Winter Flounder Technical Committee Task List

Activity Level: Medium

Committee Overlap Score: Low

Committee Task List
• Review of the RI proposal regarding aggregate weekly limits in the SNE/MA commercial winter flounder fishery (to be presented at Spring Board Meeting) • Annual state compliance reports are due December 1

TC Members

Paul Nitschke (NEFSC – Chair), Tony Wood (NEFSC), Dr. Robert Pomeroy (UCONN), Sally Sherman (ME DMR), Greg Decelles (MA DMF), Rebecca Heuss (NHFG), Linda Barry (NJ DFW), Paul Nunnenkamp (NYS DEC), John Maniscalco (NYS DEC), John Lake (RI DFW)

Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Winter Flounder Management Board

FROM: Winter Flounder Technical Committee

DATE: April 23, 2018

SUBJECT: Analysis on Proposal for Aggregate Weekly Limits in Commercial SNE/MA Fishery

At their February meeting, the Winter Flounder Management Board (Board) tasked the Winter Flounder Technical Committee (TC) with analyzing the potential impacts of aggregate trip limits in the commercial Southern New England/Mid-Atlantic (SNE/MA) winter flounder fishery. This task was in response to a proposal submitted by Rhode Island, which aims to provide greater flexibility to harvesters who are currently held to a 50 lb per day trip limit in state waters.

Background

Addendum I to the Winter Flounder FMP established a maximum possession limit of 50 lb in the commercial SNE/MA fishery. This low trip limit was in response to results of the 2008 Winter Flounder Stock Assessment which concluded that the SNE/MA winter flounder stock was severely depleted, with spawning stock biomass at only 9% of the target biomass[1]. While NOAA Fisheries established a moratorium in the SNE/MA fishery in federal waters, the Board implemented a 50 lb trip limit in state waters. The intent of this measure was to "achieve the lowest possible F rate while minimizing economic and social impacts, and dead discards, and prevent an influx of effort into state waters."[2] At the time, the Board did consider a zero possession limit; however, there were concerns that a moratorium may increase discarding and terminate the collection of fisheries-dependent data. As a result, the 50 lb trip limit was intended "solely to allow for bycatch"[3].

In April 2013, NOAA Fisheries removed the moratorium and allocated SNE/MA winter flounder to sectors and the common pool, allowing for the directed harvest of winter flounder while also making federal permit holders accountable for their catch. In contrast, the 50 lb trip limit in state waters remained. Results of the 2017 Operational Stock Assessment continue to conclude that the SNE/MA stock is overfished, with spawning stock biomass at record low abundance (4,360 mt in 2016 compared to 5,801 mt in 2008).[4] Overfishing is not occurring in the stock.[5]

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[1] NEFSC, 2008. Report of the 3rd Groundfish Assessment Review Meeting (GARM III). https://www.nefsc.noaa.gov/publications/crd/crd0815/crd0815.pdf

[2] ASMFC. 2009. Addendum I to Amendment 1 to the Interstate Fishery Management Plan for Inshore Stocks of Winter Flounder. http://www.asmfc.org/uploads/file/addendumIAm1.pdf

[3] ASMFC, 2009.

[4] NEFSC, 2017. Southern New England Mid-Atlantic Winter Flounder Operational Stock Assessment. https://www.nefsc.noaa.gov/publications/crd/crd1717/snema_winter_flounder.pdf

[5] NEFSC, 2017.

Proposal for Aggregate Trip Limits

Submitted in February 2018, Rhode Island's proposal seeks to provide flexibility to state-waters harvesters, and address inequities between state and federal regulations, by instituting an aggregate weekly limit in the commercial SNE/MA fishery. The proposal includes three management options for consideration; however, for the purposes of the TC's analysis, there are primarily two types of aggregate weekly limits.

- A 250 lb/week limit year-round
- A 350 lb/week limit in April – June and November – December. For the rest of the year, the limit would remain at 50 lb/day.

Data

To analyze the potential impacts of an aggregate weekly trip limit, the TC pulled landings data on the SNE/MA fishery between 2014 and 2016. More specifically, trip-level landings reports for state-only permit holders were gathered from the states of Massachusetts through New Jersey. These data included any trips which landed at least 1 pound of winter flounder; the name and poundage of all other species landed on the trip were also included in the data query. Vessels with federal permits were not included in this analysis since those vessels are limited by hard quotas regardless of whether they fish in federal or state waters. However, the present 50 lb trip limit in state waters is likely discouraging federal vessels from fishing in state waters.

Trends in the Data

As a first step, the TC investigated trends in the landings data from the SNE/MA stock. Figure 1 shows total commercial landings in the SNE/MA stock per year while Figures 2-4 show the number of winter flounder trips for each year (2014, 2015, 2016) by week and state. Overall, Figure 1 shows that state landings in the SNE/MA fishery have decreased from 2014 to 2016. Figures 2-4 illustrate that most of the trips are occurring in Rhode Island, with a significant number of trips also occurring in New York. In addition, the figures show clear seasonal trends in the fishery, with much of the effort occurring in the late-spring (weeks 18-24 generally correspond with May and early June). In all three years, there was also a smaller pulse of effort in the fishery at the end of the year (late October-December).

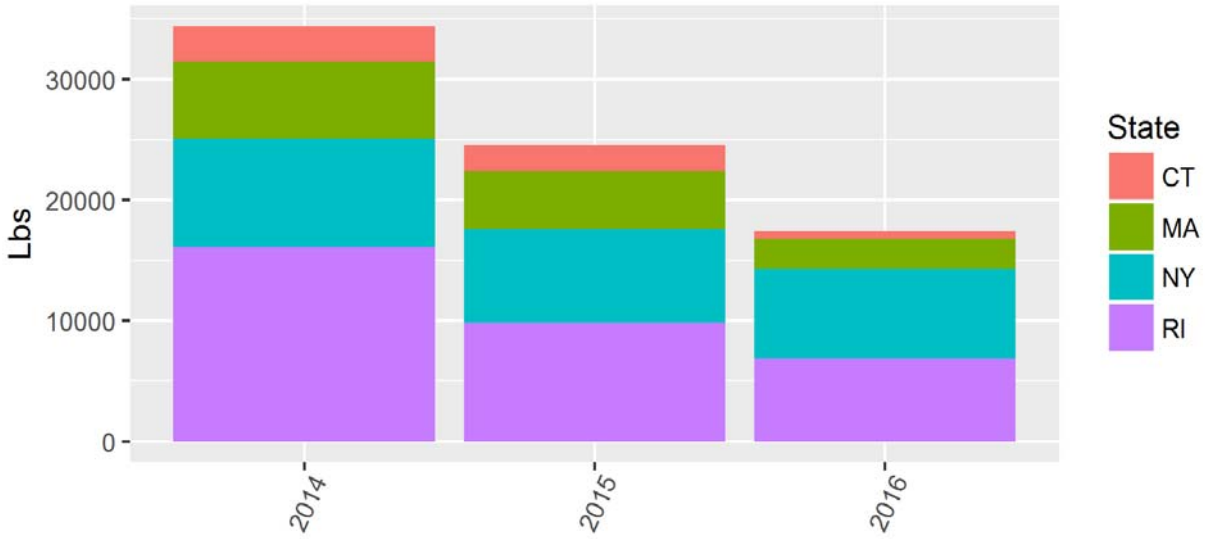

Figure 1: Pounds landed in the commercial SNE/MA winter flounder fishery by year and state. NJ data was omitted due to confidentiality rules.

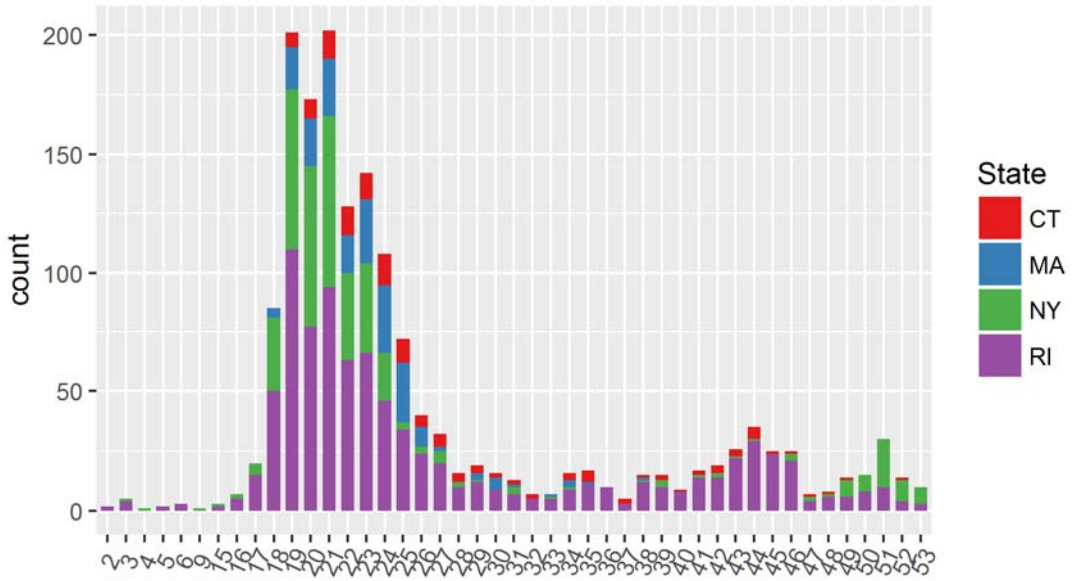

Figure 2: Number of winter flounder trips in 2014 by week and state. The x-axis represents each week in a calendar year. NJ data was omitted due to confidentiality rules.

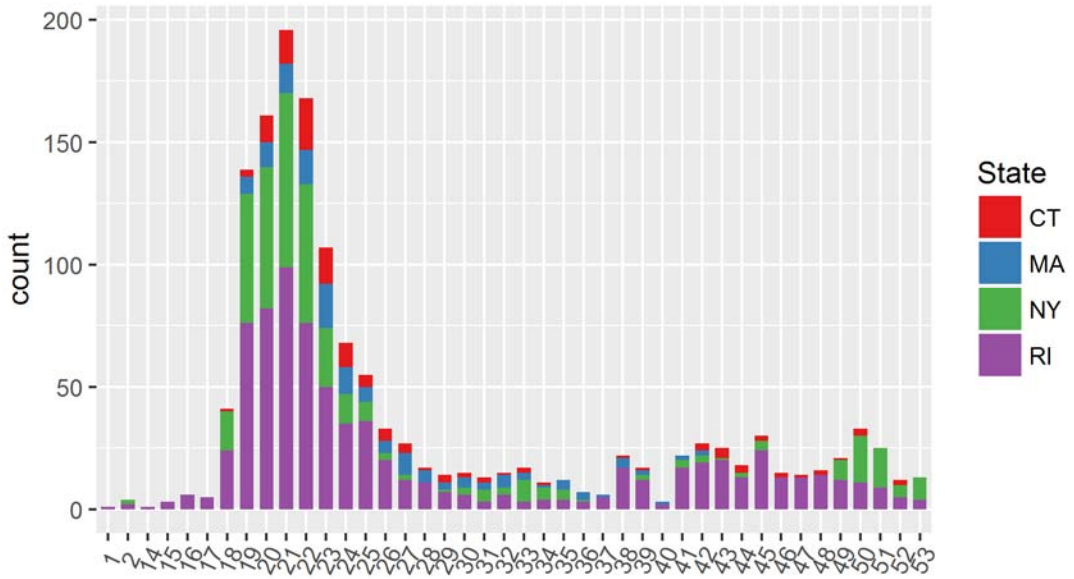

Figure 3: Number of winter flounder trips in 2015 by week and state. The x-axis represents each week in a calendar year. NJ data was omitted due to confidentiality rules.

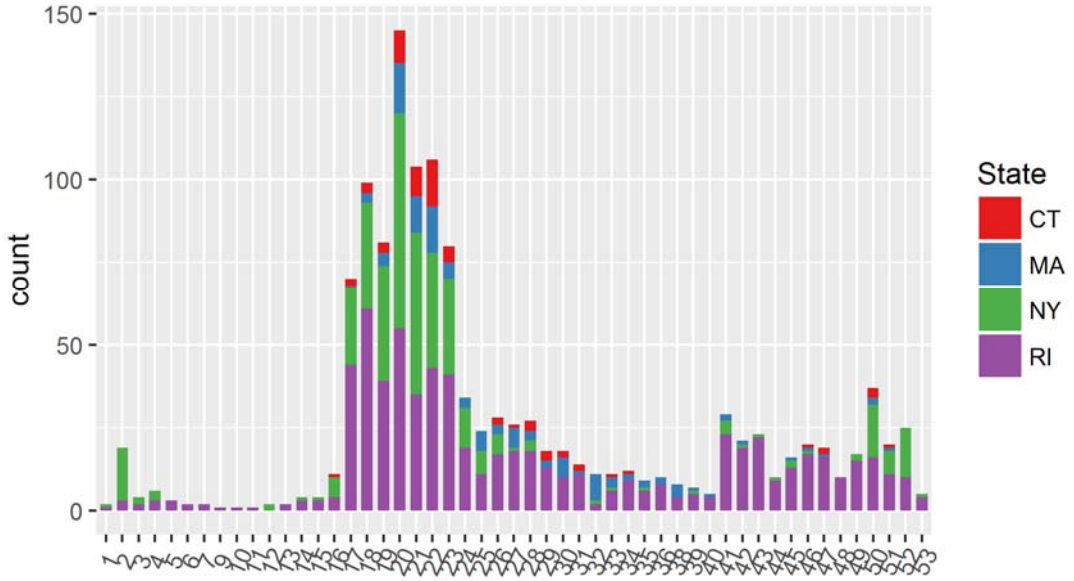

Figure 4: Number of winter flounder trips in 2016 by week and state. The x-axis represents each week in a calendar year. NJ data was omitted due to confidentiality rules.

Figures 5-7 show the landings of winter flounder, in pounds, for each year (2014, 2015, 2016) by week and state. Again, the graphs show that the highest landings are coming from Rhode Island and New York, and the greatest amount of winter founder are harvested in the late-spring (weeks 18-24 generally correspond with May and early June).

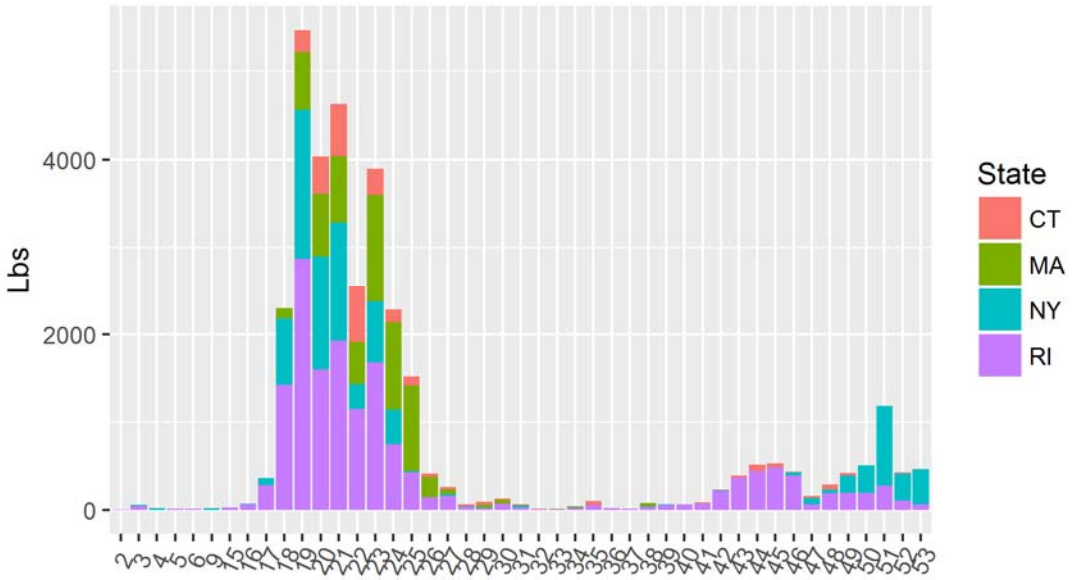

Figure 5: Pounds of winter flounder landed in 2014 by week and state. The x-axis represents each week in a calendar year. NJ data was omitted due to confidentiality rules.

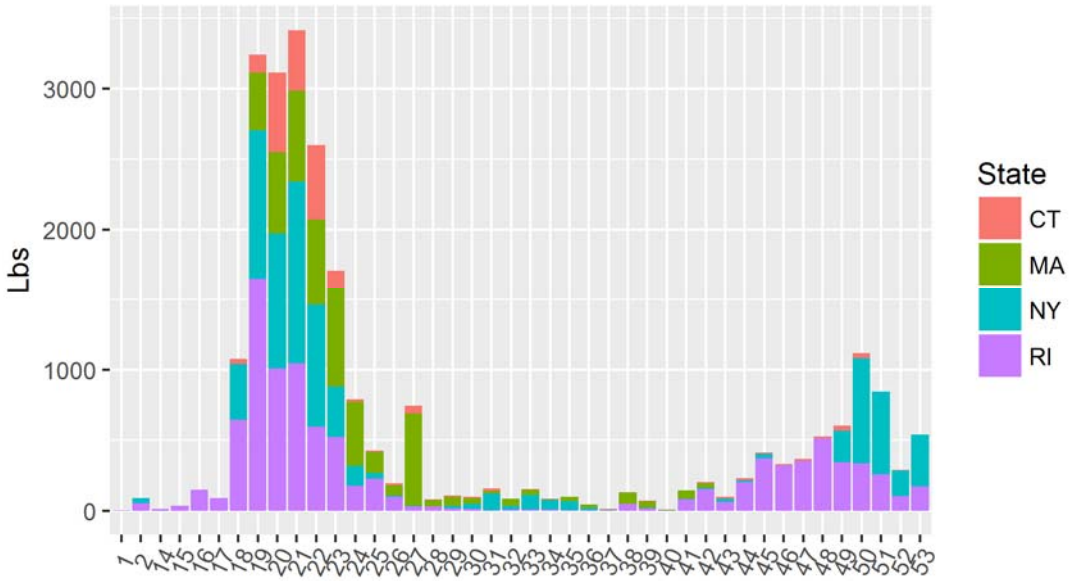

Figure 6: Pounds of winter flounder landed in 2015 by week and state. The x-axis represents each week in a calendar year. NJ data was omitted due to confidentiality rules.

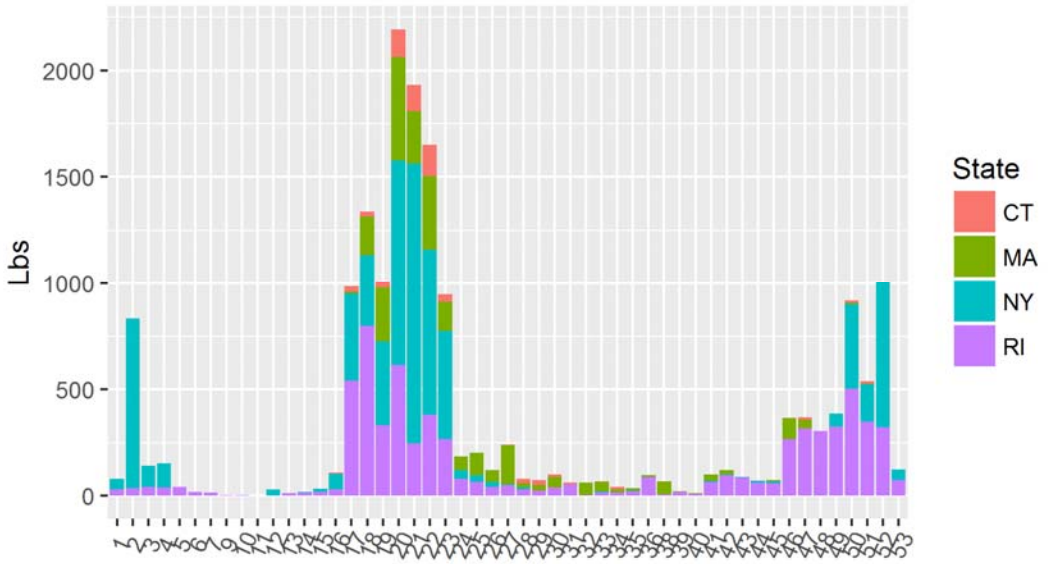

Figure 7: Pounds of winter flounder landed in 2016 by week and state. The x-axis represents each week in a calendar year. NJ data was omitted due to confidentiality rules.

Trends in individual states were also explored to determine if fishing behaviors or activities differ throughout the SNE/MA stock (Figures 8-11). Connecticut and New York show bimodal patterns in which there are a number of trips which landed very few winter flounder and a number of trips which harvested at, or near, the 50 lb trip limit. A large proportion of trips in Massachusetts state waters harvested 50 lb of winter flounder. These clusters of trips near the 50 lb trip limit may indicate regulatory discarding in the fishery. Rhode Island did not appear to have this bimodal distribution, with the majority of trips in 2016 landing less than 20 lb of winter flounder. The figures also suggest that there may be issues with non-compliance in the fishery as there were several trips which exceeded the 50 lb trip limit. The distribution of landings for New Jersey cannot be shown due to confidentiality rules.

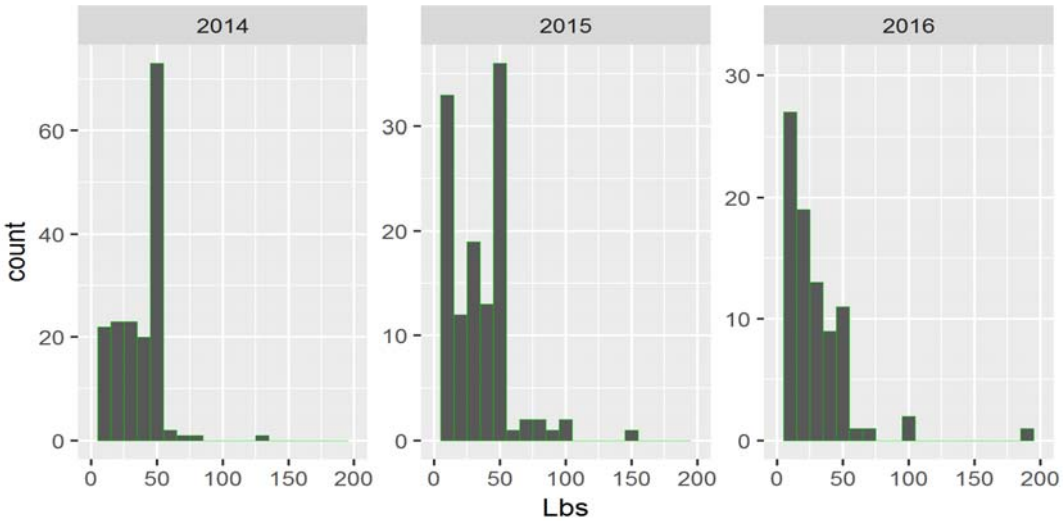

Figure 8: Distribution of catch per trip by gear types in the Massachusetts state waters winter flounder fishery.

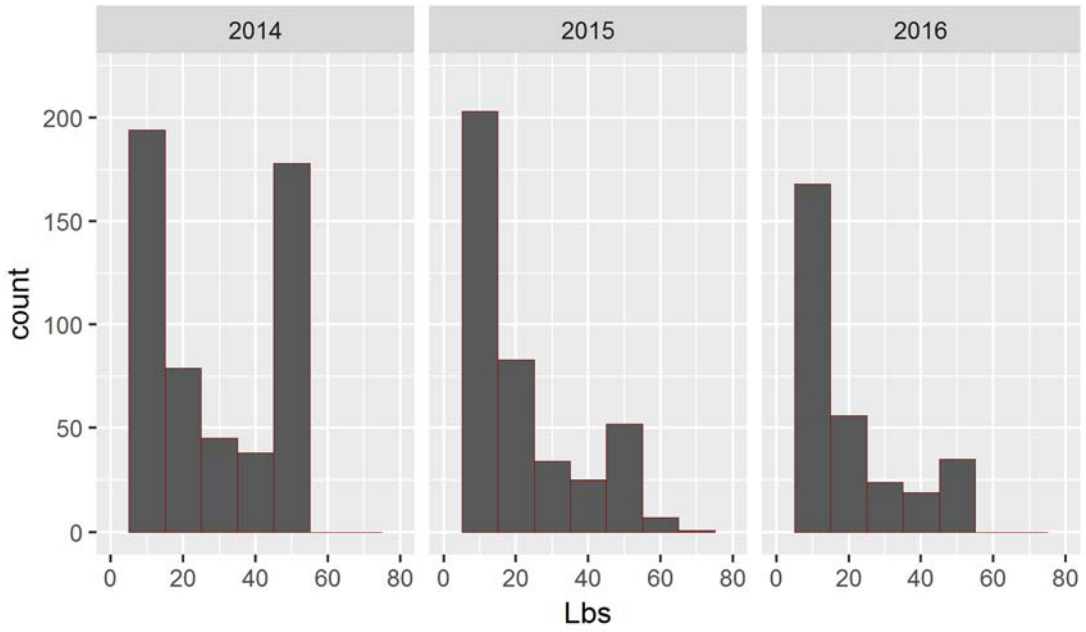

Figure 9: Distribution of catch per trip by gear types in the Rhode Island state waters winter flounder fishery.

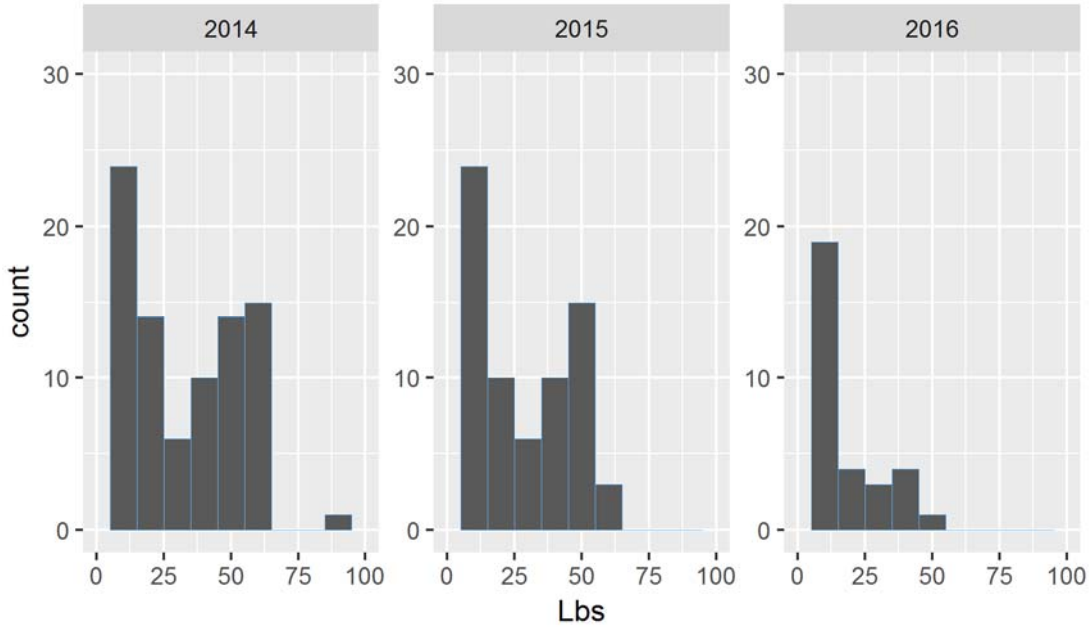

Figure 10: Distribution of catch per trip by gear types in the Connecticut state waters winter flounder fishery.

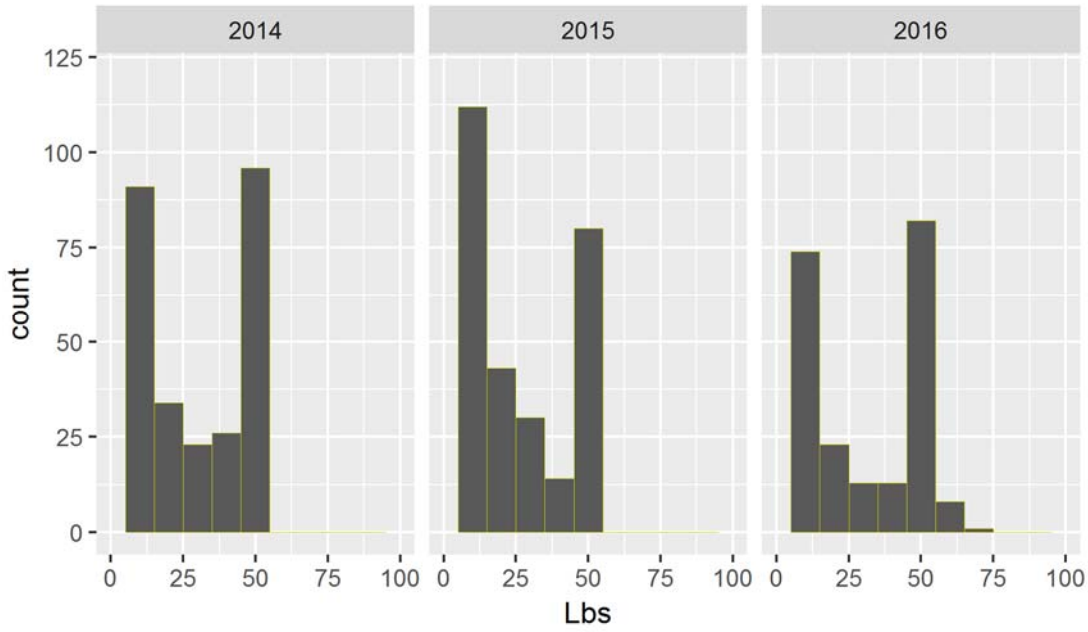

Figure 11: Distribution of catch per trip by gear types in the New York state waters winter flounder fishery.

Directed Fishing Behavior on Winter Flounder

Next, the TC investigated current targeting behavior for state permitted fishermen on the SNE/MA winter flounder fishery (all states and gears combined). Figure 12 shows the distribution of winter flounder landings per trip, in pounds, for trips from all states and months. In 2014, 22% of trips were at, or near, the trip limit (46-50 lbs). More recently (2015-2016), only 10% of trips were at or near the trip limit. Again, it is these trips which may be experiencing regulatory discarding due to the low trip limit. In addition, roughly 2% of trips were above the trip limit, suggesting some issues with compliance in the fishery. A similar analysis was conducted using data just from the months of April, May, June, November, and December. This was in response to one of the management options considered in the Rhode Island proposal. While Figures 5-7 do show that the majority of landings occur in these months, there was only a slight increase in the number of trips which were at, or near, the 50 lb trip limit (26% in 2014; 15% in 2015; and 11% in 2016). Given the trends were not different, a separate figure is not included.

The TC also investigated the proportion to which winter flounder contributed to total landings on a trip. Figure 13 shows the analysis for trips from all months and states. Overall, relatively few trips appear to be exclusively directing on winter flounder. Moreover, in 2014 and 2016 less than 7% of trips were comprised of 90+% winter flounder. This decreased in 2015 to just 2%. For the vast majority of trips (roughly 70%), winter flounder comprised less than 10% of total catch. Again, the analysis was replicated for the months of April, May, June, November, and December; however, results did not significantly vary from the analysis of all months.

When considering Figures 12 and 13 in conjunction, it can be concluded that, at present, there is little directed fishing effort on winter flounder in the SNE/MA stock by state-waters fishermen. This means that the 50 lb trip limit is achieving its stated goal of solely accounting for bycatch.

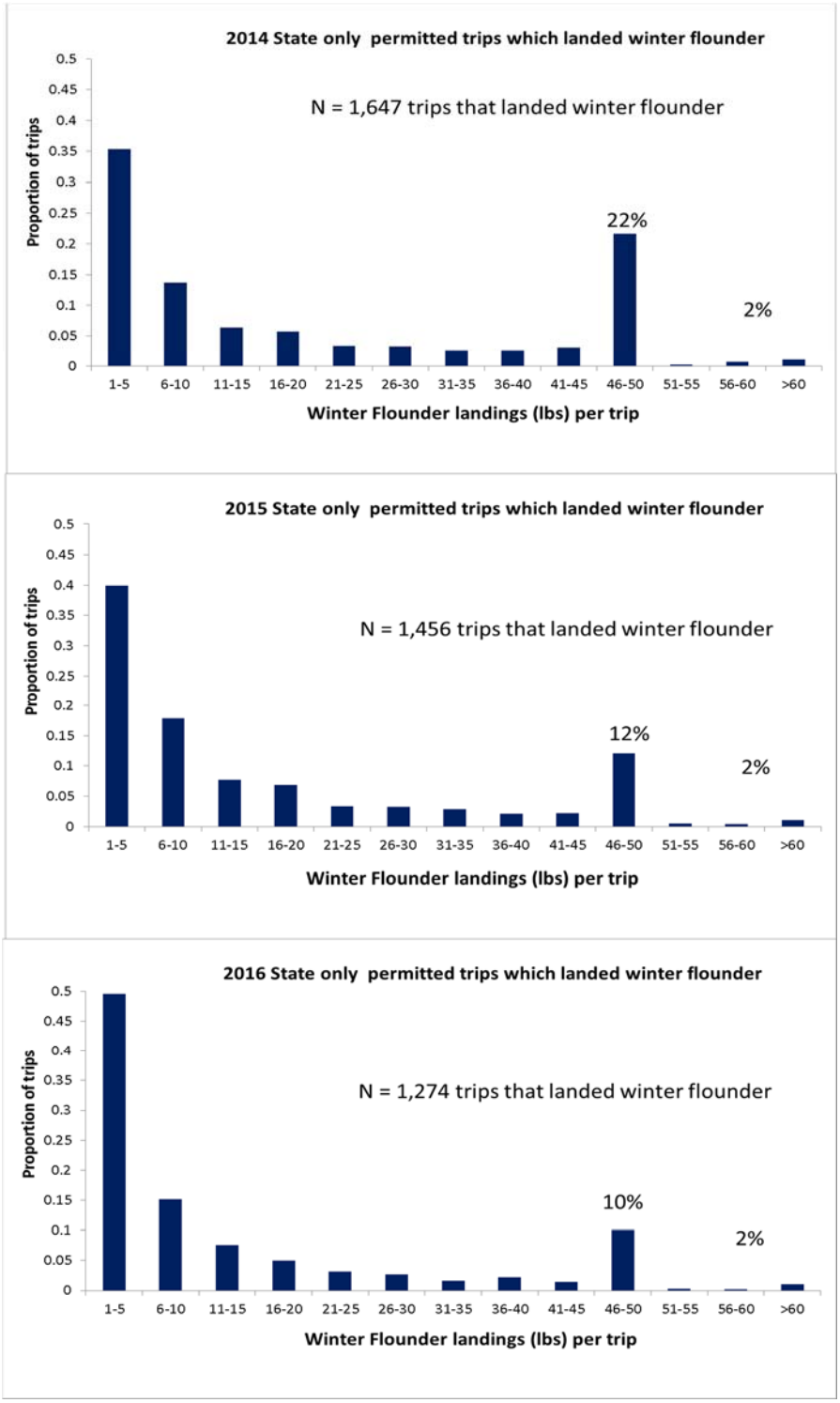

Figure 11: Winter flounder landings, in pounds, per trip for all months and all states (2014-2016).

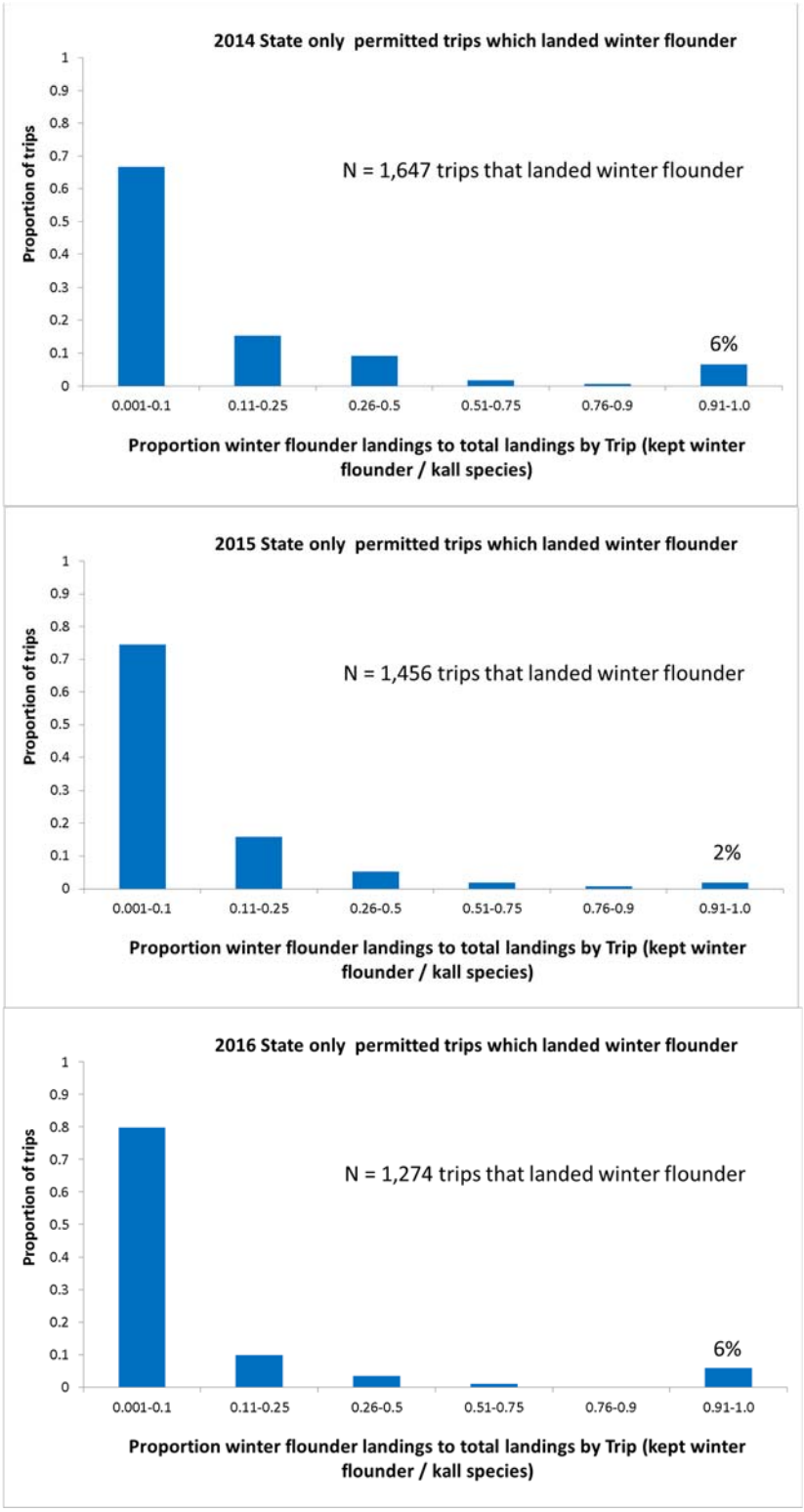

Figure 12: Proportion of winter flounder landings to total landings by trip (2014-2016). Analysis includes data from all months and all SNE/MA states.

Projection Analysis

Given the Rhode Island proposal suggests changes to the regulations, the TC attempted to predict changes in fishermen behavior under aggregate trip limits using projections. There were two primary projections considered in the analysis, based off of the Rhode Island proposal:

1. A 250 lb per week trip limit.
2. A 350 lb per week trip limit between April-June and November-December. During all other months there is a 50 lb per day trip limit.

For each of the above projections, two scenarios were considered in an attempt to project how harvesters may respond to the aggregate trip limit.

1. Each harvester lands the full aggregate limit (either 250 lb or 350 lb) in a given week.
2. Harvesters who landed greater than 50 lb in a given week will land the full aggregate limit (either 250 lb or 350 lb) per week. Harvesters who less than 50 lb in a given week will land 50 lb per week.

The calculations were based on pooling all of the 2014 -2016 states data by year and breaking the number of participants, trips, and pounds of winter flounder caught by participant/trip into week sized bins. For scenario 1, projections were then calculated by multiplying each participant in a given week by the appropriate possession limit for the week and summing. For scenario 2, participants were grouped into two tiers, those that landed > 50 lb in a week and those that landed < 50 lb in a given week. The projections were then calculated by multiplying each > 50 tier participant by the appropriate aggregate limit for the week and the < 50 tier participants by 50 lbs.

The projection values of annual landings are found in Tables 1 and 2. For scenario one (250 lb/ week year round) the average projections ranged between 164,000 lb (74.4 mt) and 66,800 lb (30.3 mt). For scenario two (350 lb/week during spring and late fall, 50 lb/day all other times) the average projections ranged between 162,100 lb (73.5 mt) and 76,900 lb (34.9 mt). The projections are a prediction of fishing behavior and are intended to provide an upper bounds to potential annual landings. The projections and the actual winter flounder landings for each year, as well as the average of 2014-2016, are plotted in Figures 13-20.

Table 1: Projection of annual winter flounder landings (in pounds) based on a 250 lb/week aggregate possession limit for the entire year.

	2014	**2015**	**2016**	**Average**
Scenario 1	175,000	156,250	145,500	164,000
Scenario 2	74,850	61,200	49,500	66,800
Actual Landings	34,822	24,550	17,812	25,749

Table 2: Projection of annual winter flounder landings based on a 350 lb/week aggregate possession limit in the spring and late fall and a 50 lb/day possession limit for the rest of the year.

	2014	2015	2016	Average
Scenario 1	176,000	155,150	144,300	162,100
Scenario 2	90,500	72,600	57,000	76,900
Actual Landings	34,822	24,550	17,812	25,749

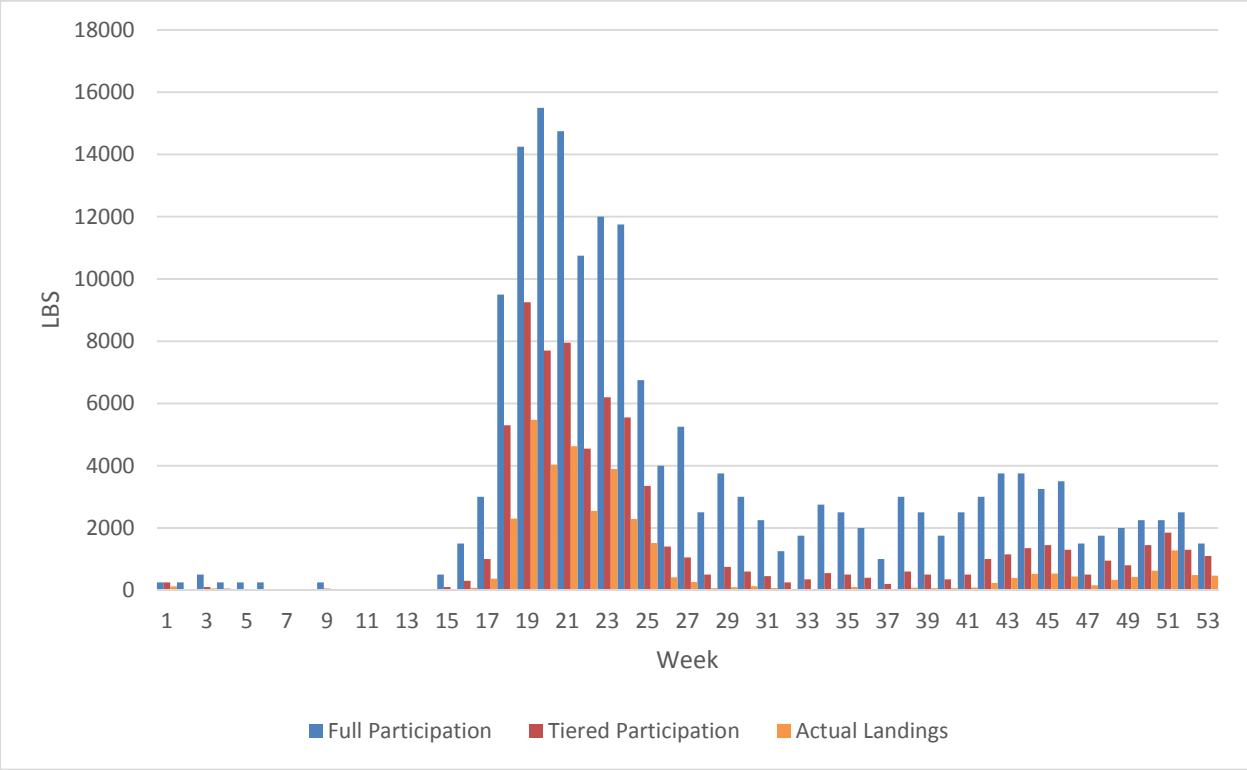

Figure 13: Projection of weekly landings based on a 250 lb/week aggregate possession limit in 2014. Project is plotted with weekly winter flounder landings in 2014.

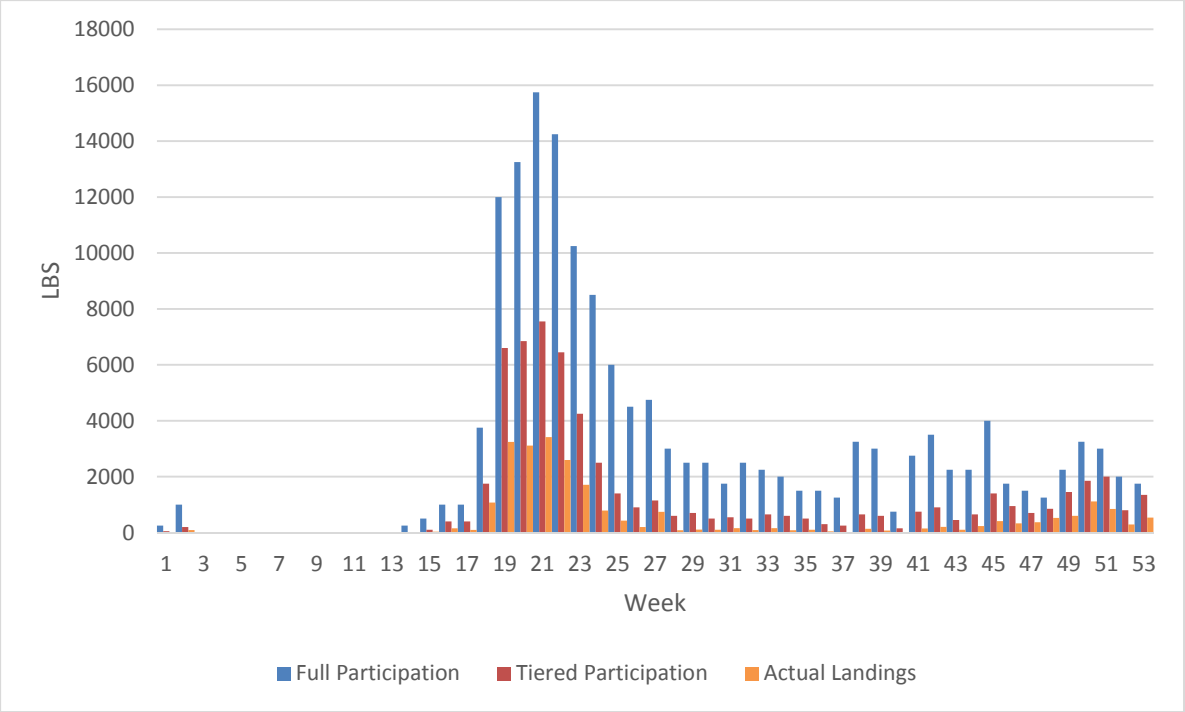

Figure 14: Projection of weekly landings based on a 250 lb/week aggregate possession limit in 2015. Projection is plotted with weekly winter flounder landings in 2015.

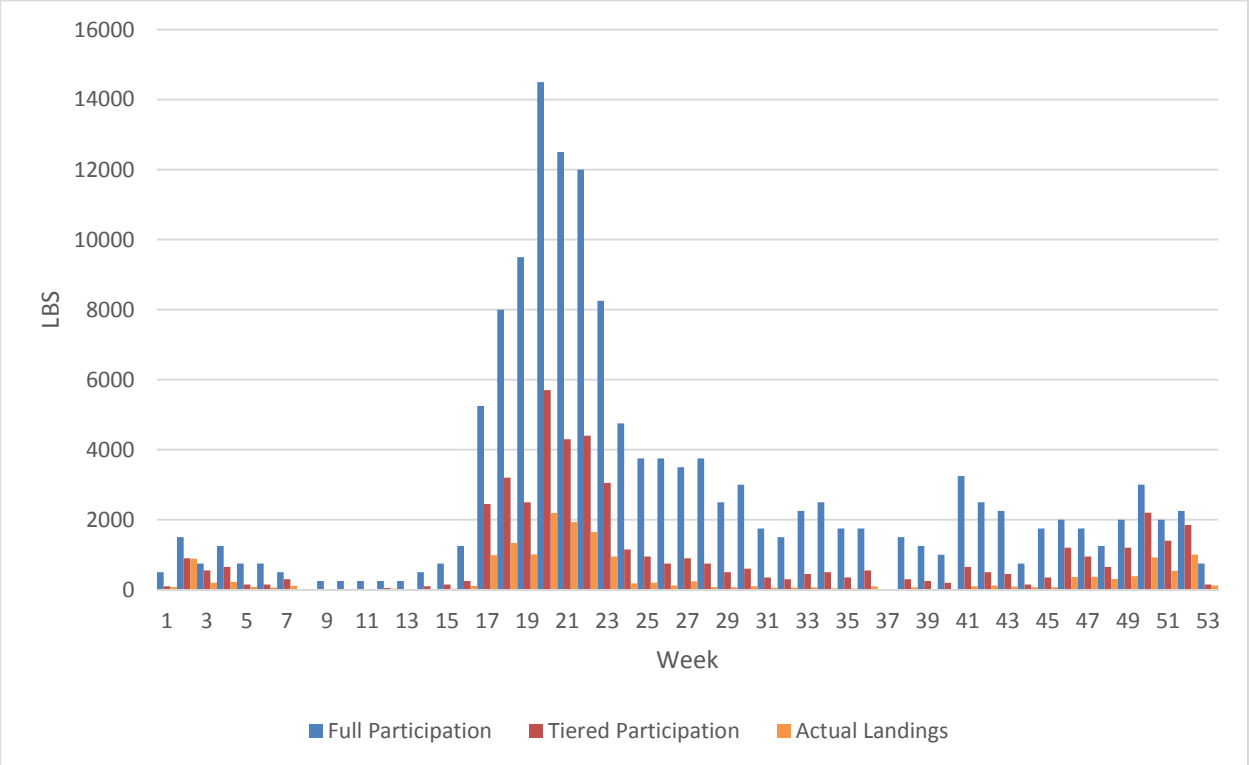

Figure 15: Projection of weekly landings based on a 250 lb/week aggregate possession limit in 2016. Projection is plotted with weekly winter flounder landings in 2016.

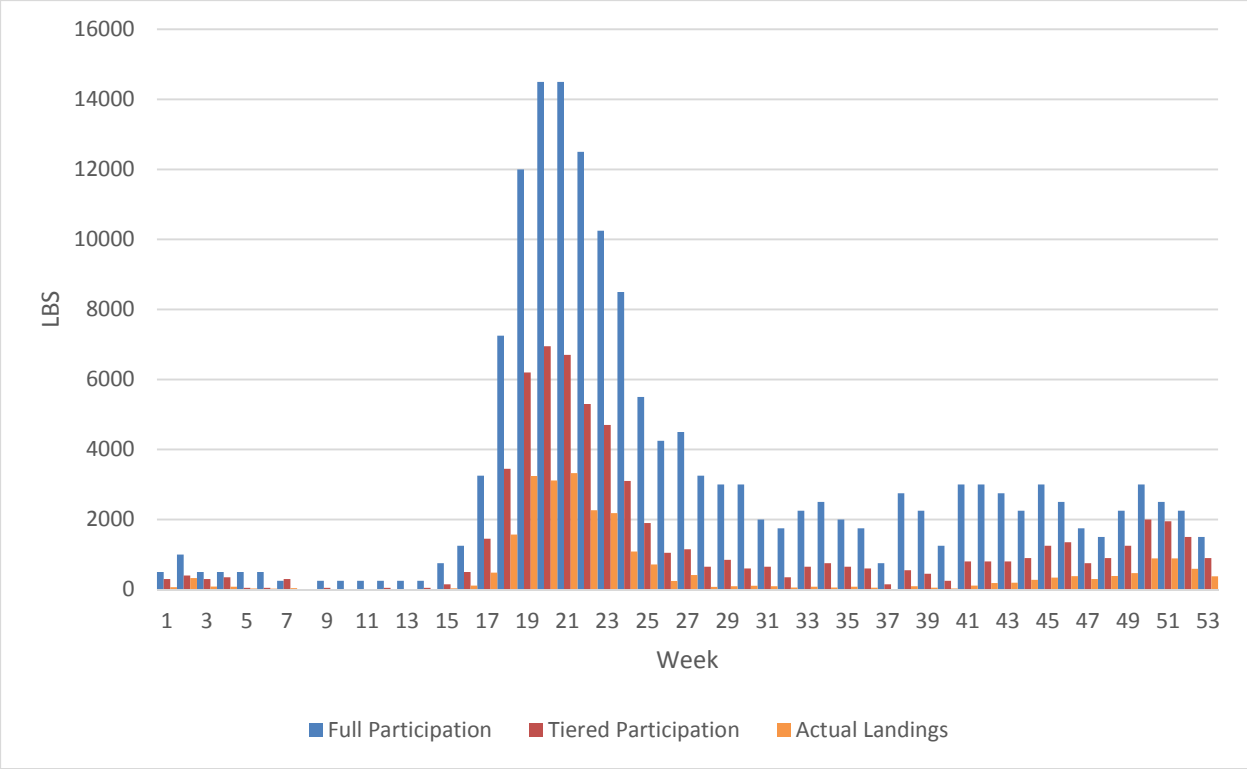

Figure 16: Projection of weekly landings based on a 250 lb/week aggregate possession limit averaged over 2014-2016. Projection is plotted with average weekly winter flounder landings for 2014-2016.

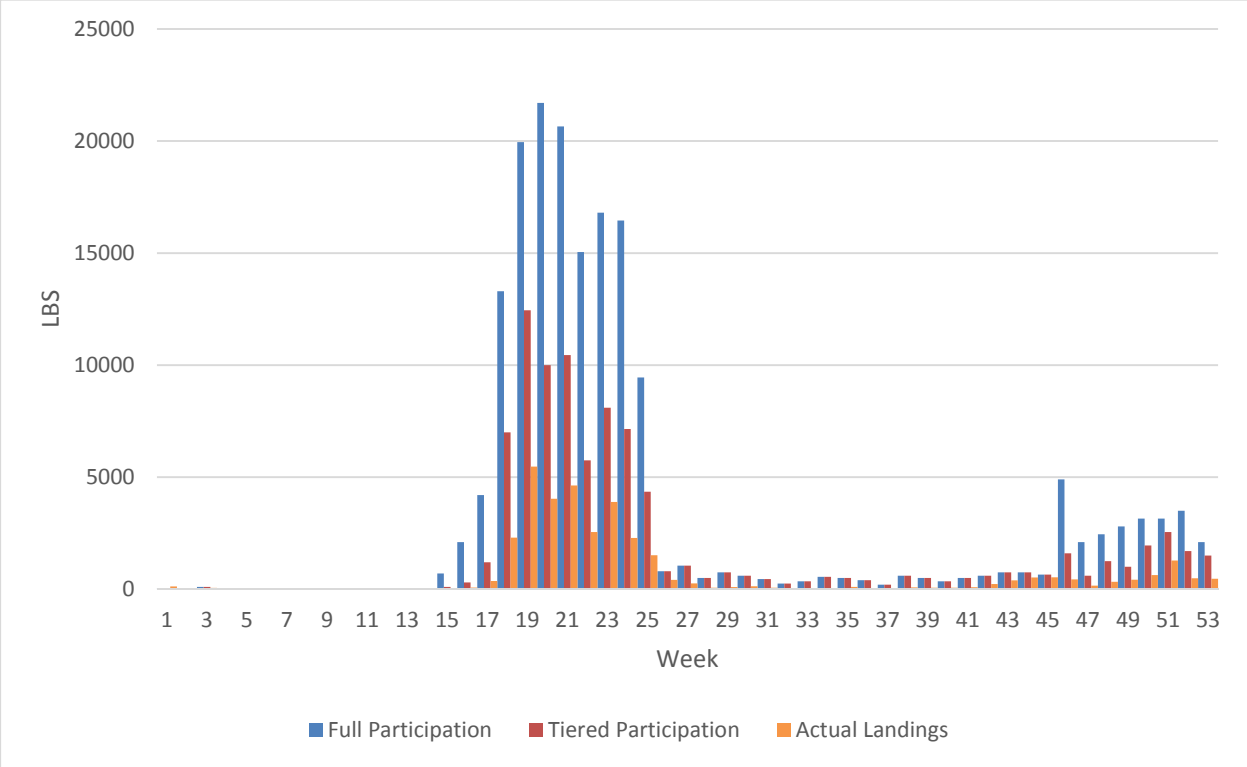

Figure 17: Projection of weekly landings based on a spring and late fall 350 lb/week aggregate possession limit in 2014. Projection is plotted with weekly winter flounder landings in 2014.

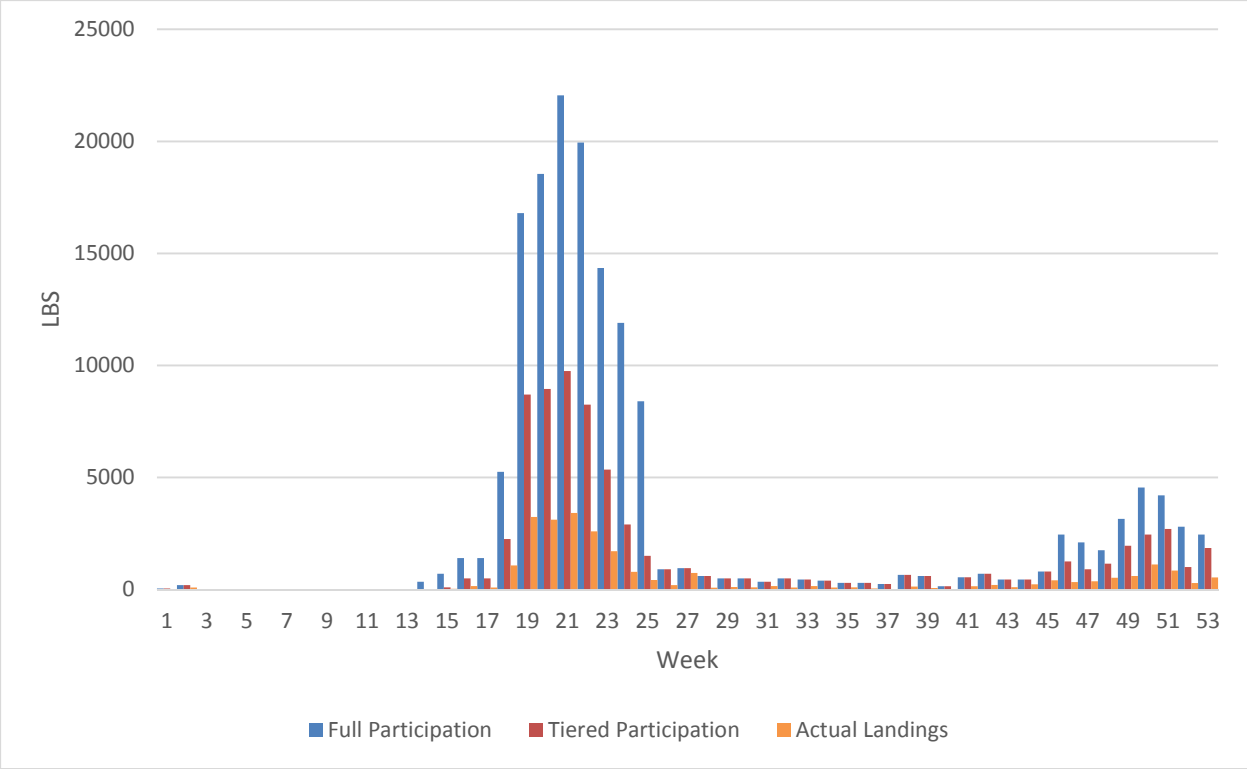

Figure 18: Projection of weekly landings based on a spring and late fall 350 lb/week aggregate possession limit in 2015. Projection is plotted with weekly winter flounder landings in 2015.

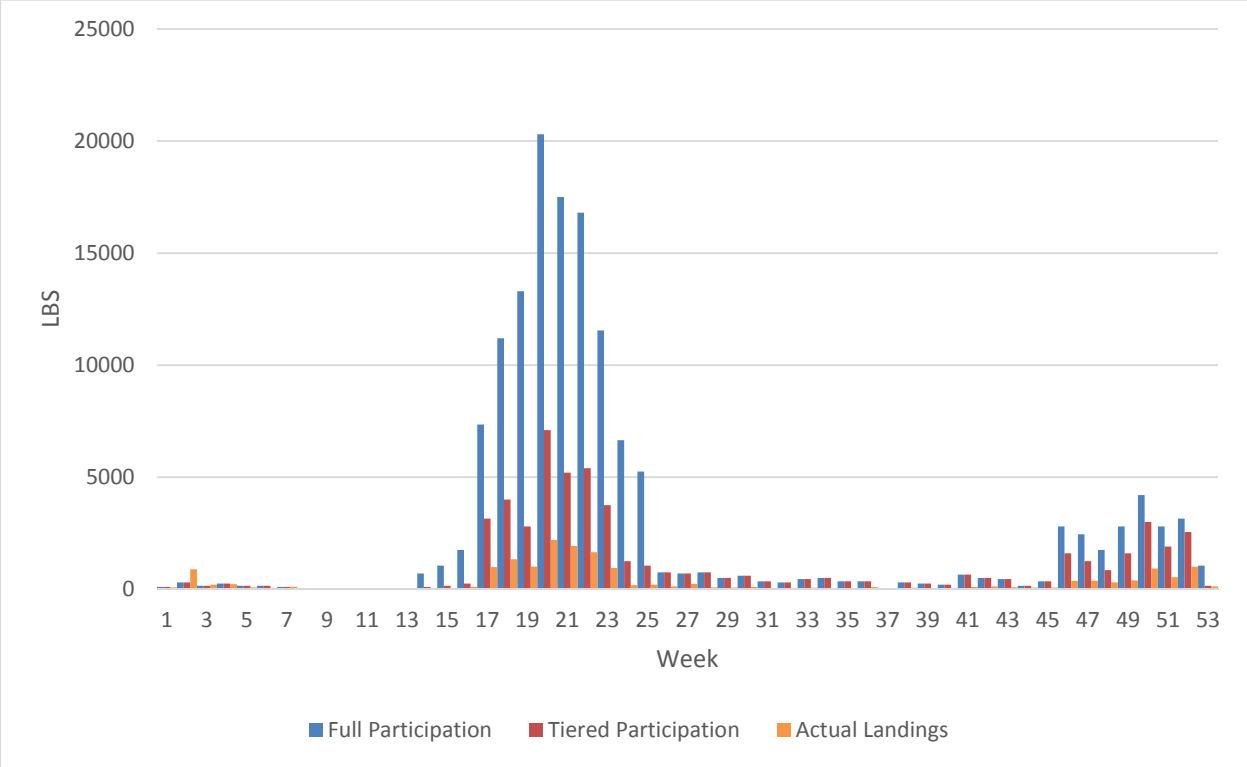

Figure 19: Projection of weekly landings based on a spring and late fall 350 lb/week aggregate possession limit in 2016. Projection is plotted with weekly winter flounder landings in 2016.

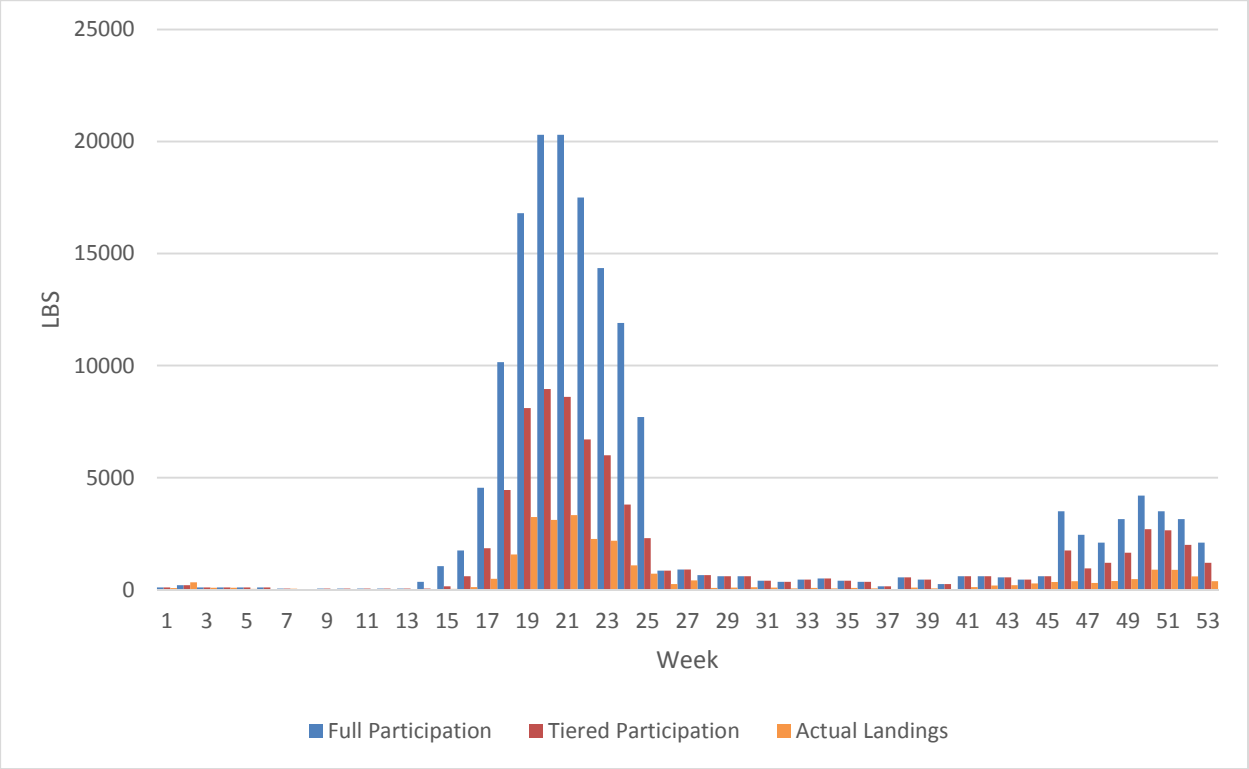

Figure 20: Projection of weekly landings based on a spring and late fall 350 lb/week aggregate possession limit averaged over 2014-2016. Projection is plotted with average weekly winter flounder landings for 2014-2016.

Discussion

When considering the Rhode Island proposal, there are several questions for the Board to consider. Will fishermen targeting behavior change? Will state waters landings increase? Will this lead to overfishing? Will the amount of fish discarded change?

Based off of the projections and current low levels of targeting behavior, the TC does believe that the behavior of state-water fishermen will change and landings will increase under an aggregate weekly limit. In fact, even under projection scenario 2 in which fishermen who currently land less than 50 lb per week are assumed to land 50 lb per week (the more conservative of the two projection scenarios), it is predicted that landings could significantly increase. Whether this expected increase in landings will lead to overfishing is hard to predict. The 2017 operational assessment suggests that overfishing is presently not occurring; however the stock is near record low spawning stock biomass with little evidence of rebuilding.

The influence of an aggregate weekly trip limit on discards is also hard to predict. If fishermen behavior changes and there is greater incentive to catch the full trip limit, there will likely be more trips at or near the aggregate weekly limit. This may perpetuate current regulatory discarding.

When considering an aggregate weekly limit, there are several unintended consequences that may arise which the TC raises for Board consideration.

- An aggregate weekly limit may result in increased fishing by federally permitted boats in states waters. At present, federally permitted boats which fish in state waters are subject to the 50 lb trip limit. Raising this limit may result in greater catch from state waters in the spring and fall. This change in the geographic distribution of effort is outside the scope of the TC's analysis since federal fishery is managed using ACLs, which are designed to prevent overfishing by federally permitted vessels.
- An aggregate weekly limit, could result in increased winter flounder targeting and subsequently higher landings from state water permit holders which would alter the state waters subcomponent for future fishing years. A three-year average of landings from SNE/MA state waters is used to develop a state-waters subcomponent. As a result, if landings increase, the state-waters subcomponent (which is voted on by the NEFMC) could also increase. While this may be to the advantage of state waters fishermen, this could be to the disadvantage of federal fishermen given their ACLs overall will decrease to compensate for the increase in state water landings. In summary, increased targeting of winter founder in state water fisheries due to an aggregate weekly limit could also result in a shift of federal permitted vessels effort into state waters while also reducing the relative quota available to federally permit holders.
- Finally, it is important to note that the winter flounder fishery, for some states, is not a limited entry fishery. Most prominently, Rhode Island does have an open access permit (Non-Restricted Finish Endorsement) which allows for the commercial harvest of winter flounder. Given Rhode Island harvests the majority of winter flounder in the SNE/MA stock, this could result in increased effort and participation in the fishery. An overview of the states permit types are included in Table 3.

Table 3. Permit requirements for states in the SNE/MA winter flounder fishery.

State	Permit Type
MA	A limited access Groundfish Endorsement is required on a commercial fishing permit to harvest winter flounder.
RI	A fisherman can obtain a Non-Restricted Finfish Endorsement Permit, which is open access, to harvest winter flounder. There is also a limited entry Multi-Purpose Fishing Permit which allows for the harvest of winter flounder.
CT	With the exception of hook-and-line fishing, the taking of finfish by all other gear types requires a limited access permit.
NY	The harvest of winter flounder requires a Food Fishing License, which are capped in the state.
NJ	Permits are issued by gear type. Limited entry gears include drift gill nets, staked/anchored gill nets, and lobster/crab/fish pot licenses.

Atlantic States Marine Fisheries Commission

Guidelines for Resource Managers on the Enforceability of Fishery Management Measures

Developed by ASMFC's Law Enforcement Committee

Second Edition
2015

Vision: Sustainably Managing Atlantic Coastal Fisheries

Introduction

The Law Enforcement Committee (LEC) of the Atlantic States Marine Fisheries Commission (ASMFC) prepared the *Guidelines for Resource Managers on the Enforceability of Fishery Management Measures* (*Guidelines)* in 2009. In keeping with ASMFC direction to periodically review and update the guidelines, the LEC has prepared this second edition, effective September 1, 2015. The core of the new *Guidelines* is an enforceability matrix for fishery management measures. The matrix table was developed from the responses to a survey of LEC members. The enforceability ratings cover a variety of management strategies that are employed in marine fisheries management programs. We include ratings for these strategies based on overall, dockside, at-sea and airborne enforceability. The LEC strongly encourages managers to take into account the enforceability of all management regulations that are developed. We believe the *Guidelines* can support and strengthen the effectiveness of ASMFC efforts to conserve our marine fisheries resources on behalf of the public we serve.

Acknowledgements

The LEC gratefully acknowledges current and past members who contributed time and expertise to the *Guidelines.* We thank NOAA Fisheries Northeast Division of the Office of Law Enforcement, NOAA General Counsel Northeast Enforcement Section, and United States Coast Guard Districts One and Five, authors of the *Enforceability Precepts for Northeast Regional Fishery Management Councils (June 2013),* for sharing their publication with us and allowing us to incorporate selected material from that document. We thank Toni Kerns and Tina Berger for assistance in developing the survey and matrix. We also acknowledge the opportunity afforded our committee by the commissioners and staff at ASMFC to revise the 2009 *Guidelines,* and to make them available for general use and reference.

How to Use This Document

The *Guidelines* are organized into three sections for ease of reference.

SECTION ONE (Page 3)

This section provides guidance in the form of **general enforcement precepts** that should be considered when evaluating fishery management options or strategies. These precepts apply regardless of the species or area under consideration.

SECTION TWO (Page 5)

This section presents the relative **enforceability ratings** of specific management options. Using a matrix table, readers may quickly identify the relative enforcement characteristics of the management strategies, including their overall, dockside, at-sea and airborne ratings.

SECTION THREE (Page 7)
This section provides details regarding the **enforcement strategies and recommendations** for the management measures covered in the *Guidelines*.

SECTION ONE
General Enforcement Precepts

SIMPLICITY
The most enforceable regulations are generally always those that are simple, realistic, easy to understand, and presented in an accessible way to the regulated community.

Simple, straightforward regulations are easier for the regulated community to understand and remember which is critical for voluntary compliance. They are also more enforceable because violations of simple regulations are easier to detect and to prove. For example, a simple regulation such as "possession of an undersized fish on a commercial fishing vessel" stands on its own. A violation of this regulation would apply regardless of where the fish was taken, how it was harvested, or any other regulatory variable. Conversely, complex regulations are more susceptible to confusion, misunderstandings, and differing interpretations among the regulated community, law enforcement personnel and the court system.

The proliferation of regulations frustrates industry as well as law enforcement personnel. Cumulative, piecemeal modification of regulations to address fishery or environmental changes inevitably leads to more complex and occasionally even contradictory regulations unless all of the regulations for a particular species are carefully reviewed together when modifications are made.

Every effort should be made to write regulations in simple, clear language that avoids jargon or technical terminology. And where possible, all related regulations for a given species should be bundled or linked together in the appropriate regulatory format.

CONSISTENCY
Regulations should make every effort to minimize exceptions and exemptions. Wherever possible, managers should adopt the same management measures among different jurisdictional fishery management plans, across different state boundaries, and between state and adjacent federal waters.

Anytime you have an exception to a regulation, such as under a conservation equivalency, you have potentially made the regulation more difficult to enforce. The LEC recognizes that conservation

equivalency is an important tool for fishery resource managers working within the collaborative structure of the ASMFC. However to the extent possible, states should make every effort to work within a regional or coast-wide regulatory framework. This is especially important where two or more states share contiguous waters or concentrated fishing areas. When individual states choose conservation equivalency, this document should be used to select management measures that are the most enforceable.

To the extent possible, there should be consistent definitions of terms for management measures, gear types or use, measurement standards, regulatory areas, and between federal and state waters.

STABILITY

Regulations should avoid frequent changes. Significant changes to regulations require a concerted outreach and education effort to adequately inform the public. This principle especially applies to recreational angling, where bag or size limits that change from year to year diminish enforceability and increase the likelihood of unintentional violations.

Enforcement personnel may require several years just to provide adequate training or to get the equipment necessary to implement new or modified regulations. More frequent changes in regulations might result in very little effective enforcement during those short regulatory time frames.

EFFECTIVENESS

In general, the most effective regulations from an enforceability perspective are those based on controlling effort (closed area or season), and not the outputs (catch quota, trip limits). Effective regulations promote rather than hinder voluntary compliance. Effective regulations take into account and are matched up with available enforcement staffing, funding, technologies and equipment.

In addition to adding complexity, the proliferation of new regulations often requires new or significantly enhanced enforcement resources. If new resources are not provided, enforcement will need to shift effort from what is currently being enforced. This can result in an arbitrary prioritization of enforcement effort that may or may not correspond to the conservation needs of the species affected.

Certain management measures can enhance effectiveness. For example, regulations that can be enforced through more than one means, or at more than one point during fishing operations, allow enforcement some flexibility in using available resources in the most efficient way possible. Any regulations that strengthen documentation and labeling of fish and fish products would enable law enforcement personnel to more effectively track products back to the harvester and/or the initial

purchaser and to intercept unlawful seafood at various points between harvest and final sale for consumption.

Enforcement tools such as electronic reporting and vessel monitoring systems (VMS) have greatly improved the effectiveness of certain regulations by allowing enforcement staff to focus effort on high priority areas. These tools do not replace traditional enforcement but rather complement patrol work and inspections.

SAFETY

Regulations should be designed such that they do not create an unintended safety-at-sea issue. For example, specified allowable days for fishing may increase pressure to go out to sea when weather conditions are unsafe. Likewise, establishment and design of closed areas should take into account safe and direct transit needs of fishermen when weather conditions change rapidly.

SECTION TWO
Enforceability Ratings

The 2009 *Guidelines* included a survey of voting members of the LEC to numerically rate the enforceability of 19 management measures based on four categories: overall, dockside, at-sea and airborne enforceability. For this revised edition of the *Guidelines*, 15 LEC members completed a new survey using a simpler, qualitative ranking and an expanded list of 26 management measures. Each management measure was rated for its overall, dockside, at-sea and airborne enforceability using a 3-tiered scale of "no" "limited" and "yes". Additionally, the overall enforceability of each management measure was rated numerically on a scale of one to five (1=poorest, 5=best).

The results of the updated survey are presented below in a visual matrix. Management measures were arranged in descending order of their average overall numerical ranking from the survey. Color coding represents the relative enforceability of the 4 enforcement categories (overall; dockside; at-sea; airborne) based on survey responses using the 3-tiered qualitative scale (yes; limited; no). Color selection was based on the following 3 rules:

1) If any one tier (yes; limited; no) received greater than or equal to 65% of responses, the representative color for that tier (green, yellow or red) was shown.
2) If only two tiers were selected, the representative color of the tier with the greater response was shown (green, yellow or red).
3) If all three tiers received selections, and none were equal to or greater than 65%, than that cell was shown as yellow (limited).

ENFORCEABILITY OF MARINE FISHERIES MANAGEMENT MEASURES

MANAGEMENT MEASURES	Average Ranking	OVERALL RATING	DOCKSIDE RATING	AT-SEA RATING	AIRBORNE RATING*
Bag and Possession Limits (low volume)	4.67				
Minimum/Maximum Size Limits	4.67				
Permits	4.67				
Prohibited Species	4.67				
Closed Seasons	4.60				
Closed Areas	4.53				
Gear Marking Requirements	4.07				
Gear Regulations except Method of Take	4.07				
Method of Take	4.07				
Bycatch Prohibitions	4.00				
Slot Limit	4.00				
Trophy Fish Allowance	4.00				
Vessel Monitoring Systems (VMS)	3.87				
Gear Restricted Areas	3.67				
Electronic Reporting	3.67				
Trip Limits (Daily)	3.47				
Days at Sea	3.27				
Annual Quotas	3.07				
ITQ/IFQ/LAP	3.00				
Bycatch Limit (weight or volume)	2.73				
Trip Limits (Aggregate)	2.73				
Catch-Release Fishing	2.60				
Bycatch Limit (percent of total catch)	2.27				
Harvest Tolerances (wt./vol./percent)	2.27				
Targeting Prohibition	2.21				
Limited Drag or Soak Time	1.93				

***Important Note:** the matrix design indicates limited applicability for most airborne ratings. The LEC stresses that this does not imply that airborne resources are ineffective. While airborne enforcement may be restricted in applicability, there are clearly times and places when it is the most effective means of enforcement, thus an important enforcement tool.

SECTION THREE
Enforcement Strategies and Recommendations

This section provides information about each of the management measures that were considered in the *Guidelines*. Included is a brief definition of the measure, its numerical ranking based on the survey results and some points for consideration when drafting regulations. For ease of organization the management measures are listed alphabetically.

ANNUAL QUOTAS

Definition: A specified amount of a particular species is allowed to be landed per fishing year (or fishing season). Typically a quota is established for the entire fishery, and occasionally is subdivided by region or time. Quotas are not usually employed for recreational fisheries.

Average Overall Rating: 3.07

Recommendations:

- A straightforward opening and closing of fishing to meet quota objectives is preferred over measures that will extend fishing, such as trip-limit triggers or progressive area closures, which complicate enforcement efforts.
- Incentives to under-report or not report are greater, so available enforcement resources must always be considered to ensure proper accounting of catch. Requirements for electronic reporting, daily or weekly reporting, on-board monitoring or tagging regulations can aid the enforcement effort. A well-designed catch documentation scheme to track fish from harvest to offloading, and through the processing and shipping phases, adds transparency and effective accountability.

BAG/POSSESSION LIMITS (low volume)

Definition: A specified amount of a particular species is allowed to be landed per trip, per fisherman or per vessel. Low volume limits are generally established as some number of fish that is easily counted on board. They typically apply to recreational fisheries. In some cases, commercial fishers may also be subject to low bag or possession limits.

Average Overall Rating: 4.67

Recommendations:

- This measure remains one of the most easily definable ways to quantify allowable harvest. It is easy to enforce and prosecute. It is simple.
- Bag and possession limits should be consistent across state and federal boundaries. The standard of measurement should be clear if the limit is based on weight.

- A possession limit is superior to a landing limit and allows for at-sea as well as dockside enforcement.
- Requiring fish to remain intact facilitates identification. Particularly for large-party charters, processing at sea or filleting out catch on board complicates enforcement. Where processing at sea is allowed, enforcement staff should be consulted. Supporting regulations requiring that skin must remain on filets, counting two filets as one fish regardless of size, or requiring retention of "racks" may aid enforceability in specific circumstances.
- Enforcement personnel find that frequently changing bag limits are difficult for fishermen to follow. Maintain limits for a minimum of 3 years to ensure consistency of enforcement and greater compliance.

BYCATCH LIMIT (Weight/volume)

Definition: Bycatch limits restrict, but do not prevent, the incidental harvest of non-targeted or otherwise protected species in the course of legal fishing activity.

Average Overall Rating: 2.73

Recommendations:

- These limits, often large weights or volumes, are difficult to enforce and even more difficult to prosecute.
- Enforcement would be enhanced if bycatch was required to be segregated from the targeted species. Accurate count of catch onboard cannot easily be done at sea due to species mixing, loading, icing, safety of boarding party in accessing the fish hold at sea, etc.
- Enforcement of bycatch limits typically are time and labor intensive.
- Bycatch limits and measurement standards should be consistent across jurisdictions.

BYCATCH LIMIT (percent of total catch)

Definition: Bycatch limits restrict, but do not prevent, the incidental harvest of non-targeted or otherwise protected species in the course of legal fishing activity.

Average Overall Rating: 2.27

Recommendations:

- These limits, especially when there may be large quantities on board, are difficult to enforce and even more difficult to prosecute.
- Enforcement would be enhanced if bycatch was required to be segregated from the targeted species.

- Enforcement is very time and labor intensive to verify the percentage of the catch that is bycatch, and to successfully document excessive bycatch volumes.
- Bycatch limits and measurement standards should be consistent across jurisdictions.
- Regulations should specify how much target species catch is required to justify retention of bycatch species and in what amounts. This is necessary to prevent a bycatch species from becoming the target species.

BYCATCH PROHIBITION

Definition: Incidental retention or possession of non-targeted or otherwise prohibited species caught during normal fishing operations is prohibited. Any bycatch must be discarded immediately. It may not be retained.

Average Overall Rating: 4.00

Recommendations:

- A bycatch prohibition is the easiest and most effective enforcement measure for bycatch.
- The enforceability of a bycatch prohibition is reduced if adjacent or nearby jurisdictional waters allow limited bycatch quantities (weight, volume or percent of catch).
- Because of perceptions of waste from discarding bycatch, other regulations (gear specifications, soak times, area restrictions) may be implemented to minimize the likelihood of catching incidental or non-targeted species in large quantities. Enforcement challenges presented by these other regulations may negate the enforceability advantage of a full bycatch prohibition.
- Clearly identify when possession of a prohibited species is restricted (i.e., returned to the sea as soon as practicable).

CATCH-RELEASE FISHING

Definition: A fish or marine organism cannot be retained but must be immediately released at the site of capture without any unnecessary harm or destruction. This is typically applied to certain recreational fisheries. Temporary possession may be allowed for proper identification, photographing, or determining compliance with applicable regulations.

Average Overall Rating: 2.60

Recommendations:

- Regulatory language should clearly specify the conditions for any temporary possession of a catch-release species on board (Identifying, measuring, photographing).

CLOSED AREAS

Definition: Fishing in a specified area is prohibited.

Average Overall Rating: 4.53

Recommendations:

- It is critical to have clearly defined areas. Use exact latitude/longitude and straight lines with regularly shaped areas as much as possible. Avoid general descriptions such as distance offshore, or a center point and radius. Do not use depth contours to define closed areas.
- Closed areas are more likely to be understood by fishermen, and to result in less unintentional non-compliance, if they are regular in shape, and where possible, oriented north-south and east-west in concert with latitude/longitude boundaries.
- While clearly defined, regularly shaped and large areas simplify enforcement, advances in tracking and monitoring technology are mitigating factors that might allow for smaller, irregularly shaped closed areas, especially when such areas are more likely to garner support and compliance, enhance safety at sea, or better protect fish and habitat.
- Successful prosecution of violations must generally include the capability to conduct vessel monitoring, aerial and at-sea surveillance. Even with VMS capability, law enforcement must document the violation at-sea to gather sufficient evidence for prosecuting the violation.
- Depending on the fishery and gear type, restrictions on only certain activities within a closed area may require at-sea boarding to document a violation.
- The more complete the closure to all fishing activity, the easier it is to enforce and successfully prosecute violations.
- Large, contiguous areas are preferable to more numerous, smaller areas.
- If possible, the area should be closed to transit with fishing gear onboard. If transit is allowed, regulations should clearly specify the proper stowage of fishing gear during transit through the closed area. Transit must be specified as continuous, direct and expeditious. If an allowance for loitering or stopping is included in regulations, there should be a mandatory call-in or reporting requirement.
- Gear closure areas or regulated mesh areas are very difficult to enforce. If regulations only prohibit the use of a particular gear type within a closed area, possession of that gear within the closed area should be prohibited.
- Temporary or short-term rolling closures are very difficult to enforce and increase the likelihood of unintentional violations because communicating the requirement to the fishing fleet can be challenging. In addition, shifting closed areas within a season increases the confusion of enforcement officials on the current status of an area.

CLOSED SEASONS

Definition: A specific fishing activity is prohibited during certain times of the year.

Average Overall Rating: 4.60

Recommendations:

- It is important to clearly define the date and times of seasonal closures, even to the minute.
- Describe what activity is allowed to occur before, during, and after the closure. For example: "all gear must be hauled in prior to the closure and gear may not be set prior to opening the closed area."
- For high-value, short-duration fisheries, fishing for other species with the same or similar gear should be prohibited for at least 72 hours before and after the established closed season.
- Minimize exemptions or exceptions to prohibited activities during the closed season. If possible, avoid allowance of gear placement or transport prior to the opening of a closed season.
- Enforcement is enhanced if retention, possession, purchase and sale of species included in a seasonal closure are all prohibited. Possible violations could then be inferred if a covered species is encountered in the market during a closed season, and would prompt an investigation into the origin of any fish or product encountered and how it got to market.
- Fisheries in which smaller vessels participate are more difficult to monitor during closed seasons. Small quantities of fish can be more easily hidden in the marketplace, or sold outside of normal market channels or dealers when the season is closed.

DAYS AT SEA

Definition: A specified amount of days are allotted for fishing for a particular species. Days at Sea are typically allocated to individuals or groups.

Average Overall Rating: 3.27

Recommendations:

- In its simplest form, without any exceptions or exemptions, this is enforceable. However it is manpower intensive unless VMS or other electronic tracking is implemented.
- Additional complicating regulations, such as associated trip limits, should be avoided.

ELECTRONIC REPORTING

Definition: Data transmission, electronic logbooks or other digital recording systems are used to record harvest activity on a vessel. Enforceability is based primarily on use in commercial fishing operations.

Average Overall Rating: 3.67

Recommendations:

- Reporting systems should be established to record and transmit data as soon as possible after actual harvest activity occurs.
- Delayed reporting should be specified to occur on a daily or weekly basis. Long delays between harvest activity and required reporting intervals greatly reduce the effectiveness of enforcement monitoring.
- Data storage systems should be readily accessible to enforcement personnel in the field or on the water.

GEAR MARKING

Definition: Regulations require specific marking of gear to identify the owner or permittee, to mark the location of gear that may not be visible at the surface, or for other identification purposes.

Average Overall Rating: 4.07

Recommendations:

- Regulations specifying the marking of gear should be clear and unambiguous as to the exact markings to be used, tags or tag placement, information included on any markings, visibility requirements or size of markings, and all other marking details to ensure standardized criteria can be enforced.
- Exceptions or exemptions to any gear marking requirements hinder overall enforcement efforts.
- To the extent possible, markings should be required to be located where they can be easily and quickly inspected by enforcement personnel.

GEAR REGULATIONS (excluding method of take)

Definition: Specific gear types or gear modifications are restricted or prohibited. "Gear" might include not only the primary methods and tools to harvest the resource, but also include the vessel, horsepower, the number of traps, mesh size and other such variables. In some cases gear regulations might stipulate a particular type or design (e.g., bycatch reduction devices or escape panels on traps).

Average Overall Rating: 4.07

Recommendations:

- Limitations on the amount of fixed gear/hooks, traps or pots is extremely difficult to enforce and manpower intensive to monitor on the water.
- Regulations stipulating how gear is to be deployed (e.g., soak time, net or trawl depth) are difficult to enforce because of inspection requirements once the gear is deployed or being actively worked.
- Monitoring and checking gear requires specialized equipment and training, and enforcement agencies may incur liability costs while handling gear.
- If a gear limitation is employed to restrict or control catch, an associated catch limitation should also be implemented. For example, a mesh size restriction to control the size of fish caught should have a companion minimum or maximum fish-size regulation.
- Standardize gear requirements, measurement procedures, equipment and techniques across all appropriate jurisdictions and time periods.
- Trap limits are more enforceable in conjunction with trap tags being required on all traps at-sea (i.e., not transferable from trap to trap while underway).
- If a specific type of gear is prohibited for use in a fishery, then carriage of the gear type should also be prohibited.

GEAR RESTRICTED AREAS

Definition: Areas where the use of specific fishing gear is prohibited. Regulations may also prohibit the possession of such gear in the specified area.

Average Overall Rating: 3.67

Recommendations:

- These are manpower intensive regulations to enforce. A gear restricted area often requires a boarding to determine if specific gear is legal, such as nets of a specific mesh size.
- In general, gear prohibitions are more enforceable than gear restrictions. Areas prohibiting nets are more enforceable than areas restricting certain net mesh sizes. Trap prohibitions are more enforceable than restrictions on certain trap types or sizes.
- Prohibit possession of restricted gear, rather than prohibiting "use" in a gear restricted area.
- Do not allow the use of similar gears within the area. Law enforcement assets may be able to differentiate between a trap boat and a dragger from a distance, but will probably have to conduct a boarding to differentiate between two types of draggers.

HARVEST TOLERANCE (weight/volume/percent)

Definition: A catch is allowed to exceed a legally defined limit of allowable harvest by a defined amount. This may allow retention of over or undersized animals or retention of a defined amount of harvested species over a specified landing limit.

Average Overall Rating: 2.27

Recommendations:

- Tolerances are often applied to large catches or landings, and so they may require extensive time and labor to verify the weight, volume or percentage of the catch that exceeds a specified limit.
- Additional tools or equipment may be required to assess amounts of catch exceeding a specified limit.

ITQ/IFQ/LAP

Definition: Individual or vessel quotas, where a specified amount of the total allowable harvest of a species is allotted to that individual or vessel. Such individual allotments may be taken over the course of a fishing season or year. This management measure is considered as it applies to commercial fishing operations only.

Average Overall Rating: 3.00

Recommendations:

- Enforcement is limited by the ability to monitor and verify individual quota limits and reported harvests under that quota. Real-time access to landings information is essential.
- Regulations must limit the number and location of authorized landing points to ensure proper harvest monitoring and dockside enforcement.
- Specific call-in procedures should be established to maximize dockside enforcement capability.
- Monitoring and enforcing individual quotas is labor intensive. Because of variable and extended time frames during which an individual could fish, it is difficult to focus enforcement efforts for maximum effectiveness.

LIMITED DRAG OR SOAK TIME

Definition: This management measure limits the amount of time between deploying and hauling back the gear, normally to allow for live discards of bycatch. This management measure is considered as it applies to commercial fishing operations only.

Average Overall Rating: 1.93

Recommendations:

- This management measure received the lowest overall rating out of the 26 measures considered in the *Guidelines*.
- Ensuring that specified time limits are followed requires close, at-sea enforcement of fishing operations, and/or onboard observer capabilities.
- Electronic reporting, onboard video monitoring, and vessel monitoring systems provide needed additional support for enforcement monitoring.

MAXIMUM/MINIMUM SIZE LIMIT

Definition: Possession of fish below/above a specified size, or inside/outside a defined "slot" limit, is prohibited.

Average Overall Rating: 4.67

Recommendations:

- This type of regulation is considered among the more straightforward and enforceable regulations, at least as it would apply to small quantities of catch.
- Standardized measurements, procedures, equipment and techniques must be used across jurisdictions to be effective.
- Exceptions allowing at-sea or onboard processing hinder enforceability. There should not be any allowable filleting at sea. Measurement standards should stipulate head and tail intact.
- Maintain size limits for a minimum of 2-3 years to maximize compliance.
- Clearly spell out exactly how a species is to be measured in the regulation.
- Specified size tolerances are not necessary, and complicate officer discretion in dealing with individual violations.

METHOD OF TAKE

Definition: A regulation stipulating a particular type of gear or fishing operation for legally harvesting a species. *See also "Gear Regulations (excluding method of take)"*.

Average Overall Rating: 4.07

Recommendations:

- If a certain gear type is prohibited, that gear should not be allowed onboard if otherwise legal fishing gear or operations are being employed.
- Regulations should specifically prohibit the possession of any net with prohibited mesh sizes from being onboard the vessel; similarly, if a net, pot, longline or other gear type is required to be modified to reduce bycatch, then the possession of any gear not properly modified should be prohibited, not just prohibited from use.

PERMITS

Definition: Fishing (usually for an identified species) is only authorized by the issuance and possession of a permit.

Average Overall Rating: 4.67

Recommendations:

- This is considered among the more straightforward and enforceable regulations.
- Successful enforcement depends on real-time access to permit-holder databases. Technologically sound permit tracking systems should be implemented or already in place for any permit requirement.
- Laws or rules should provide for permit suspension and revocation upon successful prosecution of fishing violations.
- Permit numbers should be required to be displayed on commercial fishing vessels. Permits must be in possession of the fisherman or vessel at all times.

POSSESSION/BAG LIMITS (low volume)

Definition: A restriction on the number of animals of a given species that may be caught and/or possessed by a fisherman, a group of fishermen, or onboard a vessel.

Average Overall Rating: 4.67

Recommendations:

- This is considered among the more straightforward and enforceable regulations, at least as it would apply to small quantities of catch.
- Enforcement is enhanced if any allowed bycatch species is required to be segregated from a larger catch of another or multiple species.
- Allowable quantities should be clearly stipulated and standardized across all appropriate jurisdictions.

PROHIBITED SPECIES

Definition: Possession or retention of a particular species or group of species is prohibited.

Average Overall Rating: 4.67

Recommendations:

- This is considered among the more straightforward and enforceable regulations.

- For difficult-to-identify species, it may be necessary to include species groupings in a prohibition, or to ensure adequate identification training and tools for both fishermen and enforcement personnel.
- Prohibitions should be restricted to a species or group of species across the board. There should be no exceptions for where it was taken or how it was harvested.
- Any permitted species kept on board must remain in a form easily differentiated from similar prohibited species.

SLOT LIMIT

Definition: Retention and/or possession of any species outside of a specified size range is prohibited. A slot limit may prohibit possession between a certain size range, or it may prohibit possession above or below a certain size range.

Average Overall Rating: 4.00

Recommendations:

- Regulations should clearly stipulate the range of the slot size and measurement standards should be consistent across all appropriate jurisdictions.
- Provisions allowing onboard filleting of fish or other processing of animals greatly hinder enforcement of slot limits.

TARGETING PROHIBITION

Definition: A regulation that prohibits the act of fishing for a particular species, to the exclusion of effort to catch other species.

Average Overall Rating: 2.21

Recommendations:

- This management measure is among the least enforceable of the 26 considered in the *Guidelines*.
- Enforcement would require a level of physical observation and surveillance beyond the scope of most agencies.

TRIP LIMITS (daily)

Definition: A specified amount of a species is allowed to be caught and possessed onboard or landed by weight, volume or number, on a daily basis. In most situations this applies to commercial fishing regulations. It is a form of possession limit intended to slow down the rate of harvest in a commercial fishery.

Average Overall Rating: 3.47

Recommendations:

- Enforcement is typically restricted to dockside, and requires adequate measuring capability while offloading. Checking and verifying a trip possession limit at sea is extremely difficult.
- A "possession limit" as opposed to a "landing limit" would allow more at-sea enforcement.
- There is a significant time and labor commitment to enforcing such limits, even at dockside.
- When daily trip limits are implemented a limited number of designated landing points, and advance reporting of landing would enhance enforcement.
- Limit any at-sea processing to ensure accurate identification of species subject to trip limits at dockside.
- The trip limit or possession amounts should be consistently defined and used across all appropriate jurisdictions, along with any measurement standards and techniques that are to be applied.
- Allowance for multi-jurisdictional trip limits greatly hinders successful monitoring and enforcement.

TRIP LIMITS (aggregate)

Definition: A specified amount of a species is allowed to be caught and possessed onboard or landed by weight, volume or number, covering a specified number of days' daily trip limits. In most situations this applies to commercial fishing regulations. It is a form of possession limit intended to slow down the rate of harvest in a commercial fishery. Aggregate limits allow a vessel to remain at sea fishing, rather than having to come to port with each day's harvest limit.

Average Overall Rating: 2.73

Recommendations:

- Most of the difficulties or concerns with enforcing daily trip limits would still apply to aggregate trip limits.
- It is even more difficult to enforce an aggregate trip limit at sea.
- This type of regulation allowing for a vessel to remain at sea and catch multiple daily trip limits essentially precludes any significant at-sea enforcement.
- It is extremely difficult to monitor the actual number of days at sea spent fishing, or matching up a total aggregate landing with the number of days spent fishing.

TROPHY FISH ALLOWANCE

Definition: Usually applied in recreational fisheries, it allows retention of one or more fish over a specified maximum size or slot limit.

Average Overall Rating: 4.00

Recommendations:

- Any allowance for filleting or processing at sea hinders enforcement of such provisions.
- Measurement standards should be consistent across all appropriate jurisdictions.

VESSEL MONITORING SYSTEM (VMS)

Definition: A requirement to keep a positioning transmitter (transponder) onboard a fishing vessel. The transponder transmits position and movement information at specified time intervals.

Average Overall Rating: 3.87

Recommendations:

- As VMS use is expanded it should incorporate data transmission regarding gear onboard and the fish being targeted. It can increase the efficiency and effectiveness of enforcement patrols and inspections, but does not replace on-the-water or dockside enforcement requirements.
- VMS should be considered for any large-scale fishery that is conducted in remote waters or offshore where at-sea and airborne enforcement is difficult or inefficient.