CORRESPONDENCE

P.O. Box 1230
Marshfield, MA 02050
www.stellwagenbank.org

December 1, 2021

Eric Reid, Chairman
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, Massachusetts 01950

RE: Proposed Georges Bank Recreational Cod Measures

Dear Mr. Reid:

On behalf of the Stellwagen Bank Charter Boat Association, representing over one hundred charter/party boat captains and recreational anglers that fish the Gulf of Maine (GOM) and Georges Bank waters, we offer the following comments to the proposed Georges Bank Cod Measures:

Georges Bank Quota

- An approximate 73.8% reduction is proposed to the Georges Bank quota that equates to an ABC of 754 metric tons with an allocation of 411 metric tons to Canada and the remaining 343 metric tons to the United States (US). The US quota continues to historically go down and the percentage of Canadian quota continues to increase to the detriment of the US fisherman. The September negotiations did not consider the revised stock status and subsequent impacts to the quota that ultimately has changed the outcome with significant cuts to the US quota that is not commensurate with similar reductions to the Canadian quota. This continued inequity is of concern especially as it relates to the recreational portion of the quota. The cuts are being made to the quota independent of the impact to the recreational quota. In addition, the Canadian quota is a commercial quota that when given to Canada does not consider that portion of the quota that is recreational.
- As set forth below the average percentage of recreational catches relative to US fisheries total catches over a three year period for CY 2018-2020 is 20.6%. The assumed 20.6% recreational catch target is presently removed directly from the US 343 metric tons quota and set aside for use by the recreational community. It should be noted that Canadian quota is a commercial quota, yet that 20.6% recreational portion is lost to Canada to the detriment

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of the US recreational anglers. As a result, the 20.6% recreational catch target should be revised and taken from the ABC prior to the split between the US and Canada. Such an approach is fair and equitable to the recreational community.

Georges Bank Recreational Quota

- *Option 3* – 71 mt for FY2022-FY2024 The 3-year (CY2018-CY2020) average percentage of recreational catches relative to US fisheries total catches (20.6%) applied to the proposed FY2022 US ABC (343 mt) results in a GB cod recreational catch target of 71 mt. This three year option normalizes the highs (2020) and lows (2018) observed over this three year period.
- *Option 2* is based on an ABC percentage over the same three year period resulting in a 43 metric ton recreational quota. A five year average was also estimated that resulted in a much higher value than Option 3. Ultimately the 5 year option appears too high and Option two appears to low. Option 3 is an attempt to reach middle ground and appears to be a reasonable approach. We are hesitant to approve any options when an ABC has yet to be established. As a result, we question these Options until ABC is final.

Georges Bank Recreational Seasons and Bag Limits

- The following measures were proposed, but at the time it was not clear if the options would achieve the 73% reduction.

Approach A

- Slot limit 22 in to 28 in fish size
- 5 fish bag limits
- To prioritize the closed season measure to achieve conservation goals, as:
    - First choice- May 1 to July 31 (Wave 3 and Partial Wave 4)
    - Second choice- July and August (Wave 4)

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Approach B

- 23 inch size limit
- 5 fish bag limits
- Closed season Waves 2 & 3

- June, July and August are very important months. The reduction of the bag limit to five fish with the additions of a season closure will have long lasting and devastating consequences for the for hire industry. There will be behavioral changes for the fishing public that will have significant negative social and economic impacts on the for hire sector. We ask that any reductions be spread over a wide geographic range with season restrictions as to not impact one area more than another.
- As a result, closure during Waves 2 & 3 are recommended to achieve the proposed quota reduction to keep us on the water from June through August.
- It should be noted that increased recent catch of recreational cod during Waves 2 & 3 in 2020 may also be reflected in 2021 that would require proactive measures that would not be implemented until 2022. Therefore, closure during Waves 2 & 3 may be necessary to achieve the conservation goals.

Ultimately there is much at stake and the proposed measures will have a significant impact on the for hire and recreational anglers and all of those that rely on such to make a living. If you have any questions or comments, please contact me at the email below.

Very truly yours,

Capt Rick Golden

Capt. Rick Golden
SBCBA, Secretary
captrick@1620anglers.com

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Cc: Tom Nies, NEFMC
Mike Pentony, GARFO
Russell Dunn, NOAA
Moira Kelly, GARFO
Rick Bellivance, Chairman, Groundfish Committee
Frank Blount, Chairman, RAP
Dan McKiernan, MassDMF
Melaney Griffin, MassDMF
Ron Amidon, MassF&G
Barry Gibson, RFA of New England

-----Original Message-----
From: Bounty Hunter Charters <capteric@fishbountyhunter.com>
Sent: Thursday, December 2, 2021 9:02 AM
To: comments <comments@nefmc.org>
Cc: Michael Pierdinock <cpfcharters@yahoo.com>
Subject: Proposed George's Bank Cod Recreational Measures

To whom it might concern:

Although any reduction in the bag limit or season will have a negative impact on the "for-hire" fishery. The only option I can support is "Approach B". Reducing the bag limit to 5 is going to cut out buisness significantly, since it regulates us out of a species specific fishery. Our clients will simply not pay what we need to charge on an offshore trip for 5 fish a man. Therefore it is imperative that we maintain an open season as long as possibly during the summer months so we can promote "mixed bag" trips while the weather conditions are more favorable, and might be able to target more of a "tourist" clientele that would be interested a mixed bag trip. As an industry we are constantly seeing our available resources to target reduced every year. It gets harder to promote a buisness model, as the "bag limits" are reduced. We are selling an opportunity to reach that bag limit. We are not looking to fill the limit daily, but rather sell the seats on the boat with the hopes of getting their "limit".

Sincerely, Eric Morrow

Bounty Hunter Charters

Sent from my iPhone

ASSOCIATED FISHERIES OF MAINE **NORTHEAST SEAFOOD COALITION**

December 3, 2021

Mr. Eric Reid, Chair
New England Fishery Management Council
VIA ELECTRONIC MAIL

Dear Eric:

We write to oppose a 2022 priority for groundfish that would set an ABC equal to zero for Georges Bank yellowtail.

Groundfish vessels continue to do their part to rebuild the stock of GB yellowtail and to avoid accountability measures by successfully maintaining catch of GB yellowtail below the sector sub-ACL. Other users of the GB yellowtail resource must do their part.

We cannot identify any benefit that would flow to the groundfish industry by setting an ABC to zero, particularly after a stock has been allocated to groundfish sectors.

1) Setting an ABC to zero would eliminate the incentive for both groundfish and scallop vessels to minimize catch of GB yellowtail. To date, groundfish sectors have been successful in minimizing catch of GB yellowtail.
2) Setting an ABC to zero would strip groundfish sectors of any economic benefits derived from both landings of GB yellowtail and lease of GB yellowtail ACE.
3) Setting an ABC to zero, even for a short timeframe, would negatively impact the value of groundfish permits.
4) There is no approved assessment model for GB yellowtail. Discarding catch data would be detrimental to improving stock status.
5) Setting an ABC to zero would be in contradiction to the goals and objectives of the sector management system.
6) Amendment 16 describes a process to evaluate sector management measures against stated goals including a) “addressing bycatch” and/or b) “giving industry greater control over their own fate”. A zero ABC would contradict the need to keep GB yellowtail bycatch low and would inhibit sectors’ ability to control their own fate.
7) Setting an ABC to zero would require discarding of any GB yellowtail caught. Amendment 16 explicitly prohibits the discarding of legal-size fish.
8) Setting an ABC at zero would be in contradiction to sector monitoring goals described in Amendment 23, like

- Improving documentation of catch
- incentivizing reduced discards and
- providing additional data stream for stock assessments.

None of these goals are achieved by requiring all contributors to GB yellowtail mortality to discard catch.

Finally, it is indefensible to burden groundfish sectors with the cost of 100% monitoring only to then require sector vessels to discard a valuable source of revenue.

We do support 2022 priorities for groundfish approved by the Groundfish Advisory Panel (11/22/21) Groundfish Committee (11/30/2021).

Sincerely,

Maggie Raymond, Executive Director
Associated Fisheries of Maine

Jackie Odell, Executive Director
Northeast Seafood Coalition

Northeast Seafood Coalition Associated Fisheries of Maine

December 3, 2021

Mr. Eric Reid, Chairman
New England Fishery Management Council
Via: Email

Dear Eric,

We are writing to support a remand of the Georges Bank cod (GB cod) Acceptable Biological Catch (ABC) back to the Council's Scientific and Statistical Committee (SSC) for reevaluation.

When the SSC met on October 25, 2021, the SSC did not have all the relevant information available when considering the ABC recommendation for GB cod. SSC members did not have socio-economic information, as outlined in the Council's Risk Policy Road Map, nor did they have final catch information from the 2020 fishing year that offers a different signal for the resource.

On November 19, 2021, a month after the SSC meeting, NOAA Fisheries Regional Office (GARFO) released the final 2020 catch report. This report states that the recreational fishery (combination of federal recreational and state waters) caught 294.4 mt of GB cod in 2020. *This 2020 catch represents roughly 85% of the 343 mt that would be made available to **ALL** U.S. fisheries in 2022-2024, based upon the recent GB cod assessment report and SSC recommendation. This high 2020 catch is occurring in areas not factored into the PlanBsmooth empirical assessment for GB cod. This is incongruent with the purported status of the resource.*

Continuing to rely upon a "noisy," "data limited" PlanBsmooth assessment which only factors in three years of Georges Bank survey strata/data, with one year missing due to the pandemic, is a serious problem. An SSC recommendation that represents an 80% reduction in the allowable catch for U.S. fisheries using this limited approach without factoring in the signal from the 2020 catch information is wrong.

During the SSC meeting, there was limited to no socio-economic (commercial and recreational) information for the SSC to evaluate the economic risks associated with the highly uncertain assessment and the ABC derived. This is not only counter to the directive offered by the Council's own Risk Policy but it is also inconsistent with how other FMPs provide socio-economic data for SSC consideration and deliberations under a Risk Policy Matrix.

To conclude, we implore the Council to offer a remand to the SSC that factors in all the relevant information available and reconsiders the ABC advice in a manner which does not result in an extended delay of Framework 63.

Specifically, the SSC should evaluate the economic and biological impacts associated with a phased in approach as outlined in the SSC minority report, whose linear decline represents a substantial conservation benefit. This request is consistent with the Council's ABC Control Rule:

> *Option d.: Interim ABCs should be determined for stocks with unknown status according to case-by case recommendations from the SSC.*

It is also consistent with prior SSC recommendations on GB cod, October 23, 2017 SSC report.

> 9. Recommend that the "PlanBsmooth" approach be simulation tested to answer questions about the assessment techniques stability and that other control rule options be investigated such as capping the proportional change from year to year when using this approach.

The Council has also supported a phased approach under their comments for National Standard 1 that we view is warranted now under this circumstance.

The commercial and recreational fishery deserve an SSC evaluation that includes all relevant information before being subjected to the economic losses derived from an assessment approach which is rife with uncertainty.

Sincerely,

Jackie Odell, Executive Director
Northeast Seafood Coalition

Maggie Raymond, Executive Director
Associated Fisheries of Maine

SUSTAINABLE HARVEST SECTOR
PO Box 667, Somersworth NH 03878 | 207-956-8497 | www.groundfish.org

December 3, 2021

Tom Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Tom,

We write to oppose the Council prioritizing setting the Georges Bank yellowtail ACL in 2022 to zero. This is a de facto taking of allocation from the groundfishery that will reduce groundfish permit values, degrade catch accounting, decrease revenues to both groundfish permit holders and the supporting sector management structure, and erode fleet conservation incentives. It is antithetical to the Council's fishery management objectives as implemented in Amendments 16 and 23. There is no looming financial crisis in any fishery which warrants increasing catch uncertainty for this depleted stock.

In a November 12 memo to the Council's Executive Committee, you noted staff time devoted to groundfish in 2022 would be reduced in favor of other priorities, and said the need to address inadequate rebuilding progress was likely to consume much of that time (and is thus by inference a priority). Setting the GB yellowtail ACL to zero contributes nothing to addressing rebuilding progress. Other items, such as crafting adjustments to management measures resulting from cod stock structure research, would do so. It is a mystery to industry how elimination of an ACL vaulted to the top of the Council's priority list for groundfish.

When faced with a low ACL, the groundfishery is required to adopt measures to reduce catch of that stock, such as area closures and selective gear requirements. Sectors themselves implement further conservation measures, including wider area closures and ACE reserves to prevent exceeding catch limits. We have long noted the irony that the most accountable and intensively monitored fishery in the region – our own – is granted the remnants of quota that remain after other fisheries, with less effective monitoring or accountability measures, receive their fill. At the very least, those fisheries should adopt more stringent catch control measures before consideration of simply vaporizing an ACL.

For these reasons, plus the lack of an articulated problem statement from any Council entity to date, we request the Council remove this zero-ACL item from the 2022 priority list.

Sincerely,

Hank Soule
Sector Manager

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

December 14, 2021

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

Dear Eric:

The total target level of at-sea monitoring (ASM) coverage required for Northeast multispecies sectors in fishing year 2022 will be 99 percent of all sector trips subject to the at-sea monitoring program. An ASM target coverage level of 99 percent is the highest level I am allowed to set under the regulations. This target level helps address bias, supports the collection of information and data that will help make future determinations of appropriate ASM coverage levels, and provides the additional benefit of preparing our ASM infrastructure for higher required coverage, if Amendment 23 is approved. I am announcing my determination now to allow time for us to support increased coverage, for monitoring providers to hire and train additional staff, for sectors to negotiate with providers to contract for services, and for industry members to make decisions for fishing year 2022. In the event that Amendment 23 is not approved, I may re-evaluate my coverage level determination if public comments on the Amendment or our Amendment 23 decision merit revisiting our 2022 target coverage level determination.

Each year, we complete an analysis to determine the level of ASM coverage required to estimate discards for each Northeast multispecies stock with no greater than a 30-percent coefficient of variation (CV). However, as a result of the COVID-19 health emergency, gaps in available observer and monitoring data for fishing year 2020 prevented us from completing a CV analysis to inform the 2022 target coverage level, which normally would have relied on data from the 2020 fishing year. Since fishing year 2020, in addition to the CV analysis, we have also considered the four analyses of bias developed by the Groundfish Plan Development Team (PDT) and the peer review by a sub-panel of the Council's Scientific and Statistical Committee (SSC)[1]. I previously determined in fishing years 2020 and 2021 that it would be inappropriate to base the target coverage level solely on the results of the CV analysis, and instead set the fishing coverage level target at a level that aimed to address bias to the extent practicable. Similarly, the

[1] The SSC sub-panel concluded that "(T)he set of studies provide substantial support to conclude that there are differences both in discarding behavior and in fishing behavior between observed and unobserved trips. The analyses suggest that discard estimates from observed trips should not be used to estimate discards from unobserved trips, or at minimum not without some adjustments. In addition, this suggests it is not appropriate to determine a level of observer coverage that should be deployed by considering the coefficient of variation of discard estimates from observer coverage since observed trips are not representative of unobserved trips."

2022 target coverage level must continue to account for bias beyond previous coverage levels in light of the PDT's and SSC sub-panel's conclusions. The precise level of coverage under 100 percent that sufficiently removes or reasonably accounts for bias remains unknown. There is still not sufficient information available to make this determination, and to date both we and the PDT have been unable to develop a new method or analysis for calculating this precise target coverage below 100 percent.

We expect to continue to have funding available to reimburse industry for all of its at-sea monitoring costs in fishing year 2022, including sector costs for electronic monitoring.
If you have further questions about the fishing year 2022 ASM coverage target, please contact Sarah Bland, Assistant Regional Administrator for Sustainable Fisheries, at (978) 281-9257.

Sincerely,

Michael Pentony
Regional Administrator

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
Eric Reid, *Chair* | Thomas A. Nies, *Executive Director*

January 3, 2022

Mr. Michael Pentony
Greater Atlantic Regional Administrator
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Dear Mike:

In accordance with provisions of the Magnuson-Stevens Act, I reviewed the draft regulatory text for Amendment 23 to the Northeast Multispecies (Groundfish) Fishery Management Plan in order to deem whether it is consistent with the amendment text and the Council's intent. I based the review on the draft regulatory text (version 2) provided to the Council on Nov. 18, 2021, further modified through discussions between our staffs and finalized on December 27, 2021. I concluded the agreed upon revised regulatory text implementing Amendment 23 measures is consistent with Council intent. I am not commenting on the regulation corrections provided in the same correspondence.

Please feel free to call me with any concerns.

Sincerely,

Eric Reid, Chair

Draft Regulatory Text
NE Multispecies Amendment 23

For the reasons stated in the preamble, the National Marine Fisheries Service proposes to amend 50 CFR part 648 as follows:

PART 648--FISHERIES OF THE NORTHEASTERN UNITED STATES

1. The authority citation for part 648 continues to read as follows:

Authority: 16 U.S.C. 1801 *et seq*.

2. Section 648.2 is amended by:

a. Revising the definition for "electronic monitoring";

b. Adding a new definition for "electronic monitoring audit model";

c. Adding a new definition for "electronic monitoring maximized retention model";

d. Adding a new definition for "electronic monitoring provider staff";

e. Revising the definition of "observer or monitor"; and

f. Deleting the definition of "observer/sea sampler".

§ 648.2 Definitions.

* * * * *

Electronic monitoring means a network of equipment that uses a software operating system connected to one or more technology components, including, but not limited to, cameras and recording devices to collect data on catch and vessel operations. With respect to the NE multispecies fishery, electronic monitoring means any equipment that is used to meet sector monitoring requirements in lieu of at-sea monitors as part of an approved Sector at-sea monitoring program, including the audit model and maximized retention model.

Electronic monitoring audit model with respect to the groundfish sector monitoring program means a program in which all eligible trips must be electronically monitored; discards are reported at the haul level; fish must be handled in view of cameras; species identification and length must be collected for regulated species and ocean pout discards for catch estimation; allowed discarding must occur at controlled points in view of cameras; and electronic monitoring data is compared to the area fished, regulated species and ocean pout discards, and other information reported on the vessel trip report on a subset of trips for validation.

Electronic monitoring maximized retention model with respect to the groundfish sector monitoring program, means a program in which all eligible trips are electronically monitored; fish must be handled in view of cameras; allowed discarding must occur at controlled points in view of cameras; all allocated regulated species stocks must be retained; electronic monitoring is used to verify compliance; and offloads are subject to observation by dockside monitors.

* * * * *

Electronic monitoring provider staff means any video reviewer, or any person employed or contracted by an electronic monitoring service provider to provide electronic monitoring services to vessels.

* * * * *

Observer or monitor means any person who collects observer information, operational fishing data, biological data, or economic data for conservation and management purposes on or from fishing vessels or federally permitted dealers as required by the regulations, including, but not limited to, observers, at-sea monitors, observer/sea samplers, portside samplers, or dockside monitors.

Ocean quahog means the species *Arctica islandica*.

* * * * *

3. Section 648.11 is amended by:

a. Revising paragraph (h);

b. Redesignating paragraphs (i)(5) and (6) as paragraphs (i)(6) and (7);

c. Adding a new paragraph (i)(5);

d. Revising newly redesignated paragraphs (i)(6) and (7);

e. Revising paragraph (j);

f. Redesignating paragraph (l)(1) as (l)(3), paragraph (l)(2) as (l)(4) and paragraph (l)(3) as (l)(1);

g. Adding a new paragraph (l)(2);

h. Revising newly redesignated paragraphs (l)(1) through (3); and

i. Adding new paragraphs (l)(5) through (10).

The revisions read as follows:

§ 648. 11 Monitoring coverage.

* * * * *

(h) * * *

(3) * * *

(vii) Evidence of holding adequate insurance to cover injury, liability, and accidental death for any observers, monitors (at-sea or dockside/roving monitors), or electronic monitoring provider staff who provide electronic monitoring services onboard vessels, whether contracted or directly employed by the service provider, during their period of employment (including during training).

(A) A monitoring service provider must hold Workers' Compensation and Maritime Employer's Liability for observers, monitors, vessel owners, and their operations. The minimum combined coverage required is $5 million.

(B) An electronic monitoring service provider must hold Worker’s Compensation and commercial general liability coverage for electronic monitoring provider staff. The minimum combined coverage required is $1 million.

(C) Upon request by a vessel owner, operator, or vessel manager, a monitoring service provider must provide a certificate of insurance, or other evidence, that demonstrates they have the required coverages under (A) and (B) of this paragraph as appropriate.

(viii) * * *

(ix) The names of its fully equipped observers, monitors, or video reviewers on staff; or a list of its training candidates (with resumes) and a request for an appropriate NMFS-certified Training class. All training classes have a minimum class size of eight individuals, which may be split among multiple vendors requesting training. Requests for training classes with fewer than eight individuals will be delayed until further requests make up the full training class size.

(x) An Emergency Action Plan (EAP) describing its response to an emergency with an observer, monitor, or electronic monitoring provider staff on a vessel at sea or in port, including, but not limited to, personal injury, death, harassment, or intimidation. . The EAP shall include communications protocol and appropriate contact information in an emergency.

* * * * *

(5) **Responsibilities of monitoring service providers**. To maintain an approved monitoring service provider status, a monitoring service provider, including electronic monitoring service providers, must demonstrate an ability to provide or support the following monitoring services:

(i) **Certified observers or monitors**. Provide observers or monitors certified by NMFS 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 fishing vessel, unless the monitoring service provider refuses to deploy an observer or monitor on a requesting vessel for any of the reasons specified at paragraph (h)(5)(viii) of this section.

(ii) **Support for observers, monitors, or electronic monitoring provider staff**. Ensure that each of its observers, monitors, or electronic monitoring provider staff procures or is provided with the following:

(A) All necessary transportation, lodging costs and support for arrangements and logistics of travel for observers, monitors, or electronic monitoring provider staff to and from the initial location of deployment, to all subsequent vessel assignments, to any debriefing locations, and for appearances in Court for monitoring-related trials as necessary;

(B) Lodging, per diem, and any other services necessary for observers, monitors, or electronic monitoring provider staff assigned to a fishing vessel or to attend an appropriate NMFS training class;

(C) The required observer, monitor, or electronic monitoring equipment, in accordance with equipment requirements, prior to any deployment and/or prior to certification training; and

(D) * * *

(iii) **Deployment logistics**.

(A) Assign an available certified observer or monitor to a vessel upon request. For service providers contracted to meet the requirements of the NE multispecies monitoring program in paragraph (l) of this section, assign available at-sea monitors, electronic monitoring provider staff, and other approved at-sea monitoring mechanisms fairly and equitably in a manner that represents fishing activities within each sector throughout the fishing year without regard to any sector manager or vessel representative preference.

(B) Enable an owner, operator, or manager of a vessel to secure monitoring coverage or electronic monitoring technical support when requested, 24 hours per day, 7 days per week via a telephone or other notification system that is monitored a minimum of four times daily to ensure rapid response to industry requests.

* * * * *

(vi) **Observer and monitor training requirements**. Ensure all observers and monitors attend and complete a NMFS-certified Observer or Monitor Training class. Requests for training must be submitted to NMFS 45 calendar days in advance of the requested training. The following information must be submitted to NMFS at least 15 business days prior to the beginning of the proposed training: A list of observer or

monitor candidates; candidate resumes, cover letters and academic transcripts; and a statement signed by the candidate, under penalty of perjury, that discloses the candidate's criminal convictions, if any. A medical report certified by a physician for each candidate is required 7 business days prior to the first day of training. CPR/First Aid certificates and a final list of training candidates with candidate contact information (email, phone, number, mailing address and emergency contact information) are due 7 business days prior to the first day of training. NMFS may reject a candidate for training if the candidate does not meet the minimum qualification requirements as outlined by NMFS minimum eligibility standards for observers or monitors as described on the National Observer Program website: https://www.fisheries.noaa.gov/topic/fishery-observers#become-an-observer.

(vii) * * *

(A) **Deployment reports**.

(1) Report to NMFS when, where, to whom, and to what vessel an observer or monitor has been deployed, as soon as practicable, and according to requirements outlined by NMFS. The deployment report must be available and accessible to NMFS electronically 24 hours a day, 7 days a week.

(2) Ensure that the raw (unedited) data collected by the observer or monitor is provided to NMFS at the specified time per program. Electronic data submission protocols will be outlined in training and may include accessing government websites via personal computers/devices or submitting data through government issued electronics.

(B) **Safety refusals**. Report to NMFS any trip or landing 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 or monitor's safety checklist) within 12 hours of the refusal.

(C) **Biological samples**. Ensure that biological samples, including whole marine mammals, sea turtles, sea birds, and fin clips or other DNA samples, are stored/handled properly and transported to NMFS within 5 days of landing. If transport to NMFS Observer Training Facility is not immediately available then whole animals requiring freezing shall be received by the nearest NMFS freezer facility within 24 hours of vessel landing.

(D) **Debriefing**. Ensure that the observer, monitor, or electronic monitoring provider staff remains available to NMFS, either in-person or via phone, at NMFS' discretion, including NMFS Office of Law Enforcement, for debriefing for at least 2 weeks following any monitored trip/offload or electronic monitoring trip report submission. If requested by NMFS, an observer or monitor that is at sea during the 2-week period must contact NMFS upon his or her return. Monitoring service providers must pay for travel and land hours for any requested debriefings.

(E) **Availability report**. The monitoring service provider must report to NMFS any inability to respond to an industry request for observer or monitor coverage due to the lack of available observers or monitors as soon as practicable. Availability report must be available and accessible to NMFS electronically 24 hours a day, 7 days a week.

(F) **Incident reports**. Report possible observer, monitor, or electronic monitoring provider staff harassment, discrimination, concerns about vessel safety, or marine casualty; concerns with possible electronic monitoring system tampering, data loss, or catch handling protocols; or observer or monitor illness or injury; or other events as specified by the Regional Administrator; and any information, allegations, or reports regarding observer, monitor, or electronic monitoring provider staff conflict of interest or breach of the standards of behavior, to NMFS within 12 hours of the event or within 12 hours of learning of the event.

(G) **Status report**.

(1) Provide NMFS with an updated list of contact information for all observers or monitors that includes the identification number, name, mailing address, email address, phone numbers, homeports or fisheries/trip types assigned, and must include whether or not the observer or monitor is "in service," indicating when the observer or monitor has requested leave and/or is not currently working for an industry-funded program.

(2) Place any Federally contracted observer not actively deployed on a vessel for 30 days on Leave of Absence (LOA) status (or as specified by NMFS) according to most recent Information Technology Security Guidelines.

(3) Ensure Federally contracted observers on LOA for 90 days or more conduct an exit interview with NMFS and return any NMFS issued gear and Common Access Card (CAC), unless alternative arrangements are approved by NMFS. NMFS requires 2-week advance notification when a Federally contracted observer is leaving the program so that an exit interview may be arranged and gear returned.

(H) **Vessel contract**. Submit to NMFS, if requested, a copy of each type of signed and valid contract (including all attachments, appendices, addendums, and exhibits incorporated into the contract) between the monitoring service provider and those entities requiring monitoring services.

(I) **Observer, monitor, or video reviewer contract**. Submit to NMFS, if requested, a copy of each type of signed and valid contract (including all attachments, appendices, addendums, and exhibits incorporated into the contract) between the monitoring service provider and specific observers, monitors, or video reviewers.

(J) **Additional information**. Submit to NMFS, if requested, copies of any information developed and/or used by the monitoring service provider and distributed to vessels, observers, monitors, or electronic monitoring provider staff such as informational pamphlets, payment notification, daily rate of monitoring or review services, description of observer or monitor duties, etc.

(K) **Discard estimates**. Estimate discards for each trip and provide such information to the sector manager and NMFS when providing monitoring services to meet catch estimation and/or at-sea or electronic monitoring service requirements in paragraph (l) of this section.

(L) **Data system**. If contracted to meet the groundfish sector monitoring program in paragraph (l) of this section, maintain an electronic monitoring system to record, retain, and distribute to NMFS upon request for a minimum of 12 months after receiving notice from NMFS that catch data is finalized for the fishing year, the following information:

(*1*) The number of at-sea monitor deployments and other approved monitoring equipment deployments or video reviews, including any refusal to provide service when requested and reasons for such refusals;

(*2*) Incident/non-compliance reports (e.g., failure to offload catch); and

(*3*) Vessel hail reports and landings records.

(*4*) Electronic monitoring data and reports.

(*5*) A means to protect the confidentiality and privacy of data submitted by vessels, as required by the Magnuson-Stevens Act.

(M) Ensure that electronic monitoring data and reports are retained for a minimum of 12 months after catch data is finalized for the fishing year. NMFS will notify monitoring service providers of the catch data finalization date each year. The electronic monitoring service provider must provide NMFS access to electronic monitoring data or reports upon request.

(N) Provide NMFS with all software necessary for accessing, viewing, and interpreting the data generated by the electronic monitoring system, including submitting the agency's secondary review data to the application programming interface and maintenance releases to correct errors in the software or enhance software functionality. The software must:

(*1*) Support a "dual user" system that allows NMFS to complete and submit secondary reviews to the application programming interface.

(*2*) Allow for the export or download of electronic monitoring data in order for the agency to make a copy if necessary.

(O) Provide software training for NMFS staff.

(P) Provide the following to NMFS upon request:

(1) Assistance in electronic monitoring system operations, diagnosing/resolving technical issues, and recovering lost or corrupted data;

(2) Responses to inquiries related to data summaries, analyses, reports, and operational issues;

(3) Access to video reviewers for debriefing sessions;

(Q) Provide technical and expert information substantiating electronic monitoring system data, testing procedures, error rates, peer review or other issues raised in litigation, including but not limited to, a brief summary of the litigation and any court findings on the reliability of the technology.

* * * * *

(i) **Observer, monitor, video reviewer certification** -

(1) **Requirements**. To be certified as an observer, or monitor, or video reviewer, a monitoring service provider employee or contractor must meet the criteria in paragraphs (i)(1) through (3) for observers, or paragraphs (i)(1), (2), and (4) for monitors, and paragraphs (i)(1), (2), and (5) for video reviewers, respectively. In addition, observers must meet NMFS National Minimum Eligibility Standards for observers specified at the National Observer Program website: https://www.fisheries.noaa.gov/topic/fishery-observers#become-an-observer.

(2) **Training**. In order to provide observer or monitor services and be deployed on any fishing vessel, a candidate observer or monitor must have passed an appropriate NMFS-certified Observer or Monitor Training course and must adhere to all NMFS program standards and policies. In order to perform electronic monitoring video review, a candidate video reviewer must have passed an appropriate NMFS-certified Video Review Training course and must adhere to all NMFS program standards and policies. NMFS will immediately notify any candidate that fails training and the monitoring service provider. Observer or monitor training may include an observer training trip, as part of the observer's training, aboard a fishing vessel with a trainer. Contact NMFS for the required number of program specific observer and monitor training certification trips for full certification following training.

(3) **Observer requirements**. All observers must:

(i) Have a valid NMFS fisheries observer certification pursuant to paragraph (i)(1) of this section;

* * * * *

(4) **Monitor requirements**. All monitors must:

(i) * * *

(ii) Have a valid NMFS certification pursuant to paragraph (i)(1) of this section;

* * * * *

(5) **Video reviewer requirements**. All video reviewers must:

(i) Hold a high school diploma or legal equivalent;

(ii) Have a valid NMFS certification pursuant to paragraph (i)(1) of this section; and

(iii) Accurately record sampling data, write complete reports, and report accurately any observations relevant to conservation of marine resources or their environment; and

(6) **Probation and decertification**. NMFS may review observer, monitor, and video reviewer certifications and issue observer, monitor, and video reviewer certification probations and/or decertifications as described in NMFS policy.

(7) **Issuance of decertification**. Upon determination that decertification is warranted under paragraph (i)(6) of this section, NMFS shall issue a written decision to decertify the observer, monitor, or video reviewer to the observer, monitor, or video reviewer and approved monitoring service provider via certified mail at the observer's, monitor's, or video reviewer'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.

(j) **Coverage.** In the event that a vessel is requested by the Regional Administrator to carry a NMFS-certified fisheries observer pursuant to paragraph (a) of this section and is also selected to carry an at-sea monitor as part of an approved sector

at-sea monitoring program specified in paragraph (l) of this section for the same trip, only the NMFS-certified fisheries observer is required to go on that particular trip. Vessels using electronic monitoring to satisfy the groundfish sector monitoring program requirement must comply with their vessel monitoring plan on all trips, including a trip that has been selected to carry, or a trip that carries, a fisheries observer.

* * * * *

(l) ***

(1) **Groundfish sector monitoring program goals and objectives**. The primary goal of the at-sea/electronic monitoring program is to verify area fished, as well as catch and discards by species and gear type, in the most cost-effective means practicable. The following goals and objectives of groundfish monitoring programs are equally-weighted secondary goals by which monitoring programs established for the NE multispecies are to be designed to be consistent with:

(i) Improve documentation of catch:

(A) Determine total catch and effort, for each sector and common pool, of target or regulated species and ocean pout; and

(B) Achieve coverage level sufficient to minimize effects of potential monitoring bias to the extent possible while maintaining as much flexibility as possible to enhance fleet viability.

(ii) Reduce the cost of monitoring:

(A) Streamline data management and eliminate redundancy;

(B) Explore options for cost-sharing and deferment of cost to industry; and

(C) Recognize opportunity costs of insufficient monitoring.

(iii) Incentivize reducing discards:

(A) Determine discard rate by smallest possible strata while maintaining cost-effectiveness; and

(B) Collect information by gear type to accurately calculate discard rates.

(iv) Provide additional data streams for stock assessments:

(A) Reduce management and/or biological uncertainty; and

(B) Perform biological sampling if it may be used to enhance accuracy of mortality or recruitment calculations.

(v) Enhance safety of monitoring program.

(vi) Perform periodic review of monitoring program for effectiveness.

(2) **Sector monitoring programs.** A sector must develop and implement an at-sea and/or electronic monitoring program that may be approved by NMFS as both sufficient to monitor catch, discards, and use of sector ACE; and as consistent with the sector monitoring program goals and objectives. The details of any at-sea or electronic monitoring program must be specified in the sector's operations plan, pursuant to paragraph § 648.87(b)(2)(xi), and must meet the operational standards specified in paragraph (l)(10) of this section. Maximized retention electronic monitoring and audit electronic monitoring models, meeting the requirements in paragraph (l)(10) of this section, may be used in place of at-sea monitoring to ensure a sector's monitoring programs may be approved. Other types of electronic monitoring may be used in place of at-sea monitors if the technology is deemed sufficient by NMFS, in a manner consistent with the Administrative Procedure Act, for a specific trip type based on gear type and area fished. The Regional Administrator will approve or disapprove at-sea/electronic

programs, including vessel monitoring plans, as part of a sector's operations plans in a manner consistent with the Administrative Procedure Act.

(3) **Pre-trip notification**. For the purpose of selecting vessels for observer or at-sea monitor deployment, as instructed by the Regional Administrator, the owner, operator, or manager of a vessel (i.e., vessel manager or sector manager) issued a limited access NE multispecies permit that is fishing under a NE multispecies DAS or on a sector trip, as defined in this part, must provide advance notice to NMFS at least 48 hr prior to departing port on any trip declared into the NE multispecies fishery pursuant to § 648.10 or § 648.85 of the following: The vessel name, permit number, and sector to which the vessel belongs, if applicable; contact name and telephone number for coordination of observer or at-sea monitor deployment; date, time, and port of departure; and the vessel's trip plan, including area to be fished, whether a monkfish DAS will be used, and gear type to be used, unless otherwise specified in this paragraph (l) or notified by the Regional Administrator. For trips lasting 48 hr or less in duration from the time the vessel leaves port to begin a fishing trip until the time the vessel returns to port upon the completion of the fishing trip, the vessel owner, operator, or manager may make a weekly notification rather than trip-by-trip calls. For weekly pre-trip notification, a vessel must notify NMFS by 0001 hr of the Friday preceding the week (Sunday through Saturday) that it intends to complete at least one NE multispecies DAS or sector trip during the following week and provide the vessel's trip-plans for that week, including each trip's date, time, port of departure, area to be fished, whether a monkfish DAS will be used, and gear type to be used. Pre-trip notification calls must be made no more than 10 days in advance of each fishing trip. The vessel owner, operator, or manager must notify NMFS

of any trip plan changes at least 24 hr prior to vessel departure from port. A vessel may not begin the trip without being issued either an observer notification, an at-sea monitor notification or a waiver by NMFS.

(4) **Vessel selection for observer or at-sea monitor coverage**. NMFS shall notify the vessel owner, operator, or manager whether the vessel must carry an observer or at-sea monitor for the specified trip within 24 hr of the vessel owner's, operator's or manager's pre-trip notification of the prospective trip, as specified in paragraph (l)(2) of this section. All pre-trip notifications shall be issued a unique confirmation number. A vessel may not fish on a NE multispecies DAS or sector trip with an observer waiver confirmation number that does not match the vessel's trip plan that was called in to NMFS. Confirmation numbers and the vessel's observer or observer waiver status for pre-trip notification calls remain valid for 48 hr from the intended sail date. After a trip begins, that trip's confirmation number and observer or observer waiver status remains valid until the trip ends. If a trip is interrupted and the vessel returns to port due to bad weather or other circumstance beyond the operator's control, the vessel's observer or observer waiver status and confirmation number for the interrupted trip remains the same if the vessel departs within 48 hr from the vessel's return to port If the layover time is greater than 48 hr, the vessel owner, operator, or manager must provide a new pre-trip notification.

If an observer or at-sea monitor is assigned to a particular trip, a vessel may not leave port without the at-sea monitor on board, unless NMFS issues a waiver. If a vessel is using electronic monitoring to comply with the monitoring requirements of this part, it

may not leave port without an operational electronic monitoring system on board, unless NMFS issues a waiver, or assigned other at-sea monitoring coverage.

(5) Sector **monitoring coverage levels**. Coverage levels for an at-sea or electronic monitoring program, including video review requirements, shall be specified by NMFS, pursuant to paragraph (l)(5)(i) of this section.

(i) **At-sea monitoring coverage target** The at-sea monitoring coverage target for the sector monitoring program will be set as a percentage of all eligible sector trips based on available federal funding for NMFS and industry cost responsibilities as defined in paragraph (g)(3) of this section. Sectors are responsible for industry costs for at-sea monitoring coverage up to the coverage target for all trips not observed by a Northeast Fishery Observer Program observer. In fishing years 2022, 2023, 2024, and 2025, the ASM coverage target will be set at the highest level that available federal funding for NMFS and industry cost responsibilities supports, up to 100 percent of trips. Beginning in fishing year 2026, the target coverage will be set at 40 percent of trips, unless replaced by the Council after a review, as detailed in paragraph (l)(5)(v). In the absence of available federal funds sufficient to fund both NMFS costs and industry costs associated with a coverage target of at least 40 percent of all sector trips, sectors must pay the industry's costs for coverage necessary to achieve a 40-percent coverage target. As an example, if, after paying NMFS costs, available federal funding is sufficient only to fund industry costs for 15-percent coverage, sectors must pay the industry costs for the remaining 25-percent coverage to achieve a 40-percent coverage target. Any coverage provided by the Northeast Fisheries Observer Program through deployment of an observer would be deducted from the industry's cost responsibility. To ensure coverage

is both sufficient to monitor sector catch, discards, and sector ACE; and consistent with sector monitoring goals and objectives, at-sea monitoring coverage may be higher than the at-sea monitoring coverage target, up to 100 percent of all eligible trips, if available federal funding is sufficient for NMFS and industry cost responsibilities, respectively.

NMFS will announce the coverage target at least 3 weeks before the annual sector enrollment deadline set by NMFS, if federal funding information is available.

(ii) **Gear-based exclusion from the at-sea monitoring program**. A sector vessel that notifies NMFS of its intent to exclusively fish using gillnets with a mesh size of 10-inch (25.4-cm) or greater in either the Inshore GB Stock Area, as defined at § 648.10(k)(3)(ii), and/or the SNE Broad Stock Area, as defined at § 648.10(k)(3)(iv), is not subject to the coverage level for at-sea monitoring specified in paragraph 648.11(l)(5)(i) of this section provided that the trip is limited to the Inshore GB and/or SNE Broad Stock Areas and that the vessel only uses gillnets with a mesh size of 10-inches (25.4-cm) or greater. When on such a trip, other gear may be on board provided that it is stowed and not available for immediate use as defined in § 648.2. A sector trip fishing with 10-inch (25.4-cm) mesh or larger gillnets will still be subject to at-sea monitoring coverage if the trip declares its intent to fish in any part of the trip in the GOM Stock area, as defined at § 648.10(k)(3)(i), or the Offshore GB Stock Area, as defined at § 648.10(k)(3)(iii). Vessels using electronic monitoring to satisfy the sector monitoring requirement must have their system turned on and comply with their vessel monitoring plan on all trips, including a trip that is limited to the Inshore GB and/or SNE Broad Stock Areas where the vessel only uses gillnets with a mesh size of 10-inches (25.4-cm) or greater.

(iii) **Geographic exclusion from the at-sea monitoring program**. Vessels fishing exclusively west of 71 degrees 30 minutes west longitude on a sector trip are excluded from the requirement to carry an at-sea monitor. Vessels on a trip excluded from the at-sea monitoring requirement under this provision must comply with the VMS declaration requirements at § 648.10(g)(3), and the transiting requirements at § 648.81(e) when east of 71 degrees 30 minutes. Vessels using electronic monitoring to satisfy the sector monitoring requirement must have their system turned on and comply with their vessel monitoring plan on all trips, including trips fishing exclusively west of 71 degrees 30 minutes west longitude.

(iv) **Waivers**. In addition to the safety waivers in paragraph 648.11(c), NMFS may issue a waiver for a sector trip exempting the vessel from the sector monitoring program coverage requirements for the following reasons.

(A) **Funding waivers**. NMFS will issue a waiver for a sector trip exempting the vessel from the sector monitoring program coverage requirements if coverage is unavailable due to insufficient funding for NMFS cost responsibilities as defined in paragraph (g)(3) of this section.

(B) **Logistics waivers**. NMFS may issue a waiver for a sector trip exempting the vessel from the sector monitoring program coverage requirements for logistical and technical reasons, including, but not limited to: No monitor is available; the assigned observer is unable to make the trip; the trip will have no fishing effort; and electronic monitoring system technical problems.

(C) **Set-only trip waivers**. Vessels on a set-only trip, as defined at § 648.2, are excluded from the groundfish sector monitoring program requirements in this paragraph

648.11(l). If a vessel is using electronic monitoring to comply with the monitoring requirements of this part, that vessel may turn off its cameras on a set-only trip.

(v) **Review of exclusions from the at-sea monitoring program**. A Council review of the exclusions from the at-sea monitoring program in paragraphs 648.11(l)(5)(ii) and (iii) will evaluate whether the exclusions continue to meet the intent of the Council to exclude trips with little catch of regulated species and ocean pout. The review will be conducted using complete data from 2 fishing years once the data is available (fishing years 2022 and 2023) and every 3 years after the initial review.

(6) **Groundfish sector monitoring program review**. A Council review of the NE multispecies monitoring program will evaluate whether the monitoring program is meeting the goal of improved accuracy of catch data, while maximizing value and minimizing costs of the program, using complete data from 2 fishing years once the data is available (fishing years 2022 and 2023) and periodically after the initial review. The review process should be flexible and general, and include establishing metrics and indicators of how well the monitoring program improved accuracy while maximizing value and minimizing costs.

(7) **Hail reports**. For the purposes of the monitoring requirements specified in paragraph (l)(2) of this section, sector vessels must submit all hail reports for a sector trip in which the NE multispecies catch applies against the ACE allocated to a sector, as specified in this part, to their respective contracted monitoring service providers. The mechanism and timing of the transmission of such hail reports must be consistent with instructions provided by the Regional Administrator for any at-sea or electronic

monitoring program required by paragraph (l)(2) of this section, or specified in the annual sector operations plan, consistent with section 648.87(b)(5).

(8) **Notification of monitoring service provider change**. If, for any reason, a sector decides to change approved service providers used to provide at-sea or electronic monitoring services required in paragraph (l)(2), the sector manager must first inform NMFS in writing in advance of the effective date of the change in approved monitoring service providers in conjunction with the submission of the next weekly sector catch report specified in section 648.87(b)(1)(v)(B) of this section. A sector may use more than one monitoring service provider at any time, provided any monitoring service provider employed by or contracted with a sector meets the standards specified in paragraph (b)(4) of this section.

(9) **Discards**. A sector vessel may not discard any legal-sized regulated species or ocean pout allocated to sectors pursuant to § 648.87(b)(1)(i), unless otherwise required pursuant to § 648.86(l). Discards of undersized regulated species or ocean pout by a sector vessel must be reported to NMFS consistent with the reporting requirements specified in 648.87(b)(1)(v). Discards shall not be included in the information used to calculate a vessel's PSC, as described in § 648.87(b)(1)(i)(E), but shall be counted against a sector's ACE for each regulated species allocated to a sector.

(10) **Sector monitoring program operational standards**. In addition to the monitoring service provider standards specified in paragraph (h)(5) of this section, any at-sea/electronic monitoring program developed as part of a sector's yearly operations plan pursuant to paragraph (l)(2) of this section must meet the following operational standards to be approved by NMFS:

(i) **Vessel requirements** -

(A) **Electronic monitoring system requirements**. A vessel owner or operator using electronic monitoring to meet sector monitoring requirements must do the following:

(*1*) Ensure that the electronic monitoring system is fully operational for every sector trip, which means it is operating, recording, and retaining the recording for the duration of every trip. A vessel may not fish without a fully operational electronic monitoring system , unless issued a waiver by NMFS for that trip;

(*2*) Conduct a system check of the electronic monitoring system prior to departing on a fishing trip. An electronic monitoring system check must show that the electronic monitoring system is fully operational and there is sufficient video storage capacity to retain the recording of the entire fishing trip;

(*3*) Maintain clear and unobstructed camera views at all times. Ensure lighting is sufficient in all circumstances to illuminate catch so that catch and discards are visible and may be identified and quantified as required; and

(*4*) Ensure no person tampers with, disconnects, or destroys any part of the electronic monitoring system, associated equipment, or recorded data.

(B) **Vessel monitoring plan requirements for electronic monitoring vessels**. A vessel must have a NMFS-approved vessel monitoring plan to use electronic monitoring to meet sector monitoring requirements. The vessel monitoring plan describes how an electronic monitoring system is configured on a particular vessel and how fishing operations must be conducted to effectively monitor catch.

(*1*) The vessel monitoring plan must be onboard the vessel at all times.

(*2*) The vessel owner, operator and crew must comply with all catch handling protocols and other requirements described in the vessel monitoring plan, including sorting catch and processing any discards within view of the cameras and consistent with the vessel monitoring plan.

(*3*) Modifications to any vessel monitoring plan must be approved by NMFS prior to such vessel fishing under the conditions of the new vessel monitoring plan.

(*4*) A vessel owner or operator using electronic monitoring to meet sector monitoring requirements must submit all electronic monitoring data to the monitoring service provider in accordance with the electronic monitoring program requirements in this paragraph 648.11, or as otherwise instructed by the Regional Administrator.

(*5*) A vessel owner or operator must make the electronic monitoring system, associated equipment, electronic monitoring data, or vessel monitoring plan available to NMFS for inspection, upon request.

(*6*) A vessel owner or operator using electronic monitoring to meet sector monitoring requirements must turn on its camera for 100 percent of sector trips.

(*7*) A vessel owner or operator using electronic monitoring to meet sector monitoring requirements must comply with the requirements in this paragraph 648.11(l)(10)(ii)(B) or the Regional Administrator may withdraw approval for the vessel to use electronic monitoring.

(*8*) The Regional Administrator may revise vessel monitoring plan requirements and approval standards consistent with the Administrative Procedure Act. Any revisions will be published on the agency's website.

(C) **Safety hazards**. The operator of a sector vessel must detail and identify any safety hazards to any at-sea monitor assigned pursuant to paragraph (b)(5)(iii)(B)(*1*) of this section prior to leaving port. A vessel may not begin a trip if it has failed a review of safety issues pursuant to paragraph (b)(5)(iv)(B) of this section, until the identified safety deficiency has been resolved, pursuant to § 600.746(i).

(D) **Dockside monitoring**. Vessels using maximized retention electronic monitoring must participate in either an independent third party dockside monitoring program approved by NMFS, or the dockside monitoring program operated by NMFS, as instructed by NMFS.

(E) **Retention of fish**. Vessels using maximized retention electronic monitoring must retain all fish from each allocated regulated species, regardless of length.

(ii) **Sector monitoring plan monitoring service provider requirements**. In addition to the monitoring service provider standards in paragraph (h) of this section, sector monitoring plans must include the following operational requirements for any monitoring provider contracted to meet sector monitoring program requirements in this paragraph (l):

(A) **At-sea monitoring report**. Within 48 hours of the completion of a trip, or as otherwise instructed by the Regional Administrator, electronic submission to NMFS and the sector a report detailing the area fished and the amount of each species kept and discarded. A standard format for submission shall be specified by NMFS and distributed to all monitoring service providers and sectors. NMFS will accept only monitoring data that passes automated NMFS data quality checks.

(B) **Electronic monitoring report**. A report detailing area fished and the amount of each species discarded must be submitted electronically in a standard acceptable form to the appropriate sector and NMFS within 10 business days of a trip being selected for video review, or as otherwise instructed by the Regional Administrator. The format for submission shall be specified by NMFS and distributed to all monitoring service providers and sectors. NMFS will accept only monitoring data that passes automated NMFS data quality checks.

(C) **Vessel feedback report**. A report must be submitted to the vessel owner following a trip with detailed feedback on the vessel operator's and crew's catch handling, camera maintenance, and vessel monitoring plan compliance. A copy must be submitted to NMFS upon request.

(D) **Safety hazards**. Completion by an at-sea monitor of a pre-trip vessel safety checklist provided by NMFS before an at-sea monitor can leave port onboard a vessel on a sector trip. If the vessel fails a review of safety issues pursuant to this paragraph (l)(10)(ii)(E), an at-sea monitor cannot be deployed on that vessel for that trip.

(E) **Gear**. Provision of all equipment specified by the Northeast Fisheries Science Center to each at-sea monitor before the at-sea monitor may be deployed on a vessel. A list of such equipment is available from the Northeast Fisheries Science Center upon request. This gear shall be inspected by NMFS upon the completion of training required pursuant to paragraph (i)(2) of this section.

(F) The Regional Administrator may revise monitoring service provider requirements and approval standards consistent with the Administrative Procedure Act.

(iii) **Sector requirements.** Each sector shall monitor catch by participating sector vessels to ensure that ACEs are not exceeded during the fishing year, as specified in this paragraph (l)(10)(iii). The sector shall summarize trips validated by dealer reports; oversee the use of electronic monitoring equipment and review of associated data; maintain a database of VTR, dealer, observer, and electronic monitoring reports; determine all species landings by stock areas; apply discard estimates to landings; deduct catch from ACEs allocated to sectors; and report sector catch on a weekly basis to NMFS, as required in paragraph (b)(1)(v) of this section. Unless otherwise specified in this paragraph (l)(10), all catches of s allocated to sectors by vessels on a sector trip shall be deducted from the sector's ACE for each regulated species stock regardless of the fishery the vessel was participating in when the fish was caught. For the purposes of this paragraph (l)(10), any regulated species or ocean pout caught using gear capable of catching NE multispecies (i.e., gear not listed as exempted gear under this part) would be deducted from a sector's ACE if such catch contributed to the specification of PSC, as described in § 648.87(b)(1)(i)(E), and would not apply to another ACL sub-component pursuant to § 648.90(a)(4). For example, any regulated species or ocean pout landed while fishing for or catching skates or monkfish pursuant to the regulations for those fisheries would be deducted from the sector's ACE for each stock because such regulated species or ocean pout were caught while also operating under a NE multispecies DAS. However, for example, if a sector vessel is issued a limited access General Category Atlantic Sea Scallop permit and fishes for scallops under the provisions specific to that permit, any yellowtail flounder caught by the vessel on such trips would be deducted from the appropriate non-groundfish component, such as the other sub-component or the

appropriate yellowtail flounder stock's ACL specified for the Atlantic Sea Scallop fishery and not from the yellowtail flounder ACE for the sector.

(iv) **Dealer requirements**. Federally permitted NE multispecies dealers must allow dockside monitors access to their premises, scales, and any fish received from vessels participating in the maximized retention electronic monitoring program for the purpose of collecting fish species and weights of fish received by the dealer, fish length measurements, and the collection of age structures such as otoliths or scales.

(A) **Facilitation**. Federally permitted NE multispecies dealers must facilitate dockside monitoring for vessels participating in a maximized retention electronic monitoring program, including, but not limited to, the following requirements:

(*1*) Provide a safe sampling station, including shelter from weather, for dockside monitors to conduct their duties and process catch, that is equivalent to the accommodations provided to the dealer's staff.

(*2*) Allow dockside monitors access to bathrooms equivalent to the accommodations provided to the dealer's staff.

(*3*) Allow dockside monitors access to any facilities for washing equipment with fresh water that are provided to the dealer's staff.

(B) **Processing, sorting, and reporting**.

(*1*) Offload from vessels participating in the maximized retention monitoring program all fish below the minimum size specified at 648.83 before other fish that meet the minimum size, sort the undersized fish by species, and provide the dockside monitor access to those at the safe sampling station.

(*2*) Sort by species all redfish, haddock, and pollock, except that fish of the same species below the minimum size specified at 648.83 may be mixed with the same species of fish in the smallest market category.

(*3*) Sort by species all unmarketable fish from other fish, when identifiable to species.

(*4*) Report all fish below the minimum size specified 648.83, and all unmarketable fish, as instructed by NMFS.

(v) **Adjustment to operational standards**. The at-sea/electronic monitoring operational standards specified in paragraph (l)(10) of this section may be revised by the Regional Administrator in a manner consistent with the Administrative Procedure Act.

4. Section 648.14 is revised to read as follows:

§ 648.14 Prohibitions.

* * * * *

(e) * * *

(1) Assault, resist, oppose, impede, harass, intimidate, or interfere with or bar by command, impediment, threat, or coercion any observer or monitor conducting his or her duties; any electronic monitoring provider staff who collects data required under this part; any authorized officer conducting any search, inspection, investigation, or seizure in connection with enforcement of this part; any official designee of the Regional Administrator conducting his or her duties, including those duties authorized in §§ 648.7(g) and 648.11(l)(10)(v).

(2) Refuse monitoring coverage by an observer or monitor if selected for monitoring coverage by the Regional Administrator or the Regional Administrator's designee.

(3) Fail to provide information, notification, accommodations, access, or reasonable assistance to either an observer, monitor, or electronic monitoring provider staff conducting his or her duties as specified in § 648.11.

* * * * *

(k) * * *

(2) * * *

* * *

(vii) Fish under a waiver from the groundfish sector monitoring program issued under § 648.11(l)(5)(ii) or (iii) without complying with the VMS declaration requirements at § 648.10(g)(3) and the pre-trip notification requirements at § 648.11(l)(1).

(3) **Dealer requirements**. It is unlawful for any person to:

(i) Purchase, possess, import, export, or receive as a dealer, or in the capacity of a dealer, regulated species or ocean pout in excess of the possession limits specified in § 648.82, § 648.85, § 648.86, or § 648.87 applicable to a vessel issued a NE multispecies permit, unless otherwise specified in § 648.17, or unless the regulated species or ocean pout are purchased or received from a vessel that caught them on a sector trip and such species are exempt from such possession limits in accordance with an approved sector operations plan, as specified in § 648.87(c).

(ii) * * *

(iii) Purchase, possess, import, export, or receive as a dealer, or in the capacity of a dealer, regulated species or ocean pout from a vessel participating in the maximized retention electronic monitoring program in § 648.11(l) unless the offload of catch was observed by a dockside monitor or NMFS issued a waiver from dockside monitoring for the trip.

(iv) Assault, resist, oppose, impede, harass, intimidate, or interfere with or bar by command, impediment, threat, or coercion any observer or monitor conducting his or her duties or any electronic monitoring staff who collects data required under this part.

(v) Impede a dockside monitors' access to their premises, scales, and any fish received from vessels participating in the maximized retention electronic monitoring program; fail to facilitate dockside monitoring for vessels participating in a maximized retention electronic monitoring program; or fail to process, sort, and

report fish from vessels participating in the maximized retention monitoring program; as required in § 648.11(l)(10)(iv).

* * * * *

(14) * * *

(ix) Fail to comply with the reporting requirements specified in § 648.11(l)(10)(iii) and § 648.87(b)(1)(v).

(x) Leave port to begin a trip before an at-sea monitor has arrived and boarded the vessel if assigned to carry an at-sea monitor for that trip, or without an operational electronic monitoring system installed on board, as specified in § § 648.11(l)(3) and (l)(10)(i).

(xi) Leave port to begin a trip if a vessel has failed a review of safety issues by an at-sea monitor and has not successfully resolved any identified safety deficiencies, as prohibited by § 648.11(l)(10)(i)(C).

(xii) Fail to comply with the electronic monitoring system requirements as specified in § 648.11(11)(10)(i)(A), including, but not limited to: ensuring the electronic monitoring system is fully operational; conducting a system check of the electronic monitoring system; ensuring camera views are unobstructed and clear; and ensuring that no person tampers with the electronic monitoring system.

(xiii) Fail to comply with the vessel monitoring plan requirements as specified in § 648.11(l)(10)(i)(B) , including, but not limited to: carrying the vessel monitoring plan onboard the vessel at all times; complying with all catch handling protocols and other requirements in the vessel monitoring plan; submitting electronic monitoring data as

required; and making the electronic monitoring system available to NMFS for inspection upon request.

5. Section 648.83 is revised to read as follows:

* * * * *

(a) * * *

(1) Minimum fish sizes for recreational vessels and charter/party vessels that are not fishing under a NE multispecies DAS are specified in § 648.89. Except as provided in § 648.11(l)(10)(i)(E) and § 648.17, all other vessels are subject to the following minimum fish sizes, determined by total length (TL):

Minimum Fish Sizes (TL) for Commercial Vessels

Species	Size in inches
Cod	19 (48.3 cm)
Haddock	16 (40.6 cm)
Pollock	19 (48.3 cm)
Witch flounder (gray sole)	13 (33 cm)
Yellowtail flounder	12 (30.5 cm)
American plaice (dab)	12 (30.5 cm)
Atlantic halibut	41 (104.1 cm)
Winter flounder (blackback)	12 (30.5 cm)
Redfish	7 (17.8 cm)

* * * * *

6. Section 648.85 is amended by:

a. Redesignating paragraphs (e)(1)(viii)(C)(*1*) through (C)(*7*) as paragraphs (C)(*3*) through (C)(*9*);

b. Adding new paragraphs (e)(1)(viii)(C)(*1*) and (C)(*2*); and

c. Revising newly redesignated paragraphs (e)(1)(viii)(C)(*5*), (C)(*6*), and (C)(*8*).

The revisions read as follows:

§ 648.85 Special management programs.

* * * * *

(e) * * *

(1) * * *

(viii) * * *

(C) **Administration of Thresholds**.

(*1)* For the purpose of determining a sector's monthly redfish landings threshold performance described in paragraph (e)(1)(viii)(A)(*1*) of this section and the annual redfish landings threshold described in paragraph (e)(1)(viii)(B)(*1*) of this section, landings of allocated regulated species by vessels participating in a maximized retention electronic monitoring program consistent with 648.11(l), including landings of allocated stocks below the minimum size at 648.83(a)(1), will be counted as discards and not landings.

(*2*) For the purpose of determining a sector's monthly discards threshold performance described in paragraph (e)(1)(viii)(A)(*2*) of this section, a trip by a vessel participating in a maximized retention electronic monitoring program consistent with 648.11(l) will be excluded from evaluation of the monthly discard threshold.

(*3*) If a sector fails to meet the monthly redfish landings threshold or the monthly discards threshold described in paragraphs (e)(1)(viii)(A)(*1*) and (*2*) of this section for four or more months total, or three or more consecutive months, in a fishing year, the Regional Administrator shall prohibit all vessels in that sector from fishing under the provisions of the Redfish Exemption Program for the remainder of the fishing year, and place the sector and its vessels in a probationary status for one fishing year beginning the following fishing year.

(*4*) If a sector fails to meet the annual redfish landings threshold described in paragraph (e)(1)(viii)(B)(*1*) of this section in a fishing year, the Regional Administrator shall place the sector and its vessels in a probationary status for one fishing year beginning the following fishing year.

(*5*) While in probationary status as described in paragraph (e)(1)(viii)(C)(*3*) or (*4*) of this section, if the sector fails to meet the monthly redfish landings threshold or the monthly discards threshold described in paragraphs (e)(1)(viii)(A)(*1*) and (*2*) of this section for four or more months total, or three or more consecutive months, in that fishing year, the Regional Administrator shall prohibit all vessels in that sector from fishing under the provisions of the Redfish Exemption Program for the remainder of the fishing year and the following fishing year.

(*6*) If a sector fails to meet the annual redfish landings threshold in (e)(1)(viii)(B)(*1*) of this section for any fishing year during which the sector is in a probationary status as described in paragraph (e)(1)(viii)(C)(*3*) or (*4*) of this section, the Regional Administrator shall prohibit all vessels in that sector from fishing under the provisions of the Redfish Exemption Program for the following fishing year.

(*7*) The Regional Administrator may determine a sector has failed to meet required monthly or annual thresholds described in paragraphs (e)(1)(viii)(A) and (B) of this section using available information including, but not limited to, vessel declarations and notifications, vessel trip reports, dealer reports, and observer and electronic monitoring records.

(*8*) The Regional Administrator shall notify a sector of a failure to meet the required monthly or annual thresholds and the sector's vessels prohibition or probation status consistent with the provisions in paragraphs (e)(1)(viii)(C)(*1*) through (*7*) of this section. The Regional Administrator shall also make administrative amendments to the approved sector operations plan and issue sector vessel letters of authorization consistent with the provisions in paragraphs (e)(1)(viii)(C)(*1*) through (*7*) of this section. These administrative amendments may be made during a fishing year or during the sector operations plan and sector contract approval process.

(*9*) A sector may request in writing that the Regional Administrator review and reverse a determination made under the provisions of this section within 30 days of the date of the Regional Administrator's determination. Any such request must be based on information showing the sector complied with the required thresholds, including, but not limited to, landing, discard, observer or electronic monitoring records. The Regional Administrator will review and maintain or reverse the determination and notify the sector of this decision in writing. Any determination resulting from a review conducted under this provision is final and may not be reviewed further.

7. Section 648.86 is revised to read as follows:

§ 648.86 NE Multispecies possession restrictions.

Except as provided in § 648.11(l), § 648.17, or elsewhere in this part, the following possession restrictions apply:

(a) * * *

* * * * *

8. Section 648.87 is amended by:

a. Revising paragraph (b)(1);

b. Removing paragraph (b)(1)(v);

c. Redesignating paragraphs (b)(1)(vi) through (ix) as paragraphs (b)(1)(v) through (viii);

d. Revising newly redesignated paragraphs (b)(1)(v), (b)(1)(vi)(B), (b)(1)(vii), and (b)(1)(vii)(C);

e. Revising paragraph (b)(2); and

f. Deleting paragraphs (b)(4) and (b)(5).

The revisions read as follows:

§ 648.87 Sector allocation.

* * * * *

(b) **General requirements applicable to all approved Sectors**.

(1) All sectors approved under the provisions of paragraph (a) of this section must submit the documents specified in paragraphs (a)(1), (b)(2), and (b)(3) of this section, comply with the conditions and restrictions of this paragraph (b)(1), and comply with the groundfish sector monitoring program in § 648.11(l).

* * * * *

(v) **Sector reporting requirements**. In addition to the other reporting/recordkeeping requirements specified in this part, a sector's vessels must comply with the reporting requirements specified in this paragraph (b)(1)(v).

(A) **VMS declarations and trip-level catch reports**. Prior to each sector trip, a sector vessel must declare into broad stock areas in which the vessel fishes and submit

the VTR serial number associated with that trip pursuant to § 648.10(k). The sector vessel must also submit a VMS catch report detailing regulated species and ocean pout catch by statistical area when fishing in multiple broad stock areas on the same trip, pursuant to § 648.10(k).

(B) **Weekly catch report**. Each sector must submit weekly reports to NMFS stating the remaining balance of ACE allocated to each sector based upon regulated species and ocean pout landings and discards of vessels participating in that sector and any compliance/enforcement concerns. These reports must include at least the following information, as instructed by the Regional Administrator: Week ending date; species, stock area, gear, number of trips, reported landings (landed pounds and live pounds), discards (live pounds), total catch (live pounds), status of the sector's ACE (pounds remaining and percent remaining), and whether this is a new or updated record of sector catch for each regulated species stock allocated to that particular sector; sector enforcement issues; and a list of vessels landing for that reporting week. These weekly catch reports must be submitted no later than 0700 hr on the second Monday after the reporting week, as defined in this part. The frequency of these reports must be increased to more than a weekly submission when the balance of remaining ACE is low, as specified in the sector operations plan and approved by NMFS. If requested, sectors must provide detailed trip-by-trip catch data to NMFS for the purposes of auditing sector catch monitoring data based upon guidance provided by the Regional Administrator.

(C) **Year-end report**. An approved sector must submit an annual year-end report to NMFS and the Council, no later than 60 days after the end of the fishing year, that summarizes the fishing activities of participating permits/vessels, which must include at

least the following information: Catch, including landings and discards, of all species by sector vessels; the permit number of each sector vessel that fished for regulated species or ocean pout; the number of vessels that fished for non-regulated species or ocean pout; the method used to estimate discards by sector vessels; the landing port used by sector vessels; enforcement actions; and other relevant information required to evaluate the biological, economic, and social impacts of sectors and their fishing operations consistent with confidentiality requirements of applicable law.

(D) **Streamlining sector reporting requirements**. The reporting/recordkeeping requirements specified in section 648.11(l) and this paragraph (b)(1)(v) may be revised by the Regional Administrator in a manner consistent with the Administrative Procedure Act.

(vi) **Interaction with other fisheries** -

(A) **Use of DAS**. A sector vessel must comply with all measures specified for another fishery pursuant to this part, including any requirement to use a NE multispecies DAS. If the regulations of another fishery require the use of a NE multispecies DAS, the DAS allocation and accrual provisions specified in § 648.82(d) and (e), respectively, apply to each trip by a sector vessel, as applicable. For example, if a sector vessel is also issued a limited access monkfish Category C permit and is required to use a NE multispecies DAS concurrent with a monkfish DAS under this part, any NE multispecies DAS used by the sector vessel accrues, as specified in § 648.82(e)(1)(ii) based upon the vessel's NE multispecies DAS allocation calculated pursuant to § 648.82(d)(1)(iv)(B).

(B) **Availability of ACE**. Notwithstanding the requirements in paragraph (b)(1)(vi)(A) of this section, if a sector has not been allocated or does not acquire

sufficient ACE available to cover the catch of a particular stock of regulated species while participating in another fishery in which such catch would apply to the ACE allocated to a sector, vessels participating in that sector cannot participate in those other fisheries unless NMFS has approved a sector operations plan that ensures that regulated species or ocean pout will not be caught while participating in these other fisheries.

(vii) **ACE transfers**. All or a portion of a sector's ACE for any NE multispecies stock may be transferred to another sector at any time during the fishing year and up to 2 weeks into the following fishing year (i.e., through May 14), unless otherwise instructed by NMFS, to cover any overages during the previous fishing year. A sector is not required to transfer ACE to another sector. An ACE transfer only becomes effective upon approval by NMFS, as specified in paragraph (b)(1)(vii)(B) of this section.

(A) **Application to transfer ACE**. ACE may be transferred from one sector to another through written request to the Regional Administrator. This request must include the name of the sectors involved, the amount of each ACE to be transferred, the fishing year in which the ACE transfer applies, and the amount of compensation received for any ACE transferred, as instructed by the Regional Administrator.

(B) **Approval of an ACE transfer request**. NMFS shall approve/disapprove a request to transfer ACE based upon compliance by each sector and its participating vessels with the reporting requirements specified in this part. The Regional Administrator shall inform both sectors in writing whether the ACE transfer request has been approved within 2 weeks of the receipt of the ACE transfer request.

(C) **Duration of transfer**. Notwithstanding ACE carried over into the next fishing year pursuant to paragraph (b)(1)(i)(C) of this section, ACE transferred pursuant

to this paragraph (b)(1)(vii) is only valid for the fishing year in which the transfer is approved, with the exception of ACE transfer requests that are submitted up to 2 weeks into the subsequent fishing year to address any potential ACE overages from the previous fishing year, as provided in paragraph (b)(1)(iii) of this section, unless otherwise instructed by NMFS.

(viii) **Trip limits**. With the exception of stocks listed in § 648.86(1) and the Atlantic halibut trip limit at § 648.86(c), a sector vessel is not limited in the amount of allocated NE multispecies stocks that can be harvested on a particular fishing trip, unless otherwise specified in the operations plan.

(2) **Operations plan and sector contract**. To be approved to operate, each sector must submit an operations plan and preliminary sector contract to the Regional Administrator no later than September 1 prior to the fishing year in which the sector intends to begin operations, unless otherwise instructed by NMFS. A final roster, sector contract, and list of Federal and state permits held by participating vessels for each sector must be submitted by December 1 prior to the fishing year in which the sector intends to begin operations, unless otherwise instructed by NMFS. The operations plan may cover a 1- or 2-year period, provided the analysis required in paragraph (b)(3) of this section is sufficient to assess the impacts of sector operations during the 2-year period and that sector membership, or any other parameter that may affect sector operations during the second year of the approved operations plan, does not differ to the point where the impacts analyzed by the supporting NEPA document are compromised. Each vessel and vessel operator and/or vessel owner participating in a sector must agree to and comply with all applicable requirements and conditions of the operations plan specified in this

paragraph (b)(2) and the letter of authorization issued pursuant to paragraph (c)(2) of this section. It shall be unlawful to violate any such conditions and requirements unless such conditions or restrictions are identified in an approved operations plan as administrative only. If a proposed sector does not comply with the requirements of this paragraph (b)(2), NMFS may decline to propose for approval such sector operations plans, even if the Council has approved such sector. At least the following elements must be contained in either the final operations plan or sector contract submitted to NMFS:

(i) A list of all parties, vessels, and vessel owners who will participate in the sector;

(ii) A list of all Federal and state permits held by persons participating in the sector, including an indication for each permit whether it is enrolled and will actively fish in a sector, or will be subject to the provisions of the common pool;

(iii) A contract signed by all sector participants indicating their agreement to abide by the operations plan;

(iv) The name of a designated representative or agent of the sector for service of process;

(v) If applicable, a plan for consolidation or redistribution of ACE detailing the quantity and duration of such consolidation or redistribution within the sector;

(vi) A list of the specific management rules the sector participants will agree to abide by in order to avoid exceeding the allocated ACE for each stock, including a plan of operations or cessation of operations once the ACEs of one or more stocks are harvested and detailed plans for enforcement of the sector rules;

(vii) A plan that defines the procedures by which members of the sector that do not abide by the rules of the sector will be disciplined or removed from the sector, and a procedure for notifying NMFS of such expulsions from the sector;

(viii) If applicable, a plan of how the ACE allocated to the sector is assigned to each vessel;

(ix) If the operations plan is inconsistent with, or outside the scope of the NEPA analysis associated with the sector proposal/framework adjustment as specified in paragraph (a)(1) of this section, a supplemental NEPA analysis may be required with the operations plan;

(x) Detailed information about overage penalties or other actions that will be taken if a sector exceeds its ACE for any stock;

(xi) Detailed plans for the monitoring and reporting of landings and discards by sector participants, including, but not limited to, detailed information describing the sector's at-sea/electronic monitoring program for monitoring utilization of ACE allocated to that sector; identification of the independent third-party service providers employed by the sector to provide at-sea/electronic monitoring services; the mechanism and timing of any hail reports; a list of specific ports where participating vessels will land fish, with specific exemptions noted for safety, weather, etc., allowed, provided the sector provides reasonable notification to NMFS concerning a deviation from the listed ports; and any other information about such a program required by NMFS;

(xii) ACE thresholds that may trigger revisions to sector operations to ensure allocated ACE is not exceeded, and details regarding the sector's plans for notifying NMFS once the specified ACE threshold has been reached;

(xiii) Identification of any potential redirection of effort into other fisheries expected as a result of sector operations, and, if necessary, proposed limitations to eliminate any adverse effects expected from such redirection of effort;

(xiv) If applicable, description of how regulated species and ocean pout will be avoided while participating in other fisheries that have a bycatch of regulated species or ocean pout if the sector does not have sufficient ACE for stocks of regulated species or ocean pout caught as bycatch in those fisheries, as specified in paragraph (b)(1)(vi)(B) of this section; and

(xv) A list of existing regulations that the sector is requesting exemption from during the following fishing year pursuant to paragraph (c)(2) of this section.

(3) **NEPA analysis**. In addition to the documents required by paragraphs (a)(1) and (b)(2) of this section, before NMFS can approve a sector to operate during a particular fishing year, each sector must develop and submit to NMFS, in conjunction with the yearly operations plan and sector contract, an appropriate NEPA analysis assessing the impacts of forming the sector and operating under the measures described in the sector operations plan.

* * * * *

9. In § 648.90, revise paragraphs (a)(2)(iii) and (a)(4)(i)(B) to read Section 648.90 is revised to read as follows:

* * * * *

(a) * * *

(2) * * *

(iii) In addition, the PDT may develop ranges of options for any of the management measures in the FMP and the following conditions that may be adjusted through a framework adjustment to achieve FMP goals and objectives including, but not limited to:

(A) Revisions to DAS measures, including DAS allocations (such as the distribution of DAS among the four categories of DAS), future uses for Category C DAS, and DAS baselines, adjustments for steaming time, etc.;

(B) Accumulation limits due to a permit buyout or buyback;

(C) Modifications to capacity measures, such as changes to the DAS transfer or DAS leasing measures;

(D) Calculation of area-specific ACLs (including sub-ACLs for specific stocks and areas (e.g., Gulf of Maine cod)), area management boundaries, and adoption of area-specific management measures including the delineation of inshore/offshore fishing practices, gear restrictions, declaration time periods;

(E) Sector allocation requirements and specifications, including the establishment of a new sector, the disapproval of an existing sector, the allowable percent of ACL available to a sector through a sector allocation, an optional sub-ACL

specific to Handgear A permitted vessels, management uncertainty buffers, and the calculation of PSCs;

(F) Sector administration provisions, including at-sea, electronic, dockside, and other monitoring tools, coverage requirements and processes, monitoring program review, or other measures; sector reporting requirements; vessel-specific coverage levels;

(G) State-operated permit bank administrative provisions;

(H) Measures to implement the U.S./Canada Resource Sharing Understanding, including any specified TACs (hard or target);

(I) Changes to administrative measures;

(J) Additional uses for Regular B DAS;

(K) Reporting requirements;

(L) Declaration requirements pertaining to when and what time period a vessel must declare into or out of a fishery management area;

(M) The GOM Inshore Conservation and Management Stewardship Plan;

(N) Adjustments to the Handgear A or B permits;

(O) Gear requirements to improve selectivity, reduce bycatch, and/or reduce impacts of the fishery on EFH;

(P) SAP modifications;

(Q) Revisions to the ABC control rule and 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 may be made either through a biennial adjustment or framework adjustment;

(R) Changes to the SBRM, including the CV-based performance standard, the means by which discard data are collected/obtained, fishery stratification, the process for prioritizing observer sea-day allocations, reports, and/or industry-funded observers or observer set aside programs;

(S) and any other measures currently included in the FMP.

* * * * *

(a) * * *

(4) * * *

(i) * * *

(B) **ACL recommendations**. The PDT shall develop ACL recommendations based upon ABCs recommended by the SSC and the pertinent recommendations of the Transboundary Management Guidance Committee (TMGC). The ACL recommendations of the PDT shall be specified based upon total catch for each stock (including both landings and discards), if that information is available. The PDT shall describe the steps involved with the calculation of the recommended ACLs and uncertainties and risks considered when developing these recommendations, including whether different levels of uncertainties were used for different sub-components of the fishery and whether ACLs have been exceeded in recent years. Based upon the ABC recommendations of the SSC and the ACL recommendations of the PDT, the Council shall adopt ACLs that are equal to or lower than the ABC recommended by the SSC to account for management uncertainty in the fishery. In years that the coverage target for the groundfish sector

monitoring program specified in § 648.11(l) is set at 100 percent, the management uncertainty buffer will default to zero for the sector sub-ACL for the allocated regulated species stocks specified at § 648.87(b)(1)(i)(A), but the need for a management uncertainty buffer for the sector sub-ACL will continue to be evaluated as part of each specification action. The PDT will recommend an appropriate management uncertainty buffer for the sector sub-ACLs if 100-percent monitoring coverage is determined not to be effective, or if any additional elements evaluated when setting the management uncertainty buffers have the potential to result in catches that could exceed ACLs.

* * * * *

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

January 7, 2022

Thomas A. Nies
Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

RE: Request for Changes to the Final Environmental Impact Statement for Amendment 23 to the Northeast Multispecies Fishery Management Plan

Dear Tom:

We discovered that during our review of the draft Amendment 23 final environmental impact statement that the New England Fishery Management Council submitted on April 30, 2021, we failed to provide your staff with the final approved text for the Regulatory Impact Analysis and Initial Regulatory Flexibility Analysis contained in Chapter 9. Enclosed is the correct text addressing consistency with Executive Order 12866 and the Regulatory Flexibility Act. Council and GARFO staff have already discussed the attached text and have coordinated on how to incorporate the necessary changes. As requested, my staff provided a detailed list of the text changes to your staff. There are three changes (highlighted in the enclosure): A new section in the Regulatory Impact Analysis titled "Monitoring Costs Reimbursed by NMFS Under 100% Monitoring" on pages 16-17; and two new sentences in the Initial Regulatory Flexibility Analysis on pages 20 and 22. I apologize for this oversight on our part. We appreciate your quick turnaround of the revised document, to ensure that we can file the final environmental impact statement with the Environmental Protection Agency and complete the amendment review and rulemaking process expeditiously.

Sincerely,

Michael Pentony
Regional Administrator

Enclosure

Northeast Multispecies Fishery Management Plan
DRAFT Amendment 23
Regulatory Impact Review and
Initial Regulatory Flexibility Act Analysis

January 2022

Prepared by the
New England Fishery Management Council
In consultation with the
National Marine Fisheries Service

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1. REGULATORY IMPACT ANALYSIS (RIA)

1.1 Introduction

Executive Order 12866 requires a Regulatory Impact Analysis (RIA) in order to enhance planning and coordination with respect to new and existing regulations. This Executive Order requires the Office of Management and Budget to review regulatory programs that are considered to be "significant." This RIA demonstrates that this action is not a "significant regulatory action."

Executive Order 12866 requires a review of proposed regulations to determine whether or not the expected effects would be significant. A significant regulatory action is one that may:

1. Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

The Northeast Multispecies Fishery Management Plan (FMP) specifies the management measures for thirteen groundfish species (cod, haddock, yellowtail flounder, pollock, plaice, witch flounder, white hake, windowpane flounder, Atlantic halibut, winter flounder, redfish, ocean pout, and Atlantic wolffish) off the New England and Mid-Atlantic coasts. Some of these species are sub-divided into individual stocks that are attributed to different geographic areas. Commercial and recreational fishermen harvest these species. The commercial groundfish fishery consists of primarily "sectors" as well as the "common pool." The regulations at 50 CFR § 648.87 define a sector as "[a] group of persons (three or more persons, none of whom have an ownership interest in the other two persons in the sector) holding Northeast multispecies limited access vessel permits who have voluntarily entered into a contract and agree to certain fishing restrictions for a specified period of time, and which has been granted a total allowable catch (TAC) in order to achieve objectives consistent with applicable FMP goals and objectives." Each sector receives a total amount (in pounds) of fish it can harvest for each stock. Fishermen who do not join a sector fish in the "common pool". Vessels in the common pool are allocated a certain number of Days at Sea (DAS). Vessels that fish in the common pool are managed by a variety of input and effort controls such as DAS, trip limits, closed areas, minimum fish sizes, and gear restrictions. These effort controls are subject to in-season adjustments. The FMP has been updated through a series of amendments and framework adjustments.

Amendment 16, which became effective on May 1, 2010, adopted a broad suite of management measures to achieve the fishing mortality targets necessary to rebuild overfished stocks and meet other requirements of the M-S Act. Amendment 16 greatly expanded the sector management

program and adopted a process for setting Annual Catch Limits (ACLs) that requires catch levels to be set in biennial specifications packages. This action included a host of mortality reduction measures for "common pool" (i.e. nonsector) vessels and the recreational component of the fishery. A detailed discussion of the history of the FMP up to 2009 can be found in Amendment 16 (NEFMC 2009b).

Most relevant to this action, Amendment 16 also updated the requirements for sector and common pool monitoring programs, including at-sea monitoring and dockside monitoring requirements. Following that action, Framework 45 made adjustments to the dockside monitoring program. Framework 48 later discontinued the dockside monitoring program. Additionally, Framework 48 specified the overall goals and objectives of the groundfish monitoring program (Section 3.3.2). Framework 55 clarified that the primary goal of the monitoring program is to verify area fished, catch, and discards by species and gear type; and should be done in the most cost effective means practicable. Framework 55 further clarified that all other goals and objectives of groundfish monitoring programs are considered equally-weighted secondary goals.

1.2 Description of Management Objectives

Goals and Objectives of the Northeast Multispecies FMP

The goals and objectives of the Northeast Multispecies FMP remain as described in Amendment 13 (for example, manage the Northeast multispecies complex at sustainable levels, consistent with the National Standards and other required provisions of the Magnuson-Stevens Fishery Conservation and Management Act and other applicable law; achieve, on a continuing basis, optimum yield for the U.S. fishing industry), as well as the goals in Amendment 18, and will continue to frame the long-term management of the resource and fishery. Section 2.3 of Amendment 13 presents the overall goals and objectives of the Northeast Multispecies FMP, and Section 3.3.2 of Amendment 18 includes a description of the goals that were added to the overall program specific to promoting fleet diversity and several other goals.

Goals and Objectives of groundfish monitoring program

Framework 48 to the Multispecies FMP specified the overall goals and objectives of the groundfish monitoring program. Framework 55 clarified that the primary goal is to verify area fished, catch, and discards by species and gear type; and should be done in the most cost effective means practicable. Framework 55 further clarified that all other goals and objectives of groundfish monitoring programs at §648.11(l) are considered equally-weighted secondary goals. The goals and objectives of the groundfish monitoring program, are as follows:

<u>Goal 1: Improve documentation of catch</u>

Objectives:

- Determine total catch and effort, for each sector and common pool, of target or regulated species.
- Achieve coverage level sufficient to minimize effects of potential monitoring bias to the extent possible while maintaining as much flexibility as possible to enhance fleet viability.

Goal 2: Reduce cost of monitoring

Objectives:

- Streamline data management and eliminate redundancy.
- Explore options for cost-sharing and deferment of cost to industry.
- Recognize opportunity costs of insufficient monitoring.
-

Goal 3: Incentivize reducing discards

Objectives:

- Determine discard rate by smallest possible strata while maintaining cost-effectiveness.
- Collect information by gear type to accurately calculate discard rates.

Goal 4: Provide additional data streams for stock assessments

Objectives:

- Reduce management and/or biological uncertainty.
- Perform biological sampling if it may be used to enhance accuracy of mortality or recruitment calculations.

Goal 5: Enhance safety of monitoring program

Goal 6: Perform periodic review of monitoring program for effectiveness

Goals and Objectives of Amendment 23

This action would maintain the current goals and objectives of the groundfish monitoring program described above (Section 3.3.2), but consider measures to better address Goal #1: improve documentation of catch, described as "improved catch accounting" during the scoping process for this action. The objectives associated with that goal are: 1) determine total catch and effort, for each sector and common pool, of target or regulated species; and 2) achieve coverage level sufficient to minimize effects of potential monitoring bias to the extent possible while maintaining as much flexibility as possible to enhance fleet viability.

Goals and Objectives of this Amendment are described more fully in Section 3.3.3 of the accompanying EIS.

1.3 Need for Regulatory Action

This action was developed to implement new measures to improve the reliability and accountability of catch reporting in the commercial groundfish fishery, ensuring precise and

accurate representation of landings and discards. Accurate catch data are necessary to ensure that catch limits are set at levels that prevent overfishing and to curtail fishing operations when catch limits are exceeded. Accounting of landings in this fishery is primarily reported via dealers and vessel captains, while discards are reported by human at-sea monitors, assigned algorithmically to fishing trips based on a target coverage rate established at the beginning of each fishing year.

Catch of commercial groundfish in the sector component of the fishery is managed via a quota system, where pounds of each groundfish species (ACE) are allocated annually to sectors (essentially cooperatives) and all fish caught, including discards, must be accounted against these quota shares. Quota shares may be "leased" (traded) between sectors, with each sector agreeing to a lease price prior to executing the trade. All catch that is discarded or landed illegally, without accounting, will incur no leasing costs.

Inaccurate catch data also negatively impacts the quality of the stock assessments that underly the sectors' annual ACE allocations. Therefore, inaccurate catch data will lead to more uncertain and variable assessment results and, should true catch (including any unreported landings or discards) exceed established catch limits, reduced fishable biomass and lower annual ACE allocations.

Analyses have demonstrated that the previous method for determining observer coverage rates, which seek to limit the variability of discard estimates determined from the sample of trips covered to a coefficient of variation (CV) at or below 30%, are statistically inappropriate because observed trips (sample) are not representative of all trips (population). In the presence of systematic bias, any CV-based approach is inappropriate. Further, the bias may be variable across seasons, spatial fishing locations and utilized fishing gears as vessels attempt to reduce their leasing costs and, potentially, exceed their catch allocations by failing to account for true catch.

To ensure that all sectors are accountable to their annual allocations, that catch rights flow via leasing to those able to fish most profitably conditioned on the constraints provided by catch accounting, and to ensure that total catch does not exceed legal limits, various monitoring methods are considered in this action.

This action specifies a method for setting observer coverage levels in the presence of such biased sampling. Primarily, it proposes flat-rate coverage levels at 25% increments. It also considers electronic technology-based alternatives to human at-sea monitors, and cost-saving exemptions for fishing trips that occur in places where groundfish are less likely to be encountered.

1.4 Description of the Proposed Action

The potential solutions considered in this action focus on measures that adjust the current monitoring program to improve accounting and accuracy of collected catch data. Catch accounting and reporting requirements are to be fair and equitable for all commercial groundfish fishermen, while maximizing the value of collected catch data and minimizing costs for the fishing industry and the National Marine Fisheries Service.

Briefly, the Agency proposes the following actions affecting business entities regulated under the Northeast Multispecies Fishery Management Plan:

- Commercial Groundfish Monitoring Program Revisions (Sectors Only). Sets the standard at a fixed total at-sea target monitoring (ASM) target coverage level, based on a percentage of trips, at 100 percent coverage, with federal funds reimbursing industry costs, and in the

absence of federal funding sufficient to reimburse a minimum of 40 percent coverage of all trips, the industry will fund the additional coverage needed to achieve 40 percent (combined A-Sea Monitoring (ASM) or Northeast Fisheries Observer Program (NEFOP)) coverage target. Allows additional sector monitoring tools, in addition to human ASM, including the audit model with electronic monitoring (EM) and maximized retention with EM combined with dockside monitoring (DSM). Sets a time certain for knowing the total monitoring coverage level each year. Establishes a review process to evaluate the monitoring coverage rate. Allows for additional monitoring tools, vessel specific coverage levels, and all alternatives in Amendment 23 to be considered through a future framework adjustment.

- Commercial Groundfish Monitoring Program Revisions (Sectors and Common Pool). No action would maintain the status quo, no mandatory dockside monitoring program for sectors and the common pool.

- Sector Reporting. Grants the Regional Administrator the authority to streamline sector reporting requirements.

- Funding/Operation Provisions of Groundfish Monitoring (Sectors and Common Pool). Allows for higher coverage levels up to 100 percent if NMFS determines it has available funding for additional administrative costs to NMFS and sampling costs to industry in a given year. Allows for waivers from monitoring requirements for sectors and common pool under certain conditions.

- Management Uncertainty Buffers for the Commercial Groundfish Fishery (Sectors Only). Eliminates the management uncertainty buffer for sector sub-ACLs (allocated stocks only) with 100% monitoring of all sector trips.

- Remove Commercial Groundfish Monitoring Requirements for Certain Vessel Under Certain Conditions. Removes monitoring program requirement for vessels fishing exclusively west of 71 degrees 30 minutes west longitude from additional monitoring coverage requirements. Establishes a review process for vessel to be removed from commercial groundfish monitoring program requirements.

1.5 Description of the Alternatives

The Alternatives Under Consideration in the accompanying EIS are included in Section 4.0 of this document. Alternatives considered in this action present a range of Commercial Groundfish Monitoring Revisions, including At-Sea Monitoring coverage levels of 25, 50, 75 and 100%; coverage levels defined by the percent of trips monitored or the percent of catch monitored, options for allowing Electronic Monitoring in place of human observers, exemptions from monitoring requirements under certain conditions and the removal, or not, of the management uncertainty buffers when monitoring coverage is at 100%.

The Alternatives proposed in the EIS replace the existing annual coverage determination process with a fixed coverage rate for several years, balancing the need for improved catch accounting with increases in industry costs assuming industry will pay for such monitoring. The primary difference between the various Alternatives under consideration and the proposed action is that, under the proposed action, monitoring coverage levels are fixed for four years at 100%, subject to available federal funding, and fall to 40% in year five. Year five coverage rates are subject to revision based on a required subsequent review using data generated under full coverage. Additional alternatives such as not removing the management uncertainty buffers even under 100% coverage and not exempting certain fishing trips with presumably low groundfish catch are also addressed.

Alternatives Considered but Rejected are included in Section 5.0 and are not summarized here.

1.6 Baseline Conditions

Baseline conditions are those of fishing year 2018, as described in detail in Section 7.5.1.4.2.1 of the accompanying EIS. In this year observer coverage levels were set at a target of 15% with a 14.6% realized coverage fishery-wide[1]. In FY 2018, as in all subsequent years, the fishing industry bore no direct cost for catch monitoring.

The following tables summarize baseline conditions for this analysis.

Cat	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)
<=5	0.2	0	0.1	0.1	71
>5, <=20	1.9	0	0.5	1.3	72
>20, <=50	7.8	0	2.3	5.6	71
>50, <=80	6.3	0	2.2	4.1	65
>80, <=160	27.7	0	7.5	20.3	73
>160	27.0	0	7.0	19.9	74
TOTAL	*70.9*	*0*	*19.6*	*51.3*	*70*

Table 1: Estimated dynamic impacts of monitoring under the Base case, aggregate fleet totals by days absent category (2018$, mil)

Home Port	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)
CT PORTS	0.2	0	0.0	0.1	75

1 Summary of Analyses Conducted to Determine At-Sea Monitoring Requirements for Multispecies Sectors FY2020, available at: https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/Sectors/ASM/FY2020_Multispecies_Sector_ASM_Requirements_Summary.pdf

Home Port	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)
OTHER MA PORTS	5.7	0	1.9	3.9	67
BOSTON	16.4	0	4.6	11.8	72
CHATHAM	4.7	0	0.8	4.0	83
GLOUCESTER	16.5	0	4.5	12.0	73
NEW BEDFORD	11.4	0	3.5	7.9	70
OTHER ME PORTS	2.1	0	0.7	1.4	67
PORTLAND	5.5	0	1.6	4.0	72
NH PORTS	2.2	0	0.7	1.5	69
NY PORTS	0.5	0	0.1	0.5	89
OTHER RI PORTS	0.4	0	0.2	0.3	62
POINT JUDITH	2.4	0	0.6	1.8	74
OTHER NORTHEAST PORTS	999.0	999	999.0	999.0	999

Table 2: Estimated dynamic impacts of monitoring under the Base case, aggregate fleet totals by vessel home port (2018$, mil)

Size Class	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)
30'to<50'	15	0	3.7	11	75
50'to<75'	23	0	6.0	17	74
75'+	33	0	9.9	23	70

Table 3: Estimated dynamic impacts of monitoring under the Base case, aggregate fleet totals by vessel size class (2018$, mil)

Sector	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)
Sustainable Harvest Sector	24.7	0	6.9	17.8	72
Northeast Fishery Sector II	14.5	0	3.8	10.7	74
Northeast Fishery Sector VI	5.5	0	1.5	4.0	72
Northeast Fishery Sector XIII	5.3	0	1.9	3.5	65
Northeast Fishery Sector VIII	5.1	0	1.5	3.6	71
Georges Bank Cod Fixed Gear Sector	4.8	0	0.8	4.0	84
Maine Coast Community Sector	2.6	0	0.7	1.9	72
Northeast Fishery Sector XI	2.1	0	0.7	1.5	70

Sector	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)
Sustainable Harvest Sector - Inshore	1.9	0	0.8	1.2	61
Northeast Fishery Sector V	1.8	0	0.4	1.4	79
Northeast Fishery Sector XII	1.3	0	0.4	1.0	73
Northeast Coastal Communities Sector	999.0	999	999.0	999.0	999
Northeast Fishery Sector III	0.5	0	0.2	0.3	64
Northeast Fishery Sector X	0.1	0	0.0	0.1	66
Northeast Fishery Sector VII	999.0	999	999.0	999.0	999

Table 4: Estimated dynamic impacts of monitoring under the Base case, aggregate fleet totals by sector (2018$, mil)

Beginning in FY2020 coverage targets were no longer determined by the previous "CV" standard and were instead set at a flat target of 40% for both FY 2020 and 2021[2], representing a change from these baseline conditions in that here the percentage of trips for which there is no independent accounting of landings and discards is increased. Monitoring continues to be federally funded.

1.7 Short-run Aggregate and Distributional Economic Impacts of the Proposed Action

Executive Order 12866 mandates that proposed measures be analyzed in terms of: (1) changes in net benefits and costs to stakeholders, (2) changes to the distribution of benefits and costs within the industry, (3) changes in income and employment, (4) cumulative impacts of the regulation, and (5) changes in other social concerns.

The effects of the proposed action depend, essentially, upon the degree of federal subsidy offered to the commercial groundfish fishery and the number of vessels anticipated to utilize electronic monitoring as a replacement for human at-sea monitors. Electronic monitoring is predicted to be more cost-effective, particularly for the subset of most-active vessels in the groundfish fishery (those fishing more than 30-50 days per year).

Section 6.6.10.3 states that sufficient government funding for 100% coverage is budgeted through the end of fishing year 2022. Subsequently, NMFS has indicated it anticipates funding sufficient to fund monitoring costs through the end of fishing year 2023. If monitoring costs are 100% subsidized and monitoring coverage is provided on 100% of trips, the fishery overall is predicted to generate ~$4 mil in additional revenues, due mostly to the removal of the management uncertainty buffers. These additional revenues are predicted to increase profits by approximately $2.8 mil, taking into account the fact that the industry will not be paying for monitoring. If no vessels utilize electronic monitoring as a replacement for human at-sea monitors, the fishery is predicted to generate only $1.4 mil in additional profits on $1.5 mil in additional revenues.

This action proposes a monitoring coverage level "floor" of 40%, which applies in the fifth year after implementation of this action, conditional on a required review of fishery performance, or earlier if no subsidy is available and industry is required to pay for 100% of it's monitoring costs.

2 Letters dated January 28, 2020 and January 25, 2021 from GARFO Regional Administrator to NEFMC, available at https://www.greateratlantic.fisheries.noaa.gov

Here, as at all coverage levels less than 100%, the management uncertainty buffers are not removed. In this instance, the fleet is predicted to generate between $1.5-2.0 mil less profit than under the status quo, or about a 4% reduction.

The analyses developed in support of this action assume that fishing industry will bear some or all of the costs associated with monitoring. As this will not be the case for the foreseeable future, these analyses were re-run here with no industry costs associated with monitoring.

Years 1-4, 100% monitoring with approved EM options and removal of uncertainty buffers

The proposed action sets the target monitoring coverage at 100% for four years if full federal funding is available. Under this scenario, all industry monitoring costs are $0. Fishery revenues are estimated to be $4 mil higher than under the Base case. Operating profits increase by $2.8 mil. Vessels fishing 50-80 days per year, and those fishing more than 160 days per year, are predicted to see the largest increase in profitability. Vessels larger than 50 feet, and those fishing out of New Bedford and Boston, MA, are predicted to see the largest profitability increases. No subsets of the fishing fleet are predicted to see profits decline under this scenario.

Subsidy	Cat	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
FULL	<=5	0.2	0	0.1	0.1	70	0.0
	>5, <=20	1.8	0	0.5	1.3	72	0.0
	>20, <=50	8.2	0	2.3	5.8	71	3.6
	>50, <=80	6.7	0	2.3	4.4	65	7.3
	>80, <=160	28.9	0	7.7	21.1	73	3.9
	>160	29.1	0	7.7	21.4	74	7.5
	TOTAL	*74.9*	*0*	*20.6*	*54.1*	*72*	*6.1*

Table 5: Estimated dynamic impacts of blended ASM and EM with 100% coverage with management uncertainty buffers removed, aggregate fleet totals by days absent category (2018$, mil, costs based on 3 year average for EM)

Subsidy	Home Port	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
FULL	CT PORTS	0.2	0	0.1	0.2	75	100.0
	OTHER MA PORTS	5.9	0	1.9	4.0	67	2.6
	BOSTON	17.7	0	4.9	12.8	72	8.5
	CHATHAM	4.8	0	0.8	4.0	83	0.0
	GLOUCESTER	17.1	0	4.6	12.5	73	4.2
	NEW BEDFORD	12.4	0	3.9	8.6	69	8.9

Subsidy	Home Port	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
	OTHER ME PORTS	2.2	0	0.7	1.5	68	7.1
	PORTLAND	5.8	0	1.6	4.2	72	5.0
	NH PORTS	2.3	0	0.7	1.6	69	6.7
	NY PORTS	0.6	0	0.1	0.5	89	0.0
	OTHER RI PORTS	0.5	0	0.2	0.3	63	0.0
	POINT JUDITH	2.4	0	0.6	1.8	74	0.0
	OTHER NORTHEAST PORTS	0.0	0	0.0	0.0	999	-100.0

Table 6: Estimated dynamic impacts of monitoring under blended ASM and EM with 100% coverage with management uncertainty buffers removed, aggregate fleet totals by vessel home port (2018$, mil, costs based on 3 year average for EM)

Subsidy	Size Class	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
	30'to<50'	15	0	3.8	11	75	1.8
FULL	50'to<75'	25	0	6.3	19	75	6.9
	75'+	35	0	10.5	24	70	6.1

Table 7: Estimated dynamic impacts of monitoring under blended ASM and EM with 100% coverage with management uncertainty buffers removed, aggregate fleet totals by vessel size class (2018$, mil, costs based on 3 year average for EM)

Subsidy	Sector	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
	Sustainable Harvest Sector	26.0	0	7.2	18.8	72	5.6
	Northeast Fishery Sector II	15.2	0	3.9	11.2	74	4.7
	Northeast Fishery Sector VI	6.0	0	1.6	4.3	73	7.5
	Northeast Fishery Sector XIII	5.8	0	2.1	3.8	65	8.6
	Northeast Fishery Sector VIII	5.4	0	1.6	3.9	71	8.3
FULL	Georges Bank Cod Fixed Gear Sector	4.8	0	0.8	4.0	84	0.0
	Maine Coast Community Sector	2.8	0	0.8	2.0	73	5.3
	Northeast Fishery Sector XI	2.3	0	0.7	1.6	70	6.7
	Sustainable Harvest Sector - Inshore	2.1	0	0.8	1.3	62	8.3

Subsidy	Sector	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
	Northeast Fishery Sector V	1.8	0	0.4	1.4	79	0.0
	Northeast Fishery Sector XII	1.4	0	0.4	1.0	73	0.0
	Northeast Coastal Communities Sector	999	0	0.0	0.0	999	999
	Northeast Fishery Sector III	0.5	0	0.2	0.3	64	0.0
	Northeast Fishery Sector X	0.1	0	0.0	0.1	66	0.0
	Northeast Fishery Sector VII	999	0	0.0	0.0	999	999

Table 8: Estimated dynamic impacts of monitoring under blended ASM and EM with 100% coverage with management uncertainty buffers removed, aggregate fleet totals by sector (2018$, mil, costs based on 3 year average for EM)

Year 5 (or sooner) with 40% monitoring with approved EM options and uncertainty buffers included

At a 40% target coverage, fleet-wide monitoring costs are estimated to be between $1 and $2.1 mil. The dynamically-estimated median ASM cost for 40% coverage without removing the management uncertainty buffers is $1.5 mil. Fishery revenues are estimated to be higher, generating $71.3 mil and representing an additional $0.4 mil relative to the Base case. Operating profits are estimated at $49.9 mil, or $1.4 mil lower than the Base case under this scenario.

Smaller vessels, those under 50ft, as well as vessels fishing less than 50 days per year are predicted to see the largest declines in profitability, on the order of 6-15% reductions. Chatham, Point Judith and ports in New Hampshire are all predicted to see profitability decline by more than 5%.

Cat	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
<=5	0.2	0.0	0.1	0.1	55	0.0
>5, <=20	1.7	0.1	0.5	1.1	66	-15.4
>20, <=50	7.8	0.3	2.2	5.2	67	-7.1
>50, <=80	6.4	0.2	2.2	4.0	63	-2.4
>80, <=160	27.4	0.5	7.4	19.5	71	-3.9
>160	27.8	0.4	7.3	20.0	72	0.5
TOTAL	*71.3*	*1.5*	*19.7*	*49.9*	*70*	*-2.2*

Table 9: Estimated dynamic impacts of monitoring under 40% coverage, aggregate fleet totals by days absent category (2018$, mil)

Home Port	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
CT PORTS	0.2	0.0	0.0	0.1	75	0.0
OTHER MA PORTS	5.7	0.1	1.8	3.7	65	-5.1
BOSTON	16.9	0.3	4.7	11.8	70	0.0
CHATHAM	4.6	0.1	0.8	3.7	81	-7.5
GLOUCESTER	16.3	0.3	4.4	11.6	71	-3.3
NEW BEDFORD	11.8	0.2	3.7	7.9	67	0.0
OTHER ME PORTS	2.1	0.1	0.7	1.4	64	0.0
PORTLAND	5.5	0.1	1.5	3.9	70	-2.5
NH PORTS	2.2	0.1	0.7	1.4	65	-6.7
NY PORTS	0.5	0.0	0.1	0.5	85	0.0
OTHER RI PORTS	0.4	0.0	0.2	0.3	59	0.0
POINT JUDITH	2.3	0.1	0.6	1.6	70	-11.1
OTHER NORTHEAST PORTS	0.0	0.0	0.0	0.0	999	-100.0

Table 10: Estimated dynamic impacts of monitoring under 40% coverage, aggregate fleet totals by vessel home port (2018$, mil)

Size Class	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
30'to<50'	14	0.5	3.6	10	71	-7.3
50'to<75'	24	0.5	6.0	17	73	-1.1
75'+	33	0.6	10.0	23	68	-1.3

Table 11: Estimated dynamic impacts of monitoring under 40% coverage, aggregate fleet totals by vessel size class (2018$, mil)

Sector	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
Sustainable Harvest Sector	24.8	0.4	6.9	17.5	71	-1.7
Northeast Fishery Sector II	14.4	0.2	3.8	10.4	72	-2.8
Northeast Fishery Sector VI	5.7	0.1	1.6	4.0	70	0.0
Northeast Fishery Sector XIII	5.6	0.1	2.0	3.5	62	0.0
Northeast Fishery Sector VIII	5.2	0.1	1.5	3.6	69	0.0
Georges Bank Cod Fixed Gear Sector	4.6	0.1	0.7	3.7	81	-7.5
Maine Coast Community Sector	2.7	0.1	0.7	1.9	70	0.0
Northeast Fishery Sector XI	2.2	0.1	0.7	1.4	65	-6.7

Sector	Gross Rev	ASM Cost	Cost of Ops	Operational Profit	Profit (%)	Rel to Base (%)
Sustainable Harvest Sector - Inshore	2.0	0.1	0.8	1.2	59	0.0
Northeast Fishery Sector V	1.7	0.1	0.4	1.3	75	-7.1
Northeast Fishery Sector XII	1.3	0.0	0.4	0.9	70	-10.0
Northeast Coastal Communities Sector	999	999	999	999	999	999
Northeast Fishery Sector III	0.5	0.0	0.2	0.3	59	0.0
Northeast Fishery Sector X	0.1	0.0	0.0	0.1	52	0.0
Northeast Fishery Sector VII	999	999	999	999	999	999

Table 12: Estimated dynamic impacts of monitoring under 40% coverage, aggregate fleet totals by sector (2018$, mil)

Static monitoring costs associated with industry-funded 40% monitoring coverage

The following tables show the predicted costs associated with industry funded monitoring at 40% coverage. This level is a fishery-wide floor, ensuring that catch is accurately accounted on at least 40% of trips and is expected to occur only in Year 5. It may occur at any point, however, if there is insufficient federal funding available to cover the costs of monitoring. The reversion in Year 5 from 100% to 40% monitoring is also subject to change based upon a formal review of the monitoring program beginning in Year 3; on the basis of this review, coverage targets may be set higher or lower in subsequent years.

Industry-funded monitoring will be most expensive for larger vessels making longer trips and participating more intensely in the groundfish fishery.

Cat	Fleet Low	Fleet High	Vessel Low	Vessel High	Trip Low	Trip High	Day Low	Day High
<=5	16	50	0.69	2.07	0.18	0.55	0.21	0.59
>5, <=20	85	126	2.83	4.21	0.16	0.24	0.17	0.25
>20, <=50	177	399	3.78	8.48	0.09	0.2	0.08	0.17
>50, <=80	84	191	6.03	13.63	0.08	0.19	0.05	0.13
>80, <=160	340	710	8.96	18.67	0.22	0.47	0.09	0.18
>160	297	635	14.86	31.75	0.39	0.84	0.09	0.19
TOTAL	*1,0*	*2,11*	-	-	-	-	-	-

Table 13: Estimated static costs of monitoring under 40% coverage, by days absent category (2018$, thousands. Low and high estimates are mean +/- one standard deviation)

Home Port	Fleet Low	Fleet High	Vessel Low	Vessel High	Trip Low	Trip High	Day Low	Day High
OTHER MA PORTS	95.1	183.7	4.53	8.75	0.17	0.33	0.1	0.2

Home Port	Fleet Low	Fleet High	Vessel Low	Vessel High	Trip Low	Trip High	Day Low	Day High
BOSTON	230.7	470.5	10.03	20.46	0.36	0.74	0.08	0.18
CHATHAM	85	138.9	3.86	6.32	0.1	0.16	0.14	0.22
GLOUCESTER	185.1	440.3	5.44	12.95	0.12	0.3	0.07	0.16
NEW BEDFORD	117.5	284.6	9.04	21.89	0.37	0.9	0.07	0.18
OTHER ME PORTS	45.7	90.1	3.52	6.93	0.1	0.19	0.08	0.16
PORTLAND	85.8	147.9	9.53	16.43	0.59	1.01	0.12	0.21
NH PORTS	59	137.1	4.91	11.42	0.1	0.23	0.07	0.17
NY PORTS	16.7	31.5	3.34	6.3	0.09	0.16	0.1	0.19
OTHER RI PORTS	9.2	24.4	3.07	8.14	0.58	1.53	0.13	0.43
POINT JUDITH	44.3	114.5	2.6	6.73	0.07	0.18	0.07	0.17
OTHER NORTHEAST PORTS	999	999	999	999	999	999	999	999

Table 14: Estimated static costs of monitoring under 40% coverage, by vessel home port (2018$, thousands. Low and high estimates are mean +/- one standard deviation)

Size Class	Fleet Low	Fleet High	Vessel Low	Vessel High	Trip Low	Trip High	Day Low	Day High
30'to<50'	336	643	3.7	7.1	0.10	0.18	0.09	0.18
50'to<75'	316	731	5.9	13.5	0.18	0.42	0.08	0.19
75'+	349	736	12.5	26.3	0.50	1.05	0.08	0.19

Table 15: Estimated static costs of monitoring under 40% coverage, by vessel size class (2018$, thousands. Low and high estimates are mean +/- one standard deviation)

Sector	Fleet Low	Fleet High	Vessel Low	Vessel High	Trip Low	Trip High	Day Low	Day High
Sustainable Harvest Sector	306.9	579.2	12.79	24.13	0.53	1	0.1	0.2
Northeast Fishery Sector II	139.6	356.5	5.58	14.26	0.11	0.27	0.06	0.15
Northeast Fishery Sector XIII	74.2	197.5	4.95	13.17	0.3	0.8	0.09	0.23
Northeast Fishery Sector VI	94.5	190.8	13.51	27.25	0.66	1.33	0.11	0.22
Georges Bank Cod Fixed Gear Sector	82.2	133.1	4.11	6.66	0.1	0.17	0.14	0.23
Northeast Fishery Sector XI	51	132.7	4.63	12.06	0.09	0.23	0.06	0.17
Northeast Fishery Sector VIII	51	129.4	6.38	16.18	0.3	0.75	0.07	0.18
Northeast Fishery Sector V	41	94.4	2.73	6.29	0.06	0.14	0.07	0.16
Maine Coast Community Sector	56.6	92.9	3.78	6.19	0.17	0.27	0.12	0.19
Sustainable Harvest Sector - Inshore	38.5	78	4.81	9.75	0.15	0.3	0.08	0.19
Northeast Fishery Sector XII	17.5	49.6	2.5	7.09	0.04	0.13	0.05	0.14

Sector	Fleet Low	Fleet High	Vessel Low	Vessel High	Trip Low	Trip High	Day Low	Day High
Northeast Fishery Sector III	20.5	30.2	2.57	3.77	0.12	0.18	0.15	0.22
Northeast Coastal Communities Sector	999	999	999	999	999	999	999	999
Northeast Fishery Sector X	13.9	20.3	1.99	2.9	0.18	0.26	0.21	0.31
Northeast Fishery Sector VII	999	999	999	999	999	999	999	999

Table 16: Estimated static costs of monitoring under 40% coverage, by sector (2018$, thousands. Low and high estimates are mean +/- one standard deviation)

Monitoring Costs reimbursed by NMFS under 100% monitoring

Under the proposed action, NMFS is expected to reimburse the industry for all monitoring costs. While these costs are not borne directly by fishing businesses, the reimbursement mechanism represents a subsidy, and a change in the distribution of costs from industry to taxpayers.

Amendment 16 to the Multispecies FMP envisioned a shift from subsidized monitoring to industry-based funding after two years, intended for implementation in fishing year 2012. That shift never materialized, and NMFS has received funding to pay for monitoring in all years except 2016, when 15% of monitoring costs were funded by industry. The following table shows the magnitude of these costs across the past five years.

Fishing Year	Federal reimbursement spending (mil, 2018$)	Coverage rate, ASM achieved	Coverage rate, NEFOP Achieved	Achieved combined coverage	Target combined coverage	Proportion of ASM costs federally reimbursed
2016	$0.73	10%	5%	14%	14%	85%
2017	$0.49	5%	11%	16%	16%	100%
2018	$0.60	8%	7%	14%	15%	100%
2019	$1.05	14%	9%	23%	31%	100%
2020	$0.67	9%	3%	12%	40%	100%

Table 17: Summary of costs and coverage rates, 2016-2020.

The proposed action is anticipated to take effect in Fishing Year 2022. The following table summarized a range of costs anticipated to reimbursed by the Agency (the magnitude of the federal subsidy). These costs are highly uncertain, and will vary based on the number of vessels that opt in to the two electronic monitoring programs noted in the alternatives. Because costs are not a driver for monitoring technology selection at the vessel level, and because we have no data on individual owner or captain preferences for such technologies, there is a wide range of potential costs.

These are "industry-equivalent" costs for operational components of at sea monitoring. The approach used to generate estimates in the Amendment 23 DEIS is used here, with the following modifications:

- ASM per sea-day rates will be slightly higher than those estimated in the DEIS due to anticipated difficulties stepping up human observer capacity;
- EM review rates are estimated at 50% for both the audit and max retention models in both 2021 and 2022;
- all vessels currently enrolled in an existing EM model will continue in that program;
- NEFOP coverage is subtracted from ASM (human) estimates, assuming 9% of trips in both 2021 and 2022 will be covered under NEFOP.

These are "static" costs, which assume no second-order monitoring effects. Because sectors and vessels are not directly paying the cost of monitoring, the additional monitoring is not expected to change operating costs for fishing trips and should not induce vessels to change their behavior.

Fishing Year	Monitoring Technology	# Vsls enrolled – LOW	# Vsls enrolled – HIGH	Component Cost – LOW	Component Cost – HIGH	TOTAL COST – LOW	TOTAL COST - HIGH
2021	EM-Audit	41	18	$0.61	$0.20	$2.2	$2.4
	EM-MaxRet	9	2	$0.21	$0.05		
	ASM	118	148	$1.38	$2.09		
2022	EM-Audit	99	18	$2.06	$0.20	$3.3	$6.1
	EM-MaxRet	23	2	$0.63	$0.05		
	ASM	46	148	$0.56	$5.82		

Table 18: Estimated low and high federal reimbursement of operational monitoring costs for Fishing Years 2021 and 2022 (2018$, mil). Coverage target is 40% in 2021 and 100% in 2022. Vessels currently enrolled in EM programs are assumed to remain enrolled across all permutations.

Impacts of other measures included in the Proposed Action

In all cases, vessels that opt to make fishing trips entirely west of 071' 30"W are exempt from the additional human-based (ASM) monitoring requirements. This may increase profits if the coverage level floor is implemented due to lack of federal subsidies for monitoring costs. Likewise, in the case where coverage levels are set higher than 40%, vessels opting to utilize this

exemption will reduce monitoring costs covered via federal subsidies, allowing more funding to cover monitoring for a longer duration or at a higher level.

1.8 Impacts of Significant Alternatives

The economic impacts of all alternatives are analyzed extensively in Section 7.5 of the accompanying EIS. All Alternatives assume some portion of monitoring costs will be funded by industry participants, resulting, in all cases, in reduced industry profitability relative to the Proposed Action and baseline conditions. Alternatives where less than 100% monitoring is required do not allow the management uncertainty buffers to be removed, leading to lower overall annual catch allocations and revenue declines on the order of $2-5 mil. Alternatives requiring industry to pay for monitoring reduce profits by a similar amount. There are no alternatives considered here that increase profits relative to the proposed action.

1.9 Monetizing Benefits and Discounting Future Revenues

The benefits of improved monitoring cannot be monetized. There are too many dimensions to the problem of unaccounted catch, and they propagate through too many channels to produce reliable estimates of either (a) increased future fishery allocations and long-term sustainable yields, or (b) efficient distribution of fishing rights through improved quota lease market function.

When landings or discards, both of which have monetary value, are not reported and properly accounted, the data underlying stock assessments are compromised. This creates short and long-run perturbations in estimates of biomass and sustainable yield. These perturbations generate uncertainty in estimates and imprecision in annual catch allocations (quotas, "sub-ACL's"). Sometimes the assessments generate estimates that are so imprecise as to fail to pass peer review, and remedial methods for determining stock sizes and allocations are required. If assessment quality degrades too far, stock status becomes indeterminable. This has happened on several occasions in the previous ten years, situations which lead directly to the need for this action. It is not possible, however, to determine monetized costs associated with such circumstances, nor is it possible to determine a path towards future increases in allocations in catch resulting from improved assessment accuracy.

The ability for sectors and fisherman to lease quota (ACE, derived from ACL's) allows catch rights to flow to those most able to profitably fish under prevailing allocations while allowing those with insufficient allocations to profit, by leasing quota, while not actively fishing. If landings and discards are inaccurately accounted, or unaccounted altogether, inefficient operators may chose to continue fishing while not reporting portions of their catch. This leads to an inefficient distribution of catch rights among fishery participants. The direct economic effects of this cannot be estimated or monetized.

Quotas in this fishery are set annually based upon updates to stock assessments and other data. These quotas drive the economic performance of this fishery. Absent information on future quota allocation changes, it is not possible to estimate future fishery performance on the basis of the changes proposed in this action alone. While the proposed action envisions 100% federally-funded monitoring through year 4 of this action, funds allocated to date are anticipated to provide such coverage only through year 2 and, after that, the actual coverage rate and removal status for the management uncertainty buffers, which would reduce allocations and lower revenues and profits,

is uncertain. Forecast revenues, costs and profits, as well as Net Present Value estimates, are therefore not provided.

1.10 Models, Assumptions And Uncertainties

All models used to develop these analyses, and their assumptions and associated uncertainties, are described in detail in Section 7.5.1 of the accompanying EIS.

1.11 Determination of Significance Under Executive Order 12866

The proposed action does not constitute a significant regulatory action under EO 12866. It will not have an annual effect on the economy of more than $100 million, as the fishery in it's entirety generates only ~$70-75 mil annually and the proposed action is predicted to increase fishery-wide net returns by ~$4-5 mil if monitoring is fully subsidized at a 100% coverage level with the management uncertainty buffers removed, as targeted for Years 1-4 of this action. In year 5, and in any years prior to this where federal funding for monitoring is not available, net returns are predicted to be reduced by ~$1-2 mil due to increased costs from industry-funded monitoring at a 40% coverage level with the management uncertainty buffers remaining in place.

Transfers, primarily via ACE leasing between sectors, are not expected to change dramatically under this action. It is not predicted to have any adverse impact on ports, fish dealers, recreational anglers, and operators of party/charter businesses. In years 1-4, both revenues and profits are predicted to increase so long as federal funds are available to pay for monitoring costs.

In addition, there should be no interactions with activities of other agencies and no impacts on entitlements, grants, user fees, or loan programs. No novel legal or policy issues are raised. The Proposed Action is not considered significant as defined by EO 12866.

2. INITIAL REGULATORY FLEXIBILITY ACT ANALYSIS

The Regulatory Flexibility Act (RFA), first enacted in 1980, and codified at 5 U.S.C. 600-611, was designed to place the burden on the government to review all new regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization can have a bearing on its ability to comply with Federal regulations. Major goals of the RFA are: 1) to increase agency awareness and understanding of the impact of their regulations on small business; 2) to require that agencies communicate and explain their findings to the public; and 3) to encourage agencies to use flexibility and to provide regulatory relief to small entities.

The RFA emphasizes predicting significant adverse impacts on small entities as a group distinct from other entities and on the consideration of alternatives that may minimize the impacts, while still achieving the stated objective of the action. When an agency publishes a proposed rule, it must either, (1) certify that the action will not have a significant adverse impact on a substantial number of small entities, and support such a certification declaration with a factual basis, demonstrating this outcome, or, (2) if such a certification cannot be supported by a factual basis, prepare and

make available for public review an Initial Regulatory Flexibility Analysis (IRFA) that describes the impact of the proposed rule on small entities.

The sections below provide the supporting analysis to assess whether the proposed regulations will have a "significant impact on a substantial number of small entities."

2.1 Basis and Purpose of the Rule

This action is taken under the authority of the MSA and regulations at 50 CFR part 648.

A complete description of the purpose and need and objectives of this proposed rule is found in Section 1.

The primary purpose of this action is to improve accounting of landings and discards in the commercial groundfish fishery, while also taking in to account the costs of such monitoring. Catch of commercial groundfish in the sector component of the fishery is managed via a quota system, where pounds of each groundfish species are allocated annually to sectors (essentially cooperatives) and all fish caught, including discards, must be accounted against these shares of quota. Quota shares (pounds) are "leased" (traded) between Sectors, with each Sector agreeing to a lease price prior to executing the trade. Catch that is discarded or landed without accounting will save Sectors and the businesses that comprise those Sectors the value of the leased quota pounds. To ensure that all Sectors are accountable to their annual allocations, various monitoring methods are considered.

2.2 Description of Regulated Entities

This action regulates all commercial fishing businesses with a limited access permit allowing vessels to participate in the large mesh Northeast Multispecies (groundfish) fishery. As of June 1, 2020, NMFS had issued 828 commercial limited-access groundfish permits associated with vessels. Therefore, 828 permits are regulated by this action. Each vessel may be individually owned or part of a larger corporate ownership structure, and for RFA purposes, it is the ownership entity that is ultimately regulated by the proposed action. Ownership entities are identified on June 1st of each year based on the list of all permit numbers, for the most recent complete calendar year, that have applied for any type of Northeast Federal fishing permit. The current ownership data set is based on calendar year 2019 permits and contains gross sales associated with those permits for calendar years 2017 through 2019.

For RFA purposes only, NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (see 50 CFR § 200.2). A business primarily engaged in commercial fishing (NAICS code 11411) is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide. The determination as to whether the entity is large or small is based on the average annual revenue for the three years from 2017 through 2019.

2.3 Number of Regulated Commercial Fishing Entities

Ownership data collected from permit holders indicates that there are **667 distinct business entities** that hold at least one permit regulated by the proposed action. Of these, all are engaged primarily in commercial fishing, and 80 did not have revenues (were inactive in 2019). **661 are**

categorized as small entities and **6 are categorized as large entities**, per the NMFS guidelines. Ownership data collected from dealer permit holders indicates there are 148 distinct business entities that hold at least one dealer permit regulated by this action. Of these, **135 distinct businesses are categorized as small entities and 13 are categorized as large entities**, per the NMFS guidelines.

2.4 Summary of the Proposed Action and Significant Alternatives

Briefly, the Agency proposes the following actions affecting business entities regulated under the Northeast Multispecies Fishery Management Plan:

1. Commercial Groundfish Monitoring Program Revisions (Sectors Only). Sets the standard at a fixed total at-sea target monitoring (ASM) target coverage level, based on a percentage of trips, at 100 percent coverage, with federal funds reimbursing industry costs, and in the absence of federal funding sufficient to reimburse a minimum of 40 percent coverage of all trips, the industry will fund the additional coverage needed to achieve 40 percent (combined A-Sea Monitoring (ASM) or Northeast Fisheries Observer Program (NEFOP)) coverage target. Allows additional sector monitoring tools, in addition to human ASM, including the audit model with electronic monitoring (EM) and maximized retention with EM combined with dockside monitoring (DSM). Sets a time certain for knowing the total monitoring coverage level each year. Establishes a review process to evaluate the monitoring coverage rate. Allows for additional monitoring tools, vessel specific coverage levels, and all alternatives in Amendment 23 to be considered through a future framework adjustment.

2. Commercial Groundfish Monitoring Program Revisions (Sectors and Common Pool). No action would maintain the status quo, no mandatory dockside monitoring program for sectors and the common pool.

3. Sector Reporting. Grants the Regional Administrator the authority to streamline sector reporting requirements.

4. Funding/Operation Provisions of Groundfish Monitoring (Sectors and Common Pool). Allows for higher coverage levels up to 100 percent if NMFS determines it has available funding for additional administrative costs to NMFS and sampling costs to industry in a given year. Allows for waivers from monitoring requirements for sectors and common pool under certain conditions.

5. Management Uncertainty Buffers for the Commercial Groundfish Fishery (Sectors Only). Eliminates the management uncertainty buffer for sector sub-ACLs (allocated stocks only) with 100% monitoring of all sector trips.

6. Remove Commercial Groundfish Monitoring Requirements for Certain Vessel Under Certain Conditions. Removes monitoring program requirement for vessels fishing exclusively west of 71 degrees 30 minutes west longitude from at-sea and dockside

monitoring coverage requirements. Establishes a review process for vessel to be removed from commercial groundfish monitoring program requirements.

The Alternatives Under Consideration in the accompanying EIS are included in Section 4.0 of the EIS. Alternatives considered in this action present a range of Commercial Groundfish Monitoring Revisions, including At-Sea Monitoring coverage levels of 25, 50, 75 and 100%; coverage levels defined by the percent of trips monitored or the percent of catch monitored, options for allowing Electronic Monitoring in place of human observers, exemptions from monitoring requirements under certain conditions and the removal, or not, of the management uncertainty buffers when monitoring coverage is at 100%. Alternatives Considered but Rejected are included in Section 5.0 and are not summarized here.

2.5 Description and estimate of economic impacts on regulated entities, by entity size and industry

The impacts of all alternatives on human communities, including all fishing businesses regulated by this action, are detailed in Section 6.0 of the accompanying DEIS.

The proposed action has the potential to affect 661 small and 6 large fishing business entities. Of these, 80 entities did not participate in any commercial fisheries in the most recent year (2019). Approximately 268 individual vessels actively participated in the commercial groundfish fishery by catching and landing fish for profit. These 268 vessels constitute 243 regulated business entities, of which 1 is large and 242 are small.

This action affects primarily the sector portion of the commercial groundfish fishery. Of the 268 individual vessels noted in the above paragraph, 188 were enrolled in the commercial groundfish sector system. These constitute 168 regulated business entities, of which 1 is large and 167 are small.

The effects of the proposed action depend, essentially, upon two variables. First, the degree of federal subsidy offered to the commercial groundfish fishery. Second, the number of vessels anticipated to utilize electronic monitoring as a replacement for human at-sea monitors. Electronic monitoring is predicted to be substantially more cost-effective, particularly for the subset of most-active vessels in the groundfish fishery (those fishing more than 30-50 days per year).

Section 6.6.10.3 states that sufficient government funding for 100% coverage is budgeted through the end of fishing year 2022, and that NMFS expects funding to be available for 100% coverage through the end of fishing year 2023. If monitoring costs are 100% subsidized and monitoring coverage is provided on 100% of trips, the fishery overall is predicted to generate ~$5 mil in additional revenues, due mostly to the removal of the management uncertainty buffer. These additional revenues are predicted to increase profits by approximately $4.9 mil, taking into account the fact that the industry will not be paying for monitoring. If no vessels utilize electronic monitoring as a replacement for human at-sea monitors, the fishery is predicted to generate only $1.4 mil in additional profits on $1.5 mil in additional revenues.

This action proposes a monitoring coverage level “floor” of 40%, which applies only if no subsidy is available and industry is required to pay for 100% of it’s monitoring costs. Here, as at all coverage levels less than 100%, the management uncertainty buffers are not removed. In this

instance, the fleet is predicted to generate between $1.5-2.0 mil less profit than under the status quo, or about a 4% reduction.

Vessels that opt to make fishing trips entirely west of 071' 30"W are exempt from the additional monitoring requirements. This may increase profits if the coverage level floor is implemented due to lack of federal subsidies for monitoring costs. Likewise, in the case where coverage levels are set higher than 40%, vessels opting to utilize this exemption will reduce monitoring costs covered via federal subsidies, allowing more funding to cover monitoring for a longer duration or at a higher level.

This action also imposes requirements on 135 small and 13 large federally permitted fish dealers. These requirements relate to suitable work environments for dockside monitors working with dealers offloading catch from vessels enrolled in the Maximum Retention electronic monitoring program. The requirements are similar to those afforded to other federally required dockside sampling programs and are not expected to result in any additional costs to federal dealers.

2.6 Assumptions used in evaluating impacts

All assumptions used in the various models developed to produce the economic impacts analysis referenced here are included in the Economic Methods Appendix (Appendix IX).

2.7 Summary and Conclusions

An IRFA has been prepared, as required by Section 603 of the Regulatory Flexibility Act (RFA). The IRFA consists of the various Amendment 23 analyses included in the EIS, its draft IRFA, and the preamble to the EIS.

Coverage levels above the 40% floor established in this action are a function of available federal subsidies. The range of predicted short-term revenue and profit affects from this action falls between a loss of ~$2.0 mil when subsidies are unavailable and industry must pay for monitoring, and a gain of ~$5.0 mil when subsidies are available to fund 100% coverage and the management uncertainty buffers are removed. Such impacts are well within the variability of revenues and profits experienced by business entities engaged in the federal groundfish fishery over the past few years.

There are no aspects of the proposed action that will impose differential effects on vessels owned by small or large regulated entities. This action would not have a significant economic impact on a substantial number of small entities.

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
Eric Reid, *Chair* | Thomas A. Nies, *Executive Director*

January 7, 2022

Mr. Michael Pentony
Greater Atlantic Regional Administrator
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Dear Mike:

Today, I received your request for changes to the Final Environmental Impact Statement for Amendment 23 to the Northeast Multispecies Fishery Management Plan. As requested, my staff electronically sent the corrected final submission of Amendment 23, to your staff in the Sustainable Fisheries Division at the Greater Atlantic Regional Fisheries Office.

Please contact me if you have questions.

Sincerely,

Thomas A. Nies

Thomas A. Nies
Executive Director

1991 - 2021
30
YEARS

CAPE COD COMMERCIAL
FISHERMEN'S ALLIANCE
Small Boats. Big Ideas.

To: Jon Hare, Northeast Fisheries Science Center
Michael Pentony, Greater Atlantic Regional Fisheries Office
Tom Nies, New England Fishery Management Council

From: Melissa Sanderson, Cape Cod Commercial Fishermen's Alliance

Date: January 12, 2021

RE: Recommendations for Electronic Monitoring and Stock Assessments

Fishermen who have been volunteering for electronic monitoring (EM) are deeply committed to providing the best available data to the region's stock assessment process, with the ultimate goal of efficient, timely, and accurate population assessments. For the last several years, fishermen have been incredibly frustrated when their EM and audited VTR data is excluded from the stock assessment process. While there has been recent progress in finally incorporating landings and NEFOP data from EM trips, the stock assessment process needs to prioritize how to best incorporate EM data, especially given the anticipated expansion in EM resulting from Amendment 23 monitoring requirements.

As regional lead for the New England Groundfish Electronic Monitoring Audit Model Pilot, the Fishermen's Alliance secured funding to hire a consultant to evaluate the EM program and develop recommendations for how NOAA Fisheries can maximize the utility of EM data. Cate O'Keefe of Fishery Applications Consulting Team has assembled a comprehensive report that incorporates important lessons learned from EM programs around the globe and details a series of recommendations that we hope NOAA Fisheries thoughtfully considers.

Cate's report and appendices are attached. **Please share them with your staff that work directly or indirectly with EM programs and/or data, especially the Population Dynamics Branch.**

If you or members of your team would like to speak with Cate or me, we are available to discuss the report.

We are also requesting that the Northeast Region Coordinating Council review the results; Cate is also available to present her recommendations to the NRCC, to ensure EM is appropriately addressed in the terms of reference for upcoming stock assessments.

Thank you for your attention and dedication to improved fisheries management.
Sincerely,

Chief Operating Officer
melissa@capecodfishermen.org

CC: Russel Brown, Nicole Cabana, Jessica Stephen, Amanda McCarty, Katherine McArdle, Joshua Lee, Ryan Shama, Nichole Rossi, Sarah Bland, Pete Christopher, Claire Fitz-Gerald, Jamie Cournane, Chris Kellogg, Eric Reid, Rick Bellavance

Incentivizing Accountability and Data Modernization in the New England Groundfish Fishery

Applications of Electronic Monitoring Information in Stock Assessment

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January 2022

Contents

1. Executive Summary

The Cape Cod Commercial Fishermen's Alliance contracted Fishery Applications Consulting Team to assist with the project, "Incentivizing Accountability and Data Modernization in the New England Groundfish Fishery," with a specific focus on the strategy of *"Electronic Monitoring (EM) and Stock Assessment Improvements: serve as a national model in creating a pathway for the novel EM data streams to be incorporated into stock assessments, including regional standards, stock assessment model adjustments, supplemental analyses, and industry participation."* The Alliance's specific goal to meet this strategy is to "improve stock assessments so they are more aligned with on-the-water realities, by modernizing data, improving timeliness and data quality, and increasing industry support."

This report includes an introductory overview of fisheries monitoring program design requirements, descriptions of national and regional electronic technology initiatives, and details of the EM programs developed for the New England groundfish fishery. In addition, the report provides guidance on potential approaches to integrate EM data in Northeast Multispecies stock assessments and reviews example EM programs from other regions to inform utility of EM datasets for stock assessment applications.

Information included in the report and considered to support EM program descriptions was obtained from peer-reviewed literature, technical reports and guidance documents, and personal communications with relevant experts. There is a substantial body of peer-reviewed literature related to EM system components and program development, but less available information about applications of EM-generated data, specifically related to stock assessments. Appendices 1 and 2 include a list of report contributors and outcomes from report-related meetings and communications, respectively. Appendix 3, "Electronic Monitoring Data: American Plaice" was submitted as a Working paper to the American Plaice Research Track Stock Assessment in 2021. Appendix 4 briefly summarizes the status of EM programs for Atlantic highly migratory species, Atlantic herring, and Atlantic sea scallops, including background information about pilot testing, and operationalization of regulated programs. Appendix 5 describes relevant data treatments and modeling approaches to incorporate fishery-dependent data in stock assessments, and Appendix 6 includes technical and guidance documents related to the advancement of the New England EM programs in 2021.

Based on the overall evaluation of EM programs developed for the New England groundfish fishery, we provide the following recommendations:

- In order to maximize the potential benefits of EM, including enhanced data streams for stock assessment, analyses of data collection methods and data products are needed to ensure EM data meets similar standards in quality and can be integrated with existing data sets.
    - The Northeast Fisheries Science Center Population Dynamics Branch should provide input and recommendations for catch handling requirements included in

Vessel Monitoring Plans to produce information that can be integrated into existing datasets (e.g., Northeast Fisheries Observer Program and At-Sea Monitoring) or supplement data gaps for stock assessment applications.
    - Sub-sampling levels should be based on scientific thresholds for accuracy and precision balanced with sampling conditions, and subsampling rates should be evaluated on a continuing basis to determine optimal rates to achieve objectives.
    - Video review rate should be based on obtaining the appropriate level of information needed to meet catch accounting objectives and determining the optimal review rate must remain a priority to maximize cost-efficiencies.
    - Video review guidance should remain consistent to facilitate use by multiple EM service providers and ensure data quality meets required standards for all EM users, and review guidance should continue to be adaptable to new input while maintaining established standards.
    - All data users must have a common understanding of the types of data collected by EM and standardized data codes that match other monitoring datasets (e.g., Northeast Fisheries Observer Program, At-Sea Monitoring, and Dockside Monitoring) should be established.

- To ensure that EM-generated datasets are applied in stock assessments in the future, specific data treatments and modeling approaches should be identified.
    - Establishing protocols to analyze and integrate EM data is necessary, and future assessments should consider deriving discards from EM vessels, as well as incorporate length distribution from EM trips to estimate composition of discards.

- To facilitate the integration of EM data with other fishery-dependent data sources, the Northeast region must implement a relational database infrastructure.
    - Efforts to complete the Fishery-Dependent Data Initiative and Catch Accounting and Monitoring System should be prioritized and sufficiently supported with funding and expertise.

The report concludes that that the audit model and maximized retention model EM programs operating in the Northeast multispecies fishery can improve performance of stock assessments by generating accurate, unbiased data, better characterizing fishery discards, and incentivizing individual accountability to minimize unreliable information.

2. Introduction

Fisheries monitoring is a critical component of any fisheries management system, providing information on catch, effort and size/age composition by species, gear, and area to support stock assessments, quota allocations and economic sustainability of fisheries (Garcia, 2015; Kritzer, 2020). In a broad sense, monitoring encompasses fishery-dependent and independent data collection programs, both at-sea and shoreside. Independent observations of fishing activities can verify fishermen self-reported information, allow for collection of biological samples, and provide opportunities to enhance understanding of fine-scale spatial and temporal trends and patterns in fish biology and distribution, fishing behavior, and economic drivers (Suuronen and Gilman, 2020; Kritzer, 2020). Designing effective monitoring programs to collect fishery-dependent data relies on consideration of a broad spectrum of objectives, including cost-effectiveness, data applications, and technical capabilities (Zollett et al., 2015; Cahalan and Faunce, 2020). Although there are elements of fishery monitoring programs that can be universally applied, such as ensuring data quality standards and maintaining safety protocols, several successful programs have been designed to meet specific goals for an individual fishing fleet, designated area, or defined management plan (Stanley et al., 2015; Larcombe et al., 2016; van Helmond et al, 2020; Boenish et al., 2020).

Information from fishery-dependent monitoring often supports multiple objectives, including conservation of fish resources through adherence to scientifically-based allocations (e.g., quota monitoring), and sustainable fisheries management through accurate estimates of catch to support population estimation and allocation decisions (e.g., stock assessments and catch advice). Designing a monitoring program to meet multiple objectives requires an understanding of how data components are used, the accuracy and precision needed for different uses, and the trade-offs between the ideal and real elements that can be incorporated. Stock assessments rely on fishery monitoring information, including landings, discards, fishing effort, and biological samples to estimate total fishery removals by species and area over time. Integrating the time series of removals and distribution of size and age in the fishery catch with an index of stock abundance derived from fishery-dependent catch and effort data or fishery-independent survey data can provide an estimate of stock size and fishing mortality (Cadrin et al., 2020a). Accurate estimates of removals reduce uncertainty in assessments, which can improve catch advice recommendations by minimizing interannual variability in allocations and diminishing gaps in perception of true stock size between fishermen and managers. To facilitate the incorporation of accurate estimates of removals in stock assessments, fishery monitoring programs need to collect high quality data and ensure that datasets can be integrated (i.e., linking datasets from multiple sources, such as at-sea and dockside monitoring), combined (i.e., merging datasets from different methods, such as human and electronic discard records), and accessed (i.e., common storage and formatting of datasets to allow sharing among multiple users).

At-sea fishery-dependent data collection tools, including fishermen self-collected data, fishery observers, and electronic monitoring systems, are typically designed with a focus on how the

data is collected with less attention on how the data will be applied for multiple uses. Monitoring fishing operations is inherently challenging due to the dynamic nature of fishing, a variety of fishing behaviors, costs of data collection, unanticipated events at sea, and several other confounding factors (Cahalan and Faunce, 2020; Boenish et al., 2020). The types and amount of data collected on catch, effort, gear, trip characteristics, etc., can be limited by the required protocols to maintain safety and allow normal vessel operations. Therefore, it is important to consider data needs and applications when designing and implementing specific monitoring tools to support fisheries science and management (Kritzer, 2020).

Electronic monitoring (EM), specifically referring to the replacement or supplement of at-sea observers with integrated camera systems on vessels, has been used to collect fishery-dependent data across a range of fisheries in several countries (van Helmond et al., 2020). Potential benefits of EM include reduced uncertainty in estimates of catch, increased fleet coverage, accurate discard estimates, and precise catch per unit effort time series (Michelin et al., 2018; Pew, 2019; Westfall et al., 2020). Additionally, EM has the potential to improve timeliness and quality of data collection, processing, and analyses, as well as incentivize accountability to support sustainable fisheries (McElderry, 2006; 2008).

Despite the documented and potential utility of EM data, incorporating information from EM programs into stock assessment processes has been challenging. Designing effective EM programs requires integration of technical expertise, cooperation by fishermen, data collection, storage and access systems, and application standards. Significant research has been conducted on the technical aspects of EM (e.g., camera systems, database development, at-sea operational protocols; NOAA, 2020a), but less information is available on the applications of EM-collected data. In order to maximize the potential benefits of EM, including enhanced data streams for stock assessment, analyses of data collection methods and data products are needed to ensure EM data meets similar standards in quality and can be integrated with existing data sets.

In New England, there have been substantial investments to develop and test EM technical components, including hardware, software, and data collection protocols, but there remains a disconnect between at-sea data collection and meaningful data applications. This report includes a description of the EM programs that have been developed and implemented for New England fisheries, focusing on the groundfish fishery, with a review of the data collection protocols and data applications, a description of the stock assessment process for Northeast managed stocks, and a comparison of EM programs implemented in other regions. The goal of this review and evaluation is to create a pathway for EM data streams to be incorporated into stock assessments in New England, which in turn may improve assessments so they are more aligned with on-the-water realities, by modernizing data, improving timeliness and data quality and increasing industry support.

3. Electronic Technologies and Fishery-Dependent Data Collection

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA NMFS) published a Policy Directive on Electronic Technologies (ET) in 2013 and updated the guidance in 2019 (NOAA, 2019a). The policy provided direction on the implementation of electronic technology solutions for fishery-dependent data collections programs, including Vessel Monitoring Systems (VMS), electronic reporting (ER), electronic monitoring (EM) systems, human at-sea observer programs, and other technologies that improve the timeliness, quality, integration, cost-effectiveness, and accessibility of fishery-dependent data. The policy stated, *"It is the intent of NOAA Fisheries to encourage the consideration of ET to complement and/or improve existing fishery-dependent data collection programs to achieve the most cost-effective and sustainable approach that ensures alignment of management goals, data needs, funding sources and regulations."* The policy directive listed several action items to achieve the objective of advancing electronic technologies for national fisheries, including:

- *NOAA Fisheries encourages all fishery stakeholders, including ourselves, to consider implementing ET options, where appropriate, to meet science, management, and compliance data needs.*
- *Fishery-dependent data collection programs will be designed and periodically reviewed by NOAA Fisheries regions to ensure effective, efficient monitoring programs that meet industry and government needs, increase coordination between regions and Councils, and promote sharing of research, development and operational outcomes.*
- *Fishery-dependent data collection programs may be comprised of a combination of methods and techniques including but not limited to, self-reporting, at-sea observers, and dockside monitoring, as well as the use of ER and EM.*
- *NOAA Fisheries supports and encourages the evaluation/implementation of EM to meet monitoring and compliance needs in federally managed fisheries, including full retention fisheries that have an associated dockside program for catch accounting.*
- *NOAA Fisheries encourages the use of ETs that utilize open source coding and data standards, where appropriate, to facilitate data integration, software and hardware flexibility, and long-term cost savings.*

Simultaneous to the 2019 directive on electronic technology, NOAA published a National Policy Directive entitled, "Cost Allocation in Electronic Monitoring Programs for Federally Managed US Fisheries" (NOAA, 2019b). This policy guidance outlined the complexity and cost of fishery-dependent monitoring and suggested that electronic monitoring programs provide a potentially cost-effective solution to meet data demands. The objective of the policy was to *"establish a framework for allocating costs for EM programs in federally managed US fisheries between NOAA Fisheries and the fishing industry, and a timeline for implementing the framework."* The guidance included cost responsibilities, cost categories, implementation timelines, and performance measures. The intent of the policy was to describe the categories of costs associated with EM programs and describe how costs should be allocated between NOAA and industry participants as a mechanism to evaluate EM implementation.

In 2020, NOAA published a subsequent Policy Directive titled, "Third-Party Minimum Data Retention Period in Electronic Monitoring Programs for Federally Managed US Fisheries" with the objective to provide guidance on how long to retain data collected under a third-party EM service provider program (NOAA, 2020b). NOAA's recommendations were developed to balance the fishing industry's concerns about unnecessary costs of data storage against the needed time for data retention to meet various program objectives. The directive recommended that EM service providers retain EM data for a minimum of 12 months, including video, images, and other sensor data collected during fishing operations, as well as associated metadata (e.g., trip and vessel information).

Collectively, the NOAA Policy Directives related to electronic technologies, specifically EM, provided rationale and guidance for the implementation of EM programs nationally. NOAA outlined the challenges of constraining budgets and increasing demands for fishery-dependent data collection to support near real-time monitoring of catch by species at the vessel level for catch accounting and stock assessment needs. Several US regional fishery management councils have developed, applied, and implemented EM programs to cover a variety of fishing gears and fleets at different spatial resolutions, but participation in EM programs remains limited in most regions, and EM data applications have been constrained by the lack of required infrastructure.

Electronic monitoring programs for fisheries in the Northeast have been in various phases of development, testing, review and implementation for several years. The NOAA policy directives coupled with mandates for increased fisheries monitoring coverage rates by the New England Fishery Management Council (NEFMC) have increased interest and attention for the use of EM systems to supplement and replace at-sea observers in the Northeast region. Appendix 4 briefly summarizes the status of EM programs for Atlantic highly migratory species, Atlantic herring, and Atlantic sea scallops, including background information about pilot testing, and operationalization of regulated programs. The summary includes links to detailed information about catch handling, data collection, and data review protocols.

4. Electronic Monitoring for New England Groundfish

The development of EM programs for the Northeast Multispecies (groundfish) fishery has been well-documented since initial pilot testing began in 2010 (Pria et al., 2014; Alger, 2015; Kennelly and Hager, 2018; Fitz-Gerald et al., 2019; van Helmond et al., 2020; Westfall et al., 2020). Regional non-governmental organizations, research groups, and fishermen, in partnership with NOAA, conducted a multi-phase pilot program for EM between 2010 and 2014. Phase I determined the baseline data required to monitor groundfish quota, including detection of fishing events, counting fish, and species identification. Phase II developed methods to obtain fish weights and improve species identification through catch handling protocols. Phase III tested catch handling protocols to simulate an operational EM program and identify the

components necessary to support different EM approaches, including an audit model and maximized retention model (Fitz-Gerald et al., 2019).

4.1. Audit Model EM

The audit model EM program was conducted under an EFP starting in Fishing Year (FY) 2016. The goal of the program was to validate fishermen self-reported discards of groundfish species by auditing electronic Vessel Trip Reports (eVTR) in comparison to EM data collected from the same trips. Between 2016 and 2019, the audit model EM program evolved to incorporate improved data collection and review protocols. EM data was used in place of at-sea monitoring data for a subset of trips in FY2016, then for all EM trips in FY2017. In FY2018, the audit component was introduced with review of 100% of EM data to compare to eVTRs. In FY2019, the review rate was reduced to 50% of the EM trips in the program, and eVTR discard data was applied as the official catch record for trips that passed the audit. Starting in FY2021, the audit model was operationalized to allow New England groundfish sectors the option to adopt the NOAA Fisheries audit model EM program as part of their Sector Operations Plans (NOAA, 2020c).

4.1.1. Audit Model EM At-Sea Data Collection

Vessels that choose to participate in the EM program instead of taking At-Sea Monitors are required to develop a Vessel Monitoring Plan (VMP) in collaboration with an EM service provider. The VMP must describe the specific configuration of the EM system for the vessel and how fishing operations will be effectively monitored, as well as detail the vessel's catch handling and reporting requirements and define responsibilities of all parties (Teem Fish, 2021). The VMP must be approved by NOAA and be onboard the vessel at all times. Captains and crew are required to follow the provisions of the VMP for catch handling at all times on a sector trip and must process discards consistent with the VMP protocols (Teem Fish, 2021). The VMP is critically important to the success of EM because the protocols established in the plan become criteria for compliance and a vessel's eligibility to participate in EM programs (NOAA, 2021a). All components of the EM system must be in working order at the start of a fishing trip and cameras must be used for the full duration of the trip from departure to landing. The operationalized audit model program requires participants to record the estimated weight of all discards on an eVTR and follow catch handling protocols at sea. To facilitate collection of discard data from video footage, participants must place all groundfish species under a camera on a measuring strip prior to discarding, with allowances for subsampling. All regulated groundfish discards are handled and discarded in camera view and data is collected for species, length, weight, count, and catch disposition.

4.1.2. Audit Model EM Onshore Video Review

Third-party EM service providers review and annotate video collected at-sea using guidance developed by the Northeast Fisheries Science Center (NEFSC) and Greater Atlantic Regional Fisheries Office (GARFO). Through the pilot phases of the audit model EM program, 100% of EM trips were reviewed at a rate of 100% of the trip (i.e., all EM video was reviewed). In FY2019, review was reduced to 50% of randomly selected EM trips to reflect the audit

approach, while maintaining 100% review of the video from the selected trips. In FY2021, review selection guidance was updated to incorporate GARFO's implementation of the Delta Model (Figure 1). Groundfish sector EM trips that carried a Northeast Fisheries Observer Program (NEFOP) observer are not included in the pool of trips subject to random selection for video review, instead the NEFOP discards recorded on the trip are applied for catch accounting. Additionally, sector EM trips that do not have an accompanying eVTR submitted to GARFO are not included in the pool of trips subject to video review, instead sector-specific assumed discard rates from NEFOP and ASM are applied for catch accounting. Sector EM trips that did not carry a NEFOP observer and have an accompanying eVTR submitted to GARFO are included in the pool of trips that are subject to video review with a 50% chance for random selection (Figure 1).

NOAA's draft "Electronic Monitoring Audit Model Program Reviewer Guidance Manual" has evolved since 2017 to include standardized data fields and codes, protocols for reviewing catch handling, sorting and processing, methods for obtaining species weights from video imagery, and criteria for determining if a trip is fully observed (NOAA, 2021a). In FY2019 and 2020 under the EFP program, the criterion for trips to pass or fail the EM video review was set by the NEFSC and GARFO. A successfully reviewed trip (i.e., passing) must have had "observed" data for at least 75% of the hauls fished. Trips that failed to meet the threshold were considered unobserved for the purposes of catch accounting, and the standard sector discard rate was applied to the trip's catch. The review guidance included criteria for determining whether or not a haul could be observed, meaning that all discard events in the haul were viewable and "adequately annotated" by a reviewer. The guidance provided descriptions of potential scenarios onboard vessels during fishing activities that could impact a reviewer's ability to annotate a haul, including EM system failure, video quality, interruptions to normal fishing operations, captain/crew catch handling methods, and proper system maintenance. Although some review criteria distinguished between factors that were within (e.g., making no effort to obtain fish measurements) or beyond (e.g., weather effects on camera clarity) fishermen's control, many factors that could occur during normal fishing operations were defined as criteria that could cause a haul review to fail. For example, slime or water droplets on a camera that impeded a reviewer's ability to obtain length measurements or identify a species may have resulted in a failed haul. Similarly, if a length could not be obtained because a fishermen's hand was blocking view of the measuring strip or the fish was not placed straight and flat on the strip due to stiffness resulting in too few samples measured, a haul could fail. Considering that at least 75% of hauls must have been adequately annotated for a trip to pass review, failed hauls could have had a major impact on the ability of the audit model EM program to meet objectives for catch accounting and total catch estimation.

In FY2021, the review guidance was updated to simplify criteria for observation and annotation. Trips that are selected for review must have had a working EM system, followed the Vessel Monitoring Plan catch handling protocols, recorded an equal number of EM and eVTR efforts, and recorded less than 10% of processed discards as unknown per haul in order to be considered 100% observed. During video review, lengths of groundfish that were placed on the measuring strips during at-sea data collection are converted to weight using length-weight

relationship information from the Northeast Fisheries Science Center Research Vessel Bottom Trawl Surveys (Wigley et al., 2003). A secondary review by NOAA staff is conducted on a portion of EM trips that have been reviewed by third-party service providers. The secondary review, which follows the same review guidance, is used to compare results to the third-party service provider's results. This provides assurances that EM reviews are standardized across reviewers. In the case of substantial discrepancies, NOAA has the option to overwrite the EM service provider data with the data collected during the secondary review.

4.1.3. Audit Model EM and eVTR Data Integration

Beginning in FY2021, the operationalized audit model EM program included a correction factor to adjust eVTR discards, called the Delta Factor (Appendix 6.3). The goal of the Delta Model is to make minor adjustments to eVTR self-reported discards to correct for over- or under-estimation of species weights by the captain. The Delta Factors are vessel- and species-specific and are updated throughout the fishing year based on the vessel's EM discard data. Every vessel started Fishing Year 2021 with a Delta Factor equal to 1, meaning no adjustment to eVTR discards. As the fishing year progresses, Delta Factors are updated, and discards are retroactively adjusted. Sector EM trips that are considered 100% observed have the EM discards applied for catch accounting and the EM trip data is used to update the vessel's Delta Factor. Trips that are not considered 100% observed, or were not selected for review, have the vessel's Delta Factor applied to the eVTR discards for catch accounting. The methods behind the Delta Model were favorably reviewed by the Center for Independent Experts in the fall of 2021, however as of December 2021, the Delta Model is suffering from technical issues related to development of the programming, and the eVTR data associated with EM trips is not being corrected, nor is the EM data available to sector managers for catch accounting. For FY2021, the uncorrected eVTR is considered the data of record for all sector EM trips, except those that carried a NEFOP observer.

4.1.4. Audit Model EM Data Application

As of May 1, 2021, eight sectors included an audit model EM component in their Fishing Year 2021-2022 Sector Operations Plans, and there were 22 active sector vessels using the audit model EM program to meet monitoring requirements (NRCC, 2021). Data from the audit model EM program have been used primarily to account for discards in sector quota monitoring. To date, only audit model EM trip landings have been incorporated in stock assessments for New England groundfish species; EM discard information has not been applied.

Descriptions of the audit model EM program catch handling protocols, video reviewer guidance, and data collection fields, are included in NOAA's "Electronic Monitoring Audit Model Program Reviewer Guidance Manual_V18," (NOAA, 2021a; https://apps-nefsc.fisheries.noaa.gov/NEMIS/apidocs/rgd/mul/Video%20Reviewer%20Guidance_V18.pdf). Details of the data fields collected from EM video footage are included on the Northeast Electronic Monitoring Information System application programming interface (NEMIS API; https://apps-nefsc.fisheries.noaa.gov/NEMIS/index.php/docs).

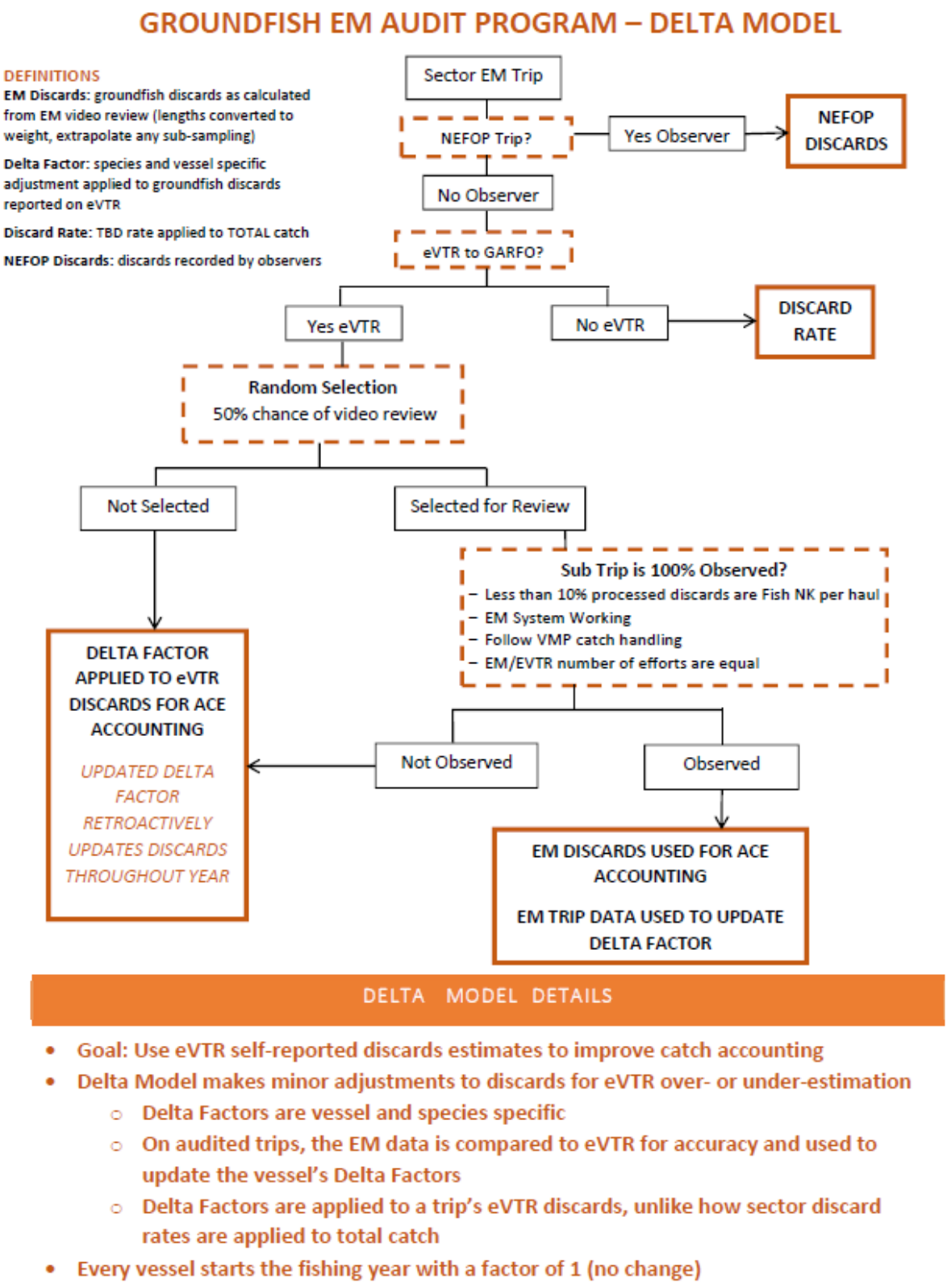

Figure 1. Audit Model EM program trip selection and Delta Model flow chart (NOAA, 2021b).

4.2. Maximized Retention Model EM

The maximized retention EM (MREM) program began under an EFP in FY2018. The initial goals under the EFP were to test the viability of maximized retention for high-volume vessels, develop standards and protocols for at-sea operations, and implement a third-party dockside monitoring program to support catch accounting shoreside (Fitz-Gerald et al., 2019). The maximized retention model employs a compliance concept, and all allocated groundfish, regardless of size or condition, are retained at-sea, landed and recorded by dealers. Electronic monitoring data confirms that allocated groundfish are not discarded at sea. From the start of the program through the end of FY2019, the MREM model focused on developing an EM system, designing program protocols, and building program infrastructure, including the development of a NOAA-led dockside monitoring program. Since FY2020, the MREM program has been updated to improve data collection, refine catch handling protocols and develop review guidance. The current goal of the program is to document allocated groundfish through dealer reports that are verified by dockside monitoring. The maximized retention model EM program is expected to be operational and available as a monitoring option in the Sector Operations Plans for FY2022.

4.2.1. Maximized Retention EM At-Sea Data Collection

Similar to the audit model EM program, participants in the maximized retention model EM program are required to develop a Vessel Monitoring Plan to include all catch handling protocols. Participants are required to retain and land all catch of allocated groundfish species, including fish below the minimum size (sub-legal) that would normally be discarded. Video cameras must be turned on for the duration of the trip and positioned to record all potential points of discards on the vessel. The maximized retention program includes less at-sea catch handling and reporting requirements than the audit model, making it a potentially more feasible option for large offshore vessels with higher volume catches.

4.2.2. Maximized Retention EM Onshore Video Review and Data Collection

EM video footage is reviewed by a third-party EM service provider to confirm full catch retention. Under the EFP, 100% of video data are reviewed, and it is expected that review rates will reduce to 50% under an operational program. Offloads for fishing trips following maximized retention protocols are observed by dockside monitoring. Dealer reports are the official catch record for each fishing trip and include the documentation of undersized and damaged groundfish using maximized retention model-specific market codes, as follows:

- X1 – Terminal Market: code used for legal-sized landings, which replaces the smallest legal category codes depending on species (i.e., small, snapper, scrod)
- X2 – Sub-Legal Size: code used for sub-legal-sized landings, which addresses the goal of the maximized retention EM program
- X3 – Terminal Market/Sublegal Mix: code used for mixed landings of legal and sub-legal sizes, which consists of non-sorted landings of high volume species (i.e., redfish, haddock, pollock).

The NOAA-led Dockside Monitoring Program (DSM) verifies dealer weights and collects biological data normally collected at sea, with a focus on collecting lengths from the exempted (sub-legal) portion of the catch. All harvested fish are accounted for and deducted from a vessel's sector quota allocation, and vessels are authorized to sell all catch. For the maximized retention EM model there is no need to compare video data to eVTRs because there are negligible amounts of operational discards. During FY2022, it is expected that NOAA and project partners will develop and transition the DSM component to an industry-led third-party model.

4.2.3. Maximized Retention EM Data Application

As of May 1, 2021, six trawl vessels were enrolled in the maximized retention model EM program (NRCC, 2021). Sublegal landings estimates and length frequency data collected through the dockside monitoring component of the maximized retention EM program have been applied for some stock assessments of New England groundfish, such as Acadian redfish and pollock. The 2019 management track assessment for pollock incorporated landings of sublegal pollock from the maximized retention EM program, as well as sublegal lengths collected by dockside monitors to characterize sublegal landings. Age-length keys from survey information were used to generate sublegal landings at age for the assessment (NOAA, 2019c). The 2020 management track assessment for Acadian redfish evaluated the potential use of length data from the maximized retention EM EFP program collected in 2018 and 2019. For both years, landings of sublegal redfish were less than 1 mt and no length samples were collected. The sublegal landings were added to total landings for 2018 and 2019 but were not apportioned into catch-at-age (NOAA, 2020d).

A description of results from the first year of the maximized retention EM program is included in the Gulf of Maine Research Institute's "Maximized Retention Electronic Monitoring in the Northeast Multispecies Groundfish Fishery Year 1 Preliminary Report" (GMRI, 2019; https://gmri-org-production.s3.amazonaws.com/documents/mrem_year_1_report_draft_2.pdf).

4.3. Northeast Multispecies Fishery Monitoring (Amendment 23)

In 2020, the New England Fishery Management Council approved changes to the fishery monitoring requirements for allocated groundfish stocks. Amendment 23 to the Northeast Multispecies Fishery Management Plan included provisions to require 100% monitoring coverage for trips that have an allocation of groundfish species in specific management areas, if sufficient funds are available from NOAA to reimburse costs for coverage (NEFMC, 2021). The Northeast Multispecies Fishery Management Plan specifies management measures for 13 groundfish species, defined as 20 individual fish stocks, which are allocated as quota managed stocks through the "sector" and "common pool" components, as well as accounted for in recreational and other non-target fisheries (for detailed information about NE multispecies sector and common pool management measures, see NE Multispecies Amendment 16; NEFMC, 2009). The NEFMC defined objectives for a monitoring program for the groundfish fishery in 2016 (NEFMC, 2016), and subsequently approved measures to implement those objectives

through Amendment 23. The New England Council stated that the primary goal of the monitoring program was *"to verify area fished, catch, and discards by species and gear type; and should be done in the most cost effective means practicable."* The management action listed several objectives related to improving the groundfish monitoring program with an overall focus on improving documentation of catch (e.g., landings and discards), reducing costs of monitoring, incentivizing reduction of discards, and providing additional data streams for stock assessments.

The amendment approved the use of both the audit model and maximized retention EM programs as options to replace human at-sea monitors. Economic impact analyses suggested that initial costs for equipment and system installation were approximately $10,000 USD and video review rates ranged from $150 to $700 USD per day (NEFMC, 2021). The Council determined that costs of EM compared to human at-sea monitors would be higher in the first year, but significantly lower in subsequent years (NEFMC, 2021). The Council's goal in approving the audit model and maximized retention EM programs as options to meet monitoring requirements was to provide sectors with additional at-sea monitoring tools and increased flexibility for monitoring catch that ensures precise and accurate landings and discards estimation while simultaneously reducing potential bias and regulatory discards.

For Fishing Year 2022, NOAA's Greater Atlantic Regional Fisheries Office set the total target level of at-sea monitoring coverage required for Northeast multispecies sectors at 99% of all sector trips subject to the at-sea monitoring program (Pentony, 2021). The rationale for this coverage target was to address bias, support the collection of information and data to assist with future determinations of appropriate monitoring coverage levels, and prepare the monitoring infrastructure for higher required coverage under Amendment 23, if approved. Sectors have the ability to include EM as a monitoring option to replace ASM, and participation in the audit model and maximized retention EM programs may increase to meet the high monitoring coverage target. With potentially increased EM program participation levels, it is critical for the Northeast region to consider EM-generated data applications and methods to integrate EM datasets with other monitoring data for catch accounting and stock assessment purposes.

5. Integrating EM Data in Northeast Multispecies Stock Assessments

5.1. NOAA's Next Generation Stock Assessment Enterprise

In 2018, NOAA published an update to their Stock Assessment Improvement Plan titled, "Implementing a Next Generation Stock Assessment Enterprise" (Lynch et al., 2018). The document describes innovative research and operations to meet stock assessment challenges and needs for the future. NOAA identified three major themes and provided recommendations to support transition to the next generation of stock assessments. The first, holistic and ecosystem-linked stock assessments, focused on direct inclusion of more ecosystem and socioeconomic factors that affect the dynamics of fish stocks and fisheries in the assessment

process. The second, innovative science for improving stock assessments, focused on providing better data efficiently and quickly, and the use of these data for advanced assessment modeling methods. The third, timely, efficient, and effective stock assessments, focused on the assessment process itself so that NOAA can update as many assessments as needed and deliver results effectively to fishery managers and the public (Lynch et al., 2018). To meet the objectives for enhancing data collection and improving stock assessments, NOAA made several recommendations, including:

- *Utilize remote fishery data collection (electronic monitoring and electronic reporting) to improve data accuracy and timeliness and reduce cost.*
- *Employ improved database procedures to hasten the delivery of processed data into the hands of analysts.*

NOAA suggested that EM can be integrated in a variety of monitoring programs nationwide and may offer improvements to fishery-dependent data collection. However, comprehensive improvements to NOAA's data collection and management systems are needed. Lynch et al. (2018) described challenges in obtaining all necessary data for assessments due to siloed data management, varying degrees of required data processing before analysis, and limited data access. They suggested that stock assessments may become more streamlined and accurate by creating systems that are easily accessible, organized in standard formats, and contain automated processing procedures to facilitate timely access to data. The report highlighted the Alaska Fisheries Information Network (AKFIN), which simplifies data processing steps and ensures transparency in how data are compiled and recommended that more regions need similar systems. The report concluded that the ability to easily examine fishery data by sector, season, and spatial distribution can help assessment analysts evaluate the number and types of fisheries that should be explicitly modeled in an assessment.

5.2. Northeast Multispecies Stock Assessment Process

The Northeast Region Coordinating Council (NRCC) oversees the stock assessment process for the New England and Mid-Atlantic regions. They developed an enhanced assessment process, implemented in 2020, with the goals of (a) improving the quality of assessments, (b) allowing more improvement to occur within the routine assessment process, and (c) providing more strategic and longer-term planning for research and workload management (NRCC, 2020). The process includes two different assessment tracks: a research track that allows comprehensive research and development of improved assessments on a stock-by-stock or topical basis, and a management track that includes routine updates to assessments but with flexibility to incorporate new data and approaches. The enhanced process was designed to provide opportunities for input and engagement from stakeholders and research partners and provide a longer-term planning horizon to carry out research to improve assessments. The research track assessment process informs the management track assessments by developing new or updating existing assessment approaches, considering all sources and treatments of data, and establishing a method to assess stocks under an accepted, peer-reviewed approach. Research

track assessments provide an opportunity to consider and analyze new data streams for potential integration in stock assessments, such as data generated from EM programs.

5.3. EM Data for the American Plaice Research Track Assessment

The "2022 Improving Assessments for American Plaice" Research Track Assessment process was initiated in July 2021 to evaluate datasets to inform new or existing stock assessment models with a goal to develop an improved stock assessment for American plaice that can be used for future management track assessments. The Research Track Terms of Reference included, "*Estimate catch from all sources including landings and discards. Describe the spatial and temporal distribution of landings, discards, and fishing effort. Characterize the uncertainty in these data sources."* The Research Track Working Group identified multiple datasets to be considered to characterize commercial landings and discards, including EM data. The group included landings data from dealer reports for vessels participating in both EM programs. The landings from the MREM program included the maximized retention model-specific market codes with total landings of 0.53 mt in 2018, 4.73 mt in 2019, and 0.48 mt in 2020 (NOAA, 2022).

The group also considered a working paper titled, "Electronic Monitoring Data: American Plaice" (Appendix 3)that characterized available discard data from both EM programs. There were very few American plaice operational discards in the maximized retention EM program, which were counted and identified to the species level. Of the 440 trips that have occurred since the start of the program in 2018 through 2020, only 230 individual American plaice were observed to be discarded (Table 1; O'Keefe et al., 2021). Audit model discard data for American Plaice was provided by Teem Fish Monitoring and the Cape Cod Commercial Fishermen's Alliance. Total discard weight of American plaice from audit model EM trips was calculated by multiplying the number of individual fish identified in the EM video review by the average fish weight in pounds derived from Wigley et al., 2003 (Table 2; O'Keefe et al., 2021).

Table 1. MREM data for FY2018-2020, including all identified and recorded American Plaice discards.

MREM	Number of Vessels	Number of Trips	Number of Discards
FY2018	3	108	51
FY2019	3	172	120
FY2020	5	160	59

Table 2. Audit model EM data for FY2019-2020, including all recorded discards and total landed weight of American Plaice from all Audit Model EM vessels.

Audit Model EM	Number of Vessels	Number of Trips	Number of Discards	Total Discard Weight (lbs)	Avg Fish Weight (lbs)	Total Landed Weight (lbs)
FY2019	5	26	627	288	0.46	69,452
FY2020	8	82	9,030	1,446	0.39	33,642

The Working Group considered methods to integrate the audit model EM data into the time series of discards for American plaice and ultimately decided to use at-sea observer (NEFOP and ASM) samples to estimate discards for all trips, including electronic monitoring trips. The audit model EM data was not applied to estimate discards for American plaice. At the time the working group reviewed the audit model EM data, the Catch Accounting and Monitoring System (CAMS) was still under development, which presented challenges for identifying and generating EM-specific discard information. Although all trips, including electronic monitoring trips, are sampled by the Northeast Fishery Observer Program, electronic monitoring trips are exempted from At-Sea Monitoring. Therefore, electronic monitoring trips are not sampled by human observers at the same intensity as non-EM trips. The working group noted that the CAMS system will include all EM data in a manner that is consistent with other monitoring datasets, and that when completed, CAMS will provide consistent datasets for catch accounting and stock assessment. Working group members highlighted that EM data used for catch accounting purposes can also be used for stock assessment purposes.

The Working Group noted that American plaice was not a commonly caught species for vessels that had participated in the EM programs through the assessment's terminal data year of 2019. They raised questions about the proportion of the groundfish fleet that has been monitored by EM over time and concluded that as the number of EM participating vessels increases, discards should be estimated directly from electronic monitoring data. Further, they drafted a research recommendation stating, *"Future assessments should consider deriving discards from electronic monitoring vessels in those programs, and information on length distribution from electronic monitoring should be considered for estimating composition of discards"* (NOAA, 2022).

5.4. Improving Utility of EM Data Products in New England Stock Assessments

Facilitating the use of data from the New England groundfish EM programs may be improved by requesting review and input from the NEFSC Populations Dynamics Branch. Stock assessment analysts may provide feedback and advice to enhance collection of data that is directly applicable to assessments, as well as mechanisms to integrate EM data with other fisheries monitoring data streams. This report suggests possible areas for feedback to improve the EM data collection and analysis processes.

5.4.1. At-Sea Data Collection

Vessel Monitoring Plans must be developed to match vessel-specific characteristics and operations, and NOAA is iteratively developing VMP guidance that includes some standard criteria to promote broader uptake of the audit model EM program and facilitate efficient video review. Recommendations from the Population Dynamics Branch would help to ensure that at-sea video data collection and catch handling requirements included in VMPs will produce information that can be integrated into existing datasets (e.g., NEFOP and ASM) or supplement data gaps for stock assessment applications.

Guidance for catch handling on EM trips is detailed in the VMPs, including specific protocols for the number of fish that must be placed on a measuring board within camera view during fishing

operations. Prior analyses of EM data from the pilot phases of the audit model EM program suggest that subsampling a relatively small number of fish per trip, regardless of gear type, may be sufficient to meet accuracy and precision standards for catch accounting and estimates of discards of allocated and regulated groundfish species. Cadrin et al. (2020b) analyzed EM data from trawl, gillnet, and longline trips to determine optimal subsampling size for length estimates of groundfish species. For each species and gear type, they considered five alternative subsample sizes (10, 20, 30, 40, and 50 fish per trip) and found that mean lengths produced by all subsample scenarios were within one centimeter of the overall length distribution. Maynard et al. (2020) examined accuracy and precision of discard weight estimates across a range of gear and species combinations and found that a subsample of five fish per trip was sufficient to estimate total discarded weight precisely and accurately by species for groundfish trips (e.g., precision of <5% CV and confidence limits within 5 pounds per trip). Although obtaining measurements of all discarded groundfish would be ideal, normal fishing operations limit sampling. The required number of fish to be placed on a measuring board within camera view should be based on scientific thresholds for accuracy and precision balanced with sampling conditions. For example, if scientific standards can be met with a subsample of five fish, then catch handling protocols may require that ten fish are placed on the measuring board to ensure that a minimum of five fish are placed correctly to obtain a measurement from video review. Requiring more sampling by fishermen than necessary to meet scientific standards for data application may not substantially improve catch accounting or estimates of total catch for assessments but could disincentivize participation in the EM program. Input from the Population Dynamics Branch on optimal subsampling rates to meet precision and accuracy standards may improve data collection protocols and resulting data streams for assessment purposes.

5.4.2. Video Review

Similar to determination of adequate data collection at-sea, it is important to consider the rate of data review at the fishery and trip levels. At-sea observer (NEPOP and ASM) coverage rates for the groundfish fishery have been determined by applying the precision standard (30% CV) at the overall stock level for each regulated groundfish species, as specified in the Standardized Bycatch Reporting Methodology (Cadrin et al., 2020a). Recent analyses conducted to support Amendment 23 to the Northeast Multispecies Plan indicated that setting a monitoring coverage target based on the precision standard may not meet program objectives for catch accounting or estimation of total catch (NEFMC, 2021). In the audit model EM program, all vessels are required to record 100% of sector fishing events, which can then be reviewed to verify eVTRs. The rate of review should be based on obtaining the appropriate level of information needed to verify eVTRs to ensure accurate estimation of catch and include consideration of costs, timeliness, and fishermen incentives. Linden (2020) examined various review rates at the trip and haul levels to determine a minimum video review rate for discard estimation for groundfish. He found that self-reported discards from vessels participating in the audit model EM EFP generally matched well with EM review data and that a review rate of 15% of hauls per trip produced high precision (≤30% CV) for eleven out of twelve considered species. Stanley et al. (2015) described the process to determine video review rates for the British Columbia groundfish hook and line fishery EM program, which were not based on precision targets. In

that program, 100% of the trips are subject to review at a rate of 10% of the hauls per trip. The rate was set commensurate with the fleet's cost expectations and has been deemed adequate to disincentivize misreporting and produce accurate estimates of catch (Stanley et al., 2011; Stanley et al., 2015). Setting the appropriate review rate for the audit model EM program requires compromise from fishermen, scientists, and managers, as well as willingness to adapt as the program evolves and self-reported data increasingly becomes the official record of catch. A high review rate that is cost prohibitive or leads to delays in data delivery can undermine program objectives resulting in less information for assessment and accounting purposes. Determining the appropriate review rate should remain a priority for advancing the audit model EM program with input from the Population Dynamics Branch.

Video review guidance must be consistent to facilitate use by multiple EM service providers and ensure data quality meets required standards for all EM users. The iterative approach to develop review guidelines has been highly effective for incorporating feedback from fishermen, scientists and managers as the audit model EM program has progressed. The iterative approach should continue to be adaptable to new input while also maintaining established standards. Under the objective of using EM review data to verify self-reported eVTRs, it is important to recognize that review criteria should match standards for catch accounting and accurate estimates of total catch. Video review should focus on verification of self-reported data, rather than establishing an independent estimate of discards. Although it may be possible to derive an independent estimate of catch from EM data alone, this is a secondary benefit that can be analyzed (Stanley et al., 2009). To ensure that the data captured during EM video review can be applied to verify eVTRs to augment groundfish stock assessments, it is important to request input from the Population Dynamics Branch on the Electronic Monitoring Audit Model Program Reviewer Guidance Manual.

5.4.3. Data Access

The Greater Atlantic Regional Fisheries Office and Northeast Fisheries Science Center have been advancing the Fisheries Dependent Data Initiative (FDDI) for the Northeast region for several years. The scope of the initiative includes data collected from fishing trips and the information systems used to collect and process these data to support monitoring requirements and fishery management, including quota monitoring and stock assessments. Under this effort, a Universal Trip Identifier (UTID) will be developed for application to all data streams associated with individual fishing trips (e.g., at-sea monitoring (NEFOP, ASM, and EM), dockside data collection (e.g., DSM, dealer reports, and port sampling), and fishermen-collected information (e.g., eVTRs and VMS)). Additionally, GARFO and NEFSC are currently developing a new catch accounting system and reporting method. The Catch Accounting and Monitoring System (CAMS) will unify data streams that are used for reporting, management, and scientific purposes. The objective is to provide a single, comprehensive source for all US commercial catch (landings and discards) for quota monitoring, stock assessment, protected resource estimation, ecosystem modeling, and other regional needs in a fully documented relational database with appropriate user views and tables (GARFO and NEFSC, 2021). To facilitate integration of data streams, the codes for gear type, species identification, haul deployment and recovery time, and area fished need to be consistent across monitoring programs for the groundfish fishery (e.g., NEFOP, ASM, EM,

and DSM). Coding seems simplistic, but inconsistencies among datasets can result in mismatch of records for catch accounting and discard estimation. It is important that all data users, including stock assessment scientists, have a common understanding of the types of data collected by EM and standardized data codes that match other monitoring datasets (e.g., NEFOP and ASM). It is anticipated that the CAMS system will be operational to include landings and discards output data in 2022.

5.4.4. Data Application

Fishermen-reported logbook data is not currently applied to estimate catch (i.e., landings and discards) for stock assessments. Logbook data is used to assign fishing location (i.e., statistical reporting area) to landings (from dealer reports) and discards (extrapolated from observer reports). The goal for the audit model EM program is to verify fishermen-reported data so that audited, verified, and Delta-adjusted self-reported data serve as the official record of discards for catch accounting and estimation of total catch. To ensure that self-reported data is applied in stock assessments in the future, the Population Dynamics Branch could conduct sensitivity analyses in management track or research track assessments with data collected from the pilot phases of the audit model EM program. Understanding the potential applications of both self-reported data and EM-generated data to estimate discards, total catch, and catch per unit effort will help to ensure that new data streams are fully utilized.

Analyses conducted during the EFP phase of the audit model program indicate that aggregate and trip-level discard estimates from EM and NEFOP data were similar in FY2017 and FY2018. The average difference in estimates of discarded weight by species between the datasets was small (~3.6 pounds per trip in FY 2017 and ~15.9 pounds per trip in FY2018) and not statistically significant in either year at the fleet and trip levels (Cadrin et al., 2020b). Additional analyses, including data collected in the operationalized audit model EM program that started in FY2021, could be conducted on a stock-by-stock basis during Research Track and Management Track stock assessments. Establishing protocols to analyze EM program data could facilitate increased application of the data for assessments.

6. Examples of EM Data Applications for Stock Assessment

Examples of EM programs that have been trialed, piloted, and fully implemented provide information that can assist in developing and advancing EM efforts to meet multiple objectives. A review of 100 EM trials and 12 fully implemented programs from around the globe conducted by van Helmond et al. (2019) concluded that EM as a monitoring tool has various strengths and weaknesses, and that EM can be a powerful tool for the future of fisheries monitoring, especially when integrated with existing monitoring programs. To inform the development and advancement of EM programs in New England, examples of programs from other regions that include comparable fishery characteristics, similar EM program components and objectives, and reported measures of performance were reviewed. The specific examples were chosen to

highlight the application of data and information generated from EM that can be used in science and management, specifically stock assessment and catch advice.

6.1. British Columbia Hook and Line Catch Monitoring Program

The British Columbia Hook and Line Catch Monitoring Program is a well-cited example of how EM data can be successfully integrated in science and management (e.g., Stanley et al., 2015; van Helmond et al., 2020). The program was developed simultaneously with an integrated catch share system in response to concerns about unreliable catch data to manage rockfish stocks (Stanley et al., 2011; Stanley et al., 2015). The monitoring program integrates fisher logbooks, dockside monitoring and the EM system. The EM system records kept and discarded fish by haul during all fishing activity and confirms fishing location reported in logbooks. Video from a random selection of 10% of hauls on each trip are reviewed on a weekly basis to compare with the self-reported fisher logbooks. If there is a reasonable match of kept and discarded species between the video review and the logbook information, the logbook data is deemed valid (Stanley et al., 2011). The dockside monitoring program records total weight of each landed species, and combined with validated fisher logbooks, serves as the official catch record (Stanley et al., 2015). The fully implemented program includes an Information Management System that integrates the various data sources to produce reports of each vessel's total catch relative to quota allocations.

The selected video review percentage of 10% was not based on a target precision for catch estimation (Stanley et al., 2015). The program was developed cooperatively with fishers, managers, and scientists to meet conservation and operational objectives, and the audit approach was a compromise between monitoring costs and incentives for compliance. The unique integration of the logbooks with EM and dockside monitoring allowed for independent verification of landings and discards that reduced uncertainty in catch estimates. Under this system, logbooks are considered to be accurate records of spatial and temporal catch and effort that are verified through the EM audit (Stanley et al., 2011). Accuracy of logbook data was analyzed through comparisons of logbooks with EM video and dockside monitoring records during a pilot phase of the program, which showed a high level of match and low bias in catch estimation by the fourth year of testing (Stanley et al., 2011). Catch estimates, including discards, were deemed precise and unbiased for use in assessment and management (Stanley et al., 2011), and Canadian assessment staff became less focused on uncertainty of recent catch estimates due to the credible discard data and ability to derive stratified estimates of total fleet catch from fisher logbooks (Stanley et al., 2015). Although historic catch data was still considered uncertain, assessments were improved as the time series of accurate catch data was extended. Additionally, fishermen have confidence in the program and the resulting data.

Official catch estimates, which are derived from self-reporting through the audited logbooks combined with dockside monitoring, are considered to be more transparent and intuitive to fishermen than estimates derived from independent third parties alone (Stanley et al., 2015). An unanticipated benefit from the EM video review, which was originally designed as an audit mechanism, was the ability to derive independent estimates of total catch from the 10%

reviewed fishing events from each trip (Stanley et al., 2009). Analysis of the monitoring data showed a close match between counts and weights derived from video alone compared to official catch records derived from audited logbooks and dockside monitoring. Stanley et al. (2009) were able to derive an unbiased estimate of mean catch per event and its variance, then expand to total catch by the total number of events. They concluded that the video data can provide an unbiased and independent catch estimate that can be compared to official catch accounting.

The monitoring program for the British Columbia hook and line fishery is considered highly successful, but it was challenging to develop and has evolved to increase flexibility and meet objectives. Stanley et al. (2015) noted the importance of the integrated elements of the program, as opposed to focusing on any single element, such as EM alone. They concluded that focusing on a single tool can cause confusion between needed information and available data types, and they noted that inclusion of stock assessment staff in development of the monitoring program helped to define information needs, which in turn streamlined the types of data collected, reviewed, and stored. A challenge in program development was determining how to handle fishermen whose self-reported data did not match EM video review. Although most participants adapted to the new monitoring program within the first year of implementation, some fishermen felt there were unrealistic standards to pass the video review criteria, resulting in the need to review 100% of the trip and disregard self-reported data. By the second year, the review scoring criteria changed to include consideration of vessel performance over the preceding 12 months in addition to the most recent trip. Results showed that most fishermen met the new standards and that repeat poor performance should be subject to penalty in the form of higher payment for increased video review time. Within two years of full implementation, the penalty did not need to be applied because logbook accuracy was achieved (Stanley et al., 2015).

Another difficulty with the program was the delayed implementation of the Information Monitoring System, which Stanley et al. (2015) described as a "mistake." The system was still being tested as data collection started in 2006, and problems with the system resulted in delayed data processing and increased operational costs for fishermen. The lack of planning led to limited system utility and recognition that business elements of the monitoring program required as much attention as the data collection aspects (Stanley et al., 2015). The program has been successful in meeting conservation and operational objectives, but in their review of the program overall, Stanley et al. (2015) noted that developing and evolving the program required significant commitment and compromise from industry, scientists, managers, and all stakeholders to consider information needs against costs and focus on overarching principles rather than single tools.

6.2. Scottish Applications of Electronic Monitoring

Electronic monitoring systems were tested on Scottish fishing vessels starting in 2008 to determine the potential efficacy of EM for monitoring a discard ban for North Sea cod (Needle et al., 2015). Marine Scotland reviewed various aspects of the EM program and potential

applications of data collected through the EM systems, including analyst training, fishing effort mapping, costs, length inference, and discard rate estimation. They noted that one of the key elements that encouraged vessel participation in the EM program was the potential use of EM data to improve science and estimate reliable discard rates. Discard rates used in ICES stock assessments have been derived from at-sea observer programs. Since these programs are expensive and not required in all European fisheries, they are limited in scope and there has been concern about 'observer bias' where discarding that occurs when an observer is present may not reflect discarding in the absence of observers. EM, which can be applied to cover a whole fleet for all fishing activities, may generate more representative discard rate estimates for use in science and management.

Discard rates for the Scottish fishery were estimated using a simple ratio estimator based on the sampled length frequency and total number of discarded fish by species by area. The analyses described by Needle et al. (2015) were based on length samples taken from 30% of hauls on individual trips. The estimated length distributions of discarded fish of each species were converted to an estimate of weight by applying length-weight relationships and the total discard weight of each species is calculated for the trip. Finally, the discard rate for the trip is calculated from the estimated weight of discarded fish to the weight of landed fish (Needle et al., 2015).

The calculated discard rates from EM vessels were lower than rates on vessels monitored by human at-sea observers. Needle et al. (2015) suggested multiple possible reasons for the difference in discard rates for EM vessels, including encouragement of reduced discarding simply due to the presence of cameras, artefacts of smaller sample size, or resulting from the selection criteria used to admit vessels into the EM program. They highlighted potential uncertainties with estimating discard rates from EM data where measuring lengths of all discarded fish is typically not possible. The measured length distribution is raised to the level of the discarded population, then raised further from sampled hauls to all hauls, and from sampled trips to all trips. Each of the extrapolation steps can introduce error. Additionally, since weights cannot be measured with cameras, externally estimated length-weight estimates are applied, which may not represent the fish being measured. (Needle et al., 2015). They noted that EM discard rates had not been applied in ICES stock assessments at the time of the study and highlight an ongoing debate about the use of length-based discard estimates for age-based assessments. They proposed the possibility of developing length-based assessment methods that do not require age data to the same extent as age-based methods.

In addition to the comparison of discard rate estimation between EM and at-sea observer data, Needle et al. (2015) provided several recommendations about EM video analyst training and length and morphometric sampling analyses. They noted that a key challenge for fisheries science has been the lack of reliable fishery-dependent data, specifically potential bias in vessel reported information about fishing location and unaccounted discards. They concluded that EM data can provide accurate information that scientists can use to better understand fishery behavior. The authors noted that significant investment in video analyst training and calibration testing is required to ensure accuracy of video-generated catch information for

catch monitoring and stock assessment input. Additionally, they noted that regular video analyst calibration updates are required to ensure continued accuracy. Needle et al. (2015) concluded that potential benefits of EM systems for scientific analysis of fisheries and fish populations are clear and that EM systems can have wider coverage of fleets, which enables random sampling of vessels beyond the capabilities of at-sea observers.

6.3. Alaska Applications of Electronic Monitoring

Federal fisheries monitoring in the Alaska region includes two EM programs. The regulated fixed gear EM program aims to provide at-sea catch information, and the trawl EM program conducted under an EFP aims to provide compliance with minimal discarding at sea. Both programs have been implemented by the North Pacific Fishery Management Council (NPFMC) in consultation with the Pacific States Marine Fisheries Commission, the fishing industry and NMFS (PSMFC, personal communication). The NPFMC and NMFS determine policies that govern EM participation and trip selection for EM data review, and the Alaska Fisheries Science Center provides the infrastructure to facilitate EM deployment and house EM data, provides guidance for EM video review by third-party service providers, and supports the dockside collection of biological data.

The Alaskan fixed-gear EM program allows vessels to choose a preferred tool for required monitoring coverage from either the EM system or at-sea observers. EM-generated data is used together with observer data to estimate catch and discard information. Collected EM data includes gear type, count of fish by species, and fate of individual species (i.e., retained or discarded). Additionally, third-party EM reviewers determine the quality of the data and whether or not the vessel operator followed the Vessel Monitoring Plan. After review, data is pushed to the Alaska Fisheries Science Center Observer Program databases where it is transformed to match other observer datasets to be fed into the Catch Accounting System. The data transformation process converts fish counts into weights by species by applying average weights sourced from observer-collected data (e.g., prior year average weight by species, disposition (kept or discarded), gear type, and area fished). The EM counts and specific locations are available through the Alaska Fisheries Information Network (AKFIN).

In the fixed-gear EM program, biological data, such as length, weight, maturity, and age structures are not collected. This has led to a lack of biological information for stock assessment purposes for some gear/area/year combinations. To counteract this lack of information, the Gulf of Alaska Pacific cod stock assessment has incorporated Alaska Department of Fish and Game port samples for lengths and otolith samples for areas/times that lack observer samples. The Alaska Fisheries Science Center recommended that there should be increased emphasis on representative sampling for the remaining observers of fixed gear (AFSC, personal communication). Another challenge associated with the fixed-gear EM program is the lack of effort data. The total number of pots and hooks, as well as soak times for pot gear and hook gear are not recorded, therefore Catch Per Unit Effort (CPUE) indices cannot be calculated.

The Pollock Pelagic Trawl EM Program, currently operating under an EFP, utilizes video monitoring to ensure maximized retention of all catch in combination with dockside monitoring to collect biological information. The goals of the program include demonstrating that maximized retention can be achieved by pelagic trawl vessels targeting pollock, demonstrating that EM camera systems can adequately capture discard events and video data can be used to verify vessel logbook discard information, and improving salmon bycatch accounting. Catch is estimated from landing reports, observer information, and logbooks. Dockside monitoring provides information about species composition and collects biological samples.

The trawl EM program collects biological data during offload rather than at-sea. The spatial and temporal resolution of these data are different than that collected by at-sea observers. However, spatial and temporal resolutions used in the Alaska pollock stock assessments have been inconsistent over time, and currently, the assessments do not include length or age information at the haul level, so no change has been needed to include EM data into the stock assessments. Still, the lack of haul level data collection presents challenges for the use of the trawl EM program data for stock assessments. Without effort data, CPUE indices cannot be calculated, and haul level analytics are not possible (e.g., location or time of day analyses of bycatch). A benefit of the Pollock Pelagic Trawl EM program for stock assessments is the collection of lengths and otolith samples of incidentally caught Pacific cod, rougheye rockfish, and sablefish through dockside monitoring, which were previously not collected by at-sea observers. These data can be apportioned to the pollock trawl fishery and combined with target fishery length and age samples to generate trawl fishery length/age compositions for the cod, rockfish, and sablefish stock assessments. Additionally, the trawl EM program dockside monitoring component collects information about length frequencies of incidentally caught sharks and skates, which was not previously collected by at-sea monitoring (AFSC, personal communication).

Generally, the Alaska EM programs have met objectives for catch accounting and discard compliance, and the data is being applied for stock assessments of target and bycatch species. The two Alaska-based EM program have different strengths and weaknesses that need to be considered for stock assessment purposes. Integrating the EM datasets has not been a constraint for the Alaska region stock assessments due to the integrated, relational database infrastructure provided by the Alaska Fisheries Information Network (AKFIN) but adapting assessment methods to include less biological information at lower spatial and temporal resolutions has proved challenging. Assessment analysts must be aware of the multitude of datasets (e.g., observer, EM, logbook, dockside monitoring, trip reports, etc.), and assumptions of error and bias around catch weight estimates may need further evaluation (AFSC, personal communication).

6.4. Synthesis of EM Examples

The reviewed examples of EM programs in British Columbia, Scotland, and Alaska provide insight about benefits and challenges associated with EM program development, data collection protocols, and data applications that can inform advancements for EM programs in

New England. All of the examples highlighted that EM was best applied as part of multi-faceted monitoring programs that include a mix of monitoring tools. Stanley et al. (2015) concluded that integrating EM with dockside monitoring and logbooks was critical to the success of the British Columbia hook and line monitoring program, as focusing on any single tool confounded the link between needed information and available data types. In Scotland and Alaska, EM data is supplemented with at-sea observations of fish lengths, weights, and biological samples (Needle et al., 2015; AFSC, personal communication). The Alaska fixed gear EM program has confronted the lack of at-sea biological sampling on EM trips by recommending increased representative at-sea monitoring for non-EM vessels in the fixed gear fishery to provide necessary data streams for stock assessment. Similarly, the New England groundfish EM programs were designed to provide increased flexibility to groundfish sectors by allowing the use of EM tools with a goal to integrate data across multiple monitoring programs (e.g., NEFOP, ASM, EM, DSM).

In each program, EM data utility was considered during program development. The British Columbia EM program included analyses of EM-generated catch estimates and deemed the data to be precise and unbiased for use in stock assessments. Although EM discard rates from the Scottish Remote Electronic Monitoring program had not been integrated in ICES assessments at the time of Needle et al.'s (2015) review, they proposed the possibility of developing length-based assessment methods that do not require age data to the same extent as age-based methods as a potential opportunity to apply EM data streams and increase participation in EM programs. Stock assessment analysts in Alaska identified challenges with EM data streams that include less biological information at lower spatial and temporal scales, and have supplemented information gaps with other available data sources to adapt assessment methods. The primary focus for EM data application from the New England groundfish fishery has been on catch accounting for quota monitoring, but as participation and the time series of data collection have increased, more information is available to incorporate in stock assessments. Landings data from both the audit model and maximized retention EM programs have been incorporated in recent assessments, and the American Plaice Research Track Stock Assessment Working Group recommended derivation of discard estimates from EM vessels, as well as application of length distribution from EM data for future stock assessments (NOAA, 2022).

Monitoring costs were a factor in the development of the British Columbia and Scottish EM programs. The British Columbia program set the video review rate at 10% to account for concerns over potentially high costs associated with higher review rates. Although the selected review rate is relatively low, analysis of monitoring data showed a close match between counts and weights from video compared to official catch records derived from audited logbooks and dockside monitoring. Stanley et al. (2015) concluded that accurate reporting was incentivized by the EM system because discrepancies between video and logbook data required increased review rates at higher costs for individual vessels. In Scotland, a challenge for fisheries science has been the lack of reliable fishery-dependent data resulting from expensive observer programs that may include observer bias. Needle et al. (2015) suggested that EM data could provide more accurate information to understand fishery behavior and that future investments

in monitoring should be aimed at EM program components. In New England, the NEFMC estimated costs associated with EM programs and determined that after the initial year of investment in equipment and system installation, costs of electronic monitoring may be substantially lower than at-sea monitoring (NEFMC, 2021). However, it will be important for the continued success of EM in New England to evaluate video review rates to maximum cost-efficiencies while maintaining precise and unbiased data streams.

A key component of the EM systems in British Columbia and Alaska is the data infrastructure system. The Information Monitoring System in British Columbia was considered essential to the proper functioning of the overall monitoring program, and Stanley et al. (2015) described the delayed implementation of the system as a mistake. The system was still in the testing phase as data collection began, which resulted in delayed data processing and increased operational costs. The Alaska Fisheries Information Network (AKFIN) was highlighted by Lynch et al., (2018) as a model for regional relational database structure and function and has been critical for integrating EM datasets into Alaska region stock assessments. The Northeast region has been developing tools and systems to process, integrate, and store fishery-dependent data for several years, but currently relies on antiquated systems that have created challenges for EM data applications. The Fishery-Dependent Data Initiative (FDDI) led by GARFO and NEFSC may provide useful solutions including the use of a Universal Trip Identifier (UTID) and the Catch Accounting Monitoring System (CAMS), which in combination could streamline data processing and integration of multiple data sources (GARFO and NEFSC, 2021). These efforts must be prioritized to ensure timely and efficient access to datasets and avoid increased costs to the fishing industry and science and management systems.

7. Conclusions and Recommendations

The EM programs developed for the Northeast multispecies fishery have successfully met objectives for catch accounting and quota monitoring. The audit model EM program, operationalized in 2021, has generated accurate and unbiased information to monitor landings and discards for participating sector vessels, and the maximized retention EM EFP program has demonstrated that video data in combination with dockside monitoring can accurately account for high volume landings and minimize regulatory discarding.

EM-generated data has had limited application to Northeast multispecies stock assessments to date, however the datasets themselves are not a constraining factor. Multiple analyses of EM-generated data (e.g., Cadrin et al., 2020b; Maynard et al., 2020; NOAA, 2022) suggest that data from the audit model and maximized retention EM programs are accurate and unbiased and can be used in stock assessments. The most significant limitation to applying EM data in stock assessments is the current lack of a regional relational database infrastructure. Once completed and operational, the UTID and CAMS systems should provide the necessary data access and processing capacity to integrate EM data with other fishery-dependent data sources to inform stock assessments.

Continued development of the EM programs would benefit from input from stock assessment scientists to ensure alignment between data collection and data applications. Based on our review of the New England groundfish EM programs, we provide the following recommendations:

- In order to maximize the potential benefits of EM, including enhanced data streams for stock assessment, analyses of data collection methods and data products are needed to ensure EM data meets similar standards in quality and can be integrated with existing data sets.
    - The NEFSC Population Dynamics Branch should provide input and recommendations for catch handling requirements included in Vessel Monitoring Plans to produce information that can be integrated into existing datasets (e.g., NEFOP and ASM) or supplement data gaps for stock assessment applications.
    - Sub-sampling levels should be based on scientific thresholds for accuracy and precision balanced with sampling conditions, and subsampling rates should be evaluated on a continuing basis to determine optimal rates to achieve objectives.
    - Video review rate should be based on obtaining the appropriate level of information needed to meet catch accounting objectives and determining the optimal review rate must remain a priority to maximize cost-efficiencies.
    - Video review guidance should remain consistent to facilitate use by multiple EM service providers and ensure data quality meets required standards for all EM users, and review guidance should continue to be adaptable to new input while maintaining established standards.
    - All data users must have a common understanding of the types of data collected by EM and standardized data codes that match other monitoring datasets (e.g., NEFOP, ASM, DSM).

- To ensure that EM-generated datasets are applied in stock assessments in the future, specific data treatments and modeling approaches should be identified.
    - Establishing protocols to analyze and integrate EM data is necessary, and future assessments should consider deriving discards from EM vessels, as well as incorporate length distribution from EM trips to estimate composition of discards.

- To facilitate the integration of EM data with other fishery-dependent data sources, the Northeast region must implement a relational database infrastructure.
    - Efforts to complete the Fishery-Dependent Data Initiative and Catch Accounting and Monitoring System should be prioritized and sufficiently supported with funding and expertise.

This report considered requirements of EM systems to generate information to inform and potentially improve fishery-dependent data streams for stock assessments. Based on the overview of the EM system components, at-sea and dockside data collection protocols and

products, integration of EM in the overall monitoring system, and review of comparable EM systems from other regions, we conclude that the audit model and maximized retention model EM programs operating in the Northeast multispecies fishery can improve performance of stock assessments by generating accurate, unbiased data, better characterizing fishery discards, and incentivizing individual accountability to minimize unreliable information.

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Incentivizing Accountability and Data Modernization in the New England Groundfish Fishery

Applications of Electronic Monitoring Information in Stock Assessment

APPENDICES

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Appendix 2 – Report Related Meetings

Date	Organization	Outcomes
29 Sep 2020	New England Fishery Management Council	Updates on status of EM programs and use of data in Northeast groundfish stock assessments
2 Dec 2020	New England Fishery Management Council	Updates on status of EM programs and use of data in Northeast groundfish stock assessments; overview of length frequency data utility
7 Jul 2021	Northeast Fisheries Science Center	Review status of regional data integration program; update on technical components of EM data collection and compilation
15 Jul 2021	Pacific States Marine Fisheries Commission	Overview of West Coast and Alaska EM programs; strengths and weaknesses of EM program design
19 Jul 2021	The Nature Conservancy/Tuck Business School	Information sharing on EM program development and implementation; Economic analyses of EM operationalization
2 Aug 2021	Alaska Fisheries Science Center	Overview of utility of EM data in Alaska stock assessments; discussion of data treatments and assessment methods for fishery-dependent data streams
4 Aug 2021	NOAA Science and Technology	Update on NOAA efforts to document and evaluate the use of EM data in stock assessments
15 Sep 2021	Gulf of Maine Research Institute/The Nature Conservancy	Overview of Maximized Retention EM program; details of data collection protocols, data availability and data utility
23 Sep 2021	Northeast Fisheries Observer Program	Overview of NOAA's Dockside Monitoring Program; details of data collection for Max Retention EM program
24 Sep 2021	American Plaice Research Track Fishermen's Meeting	Gloucester - Fishermen input on the use of EM programs to collect data related to American plaice; data collection from Audit Model and Max Retention EM programs
3 Nov 2021	American Plaice Research Track Fishermen's Meeting	Portland - Fishermen input on the use of EM programs to collect data related to American plaice; data collection from Audit Model and Max Retention EM programs
19 Nov 2021	American Plaice Research Track Working Group	Discussion of EM trips landings data for American plaice Research Track Stock Assessment
6 Dec 2021	American Plaice Research Track Working Group	Presentation of EM Data: American Plaice working paper; discussion of EM discard data for American plaice Research Track Stock Assessment
7 Dec 2021	New England Fishery Management Council	Updates on status of Audit Model EM Delta Model and regional database Catch Accounting and Monitoring System (CAMS)
7 Dec 2021	Integrated Monitoring	Overview of technological systems and applications for EM data collection, storage and access

Appendix 3 – Electronic Monitoring Data: American Plaice – Working Paper Submitted to American Plaice Research Track Assessment

Electronic Monitoring Data: American Plaice

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Submitted to the American Plaice Research Track Working Group
6 December 2021

Introduction

Electronic monitoring (EM), specifically referring to the replacement or supplement of at-sea observers with integrated camera systems on vessels, has been used to collect fishery-dependent data across a range of fisheries in several countries (van Helmond et al., 2020). Potential benefits of EM include reduced uncertainty in estimates of catch, increased fleet coverage, accurate discard estimates, and precise catch per unit effort time series (Michelin et al., 2018; Pew, 2019; Westfall et al., 2020). Additionally, EM has the potential to improve timeliness and quality of data collection, processing, and analyses, as well as incentivize accountability to support sustainable fisheries (McElderry, 2006; 2008).

Electronic Monitoring for New England Groundfish

The development of EM programs for the Northeast Multispecies (groundfish) fishery has been well-documented since initial pilot testing began in 2010 (Pria et al., 2014; Alger, 2015; Kennelly and Hager, 2018; Fitz-Gerald et al., 2019; van Helmond et al., 2020; Westfall et al., 2020). Regional non-governmental organizations, research groups, and fishermen, in partnership with NOAA, conducted a multi-phase pilot program for EM between 2010 and 2014. Phase I determined the baseline data required to monitor groundfish quota, including detection of fishing events, counting fish, and species identification. Phase II developed methods to obtain fish weights and improve species identification through catch handling protocols. Phase III tested catch handling protocols to simulate an operational EM program and identify the components necessary to support different EM approaches, including an audit model and maximized retention model (Fitz-Gerald et al., 2019).

Audit Model Electronic Monitoring

The audit model EM program was conducted under an EFP starting in Fishing Year (FY) 2016. The goal of the program was to validate fishermen self-reported discards of groundfish species by auditing electronic Vessel Trip Reports (eVTR) in comparison to EM data collected from the same trips. Between 2016 and 2019, the audit model EM program evolved to incorporate improved data collection and review protocols. EM data was used in place of at-sea monitoring data for a subset of trips in FY2016, then for all EM trips in FY2017. In FY2018, the audit

component was introduced with review of 100% of EM data to compare to eVTRs. In FY2019, the review rate was reduced to 50% of the EM data from all trips in the program, and eVTR data was applied as the official catch record for trips that passed the audit.

Starting in FY2021, the audit model was operationalized to allow New England groundfish sectors the option to adopt the NOAA Fisheries audit model EM program as part of their Sector Operations Plans (NOAA, 2020). The operationalized audit model program requires participants to record the estimated weight of all discards on an eVTR and follow catch handling protocols at sea. To facilitate collection of discard data from video footage, participants must place all groundfish species under a camera on a measuring strip prior to discarding. As of May 1, 2021, eight sectors included an EM component in their FY2021-2022 Sector Operations Plans, and there are currently 22 active sector vessels using EM to meet monitoring requirements (NRCC, 2021).

Data from the audit model EM program have been used primarily to account for discards in sector quota monitoring. All regulated groundfish discards are handled and discarded in camera view and data is collected for species, length, weight, count, and catch disposition. To date, audit model EM data streams have not been incorporated in stock assessments for New England groundfish species. Analyses conducted during the EFP phase of the audit model program indicate that aggregate and trip-level discard estimates from EM and Northeast Fisheries Observer Program (NEFOP) data were similar in FY2017 and FY2018. The average difference in estimates of discarded weight by species between the datasets was small (~3.6 pounds per trip in FY 2017 and ~15.9 pounds per trip in FY2018) and not statistically significant in either year at the fleet and trip levels (Cadrin et al., 2020).

American Plaice Audit Model EM Data

Audit model EM data for American Plaice was provided by Teem Fish Monitoring and the Cape Cod Commercial Fishermen's Alliance (Table 1). Total discard weight is calculated by multiplying the number of individual fish by the average fish weight in pounds. Total landed weight comes from dealer reports for all EM Audit Model vessels combined.

Table 1. Audit Model EM data for FY19-20, including all recoded discards and total landed weight from all Audit Model EM vessels.

Audit Model EM	# Vessels	# Trips	# Discard Fish	Total Discard Weight (lbs)	Avg Discard Weight/Fish (lbs)	Total Landed Weight (lbs) Audit EM
FY19	5	26	627	288.42	0.46	69,452
FY20	8	82	9030	1446.43	0.39	33,642

Maximized Retention Electronic Monitoring Model

The Maximized Retention electronic monitoring model (MREM) program began under an EFP during FY2018. The MREM model employs a compliance concept, and all allocated groundfish,

regardless of size or condition, are retained at-sea, landed and recorded by a dealer. Electronic monitoring data confirms that allocated groundfish are not discarded at sea. The goal of the program is to document allocated groundfish through dealer reports that are verified by dockside monitoring.

From the start of the program through the end of FY2019, the MREM model focused on developing an EM system, designing program protocols, and building program infrastructure, including the development of a NOAA-lead dockside monitoring program. Between FY2020 and the present, the MREM model worked to improve data collection, refine catch handling protocols and develop review guidance by recruiting up to eight high-volume vessels to participate in the program. As of May 1, 2021, there were three sectors and six vessels participating under the MREM EFP. The MREM model is expected to be operational and available as a monitoring option in the Sector Operations Plans for FY2022.

Under the EFP, 100% of all EM data are reviewed, and it is expected that review rates will reduce to 50% under an operational program. Offloads for fishing trips following MREM protocols are observed by dockside monitoring. The dealer report is the official catch record for each fishing trip and includes the documentation of undersized and damaged groundfish using MREM-specific market codes.

Data from the Maximized Retention EM model are used to improve catch accounting in sector quota monitoring. EM data are used to evaluate compliance with retaining allocated groundfish. The NOAA-lead DSM program verifies dealer weights and collects biological data normally collected at sea, with a focus on collecting lengths from the exempted portion of the catch. Dockside monitoring data collected in the MREM EFP program has been used in stock assessments. During FY2022, it is expected that NOAA and project partners will develop and transition the DSM component to an industry lead third-party model.

American Plaice MREM Data

MREM data for American Plaice was provided by Gulf of Maine Research Institute and New England Marine Monitoring (Table 2). Allocated groundfish discarded at-sea are counted and identified to the species level. The weights of fish discarded at-sea are not estimated in the MREM program.

Of the 440 MREM fishing trips that have occurred since the start of the program through FY2020, American Plaice discards have been observed on 112 trips.

Table 2. MREM data for FY2019-20, including all identified and recorded American Plaice discards.

Maximized Retention Model EM	Number of Vessels	Number of Trips	Number of Discards

FY18	3	108	51
FY19	3	172	120
FY20	5	160	59

Descriptions of the audit model EM program catch handling protocols, video reviewer guidance, and data collection fields, are included in NOAA's "Electronic Monitoring Audit Model Program Reviewer Guidance Manual_V18," (NOAA, 2021b; https://apps-nefsc.fisheries.noaa.gov/NEMIS/index.php/docs/guidance). Details of the data fields collected from EM video footage are included on the Northeast Electronic Monitoring Information System application programming interface (NEMIS API; https://apps-nefsc.fisheries.noaa.gov/NEMIS/index.php/docs).

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Appendix 4 – Electronic Monitoring in Northeast Fisheries

Electronic monitoring programs for fisheries in the Northeast have been in various phases of development, testing, review and implementation for several years. The NOAA policy directives coupled with mandates for increased fisheries monitoring coverage rates by the New England Fishery Management Council (NEFMC) have increased interest and attention for the use of EM systems to supplement and replace at-sea observers in the Northeast region. Appendix 4 briefly summarizes the status of EM programs for Atlantic highly migratory species, Atlantic herring, and Atlantic sea scallops, including background information about pilot testing, and operationalization of regulated programs. The summary includes links to detailed information about catch handling, data collection, and data review protocols.

Atlantic Highly Migratory Species

In 2015, the first mandatory fleet-wide EM program in the US was implemented for the pelagic longline Atlantic bluefin tuna fishery. The principal objective of EM in the pelagic longline fishery was to verify the accuracy of counts and identification of bluefin tuna reported by vessel operators via mandatory logbooks and VMS reports (NOAA, 2015). Third-party EM service providers are responsible for the installation of EM systems, training vessel operators to use, maintain and troubleshoot EM systems, and data analysis and storage. Vessel operators are required to maintain the working condition of EM cameras and submit video footage via hard drives to the third-party service providers.

Amendment 13 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan includes changes to specific EM requirements for the pelagic longline bluefin tuna fleet starting in 2022. The Amendment includes modifications to the mailing deadline for EM hard drives, expanded regulations for camera installation, and additional fish handling protocols (NOAA, 2021a). Specifically, the vessel crew will be required to place retained fish on a mat with standardized grid lines in view of the processing camera to provide video reviewers with a standardized size reference to aid in the estimation of fish size and determination of fish species. This change in catch handling protocol is expected to improve species identification and size estimation and may facilitate the development and use of automated video analysis (NOAA, 2021a).

EM data from the pelagic longline fleet are used by NMFS to accurately monitor bluefin tuna catch, ensure compliance with individual bluefin quota limits and requirements, and ensure that the longline bluefin tuna quota is not exceeded. Data from the EM program have not been used in stock assessments for western Atlantic bluefin tuna to date. The International Commission for the Conservation of Atlantic Tunas (ICCAT) completed an assessment of western Atlantic bluefin tuna in 2017 using catch data through 2015, the year that the EM program started, which precluded use of any EM data (ICCAT, 2017). ICCAT is currently conducting a new assessment of Atlantic bluefin tuna with the application of a Management Strategy Evaluation (MSE) that includes catch data through 2019 and size data through 2016

(ICCAT, 2021). EM data from the US pelagic longline fleet is not incorporated into the assessment data streams currently, but with the proposed changes to catch handling protocols included in Amendment 13, size data from the EM program may be considered in future assessments.

Information about the EM program for the pelagic longline bluefin tuna fishery is included in Amendment 7 (NOAA, 2014; https://www.govinfo.gov/content/pkg/FR-2014-12-02/pdf/2014-28064.pdf) and Draft Amendment 13 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan (NOAA, 2021a; https://media.fisheries.noaa.gov/2021-05/HMSAmendment13DEISMay2021.pdf?null=).

Atlantic Herring

The National Marine Fisheries Service conducted an EM pilot study on midwater trawl vessels fishing for herring in 2016-2017. The goal of the study was to evaluate the utility of using EM to verify catch retention and track discarded catch in the herring fishery. Results from the study suggested that EM could successfully detect full net release events to a high degree of accuracy and was effective for identifying smaller discarding events. The use of three or four cameras on midwater trawl vessels captured all areas where discarding occurs. The study compared two video footage review methodologies to quantify and categorize discard events, including an audit approach that focused on fishing events as indicated by sensors and a census approach that looked at all video captured during a trip from the time of sail to the time of landing, and results showed that the two methods had comparable data to quantify discards. The study concluded that an EM and portside sampling program could be used to meet the information needs for management of the Atlantic herring fishery. Details of the pilot study methods and results are included in the report "Herring and Mackerel Fishery Electronic Monitoring Project" (Wealti et al., 2018; http://s3.amazonaws.com/nefmc.org/4.Herring-and-Mackerel-Fishery-Electronic-Monitoring-Project_Final-Report.pdf).

In 2021, midwater trawl vessels with Atlantic herring permits were subject to a 50% coverage target for at-sea monitoring under the New England Industry-Funded Monitoring (IFM) Omnibus Amendment (NEFMC, 2018). The New England Fishery Management Council (NEFMC) recommended that NMFS administer EM and portside sampling for the midwater trawl herring fishery via an Experimental Fishing Permit (EFP) to allow vessels the option to use EM as an alternative to At-Sea-Monitors (ASM). Under the EFP, midwater trawl vessels issued A or B herring permits are required to run EM systems on 100% of declared herring trips and data from 50% of the trips are selected for review. A third-party service contractor is responsible for EM installation, review of EM video footage, processing and annotating video data, and generating EM data analysis summaries. In Fishing Year 2021, six midwater trawl herring vessels selected EM and portside sampling as their monitoring option (NRCC, 2021).

General information and data review protocols for the IFM Atlantic herring EM program is provided in NOAA's "Industry Funded Monitoring: EM Reviewer Manual for High Volume Herring Trips" (NOAA, 2021b; https://apps-

nefsc.fisheries.noaa.gov/NEMIS/index.php/docs/guidance). Details of the data fields collected from EM video footage are included on the Northeast Electronic Monitoring Information System application programming interface (NEMIS API; https://apps-nefsc.fisheries.noaa.gov/NEMIS/index.php/docs).

Northern Gulf of Maine Sea Scallops

A pilot study on the use of EM to monitor scallop vessels in the Northern Gulf of Maine scallop management area was initiated in 2019. The Maine Coast Fishermen's Association, in collaboration with the Gulf of Maine Research Institute and Teem Fish Monitoring, installed EM systems on three Maine-based vessels to test the effectiveness and efficiency of using EM to collect data on scallop catch and discards and bycatch species. The data capture objectives included kept and discarded scallop estimates, scallop shell heights, groundfish counts, presence or absence of starfish and sand dollars, and fishing effort data. The pilot study concluded that EM may be a useful tool to collect data from scallop vessels fishing in the Northern Gulf of Maine management area with further work needed to fine tune the program.

Additional details about the 2019 pilot project are described in the presentation "Northern Gulf of Maine Scallop Camera Monitoring Project 2019" (MCFA and GMRI, 2019; https://s3.amazonaws.com/nefmc.org/P.4-Northern-Gulf-of-Maine-Scallop-EM-Project-2019_-PDT-pres-BDM_final.pdf) and on the Maine Coast Fishermen's Alliance website (https://www.mainecoastfishermen.org/post/electronic-monitoring-in-the-gulf-of-maine-scallop-fishery).

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Appendix 5 – Methods to Incorporate Fishery-Dependent Data in Stock Assessments

Stock assessments rely on fishery-dependent data, including landings, discards, fishing effort, and biological samples to estimate total fishery removals by species and area over time. Integrating the time series of removals and distribution of size and age in the fishery catch with an index of stock abundance derived from fishery-dependent catch and effort data or fishery-independent survey data can provide an estimate of stock size and fishing mortality (Cadrin et al., 2020a). However, fishery-dependent data can include confounding factors related to changes in stock distribution, fishery behavior, and management interventions. Considering approaches to address these confounding and variable factors can increase data utility and enhance assessment model performance. This appendix summarizes a variety of data and model treatments to increase the use of fishery-dependent data for assessment purposes.

Discard Modeling

Discards can comprise a substantial amount of fisheries catch (Kelleher, 2005) and are time-varying due to market conditions and regulatory measures. Fish may be discarded due to low economic value, incorrect size, vessel constrained capacity, or quota limitations, which can lead to high-grading (i.e., the retention of only the most valuable size class and discarding the less profitable sizes). Excluding discards from assessments can lead to biases in the estimation of exploitation rates and stock biomass (Punt et al., 2006). Discards are considered a post capture process and should be modeled as such to provide information on the behavior of fleets and discarding dynamics for management (Cook, 2019). Discards can be accounted for in models by using a combined landings and discards value for each age (e.g., XSA model; Shepherd, 1999), or modeled as separate fleets in an assessment (e.g., ASAP; Miller and Legault, 2015). A separate model developed for discards also can be incorporated into typical catch-at-age stock assessment models to provide historical trends of discards. Cook (2019) developed a discard model that was integrated into a catch-at-age stock assessment, which was tested using a simulated catch dataset and applied to eight demersal fish stocks in the Greater North Sea and West of Scotland area. The total number of fish discarded was modeled as a time- and size-varying proportion of the total catch, where the estimated discard proportion was modeled using a logistic selection (i.e., estimated the 50% retention length). The total observed catch was calculated using the conventional Baranov catch equation. Parameters in the discard and age-structured assessment model were estimated using Bayesian statistical inference. Model results confirmed that there were shifts in the 50% retention length and selection when high grading was occurring, and bulk discarding could be identified in the historical trends (Cook, 2019). The ability to model discards in stock assessment helps produce more accurate reference points, allows managers to examine historical discard patterns, and identify the effects of different regulatory measures on discarding.

Data Weighting

Data-weighting (i.e., determining how much weight should be given to each dataset) is an important aspect in model-based stock assessments because the use of different weights can change the results of the assessment and ultimately provide varying advice for management. Francis (2011) acknowledged that there is not a single best practice method but provided guiding principles for data-weighting that can be applied for assessment purposes. With data-weighting, there is a vector of all the data (i.e., observations) and a vector of the parameters that are being estimated in the model. The objective is to find the best set of values for the parameters that best fit the data. Data that can be used in models include historical fish population trends, fishery data, and error distributions from those data. Data-weighting focuses on the error distributions, where typically the weight given to each observation is determined by how close it is to the expected value. Often, data-weighting follows a 2-stage process where first, weights are devised before the model is run based on how the data are collected using sample size and structure, and second, weights are adjusted for the whole datasets rather than individual observations and the model is rerun multiple times with iterative reweighting until stable values are reached. Modeling can include three types of errors: 1) the difference between observed and true values (i.e., observation error); 2) the difference between expected and true values (i.e., process error); and 3) the difference between observed and expected values (i.e., total error, which is the sum of the observation and process errors). Francis (2011) stated that 2-stage data weighting is necessary to accommodate each type of error, where the first stage assigns weights that are appropriate for observation error, the second stage adjusts those weights to allow for process error, and additively (or multiplicatively) the errors result in the total error. Francis (2011) suggested that abundance data is of critical importance because most of the key questions that are addressed in stock assessments involve abundance. When including abundance datasets in a stock assessment model, a determination of whether a dataset is representative of the population is required. Correlations among the data or contrasting abundance trends can occur, however the data-weighting process can allow for some correlation in the compositional data. Francis (2011) suggested that when there are contrasting abundance datasets, multiple alternative models should be run with and without the conflicting datasets and presented in the stock assessment. Ideally, the model should be robust to outliers, where the data-weighting can help reduce the effect of outliers and allow for process error. Overall, data-weighting can be improved with higher quality data that are representative of the population, but the data-weighting process is unique to each assessment based on the datasets provided.

Catch Per Unit Effort (CPUE) Indices

Improving the potential utility of fishery-dependent data for stock assessments may require changes to data collection programs, data analysis, and assessment processes. CPUE series are more likely to be representative of stock trends when the fleet covers the entire stock area and is relatively homogeneous with respect to fishing power, gear selectivity, seasonality, captain behavior, and other factors. However, since many fisheries are not homogeneous, approaches such as the use of index fleets or 'fishery footprint' analyses may be necessary. Additionally, fishery-dependent data streams are not perfect, and it is important to understand the

uncertainties, biases, and implications of the utility of the data (Cadrin et al., 2020a). CPUE indices can be developed for index fleets, which includes identifying groups of fishermen that display consistent behavior over a time series in a specific area within a species distribution footprint. Although such a CPUE index may not be representative of the entire stock, information from a group of vessels that have similar gear, vessel size and power, and target species can provide information for fine-scale spatial areas and information on general trends. Determining the appropriate time period for developing a CPUE index relies on a timeline of changes in fishing gear, vessel characteristics, crew behavior, and other factors affecting catchability on a vessel-by-vessel basis. CPUE must be standardized sufficiently to account for any changes in vessel efficiency, gear selectivity, targeting/avoidance behavior, inclusion probabilities, spatial aggregation of fish, and hyperstability (Cadrin et al., 2020a; Maunder and Punt, 2004). Understanding social and economic incentives that influence fishing behaviors can be incorporated in behavioral models to reduce bias of fishery-dependent data and enhance the utility of CPUE data (Ono et al., 2018). Factors such as quota and lease prices can influence fishing choices on when and where to fish, as well as targeting and avoidance behavior. These behaviors are important to consider when developing CPUE indices because they define targeted effort and influence the magnitude and location of fishing effort. Incorporating environmental data is also an important consideration for development of CPUE indices as oceanographic features can impact the dynamic marine habitat and alter availability of species to fishing operations (Manderson, 2016). Shifts in fish distribution can impact catchability and create the perception in CPUE data that abundance has changed, therefore is it important to account for factors that influence catchability when standardizing CPUE to ensure that the relationship between CPUE and total abundance is consistent over time. The use of CPUE indices in stock assessment can be limited by time and resources to assess the uncertainties, limitations, and potential biases associated with various data stream. However, fishery-dependent data is a valuable source of information and CPUE indices can enhance stock assessments (Cadrin et al., 2020a; O'Keefe et al., 2015).

Fishery Selectivity

Most quantitative stock assessments require estimates of selectivity, the probability of capturing an animal given it encounters the gear. Generally, selectivity is the probability of capture at a given size or age. There are a variety of methods used to estimate gear selectivity, such as side-by-side fishing with different gear sizes, under bag studies, fitting models to tagging data, and comparing length frequencies with acoustic or other alternative survey methods. However, selectivity patterns that are estimated in stock assessments are often different from gear selectivity studies. As EM datasets may lack information on gear configuration, it is important to consider alternative methods to estimate selectivity. Punt et al. (2013) provided a review on estimating selectivity in stock assessments with suggested guiding principles. They indicated that estimating selectivity can be a challenge because it can be confounded in the catch-at-age or catch-at-length data. To estimate selectivity, as well as other parameters, it is best to have additional data sources, such as relative abundance and fishing mortality, to draw inferences and make more informed assumptions. Using two fish stocks as examples, Punt et al. (2013) demonstrated that assessment results were sensitive to the

choices related to selectivity. In particular, ignoring fleet structure or assuming all fleets have the same selectivity and ignoring time-variation in selectivity can have substantial impacts on results. Punt et al. (2013) noted that the number of fleets should be based on the computational demands, model stability, data availability, and spatial area coverage. There are several methods available to select an appropriate selectivity pattern and examining residual patterns in a stock assessment can give an indication of model mis-specification. In general, selectivity should be modeled with consideration of how assessment results can change when incorrect assumptions are made about the selectivity patterns.

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Appendix 6 – EM Source Documents for 2021 Program Implementation

6.1 NEFSC – Audit Model EM Reviewer Guidance Manual v18 – April 2021
6.2 Teem Fish – Audit EM Vessel Monitoring Plan – April 2021
6.3 GARFO – Guide to FY2021 Electronic Monitoring Audit Model Catch Accounting – April 2021
6.4 GARFO – Sector Report Guide FY2021 – June 2021
6.5 GARFO and NEFSC – FDDI and CAMS Update to NRCC – November 2021
6.6 GARFO – Letter to NEFMC for 2022 ASM Coverage Target – December 2021

Electronic Monitoring Audit Model Program Reviewer Guidance Manual

NOAA Northeast Fisheries Science Center and Fisheries Greater Atlantic Regional Fisheries Office

Video Review Protocols for Multispecies Sector Trips

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Introduction:

Electronic Monitoring (EM) refers to the use of technologies, such as video cameras, gear sensors, and reporting systems, to monitor fishing operations, effort, and/or catch. In 2010, NMFS implemented Amendment 16 to the groundfish FMP and established annual catch limits and accountability measures for the fishery. Amendment 16 also included a requirement for groundfish sectors to implement and fund an at-sea monitoring (ASM) program, and regulations allow sectors to use EM to satisfy their catch monitoring requirements. The Greater Atlantic Region is assisting with the development of two EM models in the Greater Atlantic Region: the audit-model and the maximized retention model. This Guidance Document focuses on the Audit Model review requirements.

The New England Fishery Management Council developed Amendment 23 to the groundfish FMP. Amendment 23 is intended to adjust the groundfish monitoring program to improve the reliability and accountability of catch reporting in the commercial groundfish fishery, and to ensure the monitoring program is providing accurate catch information.

The New England Fishery Management Council adopted Amendment 23 to the Northeast Multispecies Fishery Management Plan at its September 2020 meeting. The measures approved in the amendment include higher levels of monitoring (i.e., 100 percent, contingent on available funding) and approval of both the audit-model and maximized retention model as optional tools to meet monitoring requirements. Amendment 23 will be submitted to NOAA Fisheries for review, and will not be an obstacle to proceeding with electronic monitoring in the Northeast groundfish fishery. Following final action, NMFS must determine that the action is consistent with all applicable law, as required by the Magnuson-Stevens Fishery Conservation and Management Act. The target date of implementation of approved monitoring measures is May 1, 2022. However, beginning in May 2021, sectors can elect to use EM as their monitoring tool, specifically the Audit Model Program. Coverage rages will remain at ASM levels until AM 23 is implemented.

The audit-model EM program began in 2016 and includes approximately 20 participating vessels using a variety of gear types. Under the audit-model EM program, participants must record the estimated weight and count of all discards on an eVTR and adhere to catch handling protocols at sea to ensure collection of discard data from the video footage. In particular, participants must hold all groundfish below the minimum fish size under a camera prior to discarding them to facilitate video review by a third-party EM service provider. NMFS audits a subset of trips taken by each participating vessel and compares the discard data submitted by the third-party EM service provider to the eVTR submitted by the vessel. The agency will apply the Delta Model to each EM trip's eVTR for catch accounting. The Delta Model makes minor adjustments to discards for eVTR over- or under-estimations made by the captain and is regularly updated for all trips within the fishing year. On audited trips, the EM data is compared to eVTR for accuracy and used to update the Delta Model. The goal of the Delta Model is to use eVTR self-reported discards estimates to improve catch accounting.

Operational EM programs have core standards that must be consistent among providers, and between providers and NMFS reviewers, including: reviewer training, data elements, species identification protocols, length measurement and weight estimation techniques, documenting events, documenting video quality, and reviewing procedures. Secondary reviews, when the video is reviewed and annotated by NMFS staff, are conducted as a quality control of the service provider. Completed trip file records submitted by each reviewer are then compared. Based on

criteria such as species counts, discard weights, image quality, system performance, and vessel performance suggestions are made to improve the data collection process and provide feedback to providers.

In order to provide data that can be meaningfully compared both among EM service providers and between NMFS and service providers, data must be collected using a standardized methodology. The purpose of this document is to provide guidance to video reviewers on items related to species identification, methods for obtaining lengths and weights, assigning an end disposition to the discards, and event documentation. This document also provides an overview of the general catch handling protocols for participating vessels and description of events. See appendix A for definitions of Vessel Monitoring Plans (VMP) and multispecies Annual Catch Entitlement (ACE).

This reviewer document is not vendor specific, it provides guidance that applies to the Audit Model Program. Essentially, the goal of this document is to provide EM reviewers working for NMFS as well as outside company's cohesive instructions on how to review an EM trip. The goal in establishing these guidelines is to both provide data sets that can be compared for research and as a means for evaluating the performance of EM review companies. This document should be actively referenced by new reviewers and veteran reviewers alike. Should discrepancies between review methods become apparent it is the responsibility of the reviewer to alert NMFS staff so that a preferred method for handling discrepancies can be determined and documented here.

Common acronyms:

EM: Electronic Monitoring	**GARFO**: Greater Atlantic Regional Fisheries Office
eVTR: Electronic Vessel Trip Report	**NMFS**: National Marine Fisheries Service
ITIS: Integrated Taxonomic Information System	**NEFSC**: Northeast Fisheries Science Center
JSON: JavaScript Object Notation	**TDQ**: Training and Data Quality Branch
VMP: Vessel Monitoring Plan	**FMRD**: Fisheries Monitoring and Research Division
NEFOP: Northeast Fishery Observer Program	**ACCSP**: Atlantic Coastal Cooperative Statistics Program
ASM: At-Sea Monitor	**ACE**: Annual Catch Entitlement

Reviewer IDs:

Reviewers will be given a NMFS observer program identification number. These reviewer IDs will be used to identify which reviewer performed the primary review.

Trip Level Elements:

A trip is defined as Port-to-Port deployments. The captain is required to submit a VTR when the vessel returns to port for any reason (weather, mechanical failure, partial off-load, etc.). In the situation where a vessel returns to port, does not offload, and returns to sea to fish, the captain would be required to submit VTRs for the two distinct fishing trips.

Catch accounting EM vessels will need to process all discards prior to ending a trip. A reviewer should verify sail and land dates within the video to the trip dates listed in the FMRD Portal. These dates need to match in order for the API to accept the trip. Sail and land times are not required to be entered by the reviewer.

If reviewers notice any discrepancy with sail and/or land dates and the dates showing in the video, please notify the EM Lead to make sure trip dates are correct and accurate.

Vessels are required to have a functional EM system for the duration of the trip. A functional EM system is defined as a system that continuously records activity on deck onto a hard drive or other suitable video storage device. The EM system consists of the control box, GPS sensors, and the cameras. The captains are required to turn the EM system on before departing a dock or mooring, keep the system running for the entirety of the trip and wait to turn it off till after they land at a dock/mooring.


```
{
  "review_id": 1245,
  "vessel_permit_number": 222222,
  "vessel_name": "Vessel B",
  "date_sail": "2020-06-29",
  "date_land": "2020-06-31",
  "evtr_num": 22222220062901,
  "total_hauls": 9,
  "reviewed_hauls": 9,
  "observed": "Y",
  "comments": "string",
```


Figure 1: Example of a trip object in JSON format.

Observed Y/N:

The trip level OBSERVED field is used to indicate if the trip was observable dock to dock, as required. When there are instances that prevent the entire trip from being observed, enter OBSERVED=N at the trip level. These instances can include, but not limited to, if the system is not activated or shut off improperly, if video gaps are present, or if there is a camera or system failure. A trip can be OBSERVED =N and still have all the hauls marked OBSERVED =Y.

Review Start and Stop Definitions:

Currently, there are no annotation requirements for review start or stop. However, a reviewer should verify the start and end of a trip are on video.

Review Start: The reviewer should make sure the vessel is at a dock or mooring prior to departing with the intent of going fishing. If the reviewer cannot determine or track the departure location and the system is activated while underway, an EMS-SYSTEM NOT ACTIVATED AT DOCK event should be annotated. The camera system must be activated by the captain prior to departure and a system check should be conducted to ensure the system and cameras are functioning properly.

Review Stop: In EM for catch accounting, review should continue until all discards are measured and all catch is fully processed or when the vessel lands with the intent to off-load their catch, whichever occurs last. If discards are collected during a haul but are not measured and the vessel lands and begins off-loading, the reviewer should continue watching the video to confirm all discards are processed. If video ends prior to being able to fully account for discards, an EMS-SYSTEM OFF PRIOR event should be annotated.

General Gear Categories:

There are currently four groundfish and two non-sector gear categories operating in the EM programs. Each trip will have a primary gear used and possibly secondary gear used. EM gear codes will align with codes established by the Atlantic Coastal Cooperative Statistics Program. The ACCSP is the data warehouse for the Atlantic states and works to standardize data sets among federal and state fishery programs. Gear category definitions and ACCSP codes can be found in Table 1.

Some vessels use multiple gear categories on the same trip. The most common multi-gear scenario is a combination of a handline/auto-jig and either gillnet or longline gear. A common scenario we observe is that vessels may test the waters with the handline before setting out the gillnet or longline gear.

If a gear not found in Table 1 or a gear not approved in the VMP is used, there is no requirement to document the haul activity or discards. The reviewer is still required to watch the video to confirm when hauling of an approved gear is resumed. The only events required would be EMS events like video or sensor gaps and camera or system failures. Once a gear found in Table 1 is seen being hauled, the reviewer will resume annotation described in this manual. The target species does not need to be groundfish if one of the gears below is hauled/fished. If groundfish are caught using one of these gears, the captain is required to process those discards accordingly.

Table 1: Gear Category definitions and ACCSP Codes - Groundfish

Gear Type	Definition	ACCSP Category	ACCSP GEARCATCD
Otter Trawl, Bottom	A funnel shaped net that is towed along the ocean bottom, behind one boat. Large doors deployed to aid in keeping the net on the bottom	Trawls	091

Gillnet	One net or a series of nets tied together between a weighted leadline and floatline creating a vertical barrier of netting in the water column.	Gill Nets	200
Longline	Fishing gear that is or is designed to be set horizontally, either anchored, floating, or attached to a vessel, and that consists of a main or ground line with three or more gangions and hooks.	Long Lines	400
Handline/ AutoJig	Long section of line that is spooled on a reel. Generally will have a weight attached to a swivel towards the end of the line, with a shorter piece of line attached to a hook or a jig. The hook may be baited or fish shaped lures may be used.	Hand Lines	700

Haul Definitions by Gear Category:

Currently vessels participating in an EM program fish with a variety of gears. Depending on the gear being used by fishermen on a trip that is selected for review, there are slightly different definitions of what is considered a 'haul' for EM data collection. The haul definitions used by EM will mimic the ASM program's gear specific definitions.

Below is how to document the different haul time elements for each gear. For all approved gears, a date, timestamp, and GPS coordinates should be created for each of the given elements within the haul. The reviewer should do his/her best in determining when each element occurs.

There may be instances where a haul element or series of elements cannot be annotated. Reasons may include missing video or the imagery is too corrupt to verify activity during that period of time. If one or more haul elements cannot be collected, for whatever reason, leave it blank or null and add a comment to the haul stating what occurred and why. DO NOT create a false annotation just to have a date/time entered.


```
{
      "haul_id": 1,
      "gear_category": "091",
      "start_haul_datetime": "2019-08-
02T16:24:45.000Z",
      "start_haul_lat": 42.123456,
      "start_haul_lon": -67.123456,
      "end_haul_datetime": "2019-08-
02T16:24:45.000Z",
      "end_haul_lat": 42.123456,
      "end_haul_lon": -67.123456,
      "delayed_catch_process": "Y",
      "observed": "Y",
      "comments": "string"
    }
```


Figure 2: Example of a haul object in JSON format

While hauling gear or immediately proceeding a haul there is generally a period of catch processing. It is important to also review the catch processing period because the vessel may decide to discard fish originally marked as kept. For trawl vessels, this period occurs after haul back, when the net has been pulled from the water and the catch is dumped on deck. For gillnet/longline and handline/jig vessels, the catch processing can occur during gear retrieval but will likely continue after the haul has ended and the entire string is onboard. At this time fish are typically being gutted and stowed and discarding can occur as the quality of the fish is examined. No annotations are required

indicating when processing has ended, but it is expected the reviewer watches all catch processing for possible discarding events.

Bottom Trawl:

HAUL_BEGIN: First component of net deployed, i.e. net hits the water.

HAUL_END: Hauling equipment put into gear with the intention of hauling back.

- Note: If the hauling equipment (i.e. wenches) are not in view, the reviewer will use the wire from the wenches to the trawl doors as the indicator of Haul End. When using the wire, look for rope or colored markings, as those will be most visible when the wire is in motion. Captains typically put depth markings on the wire that are visible on video. If the wire is not visible, the reviewer can mark the Haul End as when the trawl doors are fully up alongside the vessel.
- If the trawl net is deployed but not fished (i.e. doors not set out, net partially on reel, codend cleated to the side of the vessel), this is *NOT* a haul. The captain is cleaning the net with no intention to deploy it fully. No annotations are required for this type of event.

Gillnet or Longline:

HAUL_BEGIN: Hauling equipment put into gear or retrieval of gear commences.

HAUL_END: When the last piece of the surface system (highflyer or buoy) is brought on board.

- Note: If the highflyer/buoy is left in the water floating beside the vessel, the haul will end when the line is cleated. The vessel will likely set the same gear immediately and therefore not bring the gear completely onboard.
- If a gillnet string or a longline's mainline is broken/severed at any point and the vessel immediately retrieves the other end of the string and continues the haul, this would be considered one (1) haul. The second half of the string will only have one surface system (highflyer/buoy) and is a good indicator of a broken string. If another string is hauled in between the broken string, a new haul is created and the broken string would be counted as two (2) hauls.

Handline or Auto-Jig:

HAUL_BEGIN: Do not record haul begin information for handline gears.

HAUL_END: When all rods are stowed and fishing has ceased. Vessel has started to steam home and the deck is being cleaned.

- During the haul, the vessel can pick up gear and steam around in search of fish. All jigging activity should be accounted for as one (1) haul.
- If the captain hauls another gear type, the jig haul would end and a new haul would begin with that new gear. A new haul is *NOT* created if gear is being set (i.e. longline or gillnet) and the jig(s) is still on deck with the intent of continuing being fished. If another rod/reel/jig is added to the current set being fished, this DOES NOT constitute another haul, but a continuation of the current haul.

Haul Level Elements:

Observed Y/N:

Definition: Were all discard events in the haul viewable such that they could be adequately annotated by a video reviewer. "Adequately annotated," is defined as identification to lowest taxonomic level possible and appropriate weight estimation (length measurement, tally, subsampling, visual estimate). If video cuts out, is missing, or obstructed and the catch cannot be tracked confidently to determine end disposition, then that haul would be unobserved.

Purpose: Indicates all discards were accounted for on the haul.

A haul is OBSERVED=Y when the reviewer can adequately annotate discards within that haul. A haul is OBSERVED=N when discards cannot be accounted for or tracked. Issues that may lead to discards not being trackable include, but are not limited to, video gaps, camera or system failure, bulk discarding, slipped or tripped bag, and system image impairment issues. The appropriate EM or Crew Specific event should be created. This indicates the reason(s) the haul was unobserved and corrections can be made and feedback provided to the vessel. For the types of Crew or EM Specific Events, see the Documenting Event Standards section.

The reviewer will review and annotate all video, hauls, and discards regardless of whether the haul will be OBS Y or N. The ability to track discards may be impacted but the video should still be reviewed. The reviewer should do his/her best at documenting discards when issues arise (improper catch handling, system image impairment issues, etc.).

Delayed Catch Processing Y/N:

Vessels may elect to process their groundfish discards immediately as each animal is encountered; or process discards at the end of the haul after sorting is completed; or process discards together after several hauls. This last example is referred to as Delayed Catch Processing (DCP). Vessels are required to process discards upon changing statistical area, gear, or mesh within the trip, and prior to landing at a dock with the purpose of off-loading. A reviewer is still required to annotate each haul accordingly, if discard processing occurs or not. If multiple hauls occur with no catch processing performed after each haul the reviewer will annotate all discards on the haul where they are processed. Reviewers will check DCP = Y for each haul when discards are retained but are not processed. If discards are processed or none are seen being stowed, the reviewer will check DCP=N.

DCP instructions will be included in VMPs for vessels that are electing to utilize this operational plan. If DCP is applied during a trip, the reviewer must confirm that groundfish discards were stored at the designated area on deck and retained within camera view.

The captain must elect to use DCP for the entire trip. If the vessel is seen not retaining discards within a designated area or are stored out of view or the vessel is not retaining all groundfish discards throughout hauls documented as DCP, the reviewer should annotate a CSE-IMPROPER DCP event.

The processing of discards refers to the placing of fish on the measuring board appropriately as described in their VMP. Fish may still be discarded during the haul (Fish NK, drop-offs, etc.). Annotations of these discards do not impact the Y or N of this field.

This field will be used to indicate which haul discards were caught and if they were processed on that haul. When discards are post-processed by the Center for quota management, they will be parsed out to each haul where DCP=Y is annotated, similar to the cumulative sum estimation method at-sea observers use. A haul with DCP=N, will signify that discards were processed or that no discards were seen for that particular haul.

Catch Handling Protocols:

Fish caught in the Multispecies Groundfish fishery can fall into three categories: allocated species, regulated species and species that do not have sector allocations and are non-groundfish. See Table 2 for a list of the groundfish species and which categories these species belong to. The EM program will focus on the groundfish species listed. Reviewers should have access to the current VMP while reviewing trips and large deviations from the approved catch handling behavior should be noted in the review data.

As specified in the VMP, vessels participating in the catch accounting EM program will have a designated area for processing and measuring allocated groundfish species discards and non-allocated groundfish species on deck (See Appendix B for vessel reference). Vessel participants are allowed to land one (1) Atlantic Halibut per trip. Any upgrading (discarding a smaller, previously caught Halibut in favor of a larger one caught on a subsequent haul) will be clearly visible to the reviewer and occur within camera view. A catch entry of the discarded Halibut should be made at the time of discarding with a comment stating 'UPGRADED'. If the haul of when the fish was caught is known, include it in the comments as well. Catch handling procedures will be documented in the VMP of each vessel and will vary slightly depending on the gear used by the vessel, the catch composition and the processing workflow (e.g., if the vessel has a conveyor).

Animals that are placed with kept catch or taken out of camera view for extended periods of time during hauling, sorting, or measuring phases of fishing effort should be considered as retained catch.

Fishermen are instructed to place individual catch items along the measuring strip and smooth out the fish if it is curled or aligned with the grid if off center. Once the fish is placed accurately the fisherman will momentarily ensure an unobstructed view of the fish by removing his or her hands from the vicinity of the catch item and measuring grid. The reviewer should use his/her best judgment if a length can be obtained or not when a fish is not perfectly placed on the strip or hands are partially on the fish. Finding the exact frame where a fish is unobstructed may require rewinding or forwarding the video. If a length cannot be obtained an entry should be made with LENGTH = NULL, ESTMETHCD=VISUAL and enter in the visually estimated weight.


```
"discard_events":
    [{"haul_id": 1,
      "species_common_itis": "COD, ATLANTIC",
      "species_code_itis": 164712,
      "weight": 1.5,
      "catch_weight_uom": "LB",
      "length": null,
      "catch_length_uom": "CM",
      "count": 1,
      "weight_determined_by": "VISUAL",
      "discard_datetime": "2019-08-
02T16:24:45.000Z",
      "discard_lat": 42.123456,
      "discard_lon": -67.123456,
      "disposition": "031",
      "reviewer_id": "X99",
      "comments": "string"}]
```


Figure 3: Example of discard annotations in JSON format.

Species Identification Standards:

While sorting catch on a catch estimation trip, any of the 13 federally regulated groundfish species that the captain does not intend to land for market must be retained on board for catch accounting and length measurement processing before returning discards to the water. Vessels are allowed to discard non-regulated catch without passing them across the measuring strip, however all discarding must occur at designated control points as illustrated in the vessel's VMP.

The reviewer should make every effort to identify a catch item to species level (Table 2). For instances when a catch item cannot be identified to species or family, heed the following guidance:

When an identification cannot be determined and the reviewer is confident the item is a fish species (groundfish or non-groundfish), the reviewer will make an annotation of FISH NK, ESTMETHCD= UNKNOWN. FISH, NK should be designated to target level species, or any marketable species that is federally managed under a fishery management plan. Examples of a FISH NK include groundfish that cannot be identified to the species, fish that could be a target species (i.e. a flounder of similar size to an ACE species but not a large animal) or fish that cannot be identified at all (i.e. a blur being tossed over, water drop over fish). Entries of identifiable non-groundfish should NOT be included in any FISH NK catch entry, unless otherwise stated in this document. Entries of FISH NK should be limited to any unidentifiable fish discards.

If the reviewer sees a catch item but cannot determine if it is a fish, shark, or protected species, a catch entry should be made using VERTEBRATE UNCLASSIFIED and ESTMETHCD=UNKNOWN. When applicable Event entrie(s) should be made for fish that could not be identified. Examples of a VERTEBRATE UNCLASSIFIED would be if a large object is seen in the net, but the image quality or the views are not adequate enough to give it a classification. Actions of the captain can also aid in this entry if he/she is seen leaning over the rail and shaking the net and a splash is seen. Entries of VERTEBRATE UNCLASSIFIED should be used for anything unidentifiable that is entangled in the gear, falls from the gear, or is brought on deck.

The reviewer should be able to eliminate and exclude species based on what is visible. The reviewer should take the time to make sure the fish cannot be identified and that any non-groundfish species have been ruled out.

There are a handful of hake species encountered by fishermen participating in the Multispecies Groundfish Fishery. Many of these hakes are difficult to distinguish morphologically in person and from video footage. Because White Hake is a regulated groundfish species that are difficult to differentiate from other dorsally-filamented hake (red and spotted hakes), clearly documenting all of the individuals from these hake species is important for generating accurate estimates of the catch of White Hake. During the haul, the reviewer should tally ALL dorsal-filamented hake (i.e. white, red, and spotted hakes), regardless if a review can identify the individual to species using additional morphological characters (e.g., dashed lateral line of the spotted hake is visible). At the end of the haul, one (1) annotation of HAKE, RED/WHITE, MIX will be made with the UNIT_COUNT filled out with the total number of dorsal-filament hake species for the haul, this entry does not include hake that are measured. Individuals that can be positively identified as Silver Hake or Offshore Hake should NOT be included as part of this tally because they are non-groundfish species (i.e., species that can be discarded without catch entries). See the tally count

subsampling section below for more details.

The only time White Hake should be noted is when they are discarded as 031 - POOR QUALITY. In these cases, individuals are typically larger and easy to identify as White Hake, but are often damaged. An entry will be made for White Hake, with a visual estimated weight and categorized as 031 - POOR QUALITY. See the Documentation of Fish Disposition section for more details.

In addition to correctly identifying the species, a video analyst should be able to exclude similar species. A quick reference guide to species characteristics for regulated groundfish can be found in Appendix C.

Species Verification Program:

Starting in Fishing Year 2021, species verification will adopt a more organized format. Reviewers will be required to take quarterly identification assessments, via the internet, that cover the 13 federally managed groundfish species that EM accounts for (Table 2). These assessments will be used to verify that EM reviewers can consistently identify groundfish to species. The details of this process are still in development. This section will be updated when it is finalized.

Table 2: Federally managed groundfish species of the northeast multispecies complex.

Groundfish Species of the Northeast		
Common name	*'Allocated'*	*'Regulated'*
Atlantic cod	Yes	Yes
Haddock	Yes	Yes
Pollock	Yes	Yes
White hake	Yes	Yes
Atlantic halibut†	Yes	Yes
Winter flounder	Yes	Yes
American plaice flounder	Yes	Yes
Yellowtail flounder	Yes	Yes
Redfish	Yes	Yes
Witch Flounder	Yes	Yes
Ocean pout*	No	Yes
Windowpane flounder*	No	Yes
Atlantic wolffish*	No	Yes

* Regulations prohibit retention, † Regulations allow the retention of a single individual, upgrading possible

Protocols for Obtaining Lengths:

To turn image data into weight estimates fishermen place specimens on measuring boards (to produce lateral images of each fish directly on the board). Measuring boards are installed on deck and the view from at least one camera is focused on this 'measuring station'. Estimates of a catch item's length should be recorded in whole centimeters, with reviewers rounding to the nearest whole centimeter (i.e., round down when the estimate is less than 0.5 centimeters and up when the estimate is equal to or greater than 0.5 centimeters). Measuring standards follow current observer program's measuring protocols.

Reviewers will estimate a length in whole centimeters for *each* regulated groundfish species that is processed on the measuring strip and discarded on an EM multi-species trip. If a regulated groundfish species is placed on the measuring strip, but is seen being retained, no entry is required. In cases where the reviewer is uncertain if an individual fish is kept or discarded, the reviewer will make an annotation to species with the DISPOSITION= 900 UNKNOWN KEPT OR DISCARDED. Atlantic wolffish are exempted from length measurements and can be discarded without being placed on the strip. Make an annotation of WOLFFISH, ATLANTIC, LENGTH = NULL, DISPOSITION=099, ESTMETHCD=VISUAL and enter in the visual weight. A length measurement can be collected for Atlantic wolffish that are placed on the measuring board.

Generally, species length estimates represent a total length, however, for species with forked caudal tails, a fork length estimate should be recorded instead. Appropriate length estimates for each regulated species are illustrated in Table 3. The parameters used in length to weight conversion for each species can be found in Wigley et. al (2003). Some species exhibit seasonal variation in the parameters that best describe this length to weight relationship (related to spawning and other seasonal changes in body condition), and for these species subtly different parameters should be applied depending on the season they are caught (see Appendix F). While annotating catch data, reviewers should inspect each animal to ensure that it is whole and intact. Lengths should not be collected from groundfish that are missing body parts, reveal signs of significant predation, gear damage, or decomposition.

Table 3: Length types for groundfish species

SPECIES	LENGTH TYPE	SPECIES	LENGTH TYPE
COD, ATLANTIC	*FL*	*HADDOCK*	*FL*
FLOUNDER, AM. PLAICE	TL	HAKE, WHITE	TL
FLOUNDER, WINDOWPANE	TL	HALIBUT, ATLANTIC	TL
FLOUNDER, WINTER	TL	OCEAN POUT	TL
FLOUNDER, WITCH	TL	*POLLOCK*	*FL*
FLOUNDER, YELLOWTAIL	TL	*REDFISH, ACADIAN*	*FL*
WOLFFISH, ATLANTIC *	TL		

FL= FORK LENGTH; TL= TOTAL LENGTH * Atl. Wolffish *doesn't* require a length

If a measurement cannot be obtained for a catch item, the reviewer will include a comment that describes the reason. These data are only useful if the text used by reviewers is consistent. Below are common examples that result in degrees of difficulty for measuring a fish. If multiple issues exist, please separate them with commas:

- Not placed on measuring strip/grid
- Missing frame
- Poor image quality
- Fish extending out of camera view
- Crew interference
- Inanimate object obstructing view
- Catch item curled
- Damaged or poor quality

Determining Species Weights and Sub-Sampling Methods:

Discarded species weights will be determined either by length-weight conversion (LENGTH), tally count sub-sampling (TALLY), or visual estimates (VISUAL). There is work being done on four vessels to verify a volumetric sampling method. One vessel has been given an electronic scale (ACTUALELEC) to aid in obtaining actual weights to a basket volume. The specific annotation requirements for the volumetric sampling plan are outlined below, but should only be used on vessels participating in this data collection.

If a vessel is seen using another estimation method besides what is described in this document, a note should be made. If a weight cannot be collected by using one of these methods, the reviewer will report a count and use the UNKNOWN code and specify characteristics that led to this conclusion.

Length:

Fish that have a length measurement collected, the weight will be auto-generated based on Wigley et. al (2003).

Visual Estimate:

Fish that are not placed on the measuring strip, drop-offs, and any damaged fish will get a visually estimated weight. The weight recorded should represent what is seen, not what the fish would be whole or intact. If fish are not placed properly on the measuring strip, but an estimated length can be seen, use that estimated length to inform the visual estimate.

Tally:

When there is an overabundance of a regulated groundfish species that will not be kept from a given haul, the captain can elect to use one of the sub-sampling methods outlined below Reviewers need to understand these protocols so they can interpret what captains are doing and tailor their data to match the captain's preferred methods. Reviewers should follow the captain's lead and estimate lengths following the protocol selected by the captain. Each gear type is unique and there are gear specific sub-sampling methods (See pages 15-16).

A reviewer should not assume sub-sampling will occur based on what has previously occurred on the vessel. If there is an initial review and a flag can be added to the hauls that indicate sub-sampling will occur, the primary reviewer can mark fish discarded outside the measuring period as ESTMETHCD=TALLY. Fish discarded down the conveyor or fish that are unhooked at the rail can be marked this way. If an initial review is not completed, fish discarded outside the measuring period should be marked as ESTMETHCD=VISUAL and a visual weight entered.

ESTMETHCD=TALLY should be applied only when 20 or more length measurements are obtained per species per processing unit (i.e. haul, DCP unit, sub-trip). Regardless of the cause, such as glare or camera blocking for example, if there are less than 20 length measurements collected by the reviewer, the portion of lengths that could not be determined from the sub-sample will be added to the tallied fish and the reviewer will submit a visual estimate for the combined total. However, if 20 or more lengths are obtained and the captain continues measuring and lengths could not be determined, that portion should be added to the total tally count for the

sub-sampled species with an ESTMETHCD=TALLY.

> Example 1: The captain measures and lengths are obtained from 26 fish and then 78 fish are passed under the camera to be tallied. The tallied fish should be entered as UNIT_COUNT=78, ESTMETHCD=TALLY, wt left null. The total estimated weight will be calculated from the average individual weight of the 26 fish lengths multiplied by the total count of 104 fish.
>
> Example 2: The captain measures 20 fish and lengths are obtained from 18 fish because the reviewer could not confirm the length of **2** fish. After processing lengths, the captain passes **57** fish under the camera to be tallied. The total tally count should be entered as UNIT_COUNT=**59**, ESTMETHCD=VISUAL. The reviewer devises a visual estimate of 0.4 lbs per fish (59*0.4 lbs = 23.6 lbs) and enters a total weight of 24 lbs. The reviewer will use the appropriate event descriptor for the 2 fish that were measured but a length was undetermined.

If the reviewer feels not all individuals can be seen or made visible to the camera (ex: not moving skates or other fish around on conveyor), a Crew Event- Improper Catch Handling should be logged at the end of the haul along with a catch entry. If there is NO attempt to retain any individuals of the sub-sampled species for measurement a Crew Specific Event- Improper Catch Handling should be created.

Below are the gear-specific and species-specific sub-sampling protocols:

Trawl and Gillnet:

The captain/crew will collect all of the individuals of the species to be sub-sampled and keep them in camera view. From that species, the captain will randomly select at least 20 individuals and place these individuals on the measuring board following the standard measurement protocol. The remaining individuals will be passed under the camera at the measuring station in a manner that allows the reviewer to obtain an accurate count. At the end of the tally period, a catch entry should be made with the UNIT_COUNT filled out with the number tallied and ESTMETHCD=TALLY.

Longline:

During the haul, the captain/crew are allowed to ‘ping-off’ or unhook the species to be sub-sampled at the rail (sub-sampled fish are not retained and processed as required onboard gillnet and trawl vessels). The captain is choosing not to bring these fish onboard. Fish the captain attempts to gaff are not part of the sub-sample and should have an individual catch entry with a visually estimated weight. During the haul the captain will randomly select at least 20 individuals and place these individuals on the measuring board following the standard measurement protocol. Sub-sampled groundfish that are unhooked at the rail can be entered as a single catch entry at the end of the haul with the quantity discarded, LENGTH = null, DISPOSITION = 099 - DISCARDED, OTHER, and ESTMETHCD=VISUAL or TALLY.

The sub-sampled species are NOT considered to have a DISPOSITION = 043, as the captain is making the decision not to measure them because of their abundance. In regard to high volume sub-sampling, species that are not brought onboard (DISPOSITION =

043), the reviewer will visually estimate the weight as they are not considered to be part of the sub-sample group.

In addition, if the reviewer is not able to obtain a length for 20 individuals of the sub-sampled species placed on the measuring board, the portion of the sub-sampled individuals without lengths will be recorded as ESTMETHCD=VISUAL.

Hake:

During the haul, the captain/crew will randomly collect 20 individuals from the combined spotted/red/white hake species group (filament hakes) and retain them for measurement. The reviewer will create a catch entry and record the lengths under the species code of HAKE, RED/WHITE, MIX. The captain and crew are allowed to discard filament hake as long as all hake can be seen by the camera(s). The reviewer will collect a count of all filament hake discarded (not including silver or offshore hake) and will create one catch entry of HAKE, RED/WHITE, MIX with the UNIT_COUNT filled out with the numbered tallied and ESTMETHCD=TALLY or VISUAL.

Electronic Scale:

When a digital Marel scale is utilized, reviewers will annotate discards as follows. The captain is required to calibrate the scale once a day, before sampling occurs. Record annotations with ESTMETHCD=ACTUALELEC, DISPOSITION=099, UNIT_COUNT=NULL, enter the weight on the scale as the HAILWT. A count of the fish in the basket is ***not*** required. Confirm the species in the basket if a basket is discarded.

If another species is discarded amongst the sub-sampled species, still record the basket weight as ESTMETHCD=ACTUALELECT, but subtract the visual weight of the 'other' fish from the scale weight and enter the difference as the HAILWT. An annotation for the 'other' fish should be made with ESTMETHCD=VISUAL and comment **'in *x* basket of *y* fish.'**

If glare (sun glare, deck light glare), basket hangover, or dirty cameras prevent the scale's screen from being seen and the weight from being recorded directly from the scale, the appropriate event(s) should be made. If the captain uses a white board to display the scale's weight, record the weight seen on the board with an ESTMETHCD= ACTUALELECT, DISPOSITION=099, UNIT_COUNT=NULL and add a comment '**wt came from board**'. When a white board is used there should be an event to explain why the scale could not be read or seen.

- CSE - Improper Catch Handling for any instance when reviewers are unable to read the digital screen due to basket hangover
- CSE - Cameras Not Maintained for dirty cameras preventing data collection
- EMS - (Night Time) System Image Impairment for when deck-lights cause glare or when the scale cannot be read in general.
- FOE - Weather Induced Poor Visibility for when there is sun glare.

If the reviewer has not observed a scale calibration, the weight can still be entered as ESTMETHCD=ACTUALELECT, but add the comment **'no calibration'** to the discard annotation. This comment should be within the entry.

If the reviewer has not observed the taring of a basket, the reviewer will subtract 3.5 lbs from the weight seen on the scale and enter that weight as the HAILWT and comment **'no tare'**. This comment should be within the entry.

NOTE: The vessel with a scale may have a sea-sampler onboard specifically to record the volumetric data to support the development of the method. This is NOT a NEFOP or ASM. When the sea-sampler is present, the reviewer **SHOULD NOT** record any discard data from the sampler. The sampler is processing the data according to different protocols and is submitting that data separately from the normal data collection. The reviewer shall annotate discards as the captain processes them and disregard the sampler. The reviewer should be able to keep track of the fish even with the sampler on board (similar to if an observer was onboard). The volumetric resampling data collection protocols will only occur when a sea-sampler is onboard. The captain may still elect to process his catch following the Volumetric protocols and use the scale. If the reviewer sees the captain use baskets with delineated twine markings (white basket, blue twine), these are used as part of the Volumetric Sampling plan and should collect the following data.

Please enter comments exactly as they are written here. This will allow for easy querying. Record each basket as a single annotation with ESTMETHCD=ACTUALELEC, DISPOSITION=099, UNIT_COUNT=NULL, enter the weight on the scale as the HAILWT, and enter in the basket fullness into the comments in this format **{V: *basket fill*}**. Record basket fill as a decimal (i.e. 0.25, 0.5, 0.75, 1). A count of the fish in the basket is *not* required. Confirm the species in the basket. Record <0.25 baskets or any remaining fish that are placed on the scale in the same manner as described above, but include a comment of **{V:0}.** To assist with data queries, any comment provided by the reviewer should be outside the brackets indicating volume level (ex: '**{V:0.5}**; no calibration).

Volumetric:

This sampling plan follows the trawl tally sampling method, but with specific comment requirements. **Please enter comments exactly as they are written here.** This will allow for easy querying. Vessels will still need to measure at least 20 fish per species per haul as part of the sub-sampling protocols. The measured fish will be annotated as normal. The baskets will be annotated separately and as a TALLY. The comment should include the volume (0.25, 0.5, 0.75, 1) and *total* count of that basket. Enter the comment in this format: **{V:0.5; CT:35}**. Enter the comment in the TALLY entry. Remember to enter the UNIT_COUNT for the tally as the number counted AFTER fish are measured (if measuring occurs from said basket). The comment count should be total count from that basket (including any fish measured)

If the vessel measures <20 fish ***or*** all the fish in a basket shown for volumetric sampling, the reviewer shall add a comment to the last fish measured including the volume and count of that basket.

If fish from a <0.25 basket are processed, record discards how they are processed, either as a separate tally with a comment of **{V:0}** or length measurements.

If another species is seen being discarded amongst the sub-sampled species, annotate the tallied fish with the number of the other fish subtracted and the other fish will have a separate visually estimated entry.

Protocol for Grouping Discards into a Single Catch Entry:

Typically, reviewers will annotate discards as individual catch entries to account for the exact time the animal was identified and discarded during fishing operations. In addition to sub-sampling, there are five circumstances when a reviewer can group multiple discards of one species classification into a single catch entry (UNIT_COUNT >1). The following scenarios are common examples of when a reviewer will quantify multiple discards as a single species catch entry:

1. Any time a container of fish is discarded in one action, a single catch entry that represents identified species will be submitted with a total count entered in the UNIT_COUNT field. Discarded catch dumped from the container that cannot be classified to a regulated species will be counted and recorded as FISH, NK. Groundfish species that are identified should have a total count and a visually estimated weight assigned to each species catch entry.

2. During confirmed sub-sampling on longline trips, the species selected for sub-sampling that are discarded outside the measuring period (i.e. unhooked at the rail) can be entered as a single catch entry at the end of the haul.

3. Hake that are discarded without measuring during catch sorting (i.e. discarded down the conveyor or tossed out of the checker-pen) can be entered as a single catch entry. There may be CSE- Improper Catch Handling applied if VMP protocols are not followed (ex: if <20 hake are discarded on a haul, if no attempt to retain and measure hake is made on a haul, or if >20 hake are discarded but <20 were measured).

4. UNKNOWN KEPT OR DISCARDED: Fish that land on deck or fall off sorting tables/conveyors and are not recovered or picked up by crew cannot be confidently tracked. If multiples of the same species are observed landing on deck and cannot be tracked a reviewer can assign disposition code 900 to catch entries with a quantity > 1.

5. For trawl gear if multiple fish are washed overboard immediately following the end of the haul a single entry can be made. If multiple species are observed, a separate entry for each should be created with a tally count and estimated weight when applicable at the approximate end of the event.

Documentation of Fish Disposition:

This section gives guidance on how to assign a catch item a specific disposition or fate. These fish disposition codes mimic what NEFOP observers use to describe why fish are discarded. The disposition code will be entered in for each catch item under the DISPOSITION field of the EM Detail. A unique disposition code must be applied to each catch entry. The reviewer should make his/her best judgement as to which disposition code is best suited for the situation. The reviewer should never assume the disposition of a fish. For example, if a large groundfish is placed on the strip it should not automatically be coded as damaged or a LUMF. Check for signs of damage or indications by the captain that the fish is of less quality. The disposition codes can be found in Table 4.

Any catch item that does not show visible damage and is not kept by the vessel and is discarded will have a DISPOSITION recorded as 099- DISCARDED, OTHER. A length, a visual weight or tally count should be applied to the catch item. This disposition code will be the most commonly used code.

Fish sometimes come aboard in less than preferred market conditions or have been damaged in some way (predation, sand flea, gear, etc.). This categorization includes any legal sized groundfish that the vessel owner/captain elects not to retain because of poor quality as a result of damage (i.e. LUMF) *and* any damaged sub-legal fish. These 'poor quality' fish should be processed by captains in the same manner as regulated groundfish that cannot be kept due to size restrictions. If a poor quality catch item is identified, a visual weight will be obtained by the reviewer. The visually estimated weight should be representative of what the reviewer sees of the fish, not what the fish would weigh if it were whole. The DISPOSITION will be recorded as 031- POOR QUALITY for that catch entry. No length measurements should be recorded for any poor quality or damaged fish. Furthermore, damaged sub-legal groundfish should be separated from a tally count sub-sample; a visual estimate will always be assigned to poor quality groundfish regardless of size.

A common observation of EM reviewers are fish that interact with the gear but do not land on the deck of a vessel or are not handled by the captain/crew. These individuals are seen interacting with the fishing gear in a way that could affect their survival and thus warrant documentation by a reviewer. These fish should be given a DISPOSITION of 043- NOT BROUGHT ONBOARD, FELL OUT/OFF OF GEAR. Not Brought Onboard is defined as any fish that is entangled or caught in the gear with the intent of being landed or retained, but does not come in contact with the vessel and is assumed to be unaccounted for by the captain and therefore not included in the eVTR (i.e., drop offs). In most occurrences the catch entry will have a quantity equal to one, unless the discard event includes more than one fish that the reviewer can confidently group multiples of the same species into single catch entries. A visually estimated weight will always accompany fish that are identified as regulated groundfish. Fish with DISPOSITION = 043 do not require a CSE- Improper Catch Handling.

The disposition code (043) does NOT include fish that are momentarily handled at the rail and are dropped or escape/slip from hand; fish that make contact with the deck and are then washed overboard or out a scupper; fish that are unhooked at the rail by the captain; or fish that the captain attempts to gaff. Catch items such as these should have individual catch entries with DISPOSITION = 099- DISCARDED, OTHER. These fish have been seen by the captain and therefore be included in the eVTR.

For catch items that the reviewer cannot determine the end status (kept or discarded) the DISPOSITION should be recorded as 900- UNKNOWN KEPT OR DISCARDED. Examples of this would be, but not limited to, fish that are left on deck and not physically discarded by the crew and not deemed as kept; fish seen on deck and then washed out of camera view; fish physically taken out of camera view and never seen by the reviewer being kept or discarded. A piece count and visual weight should be applied to the catch item(s). Identification to the lowest taxonomic classification is also required. If a catch item comes back into view and is observed discarded (discarded by crew, washes out of scupper, etc) the disposition will be updated to 099- DISCARDED, OTHER.

When a reviewer observes an Incidental Take (i.e. mammal, sea turtle, or sea bird) interact with any portion of the gear, regardless of its fate or condition (dead or alive, whole or in pieces) a catch entry should be made with the DISPOSITION of 052- INCIDENTAL TAKE (MAMMAL, SEA TURTLE, SEA BIRD).

Table 4: List of Fish Disposition Codes and Description

Code	Description
031	POOR QUALITY, REASON NOT SPECIFIED
043	NOT BROUGHT ON BOARD, FELL OUT/OFF OF GEAR
099	DISCARDED, OTHER
900	UNKNOWN KEPT OR DISCARDED
052	INCIDENTAL TAKE (MAMMAL, SEA TURTLE, SEA BIRD)

Event Documentation Standards:

Occasionally, certain events will diminish the ability to obtain information and decrease the value of collected data. There are specific event types that respond to haul level observations and other events that apply to trip level concerns. Currently, there are three event types that require documentation. An event can either be a point or duration. A point event is annotated at the "first sight" of the event. A duration event begins at the "first sight" of the event and ends once the event has been resolved or when the haul has ended, depending on event type. Overlap may occur for certain duration events that are documented at the haul level. Location information (collected in the timestamp) and detailed comments will be included with the event entry.

- Fishing Operations (Table 5)
- Crew Specific (Table 6)
- EM System Specific (Table 7)


```
"other_events": [
    {
      "event_category": "FISHING
OPERATIONS",
      "event_code": "BAG",
      "event_duration": "PT4H10M20S",
      "haul_id": 1,
      "event_datetime": "2019-08-
02T16:24:45.000Z",
      "event_lat": 42.123456,
      "event_lon": -67.123456,
      "reviewer_id": "X99",
      "comments": "string"
    }
    ]
```


Figure 4: Example of an Event annotation in JSON format.

Events are processed to document a variety of specific issues or concerns and will be used to further determine if data quality was jeopardized within a haul or at any time of the trip. It is important to distinguish event types and provide notation because events can assist in rapidly responding to system malfunctions or improve catch handling techniques. See Tables 5-7 for examples of specific event types. The frequency and duration of the stated examples can disrupt workflow and in extreme cases render haul or trip level data unusable.

Fishing Operations Events:

Fishing Operations events have the potential to increase review time, make discards hard to track, and they can be related to slipped or tripped bags of catch and weather related issues. Reviewers will annotate all FOE's as duration events and provide as much information as the reviewing software allows.

Table 5: Fishing Operations Event Descriptors

SLIPPED OR TRIPPED BAG	WEATHER INDUCED POOR VISIBILITY	OTHER OPERATIONS ISSUES

Slipped or Tripped Bag: In the trawl fishery, sometimes the contents of a tow are released in the water or the catch is not fully brought onboard. A **tripped bag** indicates that the captain/crew made an intentional effort to release catch from the codend by either cutting through a large section of meshes, by setting the net out again to release the contents after surveying the composition of the bag on deck or by forcing the codend open off the stern or sides of the vessel to avoid a high amount of bycatch. A tripped bag can result from heightened safety concerns,

mechanical issues, or because the catch is not the intended target species. **Slipped catch** (or bag) is the unintentional loss of catch. The volume or amount of catch that is lost cannot be quantified in most cases and/or occurred out of camera view. An entry at the first sight of an issue should be made and the comments should include any observations regarding potential causes, such as sustained gear damage, mechanical failure, or potential safety hazards. The reviewer will include a comment regarding the species composition of released catch that was not brought on deck and handled by the crew. Since a full account of the catch cannot be made (i.e. discards cannot be tracked confidently), the haul will be marked OBSERVED=N and no catch entries need to be made for fish seen in the water or falling from the gear.

Weather Induced Poor Visibility: During fishing operations, reviewers will note when weather events related to fog, high winds, sun glare, or precipitation reduce image quality and impact video review at the haul level. Typically, more than one camera is impacted. If the weather resolves during the trip and the cameras still have water on them a Crew Specific Event-Cameras Not Maintained would be annotated. This event does not include when the lens or dome cover is foggy or hazy due to damage. Video review that is impacted by a damaged camera or dome cover would fall under EMS-System Image Impairment.

Other Operation Issues: This descriptor is designated for operational events that do not align with event descriptions listed in the Fishing Operations Event category. Events that are inputted as 'Other' can be either a duration or point event. A reviewer should document any unusual event that disrupts operations and/or impacts review. Detailed comments should be provided to help explain the situation.

Crew Specific Events:

In order to have a functional EM program captains must follow their VMP. This includes being vigilant in keeping camera covers clean and clear of fish slime, water droplets, and/or encrusted salt spray and following the catch handling protocols. They are required to keep objects from obstructing camera views and must refrain from catch handling practices that disrupt the video analyst's ability to accurately collect data. Ensuring that these entries are made is critical as timely feedback is the only way to communicate to the captain's effectively (before a series of trips are recorded with undesirable conditions). Crew Events can be reported as either a duration event or as a singular-point event.

Table 6: Crew Specific Event Descriptors

CAMERA SYSTEM NOT MAINTAINED	CAMERA BLOCKING	IMPROPER CATCH HANDLING
BULK DISCARDING	IMPROPER DELAYED CATCH PROCESSING	OTHER CREW ISSUES

Camera System Not Maintained: Cameras must be inspected by vessel personnel throughout a trip. If any camera has water spots, fish slime, or anything on the lens and the reviewers ability to ID discards, collect lengths, or track activity on deck is directly impacted, an entry should be made. This duration event entry is documented at the haul level when review is first impacted by the appearance of the liquid or debris on the dome cover and continues until the affected camera

view is no longer being used or is cleaned during the haul. This event may lead to a haul being reported as OBS=N if discards cannot be adequately tracked due to water spots, slime, debris, etc.

> Note: If camera(s) are impacted by weather, a CSE-CAMERA SYSTEM NOT MAINTAINED is not necessary. The FOE-WEATHER INDUCED POOR VISIBILITY should be annotated instead.

Camera Blocking: Once mobile gear is deployed or when a fixed gear vessel begins to retrieve gear, cameras must be maintained and routinely checked to ensure views are clear and unobstructed for the remainder of the trip. Partial or complete obstruction of a camera view(s) will be documented as a duration event anytime a camera is blocked and fishing activity has begun. The end points of the event will signify the beginning: *when the view was initially blocked* and, conclusion: *when the camera view became fully unobstructed*. Camera views that are periodically blocked throughout fishing operations (when gear is in motion or when unsorted catch is present on deck) will be documented if the reviewer could not validate VMP catch handling requirements or confirm the fate of catch items that were caught by the vessel.

> Note: Instances in which an object, hand, etc. is blocking any part of the fish and impacts the ability to record a length, it is documented as Improper Catch Handling.

Improper Catch Handling: Catch items (allocated and non-allocated species) that are not handled properly or any catch processing that is out of the purview of the vessel's VMP should be documented. This applies to any fish not properly handled, regardless of species classification (i.e. FISH NK entry made because cannot ID fish due to handling should also have an event made). These events can be annotated as either a point or duration, depending on the frequency. If Improper Catch Handling is documented 5 or fewer times during a haul the reviewer will use point events. If it occurs more than 5 times the reviewer will begin a duration event until either the issue is resolved, the haul ends, or all discards are processed. *In the instance when a duration event is annotated the prior point events do not need to be deleted.* If the vessel makes an attempt to properly place the fish on the strip (i.e. lays it flat multiple times, pulls hands away but fish curls up), no event is needed. The vessel is making a good faith effort but the fish is alive and hard to lay flat. Fish that are curved due to stiffness or rigor and are not straightened, an event should be created. The weight of the catch entry should be a visual estimate or via a sub-sample.

> Examples of when to apply a CSE - Improper Catch Handling
>
> 1. If catch handling protocols are not followed when an observer is on board. Captain supposed to hand observer the laminated Information Sheet located on the vessel.
> 2. Discarding poor quality or damaged fish without proper placement on measuring strip
> 3. Allocated or regulated fish discarded down the conveyor without measuring, or picked out of checker-pen
> 4. Fish that are assigned as Fish NK because they are discarded either out of camera view or not at a designated control point described in their VMP
> 5. If a length cannot be collected due to part of the fish (nose and/or tail) being blocked by a hand or object.
> 6. The measuring strip is taken out of camera view during the measuring period
> 7. Fish not placed straight or flat on the strip due to stiffness or rigor.

8. If no attempt to retain a species for measurement is made (i.e. all are discarded during sorting), regardless of quantity.
9. If less than 20 fish of a species are measured and a tally by the vessel is performed
10. If the first 5 flounders of each species do not have both the blind and eyed sides presented to the camera.

Examples of when NOT to apply a CSE - Improper Catch Handling

1. For longline vessels when poor quality fish are unhooked or during sub-sampling and intact fish are unhooked.
2. Crew attempts to lay the fish flat and removes hands, but the tail keeps curling or the fish keeps moving and no length is obtained.
3. Fish annotated with DISPOSITION = 043 NOT BROUGHT ONBOARD

Bulk Discarding: Refers to any action where a container of fish is dumped overboard or when catch that is piled or layered on deck is swept or shoveled overboard during video review and the contents cannot be confirmed as a groundfish or non-groundfish species. The distinction between a pile and single layer should be made. Fish discarded in a single layer can be tracked and accurately counted, and would not constitute an event. When fish are in containers or in piles, the fish mixed in or at the bottom cannot be observed, counted, or properly accounted. If fish cannot be verified for whatever reason a bulk discarding event should be documented.

A catch entry associated with the event will provide an actual or estimated count of the unidentifiable discarded contents:

FISH, NK, UNIT_COUNT > 1
DISPOSITION= DISCARDED, OTHER (099)
ESTMETHCD = UNKNOWN

The count should include all items that cannot be identified as either groundfish or non-groundfish. Obvious non-groundfish species (skate, dogfish, monkfish, crustaceans) do not need to be included, unless their ID is inhibited in some way. However, if image quality impacts the clarity of the image and only general shapes and colors can be seen, all items should be counted. Comments for the catch entry will indicate the species composition of the discarded pile. Bulk discarding is a point event annotated at the first sight of the discarding. Detailed comments within the event should fully describe the situation.

Other events may impact a reviewer's ability to verify piles of catch resulting in a Bulk Discarding event. It is important to include all events so the entire picture can be captured. Examples of event descriptors that could prompt Bulk Discarding include Cameras Not Maintained, Camera Blocking, Glare, Weather, etc.

Examples of Bulk Discarding:

1. Contents of the codend are dumped in a pile on deck then swept overboard by gear or crew and the contents cannot be identified or verified as only non-groundfish.
2. Contents within a checker-pen that has been moved to one corner or remains scattered in small piles on deck are then shoveled overboard and the contents cannot be identified or verified as exclusively non-groundfish.
3. Tote/container of unknown fish is dumped over.

Examples of NOT Bulk Discarding:

1. Throughout the haul, verified non-groundfish are pushed to a corner or side of a checkerpen by a crewmember and then discarded in one action.
2. Fish discarded in a single layer that can be tracked and counted.
3. A mound or pile of catch that is separated into a single layer before discarding.
4. Tote/container of confirmed non-groundfish is discarded.
5. Tote/container of confirmed guts and no whole fish is discarded.

Improper Delayed Catch Processing: This event should be annotated when a reviewer sees a vessel not properly carrying out the Delayed Catch Processing protocols listed in their VMP. This includes instances when a vessel has enacted DCP but they are not retaining all groundfish discards throughout hauls documented as DCP and when the vessel is not retaining discards within the designated area/or discards are stored out of camera view during DCP period.

Other Crew Issues: This descriptor should only be used if the event does not fit one of the above scenarios. Detailed comments should be provided to help explain the situation. This event can be either point or duration, the determination is to be made by the reviewer.

EM System Specific Events:

EM System Specific events reflect failures in the EM camera system and can result in loss of video and data. These events can be documented at any point in a trip, regardless of fishing activity or potential impacts to review. EM System Events include when there are video or sensor gaps, camera(s) or system failure, when the EM system is not activated prior to departure or if it is shut off prior to landing, out of synced camera. The event is created at the first sight of an issue, with the appropriate descriptor attached and ends when the event concludes or is resolved. Include any comments that may help to explain the situation.

Table 7: EM Specific Event Descriptors

SENSOR GAPS	VIDEO GAPS	CAMERA FAILURE
SYSTEM FAILURE	CAMERAS OUT OF SYNC	CAMERAS OUT OF POSITION
SYSTEM NOT ACTIVATED AT DOCK	SYSTEM TURNED OFF PRIOR TO LANDING	MEASURING SURFACE VISIBILITY
SYSTEM IMAGE IMPAIRMENT	NIGHTTIME SYSTEM IMAGE IMPAIRMENT	OTHER SYSTEM ISSUES

Sensor Gaps: If at any point during a trip, the GPS or other sensors are not functioning, an event should be created. The event should encompass the entire time the sensors are not functioning. Comments should be made describing what type of sensor and the impact to the review, if any.

Video Gaps: If any video is missing at any point in a trip, regardless of duration or number of cameras affected, an event entry should be made. The event should encompass the entire time

there are gaps. Comments should be made describing any impact to the review. Hauls that could not be successfully reviewed will be recorded as OBSERVED = N. Gaps refer to when the video goes out but then comes back on at some point in the trip. If video remains out, document it as a Camera Failure.

Camera Failure: If video from one (1) or more camera(s) but not all stop recording and no image is seen and persists for the duration of the trip an entry will be made. This event signifies that the camera was lost for the duration of the trip. The comments should include which camera(s) failed and what was seen when the cameras went out. If the reviewer could not successfully observe the haul, the haul will be recorded as OBSERVED = N.

System Failure: If at any point during a trip, the complete EM system (all cameras and all sensors) fails and stops operating, an event should be made with comments stating the situation. The event should encompass the entire time the system is not functioning. Detailed comments should be included in the event entry.

Cameras Out of Sync: If at any point during a trip the cameras are no longer in sync with each other, an event should be created. Cameras are out of sync when images are more than 5 seconds apart. The event should encompass the whole time the cameras are not synced to each other.

Measuring Surface Visibility: When non-weather related issues impact the measuring surface visibility and data collection is impacted. This can be caused by poor lighting that causes glare or shadows on the strip. These events can be annotated as either a point or duration, depending on the frequency. If the measuring surface is impacted 5 or less times during a haul the reviewer will use point events. If it occurs more than 5 times the reviewer will begin a duration event until either the issue is resolved, the haul ends, or all discards are processed. In the instance when a duration event is annotated the prior point events do not need to be deleted.

Cameras Out of Position: If at any point during the trip, one or more cameras are knocked out of position (i.e. view is not identical to VMP or the reviewer observes the camera being hit and knocked out of place), an event should be created. The event should encompass the whole time the cameras are not positioned correctly. The event may span several hauls if no corrective action is taken. If vessel personnel or an outside technician corrects the camera position the event would end. Detailed comments on which cameras were affected should be added to the event entry.

> Note: Cameras mounted on booms must be positioned correctly once the vessel arrives on the fishing grounds.

System Not Activated at Dock: The EM system is required to be operational for the duration of the trip (departure from dock to landing at a dock). If the video for a trip starts while the vessel is already underway an event entry should be made when the system begins recording video. Event comments will include what the reviewer sees when the video began and if any fishing activity occurred. This is a single point event and should be made when the video is first seen.

> The EM Provider must determine the reasons for delayed activation of the system. Comments related to the causes will be included with the event in addition to other reporting sources such as work logs or portal entries.

System Turned Off Prior to Landing: The EM system is required to be operational for the duration of the trip (departure from dock to landing at a dock). If the system is turned off prior

to landing, an event entry should be made that includes comments on the approximate location of the vessel and if there was unsorted catch or crew present on deck at the time of the cameras being lost. This is a single point event and should be made when the video cuts out. If unprocessed kept catch from multiple hauls is present on deck or if catch processing is still occurring when the system is turned off the trip could result in a failure. Multiple hauls could potentially be recorded as OBSERVED = N. Under these circumstances the provider must provide access to the video prior to submitting the trip. Reviewers must comment on what was taking place when the system was turned off.

System Image Impairment: This refers to when the image has any issues that are caused by the EM system. This includes out of focus images, melting/running images, pixelated images, or a decrease in image quality due to poor lighting, not caused by nighttime activity. Damaged dome covers also fall under this event. See below for details on what impairs an image.

Out of Focus: Camera views or viewer screens should provide clear and unblemished images. Reviewers will assess camera views at the haul level and views that are blurry due to being out of focus and do not meet the manufacturer's quality standards must be documented, regardless of impact. Causes can include lens damage such as pitting or scratches, condensation in the lens or dome, as well as a general loss of clarity.

Example of Out of Focus

1. If after examining the VMP still images the camera does not match the supplied view and it is not due to water, salt, or slime.

Not an example of Out of Focus

1. If a camera is not maintained and water spots, dried salt spray, or fish slime are observed on the camera(s). This would result in a CSE - Camera System Not Maintained

Glare: Reviewers will document glare whenever video of fishing operations is impeded by the presence of sharp-bright light or sun glare. This should be included when the primary camera(s) used by the reviewer are affected by glare or if glare directly impacts species identification or catch handling.

Note: In the trawl fishery the primary camera changes throughout the haul. Examples include, but are not limited to: if glare is impacting the view of the net reels or stern during haulback and fish cannot be tracked; during catch sorting when discards cannot be tracked or identified.

Poor Lighting: Reviewers will document poor light conditions whenever video of fishing operations is affected by shadows or otherwise a lack of light that produces darker images of activity or fish.

Pixelization: The reviewer will document video that has lost clarity as a result of pixelated images, defined as: The appearance of individual pixels and/or pixel blocks causing the individual pixels making up the image to become more prominent, thus causing a grainy appearance in the image.

Melting/Running: When the image colors blend and run together. The image appears to be melting down the screen.

Night-Time System Image Impairment: This event is specific for night time hours when fishing activity is occurring and the reviewer cannot see what is going on. This includes all the examples listed above, but will also include instances in which deck lights are either nonexistent

or insufficient for tracking fish.

Other System Issues: This descriptor should only be used if the event does not fit one of the above scenarios. Detailed comments should be provided to help explain the situation. This event can be either point or duration, the determination is to be made by the reviewer.

Submitting Reviews without Data:

If for some reason there is either no data associated with an EM trip selected for review, or the selected trip is deemed incomplete due to a missing critical element: the trip should be submitted with a skeleton JSON file to the API. The reviewer shall document the trip as OBSERVED=N, REVIEWED_HAULS = 0, TOTAL_HAULS as either the number of hauls or 0 if this is unknown, and comments explaining why a full review was not performed. Do not assume TOTAL_HAULS based on past trips. For instances in which an event caused the lack of EM data or inability to review the correct event shall be annotated.

```
{
    "vessel_permit_number": 123456,
    "vessel_name": "Fake Vesselname",
    "evtr_num": 1234567,
    "date_sail": "2020-01-13",
    "observed": "N",
    "total_hauls": 9,
    "reviewed_hauls": 0,
    "comments": "Video was corrupted or
lost or some other explanation"
    }
```

Figure 5: An example of a trip with no data in EM JSON format.

Protected Species Interactions

Incidental Take Documentation:

If at any time during an EM trip a marine mammal, sea turtle, or sea bird, regardless of condition, directly contacts the vessel, or the vessel's fishing gear and any part of the animal is entangled, snagged, ensnared, caught, hooked, collided with, hit, injured or killed by the vessel or its gear, regardless of the final condition and release of the animal, it should be reported as an incidental take. The animal could be alive or dead, whole or a skeleton/pieces of bone. The 75% articulated skeleton NEFOP rule does not apply to EM INC take annotations. All interactions should be annotated. The INC take staff at the Center will make the final determination of the incidental take. The primary reviewer is not required to identify the animal to species; only to mark the interaction (presence/absence). At the first sight of the animal, a discard entry of WHALE, DOLPHIN, SEAL, TURTLE, or BIRD NK, DISPOSITION = 052 INCIDENTAL TAKE, UNIT_COUNT=1, ESTMETHCD= UNKNOWN should be made. Each animal observed should have an individual entry and timestamp. These cannot be grouped together, even if interaction is observed at the same time. This will create a timestamp that will allow Center staff to view the clip at a later date and collect more detailed information on the take for the Protected Species Branch at the Center.

Individual Animal Documentation:

EM vessels are not required to follow specific catch handling protocols for species which typically are recorded on individual animal logs (i.e. sharks, tuna, rays, sturgeon, etc.). This protocol is consistent with ASM procedure. If an individual animal is caught during any EM trip, reviewers will document the event and create a discard entry. A length and weight estimates and identification to species are not required for these interactions. These cannot be grouped together, even if interaction is observed at the same time. A catch entry of either SHARK, RAY, STURGEON, SWORDFISH, or TUNA, NK DISPOSITION = 099 DISCARD OTHER, ESTMETHCD=UNKNOWN should be made at the first sign of interaction. There may be cases in which an Individual Animal species does not have a corresponding code in the review software, if this occurs document the animal as FISH, NK and include detailed comments in the entry.

Appendix A: General Definitions:

Vessel Monitoring Plan (VMP):

EM service providers are tasked with completing Vessel Monitoring Plans uniquely designed for individual vessel's participating under any EM program, including Exempted Fisheries Permit in the Northeast Groundfish fishery. The VMP is an essential document that serves as an operations manual for a given vessel that the captain and crew must adhere to whenever they are assigned EM coverage. The VMP describes how fishing operations on the vessel will be conducted and how the EM system and associated equipment will be configured to successfully monitor fishing activity. The VMP will contain detailed information pertaining to the vessel layout, catch handling processes, vessel information and operations outline, EM equipment set-up, contact information, and EM system malfunction.

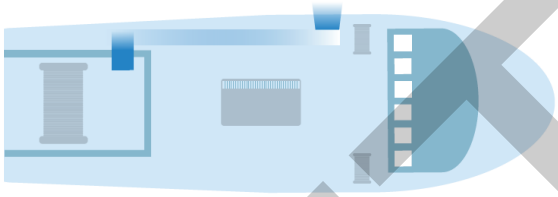
With guidance from federal agencies, the EM vendor will collaborate with individual vessel participants to ensure that the VMP is structured to minimize error and data loss. Prior to operating in the groundfish fishery with EM activated in lieu of an at-sea monitor, VMPs must go through an approval process by GARFO and TDQ.

Annual Catch Entitlement (ACE):

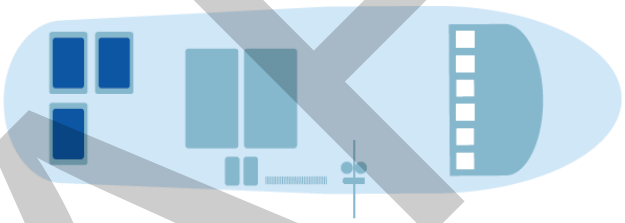
Annual Catch Entitlement with respect to the NE multispecies fishery, means the share of the annual catch limit (ACL) for each NE multispecies stock that is allocated to an individual sector operator or state permit bank based upon the cumulative fishing history attached to each permit participating in that sector or held by state-operated permit bank in a given year. This share may be adjusted due to penalties for exceeding the sector's ACE for a particular stock in earlier years, or due to other violations of the Fishery Management Plan (FMP), including the yearly sector operations plan. When a sector's or state operated permit bank's share of a NE multispecies stock, as determined by the fishing histories of the vessels participating in that sector or permits held by the state-operated permit bank, is multiplied by the available catch, the result is the amount of ACE (live weight pounds) that can be harvested (landings and discards) by participants in that sector or transferred by a state-operated permit bank during a particular permit year.

Appendix B: Generic schematics of vessel layout

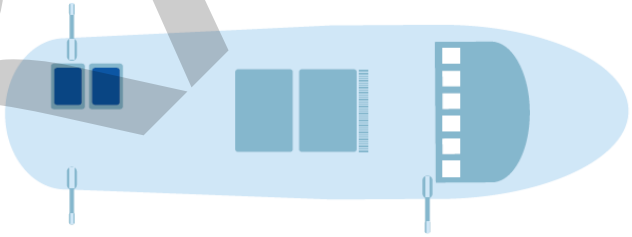
Trawl



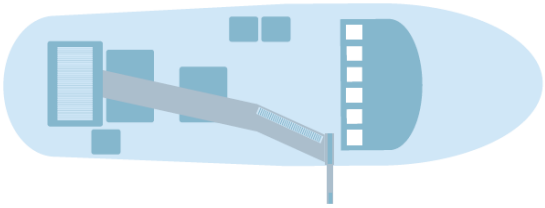
Longline



Handline/Jig



Gillnet



Appendix C: Primary Species Characteristics

Atlantic cod

- Speckled greenish-brown or reddish coloration
- Three dorsal fins
- White lateral line
- Prominent chin barbel

Pollock

- Solid blue gray dorsal color that fades to white along ventral surface
- White lateral line
- Three dorsal fins

Haddock

- Black lateral line
- Dusky black patch located above and behind pectoral fin
- Three dorsal fins

White hake

- Body rounded in front of vent
- Second dorsal and anal fin extend to tail stock
- Pelvic and dorsal fin rays present
- Pelvic fin rays do not reach vent

Acadian Redfish

- Body flame red
- Stout spines
- Bass or perch-like appearance

Windowpane flounder

- Left eyed
- Black and white spots on dorsal, anal, and caudal fins
- Ventral view body appears translucent
- Round overall body shape with pointed snout

American plaice flounder

- Right eyed, with large mouth
- Plain coloration
- Narrow caudal peduncle
- Rounded tail

Witch flounder

- Right eyed
- Upper side brown color often with black hue and dark margins along anal and dorsal fins
- Dark/black tipped pectoral fins
- Thin bodied

Winter flounder

- Thick bodied with light ventral side
- Small mouth
- Convex tail, thick caudal peduncle
- Right eyed

Yellowtail flounder

- Yellow mottled coloration on dorsal surface
- Protruding, upturned snout (dorsal side)
- Small mouth
- Convex tail

Atlantic halibut

- Right eyed
- Diamond shaped body
- Concave tail
- Underside white

Ocean pout

- Long slender body
- Broad, heavy head and large fleshy lips
- Long dorsal fin
- Rounded pectoral fin

Atlantic wolffish

- Bluish, gray color with broad dark bars covering length of body
- Large head with blunt snout
- Long dorsal and anal fins
- White underside

The following section illustrates identification characteristics of non-regulated finfish that are common bycatch in the Northeast groundfish fishery and also hold market value. Occasionally, a captain or crew member will present and process these fish on the measuring board. The video

reviewer should account for every catch item that is passed across the measuring strip within camera view.

Fourspot flounder

- Left eye
- Four distinct ocelli present on dorsal surface
- Large mouth
- Ventral view appears translucent

Red hake

- Dorsal surface brownish to bronze
- Pelvic and dorsal fin rays present
- Body rounded in front of vent
- Pelvic fin rays do reach or slightly pass vent

Silver/Offshore hake

- Lower jaw projects beyond upper
- Wide mouth (sharp teeth may be visible)
- Dark gray dorsal surface but most of the body is silver in color

Summer flounder

- Left eye
- Many ocelli present on dorsal surface
- Large mouth
- Robust tail

Appendix D: Minimum Sizes for Commercial Groundfish Species

Groundfish Minimum Fish Sizes

Species	Size (cm)
Witch flounder	33 (13 in)
Yellowtail flounder	30.5 (12 in)
American plaice flounder	30.5 (12 in)
Winter flounder	30.5 (12 in)
Redfish	17.8 (7 in)
Haddock	40.6 (16 in)
Pollock	48.3 (19 in)
Atlantic cod	48.3 (19 in)
Atlantic halibut	104 (41 in)
White hake	No minimum size

Appendix E: Electronic Monitoring EM Detail JSON Technical Requirements

Description:	**Trip review object**
report_id	integer; Used only when re-submitting an EM review.
vessel_permit_ number*	integer; The fishing vessel permit number.
	example: 222222
vessel_name*	string; The name of the fishing vessel
date_sail*	string; Date the trip left the dock in ISO1806 standard datetime format
	example: 2019-05-31
date_land*	string; Date trip returned to dock in ISO1806 standard datetime format
	example: 2020-06-01
evtr_num*	integer; Electronic Vessel Trip Report serial number (formerly trip_id)
	example: 12345619010102
total_hauls*	integer; The total number of hauls that occurred during the trip.
	example: 9
reviewed_hauls*	integer; The number of hauls reviewed.
	example: 9
observed*	string; Was the entire trip observable dock to dock?
	Array [Y, N]

comments	string; Notes pertaining to this trip or EM review.	
hauls	**description:**	**Haul object for each haul of this trip**
	haul_id*	integer; Ordinal number of the haul within the trip.
		minimum: 1
		example: 1
	haul_begin_ datetime	string($date-time); In ISO1806 standard datetime format
		example: 2019-08-02T16:24:45.000Z
	haul_begin_lat	number($double); Latitude in decimal degrees
		minimum: 0
		example: 42.123456
	haul_begin_lon	number($double); Longitude in decimal degrees
		maximum: 0
		example: -67.123456
	haul_end_ datetime	string($date-time); in ISO1806 standard datetime format
		example: 2019-08-02T16:24:45.000Z
	haul_end_lat	number($double); Latitude in decimal degrees
		minimum: 0
		example: 42.123456
	haul_end_lon	number($double); Longitude in decimal degrees

		maximum: 0
		example: -67.123456
	observed*	string; Was the haul fully observed?
		Array [Y, N]
	delayed_catch_ processing *	string; Was catch processing delayed on this haul?
		Array [Y, N]
	gear_category*	string; See Reference Table 1
	haul_id*	integer; Indicates the haul from which this discard resulted, if known.
	species_common_ itis*	string; See Reference Table 2
		example: COD, ATLANTIC
	species_code_itis*	integer; See Reference Table 2
		example: 164712
	weight	number; Weight of the discard.
		example: 1.5
	catch_weight_uom	string; Unit of measure used when estimating the weight of the discard.
	length	integer; Length of discard.
		example: 12
	catch_length_uom*	string; Unit of Measure used to measure discard.
	count	integer; Number of discards this record represents.

	weight_determined_by*	string; How was weight of discard estimated? See Reference Table 3
		example: LENGTH
	discard_datetime*	string($date-time); The date and time the discard occurred in ISO1806 standard format.
		example: 2019-08-02T16:24:45.000Z
	discard_lat*	number($double); Latitude in decimal degrees
		minimum: 0
		example: 42.123456
	discard_lon*	number($double); Longitude in decimal degrees
		maximum: 0
		example: -67.123456
	disposition*	string; See Reference Table 4.
	reviewer_id*	string; Official Observer ID assigned by TDQ to the reviewer.
		example: X99
	comments	string; Notes that are specific to understanding this discard record.
	event_category*	string
		Array [FISHING OPERATIONS, CREW, EM SPECIFIC]
	event_code*	string; See Reference Table 5.
	haul_id	integer; The haul within this event occurred, if known.
	event_datetime*	string($date-time); Timestamp in ISO1806 standard format.
		example: 2019-08-02T16:24:45.000Z

	event_lat*	number($double); Latitude in decimal degrees
		minimum: 0
		example: 42.123456
	event_lon*	number($double); Longitude in decimal degrees
		maximum: 0
		example: -67.123456
	reviewer_id*	string; Official Observer ID assigned by TDQ to the reviewer.
		example: X99
	comments	string; Notes that are specific to understanding this event.

Reference Table 1 – Gear Types - Groundfish

ACCSP_ GEARCATCD	ACCSP_CATEGORY_NAME	ACCSP_ TYPECD	ACCSP_TYPE_NAME
000	NOT CODED	000	NOT CODED
091	OTTER TRAWLS, BOTTOM	004	TRAWLS
200	GILL NETS	006	GILL NETS
400	LONG LINES	008	LONG LINES
700	HAND LINES	013	HAND LINES

Reference Table 2: Species List - Groundfish

NESPP4	COMMON_NAME	SCIENTIFIC_NAME	SPECIES_ITIS
0818	COD, ATLANTIC	GADUS MORHUA	164712
1200	FLOUNDER, WINTER	PLEURONECTES AMERICANUS	172905
1220	FLOUNDER, WITCH	GLYPTOCEPHALUS CYNOGLOSSUS	172873
1230	FLOUNDER, YELLOWTAIL	PLEURONECTES FERRUGINEUS	172909

1240	FLOUNDER, AMERICAN PLAICE	HIPPOGLOSSOIDES PLATESSOIDES	172877
1250	FLOUNDER, WINDOWPANE	SCOPHTALMUS AQUOSUS	172746
1477	HADDOCK	MELANOGRAMMUS AEGLEFINUS	164744
1520	HAKE, RED	UROPHYCIS CHUSS	164730
1539	HAKE, WHITE	UROPHYCIS TENUIS	164732
1551	HAKE, RED/WHITE MIX[1]	UROPHYCIS SP	164729
1590	ATLANTIC HALIBUT	HIPPOGLOSSUS HIPPOGLOSSUS	172933
2400	REDFISH, ACADIAN	SEBASTES FASCIATUS	166774
2500	OCEAN POUT	MACROZOARCES AMERICANUS	630979
2695	POLLOCK	POLLACHIUS VIRENS	164727
5121	WOLFFISH, ATLANTIC	ANARHICHAS LUPUS	171341
5260	FISH, NK	OSTEICHTHYES	161030
3591	SHARK, NK	SQUALIFORMES	159785
4212	STURGEON, NK	ACIPENSERIDAE	161064
4328	SWORDFISH	XIPHIAS GLADIUS	172482
4657	TUNA, NK	EUTHYNNUS THUNNUS SP	172418
6753	RAY, NK	RAJIFORMES	160806
6100	BIRD, NK	AVES	174371
6994	SEAL, NK	PHOCIDAE	180640

6997	DOLPHIN, NK (MAMMAL)	DELPHINIDAE	180415
6999	WHALE, NK	CETACEA, WHALE	180403
8160	TURTLE, NK	CHELONIOIDEA	173749
5270	VERTEBRATES, UNCLASSIFIED	VERTEBRATA	331030

[1] HAKE, RED/WHITE MIX: the reviewer should aggregate all unidentifiable hake (i.e., red, white, and spotted) discards and report them under “HAKE, RED/WHITE MIX”.

Reference Table 3 – Discarded Fish Weight Determined By [2]

Code	Weight Determined By
15	LENGTH
06	VISUALLY ESTIMATED
11	ACTUAL, ELECTRONIC SCALE
05	TALLY
03	BASKET/TOTE COUNT
00	UNKNOWN

[2] Discarded Fish Weight Determined By: when selecting UNKNOWN, the reviewer will report a count, but no weight (value will be null); when selecting VISUALLY ESTIMATED or ACTUAL, ELECTRONIC SCALE, the reviewer will report both a count and a weight.

Reference Table 4 – Fish Disposition Codes and Descriptors

Code	Description
031	POOR QUALITY, REASON NOT SPECIFIED
043	NOT BROUGHT ON BOARD, FELL OUT/OFF OF GEAR[3]
099	DISCARDED, OTHER
052	INCIDENTAL TAKE (MAMMAL, SEA TURTLE, SEA BIRD)
900	UNKNOWN KEPT OR DISCARDED

[3] Not Brought Onboard: defined as any fish that comes in contact with the gear with the intent of being landed or retained, but does not come in contact with the vessel and is assumed to be unaccounted for by the captain and therefore not included in the eVTR (i.e., drop offs).

Reference Table 5: Event Categories, Descriptions and Codes

EVENT_CAT	EVENT_DESC	EVENTCD
CREW	CAMERA SYSTEM NOT MAINTAINED	CAMMAINT
CREW	CAMERA BLOCKING	CAMBLOCK
CREW	BULK DISCARDING	BULKDISC

CREW	OTHER	OCI
CREW	IMPROPER CATCH HANDLING	ICH
CREW	IMPROPER DELAYED CATCH PROCESSING	IDCP
EM SPECIFIC	SYSTEM FAILURE	SYSTEM
EM SPECIFIC	CAMERA FAILURE	CAMFAIL
EM SPECIFIC	SENSORS GAPS	SENSGAP
EM SPECIFIC	VIDEO GAPS	VIDGAP
EM SPECIFIC	MEASURING SURFACE VISIBILITY	MEASVIS
EM SPECIFIC	OTHER	OSI
EM SPECIFIC	CAMERAS OUT OF SYNC	COS
EM SPECIFIC	SYSTEM NOT ACTIVATED AT DOCK	NAATDOCK
EM SPECIFIC	SYSTEM TURNED OFF PRIOR TO LANDING	SYSOFFPRIOR
EM SPECIFIC	CAMERAS OUT OF POSITION	CAMKNOCK
EM SPECIFIC	SYSTEM IMAGE IMPAIRMENT	IMGIMPAIR
EM SPECIFIC	NIGHTTIME IMAGE IMPAIRMENT	NIGHTIMPAIR
FISHING OPERATIONS	OTHER OPERATIONS ISSUES	OOI
FISHING OPERATIONS	SLIPPED OR TRIPPED BAG	BAG
FISHING OPERATIONS	WEATHER INDUCED POOR VISIBILITY	WEATHER

Appendix F: Month determination for Length/Weight Conversions formula for each Species

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Atl. Cod	W	W	W	S	S	S	S	S	S	A	A	A
Haddock	W/S	W/S	W/S	W/S	W/S	W/S	W/S	W/S	W/S	A	A	A
Pollock	W/S	W/S	W/S	W/S	W/S	W/S	W/S	W/S	W/S	A	A	A
Acadian Redfish	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
White Hake	W	W	W	S	S	S	S	S	S	A	A	A
Am. Plaice Fld.	W/A	W/A	W/A	S	S	S	S	S	S	W/A	W/A	W/A
Winter Fld.	W	W	W	S	S	S	S	S	S	A	A	A
Witch Fld.	W/S	W/S	W/S	W/S	W/S	W/S	W/S	W/S	W/S	A	A	A
Yellowtail Fld.	W	W	W	S	S	S	S	S	S	A	A	A
Atl. Halibut	A	A	A	S	S	S	S	S	S	A	A	A
Atl. Wolffish	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
Ocean Pout	W/A	W/A	W/A	S	S	S	S	S	S	W/A	W/A	W/A
Windowpane Fld.	W	W	W	S	S	S	S	S	S	A	A	A

W=Winter, S=Spring, A=Autumn

References:

Wigley, S.E., McBride, H.M. and McHugh, N.J., 2003. Length-weight relationships for 74 fish species collected during NEFSC research vessel bottom trawl surveys, 1992-99.

Version History:

Release Date	Description of Edits	V.
6/10/17	DRAFT 1	1
10/17/17	DRAFT 2	2
11/28/2017	FINAL DRAFT	3
10/25/18	DRAFT 3: Haul definitions, longline subsampling protocols	4
7/17/19	DRAFT 4: Hake subsampling protocols, EM specs updates, adding in MREM protocols	5
9/17/19	Addition of "Other Gear" haul definition	6
10/9/19	Addition of Water Tows definition and guidance	7
11/4/19	Reviewed and Observed field guidance	8
2/5/20	Correction to discard_condition for pinged-off fish on Longline vessels	9
4/16/20	Defining split gillnet haul, additional jig hauling guidance, FY2020 changes: event/image quality clarifications and examples, catch handling metrics, EM Detail JSON; adding fish disposition codes, changing codes to ACCSP/ITIS, longline protocols finalized	10
6/9/2020	Change to sub-sample number from 30 to 20 fish per haul	11
7/17/20	Addition of Jig SET_START def; Made haul elements optional for submission when a comment is present; EM-MSV descriptor better defined; VQE-Weather descriptor better defined.	12
8/28/20	Addition of Gear Type definitions; Addition of general vessel schematics	13
10/27/20	Addition of Review Start/Stop definitions; removal of discard annotation for FOE-Slipped/Trip Bag; revisions to several event descriptors	14
1/29/21	Addition of Volumetric/Elec Scale sub-sampling methods for four vessels only.	15
3/22/21	FY2021 Data Element Changes	16
4/2/21	Addition of section on submitting reviews without data	17

Vessel Name:	Sector Affiliation:
Permit Number:	Vessel Owner:
Hull Number:	Primary Vessel Operator:
Electronic Reporting Tool:	Mailing Address for Primary Vessel Representative:
Exempted Fishing Permit Registration:	Email Address for Primary Vessel Representative:
Primary Landing Port:	Name of Secondary Vessel Operator:

1: Provider Support and NMFS Contact Information

Table 1 – Teem Fish Contact Information

Position : Contact Name	Contact Email	Contact Phone
Teem Fish 24-hour technical support line	n/a	1-833-FISH-001 (1-833-347-4001)
TF Vessel Technician: Matt Roux	matt@teem.fish	(413) 281-4798
TF Program Manager: Jillian DiMaio	jillian@teem.fish	(401) 330-9081
Sector Manager: NAME	EMAIL	PHONE

Table 2 – Federal Staff Contact Information

Title : Contact Name	Contact Email	Contact Phone
PTNS Support	1-855-347-4371	nefsc.ptns@noaa.gov
Data Request Information	(508) 495-2139	Gina.Shield@noaa.gov
GARFO EM Lead	(978) 281-9255	Claire.Fitz-Gerald@noaa.gov
FMRD EM Lead	(508) 495-2128	Nichole.Rossi@noaa.gov

2: Trip Notification Requirements

Before Trip: The captain or owner must notify NMFS of any planned multispecies groundfish trips via the PTNS, consistent with current protocol. They will follow the same notification rules as required of any sector vessel. This includes providing a minimum of 48 hours' notice of any PTNS-eligible trip. Under the operational program vessels must run their EM system on all multispecies groundfish trips, including those that get chosen for NEFOP or NEFOP limited coverage.

Pre-Trip Notification System (PTNS): To notify for a groundfish or herring trip, log into your PTNS web account using your vessel permit number as the username and your FishOnline PIN as your password: https://apps-nefsc.fisheries.noaa.gov/PTNS/index.php/login

To enter new notifications of any type, users should navigate to 'Trips' > 'Enter Trips' along the heading bar. The new trip entry screens collect the information necessary to determine a trip's selection status and facilitate the deployment of assigned observers.

Depending upon fishery, the information entered in the 'new notifications' section will differ. Guidance for a Groundfish vessel can be found using this link:
https://apps-nefsc.fisheries.noaa.gov/PTNS/index.php/help

3: Vessel Owner/Operator Responsibilities

- Participating vessels are required to run an EM system on all applicable declared trips (groundfish or herring) for the entire trip duration (port-to-port), including set-only trips.
- Carry on board the vessel's approved VMP and make the VMP available for at-sea boardings, at all times. The vessel is prohibited from fishing in an EM program without a NMFS-approved VMP.
- Comply with requirements outlined in the VMP.
- Comply with the requirement to carry a Northeast Fishery Observer Program (NEFOP) observer or At-Sea Monitor (ASM--MREM vessels only) when selected for coverage. Vessels are required to run and submit EM data when NEFOP/ASMs are abroad.
- Conduct a system check of the electronic monitoring system prior to departing on a fishing trip to ensure it is fully operational, including ensuring there is sufficient video storage capacity to retain the recording of the entire fishing trip.
- Ensure camera views are unobstructed and clear, including ensuring lighting is sufficient in all circumstances to illuminate catch, so that catch and discards are visible to the video cameras and may be identified and quantified as required.
- Ensure that no person tampers with, disconnects, or destroys any part of the electronic monitoring system, associated equipment, or recorded data.
- In the event of an EM system failure prior to sailing, the vessel operator must notify the EM service provider and contact the Pre-Trip Notification System (PTNS) as soon as possible, to request a waiver as described in the VMP. The vessel can only sail on the trip if NMFS grants a waiver, or if the trip is selected for NEFOP coverage.
- In the event of an EM system failure during a trip, the vessel is allowed to complete the trip, but the vessel operator must contact the EM service provider and sector manager, and PTNS as soon as possible, as described in the VMP.
- Vessels shall submit EM data from all trips to their sector's contracted third-party service provider in accordance with the timeline specified by NMFS (**currently 7 days from the offload of the trip**).
- Contact the EM service provider if there has been a lapse of 30 days or more between trips, to review protocols and verify the system is functioning.
- Provide NMFS immediate access to all EM data (raw, video, sensor, GPS, summarized, etc.)

Vessel owners will be solely responsible for turning on their EM systems for multispecies groundfish trips and submitting harddrives to the EM service provider and eVTRs to GARFO.

Vessel Inactivity

:

- If you haven't used the EM system in more than 1 month the captain must call your local EM tech from your vessel to complete a pre-trip system check at least 48 hours prior to sailing
- If you haven't used the EM system in more than 6 months the captain must call your local EM tech to schedule a service visit at least 1 week prior to sailing.

Your local EM technician: Matt Roux- 413-281-4798

Pre-Trip System Check: Please power the system on immediately after arriving at the vessel because the system may need a few minutes to start all processes and obtain a GPS fix before you leave the dock. Dock to dock footage is required for all trips; the system should stay recording until after you have landed.

How To Perform a Pre-Trip System Check

Prior to all trips the captain must conduct a pre-trip system check to ensure all data collection hardware and software is working properly. Please power the system on immediately after arriving at the vessel because the system may need a few minutes to start all processes and obtain a GPS fix before you leave the dock. Dock to dock footage is required for all trips; the system should stay recording until after you have landed. This system check involves:

1. Turn system on
2. Using the tablet, connect to the AI Hub local network.
3. Select settings or the WLAN icon on the home screen.
4. Select "Network and Internet"
5. Select "WLAN"
6. Select "AI HUB" in the network list.
7. Connecting to the AI Hub for the first time on that device will require a password. The password is **shd123456.**
8. If the User Interface doesn't open immediately, go to the web browser on the device and enter the gateway address into the website field. The gateway address is **192.168.8.1**
9. Scroll through the AI Hub user interface to ensure that all cameras are showing appropriate images, the GPS has a fix(green), and the USB drives have sufficient storage space available. If the system is operating correctly all video feeds will display a live image and all sensor feeds will be green (see Figure 1). *If all sensor feeds are NOT green please contact your EM technician to troubleshoot potential issues.*
    a. NOTE: RFID and pressure sensors are not a component of the NE Audit program so may read red.

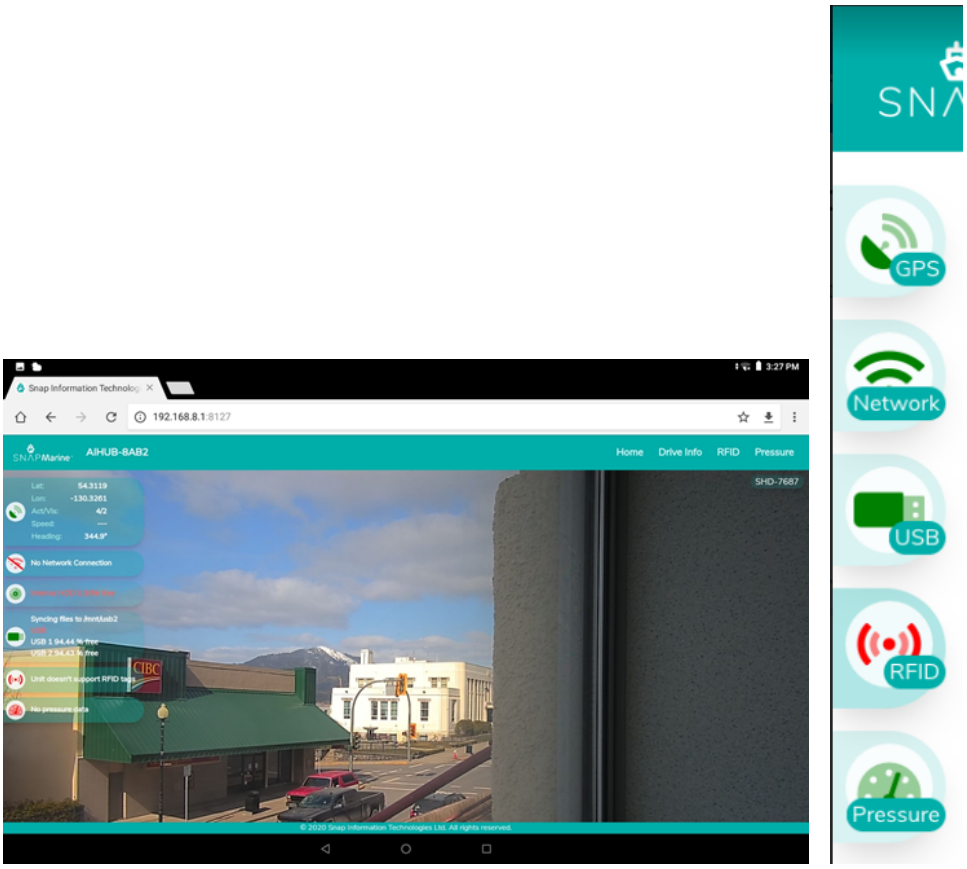


Figure 1: AI-Hub User Interface with active camera feed and close up of sensor data all showing green.

10. Check for sufficient data collection space on the removable USB drives. The percentage data storage space remaining on the USB drive can be found at the bottom of the sensor feed. The captain is responsible for replacing and mailing the hard drive **once a week if you are a day vessel or after every trip if you are a trip vessel and if**:
    a. **There is less than 75% of recording space on the USB drive**
    b. **More than 25% of USB storage space remains, but not enough to cover the entirety of the next planned trip.**
11. The full hard drive needs to be removed and delivered to Teem Fish for upload and analysis (steps for removal and mailing are listed below). Each vessel will be supplied with 2 hard drives. When hard drives are mailed in, blank ones are sent out to vessels within a day or two so there is always at least one spare on board.

    a. **Note:** The AI Hub has a 1TB internal harddrive used for backup, so pulling out the USB drives is not a concern for any data loss.

    b. **Note**: If any USBs are replaced, a new pre-trip system check is required.

12. Once the visual check is complete, the operator will tap the "pre-trip check" button and a copy of the pre-trip system check will be saved to the USB drive. These saved pre-trip system checks will be automatically stored on the USB drive and uploaded when the USB drive is mailed in. It will be archived and used as a reference if there are ever any questions regarding system issues.

Reporting

Vessels participating in EM are required to report, document, and process catch on a subtrip level (i.e., changing gear, mesh size, statistical area fished, or after each haul), and may report on a per haul basis if preferred.

EM Trips

- Captain shall report kept and discard weights on eVTR for all fish at the sub-trip level
    - A new sub-trip is triggered by change in gear type, stock area, or statistical area and requires reporting as a separate effort. ***If/when you change stat-areas or move in or out of closed areas or change gear during a trip all catch must be sorted and all discards measured from one sub-trip segment prior to starting fishing in the next sub-trip segment.***
- Captain shall fill out all other fields on the eVTR. Please see your reporting software users' manual for additional instructions and information.

NON EM Trips – under the 100% coverage operational program this type of trip only should occur if there has been a system malfunction & a waiver has been granted

- Captain shall report trip level kept and discard weights on eVTR for all fish, in addition to all other required fields. Please see your reporting software users' manual for additional instructions and information. **Remember to push the NON-EM trip button after your pre-trip System Check to ensure correct reporting requirements.**

Harddrive Removal and Replacement

If the hard drive does not have sufficient space to complete the next trip it needs to be replaced with a blank hard drive and the full hard drive needs to be delivered to Teem Fish. **Please provide the installation technician(s) with a mailing address for the fishing season for the return of blank hard drives.**

USB drive LED light color code key:

- Purple means there is footage actively being synced to that drive.
- Yellow means there is footage present on that drive.
- Blue means empty.

Hard drive Removal Steps:

1. Make note of which drive has video data on it based on the LED lights.
2. Turn off the EM system
3. Remove the USB drive that signifies there is footage on it, the yellow LED.
4. Package the drive in the pre-addressed padded envelopes provided by technicians and mail the hard drives the same day. Deliver to:

   Teem Fish Monitoring
   c/o Jillian DiMaio
   PO Box 2103
   New Bedford, MA 02741

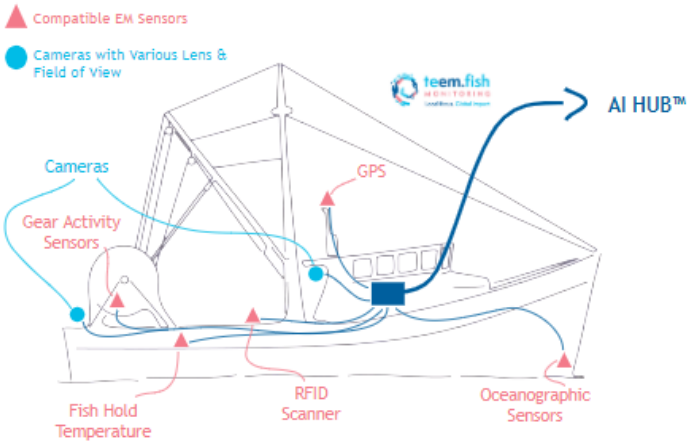
Hard drive Replacement Steps:

1. Fully insert the blank USB drive that was received in the mail into one of the empty USB slots on the AI Hub.
2. Turn the EM system on and perform a system check through the tablet or smartphone by logging into the AI Hub user interface. This check, as described above in the Operators Responsibilities Section, ensures that the disk has mounted correctly and is blank.

4: System Specifications and Installation Summary

Equipment on each vessel (see vessel schematic below)*:*

- Up to four digital (IP) cameras
- Hydraulic pressure sensor (PSI)
- GPS receiver
- Tablet
- Powered Ethernet switch
- EM control box with a removable hard drive (USB)



AI Hub with Removable USB Drives

The AI Hub video capture specifications with the SnapIT Marine cameras:

- Marine camera
    - o Dynamic image processing for high and low light with auto gain, white-balance, exposure
    - o 1/3"4 megapixel HDR sensor 1080p FHD (1920x1080)
    - o Licensed h264 video compression
    - o Frame rate: 30 frames per second
    - o 46°, 72°, 112°, 140° fixed FOV camera options
- AI Hub
    - 30 second fixed interval GPS logging
    - Using GPS data, the system software recognizes when the vessel is at port
    - Local management UI dashboard via Wi-Fi including live camera view, USB transfer status, GPS status, RFID scan history, sensor log, and cellular status
    - RFID tag scanner, buzzer, and light sensor connections
    - Internal 1TB hard drive with protected housing and data synchronization via 3x external USB 3.0 ports
    - 8GB RAM DDR4 @1866mhz
    - GPU 256-core optimized for AI

	EM Control Box	Viewport	GPS	Length Strip
Installed	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐	**Yes** ☒ **No** ☐

Type	AI Hub	Tablet	Garmin 19 hvs	1m, red and black
Location	Ceiling in wheelhouse	Wheelhouse	exterior ceiling of wheelhouse	On PVC board on top of fish hatch
Rationale	Safe and out of the way	Safe and out of the way	Safe, out of the elements	Portable to ensure good top down view of measuring strip

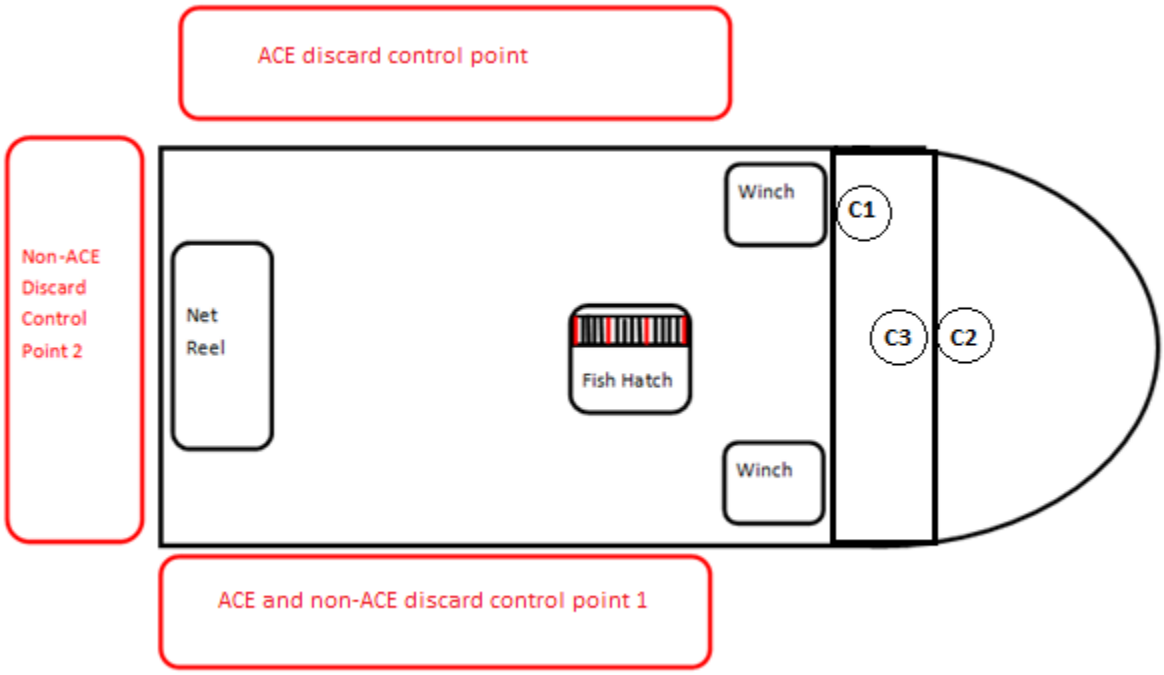


Figure 2: Vessel Diagram detailing EM equipment locations and approximate work deck during fishing

Photos of Currently Installed Components

Camera Name	Camera 1 (XX)	
Location		
View		
Aim		
Hardware	Snap Marine 112	
Resolution/FPS	15	
Recording Trigger	n/a	

Run on Time	n/a	
Recording Exceptions	n/a	

Camera Name	Camera 2 (XX)	
Location		
View		
Aim		
Hardware		
Resolution/FPS	15	
Recording Trigger	n/a	
Run on Time	n/a	
Recording Exceptions	n/a	

Camera Name	Camera 3 (XX)	
Location		
View		
Aim		
Hardware		
Resolution/FPS	15	
Recording Trigger	n/a	
Run on Time	n/a	
Recording Exceptions	n/a	

Camera Name	Camera 4 (XX)	
Location		
View		
Aim		
Hardware		
Resolution/FPS	15	
Recording Trigger	n/a	
Run on Time	n/a	
Recording Exceptions	n/a	

5: Catch Handling Requirements

- All catch of allocated groundfish stocks must be retained and landed, consistent with normal requirements for groundfish sector vessels. Undersized groundfish will be handled (sorted, retained, and processed) according to the vessel's monitoring plan (VMP), in view of cameras, and returned to the sea as quickly as possible.
- Damaged or unmarketable groundfish of legal-size must be kept and handled in the same way as the other regulated groundfish (i.e. placed on measuring strip) and reported on the eVTR, unless otherwise permitted through a regulatory exemption (i.e. Letter of Authorization or LOA) granted to the participating vessel's sector for the purpose of discarding legal-sized unmarketable fish (audit model vessels only).
- All other species will be handled per normal commercial fishing operations.
- Fish must be handled in a manner that does not impede camera views. Captain shall ensure that there is a clear view of fish placed on the measuring strip/grid with no head or hands in the way. All regulated groundfish discards must remain on the measuring strip/grid with an unobstructed view (hands removed) for at least one second.
- Groundfish flounder species must be placed on a measuring strip both dorsal and ventral side up to ensure proper identification. If flatfish are measured by species in groups, only the first 5 individuals of a species have to be flipped for identification (audit model vessels only).
- All discarded fish must be handled in view of a camera and discarded at designated discard control points. Vessel specific discard control points are detailed in your vessel diagram (Figure 2)
- Individual Animals (large sharks, sturgeon, rays, and tunas) will be handled at the captain's discretion. There are no vessel specific catch handling requirements for this subset of animals
    - However, when a NEFOP Observer is present individual animals must be removed from the gear and handed to the Observer for sampling, unless the animal poses a danger to safety.
- When a NEFOP observer is on board, captain, crew, and observers must follow NMFS EM-observer protocol
    - Vessel operator/crew must perform all EM catch handling protocols when a sea-sampler is onboard.
    - Allow sea-sampler access to all kept and discarded catch.
    - Bring aboard marine mammals, sea turtles, and seabirds caught during fishing operations for sampling by the sea-sampler.

6: Catch Sorting and Processing

Vessels participating in EM are required to report, document, and process catch on a subtrip level (i.e., changing gear, mesh size, statistical area fished, or after each haul), and may report on a per haul basis if preferred.

Processing Methods:
Option 1: Discards are processed immediately as each catch item is encountered. The discard should be measured directly after it is brought onboard and discarded shortly afterward.

Option 2: Retain groundfish discards in a designated discard area on deck and process them at the end of each haul, once gear has been retrieved, and sorting is completed. Sort discards by species and performs the appropriate catch handling as described in their VMP (length measurements, approved sub-sampling methods).

Option 3: Delayed Catch Processing (DCP) is when groundfish discards from multiple hauls are processed together. Discards are retained in camera view within a designated discard area on deck at all times. If DCP is applied during a trip, all discards must be processed before the vessel lands in port to offload or at the sub-trip level (i.e., changing gear, mesh size, statistical area fished, or after each haul) for EM data/eVTR comparisons. Discards must be processed at a subtrip level if a vessel changes gear type or statistical area. **Vessels opting to utilize DCP cannot process a portion of their catch and retain the remainder for a subsequent haul. Vessels are required to either process the entire catch or reserve the entire catch for delayed processing.**

Approved Sub-Sampling Methods:

1. Collect and sort all discards by species and choose 20 fish per species per sampling unit for random measurement. The fish must be measured and processed in a manner so a video reviewer can identify species and get an accurate count of all fish.
    a. *Chose the 20 individuals for measurement randomly throughout the haul sorting.*
    b. Any other individuals that are brought aboard and are to be discarded must be passed across the measuring strip so the video reviewer can accurately identify, and count the fish.
    c. Captain will report discarded weight on eVTR
2. Longline vessels may unhook undersized groundfish at the hauler/rail during the haul, but are still required to measure at least 20 fish.
    a. Since not all sub-legal sized fish will be brought aboard, it is essential that both the sampled and non-sampled fish are included in the estimated discarded weight that is reported on your eVTR
3. Mixed Hake sampling: Vessels are required to randomly collect at least 20 mixed hake (red, white, spotted) during catch sorting for measurement. Un-sampled hake may be discarded throughout sorting within camera view to allow a reviewer to identify species and get an accurate count of fish.
    a. Captain will report the weight of all discarded red, white, and spotted hake (by individual species) on the eVTR as already required. Document any white hake identified as LUMF as white hake.
    b. If you catch less than 20 red/white/spotted hake discards they must all be measured prior to discard.

7: Electronic Monitoring System Errors and Malfunctions

Pre-Trip: If an EM system malfunctions before the start of an EM trip:

1) Call your technician or the EM service provider's 24 hour technical support number immediately. *See Table 1 above for contact information.* In the event of a Critical malfunction that is not able to be resolved, the service provider will alert NEFSC EM Management and if possible provide details on the issue. Based on sector contract, the service provider may also alert the sector manager of the issue.
2) The EM service provider technician will troubleshoot with the captain over the phone. If the issue cannot be resolved, the technician will determine if the malfunction is critical or non-critical. A critical malfunction is one that prevents the data collection objectives of the program from being adequately achieved.
    a) Non-Critical EM System Malfunction: If the malfunction cannot be fixed in a timely fashion, the captain may depart on the scheduled trip, but must follow the EM service provider's instructions to adjust operations for that trip, if necessary.
    b) Critical EM System Malfunction: If the malfunction is critical and not repairable, the captain must contact NMFS PTNS (Table 2, above), identify themselves as an EM vessel with a critically malfunctioning EM system and request a waiver. *Specific wording and guidance around calling in for a waiver may be found below in this section.* If granted a waiver, the captain may take the trip without a functioning EM system. They may *not* sail on any additional multispecies trips without addressing their non-functioning EM system and having it deemed functional by the EM service provider.
        i) **NOTE: the vessel is *not authorized* to use any exemptions provided under an EM program while fishing under a waiver or when the EM system is not operational.**
3) It is the vessel's responsibility to inform their Sector Manager of the system malfunction and determined outcome (waiver, etc). See Table 1 above for contact information.
4) If the vessel has a critical malfunction and departs with a NEFOP observer the captain must inform the Observer that the EM system is not functioning for proper reporting by the Observer.

If the malfunction is critical and not repairable pre-trip, the captain must contact the NMFS PTNS (1-855-347-4371), identify themselves as an EM vessel with a critically malfunctioning EM system and request to speak to the on-call emergency NOAA contact to request a waiver from EM coverage, prior to leaving the dock. If granted a waiver, the captain may take the trip without a functioning EM system. They may *not* sail on any additional trips without repairing their non-functioning EM system or securing a NMFS-issued waiver. The vessel owner or operator must ensure the EM system is fully operational before sailing on any additional trip. The service provider will use the VMAN software application to log the issue and document when the critical malfunction has been resolved in accordance with the VMP. Those vessels participating in EFPs are *not authorized* to use the permit exemptions without an operational camera system on board.

Mid-Trip System Malfunction:

a. If a system malfunction occurs at sea, the captain will attempt to contact the service provider's helpline by phone. See Table 1 above for contact information.

b. If a critical malfunction cannot be resolved, the captain may complete the trip without a functioning EM system but it will be considered unobserved.

c. The vessel may *not* sail on any additional multispecies trips without addressing their non-functioning EM system and having it deemed functional by the EM service provider or obtaining an EM trip waiver from PTNS. The Service provider will alert NEFSC EM Management that the system failed and if possible provide details on the critical error.

If a critical malfunction occurs mid-trip and cannot be resolved through contact with the service provider, the vessel may complete the trip, but the trip may not count towards coverage. If a vessel is fishing in a closed or special access area, the operator *must* exit the area immediately. Upon landing, the vessel must alert their service provider and NMFS through the PTNS (1-855-347-4371). They may *not* sail on any additional trips without repairing their non-functioning EM system or securing a NMFS-issued waiver. The vessel owner or operator must ensure the system has been fully repaired. The service provider will use the VMAN software application to log the issue and document when the critical malfunction has been resolved in accordance with the VMP.

NOTE: In the event that EM outages become a frequent occurrence for any given vessel, the vessel may be removed from the EM program and be required to take At-Sea Monitors.

8: System Troubleshooting

Hardware Troubleshooting

- Resetting the AI Hub

  Oftentimes a simple power cycle or "reset" of the AI Hub can resolve several issues by restarting the processes in the system and allowing them to start back up normally. If you need to "reset" the AI Hub the best way is to switch off the breaker that the AI Hub is wired to.

  If you can't find the breaker then remove the 5 or 10 amp fuse connected to the power wire and then replace the fuse to restart the system.

  After a restart it can take up to 10 minutes before all the sensors come back online and the wifi interface becomes available again.

  - On-board Troubleshooting Checklist

- The Netonix switch is the most useful piece of diagnostic equipment in the EM system. The switch powers and sends and receives data from the cameras and AI Hub.
- The lights at each input of the switch indicate that the system has power and that each EM device is booted and communicating.
- The Netonix switch is capable of running on 9-72 VDC (positive DC only) which makes it highly compatible with most battery outputs.
- Ensure that a **5A fuse** is installed inline within 18 inches of the power source to the Netonix switch. When diagnosing power issues be sure to inspect the fuse to see if it was blown at any point.
- Each RJ45 socket on the switch, when utilized by a device, has two LEDs that will light up. One indicates the socket is powered and should be on regardless of a device being plugged into the port. The other indicates there is a live EM device at the other end of the network cable. This light will blink on and off to indicate data is being transferred.

Visual System Assessment

- Assess Power Box (Netonix PoE Switch)
  - Check that the network switch is powered (lights on network sockets):
    - Check the main fuse and voltage display.
- Check the lights on the network switch where each EM device plugs in.
  - Ensure plugs are firmly connected.
  - If the power light is not lit for a socket it may indicate a short in the cable or RJ45 terminated head. If the power light does not come on, connect to a different socket with a working power light. If this causes the power light to switch off, then there is a short circuit in the EM device or cabling.
  - Disconnect the EM device and retest to confirm if the issue is the device or cabling.
- Confirm Condition
  - Confirm the EM device is present, intact, and firmly connected
- Access Wiring
  - Open any junction boxes, unplug and inspect plug contacts, ensure cables are firmly terminated at both ends, reconnect and check for lights on switch. Check for water in junction boxes.
  - Inspect cable runs where possible to ensure they do not have crimp damage, a break in the shielded casing, or are wet.
  - Check continuity of cable to relevant device using network cable tester:
    - Disconnect cable from power box. Connect cable tester and ensure continuity of each Cable as required.
  - Reconnect the cable to the power box and check switch lights are functioning.
  - If issues persist, call your technician

Troubleshooting Tablet and Smartphone Use

See the Vessel Monitoring Plan(VMP) for the full guide on connecting a tablet or smartphone.

Issues connecting to the AI Hub Wifi (Android)

- If Your Tablet/Smartphone is frozen:
    - Power down the tablet for 30 seconds
    - Turn the tablet back on
    - Attempt to reconnect following the proper steps to connect via wifi
- If the AI Hub wifi name is not an option on the WLAN screen
    - The wifi antenna may have come loose
        - Tighten the antenna by gently screwing it back on to the "wifi" port
        - Turn the AI Hub off and back on and allow it to boot back up(2-3 minutes)
- If you cannot connect with a tablet
    - Attempt to use a smartphone to connect to the Wifi
    - Call your local technician or Teem Fish staff
- If you still can't get the **AI Hub wifi interface to work, call a technician**

9: Participant Signatures

_____Jillian DiMaio_____
Teem Fish Program Manager, Jillian DiMaio

_____
Vessel Owner, NAME

_____
Primary Vessel Operator, NAME

_____
Secondary Vessel Operator, NAME

Guide to Catch Accounting for the Audit Model Electronic Monitoring Program

Greater Atlantic Regional Fisheries Office

This document describes the catch accounting methodology for sector vessels enrolled in the audit model electronic monitoring (EM) program. This methodology may be subject to change in future fishing years if warranted based on new data collected under the program.

Goals and Objectives

The goal of the audit model EM program is to collect information to meet sector monitoring requirements and, in particular, improve accounting of discarded groundfish catch. The program uses monitoring data provided by a third-party service provider via the EM Detail File to monitor area fished and verify estimates of groundfish discards reported by the vessel on its electronic vessel trip report (eVTR). The vessel's self-reported discard estimates, as adjusted based on the vessel's past performance in the program (*i.e.*, reporting accuracy), are used for the purposes of catch accounting.

Estimates of groundfish discards reported by the vessel on its eVTR will serve as the basis for catch accounting on trips that are not selected for audit. The discard estimates will be adjusted by a **delta factor** to determine the total annual catch entitlement (ACE) charged to the sector to account for discards. Trips that are selected for audit will be charged ACE based on the discards reported in the EM Detail File. Northeast Fisheries Observer Program (NEFOP) data will still be used to account for groundfish discards on NEFOP-observed trips taken by vessels in the audit model EM program.

What is the Delta Model?

The **delta model** is a vessel- and species-specific estimation of the precision and accuracy of the vessel's self-reported discards. The **delta model** is used to adjust the vessel's self-reported discards to account for over- or under-reporting of discard estimates.

We build the **delta model** by comparing discard estimates on the eVTR to the EM Detail File on trips selected for audit. A trip selected for audit must meet these minimum standards to be included in the calculations contributing to a vessel's **delta model** estimations:

- **Less than 10 percent of processed discards are unidentifiable** – The third-party service provider must be able to identify 90 percent or more of the processed discards *to species* in order for the haul to be valid for catch accounting. If this performance standard is not met, the data from the haul will be considered invalid and will not be used due to poor data quality. Reasons for poor quality data may include improper catch handling (*e.g.*, impeding camera view during measuring) or problems with the video (*e.g.*, video gaps).

- **Sub-trip is fully observed** – In order to be included in a vessel's **delta model** estimation, a trip or sub-trip (defined as data grouped by gear category and statistical area) must be fully (*i.e.*, 100 percent) observed as defined in the video reviewer guidance.
- **EM and eVTR units of effort must be equivalent for comparison** - The number of sub-trips and/or hauls reported on the eVTR and EM Detail File must match (e.g., If the EM Detail File reports effort in two statistical areas for a given trip, the captain must also create a record for each sub-trip on the eVTR).

Applying Discards to an EM Trip

Required Data Elements

Vessel Trip Report	*EM Detail File*
Statistical area	Statistical area
Gear type and mesh size	Gear category (*e.g.*, trawl)
Estimated weight of groundfish discards (live wt.)	Calculated weight of groundfish discards (live wt.)
Data collected at the trip/sub-trip level	Data collected at the haul-level

The statistical area, gear type, and mesh size reported on the eVTR is compared to the area fished and gear category information reported in the EM Detail file. The discard data provided in the EM Detail File is aggregated at the trip or sub-trip level and compared to the estimated groundfish discards reported on the eVTR to complete the audit and build the vessel's **delta model** adjustments.

Data Available for Download on SIMM

EM Discard Download

We intend to include the following information in the download. However, the information included may change as we refine the program:

- Sector ID and name;
- Vessel name, MRI, permit number, and hull number;
- VTR serial number, date sail and date land, statistical area, gear code, mesh category, and mesh size;
- VTR species code, species name, stock area, NESPP3 code, NESPP4 code, species ITIS;
- Quantity discarded for groundfish stocks, as reported on the VTR;
- Data source (EM/VTR);
- Quantity discarded for groundfish stocks, as determined by NOAA Fisheries (*i.e.*, EM Detail File for trips selected for audit only; VTR discards as adjusted by vessel-specific **delta factors** for unselected trips only); and
- Quantity of ACE discards for groundfish stocks as determined by NOAA Fisheries and adjusted to account for species- and gear-specific discard mortality ratios.

NOTE: The assigned discard source may vary between sub-trips if a sub-trip is not fully observed.

Performance Standards

Vessel- and species-specific **delta model** adjustments are built by comparing groundfish discard data reported on the vessel's eVTR to the EM Detail File for audited trips. In order to be used in the **delta model**, the trip must meet the minimum standards described above. Trips that do not meet these standards may be indicative of performance issues (*e.g.*, system hardware issues, catch handling issues). The **delta model** requires sufficient data to meet precision and accuracy standards to inform catch accounting. Vessels that meet these standards may be audited at reduced rates in future years, whereas vessels that do not meet these standards may be audited at increased rates. Vessels with especially poor performance that prevents adequate monitoring via EM may be assigned assumed discard rates.

Questions and Answers

Q: How do I know whether a given trip passed or failed the audit?

A: Under this approach, trips are not categorized as "passing" or "failing" the audit based on the accuracy of the vessel's self-reported discards. Discard data reported by the third-party service provider in the EM Detail File forms the basis for discard catch accounting on audited trips (i.e., discards are "EM-observed") and discard data reported on the eVTR, as adjusted by vessel- and species-specific **delta model** estimates, forms the basis for discard catch accounting on unaudited trips. NEFOP data will still be used to account for groundfish discards on NEFOP-observed trips taken by vessels in the audit model EM program. Trips selected for audit must meet minimum standards to be used in the **delta model** estimation.

Q: Why is the **delta model** *not* stratifying on stock, gear type, or mesh size?

A: The **delta model** is quantifying the captain's ability to accurately estimate the weight of discarded groundfish catch by species. A captain's estimate of the weight for discards of a given species is independent of stock, gear type, and mesh size. For example, we would expect a captain to estimate a similar weight for a discarded haddock regardless of whether it is caught with extra-large mesh gillnet gear or large mesh otter trawl gear. Crucially, the expected variance scales by weight, acknowledging that absolute error will be relative to the volume of discarded catch.

Q: Why don't these discard calculations incorporate the trip/sub-trip Kall?

A: The **delta model** relies on the captain's self-reported discard estimates for a trip as adjusted based on past performance (*i.e.*, over- or under-reporting of discard estimates). This method focuses on the accuracy of the captain's self-reports over time and recognizes that catch of discards may vary from trip to trip independent of the Kall.

Q: Do changes in **delta model** adjustments apply retroactively to previous trips?

A: Yes, **delta model** estimates are modified as additional trips are audited and incorporated into the model. When new data is added to the model, the previous **delta model** adjustments are updated accordingly. This may result in adjustments to the calculated quantity of ACE discards over time as participating vessels hone their discard estimation skills.

Q: What should I use at the start of the year before the delta factors have been built?

A: At the start of the year, EM vessels will have an adjustment factor of 1 for each species. The **delta model** adjustments will be updated as additional data are incorporated into the model. In future years, EM vessels may be assigned **delta model** adjustments at the start of the year based on data from previous years.

Q: How do I account for discards if the captain has not submitted the eVTR yet?

A: The eVTR is necessary to determine whether a trip will be selected for audit and to calculate discards for a trip. We may use discard rates to impute discards for a given trip until we receive the eVTR.

NOAA FISHERIES

Sector Report Guide

FISHING YEAR 2021

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NOAA FISHERIES | Greater Atlantic Region
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Table of Contents

Section I: Introduction

Amendment 16 to the Northeast Multispecies Fishery Management Plan completely revised the requirements governing groundfish sectors. Among these changes were new monitoring and reporting requirements for sectors. Each sector must file a report documenting the sector's fishing activities. The Sector Report allows comparison of the sector's data that with the data available to NMFS. The report must include:

- Remaining balance of Allocated Catch Entitlement (ACE) for the current fishing year
- Discards
- Compliance and enforcement issues

You file a sector report each week or, in special circumstances, you file a report daily.

Use this book to learn how to submit your sector report. For electronic file formatting information, refer to a separate guide, the *Sector Report Guide Addendum: SIMM Upload File Specifications*.

Note: For information about SIMM download files, refer to the *SIMM User Guide*.

Sector Report Content

The reporting requirements have been split into three separate component reports. Collectively, they are referred to as the Weekly Sector Report or, more simply, the Sector Report. You upload these three reports to NMFS using the SIMM application. (Click here for link to SIMM application login page) The three reports are:

- Detail Report

  Provides NMFS with specific information about each fishing trip down to the stock area.

- Trip Issue Report

  Provides NMFS with the following information:

  - Compliance / enforcement concerns
  - Sector enforcement issues
  - Enforcement actions
  - Incident / non-compliance reports

- One of the following reports:
  - Weekly ACE Status Report

    Provides the means for sector managers to report their ACE status calculations. This allows NMFS to crosscheck totals.

  - Daily ACE Status Report

    Provides the means for sector managers to report their ACE status calculations on a daily basis if a "trigger point" (threshold) has been reached in the current fishing year.

Refer to the following sections for definitions of the fields required for these reports. Also, refer to the *Sector Report Guide Addendum* for the timing requirements of the Sector Report.

Detail Report

The Detail Report provides information down to the stratum level about each sector trip for a given week, based on the best available data at the time the sector submitted the report. Refer to the next section, Stratum Notes, for more information about strata.

- Columns: Refer to Table 1 for information on the Detail Report columns.
- Rows: Each row of your Detail Report should list trip data per stratum.

Table 1: Detail Report Fields

Column Heading	Description
Week Ending Date	The Saturday ending the last week included in the report. This date should be the same in all rows of the report.
Sector Name	GARFO sector name as listed on SIMM.
Vessel Permit No	Vessel permit number assigned by GARFO's Vessel Permit System (VPS).
Trip ID	eVTR Trip ID (14 characters) or paper VTR serial number (8 characters) from the first page of the VTRs used on the trip.
Trip Observed	Flag indicating if trip was observed or not observed. Observed trips include Northeast Fisheries Observer Program (NEFOP) observers, at-sea monitors (ASM), or electronically monitored (EM) trips selected for review. Y = observed N = not observed
Observer Data Quality Level	Reserved for future use; leave this field blank • Value = NULL
Enforcement issues	Flag indicating if trip had any enforcement issues. • Y = Yes • N = No If Yes, details must be documented in Trip Issue Report.
Landing Source	Code for source of landing da ta (landed weight of catch). Values: • ASU = assumed • DLR = dealer • VTR = vessel • VMS = catch report
Area Source	Code for source of area data (stock area fished and gear used). Values: • ASU = assumed • DLR = dealer • VTR = vessel • VMS = catch report
Date Sold	The date of first sale of a sector trip's catch to a seafood dealer. Subsequent sales will be rolled up to this date to form a complete trip. Date Sold may originate from one of three sources, but should be prioritized from: • Dealer receipt / sold to date • VTR Date Sold • Observer reported landings
Species ITIS	The 6-digit Integrated Taxonomic Information System (ITIS) serial number for a species. ITIS codes are unique identifiers representing information for a species.
Gear Code	The 3-character standard gear code from the VTR form.

Column Heading	Description
Mesh Cat	Gillnet gear: • ELM = Extra Large Mesh (8 inches and greater) • LM = Large Mesh (6 to less than 8 inches). Trawl gear (OTF, OHS, OTR, OTT): • SM = Small Mesh (less than 3.99 inches) • MM = Medium Mesh (3.99 inches to 5.74 inches) • LM = Large Mesh (equal to or greater than 5.75 inches) All other mesh are NA. Consistent with discard rate strata.
Stock ID	An abbreviation for the Stock Area that incorporates both the species name and the area that species is assigned to. Includes Georges Bank East & West.
Landed Weight	Landed weight (in pounds) of stock landed. The total weight should match dealer reported landings.
Live Weight	Live weight (in whole pounds) of stock landed.
Quantity Discard	Observed (via NEFOP, ASM, or EM) or calculated (via discard rates or adjusted VTR) live whole pounds of species discarded.
Harvested ACE	The cumulative number of live whole pounds of catch per stock caught on sector trips in current fishing year.
Date Last Changed	Date last updated (NULL if new record).
DSM	Flag indicating if trip was observed by dockside monitor. NOT USED AT THIS TIME. Y = Yes N = No
Discard Rate	The discard rate that applies for this trip. Provided to calculate discards on unobserved trips for ASM vessels only. Include 5 digits after the decimal point. (Obtain the appropriate discard rate for the trip from the SIMM Discardrate download file.) Use 0 if discard rates are not used to calculate discards for the trip.
Sector Kall	Total of all kept fish, excluding discards, in live pounds for the entire trip.

Stratum Notes

Read these notes for information about using strata when completing your Detail report.

What is a Stratum?

- A stratum is made up of the following fishing activity components:
  - Stock ID

    Stock Area abbreviation that incorporates information such as species name and the chart area that the species is assigned to. For example, the Stock ID CODGBW is “Cod, Georges Bank West”.
  - Gear type used
  - Mesh category used
  - Exemption used (if claimed by the vessel in its Trip Start Hail (TSH))

- Refer to the **Trip Hails** download file in SIMM for a complete list of the hails from your sector vessels for the week. This download informs you whether a sector vessel has declared a trip exemption.

Using Strata

Each time one of the stratum components changes on a fishing trip (for example, a gear or a stat area change), the vessel owner/operator must complete a new VTR. This means a single fishing trip can include one or more VTRs. Refer to Table 2 immediately following for an example.

Table 2: Stratum Change Requires Separate VTRs (Selected Fields)

VTR #	Species	Chart Area	Gear	Mesh Ring/Size	Comments
11111111	HADD	521	GNS	LM	Stratum changes because the area fished changed from Chart Area 521 to 514.
22222222	HADD	514	GNS	LM	Stratum changes because the area fished changed from Chart Area 521 to 514.

Continuing with this example, you would record the two strata for this fishing trip as two separate rows in your Detail Report, as in Table 3 immediately following:

Table 3: Strata Require Separate Rows in Detail Report

Trip ID	Stock ID	Gear Code	Mesh Cat	Comments
11111111	HADGBW	GNS	LM	Separate row in Detail report.
22222222	HADGM	GNS	LM	Separate row in Detail report.

Strata and Exemptions

If a vessel declared an exemption at the beginning of a groundfish trip, be aware of the following:

- The vessel must submit separate VTRs when it switches chart area, gear type, or mesh size. In the case of vessels using the small-mesh exemption, the redfish exemption, or the extra-large mesh gillnet exemption on a trip; the vessel must have separate VTRs for the portion of the trip using the smaller mesh. A vessel can use the small-mesh exemption with most trawl gear (mobile gear) with approved modifications. You must create at least two rows in your Detail report for a small-mesh exemption trip: one row for the large-mesh portion of the trip, and one row for the small-mesh portion of the trip. Create other rows for other strata as appropriate.
    - The exemption (or combination of exemptions) is applied to the entire trip. Within a trip, unique discard rates can still be triggered by stratum changes (i.e. gear, area, etc.).

For ASM Vessels

You must use the Discardrate download file to find out the proper discard rate to use to calculate discards for a given stratum on an unobserved trip. The discard rate that you insert into the Detail report for the stratum depends not only upon the Stock ID, gear, and mesh but also upon the exemption. Refer to Table 4 for an example.

Table 4: Small-Mesh Exemption and Discard Rates

Trip Taken	Trip Portion	Discard Rate
Large Mesh Trip (No Exemption)	N/A	Rate 1
Large Mesh Trip (With Mesh Exemption)	Large-mesh portion of trip	Rate 2
Large Mesh Trip (With Mesh Exemption)	Small-mesh portion of trip	Rate 3

- You must use the appropriate code (SM) in the Mesh Cat column of the Detail Report for the small-mesh portion.
    - Keep in mind that NMFS calculates the discards for non-allocated stocks.
    - If you have a stratum that has non-allocated stocks, you still need to list the discards that would factor into the Sector K_{all} value for the trip. Refer to Appendix C: Calculating Trip Kall Values for the Detail Report for more information about how to calculate the Sector K_{all} value.

Table 5: Stratum Change Due to Small-Mesh Exemption Requires Separate Rows in Detail Report

Trip ID	Species ITIS	Stock ID	Gear Code	Mesh Cat	Live Weight	Discard	Harvest ACE	Sector Kall
33333333	164744	HADGBW	OTF	LM	1000	50	1050	1500
44444444	164791	SHAK	OTF	SM	500	N A	N A	1500

For EM Vessels

Discard rates are not used to calculate discards for unobserved trips taken by vessels enrolled in an audit model EM program. A trip is assigned adjusted discard values based on the VTR and the delta model, which makes vessel- and species-specific adjustments based on a vessel's reporting history. See Appendix D for more information.

- The adjusted VTR values for each strata in a given trip will be provided in the EM download. Refer to Table 6 for an example.

  - **Table 6: Example of the Data Provided in the Electronic Monitoring Download in SIMM**

Trip ID	Species ITIS	Stock ID	Gear Code	Mesh Cat	VTR Quantity Discard	NMFS Discard Source	NMFS Discard Quantity	NMFS Dead Discard Quantity (ACE)
33333333	164744	HADGBW	GNS	ELM	80	EM	75	37.5
44444444	164791	SHAK	GNS	ELM	110	VTR DELTA	120	60

Note: Be aware that GARFO categorizes EM Exempted Fishing Permit (EFP) trips as separate strata. Discard rates for these trips are identified with a flag labeled EFP_EM3 in the **Other Strata** column in the DISCARDRATE download file in SIMM.

Trip Issue Report

The Trip Issue Report allows sectors to briefly describe to NMFS any enforcement or reporting compliance issues, violations of sector operations and regulations, and general problems with monitoring or sector operations during the reporting period. Issues may pertain to a specific trip or apply generally to sector operations. Issues to report in the Trip Issue Report include, but are not limited to:

- Monitoring issues (e.g., refusals) and a description of each occurrence, if applicable
- Violations or non-compliance with operational standards, including but not limited to fishery regulations and sector operation plan provisions
- General problems with sector operations and/or corrective actions taken by the sector during the reporting period

Trip Issue Reporting Form

In Fishing Year 2019, NMFS developed a new Trip Issue Report form to improve reporting for both managers and the agency. Things to note include the following:

- Process — Submit reports using the Trip Issue Reporting tool found under the Uploads menu in SIMM; you must submit at least one Trip Issue Report per weekly reporting period as required by regulation. Submit Trip Issue Reports more frequently as needed. For reporting weeks for which there are no issues to report, submit a report with the "No Issue" option selected under the **Issue Type** field, leaving all other fields blank.
- New Format — NMFS has modified the format of the report to increase readability and collect additional data fields. This version of the report adds four new fields: **Trip Issue ID**, **Case ID**, **Event Date** and **Date Entered**. **Trip Issue ID**, **Case ID**, and **Date Entered** populate automatically upon submission. **Sector Name** has been removed as unnecessary. **Enforcement**, **Discrepancies**, **Monitoring**, **Other**, and **No Issue** are in the **Issue Type** dropdown menu.
- New Functionality — You can provide an update to an existing issue by selecting the **Follow-Up** option associated with the previously reported issue. Updates to existing issues will have a unique **Trip Issue ID**, but share a single **Case ID**.
- Additional Features — The tool will display all issues and/or corrective actions that occurred during the year, as reported by the sector. Managers will have the ability to view previously submitted reports within the Trip Issue Reporting tool and will have the ability to download their previously submitted reports as an Excel or .CSV file.

Sectors should continue to use Atlassian's online issue-tracking system JIRA (maintained by APSD) in order to report and track data quality issues. Data errors resolved through internal GARFO processes (e.g., VTR discrepancies) do not need to be documented in the Trip Issue Report.

The Trip Issue Report is a tool for sectors to notify NMFS of certain issues, as described above. However, this report is not a substitute for the Sector Incident Report. Issues that require further investigation must also be documented and submitted to NMFS in a Sector Incident Report. For complete information about reporting sector incidents, see the Sector Incident Report Guide using the following link:

http://www.greateratlantic.fisheries.noaa.gov/sustainable/species/multispecies/.

Table 7 documents the Trip Issue Report field definitions.

Table 7: Sector Weekly Trip Issue Report Fields

Column Name	Description
Action	Action to perform. Choices include: • **Submit Report** (upload the Trip Issue Report) • **Follow Up** (edit an existing Trip Issue Report)
Trip Issue ID	Unique idenitfier supplied by SIMM.
Case ID	Corresponds to the value of **Trip Issue ID** and is used by SIMM to access a Trip Issue report you have already uploaded.
Week End Date	The Saturday ending the last week included in the report.
Vessel Permit No	Vessel permit number assigned by the Greater Atlantic Regional Fishing Office's Vessel Permit System (VPS).
Trip ID / VTR Serial #	Generated by GARFO upon receipt of the FVTR. The Trip ID can be the eVTR Trip ID or paper VTR serial number.
Event Date	Date on which the trip issue occurred.
Issue Type	Dropdown menu – choose one of the following: • **No Issue** (no issue to report) • **Enforcement** (law enforcement issue) • **Discrepancies** (e.g., discrepancies between reported and actual totals or trips) • **Monitoring** (NEFOP or ASM issue) • **Other** (something else that NMFS personnel should be aware of in assessing sector operations)
Fishing Year	Fishing year to which the Trip Issue reports pertain.
Date Entered	Date on which you filled out this report; supplied by SIMM.
Description	Supply the notes about any trip issues that arose during the week.

Weekly ACE Status Report

The ACE Status Report provides the means for sector managers to report their ACE status calculations. This allows NMFS to crosscheck totals, as stipulated in Amendment 16. See Table 8 . The ACE Status Report includes one row per stock (columns identified below).

Note: Lease-only sectors submit the ACE Status Report for their weekly uploads only; these sectors should not submit a Detail Report or a Trip Issue Report.

Table 8: ACE Status Report Fields

Column Heading	Description
Week Ending Date	Saturday ending the last week included in the report. Date should be the same in all rows.
Sector Name	GARFO sector name as listed on SIMM.
Stock ID	Abbreviation for the Stock Area that incorporates both the species name and the area that species is assigned to. Includes Georges Bank East & West.
Initial Allocated ACE	The total number of (live) pounds of this stock allocated to the sector for all renewed permits in the current fishing year.
Maximum Carryover	The amount, in live pounds, of unused ACE (up to the full 10% for an allowable stock) that is carried over from the previous fishing year for all renewed permits.
De Minimis Carryover	The amount, in live pounds, of the de minimis carryover for an allowable stock
In-Season ACE Adjustment	The adjusted amount (increase or decrease), in live pounds, applied to the Initial Allocated ACE of a stock allocated to a sector in season for all renewed permits.
Total ACE With Maximum Carryover	The total number of live pounds of this stock initially allocated to the sector including the maximum carryover and In-Season ACE adjustment.
Total ACE With De Minimis Carryover	The total number of live pounds of this stock initially allocated to the sector including the de minimis carryover and the In-Season ACE adjustment.
Transfers In	The cumulative number of live pounds per stock transferred into the sector for the current fishing year.
Transfers Out	The cumulative number of live pounds per stock transferred out of the sector for the current fishing year.
Total Transfers	The sum, in live pounds, of the Transfers In and Transfers Out columns per stock transferred by the sector for the current fishing year.
Conversions In	The cumulative number of live pounds of stock converted into Western GB ACE from Eastern GB ACE for the current fishing year.
Conversions Out	The cumulative number of live pounds of stock converted from Eastern GB ACE into Western GB ACE for the current fishing year.
Current ACE With Maximum Carryover	Total ACE, plus or minus Total Transfers, plus the values of Conversions In and Conversions Out, including the maximum carryover from the previous fishing year.
Current ACE With De Minimis Carryover	Total ACE plus or minus Total Transfers, plus the values of Conversions In and Conversions Out, including the de minimis carryover from the previous fishing year.
Harvested ACE	The cumulative number of live pounds of catch per stock caught on sector trips in current fishing year.

Column Heading	Description
Remaining ACE With Maximum Carryover	Current ACE With Maximum Carryover minus Harvested ACE.
Remaining ACE With De Minimis Carryover	Current ACE With De Minimis Carryover minus Harvested ACE.
Percent Harvested ACE To Date With Maximum Carryover	Harvested ACE divided by Current ACE With Maximum Carryover, expressed as a percentage.
Percent Harvested ACE To Date With De Minimis Carryover	Harvested ACE divided by Current ACE With De Minimis Carryover, expressed as a percentage.

Daily ACE Status Report

The Daily ACE Status Report allows sector managers to report their ACE status calculations on a daily basis when cumulative catch for any of the sector's allocated species reaches 90% of the ACE. Once this threshold is reached, managers must submit daily reports for a stock when:

- A sector vessel returns to port after a sector trip that landed fish above that stock's threshold.
- A sector member completes a trade including the affected stock.

The Daily ACE Status Report includes one row per stock (Refer to Table 9 for columns). Unless otherwise noted, values are for the current fishing year.

Table 9: Daily ACE Status Report Fields

Column Heading	Description
Submission Date	Date the daily report is being submitted.
Sector Name	GARFO sector name as listed on SIMM.
Stock ID	Abbreviation for the Stock Area that incorporates both the species name and the area that species is assigned to. Includes Georges Bank East & West.
Initial Allocated ACE	The total number of (live) pounds of this stock allocated to the sector for all renewed permits in the current fishing year.
Maximum Carryover	The amount, in live pounds, of unused ACE (up to the full 10% for an allowable stock) that is carried over from the previous fishing year for all renewed permits.
De Minimis Carryover	The amount, in live pounds, of the de minimis carryover for an allowable stock
In-Season ACE Adjustment	The adjusted amount (increase or decrease), in live pounds, applied to the Initial Allocated ACE of a stock allocated to a sector in season for all renewed permits.
Total ACE With Maximum Carryover	The total number of live pounds of this stock initially allocated to the sector including the maximum carryover and In-Season ACE adjustment.
Total ACE With De Minimis Carryover	The total number of live pounds of this stock initially allocated to the sector including the de minimis carryover and the In-Season ACE adjustment.
Transfers In	The cumulative number of live pounds per stock transferred into the sector for the current fishing year.

Column Heading	Description
Transfers Out	The cumulative number of live pounds per stock transferred out of the sector for the current fishing year.
Total Transfers	The sum, in live pounds, of the Transfers In and Transfers Out columns per stock transferred by the sector for the current fishing year.
Conversions In	The cumulative number of live pounds of stock converted into Western GB ACE from Eastern GB ACE for the current fishing year.
Conversions Out	The cumulative number of live pounds of stock converted from Eastern GB ACE into Western GB ACE for the current fishing year.
Current ACE With Maximum Carryover	Total ACE, plus or minus Total Transfers, plus the values of Conversions In and Conversions Out, including the maximum carryover from the previous fishing year.
Current ACE With De Minimis Carryover	Total ACE plus or minus Total Transfers, plus the values of Conversions In and Conversions Out, including the de minimis carryover from the previous fishing year.
Harvested ACE	The cumulative number of live pounds o7f catch per stock caught on sector trips in current fishing year.
Remaining ACE With Maximum Carryover	Current ACE With Maximum Carryover minus Harvested ACE.
Remaining ACE With De Minimis Carryover	Current ACE With De Minimis Carryover minus Harvested ACE.
Percent Harvested ACE To Date With Maximum Carryover	Harvested ACE divided by Current ACE With Maximum Carryover, expressed as a percentage.
Percent Harvested ACE To Date With De Minimis Carryover	Harvested ACE divided by Current ACE With De Minimis Carryover, expressed as a percentage.

Section II: Completing the Sector Manager Report

This section of the Sector Report Guide provides step-by-step instructions on how to produce each portion of the sector report for uploading to SIMM. The section is organized in 3 parts:

- Part 1: Completing the Detail Report
- Part 2: Completing the Trip Issue Report
- Part 3: Completing the ACE Status Report

The following sections in this part of the guide show you how to complete each of these reports.

Note: If your sector has reached an ACE threshold, refer to the section Submitting the ACE Status Daily Report later in this document for instructions.

Part 1: Completing the Detail Report

This section documents the steps to prepare the Sector Manager Detail Report.

Note: VTR data is available to sector managers directly from the vessel and through SIMM. Vessel-direct VTRs are usually timelier, whereas SIMM VTR data have undergone quality control checks. VTR data directly from a vessel may be used whenever SIMM VTR data are not yet available. There can be a delay of several weeks between the date that a vessel operator submits a paper VTR and the date that the VTR becomes available in SIMM if there are data quality issues. Therefore, sector managers should base their reports on the VTRs they receive from vessels.

Following are the principal tasks in preparing the Sector Manager Detail Report.

Each of the above tasks is described in order in the following sections.

Detail Report Task A: Supply the First Set of Trip Information

Complete Task A as follows:

1. Supply the **Week Ending Date** for the previous fishing week.
2. Supply the **Sector Name** that is in your Sector Operations Plan.
3. Enter the **Vessel Permit No** for a trip.

   This is the vessel permit number assigned by the Northeast Regional Office's Vessel Permit System. This is available as the Vessel Permit Number in the Vessel Trip Report.
4. Enter one of the following as the **Trip ID**:

- eVTR Trip ID as a 14-character string.
- VTR serial number, found on the hardcopy VTR form, as an 8-character string.

  For a multi-VTR trip, use the lowest VTR number in the sequence.

5. Enter the **Trip Observed** for a trip.

- **Y** = Observed (for NEFOP, ASM, or EM trips selected for review)
- **N** = Not observed

6. Enter the **Observer Data Quality Level** for a trip.

   Reserved for future use. Value = **NULL**.

Detail Report Task B: Supply the Quantity Discard for the Trip

The discard calculations for a trip differ, depending upon whether: (1) The vessel is enrolled in an ASM or EM program; and (2) the trip was observed (by NEFOP, ASM, or selected for EM review) or not. Refer to the following sections to learn how to supply the **Quantity Discard**.

Complete Task B by performing ***one*** of the following, depending upon whether the vessel is enrolled in an ASM or EM program, and the level of trip observation, for each record.

For ASM Vessels

- If a trip was ***fully*** observed:

  Use the amount of discard observed by the observer. This value is found in column **Total Discard** in the Discard download for trips with an ASM or NEFOP observer.

- If the trip was ***partially*** observed:

  NMFS adds the sum of direct discard observations for the stock from observed hauls to the sum of the estimated stock discards for unobserved hauls. The estimated stock discards for unobserved hauls are based on the observed hauls.

  To apply a partially-observed trip value:

  - Use the appropriate value found in the column **Total Discard** in the Discard download for trips with an ASM or NEFOP observer.

- If the trip was ***not*** observed:

  For each stratum within a trip, compute the discards as follows:

  - Find the value found in column **Discard Rate** in the SIMM Discard Rate table. You will use this discard ratio value in the following step.
  - Compute the stratum-specific discard amount by using the following formula.

    Discard Amount equals Discard Rate times the Kall amount.

    For detailed information about computing discards, refer to Appendix B: Unobserved in this guide.

  Note: The discard rate changes throughout the fishing year based on a series of date ranges. This is because the discard rate is based on the number of observed trips that have occurred during the fishing year. As well as applying the current discard rate to each trip that occurred during the week, you should also apply the current discard rate to all trips that have already occurred in the fishing year.

- If the trip was observed, ***but observer data are missing***:

  Use the method described in the previous bullet section (the trip was not observed). Update the value in the Quantity Discards column in your report when the observer data become available.

For EM Vessels

- If a trip was observed by NEFOP:

  Use the method described above for ASM vessels.

- If a trip was ***fully*** observed using EM:

  NMFS will provide the discards for each stratum within a trip. Use the appropriate values found in the column **NMFS Dead Discard Quantity (ACE)** in the SIMM EM download. For EM-observed trips, the strata will be categorized as "EM" in the **NMFS Discard Sources** column of the download.

- If a trip was ***partially*** observed using EM:

  As described above, NMFS will provide the discards for each stratum within a trip. Use the appropriate values found in the column **NMFS Dead Discard Quantity (ACE)** in the SIMM EM download. The strata will be categorized as either "EM" or "VTR Delta" in the **NMFS Discard Sources** column of the download, depending on whether the effort in a given strata was observed ("EM") or not ("VTR Delta").

- If a trip was ***not*** observed using EM:

  NMFS will provide the discards for each stratum within a trip. Use the appropriate values found in the column **NMFS Dead Discard Quantity (ACE)** in the SIMM EM download. For unobserved EM trips, the strata will be categorized as "VTR Delta" in the **NMFS Discard Sources** column of the download.

- If a trip was observed using EM, but data are missing:

  Use the VTR adjusted discards as described above in the section "If a trip was not observed using EM." Update the values in the Quantity Discards column of your report when the data becomes available.

Note: The adjusted VTR values provided for unobserved EM trips or sub-trips may change throughout the fishing year as more data is added to the delta model. The delta model generates vessel- and species-specific adjustments to discards reported on the VTR based on EM data collected over the course of the fishing year. In addition to applying the adjusted VTR discard quantities to each trip that occurred during a given week, you should also check the VTR discard quantities for previous weeks to determine whether there have been changes to trips that have already occurred earlier in the fishing year.

Detail Report Task C: Supply the Next Set of Trip Information

Complete Task C as follows:

1. Enter the Enforcement Issues value for this trip. Supply one value:

- **Y** = Yes
- **N** = No

   If you set the Enforcement Issues flag to **Y**, you must document the relevant issue or issues in the Trip Issue report.

2. Supply one of the following as the **Landing Source** value:

- **ASU** (assumed)
- **DLR** (dealer)
- **VTR** (vessel)
- **VMS** (VMS catch report)

   The **Landing Source** is the source of the data for the landed weight of the catch for this trip.

3. Supply one of the following as the **Area Source** value:

- **ASU** (assumed)
- **VTR** (vessel)
- **VMS** (VMS catch report)

   The **Area Source** is the source of the data for the Stat Area fished for this trip.

4. Supply the **Date Sold** for this trip.

   This is the date of the first sale of a sector trip's catch to a seafood dealer. In the following order of preference, take this value from ***one*** of the following:

   a. The Sold To date on the Dealer receipt (**Date Sold** field of the Dealer download file in SIMM).
   b. VTR date sold (**Date Sold** field of the Vessel Trip Report).
   c. Observer-reported landing date (**Date Landed** field of the Observer download file in SIMM). You can index into SIMM files using the VTR Serial Number.

Detail Report Task D: Supply the Landed Weight for the Trip

You must supply the value in the **Landed Weight** field of the total catch for each stratum during the reporting period.

Note: Since a vessel generates information about areas fished and gears used, and the dealer has the best data available for weight by species, the best data set includes both VTR and dealer data.

What Kinds of Catch Are Included in Landed Weight?

Landed weight must include all kept fish, including:

- Fish sold to a seafood dealer
- Fish seized for violations
- Fish sold/used for bait
- Fish intended for future sale
- Sub-legal fish for research
- Legal-sized fish for research
- Legal-sized unmarketable fish (LUMF)
- Fish kept for home consumption

You must include all kept fish in each landed weight total.

How Do I Put Landed Weight into My Report?

For each species, you must determine the total dealer weight of fish caught by stratum (stock area, gear, mesh) as a portion of the total amount of that same species that was caught on the trip, according to the VTR.

Landed weight is available from the following sources:

- Dealer download file in SIMM
- Dealer weighout slip

The Dealer download file in SIMM contains both landed and live weight data. Refer to Dealer Codes for information about how to indicate all of the above categories as part of your landed weight values. Live weight is described in detail later in Detail Report Task E: Enter the Live Weight for a Trip

Example: Determining Landed Weight

Complete Task D using the following example as a model. Suppose you need to compute for Trip ID 00000000 the live weight of the following stratum:

- Stock Area = CODGBW (Cod, Georges Bank West)
- Gear Code = OHS (Otter trawl, haddock separator)
- Mesh = 1.8 inches

To do this:

1. Get all the cod values from the VTR or eVTR (this example uses a VTR).
   The parts of the VTR that contain the numbers you need are shown in Table 6.

Table 6: VTR Data for Landed Weight Example

Row	Trip ID	Gear Code	Mesh Size	Mesh Category (Derived)	Chart Area	Species Code	Stock ID (Derived)	Kept	Dealer Permit Number
1	00000000	OHS	1.8	SM	614	COD	CODGBW	800	11111
2	00000000	OHS	1.8	SM	614	COD	CODGBW	10	99998
3	00000000	OHS	1.8	SM	614	COD	CODGBW	20	2
4	00000000	OTF	6.5	LM	514	FLBB	FLWGMSS	15	11111
5	00000000	OHS	1.8	SM	514	COD	CODGMSS	700	11111
6	00000000	OHS	6.5	LM	614	COD	CODGBW	225	11111

   Note the following three characteristics of the data in Table 6:

   a. Rows 1, 2, and 3 contain the numbers for the cod stratum you want.
   b. Row 4 contains winter flounder data that are not relevant to this example.
   c. Rows 5 and 6 contain the remainder of the cod values for this trip.

   All the cod values from the trip are represented on the VTR. Mesh Category is derived using the gear code and mesh size. Stock ID (the stock area) is derived from the Chart Area and the Species Code.

2. Find out how much cod in this stratum was caught on the trip.
   The VTR data presented in Table 6 include 830 pounds of fish that were caught in the stratum Stock ID CODGBW, Gear Code OHS, and Mesh Size 1.8. In this stratum:

   a. 800 pounds of cod were sold to a dealer.
   b. 10 pounds of cod were kept for home consumption (Dealer ID 99998 = home consumption).
   c. 20 pounds of cod were kept for bait (Dealer ID 2 = bait).

   Note: Refer to the section Dealer Codes for more information about entering landed weight for catch not for dealer sale such as bait and home consumption.

3. Find out how much cod not in this stratum was caught on the trip.
   In this example, 700 and 225 pounds of cod were also caught in other stock areas or using other gear. The catch included 15 pounds of flounder, but since you are calculating landed weight for cod, do not use the flounder value for this calculation.

4. Calculate the portion of cod in this stratum against all cod caught on this trip.
   a. ***Add*** the landed weight of the cod in the stratum Stock ID CODGBW, Gear Code OHS, and Mesh Size 1.8.

      800 plus 10 plus 20 equals 830 pounds.

   b. ***Add*** all the cod caught on the trip.

      800 plus 10 plus 20 plus 700 plus 225 equals 1755 pounds.

   c. ***Divide*** the stratum landed weight for cod by the total trip landed weight for cod.

      830 divided by 1755 equals 0.47293447

      0.47293447 is the Stratum Portion; in this case, that is the portion of cod from this stratum against all cod caught on this trip. Reserve this number for the next task, which is calculating the live weight for this stratum. This next task is described in the upcoming section Detail Report Task E: Enter the Live Weight for a Trip.

Note: Catch from the same trip may be sold to multiple dealers, or there may be multiple sales from the same vessel to the same dealer. These actions result in duplicate records. You can obtain a document from GARFO that shows you how to deal with duplicate records. Ask your sector representative for more details.

Dealer Codes

To record landed weight for sale to the dealer, enter the NMFS Greater Atlantic Region permit number assigned to each dealer purchasing the catch. However, if any portion of the catch of a species is not sold to a Federally-permitted dealer, enter the appropriate dealer code listed in Table 7.

Table 7: Dealer Codes

Dealer Code	Meaning
1	Seized for violations
2	Sold to another vessel for bait or retained for bait
4	Retained for future sale
5	Sold to a non-Federal dealer (non-Federally regulated species only)
6	Sub-legal catch landed for research
7	Legal catch landed for research (EFP trips only)
8	Landed, unmarketable fish (LUMF)
99998	Home Consumption

Detail Report Task E: Enter the Live Weight for a Trip

Your Detail Report must include, in the Live Weight field, the total catch for your sector during the reporting period when dealer data are available.

Note: Since a vessel generates information about areas fished and gears used, and the dealer has the best data available for weight by species, the best data set includes both VTR and dealer data.

Live weight is the landed or hail weight multiplied by a conversion factor specific to that species and disposition when known. (You will learn how the conversion factor is used later in this section.) The conversion factor compensates for the weight that fish lose from the time they are caught until the time they are weighed.

Notes About Providing Live Weight Values

Following is a list of notes about providing live weights on your report:

- Dealer data are sometimes unavailable because a dealer report has not yet been submitted, or because fish have not been sold to a dealer, as in the case of bait or home consumption. (Refer to the section Dealer Codes for a complete list of dealer codes for catch not sold to a Federal dealer.)
- Live weight can be computed from landed weight by multiplying the landed weight by the landed-weight-to-live-weight conversion factor. Each species has a conversion factor. Table 9 shows an excerpt of the complete list of landed-to-live weight conversion factors. The full list is provided in the SIMM Downloads.
- When dealer data are not available, you may convert the landed weight to live weight. Making the conversion is optional. NMFS does not require that such conversions be made except in the case of home consumption of groundfish.
- All groundfish kept for home consumption (as reported on the VTR) is considered to be fillets or parts, and is therefore multiplied by 3, which is consistent with section §648.83(b)(1) in the Code of Federal Regulations (CFR). For example, the conversion factor for cod is 1.17 unless the fish are kept for home consumption. In that case, the conversion factor is 3:1.

Completing the Live Weight Example

Complete Task E as follows:

1. Get the live weight of the relevant species caught on the trip from the dealer data in the SIMM Downloads page.

   Table 8 continues with the landed weight example data from the previous section: 800 pounds, 700 pounds, and 225 pounds. These landed weights provide the live weight values, which are 936 pounds, 819 pounds, and 263 pounds.

Table 8: Dealer Data (for Live Weight Example)

VTR Serial Number	Market Category Code	Grade Code	Species Name	Landed Weight	Live Weight
00000000	LG	23	COD	800	936
00000000	MK	23	COD	700	819
00000000	MK	23	COD	225	263
00000000	LM	1	FLOUNDER WINTER	15	15

2. Get the cod conversion factor if necessary.

Table 9: Conversion Factors for Landed-to-Live Weight (Excerpt)

SPPCODE	SPPNAME	NESPP3 Code	Conversion Factor
CLSUB	"CLAM, SURF/BUSHEL"	769	5.24
COBIA	COBIA	057	1
COD	COD	081	1.17
CRB	"CRAB, BLUE"	700	1
CRBB	"CRAB, BLUE/BUSHEL"	700	1

3. Calculate the final live weight total for this stratum.
   a. ***Add*** the Live Pounds of Cod Sold, as shown by the dealer data.
      936 plus 819 plus 263 equals 2018 pounds.
   b. ***Convert*** the Home Consumption number.
      3 times 10 pounds equals 30 pounds.
   c. ***Convert*** the Bait number.
      20 pounds times 1.17 equals 23.4 pounds.
   d. ***Add*** the Live Pounds of Cod Sold plus the Home Consumption plus the Bait to get the Live Weight Subtotal.
      2018 plus 30 plus 23.4 equals 2071.4 pounds.
   e. ***Multiply*** the Live Weight Subtotal by the cod portion that was calculated in the previous task section Detail Report Task D: Supply the Landed Weight for the Trip.
      2071.4 times 0.47293447 equals 979.6365, the final Live Weight for the stratum.
4. In the Sector Manager Detail Report, insert the final Live Weight into the **Live Weight** column, and into the row having the corresponding **Trip ID**, **Species ITIS**, **Stock ID**, and **Gear Code**.

Additional Notes on Live Weight Values

Keep the following notes in mind when you are determining live weight:

- When dealer data are not available, you must convert the landed weight of groundfish kept for home consumption to live weight. For other instances when dealer data are not available, NMFS no longer requires that you make such conversions.
- After obtaining the final live weight for the stratum, round up or down to the nearest whole pound. (Less than 0.5 pounds, round down; 0.5 pounds or above, round up.)
- In this example, the landed-to-live weight conversion rate for cod was used for the 20 pounds of bait for which the dealer had no record. However, the conversion factor for home consumption is 3, so the 10 pounds of cod for home consumption was multiplied by 3 instead of the landed-to-live weight conversion factor for cod.
- Whenever SIMM dealer data are not available, you can use the landed-to-live weight conversion factors for all fish except groundfish landed for home consumption. Find the complete list of factors in SIMM.
- If you do not have timely dealer data and you choose to use the landed-to-live weight conversion rate table, update the final Live Weight value as soon as the dealer data become available.
- There may be multiple grades and market codes for a single species in a catch. These grades and codes determine the proper conversion factor.

Special Considerations with Conversion Factors

There are several contingencies that you should be aware of in conversions. These include:

- Skate

  There are two categories of species code on the VTR for skate. The code for skate wings ends in a "W" and the code for whole skate does not. Be sure to use the appropriate conversion factor.

- Monkfish

  There are several categories of species code on the VTR for monkfish. The code for whole monkfish does not end in a **T**. Be sure to use the appropriate conversion factor.

  - For monkfish with a species code of MONKL or MONKH, use a conversion factor of **0**.

- Legal-sized unmarketable fish (LUMF)

  The conversion factor for LUMF is **1**.

- Home Consumption

  For the purposes of accounting for all catch by sector vessels as consistent with section §648.83(b)(1)(v) in the Code of Federal Regulations (CFR), the weight of all fillets and parts of groundfish, other than whole-gutted or gilled fish, reported as at-home consumption shall be multiplied by a factor of **3**.

Detail Report Task F: Supply the Concluding Set of Trip Information

Complete Task F as follows:

1. Enter the **Species ITIS** for a trip.
   In the following order of preference, take this value from the following sources:
   a. Species ITIS column in the Dealer download file in SIMM.
   b. Vessel Trip Report
2. Enter the **Gear Code** for a trip.
   Enter the gear code from the Gear Code field in the Vessel Trip Report. Refer to the complete list of gear codes at the GARFO web site.
   (Click on this link to access the gear codes list)
3. Enter the **Mesh Cat** for a trip.
   Enter the mesh category from the Mesh field in the VTR.

Note: For all gear, a change in gear requires a new VTR. The gillnet averaging applies to gill net strings containing multiple mesh sizes.

Table 10: Mesh Categories

Gear Type	Mesh Cat	Mesh Characteristics
Gillnet gear	ELM	8 inches and greater
Gillnet gear	LM	6 to less than 8 inches
Trawl gear (OTF, OHS, OTR, OTT)	SM	Less than 3.99 inches
Trawl gear (OTF, OHS, OTR, OTT)	MM	3.99 inches to 5.74 inches
Trawl gear (OTF, OHS, OTR, OTT)	LM	Equal to or greater than 5.75 inches
Other	NA	Not applicable; consistent with discard rate strata

Special Note: A vessel can use the small-mesh exemption with most trawl gear (mobile gear) with approved modifications. Refer to the section Strata and Exemptions.

4. Enter the **Stock ID** for a Trip by doing the following:
   a. On the VTR, find and note the value in the **Chart Area** field. **Chart Area** is the statistical area (Stat Area).
   b. Refer to the **Species-to-Stock Area Values** download file in SIMM.
   c. In the **Stat Area** column, find the same value that was entered in the **Chart Area** field in the VTR.
   d. Index the value in the **Stat Area** column to the corresponding value in the **Stock Area** column.
   e. Enter the **Stock Area** value into the **Stock ID** record in the Detail Report.

   You must enter all stocks per trip even if you did not fish in a particular area for the trip. For stocks not fished, enter a zero.
5. Compute the **Harvested ACE** for the trip.

   To do this computation, add the values for **Live Weight** and the **Quantity Discard**, which was described earlier in the section Detail Report Task B: Supply the Quantity Discard for the Trip. Then compute the Harvested ACE value for each stock ID, as described later in this guide in the section Calculating Harvested ACE in Appendix B.
6. Enter the **Date Last Changed** for a trip.

   This is the date on which the trip data were last updated.
7. Enter the **Discard Rate** that applies for this trip, if applicable.

   The discard rate is available from the **Discardrate** download file. Be sure to include 9 digits after the decimal point. Enter 0 if a discard rate was not applied to this trip.
8. Enter the **Sector K_{all}** for this trip.

   Provide the Sector Kall value for the trip. Refer to Appendix C: Calculating Trip Kall Values for the Detail Report later in this guide to learn how to calculate the Kall value.

Part 2: Completing the Trip Issue Report

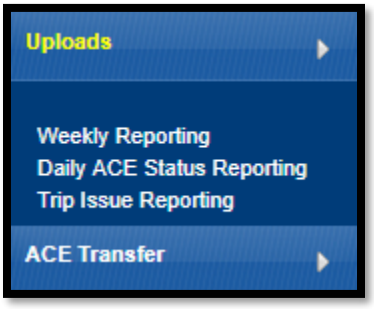
Use the Trip Issue report to provide information about sector trips for a given week that have had enforcement, data, or other types of issues. The sector must submit a Trip Issue report in order to fulfill the weekly reporting requirement, even if there were no issues during the week.

Note: Starting in FY 2019, the Trip Issue report is a form within a SIMM page that you fill out.

In the Quick Access Menu on the left side of the SIMM page, do the following:

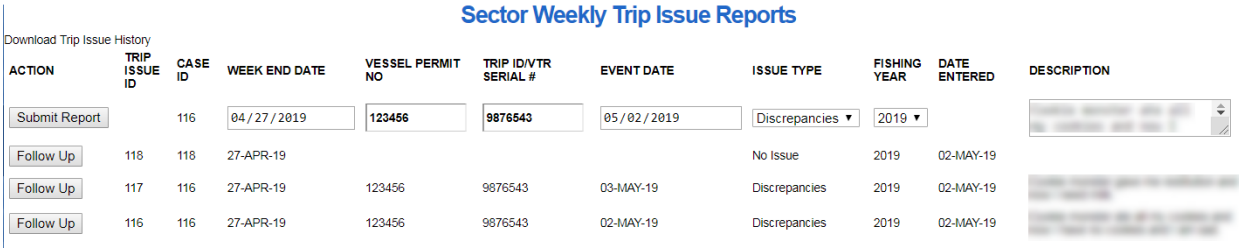
1. Click **Uploads**.
   The Uploads sub-menu appears.
2. Click **Trip Issue Reporting**.
   See Figure 1 below for an example of the Quick Access menu choice.

Figure 1: Accessing the Sector Weekly Trip Issue Reports Form Using the SIMM Quick Access Menu



SIMM opens the Sector Weekly Trip Issue Reports page, as seen in Figure 2.

Figure 2: Sector Weekly Trip Issue Reports Form



3. Use the Sector Weekly Trip Issue Reports page to perform the following tasks:

- Creating a New Trip Issue Report
- Editing an Existing Trip Issue Report
- Downloading the Trip Issue History Report

Refer to the sections immediately following for information about these tasks.

IMPORTANT: Do not use the Trip Issue form to report data errors; use the JIRA process instead.

Creating a New Trip Issue Report

To submit a new Trip Issue Report, do the following:

1. In the topmost line of the report (with the Submit Report button), verify the **Fishing Year**.
   The **Trip Issue ID** and **Case ID** fields will be supplied by SIMM.
2. If necessary, enter the **Week End Date** using the calendar buttons in the field box.
   The week ending date is the Saturday ending the last week included in the report.
3. Enter the correct number in the **Vessel Permit No** field, if applicable.
   This is the vessel permit number assigned by the Northeast Regional Office's Vessel Permit System. Find the Vessel Permit Number in the **Vessel Trip Report** download file in SIMM.
4. Enter the **Trip ID** (or the **VTR Serial #**) of the fishing trip in question, if applicable. The value should be ***one*** of the following:
   a. 14-character eVTR Trip ID.
   b. 8-character VTR Serial Number (in the upper-right corner of the VTR paper form)
5. Enter in the **Event Date** field the date on which the event in question occurred, using the calendar buttons in the field box.
6. Choose the appropriate category in the **Issue Type** dropdown menu. Categories include:
   a. **No Issue** (there were no trip issues to report this week)
   b. **Enforcement** (issue involves one or more law enforcement agencies — for example, a stop of a sector vessel by a USCG cutter)
   c. **Discrepancies** (issue involves any discrepancies between reported and actual totals or trips)
   d. **Monitoring** (issue involves ASM or NEFOP monitoring program)
   e. **Other** (Something else that NMFS personnel should be aware of))
7. Provide details about the event or incident in the **Description** field. Try to keep the description to the length of a short paragraph – two or three sentences.
8. Click **Submit Report** to upload the report to NMFS.

Editing an Existing Trip Issue Report

1. Click the **Follow Up** button.
2. If necessary, select the desired fishing year in the **Fishing Year** pulldown menu.
3. Enter the **Week End Date** using the calendar buttons in the field box.
4.
5. Make the changes you require.
6. Click **Submit Report** to upload the changes to NMFS.

Downloading the Trip Issue History Report

1. Click the **Download Trip Issue History** link in the upper-left corner of the form.
2. Select the fishing year in the pulldown, then the **Data From** and **Date To** values.
3. Click **Generate Report in Excel** or **Generate Report in CSV**.

Part 3: Completing the ACE Status Report

The ACE Status Report allows sector managers to report their ACE status calculations. Each report should be labeled according to the date on which the fishing week ends and the sector name. (You submit the ACE Status Report on a weekly basis unless you are near any ACE limits; if this is the case, you must submit an ACE Status Daily Report. Refer to the next section in this guide, Submitting the ACE Status Daily Report, for details.)

Note: A sector every year may carry over unused ACE, up to 10% of its previous FY allocation. This is referred to as the *maximum carryover*. A sector may use a portion of the carryover (up to 1% of their current allocation) without the possibility of payback in the following year if the ACL is exceeded. This is referred to as the *de minimis carryover*.

Submitting the ACE Status Report

You submit the ACE Status Report on a weekly basis.

1. Enter the **Week Ending Date** that applies to this report.
2. Enter the **Sector Name** for this report.
3. Enter each **Stock ID**.

   For each Stock ID, enter a row in the Sector Manager ACE Status Report. Fill this column with the corresponding Stock IDs. You must enter all stocks even if you did not fish in a particular area. For stocks not fished, enter a zero.
4. Enter the **Initial Allocated ACE** for each Stock ID.

   This value is the total number of (live) pounds of this stock allocated to the sector for all renewed permits in the current fishing year.
5. Enter the **Maximum Carryover** for each Stock ID where applicable.

   This value is the amount, in live pounds, of unused ACE (up to the full 10% for an allowable stock) that is carried over from the previous fishing year for all renewed permits.
6. Enter the **De Minimis Carryover** for each Stock ID where applicable.

   This value is the amount, in live pounds, of the de minimis carryover for an allowable stock.
7. Enter the **In-Season ACE Adjustment** for each Stock ID where applicable.

   This value is the adjusted amount, in live pounds, applied to the **Initial Allocated ACE** of a stock allocated to a sector in season for all renewed permits.
8. Enter the **Total ACE with Maximum Carryover** for each Stock ID.

   This value is the total number of live pounds of this stock initially allocated to the sector including **Maximum Carryover** and **In-Season ACE Adjustmen**t.
9. Enter the **Total ACE with De Minimis Carryover** for each Stock ID.

   This value is the total number of live pounds of this stock initially allocated to the sector including **De Minimis Carryover** and **In-Season ACE Adjustment**.
10. Enter the cumulative **Transfers In** for each Stock ID.

    This value is the cumulative number of live pounds per stock transferred into the sector for the current fishing year.

11. Enter the cumulative **Transfers Out** for each Stock ID.

    This value is the cumulative number of live pounds per stock transferred out of the sector for the current fishing year.

12. Enter the sum of the **Total Transfers** by Stock ID.

    This value is the sum of the Transfers In and Transfers Out columns, in live pounds, per stock transferred by the sector for the current fishing year.

13. Enter the **Conversions In** for each Stock ID (if applicable).

    This value is the cumulative number of live pounds of this stock converted into Western GB ACE from Eastern GB ACE for the current fishing year. For non-applicable stocks, supply a value of zero.

14. Enter the **Conversions Out** for the Stock ID (if applicable).

    This value is the cumulative number of live pounds of stock converted from Eastern GB ACE into Western GB ACE for the current fishing year. For non-applicable stocks, supply a value of zero.

15. Enter the **Current ACE With Maximum Carryover** for each Stock ID.

    This value equals the Total ACE plus or minus Total Transfers, including Maximum Carryover from the previous fishing year.

16. Enter the **Current ACE With De Minimis Carryover** for each Stock ID.

    This value equals the Total ACE plus or minus Total Transfers, including De Minimis Carryover from the previous fishing year.

17. Enter the **Harvested ACE** for each Stock ID.

    For each row (i.e. Stock ID) in the ACE Status Report, sum all the Harvested ACE values over all rows with corresponding Stock ID in the Detail Report table, over all Detail Reports since the start of the year. Enter that sum.

18. Enter the **Remaining ACE With Maximum Carryover** for each Stock ID.

    This value is **Current ACE With Maximum Carryover** minus **Harvested ACE**.

19. Enter the **Remaining ACE With De Minimis Carryover** for each Stock ID.

    This value is **Current ACE With De Minimis Carryover** minus **Harvested ACE**.

20. Enter the **Percent Harvested ACE To Date With Maximum Carryover** for each Stock ID.

    This value is **Harvested ACE** divided by **Current ACE With Maximum Carryover** expressed as a percentage.

21. Enter the **Percent Harvested ACE To Date With De Minimis Carryover** for each Stock ID.

    This value is **Harvested ACE** divided by **Current ACE With De Minimis Carryover** expressed as a percentage.

Submitting the ACE Status Daily Report

A sector must increase the reporting frequency for its ACE Status Report from weekly to daily when 90% of any of that sector's ACEs is reached. The Sector Manager, or a designated representative, must notify NMFS immediately by email or postal mail if the threshold that triggers daily reporting has been reached. During the period when a sector has reached or exceeded 90% of any of its ACEs, a daily ACE Status Report must be submitted only on a day when a member vessel lands, or when the sector engages in an ACE transfer of a stock that is exceeding the 90% threshold.

Note: A sector every year may carry over unused ACE, up to 10% of its previous FY allocation. This is referred to as the *maximum carryover*. A sector may use a portion of the carryover (up to 1% of their current allocation) without the possibility of payback in the following year if the ACL is exceeded. This is referred to as the *de minimis carryover*.

To complete the ACE Status Daily Report:

1. Enter the **Submission Date** that applies to this daily report.
2. Enter the **Sector Name** for this report.
3. Enter each **Stock ID**.

   For each Stock ID, enter a row in the Sector Manager ACE Status Report. Fill this column with the corresponding Stock IDs. You must enter all stocks even if you did not fish in a particular area. For stocks not fished, enter a zero.
4. Enter the **Initial Allocated ACE** for each Stock ID.

   Note: This value is the total number of (live) pounds of this stock allocated to the sector for all renewed permits in the current fishing year.

   ---
5. Enter the **Maximum Carryover** for each Stock ID where applicable.

   This value is the amount, in live pounds, of unused ACE (up to the full 10% for an allowable stock) that is carried over from the previous fishing year for all renewed permits.
6. Enter the **De Minimis Carryover** for each Stock ID where applicable.

   This value is the amount, in live pounds, of the de minimis carryover for an allowable stock.
7. Enter the **In-Season ACE Adjustment** for each Stock ID where applicable.

   This value is the adjusted amount, in live pounds, applied to the **Initial Allocated ACE** of a stock allocated to a sector in season for all renewed permits.
8. Enter the **Total ACE With Maximum Carryover** for each Stock ID.

   This value is the total number of live pounds of this stock initially allocated to the sector including **Maximum Carryover** and **In-Season ACE Adjustment**.
9. Enter the **Total ACE With De Minimis Carryover** for each Stock ID.

   This value is the total number of live pounds of this stock initially allocated to the sector including **De Minimis Carryover** and **In-Season ACE Adjustment**.

10. Enter the cumulative **Transfers In** for each Stock ID.

    This value is the cumulative number of live pounds per stock transferred into the sector for the current fishing year.

11. Enter the cumulative **Transfers Out** for each Stock ID.

    This value is the cumulative number of live pounds per stock transferred out of the sector for the current fishing year.

12. Enter the sum of the **Total Transfers** by Stock ID.

    This value is the sum of the Transfers In and Transfers Out columns, in live pounds, per stock transferred by the sector for the current fishing year.

13. Enter the **Conversions In** for each Stock ID (if applicable).

    This value is the cumulative number of live pounds of this stock converted into Western GB ACE from Eastern GB ACE for the current fishing year. For non-applicable stocks, supply a value of zero.

14. Enter the **Conversions Out** for the Stock ID (if applicable).

    This value is the cumulative number of live pounds of stock converted from Eastern GB ACE into Western GB ACE for the current fishing year. For non-applicable stocks, supply a value of zero.

15. Enter the **Current ACE With Maximum Carryover** for each Stock ID.

    This value equals the **Total ACE** plus or minus **Total Transfers**, including **Maximum Carryover** from the previous fishing year.

16. Enter the **Current ACE With De Minimis Carryover** for each Stock ID.

    This value equals the **Total ACE** plus or minus **Total Transfers**, including **De Minimis Carryover** from the previous fishing year.

17. Enter the **Harvested ACE** for each Stock ID.

    For each row (i.e. Stock ID) in the ACE Status Report, sum all the **Harvested ACE** values over all rows with corresponding Stock ID in the Detail Report table, over all Detail Reports since the start of the year. Enter that sum.

18. Enter the **Remaining ACE With Maximum Carryover** for each Stock ID.

    This value is **Current ACE With Maximum Carryover** minus **Harvested ACE**.

19. Enter the **Remaining ACE With De Minimis Carryover** for each Stock ID.

    This value is **Current ACE With De Minimis Carryover** minus **Harvested ACE**.

20. Enter the **Percent Harvested ACE To Date with Maximum Carryover** for each Stock ID.

    This value is **Harvested ACE** divided by **Current ACE With Maximum Carryover** expressed as a percentage.

21. Enter the **Percent Harvested ACE to Date With De Minimis Carryover** for each Stock ID.

    This value is **Harvested ACE** divided by **Current ACE With De Minimis Carryover** expressed as a percentage.

ACE Status Daily Report Guidelines

The following are guidelines for submitting ACE Status daily reports:

- Sector managers are required to submit an ACE Status daily report only for those stocks that have reached the "90%" threshold.
- Once your sector has reached the threshold, you are required to submit an ACE Status daily report when either of the following conditions apply:
  - When any vessel in your sector returns to port following a sector trip in the affected stock area.
  - When the sector completes a trade including the affected stock.

  You are not required to submit an ACE Status daily report if your sector has not fished in the affected stock area and has not completed trades involving the affected stock.
- If two sector trips in the affected stock area land on the same day, you would submit one ACE Status daily report that incorporates both trips. If the two sector trips land on different days, you would submit two separate daily reports, one each time a trip has landed.
- Prepare the daily ACE Status report as described in the section Sector Manager Daily ACE Status Report. The Detail Trip report, the Trip Issue report, and the full ACE Status report are to be completed and submitted on a weekly basis.
- Sector managers may stop submitting daily ACE Status reports for the 90% threshold when either of the following conditions apply:
  - You obtain sufficient ACE for the affected stock so that catch falls below the threshold.
  - Your updated data indicate that the affected stock landings have fallen below the 90% level.
- Sector managers are in charge of ensuring that ACEs for groundfish stocks are not exceeded.

Section III: Submitting the Sector Manager Report

Once your sector manager report has been compiled, you submit the report as follows:

1. Log in to SIMM with your valid SIMM login and password.
   Click here to access the SIMM login page
2. Indicate to SIMM the proper sector, as appropriate.
3. Click **Uploads**.
4. Click **Weekly Reporting, Daily ACE Status Reporting**, or **SIMM Trip Issue Reporting**, as appropriate.
   Sectors must submit their reports weekly. In addition, if cumulative catch for any of its allocated stocks reaches 90% of the sector's ACE for that stock, sector managers must prepare and submit a daily ACE Status report.
5. Choose the specific report to upload to GARFO.
6. Click **Submit Report**.

For more information about this process, refer to the *SIMM User Guide*.

Note: A lease-only sector should submit only the ACE Status Report for the weekly upload; this type of sector should not submit a Detail Report or a Trip Issue Report.

Troubleshooting Upload File Errors (Detail and ACE Reports)

Be aware of the following components to check when you are attempting to troubleshoot errors with the Sector Report upload process.

Upload File Format

Ensure that the upload file is in the correct format (that is, the file must be either a **.csv** or a **.xls** file). Within these files themselves, ensure that you render the values correctly.

Column Headings

Ensure that the column headings have both of the following characteristics:

- Are the column headings spelled correctly?

  Check the spelling in the *Sector Report Guide Addendum*, located in the **Sector > Reporting** tab at the following link: SFD Web page.

- Are the column headings in the correct order?

  Incorrect ordering is more likely to occur at the beginning of fishing year, as GARFO typically enacts any structural changes to the tables at that time. Check the data column order in the *Sector Report Guide Addendum*, located in the **Sector > Reporting** tab at the following link: SFD Web page.

Data Types

Ensure that the data match their data types. A date field must contain a date, a number field must contain a number, and so forth. (Some Sector Reports contain copy-and-paste data, which can lead to data errors.) Also ensure that data values do not violate data type limits (for example, that a value does not exceed the character length specified by the data type). Check the limits in in the *Sector Report Guide Addendum*, located in the **Sector > Reporting** tab at the following link: SFD Web page.

Initial ACE Values

The ACE Status Report includes one stock per row. Ensure that the value in the **Initial Allocated ACE** field for each stock in the ACE Status Report exactly matches the relevant **Initial Allocated ACE** value that GARFO has. If the upload has failed, GARFO may have adjusted a stock or stocks during the current fishing year due to GARFO activating a fishing permit mid-year.

Stock ID

Ensure that you list correctly the values in the **Stock ID** field in the Sector report. Refer to the official list of Stock IDs in the *Northeast Multispecies Sector Year-end Report Guide*, located through the following link: SFD Web page.

Section IV: Appendixes

This section provides useful reference material for your sector reporting operations, including:

Appendix A: Sources for the Sector Manager Detail Report

Table 11 below provides a list of data sources for the Sector Manager Detail Report.

How to Use the Data Sources Matrix?

The first column, **Detail Report Column**, in Table 11 lists in order the column headings in your Sector Detail Report: **Week Ending Date**, **Sector Name**, **Vessel Permit No**, and so forth. The other columns in Table 11 show you the sources where you can get the data to complete each record (row) of your report.

Each row of your report will contain a record of each stratum (species, area, gear). For Stratum X, for example, Table 11 shows you that you can find the **Date Sold** information for that catch in the dealer report, the VTR, the SIMM VTR download file, or the SIMM Observer download file.

For instructions on completing the Sector Manager Report, start with the section Part 1: Completing the Detail Report in this guide.

Table 11: Data Sources for the Detail Report

Column Name	Hardcopy VTR	SIMM VTR Download	SIMM Dealer Download	Sector Manager	Other
Week Ending Date	Not Applicable	Not Applicable	Not Applicable	Supplies date that is derived from **Date Landed** data	Not Applicable
Sector Name	Not Applicable	Not Applicable	Not Applicable	Supplies name as displayed in SIMM	Not Applicable
Vessel Permit No	Paper VTR: Vessel Permit Number — Field 3	Vessel Permit Number	Vessel Permit Number	Not Applicable	SIMM Observer; VMS Catch Report
Trip ID	Paper VTR: VTR Serial number (8 integers) in upper right-hand corner	Trip ID	Not Applicable	Not Applicable	VTR, eVTR, AMS; VMS Catch
Trip Observed	Not Applicable	Not Applicable	Not Applicable	Not Applicable	SIMM Observer, Trips with Observers; EM Discard downloads
Observer Data Quality Level	NULL	Reserved for future use. Value = NULL.	NULL	NULL	NULL
Enforcement Issues	Not Applicable	Not Applicable	Not Applicable	Sets flag in Trip Issue Report based on information from sector.	Not Applicable

Column Name	Hardcopy VTR	SIMM VTR Download	SIMM Dealer Download	Sector Manager	Other
Landing Source	Not Applicable	Not Applicable	Not Applicable	Supplies one of the following: • ASU(assumed) • DLR (dealer) • VTR • VMS	Not Applicable
Area Source	Not Applicable	Not Applicable	Not Applicable	Supplies one of the following: • ASU(assumed) • VTR • VMS	Not Applicable
Date Sold	Paper VTR: Field 22, Date Sold	**Date Sold**	**Date Sold**	Not Applicable	**Date Landed** in the SIMM Observer file (from observer on board)
Species ITIS	Paper VTR: Field 17, Species Code Name	**Species ITIS**	**Species ITIS**	Not Applicable	SIMM Observer; VMS Catch (Species Kept)
Gear Code	Paper VTR: Field 7, Gear Fished (alpha code)	**Gear Code**	Not Applicable	Not Applicable	Not Applicable
Mesh Cat	Paper VTR: Field 8, Mesh/Ring Size (derived from list codes)	**Mesh Category**	Not Applicable	Not Applicable	SIMM Observer
Stock ID	Paper VTR: Field 13, Chart Area (derived from stat area)	**Area (Statistical Area)**	Not Applicable	Performs computation – see procedure in this document.	SIMM Observer; VMS Catch (Stat Area)
Landed Weight	Paper VTR: Field 18 — Kept Pounds	**Quantity Kept**	**Landed Weight**	Not Applicable	VMS Catch (Pounds Kept)
Live Weight	Not Applicable	Not Applicable	**Live Weight**	Applies landed-to-live conversion factor.	NMFS conversion factor

Column Name	Hardcopy VTR	SIMM VTR Download	SIMM Dealer Download	Sector Manager	Other
Quantity Discard	Paper VTR: Field 19, Discarded	**Quantity Discard**	Not Applicable	**For ASM vessels**: Provides the discards for 100% observed trips or applies the discard rate process for partially observed and unobserved trips. **For EM vessels**: provides the discards for NEFOP observed, EM observed, or EM unobserved trips.	SIMM Observer; SIMM Discard; SIMM Discardrate; EM Discard downloads
Harvested ACE	Not Applicable	Not Applicable	Not Applicable	Sums landed/kept totals and discard totals with certain exclusions.	Not Applicable
Date Last Changed	Not Applicable	Not Applicable	Not Applicable	Supplies most recent date this report was changed.	Not Applicable
Discard Rate	Not Applicable	**Discardrate**	Not Applicable	Supplies the discard rate that applies to this trip. Include 9 digits after the decimal point. Disacrd rate is 0 if not applicable.	Not Applicable
Sector Kall	Not Applicable	Not Applicable	Not Applicable	Sums the total of all kept fish, excluding discards, in live pounds for the entire trip.	Not Applicable

Appendix B: Unobserved Discards and Harvested ACE for Vessels Enrolled in the At-Sea Monitoring Program

You need reliable information about the total groundfish catch, landings, and discards in order to make sure that your sector stays within its ACE. This appendix shows you how to calculate discards for unobserved trips taken by vessels enrolled in an ASM program, and how to calculate your sector's harvested ACE.

Example Trip for Estimating Discards

To estimate discards, use the discard method presented here. This section uses a fishing trip example to show you how to do this. The example is simple in order to present the basic logic. In the following example, an unobserved fishing trip has returned the following data:

- Species caught: haddock, cod, yellowtail, and skate
- Statistical areas fished: 522 and 521 (Georges Bank, including Georges Bank West)
- Gear used: otter trawl, bottom, fish (OTF)
- Mesh category: Large mesh (LM)

IMPORTANT: Remember that all allocated groundfish species in a stock area are discard species. This means you must calculate discards for ***all allocated groundfish species in each stock area fished***. You will see this later in the example.

Major Steps to Calculate Unobserved Discards

To calculate the discards from an unobserved trip, perform the following steps in order:

1. Identify the Strata from the Trip
2. Calculate the Stratum Portions
3. Apply the Stratum Portions to the Dealer Data
4. Calculate the Kall for Each Stratum
5. Calculate the Discards for Each Stratum

Refer to the next section for a detailed example of computing discards using these steps

Identify the Strata from the Trip

Remember that a stratum comprises several key items of information from the trip:

- Stat Area (obtained from the **Chart Area** from the VTR)
- Gear
- Mesh
- Exemption (if applicable)

If *any* of these items changes on a trip, that change creates a new stratum, and the vessel owner/operator must complete a new VTR. Also, be aware that different species may generate different sets of strata. The strata may change for each discard species, so you must repeat this process for each discard species. For example, a flounder species can differ in its stock identification, depending on the stock areas in which they are caught.

VTR Data for the Example

For this example, the VTR data for this trip is shown in Table 12 and Table 13. There are two strata, so there are two VTRs. (If there is more than one stratum, be sure to record the Kept weight for each stratum.) Pounds are in round numbers for easier reference. Assume for this example that Kept weight for the strata is 800 and 1300 pounds, respectively.

Table 12: VTR Data (First Stratum)

VTR Serial Number	Stat Area (Chart Area)	Gear	Mesh Category	Species	Kept Weight
11111111	522	OTF	LM	Cod	100
11111111	522	OTF	LM	Haddock	500
11111111	522	OTF	LM	Yellowtail	200

Table 13: VTR Data (Second Stratum)

VTR Serial Number	Stat Area (Chart Area)	Gear	Mesh Category	Species	Kept Weight
11111112	521	OTF	LM	Skate	400
11111112	521	OTF	LM	Haddock	800
11111112	521	OTF	LM	Yellowtail	100

Allocated Groundfish Discard Species

See Table 14 for the allocated groundfish discard species for the Stat Areas recorded for this trip. Note that the Stock IDs for yellowtail flounder and winter flounder differ per stat (chart) area.

Table 14: Allocated Groundfish Discard Species

Species	Stock ID for Stat Area 522	Stock ID for Stat Area 521
Cod	CODGBW (Georges Bank West)	CODGBW (Georges Bank West)
Haddock	HADGBW (Georges Bank West)	HADGBW (Georges Bank West)
Pollock	POKGMASS	POKGMASS
Witch Flounder	WITGMMA	WITGMMA
Yellowtail Flounder	**YELGB**	**YELCCGM**
Plaice	PLAGMMA	PLAGMMA
Halibut	HALGMMA	HALGMMA
Winter Flounder	**FLWGB**	**FLWSNEMA**
Redfish	REDGMGBSS	REDGMGBSS

Calculate the Stratum Portions

For each species that was caught on the trip, you need to find out the percentage of that species that was caught in each stratum. This percentage is called the **portion**.

Calculate the stratum portion as follows:

The Kept weight from the VTR for this K_{all} species caught in this stratum
Divided by
The Kept weight from the VTR for this K_{all} species for the entire trip.

This results in the portions shown in Table 15 and Table 16 immediately following.

Table 15: Agrregated Kall Species from the VTR

Species	Pounds for Stat Area 522	Pounds for Stat Area 521	Total Pounds
Cod	100	0	100
Haddock	500	800	1300
Yellowtail	200	100	300
Skate	0	400	400

Table 16: Calculating the Stratum Portions

Species	Stat Area by VTR	Stock ID	Stratum Portion
Cod	522	CODGBW	100/100=1.00
Cod	521	CODGBW	0/100=0.00
Haddock	522	HADGBW	500/1300=0.38
Haddock	521	HADGBW	800/1300=0.62
Yellowtail	522	YELGB	200/300=0.67
Yellowtail	521	YELCCGM	100/300=0.33
Skate	522	NA	0/400=0.00
Skate	521	NA	400/400=1.00

Note: The apportionment values for cod and haddock are irrelevant because the stock is consistent across the two stat areas fished.

Apply the Stratum Portions to the Dealer Data

To get the apportioned live weight for each stratum, multiply the **Stratum Portion** from Table 16 by the **Total Live Weight**. The **Total Live Weight** value for each stratum equals the sum of the following two values:

- `Live Weight Dealer`

  The species weight sold to and recorded by the dealer.

- `Live Weight Non-Dealer`

  The species weight landed but not sold to the dealer and then converted to live weight (such as bait and home consumption). In this example, all fish landed have been sold to a dealer, so this value equals zero.

Refer to Table 17 and Table 18 to see how the live weights are apportioned.

Note: If you do not have the dealer **Live Weight** values yet, get the **Kept** weight values in the VTR and convert them to live weight by using the SIMM download file **Landed-to-Live Conversion Factors**.

Table 17: Total Live Weight

Species	Live Weight Dealer	Live Weight Non-Dealer	Total Live Weight
Cod	126	0	126
Haddock	1308	0	1308
Yellowtail	319	0	319
Skate	899	0	899
Total K_{all}	**2652**	**0**	**2652**

Table 18: Applying Stratum Portions to Dealer Data

Species	Stat Area (by VTR)	Stock ID	Stratum Portion (from Table 19)	Total Live Weight by Species	Apportioned Weight
Cod	522	CODGBW	1.00	126	126
Cod	521	CODGBW	0.00	126	0
Haddock	522	HADGBW	0.38	1308	497
Haddock	521	HADGBW	0.62	1308	811
Yellowtail	522	YELGB	0.67	319	214
Yellowtail	521	YELCCGM	0.33	319	105
Skate	522	NA	0.00	899	0
Skate	521	NA	1.00	899	899

Calculate the K_{all} for Each Stratum

Sum the apportioned live weights within each stratum in order to get the K_{all} value for each stratum. Refer to Table 19 and Table 20 immediately following to see the K_{all} values for this example.

Table 19: Calculating the K_{all} for Stratum 522

Species	Stat Area (by VTR)	Stock ID	Stratum Portion (from Table 19)	Total Live Weight by Species	Apportioned Weight
Cod	522	CODGBW	1.00	126	126
Haddock	522	HADGBW	0.38	1308	497
Yellowtail	522	YELGB	0.67	319	214
Skate	522	NA	0.00	899	0
TOTAL Kall	NA	NA	NA	NA	837

Table 20: Calculating the K_{all} for Stratum 521

Species	Stat Area (by VTR)	Stock ID	Stratum Portion (from Table 19)	Total Live Weight by Species	Apportioned Weight
Cod	521	CODGBW	0.00	126	0
Haddock	521	HADGBW	0.62	1308	811
Yellowtail	521	YELCCGM	0.33	319	105
Skate	521	NA	1.00	899	899
TOTAL Kall	NA	NA	NA	NA	1815

Calculate the Discards for Each Stratum

Multiply each K_{all} in each stratum by the discard rates you obtain from the SIMM DISCARDRATE download file. Refer to Table 21 and Table 22 immediately following to see the results. Use the following formula to calculate the discards for a stratum:

`Stratum Discards = Stratum Discard Rate` **`times`** `Stratum` K_{all}

Table 21: Calculating Discards for Stratum 522

Stock ID	Stratum K_{all}	Discard Rate	Unobserved Discard Pounds
CODGBW	836.77	0.001105	0.9248
HADGBW	836.77	0.003936	3.2941
POKGMASS	836.77	0.005039	4.2176
WITGMMA	836.77	0.008870	7.4245
YELGB	836.77	0.014005	11.7219
PLAGMMA	836.77	0.000067	0.0557
HKWGMMA	836.77	0.007936	6.6424
FLWGB	836.77	0.004755	3.9798
REDGMGBSS	836.77	0.001391	1.1642

Table 22: Calculating Discards for Stratum 521

Stock ID	Stratum K_{all}	Discard Rate	Unobserved Discard Pounds
CODGBW	1815.23	0.001105	2.0054
HADGBW	1815.23	0.003936	7.1432
POKGMASS	1815.23	0.005039	9.1457
WITGMMA	1815.23	0.008870	16.0996
YELCCGM	1815.23	0.004044	7.3390
PLAGMMA	1815.23	0.000067	0.1209
HKWGMMA	1815.23	0.007936	14.4037
FLWSNEMA	1815.23	0.002244	4.0725
REDGMGBSS	1815.23	0.001391	2.5245

Use these values to supply the discard data for each stratum in your Sector Detail report.

Note: GARFO treats Electronic Monitoring (EM) trips as separate strata. EM discard rates have a flag labeled **EFP_EM1, EFP_EM2, or EFP_EM3** in the **Other Strata** column in the DISCARDRATE download file.

Additional Information about Skates

Skate species are sometimes difficult to distinguish, leading to mismatches between VTR and dealer species identification. Skates appear in the present context as a K_{all}-species. Due to frequent misidentification, convert skate species codes to a uniform code such as:

VTR code = SKATE ***or*** NESPP3 code = 365

Do this prior to matching the VTR to a dealer species. You can do this without any loss of accuracy in the discard calculation.

Calculating Harvested ACE

When you have the discard values, you can calculate the Harvested ACE values for your Sector Detail report. (Note that the Harvested ACE process holds for observed and unobserved discards, but in this continuing example you are using unobserved discards.)

Combine Live Weight and Discards for Harvested ACE Values

To calculate Harvested ACE values, sum the Discard Value with the Live Weight Value for each stock in each stratum. Table 23 and Table 24 immediately following show the Harvested ACE values for the two strata from this example trip.

Table 23: Harvested ACE Values for Stratum 522

Stock ID	Live Weight	Unobserved Discards	Total ACE Harvested
CODGBW	126	0.9248	127
HADGBW	497	3.2941	500
POKGMASS	0	4.2176	4
WITGMMA	0	7.4245	7
YELGB	214	11.7219	226
PLAGMMA	0	0.0557	0
HKWGMMA	0	6.6424	7
FLWGB	0	3.9798	4
REDGMGBSS	0	1.1642	1

Table 24: Harvested ACE Values for Stratum 521

Stock ID	Live Weight	Unobserved Discards	Total ACE Harvested
CODGBW	0	2.0054	2
HADGBW	811	7.1432	818
POKGMASS	0	9.1457	9
WITGMMA	0	16.0996	16
YELCCGM	105	7.3390	112
PLAGMMA	0	0.1209	0
HKWGMMA	0	14.4037	14
FLWSNEMA	0	4.0725	4
REDGMGBSS	0	2.5245	3

Consolidate Harvested ACE by Stock ID

Finally, consolidate the Total Harvested ACE values per Stock ID for an individual vessel for the trip. This helps keep track of ACE totals for sector vessels during the fishing year. Table 25 immediately following shows the results of adding the Total Harvested ACE values for each stratum per Stock ID that resulted from this example trip.

Table 25: Havested ACE by Stock ID

Stock ID	Total ACE Harvested for Stratum 522	Total ACE Harvested for Stratum 521	Total ACE Harvested by Stock ID
CODGBW	127	2	129
HADGBW	500	818	1318
POKGMASS	4	9	13
WITGMMA	7	16	24
YELGB	226	0	226
YELCCGM	0	112	112
PLAGMMA	0	0	0
HKWGMMA	7	14	21
FLWGB	4	0	4
FLWSNEMA	0	4	4
REDGMGBSS	1	3	4

Appendix C: Calculating Trip K_{all} Values for the Detail Report

This document provides an example of calculating the value for the **Sector Kall** field in the Detail report. The example includes several factors to account for in the **Sector Kall** value for the trip, including missing dealer data, allocated and non-allocated species, and home consumption and bait poundage.

Note: In the tables used to illustrate the report contents, only relevant report columns are shown for the purposes of layout in this guide.

Read the sections below in sequence to learn how to arrive at the Sector Kall value.

- Determine the Data That You Have and Don't Have
- Provide the Landed Weight for the Trip
- Get the Conversion Factors You Need
- Compute the Live Weight for the Stocks Unreported by the Dealer
- Compute the Final Live Weight for Each Stratum
- Supply Harvested ACE Total for the Trip
- Add Totals to Obtain Sector Kall for the Trip

Note: In order to simplify this example, assume that this trip was fully observed and that the discard values are from the Observer report in SIMM.

Determine the Data That You Have and Don't Have

To get the trip values you require for your Detail Report:

1. Compare the VTR information for a trip with the available Dealer information about that trip.

   One way to do this is to sort the Dealer download first by **Vessel Permit No**, then by **Date Sold**. At that point, you can crosscheck the results against the VTR itself or against the VTR download file. Assume for this example that the values in **Date Sold** are the same day for both the vessel and the dealer. Refer to Table 26 in order to review the Dealer data.

Note: Two of the species, cod and haddock, are allocated groundfish stocks but the other three species (halibut, cusk, and skate) are not, and therefore do not count against discards and harvested ACE.

Table 26: Selected Trip Data from Dealer Download

Dealer Permit Number	VTR Serial Number	Date Sold	Species	Landed Weight	Live Weight
BBBB	00000000	6/3/2014	HADD	212	242
BBBB	99999999	6/3/2014	HADD	455	519
BBBB	00000000	6/3/2014	HAL	112	129
BBBB	00000000	6/3/2014	CUSK	37	42

Refer to Table 27 following in order to review the VTR data for use in this example.

Table 27: Selected Trip Data from VTR Download (Plus Stock and Stratum Info)

Dealer Permit Number	VTR Serial Number	Date Sold	Gear	Mesh Size	Chart Area	Species	Stock ID (Derived)	Kept Pounds	Discard Pounds
AAAA	11111111	6/3/2014	OTF	6.5	512	COD	CODGMSS	825	0
BBBB	00000000	6/3/2014	OTF	6.5	511	HADD	HADDGM	210	10
BBBB	99999999	6/3/2014	OHS	6.5	511	HADD	HADDGM	450	15
BBBB	00000000	6/3/2014	OTF	6.5	511	HAL	HALGMMA	110	0
BBBB	00000000	6/3/2014	OTF	6.5	511	CUSK	N A	40	0
2	00000000	6/3/2014	OTF	6.5	511	SKA	N A	24	0
99998	99999999	6/3/2014	OHS	6.5	511	HADD	HADDGM	20	0

Note: Dealer Permit No. ***99998*** = home consumption, and Dealer Permit No. ***2*** = bait. Refer to Dealer Codes for a complete list of codes to use if catch is not to be sold to a Federal dealer.

2. Determine the disposition of the information for the trip.

   Comparing the Dealer and VTR information, you determine the following:

   a. The catch from the trip was sold to two dealers, AAAA and BBBB. Dealer AAAA has not provided a Dealer report yet. Therefore, for the weight values required on your Sector report, you must do the following:
      - Use the **Kept** pounds from the VTR until the **Landed Weight** and **Live Weight** values on the Dealer report become available to you.
      - Perform the landed-to-live pounds' conversion for the VTR weight values until Dealer AAAA provides the poundage data.

   b. The VTR indicates that a non-allocated groundfish species, halibut, is part of the catch.

   c. The VTR indicates that a non-groundfish species, cusk, is part of the catch.

   d. The VTR indicates that bait and home consumption, neither of which a dealer is required to report, is part of the catch.

Provide the Landed Weight for the Trip

Remember that landed weight must include all kept fish, including:

- Fish sold to a seafood dealer
- Fish seized for violations
- Fish sold/used for bait
- Fish intended for future sale
- Sub-legal fish for research
- Legal-sized fish for research
- Legal-sized unmarketable fish (LUMF)
- Fish kept for home consumption

Table 28 shows the landed weights for this trip.

Table 28: Landed Weights for the Example Trip

Stock	Pounds Kept in the Stratum
CODGMSS	825
HADDGM (OTF)	212
HADDGM (OHS)	475 (that is, 455 pounds caught plus 20 pounds of home consumption)
HALIBUT	112
CUSK	37
SKATE	24

Get the Conversion Factors You Need

Remember that you need to supply the landed-to-live weight conversion factors for the weight of the catch as listed on the VTR. When the Dealer data become available at a future time, swap out the VTR weight data for the Dealer data. (NMFS has already computed the live weight for the other species.) Table 29 shows the conversion factor for Atlantic cod.

Table 29: Landed-to-Live Conversion Factors for Unreported Species in this Example

SPPCODE	SPPNAME	NESPP3	Conversion Factor
COD	COD	81	1.169

Compute the Live Weight for the Stocks Unreported by the Dealer

To get the final numbers for the live (kept) weight for catch unreported by the dealer:

3. Convert the VTR pounds from landed weight to live weight using the appropriate conversion factors in SIMM. Remember to round the number to the nearest whole number.

Table 30 shows the live weights for the trip.

Table 30: Live Weights for the Trip

SPPCODE	VTR Quantity Kept Multiplied by Conversion Factor	Live Weight	Rounded Weight	Comments
COD	825 times 1.169	964.425	964	Conversion factor standard
SKATW	24 times 2.27	54.48	54	Conversion factor for skate wings
HADD	20 times 3	60	60	Conversion factor of 3 for stocks designated by the vessel as home consumption

Compute the Final Live Weight for Each Stratum

In the Detail Report, do the following:

4. Include the **Live Weight** totals you factored from the VTR weights with your other data. Remember that you will have to update those values once the unreported dealer numbers arrive. Refer to Table 31 for the final live weights for this example.

Table 31: Final Live Weights

Stock	Live Weight	Additional Weight	Final Live Weight	Comments
CODGMSS	964	Not Applicable	964	Computed live weight from VTR
HADDGM (OTF)	242	Not applicable	242	Live Weight from Dealer report
HADDGM(OHS)	519	Multiply 20 pounds times conversion factor of 3. Total is 60 pounds for home consumption	579	Live Weight from Dealer report plus home consumption
HALIBUT	129	Not applicable	129	Live Weight from Dealer report
CUSK	42	Not applicable	42	Live Weight from Dealer report
SKATE	54	Not applicable	54	Bait

Supply Harvested ACE Total for the Trip

In the Detail Report, do the following:

5. Add **Live Weight** and **Quantity Discard** for each stratum. Put the sum of the two values as the value in **Harvested ACE**. There is no ACE value for halibut, cusk, or skates as non-allocated species, and there are no discard values required for anything other than the 16 allocated groundfish stocks. Refer to Table 32 for the harvested ACE values.

Table 32: Supplying the Harvested ACE

Trip ID	Gear	Mesh Size	Stock ID	Final Live Weight	Discard	Harvested ACE
ZZZZZZ	OTF	6.5	CODGMSS	964	0	964
ZZZZZZ	OTF	6.5	HADDGM	242	10	252
ZZZZZZ	OHS	6.5	HADDGM	579	15	594
ZZZZZZ	OTF	6.5	HALGMMA	129	0	0
ZZZZZZ	OTF	6.5	CUSK	42	0	0
ZZZZZZ	OTF	6.5	SKATW	54	0	0

Add Totals to Obtain Sector K_{all} for the Trip

After you have completed the preliminary work in the previous sections:

Total the **Live Weight** values (which reflect the **Kept** weight) for the entire trip to get the **Sector Kall** value from the trip, as in Table 33.

Table 33: Sector Kall Value for the Trip

Trip ID	Stock	Kept
ZZZZZZ	CODGMSS	964
ZZZZZZ	HADDGM	242
ZZZZZZ	HADDGM	579
ZZZZZZ	HALGMMA	129
ZZZZZZ	CUSK	42
ZZZZZZ	SKATW	54

The **Sector Kall** value, based on the sum of the values in the **Kept** field, equals 2010 pounds.

In your Detail Report, insert the **Sector Kall** value for the trip into each stratum. Notice that you need to include the **Sector Kall** value for the entire trip in each row, as in Table 34.

Table 34: Adding the Sector Kall Value to the Detail Report

Trip ID	Gear	Mesh Size	Stock ID	Live Weight	Discard	Harvested ACE	Sector Kall
ZZZZZZ	OTF	6.5	CODGMSS	964	0	964	2010
ZZZZZZ	OTF	6.5	HADDGM	242	10	252	2010
ZZZZZZ	OHS	6.5	HADDGM	579	15	594	2010
ZZZZZZ	OTF	6.5	HALGMMA	129	0	0	2010
ZZZZZZ	OTF	6.5	CUSK	42	0	0	2010
ZZZZZZ	OTF	6.5	SKATW	54	0	0	2010

Appendix D: Guide to Catch Accounting for the Audit Model Electronic Monitoring Program

This document describes the catch accounting methodology for sector vessels enrolled in the audit model EM program. This methodology may be subject to change in future fishing years if warranted based on new data collected under the program.

Goals and Objectives

The goal of the audit model EM program is to collect information to meet sector monitoring requirements and, in particular, improve accounting of discarded groundfish catch. The program uses monitoring data provided by a third-party service provider via the EM Detail File to monitor area fished and verify estimates of groundfish discards reported by the vessel on its eVTR. The vessel's self-reported discard estimates, as adjusted based on the vessel's past performance in the program (*i.e.*, reporting accuracy), are used for the purposes of catch accounting.

Estimates of groundfish discards reported by the vessel on its eVTR will serve as the basis for catch accounting on trips that are not selected for audit. The discard estimates will be adjusted by a **delta factor** to determine the total ACE charged to the sector to account for discards. Trips that are selected for audit will be charged ACE based on the discards reported in the EM Detail File. NEFOP data will still be used to account for groundfish discards on NEFOP-observed trips taken by vessels in the audit model EM program.

What is the Delta Model?

The **delta model** is a vessel- and species-specific estimation of the precision and accuracy of the vessel's self-reported discards. The **delta model** is used to adjust the vessel's self-reported discards to account for over- or under-reporting of discard estimates.

We build the **delta model** by comparing discard estimates on the eVTR to the EM Detail File on trips selected for audit. A trip selected for audit must meet these minimum standards to be included in the calculations contributing to a vessel's **delta model** estimations:

- **Less than 10 percent of processed discards are unidentifiable** – The third-party service provider must be able to identify 90 percent or more of the processed discards *to species* in order for the haul to be valid for catch accounting. If this performance standard is not met, the data from the haul will be considered invalid and will not be used due to poor data quality. Reasons for poor quality data may include improper catch handling (*e.g.*, impeding camera view during measuring) or problems with the video (*e.g.*, video gaps).

- **Sub-trip is fully observed** – In order to be included in a vessel's **delta model** estimation, a trip or sub-trip (defined as data grouped by gear category and statistical area) must be fully (*i.e.*, 100 percent) observed as defined in the video reviewer guidance.
- **EM and eVTR units of effort must be equivalent for comparison** - The number of sub-trips and/or hauls reported on the eVTR and EM Detail File must match (e.g., If the EM Detail File reports effort in two statistical areas for a given trip, the captain must also create a record for each sub-trip on the eVTR).

Applying Discards to an EM Trip

Required Data Elements

Vessel Trip Report	***EM Detail File***
Statistical area	Statistical area
Gear type and mesh size	Gear category (*e.g.*, trawl)
Estimated weight of groundfish discards (live wt.)	Calculated weight of groundfish discards (live wt.)
Data collected at the trip/sub-trip level	Data collected at the haul-level

The statistical area, gear type, and mesh size reported on the eVTR is compared to the area fished and gear category information reported in the EM Detail file. The discard data provided in the EM Detail File is aggregated at the trip or sub-trip level and compared to the estimated groundfish discards reported on the eVTR to complete the audit and build the vessel's **delta model** adjustments.

Data Available for Download on SIMM

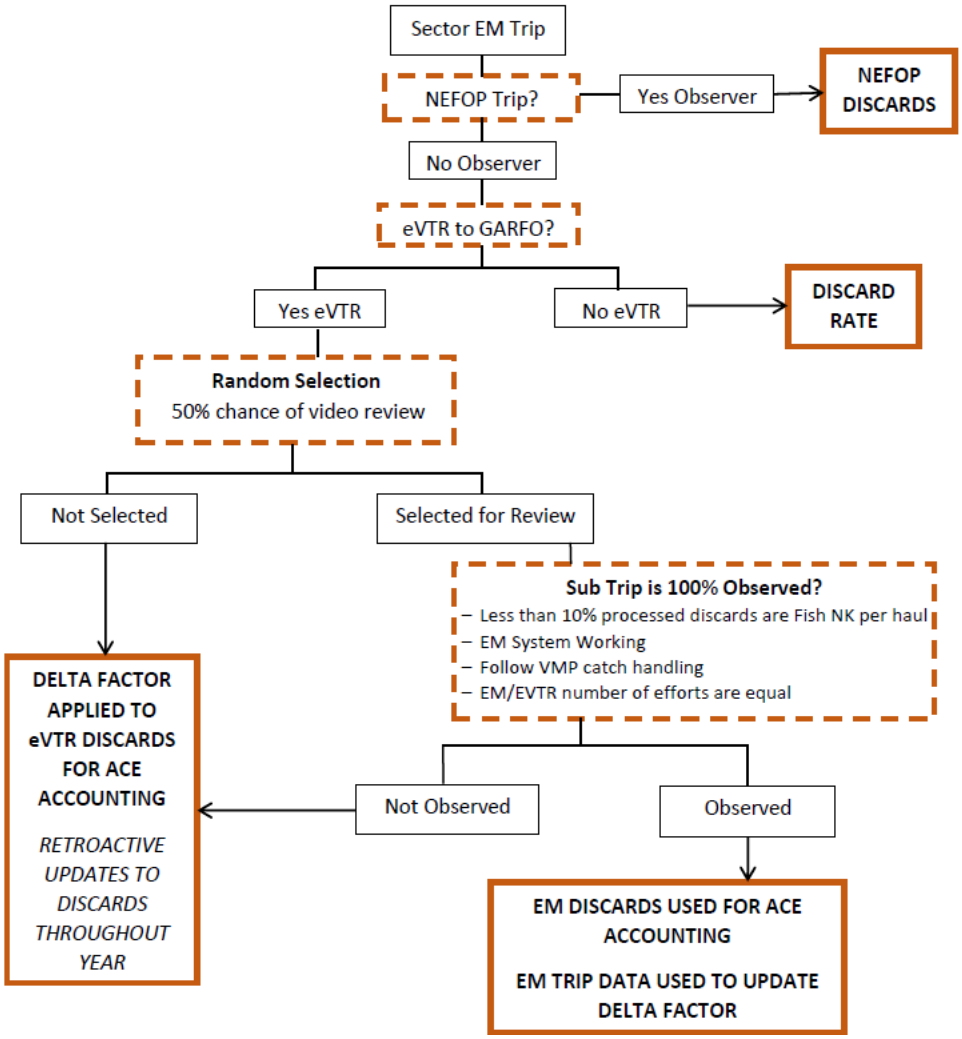
EM Discard Download

We intend to include the following information in the download. However, the information included may change as we refine the program:

- Sector ID and name;
- Vessel name, MRI, permit number, and hull number;
- VTR serial number, date sail and date land, statistical area, gear code, mesh category, and mesh size;
- VTR species code, species name, stock area, NESPP3 code, NESPP4 code, species ITIS;
- Quantity discarded for groundfish stocks, as reported on the VTR;
- Data source (EM/VTR);
- Quantity discarded for groundfish stocks, as determined by NOAA Fisheries (*i.e.*, EM Detail File for trips selected for audit only; VTR discards as adjusted by vessel-specific **delta factors** for unselected trips only); and
- Quantity of ACE discards for groundfish stocks as determined by NOAA Fisheries and adjusted to account for species- and gear-specific discard mortality ratios.

NOTE: The assigned discard source may vary between sub-trips if a sub-trip is not fully observed.

Discard Data Flow for Vessels in an Audit Model Electronic Monitoring Program



Performance Standards

Vessel- and species-specific **delta model** adjustments are built by comparing groundfish discard data reported on the vessel's eVTR to the EM Detail File for audited trips. In order to be used in the **delta model**, the trip must meet the minimum standards described above. Trips that do not meet these standards may be indicative of performance issues (*e.g.*, system hardware issues, catch handling issues). The **delta model** requires sufficient data to meet precision and accuracy standards to inform catch accounting. Vessels that meet these standards may be audited at reduced rates in future years, whereas vessels that do not meet these standards may be audited at increased rates. Vessels with especially poor performance that prevents adequate monitoring via EM may be assigned assumed discard rates.

Questions and Answers

Q: How do I know whether a given trip passed or failed the audit?

A: Under this approach, trips are not categorized as "passing" or "failing" the audit based on the accuracy of the vessel's self-reported discards. Discard data reported by the third-party service provider in the EM Detail File forms the basis for discard catch accounting on audited trips (i.e., discards are "EM-observed") and discard data reported on the eVTR, as adjusted by vessel- and species-specific **delta model** estimates, forms the basis for discard catch accounting on unaudited trips. NEFOP data will still be used to account for groundfish discards on NEFOP-observed trips taken by vessels in the audit model EM program. Trips selected for audit must meet minimum standards to be used in the **delta model** estimation.

Q: Why is the **delta model** *not* stratifying on stock, gear type, or mesh size?

A: The **delta model** is quantifying the captain's ability to accurately estimate the weight of discarded groundfish catch by species. A captain's estimate of the weight for discards of a given species is independent of stock, gear type, and mesh size. For example, we would expect a captain to estimate a similar weight for a discarded haddock regardless of whether it is caught with extra-large mesh gillnet gear or large mesh otter trawl gear. Crucially, the expected variance scales by weight, acknowledging that absolute error will be relative to the volume of discarded catch.

Q: Why don't these discard calculations incorporate the trip/sub-trip Kall?

A: The **delta model** relies on the captain's self-reported discard estimates for a trip as adjusted based on past performance (*i.e.*, over- or under-reporting of discard estimates). This method focuses on the accuracy of the captain's self-reports over time and recognizes that catch of discards may vary from trip to trip independent of the Kall.

Q: Do changes in **delta model** adjustments apply retroactively to previous trips?

A: Yes, **delta model** estimates are modified as additional trips are audited and incorporated into the model. When new data is added to the model, the previous **delta model** adjustments are updated accordingly. This may result in adjustments to the calculated quantity of ACE discards over time as participating vessels hone their discard estimation skills.

Q: What should I use at the start of the year before the delta factors have been built?

A: At the start of the year, EM vessels will have an adjustment factor of 1 for each species. The **delta model** adjustments will be updated as additional data are incorporated into the model. In future years, EM vessels may be assigned **delta model** adjustments at the start of the year based on data from previous years.

Q: How do I account for discards if the captain has not submitted the eVTR yet?

A: The eVTR is necessary to determine whether a trip will be selected for audit and to calculate discards for a trip. We may use discard rates to impute discards for a given trip until we receive the eVTR.

NOAA FISHERIES

FDDI and CAMS Update

NRCC Meeting
November 17, 2021

Greater Atlantic Regional Fisheries Office

Northeast Fisheries Science Center

Fisheries Dependent Data Initiative

- The Fisheries Dependent Data Initiative (FDDI) is being advanced by both GARFO and the NEFSC to modernize and integrate regional fisheries dependent data systems.

- The scope of the initiative includes data collected from fishing trips and the information systems used to collect and process these data to support our monitoring requirements (quota monitoring and stock assessments) and fishery managers.

What Are We Working On?

- Implementing the omnibus eVTR reporting action.
- Finalizing the FDDI Vision Document.
- Revising the Roadmap/Implementation Plan
- Developing a new eVTR data model to support the expansion of new data needs (lobster) as well as gear or fishery based eVTRs and Fish Online OSR.
- Expanding OSR capabilities to include Southeast for-hire and commercial logbooks.
- Continuing development of the Catch Accounting and Monitoring System (CAMS).

What's next?

- Finalize the Roadmap/Implementation Plan.
- Development of the universal trip identifier (UTID)
  - Identify how the UTID will be generated and propagated into individual data streams
- Develop and execute an eVTR data model implementation plan.

Catch Accounting and Monitoring System (CAMS)

- CAMS is a joint GARFO and NEFSC venture to implement a shared data system for quota monitoring and stock assessments.

- The objective is to provide a single, comprehensive source for all US commercial catch (landings and discards) for quota monitoring, stock assessment, protected resource estimation, ecosystem modeling, and other needs of GARFO and NEFSC in a fully documented relational database with appropriate user views and tables.

What We've Done Since May NRCC Meeting

- **June**
  - Completed the first draft of CAMS output tables for calendar year 2019 data
    - Common set of landings for each stock for each fishing trip.
- **July to mid-October**
  - Addressed initial feedback from NEFSC and GARFO CAMS Team members based on evaluation of the 2019 data.
  - This led to improvements in CAMS that will then be applied in the generation of the 2019 and 2020 calendar year data.

What We're Doing Now

- **Mid-October to December**
  - Assigned co-Project Managers to ensure CAMS achieves data necessary for the 2022 stock assessment process.
  - Established dual Teams that will work in parallel to finalize the landings and discard components of CAMS
  - Fine tuning CAMS to produce one landings number for each species on each trip.
    - Review and comparison of the CAMS replicates of the 2019 AA Tables by species experts and incorporating input from GARFO and Center species experts.
  - Developing one set of discard estimates for each species.

What's next?

- **December 2021**
  - CAMS landings output data for calendar year 2019 data.
- **February 2022**
  - CAMS will provide 2020 and 2021 landings to inform 2022 assessments.
    - 2019 landings will come from the 2019 AA Tables
- **March 2022**
  - CAMS discard output tables for calendar year 2019 through 2021 data
    - The goal is to complete one set of discard estimates for each stock, including discard estimates for each species for each trip.
      - Given the complexities of the various discard methodologies (i.e., SBRM, EM audit model, etc), discard output tables may not be available until summer 2022 to inform the September stock assessments.
    - If we cannot achieve our goal, we will calculate discards for 2019-2021 using status quo bycatch methodologies.

What's next?

- **Summer 2022**
  - Provide briefing for Council and ASMFC staffs
  - Development of Peer Review Process
  - Development of Change Board approach to ensure CAMS will continue to process and will evolve over time as new data and processes (e.g., FDDI) become available.
  - Continued development of CAMS.
    - Inclusion of aggregated state data in CAMS

Questions?

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

December 14, 2021

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

Dear Eric:

The total target level of at-sea monitoring (ASM) coverage required for Northeast multispecies sectors in fishing year 2022 will be 99 percent of all sector trips subject to the at-sea monitoring program. An ASM target coverage level of 99 percent is the highest level I am allowed to set under the regulations. This target level helps address bias, supports the collection of information and data that will help make future determinations of appropriate ASM coverage levels, and provides the additional benefit of preparing our ASM infrastructure for higher required coverage, if Amendment 23 is approved. I am announcing my determination now to allow time for us to support increased coverage, for monitoring providers to hire and train additional staff, for sectors to negotiate with providers to contract for services, and for industry members to make decisions for fishing year 2022. In the event that Amendment 23 is not approved, I may re-evaluate my coverage level determination if public comments on the Amendment or our Amendment 23 decision merit revisiting our 2022 target coverage level determination.

Each year, we complete an analysis to determine the level of ASM coverage required to estimate discards for each Northeast multispecies stock with no greater than a 30-percent coefficient of variation (CV). However, as a result of the COVID-19 health emergency, gaps in available observer and monitoring data for fishing year 2020 prevented us from completing a CV analysis to inform the 2022 target coverage level, which normally would have relied on data from the 2020 fishing year. Since fishing year 2020, in addition to the CV analysis, we have also considered the four analyses of bias developed by the Groundfish Plan Development Team (PDT) and the peer review by a sub-panel of the Council's Scientific and Statistical Committee (SSC)[1]. I previously determined in fishing years 2020 and 2021 that it would be inappropriate to base the target coverage level solely on the results of the CV analysis, and instead set the fishing coverage level target at a level that aimed to address bias to the extent practicable. Similarly, the

[1] The SSC sub-panel concluded that "(T)he set of studies provide substantial support to conclude that there are differences both in discarding behavior and in fishing behavior between observed and unobserved trips. The analyses suggest that discard estimates from observed trips should not be used to estimate discards from unobserved trips, or at minimum not without some adjustments. In addition, this suggests it is not appropriate to determine a level of observer coverage that should be deployed by considering the coefficient of variation of discard estimates from observer coverage since observed trips are not representative of unobserved trips."

2022 target coverage level must continue to account for bias beyond previous coverage levels in light of the PDT's and SSC sub-panel's conclusions. The precise level of coverage under 100 percent that sufficiently removes or reasonably accounts for bias remains unknown. There is still not sufficient information available to make this determination, and to date both we and the PDT have been unable to develop a new method or analysis for calculating this precise target coverage below 100 percent.

We expect to continue to have funding available to reimburse industry for all of its at-sea monitoring costs in fishing year 2022, including sector costs for electronic monitoring.
If you have further questions about the fishing year 2022 ASM coverage target, please contact Sarah Bland, Assistant Regional Administrator for Sustainable Fisheries, at (978) 281-9257.

Sincerely,

Michael Pentony
Regional Administrator