 2006

Chair: Dana Rice
Council Staff: Chris Kellogg
NMFS Staff: Michael Pentony
Council Members: Phil Ruhle
Attendance: 32 (8 signed in)

Introduction:

Mr. Rice welcomed those in attendance and introduced the purpose and structure of the SBRM Amendment public hearing. Mr. Pentony provided a short presentation on the purpose of the hearing, a summary of the SBRM Amendment and the Councils' preferred alternatives, and a review of the process to comment on the draft amendment, which are accepted at the hearing, or at the second of two public hearings on December 13, 2006, in New York, NY. Mr. Pentony announced that written comments would be accepted through December 29, 2006, via mail, fax, or email.

Five individuals provided comments on the draft amendment. The following represents a summary of the testimony of each commenter and is not intended to be a complete transcript.

Comments:

1. Gib Brogan, Oceana: Mr. Brogan relayed Oceana's concerns regarding the draft SBRM Amendment. Mr. Brogan asserted that the SBRM Amendment, as proposed, does not satisfy the Court's remand order regarding Amendment 13 to the Northeast Multispecies Fishery Management Plan (FMP). During his testimony, Mr. Brogan identified the following concerns with the document:

- The proposed SBRM continues to leave the level of observer coverage at the discretion of the Regional Administrator (RA). The SBRM Amendment should require a minimum level of observer coverage for each fishery and, therefore, does not meet the court order.
- The Purpose and Need in the first section of the document is not sufficiently clear. It should better state what is in the document and what it sets out to do; that is, how it will move the SBRM issue forward.
- An omnibus FMP amendment effects changes to all the region's FMPs. The document does not, but should, discuss how the amendment will affect each individual FMP.

- The possibility of future management implications is not spelled out in the document.
- The document should also clarify the annual process to update the observer allocations.
- An SBRM needs to establish an allocation of observer days and this document does not do that.
- The range of alternatives considered in the document is inadequate to comply with the National Environmental Policy Act (NEPA), and more viable alternatives should be considered. The performance standard of a CV equal to or less than 30% is accepted in the document as a gold standard without consideration of other CV levels.
- The document should specify what is to be included in the SBRM Report. The alternatives for requiring reports on the SBRM should be expanded.
- The idea of *accuracy* is not explored in the amendment document.
- The SBRM Amendment is very complex and technical and relies on NMFS science. The amendment should be peer reviewed to ensure the science and reasoning are robust.
- The concept of *importance filters* is too vague in the document. Sample threshold levels (used in several of the filters) and the effects of their range (0.5% - 3.0%) on the outcomes of data quality are not discussed. It appears that the threshold level can be manipulated. Threshold values should be fixed and established in the SBRM Amendment document. The importance filters should not be a mechanism merely for justifying status quo observer levels.
- Oceana has issues with specific fisheries. For sea scallop trawls, NMFS and the Councils should consider the use of underwater video monitoring to capture interactions of the fishing gear with marine life. There is no discussion of underwater video monitoring in the amendment document.
- Appendix E is an example of what a required SBRM Report might look like. The information provided in Appendix E is insufficient and does not satisfy the requests of the NEFMC regarding SBRM reporting. The example does not include any time/area data or analyses of bycatch patterns. Mr. Brogan expressed concern that if such information is not specified as required, it will not be collected.
- The SBRM Amendment has come a long way since the review of the Rago et al (2005) paper in September 2005, but more needs to be done to move the region's bycatch monitoring into modern management. Oceana will submit written comments.

2. David Frulla, Fisheries Survival Fund: Commenting on behalf of the Fisheries Survival Fund, Mr. Frulla expressed concern that some of the approaches proposed in the SBRM Amendment are too open to litigation. Mr. Frulla stated that the Fisheries Survival Fund will be submitting written comments and, perhaps, technical papers on specific issues. During his testimony, Mr. Frulla identified the following issues:

- Levels of precision and accuracy are matters of policy that should be left to the Councils. Whatever monitoring methods are decided upon, they should not unduly burden the public or bankrupt the industry.
- The document should explain the costs and benefits of achieving varying levels precision and accuracy.
- Mr. Frulla expressed support for the concept of importance filters and notes that under the example threshold levels the required number of observer days still more than doubles the highest levels ever achieved.
- Mr. Frulla concurs with the document's finding that video monitoring of discards is still a ways off. The method is not robust, as the boat deck is not a production line that is easily videotaped. Also, vis a vis underwater video monitoring, sea turtles that are deflected by a scallop dredge's turtle chains are not *bycatch*. A white paper by the Fisheries Survival Fund will address this issue.
- Mr. Frulla expressed support for the "gray cell" importance filter that removes from consideration (for observer day allocation) improbable bycatch gear/species combinations. Bycatch problems that have been addressed, such as sea turtles scallop dredges, might also be considered as gray cells in the importance filters.
- Add consideration of reducing needed observer coverage levels for fisheries that have implemented successful bycatch reduction devices.
- The detailed discussion of accuracy in the SBRM Amendment document and Rago et al (2005) should satisfy the Court's remand order. NMFS has done a good job addressing accuracy and bias in a principled way.
- The SBRM Amendment would set a performance standard of a CV less than or equal to 30% for each mode/species combination. Case law has provided more room for flexibility in this matter. The level of detail – down to mode/species combinations – is one reason the tally of observer days is so high. Mr. Frulla expressed concern that this approach may lead to a court order that requires observer coverage to meet a CV target of 30% for each mode/species combination.
- There's more flexibility in the court orders than Oceana suggests. Methodology has not been specified by the courts. The Pacific groundfish SBRM has been held up by the court as an acceptable example, but even it does not go into the level of detail of the Northeast SBRM Amendment.

3. <u>Cindy Smith</u>, Maine Department of Marine Resources (DMR): Speaking on behalf of the Maine DMR, Ms. Smith identified an issue related to the estimated discard mortalities. NMFS's mortality estimates by mode, derived from observed discards, are perceived by constituents in Maine as inequitable from mode to mode. The SBRM Oversight Committee should explain the discard estimates in the document. She explained that Maine DMR will be submitting written comments.

4. <u>Jeff Kaelin</u>, Ocean Spray Partnership/Ocean Frost Seafood: During his testimony, Mr. Kaelin identified the following issues:

- Mr. Kaelin supports the Council's decision not to adopt an electronic monitoring alternative. Electronic monitoring methods are not yet practical.

- Mr. Kaelin expressed concern regarding the Council's decision not to set minimum percentages of observer coverage.
- Mr. Kaelin also expressed concern regarding how a CV standard may leave NMFS open to litigation and that setting such a standard would handcuff the SBRM to artificial and unrealistic expectations. NMFS should not be in the position of getting sued due to lack of resources to meet CV and observer coverage targets. Can other parties at the table pitch in funds to support additional observer coverage?
- The use of importance filters in the determination of observer day determinations makes good sense. Mr. Kaelin expressed concern about the extrapolation of observed discards to derive total discard estimates. He will be submitting written comments.

5. Ron Smolowitz, Fisheries Survival Fund: During his testimony, Mr. Smolowitz identified the following issues:

- One component of monitoring that could be expanded is the use of industry and NMFS surveys to estimate bycatch. Prior to opening an area to fishing, the area gets surveyed by commercial vessels. The pre-opening surveys and the bycatch rates from VMS reporting could be expanded. Mr. Smolowitz believes that pre-opening surveys in which bycatch rates are determined may support discard estimates, even with a lower level of observer coverage in the fishery.
- The SBRM Amendment document should include a retrospective analysis of the Georges Bank sea scallop opening to determine whether the target CV was met using the pre- and post-opening surveys.
- Sea turtle interactions with scallop dredges are not bycatch. Turtle chains prevent the turtles from being caught. The interactions are "takes" (under the Endangered Species Act) and should be addressed elsewhere. This distinction should be clarified in the document.
- In areas without a TAC-driven closure, the Council and NMFS should consider requiring an exploratory level of observer coverage and develop methodology for such pilot coverage.
- The reliance in the SBRM Amendment on fishing gear/area modes is a concern for the scallop industry. Each new access area in the fishery is likely to result in a separate mode under the SBRM. This concern may be alleviated if pre-opening surveys are used to reduce the observer burden on the industry.

Conclusion:

No one else requested to speak, and the hearing was adjourned at 6:30 p.m.

Public Hearing Summary

New York, NY
December 13, 2006

Chair:	Laurie Nolan
Council Staff:	Jim Armstrong
NMFS Staff:	Michael Pentony
Council Members:	Pat Augustine, Paul Scarlett, Ed Goldman, Fran Puskas, Gene Kray, and Jeff Deem
Attendance:	16 (10 signed in)

Introduction:

Ms. Nolan welcomed those in attendance and introduced the purpose and structure of the SBRM Amendment public hearing. Mr. Pentony provided a short presentation on the purpose of the hearing, a summary of the SBRM Amendment and the Councils' preferred alternatives, and a review of the process to comment on the draft amendment. Mr. Pentony announced that written comments would be accepted through December 29, 2006, via mail, fax, or email.

After a short question-and-answer period to clarify several specific points about the amendment, four members of the public provided comments on the draft amendment. The following represents a summary of the testimony of each commenter and is not intended to be a complete transcript.

Comments:

1. Shaun Gehan, Fisheries Survival Fund: Speaking on behalf of the Fisheries Survival Fund, Mr. Gehan reiterated many of the comments made at the first hearing. In particular, Mr. Gehan identified the following issues:

   - The draft SBRM Amendment does a good job of addressing the issue of accuracy that was identified by the Court as an area of concern.
   - Overall, the importance filters are a good thing. In particular, they help focus limited resources where they would be the most meaningful.
   - Some concern that the plan far exceeds the National guidance for bycatch monitoring, which suggests achieving a CV of 20-30 percent across fisheries, not at the species-by-species level as the SBRM Amendment proposes.
   - Concerned over the potential for litigation if the amendment creates high expectations which are then not met. In order to remedy this, Mr. Gehan suggested expanding the importance filters and focusing them to further refine the resulting observer coverage levels.

- Concerned that the document does not go far enough in *requiring* an observer program; the Court said this was not optional. At a minimum, the document should stipulate that the use of observers is mandatory.

2. Greg DiDomenico, Garden State Seafood Association: Mr. DiDomenico expressed mixed emotions regarding this type of action, but stressed he hopes NMFS can get good information on bycatch occurring in the fisheries. He expressed concern that if the Agency cannot meet the requirements for fisheries observer coverage, then the amendment could serve as a tool for litigation. His primary concerns are that, if litigation occurs, either a fishery would be shut down due to incomplete observer coverage or the industry would be forced to pay for the observers.

3. Sima Freierman, Montauk Inlet Seafood: Ms. Freierman expressed concern that the SBRM Amendment does not address problems with the fisheries observer program, such as faulty data, anomalous tows, and putting observers on smaller vessels. She reported being particularly concerned about standardizing observer practices. Ms. Freierman would like the amendment to shift away from focusing on how the data are collected and to look at what goes on on the fishing vessels.

4. Peter Moore, American Pelagics Association: Mr. Moore indicated he would be submitting written comments, but expressed particular concern over the potential for unintended consequences of the amendment if the Agency cannot achieve the observer coverage levels stipulated in the amendment. He is concerned that fisheries may be shut down if there is insufficient funding to meet the expectations.

Conclusion:

There was some discussion among the attending Council members and staff, but no other members of the public requested to speak, and the hearing was adjourned at 8:15 p.m.

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Subject: PUBLIC COMMENT ON FEDERAL REGISTER OF 11/16/06 VOL 71 PG 66748
Date: Thu, 16 Nov 2006 07:33:23 -0800 (PST)
From: jean public <jeanpublic@yahoo.com>
To: SBRMcomment@noaa.gov, COMMENTS@WHITEHOUSE.GOV, VICEPRESIDENT@WHITEHOUSE.GOV

FED REG DOC E6 19398 ID 102006a
HEARING IN NYC - 50 CFR 648
MEETING ON DECEMBER 13 AT 7 PM

OF COURSE THERE SHOULD BE STANDARDIZED FORMS WHICH ARE USED ALL OVER THE U.S. BY THESE COUNCILS.

HOWEVER, THE FORMS USED ISNT THE ISSUE, THE LIES TOLD BY COMMERCIAL FISH PROFITEERS WHO OVERCATCH IS THE ISSUE. LAW ENFORCEMENT NEEDS TO BE STEPPED UP TO TEN PERCENT, NOT LESS THAN ONE PERCENT.

WE NEED TO JAIL THESE OVER QUOTA COMMERCIAL FISH PROFITEERS, FINE THEM WITH FINES STARTING AT ONE MILLION DOLLARS AND GOING UP AND SEIZE THEIR VESSELS.

IT IS CLEAR THERE IS FAR TOO MUCH OVERFISHING GOING ON AND SPECIES AFTER SPECIES AFTER SPECIES ARE VANISHING FROM THIS EARTH. OUR CHILDREN'S HERITAGE IS BEING LOST BY NOAA AND ITS FAILURE TO PROTECT ALL AMERICANS FROM RAPACIOUS SMALL PROFITEERING CLIQUES.

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December 22, 2006

Patricia Kurkul
Northeast Regional Administrator
National Marine Fisheries Service
One Blackburn Drive
Gloucester, MA 01930

Via email to: SBRMcomment@noaa.gov

Re: Comments of Oceana Concerning the Omnibus Standardized Bycatch Reporting Methodology Fishery Management Plan Amendment for the New England and Mid-Atlantic Regions

Dear Ms. Kurkul:

We would like to take this opportunity to comment on the development and approval of the Standardized Bycatch Reporting Methodology (SBRM). Catch data is the fundamental basis of any fishery management system. Without an adequate bycatch reporting system, the sustainable management of New England and Mid-Atlantic fisheries will be impossible. Developing a robust program to collect, analyze, and report bycatch data – that is available and useful for fisheries managers, stakeholders, and the public -- is a critical step in improving the sustainability of these fisheries and the efficacy of the many rebuilding programs that are under way in these regions.

Oceana would like to commend the staff of the Fisheries Service for their work in developing a draft SBRM document that provides meaningful guidance for the Council and the Agency. The draft SBRM makes important conclusions about the need for increased use of at-sea observers to collect information about bycatch, including the findings of the National Working Group on Bycatch. This information and analysis will undoubtedly improve the way the regions' fisheries are managed.

However, the SBRM draft is the product of a remand order, and it must satisfy the requirements of the law and of the Court's order. As it stands now, the draft document fails to meet those requirements. This SBRM amendment will be a precedent-setting management action that will influence how fisheries are monitored and managed across the country. Oceana understands that it may require additional time and effort to fully address the requirements of the Court's order and controlling statutes, but emphasizes again that the document must be legal and complete. We are happy to work with the agency as the process moves forward, but intend on using every option to ensure that this document fulfills its requirements.

In order to meet the legal requirements of the Magnuson-Stevens Act, National Environmental Policy Act ("NEPA") and the Court order, the SBRM must incorporate significant changes, including:

- **The SBRM must mandate how data is collected by mandating the level and allocation of observer coverage**
- **The SBRM must mandate how data is reported**
- **The agency must take a hard look at the environmental impacts of the SBRM in an Environmental Impact Statement ("EIS").**

Below is more detail on these required changes.

DETAILED COMMENTS

I. THE SBRM MUST MANDATE HOW DATA IS COLLECTED BY MANDATING THE LEVEL AND ALLOCATION OF OBSERVER COVERAGE

As you know, Oceana brought lawsuits against the Fisheries Service concerning both Groundfish Amendment 13 and Atlantic Sea Scallop Amendment 10, because neither amendment contained an adequate SBRM. In these cases, the Court ruled that the amendments violated the SBRM requirement of the Magnuson-Stevens Act.

Most importantly, the Court held that Amendment 13 failed to "establish" an SBRM, because, while it set forth an intention to achieve 5% observer coverage, it left the actual level of observer coverage completely in the discretion of the agency. *Oceana v. Evans,* No. 04-0811, 2005 WL 555146 at *42 (D.D.C. Mar. 9, 2005) (hereinafter "*Oceana I* "). The Court found Scallop Amendment 10 to be unlawful, because it too failed to "establish" an SBRM, instead leaving the actual allocation of observers up to the Regional Administrator. *Oceana v. Evans*, 384 F. Supp.2d 203, 232 (D.D.C. 2005) (hereinafter "*Oceana II").*

The draft SBRM appears to have exactly the same flaw as Groundfish Amendment 13 and Scallop Amendment 10; it appears to establish performance targets while leaving the actual level and allocation of observer coverage entirely up to the agency.

What is more, the SBRM draft does not establish an allocation of observer coverage and does not explain how one would be established. The analysis in the document appears to be based upon a certain level of days-at-sea, but it is not clear whether there is an automatic mechanism to update the allocation analysis every year, which would be needed as fishing effort changes as the result of changes in total allowable catch levels ("TACs") and other measures controlling fishing effort. The draft also makes clear, at p. 184, that the actual allocation of observers would be further reduced based on funding, but the SBRM neither gives a minimum number of observers nor any way to determine how observer allocation would be reduced.

The hard work of the SBRM team should not be in vain. The Council and the agency must take the final step required by the law and establish the SBRM with binding requirements for observer allocation in affected fisheries.

II. THE SBRM MUST MANDATE HOW DATA ARE REPORTED

As an omnibus amendment to individual fishery management plans, the SBRM amendment must develop a standardized bycatch reporting methodology that addresses the management and data needs of each fishery. The reporting methodology should be an integral part of each plan and effectively contribute to improving fishery management. The current document does not consider current or future management needs or discuss how the information provided by the SBRM could improve or change the management of a given fishery. The final document should include a discussion of the management scheme for each affected fishery and the possible bycatch data needs of the current and future management of these fisheries. The amendment should take affirmative steps to address these needs.

For example, the SBRM as drafted merely states that the Council can request information and it will be provided through a 'query' of the bycatch database and related analyses. This non-binding and vague promise does not establish a reporting methodology – it leaves reporting solely at the discretion of the agency. Instead, the SBRM should specify data to be collected, reporting formats, and reporting frequencies to address the needs of specific fisheries.

III. THE SBRM MUST CONSIDER BYCATCH OF SPECIES THAT ARE NOT TARGETED UNDER FISHERY MANAGEMENT PLANS

The Magnuson-Stevens Act definition of bycatch and fish encompasses a much broader range of bycatch species than the SBRM document considers in its analyses. Species that are not targeted under fisheries managed by the New England or Mid-Atlantic Councils, such as those managed by the Atlantic States Marine Fisheries Commission (i.e. striped bass, shad, etc) or the National Marine Fisheries Service directly (Highly Migratory Species), must be considered in the Standardized Bycatch Reporting Methodology. Without a method to assess and report bycatch of *all* species, the SBRM is incomplete. Additionally, the SBRM must consider the management needs of the Councils in its analysis and include a discussion of bycatch of corals and sponges as possible indicators of impacts on marine habitat, especially essential fish habitat ("EFH").

IV. THE SBRM DRAFT DOES NOT SATISFY NEPA

A. An Environmental Assessment ("EA") Is Insufficient for This Action

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 management approaches used to reach management goals. Therefore, the Omnibus SBRM amendment is a major federal action significantly affecting the quality of the human environment. Accordingly, the agency must take a hard look at the environmental impacts of the preferred alternative as well as other alternatives, in a full Environmental Impact Statement.

With a wide range of stakeholders that could be affected by the findings of this process, the agency must 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. Instead of an open public process, the agency chose to develop this document using the internal Fishery Management Action Team ("FMAT") process which removed interested parties from the development process with the exception of periodic updates to the Councils.

B. The SBRM Document Must Discuss the Purpose, Need, and Scope of the Amendment

In it current form, the SBRM document is vague and fails to clearly state the goals or issues to be addressed. The SBRM EIS must be presented in a format that is accessible to the public, affected stakeholders, and decision makers. The SBRM development process suffered because of a lack of public participation and the failure to engage the New England and Mid-Atlantic Councils apart from cursory presentations at council meetings. Putting the analysis in a more accessible format will yield a more complete and functional document.

C. The EIS Must Consider a Range of Feasible Alternatives

Instead of examining real alternatives for each decision point, the EA only presents the options of status quo, preferred alternative and impossible straw man. This is blatantly in violation of NEPA and quite similar to the EAs that were thrown out in the original EFH case. *See AOC v. Daley*, 183 F. Supp.2d 1, 19 (D.D.C. 2000) (EAs overturned where most considered only status quo and preferred alternative).

For the important choices the EIS must consider *real* alternatives. For example:

1. Performance standard

The document fails to define to which units of measurement the performance standard will be applied. For example, would the bycatch estimate that would have a 30% CV be an overall bycatch estimate for all species aggregated; an estimate for all species aggregated, but broken out by time and area; an estimate by "fishing mode;" an estimate for each individual species; or an estimates for various species groups?

For the SBRM to be effective, it needs to include a performance standard. This standard needs to be a requirement, not a target. Oceana believes that the SBRM can and should mandate compliance with relevant performance standards to ensure high quality bycatch data is used in fisheries management.

2. Reporting

The EIS should consider different reporting formats and frequencies and the option of a mandatory periodic report on bycatch in respective fisheries. The draft EA considers different frequencies of the SBRM review process, but does not discuss what should be in the report, or whether different reports should be required under the SBRM.

3. Accuracy

Precision and accuracy are equally important metrics by which the quality of data can be assessed. The treatment of accuracy in the SBRM is limited to a dismissal of current science (Babcock, et al). Although accuracy may be considerably more difficult to proactively plan for in sampling design, the EIS should consider alternative methods to retrospectively assess the accuracy of bycatch data in periodic bycatch reports.

D. The EIS Must Consider Cumulative Environmental Impacts

The EA erroneously ignores the indirect and cumulative effects of the SBRM on the environment. As a broad reaching amendment to 13 management plans, the SBRM will indirectly affect the level of fishing and the level of mortality of targeted, bycatch, and protected species in the many fisheries and will directly affect the quality of the data used to complete stock assessments and set mortality limits. Particularly salient is that the less frequent the reporting and the less precise the methodology, the greater the risk to the environment. The EIS must fully discuss these issues and the importance of a robust SBRM or risk marginalizing the document and its important work.

E. The EIS Must Address Protected Resources

Bycatch of protected species is a recently documented problem in some of the fisheries affected by this SBRM document. More attention must be given to the problem of protected resources and the chronic imprecision and inaccuracy of, e.g., sea turtle bycatch, estimates in these fisheries. Furthermore, the SBRM must address how data will be collected on sea turtle impacts in the scallop dredge fishery, which currently has no adequate monitoring mechanism since turtle chains render it impossible for at-sea observers to monitor interactions. Additionally, the EIS must fully discuss the impacts of the SBRM on the drafting and issuance of Incidental Take Statements and Biological Opinions for these fisheries.

F. The EIS Must Address Importance Filters

The various alternatives for filters must be laid out in an EIS that explains the implications of the filters and proposes levels at which the filters could be set. *See section VI below for additional information.*

V. Peer Review

The Omnibus SBRM Amendment is a significant action that will affect a wide range of fisheries. The National Marine Fisheries Service should ensure that the document receives a full external peer review by a body such as the Center for Independent Experts (CIE). Although the SBRM received a short review by a limited number of members of the joint Council Scientific and Statistical Committee, the review was limited to very technical issues, and was done while the SBRM was still very incomplete. Experts from the CIE should be given the opportunity to comment on the technical issues but also issues related to management and the integration of the SBRM into stock assessments.

VI. IMPORTANCE FILTER

A. Development of Filters

The preferred alternative would reduce the initial observer allocation by means of applying a series of "importance filters" to remove fishery mode/species combinations from the list of observer needs based on different criteria including the current database of fishery mode/species interactions. This approach is fundamentally flawed because it uses the scant observer data from past years as the foundation for the calculation of interaction percentages. Instead, the SBRM should mandate a baseline level of observer coverage and use the information from this coverage as the foundation for the future application of statistical filters.

Oceana also has serious concerns about the development and use of filters 3 and 4. These filters create a loophole through which the agency can support any level of observer coverage by manipulating the threshold values for these filters. If the SBRM does not specify the thresholds, the public has no way of knowing how useful the SBRM will be. Because the threshold values will constitute a significant part of the SBRM if the importance filter is adopted, the amendment must go out for further public comment on specific alternatives for the threshold values, including a proposed preferred alternative.

The draft document states that: "The third-level filter would eliminate species when the discards of that species in a mode are less than a certain minimum percentage of the total discards for that mode." Thus, the filter can be used to mask the real effects of a bycatch problem. For example, an unselective gear that catches a high volume of fish, like trawl gear, might catch a significant percentage of a particular species, but the percentage of that species in the total catch of the gear might not be high. Thus the third-level filter might fail to properly address bycatch of species like cod or haddock in gear like herring trawls.

Oceana recommends that filter 3 be removed from the SBRM and that the options for the percentage level for filter 4 be developed through an EIS.

B. Protected Species

Oceana agrees that applying the first level 'graying out' filter is appropriate for those species which are geographically limited or physically unable to be taken with a given fishery mode but recommends that criteria or discussion be provided for all combinations removed through 'graying out'. This importance filter, however, is inappropriate for removing any fishery mode/protected species combination. Interactions with protected species are rarer than interactions with fish species. Interaction combinations should not be excluded based on frequency of the interactions until a robust observer program is in place which indicates that an interaction is unlikely.

VII. COMMENTS ON DRAFT REPORT OF BYCATCH

Throughout the SBRM development process, FMAT members assured those involved at Committee and Council discussions that data would be available from the SBRM which would provide estimates of bycatch broken down by ***time, area, gear, and species/stock***.

Instead of real examples of the usable data that the SBRM could produce, the Council and the public were provided with disappointing reproductions of past uses of bycatch data in fisheries management.

The New England Council is moving forward with a new management action to meet the mortality and rebuilding goals of the Multispecies Fishery. The Council should require that the following information should be included in any report from a 'query':

Estimates of overall bycatch and bycatch mortality by species/stock within a fishery and/or fishery mode or gear sector in a particular area (e.g. Bycatch of George's Bank Cod in the small vessel gillnet fishery)

Without evidence of the capability to assess bycatch in this kind of detail, the Council should require the FMAT to resume development of the document until such time as this level of detail is available.

CONCLUSION

Oceana appreciates the work that has gone into the development of the SBRM document and its analyses. The work will advance the management of the region's fisheries and will bring the region closer to real fisheries accountability. Oceana is concerned that the process has gone most of the way toward completing its obligations but fails to take the final step to finish the job. We hope that the issues raised above can be amended before the SBRM is approved and implemented.

Thank you for your consideration.

Sincerely,

Michael F. Hirshfield, Ph.D.
Senior Vice President and Chief Scientist

cc: Members
New England Fishery Management Council

Paul J. Howard
Executive Director
New England Fishery Management Council

William Hogarth
Assistant Administrator
National Marine Fisheries Service

Patricia A. Kurkul
Regional Administrator
National Marine Fisheries Service

Gene Martin
Regional Counsel
National Marine Fisheries Service

Subject: Comments on Section 7.2.1.3.2. Alternative 1.2 - Implement Electronic Monitoring
Date: Wed, 27 Dec 2006 08:02:29 -0900
From: Mark K. Buckley <mkbuckley@alaska.com>
To: SBRMcomment@noaa.gov

My comments are related to the concluding paragraph of the above-referenced section of the SBRM:

> "Comparatively, the costs associated with the electronic monitoring alternative appear much greater than the status quo alternative that is proposed as the preferred alternative at this time. Future consideration of electronic monitoring programs would need to weigh the benefits of such a program against the substantial costs to both the fishing industry and the Federal government, although as technologies improve, costs may decrease."

The facts in support of this statement are found in the previous paragraphs of that section. They reflect the cost structure associated with one contractor, who has has thus far been involved with the vast majority of video monitoring deployments in the commercial fisheries of North America. This contractor provides excellent service, and my comments are in no way meant to disparage the quality or thoroughness of its products. Nonetheless the contractor enjoys a virtual monopoly in the video monitoring field on this continent. This market dominance and scarcity of competition, I believe, have led to higher prices for video monitoring services.

A case in point is a video monitoring RFP issued in 2006 by the Alaska Fisheries Science Center. In this example there was a competitive field, with my Alaska-based company bidding against the market leader. My company's bid was $101,000 and the market leader's bid was $151,000.

This 33% cost difference, I believe, was due to my company's lower overhead and its local-hire business model. I am confident that if there were more competition to provide electronic observer services in places such as the New England Region, the prices would come down considerably.

Mark Buckley
Kodiak, Alaska

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December 29, 2006

Patricia A. Kurkul
Regional Administrator
Northeast Regional Office
National Marine Fisheries Service
One Blackburn Drive
Gloucester, Massachusetts 01930-2298

Re: Comments on Draft SBRM Amendment

Dear Ms. Kurkul:

On behalf of the Natural Resources Defense Council (NRDC), I submit the following comments regarding the National Marine Fisheries Service (NMFS)' Northeast Region Standardized Bycatch Reporting Methodology, an Omnibus Amendment to the Fishery Management Plans of the Mid-Atlantic and New England Regional Fishery Management Councils ("Draft Bycatch Amendment" or "Draft Amendment").

NRDC's primary concern with the Draft Bycatch Amendment -- and it is a fundamental one -- is that the Draft Amendment fails to incorporate the necessary requirements relating to *how* the bycatch data is collected. Section 303 of the Magnuson-Stevens Act requires that each Fishery Management Plan ("FMP") and FMP amendment (hereinafter collectively "FMP") "shall … establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery …." *See* 16 U.S.C. § 1853(a)(11). It seems self-evident that, to "establish" such a standardized bycatch reporting methodology ("SBRM"), a FMP must "establish" both the manner in which the bycatch data is collected, *e.g.*, whether by observers and if so the nature of the observer coverage, as well as "establish" how this data is then processed so as to provide an adequate basis for management decisions. Adequate data collection is obviously a necessary predicate to adequate analysis.

In three different decisions, one in 2001 and two in 2005, the federal district court for the District of Columbia recognized that the requirement to establish a SBRM includes a requirement to establish the bycatch data collection system itself. *See Oceana v. Evans,* No. 04-0811, 2005 WL 555146 (D.D.C. Mar. 9, 2005) (hereinafter "*Oceana I")*; *Oceana v. Evans*, 384 F. Supp. 2d 203 (D.D.C. 2005); *CLF v. Evans*, 209 F. Supp. 2d 1 (D.D.C. 2001). The federal court specifically concluded that a SBRM that only indicates an "intent" to implement, rather than a mandate to implement, an adequate observer program fails to satisfy Section 303. *See, e.g. Oceana I,* 2005 WL at *34.

The Draft Bycatch Amendment does not satisfy the requirements of Section 303. In the portions of the Draft Amendment addressing data-gathering, NMFS simply states that its "preferred" approach is to continue to utilize the "status quo" data sources, most significantly the at-sea observer program. *The Draft Amendment is fatally flawed because it does not propose to set any requirements relating to these data gathering programs, or to otherwise "establish" them.* Most critically, the Draft Amendment does not set any requirements for level or allocation of observer coverage, or, for that matter, for any observers at all. The Amendment does propose the use of a 30% "Coefficient of Variation" ("C.V.") "standard" applied to "all applicable fishing modes for each species group." As an initial matter, we note that, because of the relatively general level at which NMFS proposes to apply the 30% C.V. "standard," it may not provide adequate precision. More significantly, like the 5% observer coverage level at issue in *Oceana I*, the 30% C.V. "standard" appears to still be simply a target, not a requirement. While such a performance measure may well provide an enhanced understanding of the precision of various bycatch estimates, as well as facilitate the most cost-effective use of observers, the 30% C.V. performance target proposal still falls short of what the law requires. As was already determined by the district court in *Oceana I:* it "merely suggests a hoped-for result, as opposed to 'establish[ing]' a particular standardized methodology, [and thus] does not measure up to the statute's requirements." *See id.*

In its comments dated December 22, 2006, Oceana addressed a number of other concerns with the Draft Amendment. NRDC shares these concerns and adopts Oceana's comments herein in their entirety. We want to draw the agency's attention in particular to the following concerns:

- The Draft Bycatch Amendment proposes the use of "importance filters" for the purpose of reducing observer coverage to only what it considers to be significant fishery mode/species interactions. As set out in the Draft Amendment, however, the "importance filters" threaten to ensnare the agency in a self-perpetuating data-poor bycatch reporting methodology and to mask the shortcomings of this methodology from the public. First, it is critical – given that up-to-date data of adequate specificity, *i.e.*, to the time/area/species/fishing mode level, is frequently lacking – that NMFS explain the limits of the existing data for each specific gear/species combination proposed to be "filtered out." Second, NMFS must identify, and allow the public to comment on, the "specific minimum percentage" thresholds that it intends to apply in the case of importance filters 3 and 4.

- The Draft Bycatch Amendment needs significantly more detail concerning how the bycatch information needs of each specific FMP will be addressed on an ongoing basis. For example, it is not at all clear that the proposed bycatch reporting methodology will be able to generate analyses, reports, and other forms of information that adequately address specific bycatch problems in specific fisheries, i.e., provide adequate information to make a management response possible. It is also important that managers be able to propose changes in the SBRM and supplemental monitoring in order to focus on a particular bycatch problem and enable development of a management response.

- For reasons set forth by Oceana, the Draft Bycatch Amendment requires an EIS. In this regard, we want to note that the Draft Amendment is, as NMFS almost certainly recognizes, a very important regulatory proposal. It addresses a significant fisheries management problem and proposes to do so by amending thirteen different FMPs, which cover dozens of managed stocks and affect a much larger number of marine species. The Draft Amendment is also of course a response to a judicial remand in two separate federal court actions.

In closing, NRDC does recognize that the Draft Bycatch Amendment is the product of considerable work and represents a step forward in certain respects, such as by recognizing the importance of observers and the need to increase observer coverage. However, as already noted, the Draft Amendment still falls substantially short of what the statute requires. We strongly urge NMFS to address the concerns we have highlighted above, as well as those identified by Oceana. Thank you for consideration of our comments.

Respectfully yours,

Brad Sewell
Senior Attorney
Natural Resources Defense Council

KELLEY DRYE
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December 29, 2006

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VIA ELECTRONIC MAIL

Ms. Patricia A. Kurkul
Regional Administrator
National Marine Fisheries Service
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RE: FISHERIES SURVIVAL FUND COMMENTS ON SBRM AMENDMENT

Dear Ms. Kurkul:

We represent the Fisheries Survival Fund, an association whose participants include the bulk of the Atlantic scallop full-time limited access permit holders. We submit this letter on behalf of the FSF, as well as North Carolina Fisheries Association, the Garden State Seafood Association, Montauk Inlet Seafood, Inc., the American Pelagic Association, and Associated Fisheries of Maine, and we expect other groups may associate themselves with these comments. Collectively, these organizations represent thousands, of participants in nearly every, if not every, fishery managed by the New England and Mid-Atlantic Fishery Management Councils. We appreciate this opportunity to provide comments, including technical comments prepared by a respected fisheries scientist, Mr. Paul Starr, who has years of experience in designing and implementing bycatch estimation programs,[1] on the proposed omnibus Standardized Bycatch Reporting Methodology ("SBRM") Amendment, under consideration by both these councils.

INTRODUCTION

Development of an omnibus SBRM amendment represents an ambitious project, albeit one that has not garnered attention and scrutiny commensurate with its significance. The Public Hearing Document is technical, but if it is implemented in the preferred form, it will have major practical ramifications for New England and Mid-Atlantic fisheries. It appears, moreover, that neither the fishing communities nor the New England and Mid-Atlantic Fishery Management Council members yet understand these ramifications. In contrast, and judging by the attendance at the two public hearings on the SBRM Amendment, environmental organizations, including those whose lawsuits in the groundfish and scallop cases resulted in the court decisions to which the SBRM Amendment responds, are paying close attention to this process. If the past is prologue, these groups will not hesitate either to renew such challenges if they perceive any weakness in the amendment or bring suit to enforce any mandate seen as resulting from the action the Councils take on this amendment.

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1 These comments are included, along with Mr. Starr's *curriculum vitae*, as Attachments 1 and 2 to this letter.

Indeed, whatever standardized bycatch reporting methodology the Councils decide to implement, they should recognize that they are creating standards for a program that might be able to be enforced in court. In discussing a case involving invalidation of the Pacific Groundfish FMP for lacking an adequate SBRM, the federal court that invalidated the Scallop Amendment 10 SBRM, explained:

> The failing in PMCC was that NMFS had determined that a live observer program was necessary for accurate reporting, but it had nonetheless neglected to establish any type of observer program.

Oceana v. Evans, 384 F. Supp. 2d 203, 234 n.38 (D.D.C. 2005) ("*Oceana II*"), *citing Pacific Marine Conservation Council, Inc. v. Evans*, 200 F. Supp. 2d 1194, 1200 (N.D. Cal 2002).

In summary, the SBRM Amendment is currently not on a feasible or productive track. While considerable rigorous work has gone into this draft omnibus amendment, it does not strike an adequate balance between specificity and generality. It is overly specific when it stratifies the bycatch reporting regime into tens of hundreds of strata and then prescribes a uniform coefficient of variation ("CV") for each. Such fine gradations of the units of analysis are not necessary to meet the requirements for an SBRM requested by the court in the scallop and groundfish cases. (The undersigned participated on the government's side in the challenges to the SBRM in these cases and have a detailed understanding of these decisions.) Even more fundamentally, as explained herein, such an approach is not consistent with nationwide NMFS technical guidance.

Such a uniform CV approach across these many strata is likewise too general. Bycatch reporting objectives will and should vary with the particular management needs and problems specific to each fishery. NMFS explained in its nationwide technical guidance for establishing such monitoring systems that, "The development of a sampling strategy for the estimation of bycatch based on an at-sea observer program entails first clearly defining the objectives of the sampling program and selecting a sampling strategy designed to meet these objectives. . . . An explicit statement of the objectives is a critical step in devising effective sampling procedures."[2]

In contrast to this considered nationwide guidance, the omnibus amendment puts the metaphorical cart before the horse (as the court found in the prior cases) by establishing blanket standards of precision across a myriad of fisheries "modes" sub-divided by bycatch species, rather than considering the needs and requirements of individual fisheries. In this regard, the amendment appears to share the failures that the court found to exist in the scallop and groundfish amendments.

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2 National Marine Fisheries Service, *Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs*, NOAA Technical Memorandum NMFS-S/SPO-66, at 48 (Oct. 2004) (hereafter "*Evaluating Bycatch*"); *see also* Comments of Mr. Paul Starr, at 1-2 (attached) ("Starr Comments").

This omnibus amendment would be more constructive if it provided the Councils and NMFS with a process and some ground rules they could employ to develop and implement fisheries-specific monitoring systems in plan-specific contexts. Such an approach could provide information that is actually useful to management. The amendment could also establish general rules for NMFS to use in administering observer programs. As we explain, we would expect, and the omnibus amendment could prescribe, that observer programs represent a core component of fishery-specific programs.

Finally, and perhaps equally importantly, such an approach could take into account available resources. As explained above, the Public Hearing Draft would prescribe that managers seek to achieve a 30% CV for tens of hundreds of different strata. While it is not clear whether the Public Hearing Document plans to treat this 30% CV goal as mandatory for each stratum, it is quite possible (and perhaps even likely) that a court would find this requirement to be enforceable, particularly if attainment of 30% CV represents the centerpiece requirement of the amendment. As the Councils can well understand, the resources do not and will not exist to achieve such a mammoth undertaking. However, failure to achieve these CVs could result in chronic and disabling litigation, each time a target CV is not met.

Fortunately, it is not necessary to begin the process from square one. With the adjustments suggested herein, which are based on the *Evaluating Bycatch* report, applicable law, consultation with experts in sampling design, and the decisions in the groundfish and scallop cases, the Omnibus SBRM Amendment can fully meet legal requirements and assist the Councils in their statutory responsibilities to evaluate and minimize bycatch. The following proposal provides a more practical – and practicable – way forward to create a workable program that not only actually <u>can</u> be implemented, but is also more consistent with legal requirements and the Councils' management needs. After setting forth our proposal, we will conclude by discussing the general legal framework applicable to this action and the specific issues raised in the SBRM Public Hearing Document.

RECOMMENDED DIRECTION FOR THE SBRM AMENDMENT

The key task identified by NMFS in its *Evaluating Bycatch* report is to define the objectives of any SBRM program. (Typically, an SBRM program would not be designed for an entire NMFS Region's worth of fisheries at once, but the principle remains the same.) As we explain below, the draft Public Hearing Document has not been able to define the objectives for the SBRM program, either as a whole or for each specific fishery. It is simply not sufficient to prescribe a blanket CV requirement and term this an objective.

Properly conceived bycatch and reporting methodology objectives will vary by fishery, depending on such factors as whether protected species issues are involved, the gear types employed, and the baseline amount of information on the types and amount of bycatch. As noted in *Evaluating Bycatch*, different fisheries have differing needs in terms of sampling design and other elements of an SBRM. The report explains:

> [A]n at-sea observer program designed with the objective of estimating fishery discards may be quite different from one designed to assess incidental takes of protected species, particularly if the latter represents rare events. When there are multiple objectives for an observer program, the program design often will need to address competing objectives and the optimal design cannot be determined unless weights have been assigned to the various objectives. Basically, when there are multiple objectives, it becomes much more difficult to clearly define the objective (including the weights to be used), to identify the appropriate sample design, and to identify the desired level of precision for each estimate.

Evaluating Bycatch, at 48-49; *see also* Starr Comments, at 1 ("There is no substitute for dealing with each fishery unit (or grouping) individually and tailoring the monitoring to fit the situation.").

Accordingly, the omnibus should instead focus on the development of a broad program – and methodology for developing fishery specific bycatch reporting regimes – with the details left to development in the context of individual fishery management plans. Such an approach represents a constructive enterprise. There is a value in and of itself for the Northeast Region to have a consistent set of standards for developing fishery-specific bycatch reporting programs.

Furthermore, the applicable case law does not require NMFS to develop fishery-specific programs to have a legally adequate and useful omnibus amendment. *Oceana II* explained that:

> A methodology need not necessarily be detailed, but it must at the very least provide decision makers and the public with a program of what actually will be *done* to improve bycatch reporting, and why these measures will be sufficient based on the best available science.

384 F. Supp. 2d at 234. Realistically, given the nature of this omnibus amendment process, the elements of this amendment must be somewhat general.

Whether general or specific, the key element for an appropriate SBRM is that it sets requirements for NMFS to follow in deploying observer coverage and undertaking other fishery monitoring programs. *Oceana II* explained:

> The Court concluded that the Secretary's mere "intention" to maintain a five-percent observer coverage level, while delegating the actual level of observer coverage and methodology to the Regional Administrator, did not constitute establishment of a "bycatch reporting methodology."

Oceana II, 384 F. Supp. 2d at 232 (*citing Oceana I*, 2005 U.S. Dist. Lexis 3959, 2005 WL 555416, at *40). Our proposal's strength is that it would allow the <u>Councils</u> to develop these requirements, based on the recommendations of those with fishery-specific expertise.

Accordingly, this SBRM omnibus amendment would meet all legal requirements so long as it: (1) establishes a process and broad programmatic outline that will guide the development of FMP-specific programs; and (2) directs the agency to focus resources according to certain criteria based on urgency for coverage determined from an examination of existing bycatch information, including reliable anecdotal information.

Regarding process, the omnibus amendment should authorize the Councils to develop and implement more detailed methodologies, specific to each fishery, through framework adjustments, regulatory amendments, or full plan amendments, as they see fit. To allow for initiation of such a subsequent FMP-specific process, the omnibus amendment should amend each fishery management plan to allow for the adoption of a bycatch estimation program by abbreviated rulemaking processes, such as through a framework action.[3] Individual plan development teams, perhaps supplemented by working groups (as explained by Mr. Starr at page 3), would have the specific knowledge of the fishery in question to develop practical and practicable approaches. Moreover, the process should allow managers to adjust these fishery specific requirements, perhaps through annual or biannual specification setting processes, as conservation and management requirements for the fishery change over time. This approach would allow each Council to tailor bycatch monitoring and reporting to the specific needs of each fishery as they evolve.

Regarding more substantive requirements, the amendment will most likely have to mandate a live observer program in each fishery, in conjunction with other data collection systems. *Evaluating Bycatch* and other studies have found observers to be important to achieve precise and accurate estimates. Courts have also recognized the importance of live observers.[4]

Additional substantive requirements can be more general in nature. To that end, we would suggest that the SBRM:

- Mandate that each fishery management plan establish observer coverage levels in that fishery based on considerations specific to that fishery. Such levels can be particular to an individual species or a species grouping, as well as to each specific gear type, and can be changed through framework adjustment or specification

[3] As an omnibus amendment, the SBRM Amendment can provide overarching analyses that can be incorporated into streamlined rulemaking documents under each FMP. This is perfectly consistent with legal requirements under the National Environmental Policy Act.

[4] *See, e.g., Oceana II*, 384 F. Supp. 2d at 233-34 ("'Because the observer program is optional under Amendment 13, NMFS in theory could decide not to implement an observer program for the ground fishery, and nothing in Amendment 13 would prohibit the agency from making that decision.'") (quoting *Pac. Marine Conservation Council, Inc. v. Evans*, 200 F. Supp. 2d 1194, 1200 (N.D. Cal. 2002)).

setting processes, as conservation and management needs changes in the fishery and across fisheries[5];

- Provide that each FMP should establish a set of diagnostics, perhaps using a target CV or CVs for each fishery or fishery mode, to gauge whether the program is providing sufficiently precise information for management purposes. This is consistent with NMFS' guidance,[6] and far more realistic than attempting to achieve such a level for several hundred fishery modes sub-divided by bycatch species;

- Create a general set of priorities for deployment of limited observer resources that is non-discretionary for NMFS. For example, that resources be dedicated first to fisheries or sectors within a fishery that have taken protected species or that have material bycatches of overfished species;

- Mandate that sampling designs developed for each fishery minimize bias (thus promoting accuracy in assessments) to the greatest extent practicable;

- Authorize and encourage cooperative research to undertake such activities as, for example, development of gear that minimizes bycatch, identification of times/areas/gear with unusually high or levels of bycatch, testing of sampling designs, and getting basic information for fisheries for which the extent of bycatch information is not well understood. *See Evaluating Bycatch*, at 35 (also suggesting cooperative research projects focus on discard mortality and identifying means of minimizing the so-called "observer effect");

- Explain, expand upon, and authorize the use of "importance filters" by Councils as they develop fishery-specific observer plans, in order to insure that resources are focused on the highest priority areas.

These suggestions are not exclusive, but provide some flavor of the type of guidance the Omnibus SBRM Amendment should provide, and most of these elements are already contained in the document. A combination of mandatory elements, such as the observer program, priorities, and general guidance will together provide the necessary structure and guidance for the operation of fishery-specific monitoring programs that do not leave all the discretion with NMFS. As explained above, this is a key element of the court decision in the groundfish and scallop cases. *See Oceana II,* 384 F. Supp. 2d at 234 n.41 ("[T]he Court is not suggesting that the FMP should mandate the precise areas where observers must be concentrated for years to come; it only requires that the FMP establish some method for determining observer concentration instead of leaving all decisions to the Regional Administrator's discretion.").

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5 In developing these fishery-specific programs, existing observer commitments (such as for higher levels of coverage in the Atlantic sea scallop area access and groundfish "B" day programs) will need to be considered as well.

6 *See Evaluating Bycatch*, at 57-58.

As noted, our proposal does not represent a major change from the direction that the current SBRM Amendment has taken. The Public Hearing Document contains many useful elements, such as its discussion of the various reporting methodologies, tools (such as logbooks, VMS, electronic monitoring systems, etc.). However, in its ambition, it far exceeds both legal requirements and what is feasible given current constraints, not to mention the national guidance from NMFS. As such, there is a very real danger that, if passed essentially as is, it could be found by courts to set a new standard that is neither feasible nor necessary.[7]

GENERAL LEGAL ISSUES

Before turning to the specifics of the Public Hearing Document, there are general legal issues to consider. The Executive Summary of the Public Hearing Document explains:

> Generally, an SBRM can be viewed as the combination of sampling design, data collection procedures, and analyses used to estimate bycatch in multiple fisheries. The SBRM provides a structured approach for evaluating the effectiveness of the allocation of fisheries observer effort across multiple fisheries to monitor a large number of species. Several specific analyses are conducted to calculate a measure of the variance associated with the data that have been collected by fisheries observers and to determine the most appropriate fisheries observer coverage levels and the optimal allocation of observer effort across the fisheries in order to minimize the variance to the degree practicable. Given the target level of data precision desired by fisheries scientists and managers, fisheries observer coverage levels can be calculated that would be expected to provide data of the desired precision [and accuracy].

Public Hearing Document, at iv.

The appropriate levels of precision and accuracy to be achieved from the SBRM contain a policy component under the Magnuson-Stevens Fishery Conservation and Management Act. The Public Hearing Document explains that the Magnuson-Stevens Act "addresses both the requirement to establish an SBRM for each FMP and the requirement to include conservation measures to minimize bycatch and bycatch mortality to the extent practicable . . . ." Public Hearing Document, at 6 (citing 16 U.S.C. § 1853(a)(11) (requiring these bycatch related measures in each FMP)). Notably, the Public Hearing Document proceeds to explain that it will deal with only the former element, and not address bycatch reduction as a conservation matter. *Id.* However, it does note that the goal is "to minimize the variance to the extent practicable." *Id.* at iv.

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7 Parenthetically, the supervening changes in the Magnuson-Stevens Act, signed into law on December 27, 2006, and their applicability to amendments such as this now under consideration, mean that a slightly new course can be charted without any delay beyond that which will necessarily occur as guidance is developed and the SBRM Amendment reviewed for consistency with the newly-amended law.

Accordingly, the Magnuson-Stevens Act's practicability standard applies to this exercise. In this instance, practicability entails two considerations: (1) the monitoring standards/observer requirements should not unduly burden the public fisc or bankrupt the fishing industry to implement; and (2) there needs to be a discussion of the benefits and costs of various levels of precision and accuracy, not just a purely scientific conclusion that a certain level is required. The court in the *Oceana* cases essentially made this point, and we are litigating it in another context.

A corollary to the first point, also, is that the SBRM should not be established as a set of aspirational goals that are not expected to be attained on a regular basis, given the expected resource constraints from a budgetary and observer manpower perspective. If the system is either aspirational, or so ambitious that it can only be expected to be aspirational, it will just become fodder for litigation from year to year when the standards are not met, with the threat of a court injunction on the fishery as a remedy for non-compliance.

As to the point regarding practicability, it must be noted that the requirement to establish an SBRM is an adjunct to the duty of the Council to minimize bycatch more generally. Indeed, the SBRM must be designed "to assess the amount and type of bycatch occurring in the fishery," and that bycatch must then be minimized to the extent practicable. 16 U.S.C. § 1853(11). In instances where a particular bycatch species is rarely encountered, and thus has been minimized, it is fully consonant with the legal requirement not to expend significant scarce resources in an attempt to develop extremely precise estimates. That is the essence of the practicability limitation, which applies with as much force to the SBRM as to the bycatch minimization objective itself.

In this regard, the FSF applauds the decision to include "importance filters" as a means of insuring that limited resources are directed to where they will be most effective. The Public Hearing Document, *see e.g.*, *id.* at 167-71, does an admirable job of providing a reasoned explanation and justification for their use, and does so in legally relevant terms. For instance, it notes that achieving the essentially arbitrary target level of precision for estimates of red crab bycatch would cost more than three times the value of the entire red crab fishery. *Id.* at 170. Employment of these filters as a means of identifying the truly important bycatch species and fishing modes in which to focus limited observer resources represents a reasoned, practicable policy judgment that meets the requirements of the law.

Finally, it is worth noting that the SBRM well addresses one of the key issues in the court decisions in the Amendments 10 and 13 cases, specifically, the issue of accuracy. The failure in those amendments to address the findings in the Babcock, *et al.*, study with respect to levels of observer coverage necessary to achieve precise and accurate estimates was one of the key omissions identified by the court. This shortcoming, however, has been rectified with the Rago, *et al.*, study referenced in, and included with the amendment.

ELEMENTS OF SBRM AMENDMENT

Turning to the elements of the Public Hearing Document, it prescribes four choice points for the councils: (1) bycatch reporting and monitoring mechanisms; (2) analytical techniques and allocation of observers; (3) SBRM standard; and (4) SBRM review process. This memorandum will set forth the Councils' preferred alternative and some initial thoughts below.

The problem, however, is that the uncertainties of agency budgets and observer availability make it very difficult for NMFS to ensure implementation of a mandatory, highly ambitious level of observer coverage. Perhaps the most fundamental flaw in the Public Hearing Document is that it provides for an incredibly, in fact unduly, ambitious set of standards for observed trips, without any discussion or understanding of whether and how that level of observer coverage can be provided or paid for, or whether the agency can even make use of all the data it would collect under such a program (which has been a problem even in very targeted observer programs). *See* Starr Comments, at 2.

Oceana II makes clear that an SBRM standard may not be based, or back-calculated from, how much observer coverage can be funded. "While the logistics of paying for observers is a fair consideration in establishing a particular bycatch reporting methodology," the agency cannot put "the cart before the horse, predicting sampling frequency, observer distribution, and precision rates based on potentially available funding rather than establishing a methodology." *Oceana II*, 384 F. Supp.2d at 236.

Monitoring Mechanisms: Regarding element one, monitoring mechanisms: The Public Hearing Document essentially contains two options. The first involves using the sources of information that are currently available: fishery independent surveys, fishing vessel trip reports, dealer purchase reports, at-sea observers, commercial port sampling, recreational fishery sampling (MRFSS), and industry-based surveys. The document then addresses the strengths and limitations of each source of data from the perspective of identifying bycatch:

> Observer-gathered discard information is generally considered the most accurate and objective in recording bycatch and discard information. Observer programs often collect detailed biological information on both catch and discards for all aspects of commercial catch . . . .
>
> Observer data are preferred over other data sources including FVTR data for a few reasons. Unlike fishermen, who may be performing or managing many fishing related tasks at once . . . observers are focused solely on data collection while deployed at sea. . . .
>
> [However,] [m]anaging an observer program requires dealing with numerous practical and fiscal constraints. Observers must be carefully trained, work under sometimes hazardous conditions, and deal with a variety of circumstances that can arise while at sea on a fishing vessel. Logistical issues, such as having an adequate number of observers available to cover a wide geographic area,

> numerous ports, and a variety of fisheries; and getting the observers aboard vessels within relatively short windows of time before they intend to sail further add to the complexity and costs of observer programs.

Public Hearing Document, at 89. The document identifies only video sampling as an alternative to the current array of monitoring options, and explains that video does not currently provide the same types of detail as on-board observers. *Id.* at 98-101. The document correctly recognizes the analytical difficulties involved in transitioning to video monitoring and thus sensibly defers use of these systems, pending further development. *Id.* at 113.

Of course, this is not the end of the story. If the status quo is chosen, NMFS needs, as a practical matter, to get to an affordable and effective observer system, with a stable workforce and budgets. This is lacking right now for most Northeast Region fishing fleets.

Analytical Techniques and Allocation of Observers: In general, we support the preferred alternative, which would apply an "importance filter" to "aid in establishing target observer sea day allocations." *Id.* at 117. Recommended by the Scientific and Statistical Committee, the importance filter "is specifically designed to 'weed out' particular combinations of fishing gear and bycatch species where the infrequency and variable amounts of discards would result in very high observer sea day coverage levels, in spite of the fact that the actual magnitude and frequency of discards is very low and likely of no consequence to the discarded species." *Id.* "The importance filter focuses on the encounter rate (the proportion of trips in which the species was encountered and discarded), the relative proportion of discards of that particular species when compared to the discards of other species within the fishing mode, the magnitude of the observed discards, and the proportion of the discards of the species within the fishing mode to the total landings of the species among all fisheries." *Id.*

The importance filtering mechanisms need to be clarified and perhaps expanded to ensure that they have sufficiently identified the criteria to be used as filters. For instance, while an importance filter includes an encounter rate component, the Amendment should state that observer sea days can be reduced when gear improvements have reduced, if not eliminated, the potential for bycatch, viz. turtle chains ought to preclude intensive scallop fishery turtle monitoring. The Councils should also consider a filter for any mode of fishing whose overall contribution to total landings falls below some threshold or is so rarely used that it can be assumed that the contribution to total discards are likely *de minimus*. This would help to reduce the administrative complexity of the plan, as well as to preserve limited observer assets for areas of real concern.

SBRM Standard: The question presented in the Public Hearing Document is whether the SBRM Amendment would "specify a target CV as a performance measure or standard against which to judge the adequacy of the bycatch monitoring program described in the amendment." *Id.* at 121. The options are the *ad hoc* approach that exists now, or application of a uniform 30% CV, subject to importance filtering. As explained above, we submit these decisions should be made in a more structured way than they currently are, but in FMP-specific contexts.

The Public Hearing Document explains that the preferred alternative (uniform 30% CV) would comprise the following:

> In addition to a set of bycatch reporting and monitoring mechanisms used to collect information on discards in a fishery, and a set of analytical techniques and procedures used to estimate discards, allocate at-sea fishery observer effort, and perform stock assessments, the preferred alternative would also establish a performance measure to ensure that the bycatch-related data collected under the SBRM and utilized in stock assessments and management is adequate for those tasks. In order to ensure that the SBRM is performing to the expected level, this preferred alternative would establish a process to periodically review the adequacy of the SBRM, with consideration of how and when changes to the SBRM should be made.

Id. at 121.

We submit that it will be important for the Amendment to establish some standards, to ensure fidelity to the *Oceana* decisions, but that: (1) there will need to be some flexibility in these standards; and (2) the Amendment should not be light years more ambitious than NMFS guidance in seeking to apply these standards. Our recommendations that seek to address these concerns are set forth above.

In terms of flexibility, such performance measures should represent diagnostic tools, and must not be read or be able to be characterized as immutable standards, such that failure to achieve them in any given year becomes an event for litigation. In this regard, as discussed below in regards to the second point, the ambitions of the SBRM as proposed in the Public Hearing Document may far exceed the ability of the agency to meet on a sustained basis, making it very important that the Councils utilize the importance filters, make clear that the CVs are aspirational, and state that program overall is sufficient to precisely characterize and assess bycatch across fisheries (as opposed to any particular mode).

Such flexibility is consistent with the decisions in the *Oceana* cases. The primary deficiency of Amendments 10 and 13 was the Council's failure to develop an reporting methodology coupled with what the judge saw as a grant of unfettered discretion to the Regional Administrator to determine when, where, and how much observer coverage to deploy. "[A]n FMP that merely suggests a hoped-for result, as opposed to 'establishing' a particular standardized methodology, does not measure up to the statute's requirements." *Oceana v. Evans* ("*Oceana I*"), 2005 U.S. Dist. LEXIS 3959, at *136 (D.D.C., March 9, 2005) (citation omitted). "Instead of analyzing what type of program – whether a mandated level of coverage or *some other mechanism* – would succeed in producing the statistically reliable estimates of bycatch needed to better manage the fishery, the FMP essentially assigns this task to the Regional Administrator." *Oceana II*, 384 F. Supp. 2d at 233-34 (emphasis added).

In the current instance, the methodology specified more than meets, and even exceeds, the requirements laid out by the court.[8] In fact, the proposed amendment is far more comprehensive than what has been laid out in FMPs for other fisheries, such as the Pacific Groundfish and the Pacific Highly Migratory Species fisheries, the latter of which was cited by the environmental plaintiffs as a model and the former which was promulgated in response to a similarly successful SBRM challenge.

What the *Oceana* cases did not do, however, was to mandate any particular approach or set of performance requirements in order to meet the SBRM requirement. For instance, the judge explicitly noted that "*Oceana I* did *not* require that an FMP mandate a specific level of observer coverage. Rather, the Court held that an FMP may not delegate the development of a standardized bycatch reporting methodology to the Regional Administrator." *Oceana II* at 384 F. Supp. 2d at 234 n.38. The court also noted that it "is not suggesting that the FMP should mandate the precise areas where observers must be concentrated for years to come; it only requires that the FMP establish some method for determining observer concentration instead of leaving all decisions to the Regional Administrator's discretion." *Id.* n.41. What the court did require, and this amendment actually overachieves relative to NMFS's guidelines, as noted below, is that mechanisms be developed that "would succeed in producing the statistically reliable estimates of bycatch needed to better manage the fishery." *Id.* In these terms, the task is to best utilize the government's resources to gain a precise estimate of the amount and composition of bycatch in the managed fisheries rather than designing a theoretically ideal system.

Even in instances where the importance filtering still requires some coverage, there may be a need for reduced levels of coverage designed to identify whether there is any bycatch issue when the data is too sparse to determine what level of observer coverage would be needed to achieve a pre-determined level of precision/accuracy. This may also need some statistical support as a basis for application either of an importance filter or some tolerance for a reduced level of precision/accuracy. These considerations are best addressed in context, as both *Evaluating Bycatch* and Mr. Starr explain. *See Evaluating Bycatch*, at 58-59; Starr Comments, at 1-2.

What would appear to be required, however, is a mandate that the agency create an observer program to implement the SBRM. *See, e.g., Oceana II*, at 135 ("'Because the observer program is optional under Amendment 13, NMFS in theory could decide not to implement an observer program for the ground fishery, and nothing in Amendment 13 would prohibit the agency from making that decision.'") (quoting *Pac. Marine Conservation Council, Inc.*, 200 F. Supp. 2d at 1200). This is not the same as setting minimum levels of observer coverage, which,

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8 *See id.* ("A methodology need not necessarily be detailed, but it must at the very least provide decision makers and the public with a program of what actually will be *done* to improve bycatch reporting, and why these measures will be sufficient based on the best available science.") (citation omitted)).

it should be stressed, is not required under the law.[9] Rather, it is a matter of including language similar to that in Pacific Groundfish Plan: "The Regional Administrator will implement an observer program through a Council-approved Federal regulatory framework." PFMC, Pacific Coast Groundfish FMP, at 71 (Sept. 2006). Such is necessary to avoid the same deficiency the court found in the *Oceana* cases.

The second, and significant, issue is that the Public Hearing Document goes far beyond NMFS guidance by recommending to apply this level of statistical precision to fishery modes, as opposed to the fishery for a species as a whole. It would also apply such a level of precision to each bycatch species rather than to bycatch in a fishery as a whole:

> In total, the proposed SBRM would separately track and report the precision associated with the discard estimates of 36 individual fishery resources or species groups and 23 individual protected species or species groups across 39 separate fishing gear modes. In sum, this means that rather than trying to achieve a precision of 20-30 percent for a single estimate of total discards in each of the 16 major fisheries (16 separate estimates), under the proposed SBRM, the Councils and NOAA Fisheries Service will strive to achieve a precision of no more than 30 percent in up to 2,301 unique fishing gear mode and species combinations [less certain importance-filtered combinations].

Id. at 123. The *Oceana* decisions do not require this level of detail, as the quotes from the decisions above indicate.

Significantly, the Public Hearing Document's disaggregated approach countervails nationwide NMFS guidance. The SBRM Amendment explains:

> Although the proposed 30-percent CV target is based on the recommendation [for CVs of 20-30% for SBRM programs] in NMFS (2004), the proposed application

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9 While the court found fault with the fact that Amendments 10 and 13 did not set a mandatory level of observer coverage, those decisions were made in the context of two plans that contained "recommended" levels of observer coverage that could be changed or not implemented at all at the agency's sole discretion. *See, e.g., Oceana I* at 133 ("[T]he Secretary stated that he merely 'intends' to maintain a 5% coverage level. While he did state that a 5% level 'will resume in FY 05 and beyond,' in the context of the Secretary's overall response to criticisms of Amendment 13's bycatch reporting, it is clear that this figure is not mandatory and may be subject to change if the Secretary deems it proper.") (citations omitted). In other words, minimum levels of observer coverage were the primary means for collecting bycatch information under those two plans, and as such, the Court found that they must be mandatory and shown to be sufficient to collect precise and accurate data. By contrast, Councils could select a different mechanism, to wit, a methodology focused on gear types, sectors, and fisheries.

> of this standard differs in several important ways. First, the precision goal is recommended to apply to a "fishery," but in the proposed SBRM, the target CV would apply at the level of the fishing mode. [The Amendment then explains that this would require the six separate modes of the monkfish fishery to be examined separately.]
>
> ***
>
> Another way in which the proposed application of the SBRM differs from the NMFS (2004) guidance is that while the guidance document indicates that the precision goal of 20-30 percent should apply to total discards "aggregated over *all* species [emphasis added], this proposed alternative proposes disaggregating all species to the level of individual species or groups of related species. Continuing the example of the monkfish fishery, among the gear types that catch monkfish, there are more than 29 other species caught in those gears (along with many other non-FMP species). The guidance in NMFS (2004), therefore, recommends that the precision of the estimate of total discards of all 30+ species across all applicable fishing gears would be sufficient if the single estimate had a CV between 20 and 30 percent. The SBRM proposed under the preferred alternative would separately track the precision of the discard estimates for each individual species, except for a few limited cases where a species complex is more appropriate, managed under a Northeast Region FMP.

Id. at 122.

This is not an academic exercise. In practical effect, adopting the preferred alternative might require, based on estimates provided at the SSC, about 58,000 observer sea-days across the Northeast Region, compared to the 8,000 or so deployed, for example, in 2004. As explained above, the *Oceana* decisions suggest that if the Amendment appears to set certain standards for observer coverage, Councils will likely be held to those standards. It is, furthermore, unlikely that even with such coverage levels this standard could be attained for many of the various modes.

In this regard, Mr. Starr explains:

> It is very unlikely that a single CV "performance standard" can be applied successfully to such a broad and diverse range of fisheries. While the application of such a standard may improve the existing situation, given that relatively little monitoring presently exists, I believe that it will also result in a large number of data collection programmes which will be poorly designed, badly applied and subsequently not properly analysed. Thus I believe that the overall goal of better monitoring and management of these fisheries will not be achieved, particularly in the short term.

Starr Comments, at 1. It is also Mr. Starr's conclusion, which coincides with the advice in the NMFS nationwide technical document, that "[t]here is no substitute for dealing with each fishery unit (or grouping) individually and tailoring the monitoring to fit the situation." *Starr Comments, at 1.*

The divergence from NMFS guidance that would seek to prescribe a uniform level of precision of estimates for each bycatch species appears to present the biggest obstacle in practical implementation.[10] Tellingly, Mr. Starr further explains that, in his experience, calculation of CVs for each cell is a detailed, individualized process. Starr Comments, at 2-4. It is hard to conceive how NMFS could administer this program, with the resource constraints it faces and its essential inflexibility as an institution. There is a reasonable concern that litigation could ensue again if NMFS were not able to achieve the stated degree of precision (plus accuracy) in each of these 2,000 or so individual situations, even if this approach is not consistent with NMFS guidance.

Figuring out how to address this issue will be very important for the fishing fleets in the Northeast Region. It may be that observer and management decisions could be based on an aggregated estimate, consistent with the NMFS nationwide guidance, and that the species by species information could be assembled as a diagnostic and evaluative tool. In either event, importance filtering will have an important role.

CONCLUSION

The suggestions offered represent a workable and legally sufficient approach, that better meshes with available resources. It will also provide the Councils with the fishery-specific bycatch information they need in order to meet the conservation and management of the Magnuson-Stevens Act, especially as amended. This is an important issue, albeit one which is comparatively complicated. It bears taking the time necessary to produce a workable and realistic methodology.

Sincerely,

David E. Frulla
Shaun M. Gehan

Counsel for Fisheries Survival Fund

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10 There may be good reason, to seek to ensure consistent levels of coverage among fishing sectors, but there needs to be flexibility in terms of the levels of precision that are sought. *See Evaluating Bycatch*, at 59 ("Flexibility is needed when setting CV targets for specific fisheries and bycatch species.").

<u>ATTACHMENT 1</u>

Paul Starr, Fisheries Stock Assessment Scientist
61A Rhine Street, Island Bay, Wellington, New Zealand

29 December 2006

Patricia A. Kurkul
Regional Administrator
National Marine Fisheries Service
One Blackburn Drive
Gloucester, MA 01930

RE: Submission on SBRM Amendment

Dear Ms. Kurkul:

Introduction and qualifications

I have been asked by the Fisheries Survival Fund (FSF) to prepare an independent submission as an outside expert familiar with many of the issues being debated over the adoption of the Standardised Bycatch Reporting Methodology (SBRM) Amendment. I have had considerable experience over the thirty years that I have been a fisheries scientist in designing, implementing and analysing data generated from various programmes intended to measure quantities of interest in a fishery. These programmes range from observer programmes such as those being discussed in relation to the SBRM to logbook programmes which are designed to be completed by the fisherman.

I am not completely familiar with the details of how fisheries are managed on the eastern seaboard of the United States nor am I fully cognisant of all the sensitivities which exist between the various sectors and stakeholders who participate in these fisheries. However, I feel that I am able to make some general comments on the nature of the "preferred alternatives" identified in the SBRM Public Hearing Document because such programmes tend to have strong similarities regardless of where they are implemented. I have experienced this universality myself, having worked extensively in western Canada as a salmon and groundfish scientist and also having worked in the New Zealand groundfish and shellfish fisheries.

Summary

The following is a summary of the main points of this submission:

- It is very unlikely that a single CV "performance standard" can be applied successfully to such a broad and diverse range of fisheries. While the application of such a standard may improve the existing situation, given that relatively little monitoring presently exists, I believe that it will also result in a large number of data collection programmes which will be poorly designed, badly applied and subsequently not properly analysed. Thus I believe that the overall goal of better monitoring and management of these fisheries will not be achieved, particularly in the short term.
- There is no substitute for dealing with each fishery unit (or grouping) individually and tailoring the monitoring to fit the situation. Therefore, a more productive approach

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would be to establish a process through which all stakeholders can participate in the establishment of the monitoring programme, including agreement on the overall management goals.

- Finally, my experience has shown that successful fishery monitoring programmes need the co-operation of the stakeholders being monitored. It is easy to mandate compulsory programmes, but they tend to be less successful (and more costly) than programmes that have been developed co-operatively.

General comments

The most relevant comment that I feel I can make is that collecting information from any fishery without clear objectives which are tightly integrated into the management of that fishery is not a sensible course of action. This seems to me to be the most fundamental flaw in the SBRM Public Hearing Document where the "preferred alternative" is to specify a single region-wide performance standard, specifically the "30% CV" for mean catch estimates, without reference to the management objectives the coefficient of variation (CV) standard is to serve, including conservation issues applying to these fisheries. That is because specifying a CV without knowing how the data will be used in the management or the science is like putting the "cart before the horse". The precision required for an estimate should always be tied to the purpose to which the estimate is put. To do otherwise is poor science and not good management practise.

I recognise that there is a lack of information to manage some aspects of these fisheries and the SBRM is an attempt to rectify important missing components needed for management. However, simply specifying a minimum level of observer coverage and/or specifying a target performance standard is probably not the best way to go about establishing the collection of data that can be used to manage these fisheries. My understanding is that the SBRM will apply to about 1,500 strata (where a stratum would be a species, fishery, time period cell) for which data would be collected. It is almost inconceivable that any agency would have the resources to go through a process of designing, implementing and finally analysing the data for such a large number of strata. Even 100 such strata would tax the capacity of any agency with which I am familiar. It is important to note that an observer on a vessel collecting information over a number of species will not achieve the 30% CV performance standard for each species collected. Instead, the 30% CV performance standard will require a separate sampling protocol for every species because each species is captured at different rates, even on the same vessel.

A frequent lapse in many observer programmes is the failure to adequately analyse the resulting data. Captain Ron Smolowitz, an independent gear technologist and consultant to the FSF, described to me the existence of observer bycatch information for a scallop dredge fishery in the Georges Bank Scallop Access Areas which takes yellowtail flounder as a bycatch. High levels of observer coverage are used to manage this fishery and there exist at least four years of good quality data. However, I understand that these data have not yet been analysed to see whether they have achieved a target CV performance standard nor has the design of this observer programme been adjusted based on the data collected. Given that resource constraints apply to all natural resource management regimes with which I am familiar, this example shows how difficult it is to achieve an adequate level of design, implementation and analysis for a single programme, let alone 1,500 cells.

Therefore, I believe that mandating a fixed CV performance standard on 1,500 strata and expecting that this will supply useful information that can be used in managing these fisheries is a recipe for failure. It is inconceivable to me that there would be sufficient resources, either in terms of personnel or of money, that could successfully undertake the design of such a large programme, let alone implement and evaluate the outcome of each and every stratum. The SBRM, as I think it will progress over time, will most likely result in a pattern of putting

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observers on vessels without a great deal of thought, collecting a large amount of data, some of which may be relatively useless and then allowing the data to moulder in a computer without being properly analysed.

An alternative approach

My experience has shown that this problem should be approached differently to achieve success. For instance, in New Zealand, the Ministry of Fisheries uses "Working Groups" (which are organised around specific fisheries or species groupings) to help it to perform the following tasks: a) setting priorities for which fisheries are to be monitored (usually on the basis of perceived problems), b) arranging for the scientific design of an observer programme to address the problems, c) critiquing and evaluating the design before implementation, d) overseeing the implementation of the design and e) arranging for an evaluation of the final product.

In New Zealand, Working Groups are comprised of knowledgeable and interested people who represent all components of fishery "stakeholders": government and industry scientists, managers, representatives from NGOs, recreational fishery groups and aboriginal groups. The Working Groups tend to work on a consensus basis, primarily putting forward material on which there is agreement. Occasionally there is dissension and a minority report will also be filed. But there is usually strong agreement on issues which involve fishery observer coverage because these issues tend to be straightforward and usually do not cause much difference in opinion.

It appears to me that what is missing in the SBRM Public Hearing Document is the establishment of a process – the development of fishery-specific methodologies – that will achieve the collection of useful information which can be used to manage bycatch in these fisheries without specifically mandating a fixed 30% CV for large number of separate strata. Such a process needs to be measured, thoughtful and directed towards where it will do the most good and will address the problems which require immediate attention. Resources are always limiting in natural resource management situations and they need to focussed on those problems which are perceived to be the most acute. This can be best done (in my experience) in a group setting where consensus can be reached. A motivated and well run Working Group will achieve a much better result than single individuals working in isolation, regardless of which agency or interest group they represent.

Additional issues concerning the design of observer programmes

I have a few additional points to add to this submission, which are technical but which have implications for the SBRM decision:

1. Observer coverage CVs often are calculated as if every tow is independent. This is not true because observer coverage takes place in the context of a fishing trip, a series of tows conducted by the same skipper. Experience has shown that sequential tows by the same skipper are correlated, which means they are not statistically independent. This means that more tows need to be observed to achieve the statistical performance standard of a 30% CV than would be required if all tows could be randomly selected. While this issue is not strictly relevant to the specification of the 30% CV performance standard, it is frequently overlooked and means that achieving the mandated performance standard is often much more difficult than envisioned.

2. There are also auxiliary issues associated with observer coverage. One of these is the "observer effect". That is, vessels perform differently when an observer is present. This effect is obviously most important when observer coverage is low, because there will be the greatest leverage. However, this effect may affect the calculation of the CVs and should be considered in the design of the programme.

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3. Another issue is how to handle downtime while the observer is on board. NGO commentary often suggests that commercial vessels use this opportunity to subvert the coverage afforded by an independent observer, although this effect may be less pronounced in fishery systems that are managed by a trip limit or by the number of days fished. More importantly, observer downtime will affect the estimate of the CV and should be included in the estimation of this quantity. Again, this is frequently an aspect of observer coverage which tends to be overlooked with the more usual response being to assume that every tow on a vessel with an observer is actually observed.

4. The method of calculating the CV will also be, to some extent, fishery (or stratum) dependent. For instance, fisheries that consist mainly of day trips will have different issues for calculating the CV compared to fisheries that go out for a week or more. This dichotomy shows the weakness of relying on a universal standard to ensure adequate coverage for all fishery strata and indicates that specifying a single target CV performance standard will not address all the relevant issues.

I bring up these points not because they are directly relevant to the decision of whether to implement the SBRM, but because they affect the design of the programme which is needed to achieve the mandated 30% CV and illustrate why specifying a single CV target is not adequate in itself. The calculation of the CV itself will be incorrect unless all factors which affect the CV are incorporated, and these will vary across fisheries or even within the same fishery, as they will differ by species. With these factors contributing complications in calculating the CV estimates, there is a danger that the focus of the SBRM programme will move to determining whether the performance standard was achieved, rather than ascertaining whether the data needed to manage the fishery were obtained.

Conclusion

My instinctive reaction to the SRBM proposal is that a single performance standard that applies to a range of objectives across a large number of fisheries is doomed to failure. Fisheries don't fit the "one size fits all" model. It is not sensible to expect that a single over-arching performance standard, such as specifying a 30% CV, will automatically result in satisfactory outcomes across a number of differing situations. Fisheries are complex and managing them requires careful consideration of the components of each situation individually. To do otherwise is a recipe for failure.

One final point: my experience has shown that observer programmes are much more successful when the participants support the project. Observers always are "extra" in that they interfere with the smooth operation of the vessel and potentially may affect the livelihoods of everyone on board. Therefore, it makes a lot of sense to design the programme in such a way that the co-operation of those most affected is secured. Mandating unrealistic solutions that are probably not achievable is not the best way to proceed. Instead, if a process where fishermen are allowed to have a real and significant input at the design level of the programme is developed, then the overall goals of the programme are much more likely to be achieved.

Sincerely yours,

Paul Starr

ATTACHMENT 2

CURRICULUM VITAE

Full Name: Paul J. Starr

Present Position: Consulting Fisheries Stock Assessment Scientist

Present Employer: self-employed

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Academic Qualifications:

1973 Master of Science
University of British Columbia
Thesis title: Population dynamics and colonisation of *Sida crystallina* in Marion Lake, British Columbia.

1968 Bachelor of Science
Yale University
Thesis topic: Distribution of aquatic invertebrate fauna in cave ecosystems

Professional Positions Held:

2000 – present Consulting Fisheries Stock Assessment Scientist
Major clients:
- Canadian Groundfish Research and Conservation Society
- New Zealand Rock Lobster Industry Council
- New Zealand Seafood Industry Council

1997 – 2000 Chief Scientist
NZ Seafood Industry Council

1991 – 1997 Fisheries Stock Assessment Scientist
NZ Seafood Industry Council
(previously *New Zealand Fishing Industry Board*)

1982 – 1991 Senior Stock Assessment Biologist (chinook salmon)
Canadian Department of Fisheries and Oceans (DFO)
Biological Sciences Branch

1981 - 1982	Program Planner Canadian Department of Fisheries and Oceans Program Planning Branch
1980 - 1981	Management Biologist, Canadian Department of Fisheries and Oceans Fraser River Division Fisheries Branch
1976 - 1980	Biological Technician Canadian Department of Fisheries and Oceans Fraser River Division Fisheries Branch
1975 -1976	Fisheries Biologist Province of British Columbia Fish and Wildlife Branch
1973 - 1975:	Research Assistant University of British Columbia Institute of Animal Resource Ecology

Present Research/Professional Speciality:

- Experience in stock assessment of a variety of marine species, including deepwater demersal species (orange roughy, oreo, hoki and other species), inshore demersal species (snapper), shellfish (including lobster) and salmon (chinook, coho, sockeye, chum and pink).
- Experience in designing marine fisheries research programmes, including biomass tagging surveys, sampling of commercial and recreational catches, and research trawl surveys.
- Specialisation includes designing self-monitoring programmes for the collection of scientifically useable information in commercial potting, long line and trawl fisheries.
- Experience in the presentation and interpretation of fisheries data for the purposes of fishery management, including extensive participation in peer review working groups in Canada, New Zealand and the United States.
- Experience in providing advice to the fishing industry, to government policy makers, and to government negotiators in international fishing treaties.
- Experience in the New Zealand ITQ system, particularly in its implementation of research planning for fisheries assessment research, the evaluation of the research output and its integration into eventual management decisions.
- Specialisation in the interpretation and presentation of scientific information to all parts of the NZ Fishing Industry to allow informed decision making on scientific issues.
- Supervision and training of graduate students in a practical fisheries assessment and management environment.

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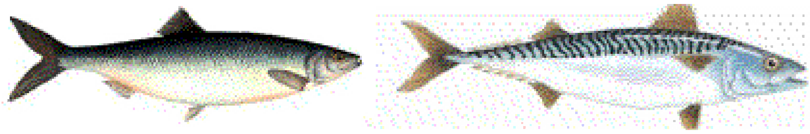

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F/V Eastern Hunter
F/V Western Hunter
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F/V Luke and Sarah

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F/V Endeavor
F/V Challenger
F/V Voyager

Portland, ME
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Associations:

American Pelagic Association

Garden State Seafood Association

December 29, 2006

VIA ELECTRONIC MAIL

Patricia A. Kurkul
Regional Administrator
National Marine Fisheries Service
One Blackburn Drive
Gloucester, MA 01930

RE: FISHERIES SURVIVAL FUND COMMENTS ON SBRM AMENDMENT

On behalf of the companies and vessels listed in our masthead, we are writing in support of the comments submitted to you today by Kelley Drye Collier Shannon (Shaun Gehan and David Frulla, on behalf of Fisheries Survival Fund) relative to the Standardized Bycatch Reporting Methodology Omnibus Amendment.

Their comments and suggestions reflect our needs, and will make the Omnibus Amendment workable for the Agency, the Councils and the affected industry.

As an industry, we advocate for sound fishery science and management. We believe the Omnibus Amendment, as currently written, could be very detrimental to your Agency's ability to manage the fisheries properly given the likelihood for litigation if and when the Agency is unable to fulfill the specific requirements of the Amendment as currently proposed.

Thank you,

/s/
Brady Schofield and Jeff Reichle

Conservation Law Foundation

December 29, 2006

Patricia A. Kurkul
Regional Administrator
National Marine Fisheries Service
One Blackburn Drive
Gloucester, MA 01930

Via electronic mail to: SBRMcomment@noaa.gov

Re: Comments on SBRM Amendment

Dear Ms. Kurkul,

The Conservation Law Foundation (CLF) submits the following comments on the omnibus Standardized Bycatch Reporting Methodology Amendment (Omnibus SBRM). We again acknowledge and thank the New England Fishery Management Council (NEFMC) and the National Marine Fishery Service (NMFS) for responding to our request in the fall of 2005 to decouple the draft SBRM, advanced by NMFS at that time from Groundfish Framework 42. The draft Omnibus SBRM amendment that will apply to all fisheries in New England is clearly a superior effort that has benefited from additional work. Developing and implementing a comprehensive SBRM based on the best available science is an important step toward achieving full compliance with the Magnuson-Stevens Act's bycatch requirements and addressing one of the most serious conservation and management issues facing fisheries management in New England.

While the proposed Omnibus SBRM demonstrates considerable effort by NMFS to develop a draft SBRM that would be a significant improvement over the existing patchwork of bycatch reporting measures, it simply continues to fail to meet the legal requirements of the Magnuson-Stevens Act (MSA), the National Environmental Policy Act (NEPA), and relevant court orders. CLF urged that these shortcomings be addressed throughout development of the Omnibus SBRM, thus it is unfortunate that at this time we must urge you to again withdraw the draft Omnibus SBRM in order to develop and analyze an appropriate range of alternatives addressing the legal shortcoming discussed below through a full Environmental Impact Statement (EIS). While we continue to seek expeditious implementation of SBRMs throughout New England's fisheries, the fact is that this SBRM will establish precedent for future SBRM's across the nation. Thus, while we are disappointed that more time will be required to complete the amendment, it is more important that it be done right and that further litigation on this matter is avoided if at all possible.

I. Bycatch Information is Critically Important to Effective Fisheries Management

The Northwest Atlantic ecosystem, the fish populations it supports, and fishing communities throughout New England continue to suffer due to depleted fish populations resulting from the failure of the existing groundfish management system to achieve its conservation and rebuilding goals. A

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significant contributing factor to the poor condition of N.E. stocks is the failure of New England fisheries managers to adequately implement measure to avoid and minimize bycatch.

As clearly set out in the Magnuson-Stevens Act, development of a SBRM to assess the amount and types of bycatch occurring in fisheries is a critical aspect of the Council's responsibility when writing fishery management plans, and it is the first step to fulfilling the Act's mandates to minimize bycatch and bycatch mortality. Without an accurate and precise assessment of bycatch, the Council and NMFS are simply hamstrung in their ability to develop management measures to account for the ecological and economic waste that is occurring in our fisheries. Without appropriate bycatch assessment and reporting, effective management is impossible.

II. The Omnibus SBRM Fails to Meet the Requirements of the Court Order Regarding the Development of a Standardized Bycatch Reporting Methodology

As you are aware, the Conservation Law Foundation brought two separate federal court cases resulting in decisions holding that the bycatch measures developed by the Council and NMFS for inclusion in the Groundfish FMP failed to meet the legal requirements of the Magnuson-Stevens Act (MSA).[1] While the proposed Omnibus SBRM Amendment is greatly improved over initial efforts, it is still inadequate and fails to meet the applicable legal requirements as set forth in the March 9, 2005 Order by the United States District Court for the District of Columbia. Specifically, the Federal Court ordered NMFS and the NEFMC to evaluate its bycatch reporting and assessment program, establish a standardized reporting methodology, specify observer coverage levels in their fishery management plans, and address other demonstrated shortcomings in their observer program.[2] In reaching this conclusion, the Court emphasized the following points:

1. NMFS violated the MSA when it failed to require any observers in the New England groundfish fishery.[3]

2. NMFS violated the MSA and ignored the best available science when it failed to take account of the report on bycatch and observers submitted by Oceana to NMFS as part of the Amendment 13 administrative record.[4]

3. NMFS violated the MSA when it failed to assess the bycatch problem by sector, gear type, and species.[5]

4. NMFS violated the MSA when it relied upon discredited methodologies for monitoring and reductions in bycatch in the New England groundfish fishery.[6]

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[1] *Conservation Law Foundation v. Evans,* 209 F. Supp. 2d (D.D.C. 2001); *Conservation Law Foundation v. Evans,* D.D.C. No. 04-811 ESH (March 9, 2005)(*consolidated as Oceana v. Evans).* In the 2001ruling, the Court explicitly criticized NMFS for relying upon bycatch reporting methods that were demonstrably inaccurate and inadequate. In the March 9, 2005 ruling, the Court referenced these earlier findings. *Oceana v. Evans,*. at 85.

[2] *Oceana v. Evans*, D.D.C. No. 04-811 at 85.

[3] *Id.* at 79-82.

[4] *Id.* at 83-84.

[5] *Id.* at 84-85.

[6] *Id.* at 85.

Upon entering these findings, the Court remanded the bycatch portion of Amendment 13 to NMFS with instructions to comply with the MSA.[7]

Given that NMFS has already delayed its compliance with the bycatch requirements of the MSA by over ten years, and now for more than five years following the ruling by Judge Kessler in December of 2001, we again request prompt compliance with the MSA and the March 9, 2005 Order. In order to do so, the following changes to the draft SBRM must be made.

1. Specify levels of Observer Coverage in the FMPs

The Court found that the groundfish FMP failed to specify a level of observer coverage in the fishery. Further, the Court rejected the argument by NFMS that is had met its SBRM obligations by stating an intention to achieve a certain level of observer coverage while retaining complete discretion for setting the actual level of observer coverage.[8] The draft Omnibus SBRM appears to take the same approach rejected by the Court by establishing mere performance targets in the SBRM while leaving the actual level of observer coverage entirely up to NMFS's discretion.

Further, insofar as the SBRM appears to undertake an allocation analysis for observer coverage based upon a certain level of days fished, it is not clear whether there is a mechanism in place to update the allocation analysis annually (or more often) in order to address changes in the fishery. The draft also indicates that the actual allocation of observers would be reduced based on funding, but there is no way to determine how this will occur and no standards are set for minimum levels of coverage. The Omnibus SBRM must set the stage for the Council and NMFS to specify the levels of observer coverage in all fisheries by gear type, sector, and/or other appropriate criteria.

2. Adequately Assess the Bycatch Problem by Fishery, Gear Type, and Species.

In reaching its conclusion that the SBRM needed to address bycatch by sector, gear type, and species, the Court considered the bycatch plan utilized in the Pacific Highly Migratory Fisheries (FMP) as a reference point for what a legally compliant SBRM in New England would look like.[9] As is evident by the Court's decision and a review of the Pacific FMP, to be useful in improving fisheries management the SBRM must specifically contemplate the changing dynamics of each fishery by gear type and species, and be integrated into each FMP. The draft Omnibus SBRM does not do this in a meaningful way, and therefore it is likely to fall well short of anticipating and adapting to future fishery conditions and management needs. As a starting point for addressing these shortfalls and making the SBRM a truly useful document, it should include a discussion of each fishery, gear type, and associated species interactions along with the fisheries management scheme. It should then consider and seek to anticipate the potential bycatch data needs in order to make appropriate recommendations for levels of observer coverage and other means for collecting bycatch data.

Further, the MSA's bycatch provisions contemplate that a broader range of species will be addressed than is covered by the Omnibus SBRM. Species not commercially targeted under fisheries managed by the New England or Mid-Atlantic Councils should be included. These

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[7] *Id.* at 85-86.

[8] *Id.* at 79-82.

[9] The Court noted specifically that the FMP evaluates various kinds of reporting for different types of fishing gear and vessels. (See CLF Mot. Ex. 2 (HMS FMP, August 2003) at Ch. 5, pp. 34-36 (previously provided as part of this record).

species should include those managed by the Atlantic States Marine Fisheries Commission, Highly Migratory Species, protected species (e.g., sea turtles), and species known to be at risk (e.g., wolfish, cusk, corals). Absent these species, the SBRM is incomplete and will fail to meet the MSA's intended goals.

3. Best Available Science Must be Applied in Establishing the SBRM

Performance standard

To be effective, the Omnibus SBRM must set a mandatory performance standard; it cannot be a mere target standard. The standard must clearly indicate how it is to be applied, and it needs to be set for each fishery, gear type and/or sector, and species.

Reporting

There should be, at a minimum, an annual report on bycatch for each fishery broken down by gear type, sector (as appropriate), area fished, species and other means as determined by the Council. All reports must be public.

Filters

The Omnibus SBRM proposes to reduce the initial observer allocations by applying a series of "importance filters." These filters would remove fishery mode/species combinations from the list of observer needs based on different criteria including the current database of fishery mode/species interactions. This approach is fundamentally flawed because it uses the existing poor observer data as the foundation for the calculation of the allocation. A better approach would be to establish a baseline level of observer coverage for a period of years and to then use this observer data to establish the appropriate use of future of statistical filters. Further, until there is a robust data set providing a high degree of confidence in the use of filers, no protected species or species at risk should be eliminated as a result of data shoing a low frequency of interaction because, by definition, a low frequency is likely in many instances due to the low abundance of protected species.

CLF is also concerned that filter 3 could result in the inappropriate removal of a fishery mode/species because the species could show up as a low volume in a very high volume fishery, yet the environmental impact could be significant. Recent evidence of bycatch of haddock in the herring mid-water trawl fishery is one example though, because of the severely depleted status of cod, a cod/herring trawl interaction could be even more serious. Filter 3 should be eliminated from the SBRM. Filter 4 is also of concern because it fails to establish a threshold value, a matter that should be analyzed through an appropriate EIS alternatives analysis.

III. Failure to Complete an Environmental Impact Statement or Meet Other Fundamental National Environmental Policy Act Requirements

1. The SBRM Will Have Significant Environmental Impacts Triggering the Need for an EIS

Contributing significantly to the shortfalls in the Omnibus SBRM is the failure to develop the Amendment through an EIS. Lack of an EIS limited the opportunities for public participation and stymied New England and Mid-Atlantic Council involvement, which in turn has significantly limited the range of alternatives considered and the substantive analysis of the issues.

As noted above, the first step to fulfilling the Act's mandates to minimize bycatch and bycatch mortality is the SBRM; if the SBRM fails to include an accurate and precise assessment of bycatch it is impossible for the Council and NMFS to develop the management measures necessary to reduce the ecological and economic waste that is occurring in our fisheries. The decisions made as a result of the SBRM analysis will affect fisheries and other ocean life throughout the New England and Mid-Atlantic regions and will help form the basis for nearly all fundamental fisheries management tools including stock assessments and management measures to control fishing mortality and bycatch, itself. A poorly designed SBRM could result in significant environmental harm as bycatch issues are missed or their seriousness is not accurately assessed resulting in the severe depletion of a species.

It is difficult to imagine an action to be taken by NMFS with a greater potential to significantly affect the quality of the human environment, thus the agency must take a hard look at the environmental impacts of the Omnibus SBRM in a full EIS.

2. The SBRM Fails to Consider a Range of Alternatives

Fundamentally, the draft Omnibus SBRM only contains two alternatives for each decision point, one of which is the status quo, and fails to consider other reasonable alternatives. In some cases the identified alternative is so overly simplistic the result is in effect to have no alternative at all (e.g., whether to specify an SBRM review process). Development of a SBRM, like other major federal actions, requires consideration of an appropriate range of alternatives to comply with NEPA and the MSA. Additional alternatives should have been considered in many areas of the Omnibus SBRM, including for importance filters, bycatch reporting and monitoring mechanisms, performance standards, and bycatch review and reporting. The failure to consider a reasonable range of alternatives here at least partly stems from the decision early on not to undertake an EIS, thereby limiting public participation and the opportunity to develop additional alternatives.

IV. NMFS Should Specify Observer Coverage via Emergency Rule

Because the fishery management plans for New England continue to unlawfully fail to require any level of observer coverage, NMFS must take action immediately by emergency rule to establish an adequate level of coverage during the period of time it takes to develop a legally compliant SBRM through an EIS. The observer coverage established through emergency rule must be based on the best available science. In instances where draft SBRM or other information does not represent the best available science for setting the level observer coverage necessary to assure accurate and precise estimates of bycatch for a given gear type or sector, NMFS should establish observers on at least 20 percent of all days fished (trips) consistent with the Oceana report on bycatch discussed in the March 9, 2005 federal court ruling (e.g., 20 percent).[10]

Thank you for considering these comments. The Conservation Law Foundation looks forward to working with NMFS, the NEFMC and other interested parties to address the concerns raised in these comments. Should you have questions regarding these comments or wish to discuss any of the issues further, please contact me at rfleming@clf.org or by telephone at 207.729.7733.

Sincerely yours,

/S/__________
Roger Fleming
Senior Attorney

[10] *Oceana v. Evans*, D.D.C. No. 04-811 at 84-85.

cc: New England Fishery Management Council

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New England Fishery Management Council

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Appendix F
Example SBRM Report and Data Queries

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Northeast Region SBRM Review Report

[*Note: This is an example report to illustrate one possible structure for presenting information relevant for reviewing and evaluating the Northeast Region SBRM. This information should be considered preliminary and is not intended for Council action.*]

Monkfish

Background

Amendment 3 to the Monkfish Fishery Management Plan (FMP), part of the Omnibus Standardized Bycatch Reporting Methodology (SBRM) Amendment to the Northeast Region FMPs, implemented several requirements regarding the reporting of bycatch information for the monkfish fishery. This amendment was developed under the authority of section 303(11)(a) of the Magnuson-Stevens Act, which requires that all FMPs establish an SBRM. The SBRM Amendment addressed four elements: (1) The bycatch reporting and monitoring mechanisms used to obtain information on discards in Northeast fisheries; (2) the analytical techniques used to estimate discards and to allocate at-sea observer effort; (3) establishing a precision-based performance standard for the SBRM; and (4) requiring a periodic review and reporting process as part of the SBRM.

This document complies with the fourth element of the SBRM implemented under Amendment 3: The periodic SBRM Report. This report is intended to provide information with which the New England and Mid-Atlantic Fishery Management Councils (Councils) and NOAA Fisheries Service would consider the effectiveness of the SBRM and, if necessary, take appropriate steps to improve the SBRM. As described in Amendment 3, the SBRM Report would provide the following information: (1) A review of the recent levels of observer coverage in each applicable fishery; (2) a review of recent observed encounters with each species in each fishery, and a summary of observed discards by weight; (3) a review of the coefficient of variation (CV) of the discard information collected for each fishery; (4) an estimate of the total amount of discards associated with each fishery (these estimates may differ from estimates generated and used in stock assessments, as different methods and stratification may be used in each case); (5) an evaluation of the effectiveness of the SBRM at meeting the specified target for each fishery; (6) a description of the methods used to calculate the reported CVs and to determine target observer coverage levels, if the methods used are different from those described and evaluated in the SBRM Amendment; and (7) an evaluation of the implications for management of the discard information collected under the SBRM.

The information to be provided in the report for the purpose of determining the effectiveness of the SBRM in meeting the CV standards should not be confused with the level of information a Council may want or need to address specific management issues. More detailed discard-related information, structured in a way and at a scale meaningful for the particular management issue, can always be provided at the Councils' request.

Analytical Overview

This report focuses on the monkfish fishery, as managed under the Monkfish FMP, but addresses the discards of all species in the monkfish fishery as well as the discards of monkfish in other fisheries. There are three primary fishing gear modes that comprise the monkfish fishery: New England large-mesh otter trawl; New England extra-large-mesh gillnet; and Mid-Atlantic extra-large-mesh gillnet. This analysis will examine the discards of all species that occur in these three fishing modes.

In addition to the three primary monkfish fishing modes identified above, there are another 17 fishing modes for which at least some amount of monkfish was discarded in 2004. Of these, there are nine that contributed at least 1 percent of the total estimated monkfish discards in 2004: New England and Mid-Atlantic open area, limited access scallop dredge; New England and Mid-Atlantic small-mesh otter trawl; New England and Mid-Atlantic open area, general category scallop dredge; New England and Mid-Atlantic closed area, limited access scallop dredge; and Mid-Atlantic large-mesh otter trawl. This analysis will examine monkfish discards in these fishing modes.

Review of Recent Levels of Observer Coverage

Table 1 identifies the observer coverage in 2004 for the primary monkfish fishery and monkfish discard fishing modes. This table also identifies the number of FVTR reports submitted for each fishing mode, in order to calculate an observer coverage rate for 2004.

Fishing Mode	Observed Trips	Observed Sea Days	FVTR Trips	Coverage Rate
NE large-mesh otter trawl	386 (153)	1,076 (871)	16,156	2% (3%)
NE x-large-mesh gillnet	445 (124)	533 (168)	4,712	9% (12%)
MA x-large-mesh gillnet	27 (115)	30 (122)	2,568	1% (6%)
NE OL scallop dredge	26 (10)	344 (113)	1,229	2% (3%)
MA OL scallop dredge	69 (9)	591 (84)	1,822	4% (4%)
NE small-mesh otter trawl	142 (58)	449 (128)	3,484	4% (6%)
NE OG scallop dredge	9 (11)	11 (13)	3,566	0.25% (1%)
NE CL scallop dredge	86	805	292	29%
MA CL scallop dredge	35	373	78	45%
MA OG scallop dredge	22 (17)	33 (22)	3,433	1% (1%)
MA large-mesh otter trawl	75 (1)	183 (3)	8,850	1% (1%)
MA small-mesh otter trawl	194 (11)	471 (18)	5,222	4% (4%)

Table 1. 2004 observer coverage rates for the primary fishing modes associated with either the monkfish fishery (landings) or monkfish discards. Numbers in parentheses represent additional observer coverage included in the protected resources dataset (either training trips or "limited protocol" trips). For modes with no number in parentheses, there were no additional trips in the protected resources dataset.

Recent Observed and Estimated Discards

Discards in the Monkfish Fishery

As noted above, there are three primary fishing modes that comprise the monkfish fishery: New England large-mesh otter trawl; New England extra-large-mesh gillnet; and Mid-Atlantic extra-large-mesh gillnet. Together, three fishing modes accounted for over 92 percent of monkfish landings in 2004 (see Table 2). Although there were 142 species observed to be discarded in 2004 by these three fishing modes, the top 10 discard species accounted for 83 percent, by weight, of the total observed discards (see Table 3). Winter and little skates were the primary discard species, together comprising over 41 percent of observed discards. All skates combined represented 58 percent of all observed discards in these three fishing modes. Spiny dogfish accounted for another 14 percent of observed discards; monkfish, 4 percent; Jonah crab, 3.2 percent; American lobster, 2.9 percent; and thorny skate, 2.8 percent. All other discard species represented 1 percent or less of the total observed discards for these three fishing modes. Attachments 1, 2, and 3, identify all observed discards, by weight, for the three primary monkfish fishing modes.

Fishing Mode	2004 Monkfish Landings (lb) (FVTR)	Percent of Total 2004 Monkfish Landings	Cumulative Percentage of Landings
NE Large-mesh Trawl	14,955,163	47.6%	47.6%
NE X-Large-mesh Gillnet	9,836,119	31.3%	78.9%
MA X-Large-mesh Gillnet	4,301,618	13.7%	92.6%
NE Scallop Dredge	878,931	2.8%	95.4%
NE Large-mesh Gillnet	615,585	2.0%	97.3%
MA Scallop Dredge	348,132	1.1%	98.4%
MA Large-mesh Trawl	346,457	1.1%	99.5%
NE Small-mesh Trawl	49,150	0.2%	99.7%
MA Small-mesh Trawl	36,600	0.1%	99.8%
MA Scallop Trawl	32,555	0.1%	99.9%

Table 2. 2004 monkfish landings, by weight, by fishing mode (FVTR).

Discard Species	Total 2004 Observed Discards (lb)	Percent of Total Observed Discards	Cumulative Percent of Observed Discards
Winter skate	386,292	21.5%	21.5%
Little skate	353,072	19.6%	41.1%
Spiny dogfish	253,710	14.1%	55.2%
Skate, NK	219,095	12.2%	67.3%
Monkfish	72,706	4.0%	71.4%
Jonah crab	57,026	3.2%	74.5%
American lobster	51,748	2.9%	77.4%
Thorny skate	50,240	2.8%	80.2%
Atlantic cod	27,633	1.5%	81.7%
Windowpane flounder	23,448	1.3%	83.0%

Table 3. Top ten discard species, by weight, and percent of total 2004 observed discards in the New England large-mesh otter trawl, and New England and Mid-Atlantic extra-large-mesh gillnet fishing modes, combined.

<u>Discards of Monkfish in Other Fisheries</u>

As noted above, there are 20 fishing modes, including the three primary modes in the monkfish fishery, for which at least some amount of monkfish was discarded in 2004. Table 4 identifies the discards of monkfish in 2004, based on observed fishing trips in these 20 fishing modes. The table identifies both the observed discards, the ratio of observed monkfish discards to total observed discards (which indicates the degree to which monkfish is a component of the total discards in the fishing mode), an estimate of the total discards of monkfish in these fishing modes (based on the techniques described in the SBRM Amendment), and the percent (and cumulative percent) of the estimated total monkfish discards in these fishing modes.

Fishing Mode	Observed Monkfish Discards (lb)	Observed Discards, All Species (lb)	Ratio of Monkfish to Total Discards	Estimate of Total Monkfish Discards (lb)	Percent of Total Monkfish Discards	Cumulative Percent of Discards
NE Scallop Dredge OL	37,877	806,792	4.7%	2,896,875	29.71%	29.71%
MA Scallop Dredge OL	45,211	787,116	5.7%	2,027,711	20.79%	50.50%
NE Large-mesh Otter Trawl	41,061	1,545,623	2.7%	1,313,457	13.47%	63.97%
NE Small-mesh Otter Trawl	26,577	1,108,074	2.4%	1,136,577	11.66%	75.63%
NE X-Large-mesh Gillnet	29,933	241,610	12.4%	635,797	6.52%	82.15%
NE Scallop Dredge OG	3,330	9,918	33.6%	402,741	4.13%	86.28%
NE Scallop Dredge CL	123,828	1,477,622	8.4%	377,988	3.88%	90.15%
MA Scallop Dredge CL	67,163	960,608	7.0%	245,389	2.52%	92.67%
MA Scallop Dredge OG	1,307	33,400	3.9%	209,696	2.15%	94.82%
MA Large-mesh Otter Trawl	3,629	208,137	1.7%	166,051	1.70%	96.52%
MA Small-mesh Otter Trawl	7,744	776,602	1.0%	110,351	1.13%	97.65%
MA X-Large-mesh Gillnet	1,712	13,386	12.8%	103,961	1.07%	98.72%
MA Scallop Trawl OL	275	16,019	1.7%	76,078	0.78%	99.50%
MA Scallop Trawl OG	585	37,893	1.5%	28,377	0.29%	99.79%
NE Large-mesh Gillnet	878	555,903	0.2%	11,021	0.11%	99.90%
MA Scallop Dredge CG	11	394	2.8%	6,106	0.06%	99.97%
NE Midwater Trawl	269	402,297	0.1%	2,241	0.02%	99.99%
MA Midwater Trawl	94	18,637	0.5%	461	0.00%	99.99%
NE Shrimp Trawl	2	2,175	0.1%	428	0.00%	100.00%
MA Fish Pot	1	7,771	0.0%	234	0.00%	100.00%

Table 4. 2004 discards of monkfish, both observed and estimated total discards, by weight, for the 20 Northeast Region fishing modes with at least 1 lb of observed discards. The ratio of monkfish to total discards indicates, based on observer data, the relative proportion of the total observed discards that are accounted for by discards of monkfish. For example, the data collected by at-sea observers in 2004 suggest that monkfish comprise one-third of all discards in the New England open area, general category scallop dredge fishing mode.

Precision of Discard Estimates

Based on the information presented in the SBRM Amendment, a CV is a measure of the precision of the data used in developing discard estimates. Table 5 and Table 6 provide the CVs associated with the discard estimates for the fishing modes most relevant to this report. Table 5 identifies the CVs for all relevant species and species groups for the New England large-mesh otter trawl, and the Mid-Atlantic and New England extra-large-mesh gillnet fishing modes (the primary three fishing modes associated with the monkfish fishery). Table 6 identifies the CVs for monkfish discards for the 12 fishing modes for which the discards of monkfish accounted for at least 1 percent of the total monkfish discards in 2004.

Discard Species/Species Group	**NE large-mesh otter trawl**	**NE extra-large-mesh gillnet**	**MA extra-large-mesh gillnet**
Bluefish	247%	**18%**	**30%**
Atlantic herring	131%	38%	*
Deep-sea red crab	**28%**	N/A	N/A
Sea scallop	35%	N/A	N/A
Mackerel, squid, butterfish	57%	50%	*
Monkfish	**9%**	**17%**	**27%**
Large-mesh multispecies	**10%**	**16%**	*
Small-mesh multispecies	**18%**	62%	N/A
Skates	**17%**	**12%**	**11%**
Spiny dogfish	**24%**	**16%**	**13%**
Summer flounder, scup, black sea bass	32%	**23%**	**30%**
Surfclam, ocean quahog	N/A	N/A	N/A
Tilefish	53%	N/A	N/A
Sea turtles	*	*	49%

Table 5. The CV of total discards, by fleet and species group, derived from the 2004 Northeast Region Fisheries Observer Program, for the primary three fishing modes associated with the monkfish fishery. "*" indicates that there were zero discards in 2004. "N/A" indicates that the particular combination of species and fishing mode is excluded from the review.

Fishing Mode	**Monkfish Discards**
NE Scallop Dredge OL	32%
MA Scallop Dredge OL	**17%**
NE Large-mesh Otter Trawl	**9%**
NE Small-mesh Otter Trawl	40%
NE X-Large-mesh Gillnet	**17%**
NE Scallop Dredge OG	56%
NE Scallop Dredge CL	**25%**
MA Scallop Dredge CL	**26%**
MA Scallop Dredge OG	**20%**
MA Large-mesh Otter Trawl	**29%**
MA Small-mesh Otter Trawl	35%
MA X-Large-mesh Gillnet	**27%**

Table 6. The CV of total monkfish discards, by fleet, derived from the 2004 Northeast Region Fisheries Observer Program, for the 12 fishing modes for which each mode's monkfish discards account for at least 1 percent of total monkfish discards.

Evaluation of Effectiveness of Meeting the SBRM Standard

The SBRM Amendment [*proposes to*] implement a performance standard of a CV of no more than 30 percent for each relevant combination of fishing mode and species/species group in the Northeast Region. The intent of this standard is to ensure that the data obtained through the Northeast Region SBRM is sufficiently precise to enable scientists and managers to confidently use the resulting data for conducting stock assessments and making management decisions.

Based on the information presented in Table 5 and Table 6, we can evaluate whether the SBRM has met the performance standard for the fishing modes relevant to the subject of this report, monkfish. For the three primary monkfish fishing modes, there are five species groups for which a CV could not be calculated because there were no (zero) discards observed in these fishing modes. There were also 10 species groups which are not included due to the “gray-cell” filter process (see SBRM Amendment for explanation of the gray-cell process). Of the remaining 27 combinations of fishing modes and species groups, 17 have CVs of 30 percent or less. Many of these have CVs considerably better than the SBRM standard (e.g., monkfish in New England large-mesh otter trawl, 9 percent; spiny dogfish in Mid-Atlantic extra-large-mesh gillnet, 13 percent). The remaining 10 combinations have CVs that exceeded the standard, and ranged from 32 percent to 247 percent.

For the 12 fishing modes with monkfish discards included in Table 6, 8 have CVs of 30 percent or less. The other four fishing modes have CVs that range from 32 to 56 percent. Overall, of the 41 unique fishing mode and species group combinations subject to the SBRM standard and related to monkfish, 14 (one-third) have CVs that exceed the standard. The remaining 27 combinations either meet the CV standard or have zero discards.

Implications for Management

In addition to determining whether or not the SBRM standard was met for each applicable combination of fishing mode and species group, it is also important to examine the potential management implications of not meeting the standard. The reasons for not meeting the standard can vary and include: Insufficient sampling; highly variable discard events; rare discard events; etc. Taking stock of the discard information driving the high CVs can be informative for both understanding the implications of not meeting the standard as well as setting priorities for redressing the issues. Table 7 displays, for each of the three primary monkfish fishing modes, the species groups for which the 2004 CV exceeds the SBRM standard and the observed discards, the estimated total discards, and the percent of total catch represented by the estimated total discards. Table 8 shows similar information for monkfish discards by the primary discard fishing modes for which the 2004 exceeds the SBRM standard.

	Discard Species/Species Group	2004 CV	Observed Discards (lb)	Estimated Total Discards (lb)	Discards as Percent of Total Landings
NE Large-mesh Otter Trawl	Atlantic bluefish	247%	854	31,518	0.14%
	Atlantic herring	131%	563	18,710	0.01%
	Sea scallop	35%	1,191	39,996	0.06%
	Mackerel, squid, butterfish	57%	357	12,498	0.01%
	Summer flounder, scup, black sea bass	32%	21,854	720,531	1.48%
	Tilefish	53%	285	8,798	0.38%
NE X-Large-mesh Gillnet	Atlantic herring	38%	46	531	0.00%
	Mackerel, squid, butterfish	50%	393	9,736	0.00%
	Small-mesh multispecies	62%	373	4,414	0.02%
MA X-Large-mesh Gillnet	Sea turtles	49%	Yes	N/A	N/A

Table 7. Summary information regarding the potential impact of discards for species/species groups for which the 2004 CV exceeded the SBRM standard.

Fishing Mode	2004 CV (Monkfish)	Observed Discards (lb)	Estimated Total Discards (lb)	Discards as Percent of Total Landings
NE Scallop Dredge OL	32%	37,877	2,896,875	12.58%
NE Small-mesh Otter Trawl	40%	26,577	1,136,577	4.93%
NE Scallop Dredge OG	56%	3,330	402,741	1.75%
MA Small-mesh Otter Trawl	35%	7.744	166,051	0.48%

Table 8. Summary information regarding the potential impact of monkfish discards for fishing modes for which the 2004 CV exceeded the SBRM standard.

Examining the information presented above provides insight into the potential implications for management of the relatively high CVs associated with the discard information collected in 2004 for the primary monkfish fishery fishing modes. With the possible exception of summer flounder, scup, and black sea bass discards in the New England large-mesh otter trawl mode, and sea turtle encounters in the Mid-Atlantic extra-large-mesh gillnet mode, the impacts of the discards associated with relatively high CVs are very likely to be trivial. Except as noted, estimated total discards do not exceed 40,000 lb for any species/species group, and for most cases, the estimated total discards represent less than 1/10 of 1 percent of the total (recreational and commercial) landings. Within the fishing modes that discard monkfish, although New England open area, limited access scallop dredge contributes the most monkfish discards, the CV (32 percent) is very close to the SBRM standard. Mid-Atlantic small-mesh otter trawl also has a CV (35 percent) relatively close to the SBRM standard, and the estimated total discards represent less than ½ of 1 percent of the total monkfish landings for 2004.

Further examination of the summer flounder, scup, and black sea bass discards in the New England large-mesh otter trawl fishing mode indicates that over 90 percent of the observed discards for this species group are summer flounder (19,723 lb out of 21,854 lb). Table 9 provides additional information on these three species for this fishing mode. In this case, the highest CVs are associated with scup and black sea bass, but estimated total discards for these two species are relatively low (0.45 percent and 0.15 percent, respectively, of total (commercial and recreational) 2004 landings). Most of the discards within this species group are summer flounder, but even though the CV is greater than the SBRM standard, it remains relatively close (33 percent rather than 30 percent).

Individual Species	2004 CV	Observed Discards (lb)	Estimated Total Discards (lb)	Discards as Percent of Total Landings
Summer flounder	33%	19,723	650,271	2.23%
Scup	92%	1,879	61,951	0.45%
Black sea bass	83%	253	8,341	0.15%

Table 9. Additional summary information regarding the potential impact of discards for species for which the 2004 CV exceeded the SBRM standard.

The implications of CVs exceeding the SBRM target, based on this information, are likely to be most important for the discards of monkfish in the New England small-mesh otter trawl and New England open area, general category scallop dredge fishing modes.

Trends in Discards

There is no information to be presented at this time on recent or developing trends in discards for the subject fishing modes.

Notes on the Example

This information should be considered to be preliminary. It is not presented for Council action, but rather is intended solely as an example of the potential structure and content that could be used in preparing future SBRM Reports.

The information presented in this example report was collected prior to the development and implementation of the Northeast Region SBRM. Future evaluations of the SBRM data should be conducted based on information collected after the SBRM is implemented.

Were this an actual SBRM report, additional information could be utilized and incorporated into the report, such as trend information on discards over time. Also, additional information could be presented depending on the specific needs of the Councils, Plan Development Teams, Fishery Management Action Teams, or Monitoring Committees.

Attachment 1: ***Observed Discards in the NE Large-mesh Otter Trawl Fishing Mode***

	Species Name	Observed Discards (lb)	Observed Discards, All Species (lb)	Ratio of Discards to All Discards	Cumulative Percent of Total Discards
1	SKATE, WINTER (BIG)	366,380	1,545,623	23.70%	23.70%
2	SKATE, LITTLE	347,835	1,545,623	22.50%	46.21%
3	SKATE, NK	217,238	1,545,623	14.06%	60.26%
4	DOGFISH, SPINY	149,701	1,545,623	9.69%	69.95%
5	CRAB, JONAH	49,502	1,545,623	3.20%	73.15%
6	SKATE, THORNY	47,074	1,545,623	3.05%	76.20%
7	MONKFISH (ANGLER, GOOSEFISH)	41,061	1,545,623	2.66%	78.85%
8	LOBSTER, AMERICAN	29,328	1,545,623	1.90%	80.75%
9	FLOUNDER, SAND DAB (WINDOWPANE)	23,446	1,545,623	1.52%	82.27%
10	FLOUNDER, WITCH (GREY SOLE)	22,266	1,545,623	1.44%	83.71%
11	FLOUNDER, SUMMER (FLUKE)	19,723	1,545,623	1.28%	84.99%
12	SKATE, SMOOTH	18,832	1,545,623	1.22%	86.20%
13	FLOUNDER, YELLOWTAIL	17,016	1,545,623	1.10%	87.30%
14	RAVEN, SEA	15,844	1,545,623	1.03%	88.33%
15	SPONGE, NK	15,118	1,545,623	0.98%	89.31%
16	COD, ATLANTIC	13,711	1,545,623	0.89%	90.19%
17	FLOUNDER, AMERICAN PLAICE	12,086	1,545,623	0.78%	90.98%
18	SCULPIN, LONGHORN	9,979	1,545,623	0.65%	91.62%
19	HADDOCK	9,724	1,545,623	0.63%	92.25%
20	OCEAN POUT	9,242	1,545,623	0.60%	92.85%
21	BASS, STRIPED	9,217	1,545,623	0.60%	93.45%
22	CRAB, TRUE, NK	8,419	1,545,623	0.54%	93.99%
23	SKATE, BARNDOOR	7,846	1,545,623	0.51%	94.50%
24	STARFISH, SEASTAR,NK	7,529	1,545,623	0.49%	94.99%
25	REDFISH, NK (OCEAN PERCH)	7,220	1,545,623	0.47%	95.45%
26	CRAB, DEEPSEA, RED	6,660	1,545,623	0.43%	95.88%
27	CRAB, SPIDER, NK	4,945	1,545,623	0.32%	96.20%
28	FISH, NK	4,499	1,545,623	0.29%	96.49%
29	FLOUNDER, FOURSPOT	4,474	1,545,623	0.29%	96.78%
30	FLOUNDER, WINTER (BLACKBACK)	3,871	1,545,623	0.25%	97.03%
31	HAKE, SILVER (WHITING)	3,648	1,545,623	0.24%	97.27%
32	POLLOCK	3,570	1,545,623	0.23%	97.50%
33	LUMPFISH	3,481	1,545,623	0.23%	97.73%
34	SKATE, CLEARNOSE	2,997	1,545,623	0.19%	97.92%
35	CRAB, ROCK	2,961	1,545,623	0.19%	98.11%
36	ANEMONE, NK	2,364	1,545,623	0.15%	98.26%
37	RAY, TORPEDO	2,358	1,545,623	0.15%	98.42%
38	SHARK, BASKING	2,000	1,545,623	0.13%	98.55%
39	DOGFISH, SMOOTH	1,999	1,545,623	0.13%	98.68%
40	SCUP	1,879	1,545,623	0.12%	98.80%
41	SCULPIN, NK	1,742	1,545,623	0.11%	98.91%
42	HAKE, WHITE	1,674	1,545,623	0.11%	99.02%
43	HAKE, RED (LING)	1,280	1,545,623	0.08%	99.10%
44	CRAB, NORTHERN STONE	1,253	1,545,623	0.08%	99.18%
45	SEA ROBIN, STRIPED	1,197	1,545,623	0.08%	99.26%
46	SCALLOP, SEA	1,191	1,545,623	0.08%	99.34%
47	HALIBUT, ATLANTIC	942	1,545,623	0.06%	99.40%
48	FLOUNDER, NK	875	1,545,623	0.06%	99.45%
49	BLUEFISH	854	1,545,623	0.06%	99.51%
50	CRAB, HORSESHOE	716	1,545,623	0.05%	99.56%
51	CRAB, SNOW	590	1,545,623	0.04%	99.59%
52	HERRING, ATLANTIC	563	1,545,623	0.04%	99.63%
53	CRAB, HERMIT, NK	468	1,545,623	0.03%	99.66%

	Species Name	Observed Discards (lb)	Observed Discards, All Species (lb)	Ratio of Discards to All Discards	Cumulative Percent of Total Discards
54	CUSK	435	1,545,623	0.03%	99.69%
55	CRAB, CANCER, NK	288	1,545,623	0.02%	99.71%
56	TILEFISH, GOLDEN	285	1,545,623	0.02%	99.73%
57	SEA ROBIN, NK	267	1,545,623	0.02%	99.74%
58	SEA ROBIN, NORTHERN	260	1,545,623	0.02%	99.76%
59	SEA BASS, BLACK	253	1,545,623	0.02%	99.78%
60	WOLFFISH, ATLANTIC	251	1,545,623	0.02%	99.79%
61	SNAIL, MOONSHELL, NK	241	1,545,623	0.02%	99.81%
62	SKATE, ROSETTTE	236	1,545,623	0.02%	99.82%
63	WHITING, BLACK (HAKE, OFFSHORE)	214	1,545,623	0.01%	99.84%
64	SEA CUCUMBER, NK	179	1,545,623	0.01%	99.85%
65	SHARK, PORBEAGLE (MACKEREL SHARK)	175	1,545,623	0.01%	99.86%
66	RAY, NK	164	1,545,623	0.01%	99.87%
67	SQUID, SHORT-FIN	154	1,545,623	0.01%	99.88%
68	SNAIL, NK	140	1,545,623	0.01%	99.89%
69	MUSSEL, NK	126	1,545,623	0.01%	99.90%
70	HERRING, BLUEBACK	111	1,545,623	0.01%	99.91%
71	WRYMOUTH	108	1,545,623	0.01%	99.91%
72	LUMPSUCKER, ATL SPNY	100	1,545,623	0.01%	99.92%
73	CLAM, NK	100	1,545,623	0.01%	99.93%
74	QUAHOG, OCEAN (BLACK CLAM)	86	1,545,623	0.01%	99.93%
75	SQUID, NK	82	1,545,623	0.01%	99.94%
76	TAUTOG (BLACKFISH)	77	1,545,623	0.00%	99.94%
77	SHAD, AMERICAN	69	1,545,623	0.00%	99.95%
78	HAKE, NK	67	1,545,623	0.00%	99.95%
79	ROSEFISH,BLACK BELLY	66	1,545,623	0.00%	99.95%
80	MACKEREL, ATLANTIC	62	1,545,623	0.00%	99.96%
81	SEA URCHIN, NK	43	1,545,623	0.00%	99.96%
82	WHELK, CHANNELED (SMOOTH)	43	1,545,623	0.00%	99.96%
83	STURGEON, NK	40	1,545,623	0.00%	99.97%
84	SQUIRRELFISH, NK	35	1,545,623	0.00%	99.97%
85	SHRIMP, NK	34	1,545,623	0.00%	99.97%
86	ALEWIFE	33	1,545,623	0.00%	99.97%
87	HAKE, SPOTTED	30	1,545,623	0.00%	99.97%
88	SQUID, ATL LONG-FIN	30	1,545,623	0.00%	99.98%
89	BUTTERFISH	29	1,545,623	0.00%	99.98%
90	HAKE, RED/WHITE MIX	29	1,545,623	0.00%	99.98%
91	CLAM, SURF	26	1,545,623	0.00%	99.98%
92	WHELK, NK, CONCH	25	1,545,623	0.00%	99.98%
93	CUNNER (YELLOW PERCH)	21	1,545,623	0.00%	99.99%
94	SHARK, ATL SHARPNOSE	21	1,545,623	0.00%	99.99%
95	SEA SQUIRT, NK	17	1,545,623	0.00%	99.99%
96	DOGFISH, NK	17	1,545,623	0.00%	99.99%
97	CUSK-EEL, NK	16	1,545,623	0.00%	99.99%
98	HERRING, NK (SHAD)	15	1,545,623	0.00%	99.99%
99	SHARK, SANDBAR (BROWN SHARK)	15	1,545,623	0.00%	99.99%
100	HAGFISH, ATLANTIC	13	1,545,623	0.00%	99.99%
101	CRAB, SPIDER, PORTLY	13	1,545,623	0.00%	99.99%
102	OCTOPUS, NK	12	1,545,623	0.00%	99.99%
103	EEL, NK	11	1,545,623	0.00%	99.99%
104	EELPOUT, NK	11	1,545,623	0.00%	100.00%
105	CRAB, LADY	11	1,545,623	0.00%	100.00%
106	DORY, BUCKLER (JOHN)	10	1,545,623	0.00%	100.00%
107	SHAD, HICKORY	7	1,545,623	0.00%	100.00%
108	CRAB, BLUE	5	1,545,623	0.00%	100.00%

	Species Name	Observed Discards (lb)	Observed Discards, All Species (lb)	Ratio of Discards to All Discards	Cumulative Percent of Total Discards
109	MENHADEN, ATLANTIC	5	1,545,623	0.00%	100.00%
110	JELLYFISH, NK	5	1,545,623	0.00%	100.00%
111	FLOUNDER, LEFTEYE, NK	5	1,545,623	0.00%	100.00%
112	WHELK, KNOBBED	4	1,545,623	0.00%	100.00%
113	INVERTEBRATE, NK	4	1,545,623	0.00%	100.00%
114	TRIGGERFISH, NK (LEATHERJACKET)	3	1,545,623	0.00%	100.00%
115	WEAKFISH (SQUETEAGUE SEA TROUT)	2	1,545,623	0.00%	100.00%
116	ROCKLING, FOURBEARD	2	1,545,623	0.00%	100.00%
117	MACKEREL, NK	1	1,545,623	0.00%	100.00%
118	SHRIMP, MANTIS	1	1,545,623	0.00%	100.00%
119	SHRIMP, PANDALID, NK (NORTHERN)	1	1,545,623	0.00%	100.00%
120	TOADFISH, OYSTER	1	1,545,623	0.00%	100.00%
121	STARGAZER, NK	1	1,545,623	0.00%	100.00%
122	GRENADIER, COMMON (MARLINSPIKE)	1	1,545,623	0.00%	100.00%
123	SEA ROBIN, ARMORED	1	1,545,623	0.00%	100.00%
124	SCALLOP, BAY	1	1,545,623	0.00%	100.00%

Attachment 2: ***Observed Discards in the NE Extra-Large-Mesh Gillnet***

	Species Name	Observed Discards (lb)	Observed Discards, All Species (lb)	Ratio of Discards to All Discards	Cumulative Percent of Total Discards
1	DOGFISH, SPINY	100,388	241,610	41.55%	41.55%
2	MONKFISH (ANGLER, GOOSEFISH)	29,933	241,610	12.39%	53.94%
3	LOBSTER, AMERICAN	22,402	241,610	9.27%	63.21%
4	SKATE, WINTER (BIG)	19,309	241,610	7.99%	71.20%
5	COD, ATLANTIC	13,922	241,610	5.76%	76.96%
6	SKATE, BARNDOOR	7,871	241,610	3.26%	80.22%
7	CRAB, JONAH	7,444	241,610	3.08%	83.30%
8	CRAB, ROCK	4,831	241,610	2.00%	85.30%
9	RAVEN, SEA	4,266	241,610	1.77%	87.07%
10	SKATE, LITTLE	3,768	241,610	1.56%	88.63%
11	SKATE, THORNY	3,167	241,610	1.31%	89.94%
12	TUNA, BLUEFIN	2,875	241,610	1.19%	91.13%
13	FLOUNDER, SUMMER (FLUKE)	2,416	241,610	1.00%	92.13%
14	FISH, NK	2,286	241,610	0.95%	93.07%
15	BLUEFISH	1,935	241,610	0.80%	93.88%
16	CRAB, TRUE, NK	1,577	241,610	0.65%	94.53%
17	SKATE, NK	1,535	241,610	0.64%	95.16%
18	POLLOCK	1,526	241,610	0.63%	95.79%
19	BASS, STRIPED	1,219	241,610	0.50%	96.30%
20	STARFISH, SEASTAR,NK	1,169	241,610	0.48%	96.78%
21	SHARK, PORBEAGLE (MACKEREL SHARK)	721	241,610	0.30%	97.08%
22	SPONGE, NK	631	241,610	0.26%	97.34%
23	LUMPFISH	515	241,610	0.21%	97.56%
24	HAKE, WHITE	437	241,610	0.18%	97.74%
25	SHARK, THRESHER	400	241,610	0.17%	97.90%
26	MACKEREL, ATLANTIC	392	241,610	0.16%	98.06%
27	SHARK, MAKO, NK	300	241,610	0.12%	98.19%
28	CRAB, NORTHERN STONE	294	241,610	0.12%	98.31%
29	MUSSEL, NK	289	241,610	0.12%	98.43%
30	RAY, TORPEDO	282	241,610	0.12%	98.55%
31	HAKE, RED (LING)	277	241,610	0.11%	98.66%
32	SKATE, SMOOTH	258	241,610	0.11%	98.77%
33	FLOUNDER, YELLOWTAIL	200	241,610	0.08%	98.85%
34	OCEAN POUT	176	241,610	0.07%	98.92%
35	HADDOCK	176	241,610	0.07%	98.99%
36	FLOUNDER, WINTER (BLACKBACK)	153	241,610	0.06%	99.06%
37	CRAB, SPIDER, NK	126	241,610	0.05%	99.11%
38	SHARK, MAKO, SHORTFIN	120	241,610	0.05%	99.16%
39	CRAB, HORSESHOE	116	241,610	0.05%	99.21%
40	SCULPIN, LONGHORN	115	241,610	0.05%	99.26%
41	STURGEON, ATLANTIC	113	241,610	0.05%	99.30%
42	SKATE, CLEARNOSE	107	241,610	0.04%	99.35%
43	STURGEON, SHORT-NOSE	100	241,610	0.04%	99.39%
44	DOGFISH, SMOOTH	99	241,610	0.04%	99.43%
45	DORY, BUCKLER (JOHN)	97	241,610	0.04%	99.47%
46	HAKE, SILVER (WHITING)	97	241,610	0.04%	99.51%
47	TUNA, NK	95	241,610	0.04%	99.55%
48	SEA ROBIN, NORTHERN	88	241,610	0.04%	99.58%
49	HALIBUT, ATLANTIC	82	241,610	0.03%	99.62%
50	TUNA, YELLOWFIN	71	241,610	0.03%	99.65%
51	TILEFISH, GOLDEN	71	241,610	0.03%	99.68%
52	DOGFISH, NK	69	241,610	0.03%	99.71%

	Species Name	Observed Discards (lb)	Observed Discards, All Species (lb)	Ratio of Discards to All Discards	Cumulative Percent of Total Discards
53	SEA URCHIN, NK	69	241,610	0.03%	99.73%
54	FLOUNDER, NK	50	241,610	0.02%	99.75%
55	SCALLOP, SEA	49	241,610	0.02%	99.78%
56	SNAIL, NK	48	241,610	0.02%	99.80%
57	HERRING, ATLANTIC	46	241,610	0.02%	99.81%
58	FLOUNDER, FOURSPOT	43	241,610	0.02%	99.83%
59	CRAB, CANCER, NK	36	241,610	0.01%	99.85%
60	SCULPIN, NK	33	241,610	0.01%	99.86%
61	CLAM, NK	30	241,610	0.01%	99.87%
62	CRAB, DEEPSEA, RED	26	241,610	0.01%	99.88%
63	SEA BASS, NK	24	241,610	0.01%	99.89%
64	FLOUNDER, AMERICAN PLAICE	22	241,610	0.01%	99.90%
65	SHARK, NK	20	241,610	0.01%	99.91%
66	STURGEON, NK	20	241,610	0.01%	99.92%
67	CRAB, HERMIT, NK	19	241,610	0.01%	99.93%
68	WHELK, NK, CONCH	18	241,610	0.01%	99.93%
69	SEA CUCUMBER, NK	18	241,610	0.01%	99.94%
70	TAUTOG (BLACKFISH)	17	241,610	0.01%	99.95%
71	SHAD, AMERICAN	16	241,610	0.01%	99.96%
72	SEA ROBIN, STRIPED	13	241,610	0.01%	99.96%
73	FLOUNDER, LEFTEYE, NK	12	241,610	0.00%	99.97%
74	REDFISH, NK (OCEAN PERCH)	11	241,610	0.00%	99.97%
75	CUNNER (YELLOW PERCH)	9	241,610	0.00%	99.97%
76	ANEMONE, NK	9	241,610	0.00%	99.98%
77	SEA SQUIRT, NK	8	241,610	0.00%	99.98%
78	SNAIL, MOONSHELL, NK	8	241,610	0.00%	99.98%
79	WRYMOUTH	5	241,610	0.00%	99.99%
80	HERRING, BLUEBACK	4	241,610	0.00%	99.99%
81	HAKE, NK	4	241,610	0.00%	99.99%
82	JELLYFISH, NK	3	241,610	0.00%	99.99%
83	LAMPREY, NK	3	241,610	0.00%	99.99%
84	CUSK	2	241,610	0.00%	99.99%
85	FLOUNDER, SAND DAB (WINDOWPANE)	2	241,610	0.00%	99.99%
86	SEA ROBIN, NK	2	241,610	0.00%	99.99%
87	DOGFISH, CHAIN	2	241,610	0.00%	99.99%
88	CORAL, STONY, NK	2	241,610	0.00%	100.00%
89	STARFISH, BRITTLE,NK	2	241,610	0.00%	100.00%
90	SEA ROBIN, ARMORED	2	241,610	0.00%	100.00%
91	HAGFISH, ATLANTIC	1	241,610	0.00%	100.00%
92	INVERTEBRATE, NK	1	241,610	0.00%	100.00%
93	BUTTERFISH	1	241,610	0.00%	100.00%
94	FLOUNDER, WITCH (GREY SOLE)	1	241,610	0.00%	100.00%
95	SCUP	1	241,610	0.00%	100.00%
96	SKATE, ROSETTTE	1	241,610	0.00%	100.00%
97	WORM, NK	1	241,610	0.00%	100.00%

Attachment 3: ***Observed Discards in the MA Extra-Large-Mesh Gillnet***

	Species Name	Observed Discards (lb)	Observed Discards, All Species (lb)	Ratio of Discards to All Discards	Cumulative Percent of Total Discards
1	DOGFISH, SPINY	3,620	13,386	27.05%	27.05%
2	CRAB, HORSESHOE	2,107	13,386	15.74%	42.79%
3	MONKFISH (ANGLER, GOOSEFISH)	1,712	13,386	12.79%	55.58%
4	SKATE, LITTLE	1,469	13,386	10.97%	66.55%
5	SKATE, WINTER (BIG)	603	13,386	4.50%	71.05%
6	STARFISH, SEASTAR,NK	600	13,386	4.48%	75.53%
7	STURGEON, ATLANTIC	547	13,386	4.09%	79.62%
8	BASS, STRIPED	453	13,386	3.38%	83.00%
9	FISH, NK	379	13,386	2.83%	85.83%
10	BLUEFISH	328	13,386	2.45%	88.28%
11	SKATE, NK	322	13,386	2.40%	90.68%
12	STURGEON, NK	235	13,386	1.76%	92.44%
13	SPONGE, NK	192	13,386	1.43%	93.87%
14	FLOUNDER, SUMMER (FLUKE)	113	13,386	0.84%	94.71%
15	STURGEON, SHORT-NOSE	110	13,386	0.82%	95.53%
16	SKATE, CLEARNOSE	107	13,386	0.80%	96.33%
17	DOGFISH, SMOOTH	89	13,386	0.66%	97.00%
18	CRAB, JONAH	80	13,386	0.60%	97.59%
19	CRAB, ROCK	60	13,386	0.45%	98.04%
20	SCALLOP, SEA	60	13,386	0.44%	98.49%
21	CRAB, TRUE, NK	27	13,386	0.20%	98.69%
22	MENHADEN, ATLANTIC	23	13,386	0.17%	98.86%
23	CRAB, SPIDER, NK	23	13,386	0.17%	99.03%
24	LOBSTER, AMERICAN	18	13,386	0.13%	99.17%
25	CROAKER, ATLANTIC	18	13,386	0.13%	99.30%
26	FLOUNDER, NK	15	13,386	0.11%	99.41%
27	DOGFISH, NK	15	13,386	0.11%	99.53%
28	STARGAZER, NK	14	13,386	0.10%	99.63%
29	RAY, TORPEDO	12	13,386	0.09%	99.72%
30	WHELK, NK, CONCH	8	13,386	0.06%	99.78%
31	CRAB, CANCER, NK	7	13,386	0.05%	99.83%
32	ANCHOVY, NK	5	13,386	0.04%	99.87%
33	STARFISH, BRITTLE,NK	5	13,386	0.04%	99.91%
34	WEAKFISH (SQUETEAGUE SEA TROUT)	4	13,386	0.03%	99.94%
35	CRAB, HERMIT, NK	2	13,386	0.01%	99.95%
36	MACKEREL, FRIGATE	1	13,386	0.01%	99.96%
37	HERRING, BLUEBACK	1	13,386	0.01%	99.97%
38	SEA ROBIN, STRIPED	1	13,386	0.01%	99.98%
39	CLAM, NK	1	13,386	0.01%	99.99%
40	MUSSEL, NK	1	13,386	0.01%	99.99%
41	SEA ROBIN, NORTHERN	1	13,386	0.00%	100.00%
42	SEA URCHIN, NK	1	13,386	0.00%	100.00%

Examples of how observer discard data can be queried and analyzed to support management decisions.

Example 1

The follow excerpts are from pages 137, 152, and 153 of Framework 40A to the Northeast Multispecies FMP. This example demonstrates the use of observer discard data to make predictions of possible biological impacts of management alternatives. The complete document is available at: http://www.nefmc.org/nemulti/index.html.

ENVIRONMENTAL CONSEQUENCES – ANALYSIS OF IMPACTS
Proposed Action

CAII Haddock SAP
An experiment has not been conducted that estimates the incidental catch species that will be taken during the CAII haddock SAP. As a result, this analysis uses recent observer reports from the area and the results of several gear experiments to evaluate the impacts of this SAP on incidental catch species. First examined were observer reports for trawl trips in SA 561 and 562 from calendar years 2001 through 2003. A summary of observed tows by area and quarter is provided in Table 45. The analyses focus on 2002 and 2003 because of the higher level of observer coverage in SA 562. Note that for these tows, there was no requirement to use a haddock separator trawl. Catches of the top fifteen species are shown by statistical area for calendar years 2002 and 2003 in Table 57 and Table 58. Of the regulated groundfish species in this list, the stocks of concern that were caught most frequently in both years were cod, white hake, plaice, and witch flounder. Large quantities of skates were also caught and these catches will be discussed in a following section that analyzes bycatch.

The proposed SAP is allocated a portion of the GB cod incidental catch TAC. The observed trips were examined further to determine catch rates of cod and to estimate the number of days that may be fished before the cod TAC is caught. Cod catches on observed tows in 2002 averaged 109 lbs./tow for the entire area. The difference between the average cod/tow in SA 561 (166) and SA 562 (75) was statistically significant. Catch per tow on observed tows in 2003 was 245 lbs./tow. Once again, the catch per tow in SA 561 (365) was significantly higher than that in SA 562 (141). Catches for plaice, white hake, and witch flounder were less than 25 lbs./tow. 2003 tows were analyzed to determine the mean catch of cod on tows targeting haddock. For both areas, the average cod catch/tow was 235 lbs for tows targeting haddock. The cod catch/tow in SA 561 (457 lbs.) was significantly different than that in SA 562 (110 lbs.). According to the data, catches per tow of cod are higher in SA 561, while catches of haddock are higher in SA 562.

	Number of Observed Tows								
	2001			2002			2003		
Quarter	Both	561	562	Both	561	562	Both	561	562
1	68	63	5	29	20	9	192	108	84
2	54	52	2	135	41	94	576	321	255
3	9	9	0	208	58	150	240	67	173
4	30	29	1	72	49	23	189	55	134
Total	161	153	8	444	168	276	1197	551	646

Table 45 – Observed otter trawl tows, calendar years 2001 – 2003, statistical areas 561 and 562 (NMFS OBDBS database)

Species	SA 561		SA 562		Grand Total
	Discarded	Kept	Discarded	Kept	
ANGLER	955	17,246	479	4,008	22,688
COD	631	27,181	136	20,526	48,473
FLOUNDER, AM. PLAICE	150	5,486	3	13	5,652
FLOUNDER, SUMMER	66	192	4,633	2,399	7,289
FLOUNDER, WINTER	2	30,208	1,695	287,302	319,207
FLOUNDER, YELLOWTAIL	378	25,468	165	41,184	67,194
HADDOCK	292	15,966	758	18,163	35,179
HAKE, WHITE	77	4,823	9	34	4,943
LOBSTER	1,752	5,980	2,272	6,246	16,250
SCALLOP, SEA	261	8	6,514	3,490	10,273
SEA RAVEN	2,021	10	2,150	10	4,191
SKATE, LITTLE	14,428	1,352	111,140		126,920
SKATE, THORNY	2,779		1,883		4,662
SKATE, WINTER(BIG)	12,761	7,228	72,358	13,287	105,634
SKATES	5,980	70	35,401	2,303	43,754
Grand Total	42,532	141,218	239,594	398,962	822,307

Table 57 – Top fifteen species caught by otter trawls on observed tows in SAs 561 and 562, 2002 (pounds) (NMFS OBDBS)

Species	SA 561		SA 562		Grand Total
	Discarded	Kept	Discarded	Kept	
ANGLER	3,787	72,916	1,939	11,309	89,951
COD	11,210	190,872	1,412	89,895	293,388
FLOUNDER, AM. PLAICE	1,210	16,384	53	1,630	19,277
FLOUNDER, WINTER	1,554	85,278	432	354,303	441,566
FLOUNDER, WITCH	1,304	9,192	329	1,181	12,006
FLOUNDER, YELLOWTAIL	954	83,699	4,012	131,763	220,428
HADDOCK	3,313	39,560	6,656	199,215	248,743
HAKE, SILVER	759	243	212	17,111	18,325
LOBSTER	6,581	25,037	3,995	15,038	50,651
POLLOCK	24	19,115		445	19,584
SCALLOP, SEA	2,554	7,268	15,794	12,745	38,360
SEA RAVEN	5,027		7,412		12,439
SKATE, LITTLE	56,812		282,885		339,697
SKATE, WINTER(BIG)	66,581	46,318	330,624	56,742	500,264
SKATES	16,018	14,742	87,040	20,611	138,410
Grand Total	177,687	610,622	742,794	911,986	2,443,089

Table 58 – Top fifteen species caught by otter trawls on observed tows in SAs 561 and 562, 2003 (pounds round weight), 2003 (NMFS OBDBS)

Example 2

The following excerpt is from page 205 of Framework 42 to the Northeast Multispecies FMP. This is a good example of how observer discard data can be used to examine a specific program in a defined area and time period, in this case, the Yellowtail Flounder Special Access Program in Closed Area II. The complete document is available at: http://www.nefmc.org/nemulti/index.html.

6.5.2.4 Closed Area II Yellowtail Flounder Special Access Program

Yellowtail flounder discards in the SAP were reviewed to determine the cause. Thirty-one (out of 319, or 9.7 percent) trawl trips in the CAII Yellowtail Flounder SAP were observed. Yellowtail flounder (600,805 lbs.), haddock (156,378 lbs.), sea scallops (88,634 lbs.), monkfish (68,417 lbs.), and winter skates (47,517 lbs.) were the top five kept species on these observed trips. The top discarded species were skates (704,205 lbs., all species), sea scallops (32,610 lbs.), yellowtail flounder (30,290 lbs.), and haddock (22,178 lbs.). The primary reason for yellowtail flounder discards on observed trips was that the fish were smaller than the regulatory minimum size (21,289 lbs., or 70 percent of observed discards). Vessels that had filled their quota discarded another 3,409 lbs. on observed trips, while 4,081 lbs. were discarded due to market conditions.

Example 3

The following excerpts are from page 211-215 of Framework 42 to the Northeast Multispecies FMP. In this example, observer discard data are used to help evaluate the performance of the haddock separator trawl in commercial fishing operations. The complete document is available at: http://www.nefmc.org/nemulti/index.html.

6.5.2.8 Haddock Separator Trawl

This action proposes two measures that require use of the haddock separator trawl: an extension of the Eastern U.S./CA Haddock SAP, and a proposal to require the use of the separator trawl when participating in the Category B (regular) DAS Program (which may be renewed). There are a limited number of observed trips by vessels using the separator trawl which can be used to supplement experimental data on the performance of the trawl.

The observer (OBDBS) database was queried to identify trawl trips that used a separator panel (excluder device='3') in CY 2005. A total of 20 observed trips were identified in the database as of December 14, 2005. Additional observed trips may have occurred but may not yet be entered into the database. Fourteen trips were recorded as U.S./CA area trips while six trips were recorded as Category B (regular) DAS trips. This designation is made by the observer, and it is possible that they are not exclusive (e.g. a Category B (regular) program trip may occur in the U.S./CA area). Seven trips made tows both with and without the panel. Most trips used the separator panel in the Eastern U.S./Canada area (SAs 561 and 562).

Catches (kept and discarded) of the top twenty-five species on tows using a separator panel are shown in Table 74. Regulated groundfish accounted for sixty-five percent of the catch, with haddock, yellowtail flounder, cod, and winter flounder as the four largest regulated groundfish components. Combined catches of skates (207,136 lbs.) exceeded the haddock catch (199,634 lbs.). The overall ratio of haddock to yellowtail flounder was 2.6:1, the ratio of haddock to cod was 4.2:1, and the ratio of haddock to winter flounder was 3.2:1. Monkfish, witch flounder, and plaice were also caught in substantial quantities.

The ratio of haddock to other species was compared for trips identified as occurring in the Category B (regular) DAS program and trips identified as taking place in the U.S./CA area. With only five observed trips using the separator trawl in the Category B (regular) DAS program these results should not be considered definitive. While the ratio of haddock to winter flounder in both programs was similar (3.1:1 in the U.S./CA area, 3.4:1 in the Category B(regular) DAS program), the ratio of haddock to yellowtail flounder was 4.1:1 in the U.S./CA program but 1.1:1 in the Category B (regular) DAS Pilot Program. The ratio of haddock to cod in the U.S./CA program was 3.8:1, while it was 7:1 in the Category B (regular) DAS program. The ratio of haddock to monkfish was similar in both programs.

Haddock discards accounted for six percent of the haddock catch (12,466 lbs.), with almost all discards due to the fish being smaller than the regulatory minimum. Cod discards accounted for fifty percent (21,504 lbs.) of the cod catch; sixty-seven percent of these discards were due to a filled vessel quota, twenty-three percent were due to high grading, and various other reasons were given for the remaining discards. Ninety-four percent of the skates caught were discarded, totaling 193,937 pounds. Winter skate (49,716 lbs.) and little skates (54,369 lbs.) were the largest components identified by species, but an additional 78,711 lbs. was identified as skates (NK). There were also 10,609 lbs. of barndoor skates caught, all discarded, and 532 lbs. of smooth skates.

Catch composition on tows using the separator trawl was examined by trip, focusing on regulated groundfish. All twenty trips caught haddock and cod while using a separator trawl, seventeen trips caught yellowtail, winter flounder, or monkfish, fifteen trips caught plaice, and thirteen trips caught grey sole (witch flounder). The ratio of haddock to cod for the twenty trips ranged from 0.2:1 to 22.4:1. For the seventeen observed trips that caught winter flounder, the ratio of haddock to winter flounder ranged from 0.1:1 to 186.8:1. For the trips that caught yellowtail flounder, the ratio of haddock to yellowtail flounder ranged from 0.1:1 to 5,230:1.

There were a total of 405 observed tows that used a separator trawl on these fifteen trips. Over these tows, haddock was caught on 370 tows (ninety-one percent), cod on 309 tows (seventy-six percent), yellowtail flounder on 266 tows (sixty-six percent), and winter flounder on 243 tows (sixty percent). The average catch of haddock per tow was 493 lbs., yellowtail flounder was 189 lbs., cod was 117 lbs., and winter flounder was 156 lbs. In comparison to the observed data, FW 40A estimated that the cod catch per tow would be between 47 and 92 lbs. and the haddock catch per tow would be 765 lbs. There was considerable variation in the catch of regulated groundfish between trips and tows. For example, four trips did not have any tows catching yellowtail flounder, four trips had occasional tows that caught small amounts, one trip had yellowtail catches decline as the trip passed, and six trips had frequent tows catching sizeable amounts of yellowtail flounder.

As reported earlier, seven trips made tows both with and without the separator trawl. These trips were examined to contrast the performance of tows using the separator trawl with tows that did not use the separator trawl by vessels that used both on the same trip. While this approach reduces the likelihood that any differences are due to differences between vessels, it does not resolve the issue that catches may be the result not just of the gear used, but numerous other factors: location, depth fished, etc. Catch composition differed: haddock accounted for twelve percent of the catch on tows without the separator trawl, and thirty-three percent of the catch on tows with the trawl (Table 75). Overall, the ratio of haddock to cod for these trips, while not using the separator trawl, was 1.4:1, the ratio of haddock to yellowtail flounder was 0.7:1, the ratio of haddock to winter flounder was 11.8:1, and the ratio of haddock to monkfish was 1:1. While using a separator trawl, for these vessels the ratio of haddock to cod on the same trip was 2.5:1, the ratio of haddock to yellowtail flounder was 7.4:1, the ratio of haddock to winter flounder was 3.1:1, and the ratio of haddock to monkfish was 6.3:1. In an effort to reduce the influence of tows in different areas, five trips were examined that fished in SA 561 and 562. The results, while not detailed here, were similar.

Table 73 – Observed trips using a separator panel, CY 2005 (OBDBS data available as of December 14, 2005)

Program	Month	521	522	525	561	562	Total
US/CA	01	0	0	0	0	1	1
	03	1	0	0	4	3	5
	05	0	1	0	5	5	5
	06	0	0	1	0	2	2
	07	0	0	1	1	1	1
Sub-Total		1	1	1	10	10	14
CAT B (regular)	03	1	1	0	0	0	1
	05	0	0	1	0	2	2
	06	2	2	1	0	0	2
	07	0	1	0	0	0	1
Sub-Total		3	3	2	0	4	6
Grand Total		4	4	3	10	14	20

Table 74 – Catches (pounds, live weight, kept and discarded) by statistical area on observed tows using a haddock separator trawl, CY 2005

COMNAME	521	522	525	552	561	562	Grand Total
HADDOCK	8,445	31,152	142	18	47,946	140,234	227,937
SKATE, LITTLE	25	83,432	1,977	500	5,975	44,916	136,825
FLOUNDER, YELLOWTAIL	1	1,375	4,633	30	3,834	91,623	101,496
MONKFISH (ANGLER, GOOSEFISH)	9,368	43,446	341	0	23,475	14,187	90,817
SKATE, WINTER (BIG)	2,105	10,700	357	693	21,087	51,773	86,715
SKATE, NK	1,770	235	1,500	0	8,766	70,805	83,076
FLOUNDER, WINTER (BLACKBACK)	5	174	67	420	9,461	54,546	64,673
COD, ATLANTIC	12,712	1,591	41	339	32,955	16,339	63,977
FLOUNDER, AMERICAN PLAICE	876	2,681	54	0	24,635	1,898	30,144
FLOUNDER, WITCH (GREY SOLE)	14,813	1,415	105	0	9,583	3,331	29,247
LOBSTER, AMERICAN	1,785	2,130	34	0	13,902	3,776	21,627
SKATE, BARNDOOR	98	434	306	0	515	10,369	11,722
CRAB, JONAH	11	9,310	0	0	24	157	9,502
POLLOCK	873	1,344	0	0	6,226	238	8,681
HAKE, WHITE	191	930	0	0	4,400	9	5,530
FLOUNDER, SAND DAB (WINDOWPANE)	0	3	136	15	70	3,813	4,037
SCALLOP, SEA	0	112	1	0	303	3,289	3,705
RAVEN, SEA	114	114	217	10	711	2,515	3,681
DOGFISH, SPINY	185	186	0	0	2,895	201	3,467
FLOUNDER, FOURSPOT	0	42	210	0	51	2,238	2,541
HAKE, RED (LING)	8	7	138	0	1,393	218	1,764
HERRING, ATLANTIC	0	1,482	0	0	4	0	1,486
STARFISH, SEASTAR,NK	6	717	2	0	11	713	1,449
FLOUNDER, SUMMER (FLUKE)	0	89	80	10	24	955	1,158
OCEAN POUT	9	41	8	0	128	804	990
Grand Total	53,400	193,142	10,349	2,035	218,374	518,947	996,247

Table 75 – Catch composition (pounds, live weight) for seven trips that made tows with and without the separator panel, CY 2005 (Source: NMFS OBDBS as of December 12, 2005)

COMNAME	Without Separator	With Separator	Grand Total
HADDOCK	17,679	40,893	58,572
SKATE, WINTER (BIG)	21,960	14,207	36,167
FLOUNDER, YELLOWTAIL	23,750	5,560	29,310
COD, ATLANTIC	12,920	16,146	29,066
MONKFISH (ANGLER, GOOSEFISH)	17,117	6,489	23,606
SKATE, LITTLE	14,346	5,754	20,100
SKATE, NK	2,875	14,163	17,038
FLOUNDER, WINTER (BLACKBACK)	1,494	13,209	14,703
FLOUNDER, AMERICAN PLAICE	10,462	1,416	11,878
LOBSTER, AMERICAN	7,109	3,359	10,468
FLOUNDER, WITCH (GREY SOLE)	4,135	1,715	5,850
POLLOCK	4,300	623	4,923
HAKE, WHITE	3,490	469	3,959
SCALLOP, SEA	2,766	150	2,916
DOGFISH, SPINY	1,893	98	1,991
HAKE, RED (LING)	1,410	0	1,410
SKATE, BARNDOOR	1,083	24	1,107
RAVEN, SEA	365	394	759
FLOUNDER, FOURSPOT	618	1	619
FLOUNDER, SAND DAB (WINDOWPANE)	48	407	455
OCEAN POUT	213	101	314
LUMPFISH	276	12	288
HALIBUT, ATLANTIC	0	263	263
FLOUNDER, SUMMER (FLUKE)	50	63	113
WOLFFISH, ATLANTIC	25	33	58
Grand Total	150,384	125,549	275,933

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Appendix G
Example Discard Report

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National Marine Fisheries Service

EXAMPLE DISCARD REPORT

DATE: SEMI-ANNUAL OR ANNUAL

1.0 INTRODUCTION/SUMMARY

- Include a general description of NMFS Observer Program by Quarter – number of trips observed, fisheries of particular interest/focus, etc.
- Discuss funding issues and other related issues/developments
- Provide projections on coverage across fisheries for upcoming quarters

2.0 OBSERVER DATA FOR FISHERY X

2.1 SUMMARY OF OBSERVED TRIPS IN FISHERY X

- Information could be provided for the quarters in question as well as across the entire year to date.

EXAMPLE TABLES:

Gear Type	Area	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
GEAR 1	XXX					
	XXX					
	XXX					
GEAR 2	XXX					
	XXX					
	XXX					
GEAR 3	XXX					
	XXX					
	XXX					
Totals						

Table F-1. Number of NMFS Observer Days Scheduled for Fishery X during YEAR by Area, Gear, and Quarter.

NMFS SEA SAMPLING BY QUARTER		1	2	3	4
GEAR 1	Observed Trips				
	Total Trips (VTR)				
	% Trips Observed				
GEAR 2	Observed Trips				
	Total Trips (VTR)				
	% Trips Observed				
GEAR 3	Observed Trips				
	Total Trips (VTR)				
	% Trips Observed				
Total No. Observed Trips YTD					
Total No. Trips YTD (VTR)					
Total % Observed Trips YTD					

Table F-2. Distribution of NMFS' Sea Sampling Trips in Fishery X by Gear Type and Quarter (Expressed as Percentage of Total Trips as Reported in the VTRs).

STATISTICAL AREA	GEAR 1	GEAR 2	GEAR 3
XXX			
XXX			
XXX			
XXX			
XXX			
XXX			
XXX			
XXX			
XXX			
XXX			
XXX			
XXX			
Unknown			

Table F-3. Distribution of NMFS' Sea Sampling Trips by Gear Type and Statistical Area in Fishery X.

2.2 OBSERVER DATA BY GEAR TYPE AND AREA IN FISHERY X

- Information could be provided for the quarters in question as well as across the entire year to date.

SPECIES CAUGHT	DISCARD LBS.	KEPT LBS.	TOTAL CATCH LBS.
Species X			
Species X			
Species X			
Species X			
Species X			
Species X			
Species X			
Species X			
Species X			
Species X			
GRAND TOTAL			

Table F-4. Catch and Discards (Lbs.) of All Species on X# Observed Gear Type Trips in Fishery X for Quarter X.

AREA:		Stat Area	Stat Area	Stat Area	Stat Area	Stat Area
Species X	Kept Lbs					
	Discard Lbs					
Species X	Kept Lbs					
	Discard Lbs					
Species X	Kept Lbs					
	Discard Lbs					
Species X	Kept Lbs					
	Discard Lbs					
Species X	Kept Lbs					
	Discard Lbs					

Table F-5. Observed Catch (Kept Fish and Discards) by Statistical Area on X# Observed Gear Type Trips Fishery X for Quarter X.

- Repeat above tables for entire year to date.

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Appendix H
Draft Proposed Regulations

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TITLE 50--Wildlife and Fisheries

CHAPTER VI--FISHERY CONSERVATION AND MANAGEMENT, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

PART 648--FISHERIES OF THE NORTHEASTERN UNITED STATES

Subpart B—Management Measures for the Atlantic Mackerel, Squid, and Butterfish Fisheries

In § 648.21, paragraph (c) is revised to read as follows:

§ 648.21 Procedures for determining initial annual amounts.

(c) *Recommended measures.* * * *

(13) Changes, as appropriate, to the Northeast Region SBRM, including the coefficient of variation (CV) based performance standard, fishery stratification, and/or reports.

* * * * *

In § 648.24, paragraph (a) is revised to read as follows:

§ 648.24 Framework adjustments to management measures.

(a) *Within season management action.* * * *

(1) *Adjustment process.* The Council shall develop and analyze appropriate management actions over the span of at least two Council meetings. The Council must provide the public with advance notice of the availability of the recommendation(s), appropriate justification(s) and economic and biological analyses, and the opportunity to comment on the proposed adjustment(s) at the first meeting and prior to and at the second Council meeting. The Council's recommendations on adjustments or additions to management measures must come from one or more of the following categories: Minimum fish size, maximum fish size, gear restrictions, gear requirements or prohibitions, permitting restrictions, recreational possession limit, recreational seasons, closed areas, commercial seasons, commercial trip limits, commercial quota system including commercial quota allocation procedure and possible quota set asides to mitigate bycatch, recreational harvest limit, annual specification quota setting process, FMP Monitoring Committee composition and process, description and identification of essential fish habitat (and fishing gear management measures that impact EFH), description and identification of habitat areas of particular concern, overfishing definition and related thresholds and targets, regional gear restrictions, regional season restrictions (including option to split seasons), restrictions on vessel size (LOA and GRT) or shaft horsepower, changes to the Northeast Region SBRM (including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs), any other management measures currently included in the FMP, set aside quota for scientific research, regional management, and process for inseason adjustment to the annual specification.

* * * * *

Subpart D—Management Measures for the Atlantic Sea Scallop Fishery

In § 648.55, paragraph (e) is revised to read as follows:

§ 648.55 Framework adjustments to management measures.

* * * * *

(e) * * *

(31) Changes to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs.

(32) Any other management measures currently included in the FMP.

* * * * *

Subpart E—Management Measures for the Atlantic Surf Clam and Ocean Quahog Fisheries

In § 648.77, paragraph (a) is revised to read as follows:

§ 648.77 Framework adjustments to management measures.

(a) *Within season management action.* * * *

(1) *Adjustment process.* The Council shall develop and analyze appropriate management actions over the span of at least two Council meetings. The Council must provide the public with advance notice of the availability of the recommendation(s), appropriate justification(s) and economic and biological analyses, and the opportunity to comment on the proposed adjustment(s) at the first meeting, and prior to and at the second Council meeting. The Council's recommendations on adjustments or additions to management measures must come from one or more of the following categories: The overfishing definition (both the threshold and target levels), description and identification of EFH (and fishing gear management measures that impact EFH), habitat areas of particular concern, set-aside quota for scientific research, VMS, OY range, suspension or adjustment of the surfclam minimum size limit, and changes to the Northeast Region SBRM (including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs).

* * * * *

Subpart F—Management Measures for the NE Multispecies and Monkfish Fisheries

In § 648.90, paragraphs (a), (b), and (c) are revised to read as follows:

§ 648.90 NE multispecies assessment, framework procedures and specifications, and flexible area action system. * * *

(a) * * *

(2) *Biennial review.* (i) Beginning in 2005, the NE Multispecies PDT shall meet on or before September 30 every other year, unless otherwise specified in paragraph (a)(3) of this section, under the conditions specified in that paragraph, to perform a review of the fishery, using the most current scientific information available provided primarily from the NEFSC. Data provided by states, ASMFC, the USCG, and other sources may also be considered by the PDT. Based on this review, the PDT will develop target TACs for the upcoming fishing year(s) and develop options for Council consideration, if necessary, on any changes, adjustments, or additions to DAS allocations, closed areas, or on other measures necessary to achieve the FMP goals and objectives, including changes to the Northeast Region SBRM. For the 2005 biennial review, an updated groundfish assessment, peer-reviewed by independent scientists, will be conducted to facilitate the PDT review for the biennial adjustment, if needed, for the 2006 fishing year. Amendment 13 biomass and fishing mortality targets may not be modified by the 2006 biennial adjustment unless review of all valid pertinent scientific work during the 2005 review process justifies consideration.

(ii) * * *

(iii) Based on this review, the PDT shall recommend target TACs and develop options necessary to achieve the FMP goals and objectives, which may include a preferred option. The PDT must demonstrate through analyses and documentation that the options they develop are expected to meet the FMP goals and objectives. The PDT may review the performance of different user groups or fleet Sectors in developing options. The range of options developed by the PDT may include any of the management measures in the

FMP, including, but not limited to: Target TACs, which must be based on the projected fishing mortality levels required to meet the goals and objectives outlined in the FMP for the 10 regulated species, Atlantic halibut (if able to be determined), and ocean pout; DAS changes; possession limits; gear restrictions; closed areas; permitting restrictions; minimum fish sizes; recreational fishing measures; description and identification of EFH; fishing gear management measures to protect EFH; designation of habitat areas of particular concern within EFH; and changes to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs. In addition, the following conditions and measures may be adjusted through future framework adjustments: Revisions to status determination criteria, including, but not limited to, changes in the target fishing mortality rates, minimum biomass thresholds, numerical estimates of parameter values, and the use of a proxy for biomass; DAS allocations (such as the category of DAS under the DAS reserve program, etc.) and DAS baselines, etc.; modifications to capacity measures, such as changes to the DAS transfer or DAS leasing measures; calculation of area-specific TACs, area management boundaries, and adoption of area-specific management measures; Sector allocation requirements and specifications, including establishment of a new Sector; measures to implement the U.S./Canada Resource Sharing Understanding, including any specified TACs (hard or target); changes to administrative measures; additional uses for Regular B DAS; future uses for C DAS; reporting requirements; the GOM Inshore Conservation and Management Stewardship Plan; GB Cod Gillnet Sector allocation; allowable percent of TAC available to a Sector through a Sector allocation; categorization of DAS; DAS leasing provisions; adjustments for steaming time; adjustments to the Handgear A permit; gear requirements to improve selectivity, reduce bycatch, and/or reduce impacts of the fishery on EFH; SAP modifications; and any other measures currently included in the FMP.

* * * * *

(b) *Small mesh species*— * * *

(ii) The WMC shall recommend management options necessary to achieve FMP goals and objectives pertaining to small-mesh multispecies, which may include a preferred option. The WMC must demonstrate through analyses and documentation that the options it develops are expected to meet the FMP goals and objectives. The WMC may review the performance of different user groups or fleet Sectors in developing options. The range of options developed by the WMC may include any of the management measures in the FMP, including, but not limited to: Annual target TACs, which must be based on the projected fishing mortality levels required to meet the goals and objectives outlined in the FMP for the small-mesh multispecies; possession limits; gear restrictions; closed areas; permitting restrictions; minimum fish sizes; recreational fishing measures; description and identification of EFH; fishing gear management measures to protect EFH; designation of habitat areas of particular concern within EFH; changes to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs; and any other management measures currently included in the FMP.

* * * * *

(c) *Within season management action for NE multispecies, including small-mesh NE multispecies.* * * *

(1) *Adjustment process.* (i) After a management action has been initiated, the Council shall develop and analyze appropriate management actions over the span of at least two Council meetings. The Council shall provide the public with advance notice of the availability of both the proposals and the analyses and opportunity to comment on them prior to and at the second Council meeting. The Council's recommendation on adjustments or additions to management measures, other than to address gear conflicts, must come from one or more of the following categories: DAS changes, effort monitoring, data reporting, possession limits, gear restrictions, closed areas, permitting restrictions, crew limits, minimum fish sizes, onboard observers, minimum hook size and hook style, the use of crucifer in the hook-gear fishery, fleet Sector shares, recreational fishing measures, area closures and other appropriate measures to mitigate marine mammal entanglements and interactions, description and identification of EFH, fishing gear management measures to protect EFH, designation of habitat areas of particular concern within EFH, changes to the Northeast Region SBRM, and any other management measures currently included in the FMP. In addition, the Council's recommendation on adjustments or additions to management measures pertaining to small-mesh NE multispecies, other than to address gear conflicts, must come from one or more of the following categories:

more of the following categories: Quotas and appropriate seasonal adjustments for vessels fishing in experimental or exempted fisheries that use small mesh in combination with a separator trawl/grate (if applicable), modifications to separator grate (if applicable) and mesh configurations for fishing for small-mesh NE multispecies, adjustments to whiting stock boundaries for management purposes, adjustments for fisheries exempted from minimum mesh requirements to fish for small-mesh NE multispecies (if applicable), season adjustments, declarations, participation requirements for the Cultivator Shoal Whiting Fishery Exemption Area, and changes to the Northeast Region SBRM (including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs.

* * * * *

In § 648.96, paragraphs (a), (b), and (c) are revised to read as follows:

§ 648.96 Monkfish annual adjustment process and framework specifications.

(a) *General.* The Monkfish Monitoring Committee (MFMC) shall meet on or before November 15 of each year to develop target TACs for the upcoming fishing year in accordance with paragraph (b)(1) of this section, and options for NEFMC and MAFMC consideration on any changes, adjustment, or additions to DAS allocations, trip limits, size limits, the Northeast Region SBRM (including the CV-based performance standard, fishery stratification, and/or reports), or other measures necessary to achieve the Monkfish FMP's goals and objectives. The MFMC shall review available data pertaining to discards and landings, DAS, and other measures of fishing effort; stock status and fishing mortality rates; enforcement of and compliance with management measures; and any other relevant information.

(b) *Annual Adjustment Procedures*— * * *

(5) *Annual review process.* The Monkfish Monitoring Committee (MFMC) shall meet on or before November 15 of each year to develop options for the upcoming fishing year, as needed, and options for NEFMC and MAFMC consideration on any changes, adjustment, or additions to DAS allocations, trip limits, size limits, the Northeast Region SBRM (including the CV-based performance standard, fishery stratification, and/or reports), or other measures necessary to achieve the Monkfish FMP's goals and objectives. The MFMC shall review available data pertaining to discards and landings, DAS, and other measures of fishing effort; stock status and fishing mortality rates; enforcement of and compliance with management measures; and any other relevant information.

* * * * *

(c) *Annual and in-season framework adjustments to management measures*—(1) *Annual framework process.* (i) Based on their annual review, the MFMC may develop and recommend, in addition to the target TACs and management measures established under paragraph (b) of this section, other options necessary to achieve the Monkfish FMP's goals and objectives, which may include a preferred option. The MFMC must demonstrate through analysis and documentation that the options it develops are expected to meet the Monkfish FMP goals and objectives. The MFMC may review the performance of different user groups or fleet sectors in developing options. The range of options developed by the MFMC may include any of the management measures in the Monkfish FMP, including, but not limited to: Closed seasons or closed areas; minimum size limits; mesh size limits; net limits; liver-to-monkfish landings ratios; annual monkfish DAS allocations and monitoring; trip or possession limits; blocks of time out of the fishery; gear restrictions; transferability of permits and permit rights or administration of vessel upgrades, vessel replacement, or permit assignment; measures to minimize the impact of the monkfish fishery on protected species; gear requirements or restrictions that minimize bycatch or bycatch mortality; transferable DAS programs; changes to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs; and other frameworkable measures included in §§648.55 and 648.90.

* * * * *

Subpart G—Management Measures for the Summer Flounder Fisheries

In § 648.100, paragraphs (a) and (b) are revised to read as follows:

§ 648.100 Catch quotas and other restrictions.

(a) *Review.* The Summer Flounder Monitoring Committee shall review each year the following data, subject to availability, unless a TAL has already been established for the upcoming calendar year as part of a multiple-year specification process, provided that new information does not require a modification to the multiple-year quotas, to determine the annual allowable levels of fishing and other restrictions necessary to achieve, with at least a 50-percent probability of success, a fishing mortality rate (F) that produces the maximum yield per recruit (F_{max}): Commercial, recreational, and research catch data; current estimates of fishing mortality; stock status; recent estimates of recruitment; virtual population analysis results; levels of noncompliance by fishermen or individual states; impact of size/mesh regulations; discards; sea sampling and winter trawl survey data or, if sea sampling data are unavailable, length frequency information from the winter trawl survey and mesh selectivity analyses; impact of gear other than otter trawls on the mortality of summer flounder; and any other relevant information.

(b) *Recommended measures on an annual basis.* * * *

(12) Changes, as appropriate, to the Northeast Region SBRM, including the CV-based performance standard, fishery stratification, and/or reports.

* * * * *

In § 648.108, paragraph (a) is revised to read as follows:

§ 648.108 Framework adjustments to management measures.

(a) *Within season management action.* * * *

(1) *Adjustment process.* The Council shall develop and analyze appropriate management actions over the span of at least two Council meetings. The Council must provide the public with advance notice of the availability of the recommendation(s), appropriate justification(s) and economic and biological analyses, and the opportunity to comment on the proposed adjustment(s) at the first meeting and prior to and at the second Council meeting. The Council's recommendations on adjustments or additions to management measures must come from one or more of the following categories: Minimum fish size, maximum fish size, gear restrictions, gear requirements or prohibitions, permitting restrictions, recreational possession limit, recreational seasons, closed areas, commercial seasons, commercial trip limits, commercial quota system including commercial quota allocation procedure and possible quota set asides to mitigate bycatch, recreational harvest limit, annual specification quota setting process, FMP Monitoring Committee composition and process, description and identification of essential fish habitat (and fishing gear management measures that impact EFH), description and identification of habitat areas of particular concern, overfishing definition and related thresholds and targets, regional gear restrictions, regional season restrictions (including option to split seasons), restrictions on vessel size (LOA and GRT) or shaft horsepower, operator permits, changes to the Northeast Region SBRM (including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs), any other commercial or recreational management measures, any other management measures currently included in the FMP, and set aside quota for scientific research.

* * * * *

Subpart H—Management Measures for the Scup Fishery

In § 648.120, paragraphs (a) and (b) are revised to read as follows:

§ 648.120 Catch quotas and other restrictions.

(a) *Review.* The Scup Monitoring Committee shall review each year the following data, subject to availability, unless a TAL already has been established for the upcoming calendar year as part of a multiple-year specification process, provided that new information does not require a modification to the multiple-year quotas: Commercial, recreational, and research data; current estimates of fishing mortality; stock status; recent estimates of recruitment; virtual population analysis results; levels of noncompliance by fishermen or individual states; impact of size/mesh regulations; impact of gear on the mortality of scup; discards; and any other relevant information. This review will be conducted to determine the allowable levels of fishing and other restrictions necessary to achieve the F that produces the maximum yield per recruit (F_{max}).

(b) *Recommended measures.* * * *

(13) Changes, as appropriate, to the Northeast Region SBRM, including the CV-based performance standard, fishery stratification, and/or reports.

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Subpart I—Management Measures for the Black Sea Bass Fishery

In § 648.140, paragraphs (a) and (b) are revised to read as follows:

§ 648.140 Catch quotas and other restrictions.

(a) *Review.* The Black Sea Bass Monitoring Committee shall review each year the following data, subject to availability, unless a TAL already has been established for the upcoming calendar year as part of a multiple-year specification process, provided that new information does not require a modification to the multiple-year quotas, to determine the allowable levels of fishing and other restrictions necessary to result in a target exploitation rate of 23 percent (based on F_{max}) in 2003 and subsequent years: Commercial, recreational, and research catch data; current estimates of fishing mortality; stock status; recent estimates of recruitment; virtual population analysis results; levels of noncompliance by fishermen or individual states; impact of size/mesh regulations; discards; sea sampling and winter trawl survey data, or if sea sampling data are unavailable, length frequency information from the winter trawl survey and mesh selectivity analyses; impact of gear other than otter trawls, pots and traps on the mortality of black sea bass; and any other relevant information.

(b) *Recommended measures.* * * *

(12) Changes, as appropriate, to the Northeast Region SBRM, including the CV-based performance standard, fishery stratification, and/or reports.

* * * * *

Subpart J—Management Measures for the Atlantic Bluefish Fishery

In § 648.160, paragraphs (a) and (b) are revised to read as follows:

§ 648.160 Catch quotas and other restrictions. * * *

(a) *Annual review.* On or before August 15 of each year, the Bluefish Monitoring Committee will meet to determine the total allowable level of landings (TAL) and other restrictions necessary to achieve the target fishing mortality rate (F) specified in the Fishery Management Plan for Atlantic Bluefish for the upcoming fishing year or the estimated F for the fishing year preceding the Council submission of the recommended specifications, whichever F is lower. In determining the TAL and other restrictions necessary to achieve the specified F, the Bluefish Monitoring Committee will review the following data, subject to availability: Commercial, recreational, and research catch data; current estimates of fishing mortality; stock status; recent estimates of recruitment; virtual population analysis results; levels of noncompliance by fishermen or individual states; impact of size/mesh regulations; discards; sea sampling data; impact of gear other than otter trawls and gill nets on the mortality of bluefish; and any other relevant information.

(b) *Recommended measures.* * * *

(9) Changes, as appropriate, to the Northeast Region SBRM, including the CV-based performance standard, fishery stratification, and/or reports.

* * * * *

In § 648.165, paragraph (a) is revised to read as follows:

§ 648.165 Framework specifications.

(a) *Within season management action.* * * *

(1) *Adjustment process.* After a management action has been initiated, the Council shall develop and analyze appropriate management actions over the span of at least two Council meetings. The Council shall provide the public with advance notice of the availability of both the proposals and the analysis and the opportunity to comment on them prior to and at the second Council meeting. The Council's recommendation on adjustments or additions to management measures must come from one or more of the following categories: Minimum fish size, maximum fish size, gear restrictions, gear requirements or prohibitions, permitting restrictions, recreational possession limit, recreational season, closed areas, commercial season, description and identification of essential fish habitat (EFH), fishing gear management measures to protect EFH, designation of habitat areas of particular concern within EFH, changes to the Northeast Region SBRM (including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports and/or industry-funded observers or observer set-aside programs), and any other management measures currently included in the FMP.

* * * * *

Subpart K–Management Measures for the Atlantic Herring Fishery

In § 648.200, paragraph (b) is revised to read as follows:

§ 648.200 Specifications.

* * * * *

(b) *Guidelines*. As the basis for its recommendations under paragraph (a) of this section, the PDT shall review available data pertaining to: Commercial and recreational catch data; current estimates of fishing mortality; discards; stock status; recent estimates of recruitment; virtual population analysis results and other estimates of stock size; sea sampling and trawl survey data or, if sea sampling data are unavailable, length frequency information from trawl surveys; impact of other fisheries on herring mortality; and any other relevant information. * * *

* * * * *

In § 648.206, paragraph (b) is revised to read as follows:

§ 648.206 Framework provisions.

* * * * *

(b) *Possible framework adjustment measures*. * * *

(29) Changes, as appropriate, to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs; and

(30) Any other measure currently included in the FMP.

* * * * *

Subpart L—Management Measures for the Spiny Dogfish Fishery

In § 648.230, paragraphs (a) and (b) are revised to read as follows:

§ 648.230 Catch quotas and other restrictions.

(a) *Process for setting specifications*. The Spiny Dogfish Monitoring Committee will review the following data at least every 5 years, subject to availability, to determine the total allowable level of landings (TAL) and other restrictions necessary to assure that a target fishing mortality rate specified in the Spiny Dogfish Fishery Management Plan will not be exceeded in each year for which TAL and any other measures are recommended: Commercial and recreational catch data; discards; current estimates of F; stock status; recent estimates of recruitment; virtual population analysis results; levels of noncompliance by fishermen or individual states; impact of size/mesh regulations; sea sampling data; impact of gear other than otter trawls and gill nets on the mortality of spiny dogfish; and any other relevant information.

(b) *Recommended measures*. * * *

(5) Changes to the Northeast Region SBRM, including the CV-based performance standard, fishery stratification, and/or reports; or

(6) Other gear restrictions.

* * * * *

In § 648.237, paragraph (a) is revised to read as follows:

§ 648.237 Framework provisions.

(a) *Within season management action.* * * *

(1) *Adjustment process.* After the Councils initiate a management action, they shall develop and analyze appropriate management actions over the span of at least two Council meetings. The Councils shall provide the public with advance notice of the availability of both the proposals and the analysis for comment prior to, and at, the second Council meeting. The Councils' recommendation on adjustments or additions to management measures must come from one or more of the following categories: Minimum fish size; maximum fish size; gear requirements, restrictions or prohibitions (including, but not limited to, mesh size restrictions and net limits); regional gear restrictions; permitting restrictions and reporting requirements; recreational fishery measures (including possession and size limits and season and area restrictions); commercial season and area restrictions; commercial trip or possession limits; fin weight to spiny dogfish landing weight restrictions; onboard observer requirements; commercial quota system (including commercial quota allocation procedures and possible quota set-asides to mitigate bycatch, conduct scientific research, or for other purposes); recreational harvest limit; annual quota specification process; FMP Monitoring Committee composition and process; description and identification of essential fish habitat; description and identification of habitat areas of particular concern; overfishing definition and related thresholds and targets; regional season restrictions (including option to split seasons); restrictions on vessel size (length and GRT) or shaft horsepower; target quotas; measures to mitigate marine mammal entanglements and interactions; regional management; changes to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside program; any other management measures currently included in the Spiny Dogfish FMP; and measures to regulate aquaculture projects.

* * * * *

Subpart M—Management Measures for the Atlantic Deep-Sea Red Crab Fishery

In § 648.260, paragraph (b) is revised to read as follows:

§ 648.260 Specifications.

* * * * *

(b) *Development of specifications.* In developing the management measures and specifications, the PDT shall review at least the following data, if available: Commercial catch data; current estimates of fishing mortality and catch-per-unit-effort (CPUE); discards; stock status; recent estimates of recruitment; virtual population analysis results and other estimates of stock size; sea sampling, port sampling, and survey data or, if sea sampling data are unavailable, length frequency information from port sampling and/or surveys; impact of other fisheries on the mortality of red crabs; and any other relevant information. * * *

Subpart N—Management Measures for the Tilefish Fishery

In § 648.293, paragraph (a) is revised to read as follows:

§ 648.293   Framework specifications.

(a) *Within-season management action.* * * *

(1) *Specific management measures.* * * *

(xiv) Habitat areas of particular concern,

(xv) Set-aside quotas for scientific research, and

(xvi) Changes to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs.

* * * * *

Subpart O—Management Measures for the NE Skate Complex Fisheries

In § 648.321, paragraph (b) is revised to read as follows:

§ 648.321   Framework adjustment process.

* * * * *

(b) *Possible framework adjustment measures.* * * *

(19) OY and/or MSY specifications;

(20) Changes to the Northeast Region SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, reports, and/or industry-funded observers or observer set-aside programs; and

(21) Any other measures contained in the FMP.

* * * * *

Proposed Regulations for Industry-Funded Observer Program Provisions

Subpart A—General Provisions

In § 648.11, paragraphs (h) and (i) are revised to read as follows:

§ 648.11 At-sea sea sampler/observer coverage.

* * * * *

(h) *Observer service provider approval and responsibilities.*

(1) *General*. An entity seeking to provide observer services must apply for and obtain approval from NMFS following submission of a complete application to The Observer Program Branch Chief, 25 Bernard St Jean Drive, East Falmouth, MA 02536. A list of approved observer service providers shall be distributed to vessel owners and shall be posted on the NMFS/NEFOP website at http://www.nefsc.noaa.gov/femad/fsb/.

(2) *Existing observer service providers*. Observer service providers that currently deploy certified observers in the Northeast must submit an application containing the information specified in paragraph (h)(3) of this section, excluding any information specified in paragraph (h)(3) of this section that has already been submitted to NMFS.

(3) *Contents of application*. An application to become an approved observer service provider shall contain the following:

(i) Identification of the management, organizational structure, and ownership structure of the applicant's business, including identification by name and general function of all controlling management interests in the company, including but not limited to owners, board members, officers, authorized agents, and staff. If the applicant is a corporation, the articles of incorporation must be provided. If the applicant is a partnership, the partnership agreement must be provided.

(ii) The permanent mailing address, phone and fax numbers where the owner(s) can be contacted for official correspondence, and the current physical location, business mailing address, business telephone and fax numbers, and business e-mail address for each office.

(iii) A statement, signed under penalty of perjury, from each owner or owners, board members, and officers, if a corporation, that they are free from a conflict of interest as described under paragraph (h)(6) of this section.

(iv) A statement, signed under penalty of perjury, from each owner or owners, board members, and officers, if a corporation, describing any criminal convictions, Federal contracts they have had, and the performance rating they received on the contract, and previous decertification action while working as an observer or observer service provider.

(v) A description of any prior experience the applicant may have in placing individuals in remote field and/or marine work environments. This includes, but is not limited to, recruiting, hiring, deployment, and personnel administration.

(vi) A description of the applicant's ability to carry out the responsibilities and duties of a fishery observer services provider as set out under paragraph (h)(2) of this section, and the arrangements to be used.

(vii) Evidence of holding adequate insurance to cover injury, liability, and accidental death for observers during their period of employment (including during training). Workers' Compensation and Maritime Employer's Liability insurance must be provided to cover the observer, vessel owner, and observer provider. The minimum coverage required is $5 million. Observer service providers shall provide copies of the insurance policies to observers to display to the vessel owner, operator, or vessel manager, when requested.

(viii) Proof that its observers, either contracted or employed by the service provider, are compensated with salaries that meet or exceed the U.S. Department of Labor (DOL) guidelines for observers. Observers shall be compensated as a Fair Labor Standards Act (FLSA) non-exempt employees. Observer providers shall provide any other benefits and personnel services in accordance with the terms of each observer's contract or employment status.

(ix) The names of its fully equipped, NMFS/NEFOP certified observers on staff or a list of its training candidates (with resumes) and a request for an appropriate NMFS/NEFOP Observer Training class. The NEFOP training has a minimum class size of eight individuals, which may be split among multiple vendors requesting training. Requests for training classes with less than eight individuals will be delayed until further requests make up the full training class size. Requests for training classes must be made 30 days in advance of the requested date and must have a complete roster of trainees at that time.

(x) An Emergency Action Plan (EAP) describing its response to an 'at sea' emergency with an observer, including, but not limited to, personal injury, death, harassment, or intimidation.

(4) *Application evaluation*.

(i) NMFS shall review and evaluate each application submitted under paragraphs (h)(2) and (h)(3) of this section. Issuance of approval as an observer provider shall be based on completeness of the application, and a determination of the applicant's ability to perform the duties and responsibilities of a fishery observer service provider as demonstrated in the application information. A decision to approve or deny an application shall be made by NMFS within 15 business days of receipt of the application by NMFS.

(ii) If NMFS approves the application, the observer service provider's name will be added to the list of approved observer service providers found on NMFS/NEFOP website specified in paragraph (h)(1) of this section and in any outreach information to the industry. Approved observer service providers shall be notified in writing and provided with any information pertinent to its participation in the fishery observer program.

(iii) An application shall be denied if NMFS determines that the information provided in the application is not complete or the evaluation criteria are not met. NMFS shall notify the applicant in writing of any deficiencies in the application or information submitted in support of the application. An applicant who receives a denial of his or her application may present additional information to rectify the deficiencies specified in the written denial, provided such information is submitted to NMFS within 30 days of the applicant's receipt of the denial notification from NMFS. In the absence of additional information, and after 30 days from an applicant's receipt of a denial, an observer provider is required to resubmit an application containing all of the information required under the application process specified in paragraph (h)(3) of this section to be re-considered for being added to the list of approved observer service providers.

(5) *Responsibilities of observer service providers*.

(i) An observer service provider must provide observers certified by NMFS/NEFOP pursuant to paragraph (i) of this section for deployment in a fishery when contacted and contracted by the owner, operator, or vessel manager of a vessel fishing unless the observer service provider refuses to deploy an observer on a requesting vessel for any of the reasons specified at paragraph (viii) of this section. An approved observer service provider must maintain a minimum of eight appropriately-trained NEFOP certified observers in order to remain approved; should a service provider cadre drop below eight, the provider must submit the appropriate number of candidates for the next available training class. Failure to do so shall be cause for suspension of their approved status until rectified.

(ii) An observer service provider must provide to each of its observers:

(A) All necessary transportation, including arrangements and logistics, of observers to the initial location of deployment, to all subsequent vessel assignments, and to any debriefing locations, if necessary;

(B) Lodging, per diem, and any other services necessary for observers assigned to a fishing vessel or to attend an appropriate NMFS/NEFOP Observer Training class;

(C) The required observer equipment, in accordance with equipment requirements listed on the NMFS/NEFOP website specified in paragraph (h)(1) of this section, prior to any deployment and/or prior to NMFS observer certification training; and

(D) Individually assigned communication equipment, in working order, such as a cell phone or pager, for all necessary communication. An observer service provider may alternatively compensate observers for the use of the observer's personal cell phone or pager for communications made in support of, or necessary for, the observer's duties.

(iii) *Observer deployment logistics*. Each approved observer service provider must assign an available certified observer to a vessel upon request. Each approved observer service provider must provide for access by industry 24 hours per day, 7 days per week, to enable an owner, operator, or manager of a vessel to secure observer coverage when requested. The telephone system must be monitored a minimum of four times daily to ensure rapid response to industry requests. Observer service providers approved under paragraph (h) of this section are required to report observer deployments to NMFS daily for the purpose of determining whether the predetermined coverage levels are being achieved in the appropriate fishery.

(iv) *Observer deployment limitations*. Unless alternative arrangements are approved by NMFS, an observer provider must not deploy any observer on the same vessel for two or more consecutive deployments, and not more than twice in any given month. A certified observer's first deployment and the resulting data shall be immediately edited, and approved, by NMFS prior to any further deployments of that observer.

(v) *Communications with observers*. An observer service provider must have an employee responsible for observer activities on call 24 hours a day to handle emergencies involving observers or problems concerning observer logistics, whenever observers are at sea, stationed shoreside, in transit, or in port awaiting vessel assignment.

(vi) *Observer training requirements*. The following information must be submitted to NMFS to request a certified observer training class at least 30 days prior to the beginning of the proposed training class: Date of requested training; a list of observer candidates, with a minimum of eight individuals; observer candidate resumes; and a statement signed by the candidate, under penalty of perjury, that discloses the candidate's criminal convictions, if any. All observer trainees must complete a basic cardiopulmonary resuscitation/first aid course prior to the beginning of a NMFS/NEFOP Observer Training class. NMFS may reject a candidate for training if the candidate does not meet the minimum qualification requirements as outlined by NMFS National Minimum Eligibility Standards for observers as described in paragraph (i)(1) of this section.

(vii) *Reports*.

(A) *Observer deployment reports*. The observer service provider must report to NMFS when, where, to whom, and to what fishery an observer has been deployed, within 24 hours of their departure. The observer service provider must ensure that the observer reports back to NMFS its Observer Contract (OBSCON) data, as described in the certified observer training, within 12 hours of landing. OBSCON data are to be submitted electronically or by other means as specified by NMFS. The observer service provider shall provide the raw (unedited) data collected by the observer to NMFS within 72 hours of the trip landing.

(B) *Safety refusals*. The observer service provider must report to NMFS any trip that has been refused due to safety issues, e.g., failure to hold a valid USCG Commercial Fishing Vessel Safety Examination Decal or to meet the safety requirements of the observer's pre-trip vessel safety checklist, within 24 hours of the refusal.

(C) *Biological samples*. The observer service provider must ensure that biological samples, including whole marine mammals, sea turtles, and sea birds, are stored/handled properly and transported to NMFS within 7 days of landing.

(D) *Observer debriefing*. The observer service provider must ensure that the observer remains available to NMFS, including NMFS Office for Law Enforcement, for debriefing for at least two weeks following any observed trip. If requested by NMFS, an observer that is at sea during the 2-week period must contact NMFS upon his or her return.

(E) *Observer availability report*. The observer service provider must report to NMFS any occurrence of inability to respond to an industry request for observer coverage due to the lack of available observers on staff by 5 pm, Eastern Standard Time, of any day on which the provider is unable to respond to an industry request for observer coverage.

(F) *Other reports*. The observer provider must report possible observer harassment, discrimination, concerns about vessel safety or marine casualty, observer illness or injury, and any information, allegations, or reports regarding observer conflict of interest or breach of the standards of behavior must be submitted to NMFS within 24 hours of the event or within 24 hours of learning of the event.

(viii) *Refusal to deploy an observer*.

(A) An observer service provider may refuse to deploy an observer on a requesting fishing vessel if the observer service provider does not have an available observer within 72 hours of receiving a request for an observer from a vessel.

(B) An observer service provider may refuse to deploy an observer on a requesting fishing vessel if the observer service provider has determined that the requesting vessel is inadequate or unsafe pursuant to the reasons described at §600.746.

(C) The observer service provider may refuse to deploy an observer on a fishing vessel that is otherwise eligible to carry an observer for any other reason including failure to pay for previous observer deployments, provided the observer service provider has received prior written confirmation from NMFS authorizing such refusal.

(6) *Limitations on conflict of interest.* An observer service provider:

(i) Must not have a direct or indirect interest in a fishery managed under Federal regulations, including, but not limited to, a fishing vessel, fish dealer, fishery advocacy group, and/or fishery research;

(ii) Must assign observers without regard to any preference by representatives of vessels other than when an observer will be deployed; and

(iii) Must not solicit or accept, directly or indirectly, any gratuity, gift, favor, entertainment, loan, or anything of monetary value from anyone who conducts fishing or fishing related activities that are regulated by NMFS, or who has interests that may be substantially affected by the performance or nonperformance of the official duties of observer providers.

(7) *Removal of observer service provider from the list of approved observer service providers*. An observer provider that fails to meet the requirements, conditions, and responsibilities specified in paragraphs (h)(5) and (h)(6) of this section shall be notified by NMFS, in writing, that it is subject to removal from the list of approved observer service providers. Such notification shall specify the reasons for the pending removal. An observer service provider that has received notification that it is subject to removal from the list of approved observer service providers may submit information to rebut the reasons for removal from the list. Such rebuttal must be submitted within 30 days of notification received by the observer service provider that the observer service provider is subject to removal and must be accompanied by written evidence that clearly disproves the reasons for removal. NMFS shall review information rebutting the pending removal and shall notify the observer service provider within 15 days of receipt of the rebuttal whether or not the removal is warranted. If no response to a pending removal is received by NMFS, the observer service provider shall be automatically removed from the list of approved observer service providers. The decision to remove the observer service provider from the list, either after reviewing a rebuttal, or if no rebuttal is

submitted, shall be the final decision of NMFS and the Department of Commerce. Removal from the list of approved observer service providers does not necessarily prevent such observer service provider from obtaining an approval in the future if a new application is submitted that demonstrates that the reasons for removal are remedied. Certified observers under contract with an observer service provider that has been removed from the list of approved service providers must complete their assigned duties for any fishing trips on which the observers are deployed at the time the observer service provider is removed from the list of approved observer service providers. An observer service provider removed from the list of approved observer service providers is responsible for providing NMFS with the information required in paragraph (h)(5)(vii) of this section following completion of the trip. NMFS may consider, but is not limited to, the following in determining if an observer service provider may remain on the list of approved observer service providers:

(i) Failure to meet the requirements, conditions, and responsibilities of observer service providers specified in paragraphs (h)(5) and (h)(6) of this section;

(ii) Evidence of conflict of interest as defined under paragraph (h)(3) of this section;

(iii) Evidence of criminal convictions related to:

(A) Embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; or

(B) The commission of any other crimes of dishonesty, as defined by state law or Federal law that would seriously and directly affect the fitness of an applicant in providing observer services under this section;

(iv) Unsatisfactory performance ratings on any Federal contracts held by the applicant; and

(v) Evidence of any history of decertification as either an observer or observer provider.

(i) *Observer certification.*

(1) To be certified, employees or sub-contractors operating as observers for observer service providers approved under paragraph (h) of this section must meet NMFS National Minimum Eligibility Standards for observers. NMFS National Minimum Eligibility Standards are available at the National Observer Program website: http://www.st.nmfs.gov/st4/nop/.

(2) *Observer training*. In order to be deployed on any fishing vessel, a candidate observer must have passed an appropriate NMFS/NEFOP Observer Training course. If a candidate fails training, the candidate shall be notified in writing on or before the last day of training. The notification will indicate the reasons the candidate failed the training. Observer training shall include an observer training trip, as part of the observer's training, aboard a fishing vessel with a trainer. A certified observer's first deployment and the resulting data shall be immediately edited, and approved, by NMFS prior to any further deployments of that observer.

(3) *Observer requirements*. All observers must:

(i) Have a valid NMFS/NEFOP fisheries observer certification pursuant to paragraph (i)(1) of this section;

(ii) Be physically and mentally capable of carrying out the responsibilities of an observer on board fishing vessels, pursuant to standards established by NMFS. Such standards are available from NMFS/NEFOP website specified in paragraph (h)(1) of this section and shall be provided to each approved observer service provider; and

(iii) Have successfully completed all NMFS-required training and briefings for observers before deployment, pursuant to paragraph (i)(2) of this section.

(iv) Hold a current Red Cross (or equivalence) CPR/first aid certification.

(4) *Probation and decertification*. NMFS has the authority to review observer certifications and issue observer certification probation and/or decertification as described in NMFS policy found on the NMFS/NEFOP website specified in paragraph (h)(1) of this section.

(5) *Issuance of decertification*. Upon determination that decertification is warranted under paragraph (i)(3) of this section, NMFS shall issue a written decision to decertify the observer to the observer and approved observer service providers via certified mail at the observer's most current address provided to NMFS. The decision shall identify whether a certification is revoked and shall identify the specific reasons for the action taken. Decertification is effective immediately as of the date of issuance, unless the decertification official notes a compelling reason for maintaining certification for a specified period and under specified conditions. Decertification is the final decision of NMFS and the Department of Commerce and may not be appealed.

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MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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