

AKSC Halibut Bycatch Performance Report to the North Pacific Fishery Management Council December 2017

At its June 2015 meeting, the North Pacific Fishery Management Council (the Council) reduced halibut prohibited species catch available to groundfish fisheries (including a reduction of that PSC available to the Amendment 80 sector of at least 25 percent). Also at that meeting, the Council requested that the Amendment 80 cooperatives prepare plans for halibut avoidance that include:

1. halibut avoidance practices on the grounds,
2. increased communication between participating harvesters,
3. sharing data for performance tracking,
4. use and development of excluders,
5. deck sorting,
6. performance measurement and assessment at the boat and company level,
7. incentives for continuous efforts to minimize bycatch, and
8. consequences for substandard performance.

The Council also requested that the sector's cooperatives annually report on their performance under these plans during the December Council meeting. Since all sector members have worked closely in halibut avoidance efforts in 2017, a single consolidated report is provided. Notably, for 2018 all members of the sector have agreed to join a single cooperative next year. This consolidation should streamline oversight over the activities of sector members and help coordination of the continuing efforts to reduce halibut usage by the sector.

Background

The halibut PSC reduction adopted by the Council in 2015 was the culmination of a series of regulatory and self-imposed measures reducing halibut use by the Amendment 80 sector. The Council intended Amendment 80 to provide the sector with the ability to increase retention by ending the race for fish. The action has exceeded expectations, with groundfish retention increasing from levels slightly above 50 percent prior to Amendment 80 to over 90 percent currently. Although the Council's primary focus of the Amendment 80 was groundfish retention, the action also included a reduction of halibut available to the sector. The initial reduction, together with a 150 mt reduction over the course of the first four years of the program, represented a 12 percent reduction from historical use.

In June of 2014, the Alaska Seafood Cooperative (AKSC) undertook a second reduction in halibut PSC usage after a request from the Council. At that meeting, at the request of IPHC Commissioners, the Council passed a motion asking all BSAI sectors to "undertake voluntary efforts to reduce halibut mortalities in the BSAI resulting from PSC use by 10% from the current 5-year average levels through the 2014-2015 fishing season." As understood by the Council and industry at the time, the reduction would stem a decline in catch limits in directed halibut fishery in the Area 4CDE management area, which includes the Pribilof Islands and Western Alaska. In response, the cooperative established protocols and targets for reducing its halibut usage in the second half of 2014 (July to December). The cooperative successfully reduced its halibut usage for the year and achieved the Council's reduction goal. Despite achieving the goal, the halibut catch limit in Area 4CDE declined, in part, due to concentration of bycatch in Area 4CDE and the size composition of that bycatch, factors that were not considered by industry, the IPHC Commissioners, or the Council when requesting the bycatch reduction from the different Bering Sea and Aleutian Islands fleets.

At its December 2014 meeting, the Council moved to address the decline in the Area 4CDE halibut fishery catch limit, requesting NMFS to take emergency action to reduce halibut PSC available to all sectors by 33 percent, the reduction needed to achieve a 1 net million pound catch limit in Area 4CDE. NMFS subsequently rejected the Council's request for emergency action.

To do its part to rectify the drop in the halibut catch limit in Area 4CDE, representatives of the AKSC attended the January 2014 meeting of the IPHC, providing a presentation to the Commission describing halibut bycatch reduction measures employed by the cooperative, the PSC reduction needed to allow for a 1 million net pound catch limit in Area 4CDE, and identifying the cooperative's proportional share of that reduction based on historical PSC usage. Based in part on the cooperative's presentation and the presentations of other halibut PSC users, the IPHC established a 1.285 million net pound catch limit for Area 4CDE. The cooperative achieved the target reduction, reducing its bycatch by almost 4 percent below its target.

This outcome reflects the sector's willingness to respond to halibut management issues quickly and effectively when the Council and NMFS were unable to. In the two months between the IPHC's interim and annual meeting, halibut PSC users developed plans to respond to the needs of directed halibut users based on the preliminary analysis that the IPHC uses to set the directed fishery catch limits. The IPHC relied on these cooperative measures to achieve the Council's halibut directed fishery management goal of a 1 million net pound fishery, while the detrimental effects of halibut PSC reductions on the cooperative were mitigated by its targeted action. By targeting the reduction in Area 4CDE (while at the same time not increasing halibut usage in Areas 4A and 4B) the Council was able to realize the Council's intended goal of reducing bycatch to allow for a 1 million net pound fishery in Area 4CDE; however, by targeting the reduction in Area 4CDE, the cooperative was able to achieve that goal with a reduction in halibut usage of less than 20 percent. These directed actions are informative, as the Council considers the effects of various halibut PSC reductions, as well as the necessity and practicability of various future actions.

In June of 2015, the Council took further action to reduce halibut available to Amendment 80 participants, reducing PSC available to cooperatives by 25 percent and reducing allocations to any limited access fishery by 40 percent. NMFS implemented this latest reduction in 2016. Since 2008, when the Amendment 80 sector began the process of regulatory and self-imposed halibut PSC reductions, the cooperative has developed a variety of tools to help achieve its halibut reduction goals. In addition, in direct response to the Council's request to adopt a halibut avoidance plan, the cooperative and the Alaska Groundfish Cooperative entered an inter-cooperative agreement for halibut avoidance as described below.

The Inter-cooperative Agreement

The inter-cooperative agreement defines a means of ensuring sector-wide accountability for halibut avoidance. The agreement consists of three components:

- Best Practices – This aspect of the plan defines best operational practices for halibut avoidance by the Amendment 80 sector. On the grounds, halibut avoidance practices are described, including: monitoring halibut bycatch; communication protocols; excluder use and development; and halibut avoidance through changing a variety of fishing parameters, including location, target, depth, tow speed, and other factors.
- Deck sorting – The second aspect of the program is the development of a deck sorting program. The sector is currently engaged in its fourth exempted fishing permit (EFP), which allows vessels to deck sort halibut to return halibut to the water quickly, thereby reducing halibut mortality. The sector has applied for a new EFP that will begin in January 2018 to allow for continued

development of deck sorting protocols that can be incorporated into a regulatory package in the future.

- Halibut Avoidance Plan – This aspect of the plan defines performance standards to incentivize all vessels in the fleet to achieve acceptable levels of halibut use in the fisheries. The program is intended to ensure that all vessels maintain minimum halibut rates annually using both annual and quarterly performance standards with a specific component to assess performance in the fourth quarter, when halibut rates have historically increased to the highest levels for the year.

Best Practices

The sector utilizes a suite of bycatch tools to reduce halibut mortality, most of which are described in its rules of the road document, which is attached. This section provides a brief description of the sector's halibut avoidance efforts set out in that agreement.

Sector members minimize halibut usage through a variety of halibut avoidance measures, including choices of fishing location and time of day, excluders, and deck sorting. The sector's vessel operators alter fishing location and time to achieve high yield for target species and low halibut bycatch rates. Small test tows are used to assess catch conditions for bycatch and target species. Small test tows are one of several tools used by vessel operators to determine species composition of catch, to evaluate potential halibut bycatch rates in an area selected for directed groundfish fishing. Test tows allow vessel operators to avoid areas with large concentrations of halibut.

Principal to these halibut avoidance measures was active communication among captains on the grounds. The effectiveness of the various halibut avoidance measures changes with fishery conditions. On the grounds communications keep captains well-informed on successful PSC avoidance strategies allowing them to cope with continuously changing fishing conditions and effectiveness of the various halibut avoidance tools.

The sector supplements these on the grounds communications with weekly meetings of company representatives and vessels captains. At the meetings, a review of weekly halibut performance reports leads into a discussion of the conditions on the grounds and the effectiveness of halibut avoidance measures. The meetings typically cover halibut mortality rates, target species, excluder effectiveness, halibut movement, fishing depths, and bottom temperatures in the areas being fished by sector members. The sector distributes summaries of the meeting discussions to all members on the day of the meeting.

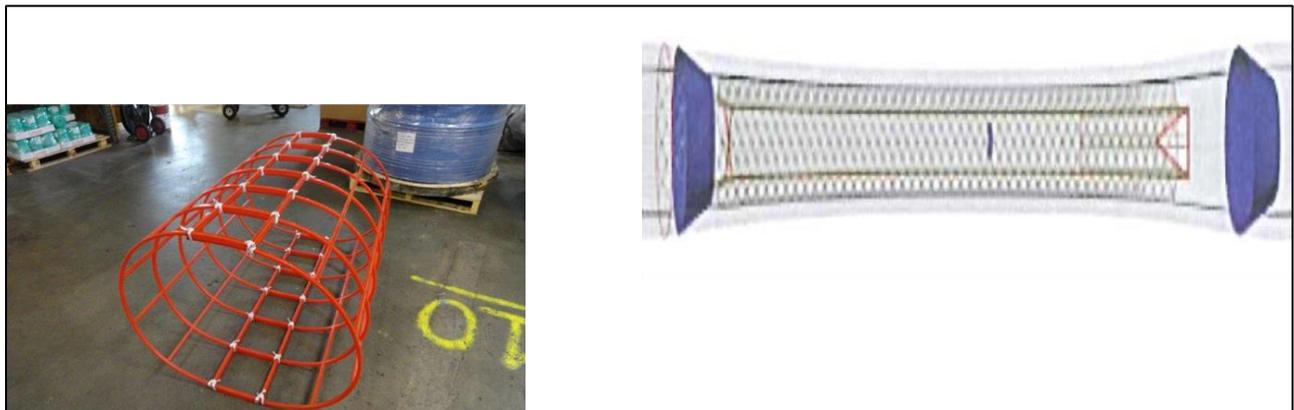
Each cooperative and along with member company managers monitor individual vessel halibut performance through Seastate. Monitoring is conducted through regular checks on cooperative, as well as company and vessel, performance.

All sector members have experimented with a variety of excluders designs. For example, one halibut excluder design uses a grid placed at an angle to allow it to lie diagonally across the inside of the net slanted towards the direction of the codend, with an escapement panel for halibut that are not able to fit through the grid (see Figure 1). An alternative design uses a grid system that makes up the net's circumference with escapement panel placed before the codend (see Figure 2). Choice of excluder typically depends on the specific vessel's operating characteristics and conditions in the fishery (such as size of target catch and size of halibut encountered).

Figure 1: Ramp Halibut Excluder



Figure 2: Hallway Halibut Excluder



Vessels also modify existing designs to improve effectiveness, increasing the exclusion of halibut and decreasing loss of target catch. For example, captains have used kites, typically comprised of panels of canvas tied into sections of the mesh to lift out and slow down the water flow in select areas of the excluder. The addition of these kites allows target species to swim through the inner panels of the excluder and into the codend reducing loss of target species catch, while still allowing halibut to escape. These improvements allowed vessels to use excluders with lower loss of target fish, reducing halibut bycatch rates, and avoiding the need to tow longer. These more effective excluders are now deployed in a larger range of conditions and fisheries. Excluder effectiveness varies across fisheries and vessels with conditions, vessel and net characteristics, and operating practices. As a result, individual experimentation with operations and configuration is needed to get the greatest return from an excluder. Vessels anticipate continuing excluder development and refinement to further increase halibut exclusion and reduce losses of target catch.

Deck Sorting

Under current regulations, halibut mortality in the flatfish trawl CP sector is significantly increased by the requirement that all catch be transferred to below-deck tanks, without sorting, immediately upon being brought aboard to allow for observer weighing and sampling. This requirement results in halibut being held out of water for extended periods of time before release. In recent years, the discard mortality rate (DMR) for halibut in these conditions has averaged around 85%. Since 2009, the cooperative has worked closely with NMFS through Exempted Fishing Permits (EFPs) to explore options that allow vessels to return halibut to the sea quickly from the deck to reduce mortality while accurately accounting for the amount of halibut released from the deck and its viability.

Under these EFPs, the codend is pulled forward of the aft live tank hatches to allow space for sorting and is gradually emptied onto the deck. Crewmembers carefully remove halibut while moving the other fish into the tanks. The halibut are slid or carried to a station/table where the observer on duty is positioned. The observer's table typically leads to a chute used to channel halibut off the vessel after counting and sampling. All observer tables must be pre-approved by NMFS prior to deck sorting and video monitoring is used in all locations where crew activities involving sorting and handling of halibut occur. During the 2017 EFP, observers used a random "one in five" sampling scheme under which the observer counts the total number of halibut sorted on deck and samples 20% of those halibut for length and viability. These data are extrapolated to generate estimates of total halibut mortality on deck for each tow. Halibut measurements and viability sampling use methods approved by the IPHC and NMFS.

The 2017 EFP had by far the highest level of participation to date. Deck sorting activities began at the start of the fishing season (January 20th), marking the first time that deck sorting has taken place in the early part of the year. Seventeen vessels (including 2 vessels outside the Amendment 80 sector) participated this year, compared to 9 in 2015 and 12 in 2016. The 2017 EFP also expanded to allow deck sorting of catch in CDQ fisheries and deliveries from catcher vessels fishing in CDQ and trawl limited access fisheries. As a result of these changes, the large majority of flatfish catch – particularly yellowfin sole – was taken in the EFP. Vessels also used deck sorting in the Atka mackerel and Pacific ocean perch fisheries for the first time. In sum, over 200,000 MT of groundfish were harvested in the 2017 EFP. This amount is more than double the amount of catch deck sorted in any of the prior years of the EFP.

The average halibut DMR in the 2017 EFP was approximately 54%, compared to the default DMR of 85% assigned to trawl CP vessels in recent years. In an effort to make deck sorting more feasible, vessel crew members were urged to focus sorting efforts on the most viable halibut; this strategy maximized attainment of the EFP goal of improving halibut survival while reducing observer time on deck and disruption of other crew activities

Agency support and interaction in the development and implementation of this year's EFP has helped greatly with the success of deck sorting. The sector has worked extensively with NMFS – particularly its Observer Program – over the course of this EFP to ensure that all objectives are met. This collaboration has included troubleshooting problems, facilitating communications, and meeting Observer Program standards for data and working conditions. The Observer Program and sector staff held meetings roughly twice a month to maintain a constant dialogue and address issues as they arise. These communications prevented complications from escalating in a manner that would threaten the success of the EFP.

Looking to the future, the sector has applied for a renewal of the EFP through 2019. Many of the catch handling protocols, sampling, and monitoring issues for deck sorting have been worked out through the multi-year EFP process; the focus for the 2018-2019 EFP will be individual vessel safety plans, which define safety procedures and best practices to ensure observer safety during their extended time on deck needed for sorting. The permit renewal will also expand deck sorting into the Gulf of Alaska. These operations will be held to the same standards as for deck sorting in the Bering Sea and Aleutian Islands.

The sector is hopeful that deck sorting protocols can be finalized as a part of this EFP and deck sorting can be implemented in regulation for the 2020 season.

The Alaska Seafood Cooperative prepared an interim report on the 2017 EFP for the North Pacific Fishery Management Council and delivered it at the NPFMC's October meeting. That report delved into greater detail on specific performance metrics and is available from the NPFMC. Additionally, Alaska Seafood Cooperative will be preparing a final report updating the information provided in the October report through year end, once activities under the permit are completed for the year.

Halibut Avoidance Plan

To further the incentive for halibut avoidance in the sector, its members developed and agreed to performance standards that define maximum halibut rates (kilograms of halibut mortality per metric ton of groundfish) in target fisheries that are prone to halibut bycatch. The plan is intended to ensure that no vessels are outliers with unacceptably high halibut bycatch rates using both annual and quarterly performance standards. The plan also establishes a maximum halibut rate standard for the fourth quarter when halibut rates typically rise to their highest levels. Vessels that fail to stay below the rate standards are penalized, with penalties increasing with both the vessel's halibut rate and groundfish harvest. This section provides a brief description of the plan, as well as the performance of the sector's vessels under the plan in its first two years.

Description of the plan

The sector's halibut avoidance plan is comprised of three tests. Two of the tests provide incentives for maintaining acceptable halibut avoidance on an annual basis. The third test provides incentives for maintaining halibut avoidance techniques into the fourth quarter, when halibut rates historically have risen.

- Annual Outlier Test - Tier 1: Individual vessels are required to meet annual halibut rate standards for three species/species group target fisheries – yellowfin sole, rock sole, and flathead sole/arrowtooth flounder. The annual standards become more stringent over time to incorporate learning and increased ability of vessels to achieve halibut avoidance goals. Vessels that fail to meet the applicable rate standard are subject to monetary penalties.
- Fourth Quarter Test: To curtail the potential for halibut rates to increase in the fourth quarter, all vessels are subject to a fourth quarter rate standard. Vessels that fail to meet the rate standard are subject to monetary penalties.
- Quarterly Outlier Test - Tier 2: Any vessel that does not meet the Tier 1 annual standard in a target fishery will be subject to quarterly monitoring the following year, in addition to the annual monitoring and fourth quarter monitoring that apply to all vessels. Vessels that fail to meet the applicable Tier 2 standard in any quarter would be subject to halibut forfeitures.

Annual Outlier Test - Tier 1

The Annual Outlier Test (Tier 1) requires each vessel to meet halibut rate standards annually in three different target fisheries. The outlier test is similar to the Vessel Incentive Program (VIP), which was abandoned by the Council due, in part, to NMFS enforceability concerns. The inter-cooperative agreement provides a structure for internally implementing and enforcing these standards without regulation.

The yellowfin sole, rock sole, flathead sole, and arrowtooth flounder targets accounted for over 80 percent of the halibut mortality of the sector in every year since 2008; therefore, these target fisheries provide the

greatest opportunity for halibut mortality savings. Maintaining halibut mortality rates in these targets at low, yet practicable, levels allows the fleet to minimize halibut use to the extent practicable.

The plan sets rate standards in three different target fisheries based on historical performance. Yellowfin sole and rock sole will each be monitored independently because these fisheries occur in different areas at different times of year. Arrowtooth flounder and flathead sole occur in similar fishing locations, times, and conditions and are therefore aggregated as a target under the plan.

Under the program, rates are based on the 2012-2014 average halibut rates for each of the targets. These years represent the most recent three-year average leading up to adoption of this program, and are most representative of ocean and fishing conditions, as well as the state of halibut avoidance in the sector. Similar to the VIP, the average halibut rate for each target species is multiplied by a “multiplier” to establish the standard recognizing that a portion of the fleet exceeds the average by definition. The VIP multiplier was 2.0, and was the starting point for yellowfin sole and rock sole targets in 2016. To bring outlier vessels closer to the fleet average, the multiplier in these target fisheries was reduced to 1.75 in 2017 and will be reduced to 1.5 in 2018. The arrowtooth flounder/flathead sole combined target is subject to a 1.8 multiplier in 2016, which is reduced to 1.65 in 2017, and 1.5 in 2018 and thereafter.

The more stringent starting point for these targets recognizes the need to achieve reductions more quickly in these fisheries, which have historically experienced higher halibut mortality rates. Lowering limits in the second and third years of the program is intended to provide time for outlier vessels to adjust their bycatch avoidance practices to these more restrictive standards. The rate reductions will have the effect of making scaled mortality reductions on outlier vessels, as well as reducing halibut mortality overall in these fisheries.

Rates standards based on the fleet mean 2012-2014 rate with a decreasing multiplier.

Species	2012-2014 Base Rate (kg/mt)	Year	Multiplier	Rate Standard (kg/mt)
Yellowfin sole	5.8	2016	2	11.7
		2017	1.75	10.2
		2018	1.5	8.7
Rock sole	7.2	2016	2	14.3
		2017	1.75	12.6
		2018	1.5	10.8
Flathead sole/ Arrowtooth flounder	11.7	2016	1.8	21
		2017	1.65	19.2
		2018	1.5	17.5

The test is applied by comparing a vessel’s halibut rate in a target fishery to the applicable annual standard at the end of the year. A vessel’s rate will be based on its target catches in Amendment 80 and CDQ fisheries combined. Including CDQ catch will prevent vessels from attributing catch to one management program or the other based on the potential for a violation under the program. Vessels that exceed the applicable rate standard will be subject to a monetary penalty as described below.

Minimum groundfish thresholds for test

To avoid the potential for discouraging a vessel with unacceptably high halibut rates from exiting a fishery, vessels that have minimal groundfish catch in a target will be excluded from the program. Specifically, if a vessel enters a fishery and finds unacceptably high halibut rates, applying a penalty at low harvest amounts would create an incentive for the vessel to remain in the fishery hoping to find cleaner fishing to lower its rate.

Vessels have occasionally had very little catch in one of the targets, at times with relatively high halibut rates. Departure of these vessels from the fishery saved halibut and should not be discouraged. To avoid the creation of a disincentive for leaving a fishery with high halibut bycatch rates, vessels below a threshold catch amount in a target are not subject to the rate test. Thresholds for the targets are 1,000 mt in yellowfin sole, 1,000 in rock sole, and 500 mt in arrowtooth/flathead. These catch thresholds should be adequate to ensure that a vessel has no incentive to remain in a fishery in an attempt to avoid a penalty.

Penalties

Vessels that do not pass the annual outlier test for a given target species will be subject to a monetary penalty. Fines are on a target basis, so a vessel will be subject to a penalty in each target in which it fails to meet the applicable standard. Fines for each target range from a minimum of \$50,000 to a maximum of \$100,000 based on the vessel's halibut rate and the amount of groundfish harvested. Having the penalty increase with groundfish harvests creates a disincentive for continuing harvests at the unacceptably high rate. Vessels that do not meet the annual standard will also be subject to additional scrutiny in the following year by being subject to quarterly monitoring.

Fourth Quarter Test

Among the concerns addressed by this plan is the historical rise halibut rates in the fourth quarter. The rise is likely attributable to several factors, including dispersion of target fish on the grounds, halibut abundance and distribution, and incentives for halibut avoidance. The fourth quarter test increases the incentive for halibut avoidance during the latter part of the year. As a result, vessels with excess halibut at the end of the year have an increased incentive for reducing their halibut and leaving unused halibut in the water.

Under the fourth quarter monitoring plan, vessels must maintain halibut rates at or below a threshold level in the three flatfish targets included in the program. Although the large majority of groundfish catch and halibut bycatch in the fourth quarter is from the yellowfin sole target, full accountability for halibut bycatch is better achieved by a more comprehensive program that also includes the rock sole and arrowtooth flounder/flathead sole targets.

The rate standard is set at the fourth quarter 2012-2014 fleet average halibut rate in the aggregated flatfish targets. Recognizing that halibut rates have historically been highest in the fourth quarter, no multiplier is applied to the historical rate. This results in a rate standard of 12.1 kilograms of halibut per metric ton of groundfish harvest. By simply requiring all vessels to stay below the historical fleet average, the fleet's overall rate will be reduced from historical levels.

The test is applied by comparing each vessel's individual halibut mortality rate for aggregated yellowfin sole, rock sole, arrowtooth flounder, and flathead sole targets for the fourth quarter with the rate standard. Vessels that are above the test rate are considered outliers and are subject to a monetary penalty.

Minimum groundfish and halibut thresholds for test

Similar to the annual test, the fourth quarter test provides a vessel just beginning to fish in the fourth quarter that immediately realizes poor halibut rates with an opportunity to leave the fishery by exempting any vessel from the penalties that has minimal catch (defined as less than 750 mt). This catch threshold is

intended to strike a reasonable balance, allowing a vessel a reasonable opportunity to find acceptably clean fishing, but not creating an incentive for a vessel to remain in the fishery for an extended period, if acceptable fishing cannot be found.

The program also recognizes that a vessel's quarterly halibut catch, in and of itself, could reach an unacceptable level, regardless of the amount of target catch of the vessel. To prevent a vessel from taking an excessive amount of halibut a 20 mt threshold will be applied, after which the penalty system will apply to the vessel, regardless of whether the 750 mt threshold is reached. This threshold creates an incentive for a vessel with unacceptably high halibut mortality to discontinuing fishing, regardless of how quickly it approaches the 750 mt catch threshold. Together the combination of a groundfish threshold and a halibut threshold in the fourth quarter create an incentive for vessels with unacceptably high halibut rates to depart the fishery quickly to avoid possible penalties.

Monetary penalties

Vessels that do not meet the fourth quarter rate standard in the aggregated flatfish targets will be subject fines. Fines range from a minimum of \$25,000 to a maximum of \$50,000, and are in addition to any annual fine assessed. Fines increase with both the halibut rate of the vessel and the amount of groundfish catch by the vessel. Increasing penalties with groundfish catch creates an incentive for a vessel to stop fishing, if it is unable to improve its rates.

Quarterly Outlier Test - Tier 2

The quarterly outlier test provides additional scrutiny of vessels that fail to meet an annual halibut rate standard. The additional scrutiny is intended to increase the incentive for non-performing vessels to meet acceptable rate standards in the subsequent year. A vessel is subject to the quarterly monitoring test for any targets for which it failed the annual rate test the preceding year. Quarterly monitoring is in addition to the other monitoring under the plan. All vessels (including those subject to quarterly monitoring) will be subject to both the annual monitoring and the fourth quarter monitoring.

The quarterly rate standard for the first three quarters will be the same as the annual rate standard applicable in that calendar year. For example, a vessel that is subject to quarterly monitoring in a target would be subject to quarterly monitoring in the target at the annual rate standard for that target for the first three quarters of the year.

In the fourth quarter, vessels subject to quarterly monitoring will be required to meet the fourth quarter test rate that applies to all flatfish targets. Given the lack of substantial fishing in the rock sole and arrowtooth/flathead targets and the relatively higher rates in the quarter, applying the aggregated fourth quarter standard will induce the desired level of halibut avoidance across all targets. Vessels under quarterly monitoring are subject to two penalties for failing to meet the fourth quarter rate, a halibut penalty under the quarterly plan (as described below) and a monetary penalty under the fourth quarter monitoring plan (as described above). This added incentive ensures that these vessels fish at an acceptable annual rate.

Minimum groundfish and halibut thresholds for test

As with the other tests under the program, quarterly monitoring should not be structured in a manner that discourages a vessel from exiting a fishery because it is finding unacceptable halibut rates. Therefore, the quarterly rate standards are not applied to vessels that have not reached a threshold catch amount. For the first three quarters the catch threshold would be the same as the annual catch threshold in the applicable target fishery (i.e., 1,000 metric tons in the yellowfin sole and rock sole target fisheries and 500 metric tons in the arrowtooth flounder/flathead sole target fishery). In the fourth quarter, the threshold catch amount is 750 metric tons, which is the same threshold used in the fourth quarter test.

As in the fourth quarter test, the quarterly test recognizes that a vessel's quarterly halibut catch, in and of itself, could reach an unacceptable level, regardless of the amount of target catch of the vessel. To prevent a vessel from taking an excessive amount of halibut, a 20 metric ton threshold will be applied in each quarter. If that threshold is exceeded the penalty system will apply to the vessel, regardless of whether the applicable catch threshold is reached. The catch and halibut thresholds together create an incentive for vessels with unacceptably high halibut catch or rates to depart the fishery quickly to avoid possible penalties.

Halibut penalties

A vessel that fails to meet the quarterly rate standard will be subject to a halibut penalty equal to the additional halibut that the vessel used as a result of exceeding the target rate. This amount is calculated as the difference between the vessel's actual halibut use and the use that the vessel would have achieved had it met the applicable rate standard. In other words, the vessel's halibut use in the quarter minus the vessel's groundfish catch in that quarter times the applicable rate standard.

Retrospective analysis of the program

In developing the program, the sector undertook a retrospective analysis of the potential effect of the program to assess its potential effect. This analysis applied the various standards to prior years' fishing to ensure that behavior modification would be driven by the plan.

Annual outlier test

The annual outlier test is intended to create a strong incentive for each vessel to maintain a reasonable halibut mortality rate in the fisheries prone to halibut bycatch – yellowfin sole, rock sole, and arrowtooth flounder/flathead sole. This incentive is driven by a fine that is applied to each vessel that fails to meet an acceptable annual mortality rate (in kg of halibut mortality per metric ton of groundfish catch). Mortality test rates decline over a three year period to one and one-half the fleet average mortality from 2012 to 2014. The decreasing rate standards provide vessels that would currently be non-compliant with an opportunity to develop halibut avoidance proficiency.

The table below shows the annual fines that would have been applied had the program been in place from 2008 to 2015 (through December 1, 2015). Fines are shown for each defined target and in the aggregate in the last row of the table. Fines in the fisheries follow no particular pattern when compared to overall fleet performance. In a few cases, more fines are imposed in years of relatively high mortality rates; however, in some years of low mortality rates, both the number of vessels subject to fines and the amount of fines are large. Such a result suggests that the test will be useful for deterring outlier vessels, rather than just fining vessels when halibut mortality rates are relatively high overall. The final two lines in the table show aggregate projected annual fines under the test. The table shows that fines would have which averaged over \$430,000 annually under the rate standards applied in 2017. The highest fines in a given year would have exceeded \$600,000.

Projected annual fines by target under the annual outlier test applying the 2017 standards (2008-2015).

Target	Year	Number of vessels	Number of vessels fined	Fine amounts (\$)
Yellowfin sole	Average	19	3	176,875
	Maximum	21	4	320,000
Rocksole	Average	19	2	165,000
	Maximum	21	5	370,000
Arrowtooth flounder /flathead sole	Average	17	1	88,125
	Maximum	18	5	395,000
Total	Average	55	6	430,000
	Maximum	59	9	610,000

Note: total vessel counts includes double counting of vessels in multiple targets.

Effects of the fourth quarter test

In the fourth quarter, all vessels are subject to a rate standard equal to the mean rate in the fourth quarter from 2012 through 2014. Vessels that fail to meet the standard are subject to a penalty of approximately one half of the annual penalty. The rate standard is applied to all flatfish targets monitored under the program (i.e., yellowfin sole, rock sole, arrowtooth flounder/flathead sole in the aggregate). Yellowfin sole is the primary target in the fourth quarter; however, all targets are included to ensure that vessels cannot avoid the program through target selection.

The table below shows a retrospective analysis of the fourth quarter test from 2008 through 2015. The test shows that fines would have averaged almost \$150,000 annually, with 5 vessels failing to meet the rate standard on average. At most 10 vessels would have been fined for exceeding the standard and over \$320,000 would have been paid by substandard vessels in one year.

Projected annual fines under the fourth quarter test (2008-2015).

	Number of vessels	Number of fined vessels	Fine amounts (\$)
average	15	5	142,500
maximum	18	10	320,000

In considering these results, it is important to keep in mind that the objective of the avoidance plan is not to collect fines, but to change incentives in a manner that induces all vessels to meet the rate standards. In other words, success should be measured not in the amount of money paid in fines, but rather by the absence of fines. The retrospective analysis provides a reasonable baseline for assessing future performance. Fewer fines than those suggested by the retrospective analysis suggest that changes in halibut mortality rates intended to arise from the program have occurred.

Performance in the 2017 season

In the 2017 season, no vessels fished at halibut rates that led to penalties under either the annual standard or the fourth quarter standard. Annual participation in the yellowfin sole and rock sole targets were similar to participation levels in the historical period, with 19 and 18 vessels participating in those fisheries respectively. One vessel in yellowfin fishery and three vessels in the rock sole fishery failed to meet the minimum groundfish threshold needed for the standard to apply. Only 12 vessels participated in

the arrowtooth flounder and flathead sole target fisheries, down from an average of 17 vessels in the historical period, with only 9 vessels reaching the minimum groundfish thresholds. Those fisheries tended to draw fewer vessels historically than yellowfin sole and rock sole target fisheries. All vessels that reached the minimum groundfish threshold achieved halibut rates below the applicable 2017 rate standard. In addition, all of these vessels achieved the halibut rate that would apply in the 2018 rate standard.

Annual outlier test results for 2017.

Target	Number of vessels in the fishery	Number of vessels meeting the minimum groundfish threshold	Number of vessels meeting the 2017 standard	Number of vessels meeting the 2018 standard
Yellowfin sole	19	18	18	18
Rock sole	18	15	15	15
Arrowtooth and flathead (combined)	12	9	9	9

In the fourth quarter, 17 vessels fished in the flatfish targets included in the program. Of those vessels, 13 met the minimum groundfish threshold, with all of those vessels meeting the halibut rate standard. The number of vessels fishing in the targets is slightly higher than historical numbers, but performance in 2017 was substantially better than historical performance, as prior to 2017, 5 vessels on average exceeded the rate standard annually.

Fourth quarter outlier results for 2017

Number of vessels in yellowfin, rock sole, and flathead/arrowtooth targets	17
Number of vessels meeting the minimum groundfish threshold	13
Number of vessels meeting the 4th quarter standard	13

Historically, some vessels in the Amendment 80 sector were outliers, maintaining halibut bycatch rates substantially higher than the rest of the fleet. The annual outlier test and its accompanying penalties are intended to induce those vessels to reduce rates to acceptable level given the historical fleet average. In the first two years of the program, the absence of penalties charged (in comparison to the historical fishing) demonstrates the success of the program in bringing outlier vessels closer to the fleet average. With additional reductions in the standard, historical outlier vessels will be subject to a greater incentive to maintain rates at lower levels next year. The fourth quarter rate test is intended to result in all vessels achieving rates below the fleet’s historical average fourth quarter rates. In the first two years, this goal was achieved by all vessels in the fisheries.

The halibut avoidance plan and its associated standards and penalties have become an integral part the inseason management of halibut in the Amendment 80 sector. Each company receives a weekly report showing the performance of each of its vessels relative to the applicable standards. These reports further

monitoring of halibut avoidance efforts and have contributed to the success of the sector in maintaining operations despite the recent reduction in halibut limits and usage by the sector.

Overview of the Sector’s Halibut Avoidance Performance

Halibut avoidance performance is subject to a variety of factors in addition to use of halibut avoidance measures. Fishing conditions (including the presence or absence of halibut intermingled with groundfish stocks) often vary across time in unpredictable ways. As a result, halibut bycatch fluctuates within and across years. Despite these vagaries, the cooperative’s halibut PSC performance has generally improved over time.

Through November 30, 2017 the sector had its lowest annual halibut usage since implementation of Amendment 80. Halibut mortality reductions have come at significant expense to the sector. Direct financial expenses are incurred. Most vessels have purchased several excluders, as effectiveness of different types and specifications vary with conditions and target species. Some vessels have carried a third observer to reduce factory shutdowns during deck sorting. Fuel expenses rise as vessels move away from areas with unacceptably high bycatch rates. Revenues are also reduced by most halibut avoidance measures, with this year’s catch dropping to its lowest level since implementation of Amendment 80. Excluder use reduces target catches – in some cases by as much as 40%. Fishing time and catches drop with movement away from high bycatch areas and deck time being devoted to sorting halibut. It is notable that the three most recent years (2015, 2016, and 2017) are the only years when the sector’s halibut usage was below the current cap level (Table 1).

Amendment 80 halibut mortality in the Bering Sea and Aleutian Islands (2008-2017).

Year	Mortality	Total Groundfish
2008	1,925	326,994
2009	2,092	314,700
2010	2,284	336,280
2011	1,810	324,681
2012	1,945	326,930
2013	2,168	334,521
2014	2,179	334,978
2015	1,633	306,422
2016	1,401	316,715
2017	1,126	290,565

Information is complete through November 30, 2017.

Although the halibut PSC limit of the sector applies across all halibut management areas in the Bering Sea and Aleutian Islands, the sector monitors its halibut usage in the three Bering Sea and Aleutian Island halibut management areas to ensure that its bycatch does not disproportionately affect any one area. In the most recent years, the sector’s halibut usage has been relatively stable or has declined across the three areas (Table 2).

Amendment 80 sector halibut mortality in Bering Sea and Aleutian Islands halibut management areas (2008-2017).

Year	4A	4B	4CDE
2008	332	88	1,502
2009	498	163	1,432
2010	294	242	1,723
2011	255	214	1,261
2012	298	261	1,353
2013	265	206	1,588
2014	151	168	1,817
2015	127	145	1,358
2016	83	115	1,196
2017	94	120	912

Information is complete through November 30, 2017.

It is notable that the sector will end the year with approximately 25,000 mt less catch than in any year since implementation of Amendment 80. Given that halibut avoidance measures adopted by vessels are not foolproof and the potential for halibut interactions to increase near the end of the year, this year's halibut performance may not be achievable in the future. Notwithstanding, sector members have a great incentive for halibut avoidance. The halibut avoidance plan, and particularly the measure in that plan that addresses the potential for increases in halibut bycatch rates in the fourth quarter, ensure that halibut avoidance incentives remain strong through the year's end.

Conclusion

Amendment 80 sector members rely on multiple tools to reduce halibut PSC. Effectiveness of different tools varies with fishing conditions. As a result, the sector's members change halibut PSC reduction methods with changes in conditions. For example, safety concerns may prevent the use of deck sorting in stormy weather, requiring vessels to rely more heavily on excluders. Despite these challenges, the sector has achieved substantial reductions in halibut PSC through its persistent efforts.

Amendment 80 Sector's Halibut Bycatch Rules

(Adopted by all sector members in 2015)

In order reduce bycatch to allow for a substantial increase in the directed halibut fishery catch limit in Area 4CDE from the IPHC staff's preliminary blue line advice, the members of the Alaska Seafood Cooperative (AKSC) agree to the following terms:

Notice of entry to/exit from the BSAI fisheries - Each vessel will notify both Seastate and the other fishery participants on entry to or exit from the Bering Sea and Aleutian Islands fisheries to facilitate communication.

On grounds communication among captains – Captains will communicate on the grounds concerning halibut bycatch rates. On grounds communication provides the most up to date and complete information concerning halibut avoidance – includes discussions of:

- 1) prevailing bycatch rates and changes in those rates,
- 2) catch rates of halibut (particularly in the 4CDE accounting area),
- 3) effectiveness of deck sorting in the different target fisheries under various conditions and bycatch levels,
- 4) effectiveness of excluders in the different target fisheries under various conditions and bycatch levels, and
- 5) any factor that may be relevant to bycatch rates and bycatch rates, including the effects on halibut rates and halibut rates of:
 - a. time of day
 - b. fishing depth
 - c. water temperature
 - d. areas of halibut concentrations
 - e. excluder performance (including type and mesh size)
 - f. effects of any gear modifications.

Test tows – When appropriate, vessels will use smaller test tows to ensure that halibut rate is acceptable prior to fishing an area.

Attention to Haul Composition –Wheelhouse personnel will give increased attention to haul composition by watching the bag dump and assessing the halibut bycatch rate and halibut O26 bycatch rate and to increase communication with deck crew concerning halibut bycatch (and halibut O26 bycatch) trends.

Excluder Use – The use of excluders is encouraged. Since excluders may have limited benefits (and sometimes increase bycatch) in the high volume, low bycatch periods, vessels are also encouraged to share information concerning the effectiveness of excluders when fishing different areas and under different conditions.

Seastate Reporting – Seastate is commissioned to develop bycatch charts on a regular basis that display the halibut bycatch rates in the fisheries. These charts will show halibut bycatch by target fishery.

Deck sorting - On approval of the cooperative's 2015 deck sorting Exempted Fishing Permit, vessels are encouraged to use deck sorting to reduce mortality of halibut (particularly in the 4CDE accounting area).

Night Towing – Night towing is discouraged in fisheries with historically higher night halibut bycatch rates. Cooperative members are directed to give extra attention to halibut bycatch rates (and 4CDE halibut bycatch) if fishing at night. If a vessel cannot achieve night fishing bycatch rates that are measurably similar to day fishing bycatch rates, the vessel is strongly encouraged to end night fishing.

Rate Standard — As fishing progresses during the season, cooperative members will consider whether any halibut rate standards may be beneficial for achieving halibut bycatch reductions. Rate standards could be applied at the target fishery level to compel certain avoidance measures, if appropriate rate levels and monitoring requirements and effective response measures can be identified.

Weekly meetings – Cooperative members agree to meet weekly to discuss overall Bering Sea halibut PSC performance and 4CDE accounting area halibut bycatch performance. Meetings will include discussions of:

- 1) Prevailing halibut bycatch rates and performance (and particularly 4CDE accounting area rates and performance).
- 2) Success of the various bycatch avoidance strategies identified in this agreement and the effects of any other strategy or factor on bycatch avoidance and rates
- 3) Development of additional measures to reduce bycatch, including whether sufficient information exists to develop any new or additional bycatch avoidance requirements or practices to supplement those identified in this agreement
- 4) Possible performance standards and responses required for those vessels not meeting the standards.