

Analysis of Proposed Regulation Changes for the Area 2C and 3A Charter Halibut Fisheries for 2020

A Report to the North Pacific Fishery Management Council

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May 8, 2020

1. Introduction

The International Pacific Halibut Commission (IPHC) approves catch limits for Pacific halibut each year for regulatory areas in Alaska. In IPHC Regulatory Areas 2C and 3A, which roughly correspond with Southeast and Southcentral Alaska, Federal regulations specify a Halibut Catch Sharing Plan (CSP) that allocates the catch limits between the commercial longline fishery and the recreational charter fishery. The allocations vary with the magnitude of the overall catch limit, such that the percentage allocated to the charter sector increases slightly as catch limits decrease. In accordance with the U.S. Halibut Act, and under terms of the Convention between the U.S. and Canada governments, the IPHC recommended, and the National Marine Fisheries Service (NMFS) implemented, catch limits for 2020, including the CSP allocations for Areas 2C and 3A. Charter allocations for 2020 are 780,000 lbs. in Area 2C and 1,700,000 lbs. in Area 3A.

The CSP specifies a process for the Council to review and recommend to the IPHC annual management measures that are designed to keep the charter sector harvest within its annual allocation. Based on analyses requested by the Council's Charter Halibut Management Committee, the Council recommended the following management measures for the 2020 charter halibut fisheries, which were implemented into regulation by NMFS in March 2020.

Area 2C:

- One-fish bag limit, and a reverse slot limit where retained fish must be 40 inches or less or 80 inches or more (U40 O80)

Area 3A:

- Two-fish bag limit, one fish of any size and one fish 26 inches or less
- One-trip per day limit for charter vessels and for charter halibut permits
- Annual limit of four fish per charter angler
- No halibut retention by charter anglers on all Tuesdays and all Wednesdays

In April 2020, the National Marine Fisheries Service (NMFS) received a proposal from members of the charter halibut sector to relax the existing management measures in Areas 2C and 3A due to the impacts of COVID-19 on the sector, in particular the cancellation of cruise ship sailings and current travel restrictions. The proposal seeks to amend the established 2020 charter halibut management measures for Areas 2C and 3A due to the expected reduction in charter fishing effort this summer. Proposed management measures include the following:

Area 2C, proposed regulation change to be implemented *when travel restrictions are lifted*:

- One-fish bag limit and a reverse slot limit where retained fish must be 45 inches or less or 80 inches or more (U45 O80)

Area 3A, proposed regulation change to be implemented *until travel restrictions are lifted*:

- Two-fish bag limit, with no size restrictions
- No annual limit
- No day-of-week closures
- One-trip per day limit for charter vessels and for charter halibut permits

2. Estimates

This document includes estimates and information on removals to aid in the decision-making process. The analyses do not reflect any known changes to angler effort due to the current pandemic or economy. General methods to forecast removals can be found in Webster and Powers (2019) and Webster and Powers (2020).

For each Regulatory Area, the projected proportion of removals in 2020 under status quo regulations was estimated for semi-monthly periods (Tables 1 and 7). These tables characterize the recent historical distribution of removals throughout the season in a typical year. Projections used the proportion of harvest within each date range by subarea for 2019 (most recent year) and the three-year average of the proportion of harvest by subarea from 2017 - 2019. Proportions were applied to 2020 harvest forecasts in each subarea during each date range in the 2020 season. Average weight forecasts were applied to subarea forecasts to estimate yield, then multiplied by the 2020 release mortality inflation factor, to estimate removals. Analysis was subarea specific to account for spatial differences that may affect halibut harvest and removals.

The proportion of total charter harvest by Alaska resident anglers (“residents” herein) from 2006 – 2019 was estimated in each Regulatory Area (Tables 2 and 8). In Area 2C, the resident proportion of charter harvest has ranged from 1.4% to 2.6% of total harvest and has been lowest in the most recent years. Residents typically account for a greater proportion of the charter harvest in Ketchikan, Prince of Wales Island, and Juneau. In Area 3A, the resident proportion of the harvest has ranged from 17.7% to 29.9% and has also been lowest in recent years. The resident proportion of harvest in Area 3A is typically highest in Valdez and Whittier.

Projected annual removals by residents were estimated under both status quo management measures and proposed management measures (Tables 3 and 9). Removals by residents were estimated to evaluate the impact travel restrictions might have on charter sector harvest if in place for the entire year and assumes nonresident harvest would be negligible due to the travel restrictions. Low and high removal projections are included to account for uncertainty in resident participation and potential behavioral changes due to less restrictive regulations.

Projected annual removals by all anglers (residents and nonresidents combined) under proposed management measures were also estimated for both Regulatory Areas (Tables 4 and 10). These projections assume no change in effort due to the current travel restrictions. Tables 4 and 10 include the required reduction in removals necessary for the charter sector in each area to remain below their 2020 allocations if the proposed regulations were implemented for the entire season. For Area 3A, both low and high removal estimates were included to account for the uncertainty in removal estimates when implementing a regulation of two fish of any size.

Removals were then projected for a scenario where the travel restrictions are in effect through June 30 (Tables 5 and 11). This is an example of harvest that may occur before and after travel restrictions are rescinded and does not reflect any knowledge by the State of Alaska regarding actual dates for changes in

travel restrictions, or the extent to which the restrictions may be changed, or the extent to which existing travel restrictions have already impacted charter halibut effort. For both Regulatory Areas, proportions of harvest under less restrictive regulations were adjusted to reflect a potential increase in effort due to less restrictive regulations. One example then assumes 100% of both resident and non-resident harvest would occur once travel restrictions are lifted and a second example assumes 100% of resident harvest and 50% of nonresident harvest would occur.

Finally, annual removals were projected using explicit dates for regulatory changes (Tables 6 and 12). Annual removals were projected under each management measure, then the proportion of harvest that occurs during the defined time period was applied to the projection. Projected removals before and after the date of regulation change were summed to estimate annual removals and the necessary reduction in removals to remain below the Regulatory Area's respective allocations. This does not attempt to account for harvest under current travel conditions and does not account for changes in effort due to less restrictive regulations. For Area 3A, both low and high harvest estimates were included to account for the uncertainty in removals estimates when reverting to a regulation of two fish of any size.

3. Implementation Considerations

Area 2C

The proposed change in size limits for Area 2C is consistent with recent management measures and therefore there are no anticipated problems associated with analyzing a change in the reverse slot limit.

While travel restrictions are in effect, it is assumed there will be a negligible amount of harvest from nonresident anglers and that only residents will be able to access the fishery. Resident harvest accounted for 1.4% to 2.6% of total Area 2C harvest since 2006. Therefore, while travel restrictions are in effect, it is anticipated that the removals in Area 2C will be minimal.

Area 3A

The proposed changes to regulations in Area 3A are substantially different from recent years and therefore there is a considerable amount of uncertainty in forecasts. There are no anticipated analytical problems associated with annual limits. It is assumed that closed days in recent years have eliminated charter angler effort that historically occurred on those days; effort that may have been displaced to other days of the week could result in an overestimate of harvest in these analyses. Since the implementation of size limits in Area 3A, there has been a considerable decrease in the proportion of anglers retaining two fish. This analysis included estimates using both projected proportions of second fish in the harvest and historical (2013, the last year with no size restrictions) proportions of second fish in the harvest to account for the uncertainty in harvest estimates related to removing the size restriction. Furthermore, the average size of fish is highly uncertain if size limits are removed. This analysis included two different estimates of the average size fish. One estimate used the average size fish in 2013; in addition to being the last year with no size restrictions it was also the year with the lowest average weight from 1994 – 2013. The second estimate used the average size of fish greater than 28 inches in 2019; any removal over 28 inches was considered the fish of any size in the bag limit and the average weight was consistent with observed average weights in past years.

While travel restrictions are in effect, it is assumed there will be a negligible amount of harvest from nonresident anglers and only residents will be able to access the fishery. Resident harvest has declined in recent years, likely related to the more restrictive regulations for charter anglers. In 2019, residents accounted for 18.7% of total harvest; prior to regulatory restrictions to the charter sector, residents

accounted for as much as 29.9% of harvest. It is possible a change in regulations would increase resident participation in the charter sector and therefore increase overall harvest relative to this analysis.

General

In both Regulatory Areas, this analysis assumes that nonresident participation will be negligible and have no meaningful effect on the charter halibut fishery removals while travel restrictions are in effect. It is likely there will still be some amount of nonresident harvest, as there are still likely to be some tourists who adhere to the 14-day quarantine, seasonal workers who have completed their 14-day quarantine period and are residing in Alaska for longer periods of time, or people living in Alaska who have not yet achieved resident status. This analysis assumes that resident participation will be consistent with past years and does not account for residents who chose not to participate due to health concerns or economic hardships. Further, this does not account for other health mandates such as social distancing requirements and onboard capacity requirements.

The analysis does not attempt to quantify known or implied changes in nonresident participation due to cancellation of cruise ships sailings, or closure of lodging facilities and businesses, or cancellations of lodge and daily charter trips that have already occurred. For example, at the time of writing, Princess, Holland America, and Carnival Cruise Lines have all cancelled 100% of their sailings to and within Alaska and all of the Princess Lodges announced they will close for the season, as have several fishing lodges in remote areas.

Currently, there is no indication of anticipated changes to travel restrictions. It is possible the mandatory 14-day quarantine for all travelers entering the state will be rescinded, but it may also be amended. Furthermore, considering the dynamic nature of the current situation, it is possible that mandates will become less restrictive, then revert to the current mandates. This analysis did not attempt to address these dynamics or how they may affect regulatory changes or harvest forecasts.

A mid-season change in regulations will be problematic for future harvest estimates and forecasting because there is a considerable amount of uncertainty with how such regulatory inseason changes affect angler behavior. While the estimates reported here are in light of the current situation, inseason changes to regulations would not be advisable in the future.

4. References

Webster, S. and R. Powers 2019. Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019

Webster, S. and R. Powers 2020. Supplemental analysis of management options for the 3A charter halibut fishery for 2020: A report to the North Pacific Fishery Management Council, January 2020

Table 1. Area 2C projected proportion of removal in 2020 by semi-monthly period under status quo regulations. Projections used the proportion of harvest within each date range by subarea* for 2019 (most recent year) and the three-year average of the proportion of harvest by subarea from 2017 - 2019. Proportions were applied to 2020 harvest forecast in each subarea during each date range in the 2020 season. Forecasts of average weight of retained halibut were applied to subarea forecasts to estimate yield, then multiplied by the 2020 release mortality inflation factor to estimate total removal. Analysis was subarea specific to account for spatial differences that may affect halibut harvest and removal (i.e. business practices, available facilities, ecological factors). *A list of subareas can be found in *Webster, S. and R. Powers 2019. Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019.*

| Date Range | Projections Using 2019 Data | Projections Using Three-Year Average (2017 - 2019) |
|--------------------------|----------------------------------|--|
| | Proportion of Removals (lbs.) | Proportion of Removals (lbs.) |
| February 1 - 15 | 0.0% | 0.0% |
| February 16 - 29 | 0.0% | 0.0% |
| March 1 - 15 | 0.0% | 0.0% |
| March 16 - 31 | 0.0% | 0.0% |
| April 1 - 15 | 0.0% | 0.0% |
| April 16 - 30 | 0.0% | 0.0% |
| May 1 - 15 | 0.3% | 0.3% |
| May 16 - 31 | 3.7% | 3.8% |
| June 1 - 15 | 7.9% | 9.1% |
| June 16 - 30 | 14.3% | 15.6% |
| July 1 - 15 | 16.9% | 16.7% |
| July 16 - 31 | 19.4% | 19.7% |
| August 1 - 15 | 19.3% | 17.7% |
| August 16 - 31 | 12.8% | 12.3% |
| September 1 - 15 | 5.1% | 4.4% |
| September 16 - 30 | 0.3% | 0.4% |
| October 1 - 15 | 0.1% | 0.0% |
| October 16 - 31 | 0.0% | 0.0% |
| November 1 - 15 | 0.0% | 0.0% |
| November 16 - 30 | 0.0% | 0.0% |
| December 1 - 15 | 0.0% | 0.0% |
| December 16 - 31 | 0.0% | 0.0% |

Table 2. Area 2C proportion of total charter halibut harvest by resident anglers. Proportion of total annual charter halibut harvest in Area 2C by resident anglers from 2006 – 2019.

| Year | Proportion Resident Harvest (no. fish) |
|-------------|---|
| 2006 | 2.1% |
| 2007 | 1.8% |
| 2008 | 1.6% |
| 2009 | 2.1% |
| 2010 | 2.3% |
| 2011 | 1.6% |
| 2012 | 1.7% |
| 2013 | 1.9% |
| 2014 | 1.6% |
| 2015 | 1.7% |
| 2016 | 1.5% |
| 2017 | 1.8% |
| 2018 | 1.4% |
| 2019 | 1.5% |

Table 3. Area 2C projected charter halibut removal from resident anglers. Projected removal for 2020 from resident charter halibut anglers in Area 2C under reverse slot limits of less than or equal to 40 inches or greater than or equal to 80 inches (status quo) and less than or equal to 45 inches or greater than or equal to 80 inches (proposed regulations). Low removal estimates used the 2020 projected removals for each subarea and applied the proportion of resident harvest in that subarea in 2018, the year with the lowest proportion of resident harvest in Area 2C. High removal estimates used the 2020 projected removals for each subarea and applied the proportion of resident harvest in that subarea in 2010, the year with the highest proportion of resident harvest in Area 2C. Projections do not account for any changes to angler behavior due to the current pandemic or economy, or removal under status quo regulations until new regulations are implemented. Low and high removal estimates are provided to help characterize the uncertainty in harvest estimates.

| Scenario | U40 O80 (Status Quo) | U45 O80 (Proposed Regulations) |
|-------------------------------------|-----------------------------|---------------------------------------|
| Low Removal Estimate (lbs.) | 10,143 | 11,378 |
| High Removal Estimate (lbs.) | 17,078 | 19,226 |

Table 4. Area 2C projected charter halibut annual removal from all anglers under proposed regulations. Projected removal for 2020 from all charter halibut anglers in Area 2C under a reverse slot limit of less than or equal to 45 inches or greater than or equal to 80 inches and necessary reduction in removals to remain below the 2020 Area 2C charter allocation of 780,000 lbs. Projections do not account for any changes to angler behavior due to the current pandemic or economy, or removal under status quo regulations until new regulations are implemented. Projected removals estimates under all reverse slot limits with lower limits from 35 to 50 inches and upper limits from 50 to 80 inches can be found in *Webster, S. and R. Powers 2019. Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019.*

| | Removal Estimate (lbs.) | Necessary Reduction in Removal |
|------------------------------|--------------------------------|---------------------------------------|
| 2020 Forecast U45 O80 | 888,260 | -12.2% |

Table 5. Example of Area 2C projected charter halibut removal with interstate travel restrictions through June 30. Projected removal for 2020 from charter halibut anglers in Area 2C under a change in the reverse slot limit from less than or equal to 40 inches or greater than or equal to 80 inches through June 30 to less than or equal to 45 inches or greater than or equal to 80 inches through the end of the year. Two different scenarios are included. Both scenarios assume that only resident anglers are able to participate in the fishery while travel restrictions are in place and use the proportion of total annual harvest taken by residents through June in each subarea in 2019 to reflect current conditions under status quo regulations. One scenario assumed 100% of both resident and nonresident harvest would occur once travel restrictions are lifted and the proportion of harvest would be equal to those years with the highest proportion of resident (2012) and non-resident (2010) harvest in the second half of the season. The years with the highest proportion of harvest were selected to reflect a potential increase in effort due to less restrictive size limits. A second scenario assumed 100% of resident harvest and 50% of nonresident harvest would occur once travel restrictions are lifted and otherwise follows the same estimation methods as the first scenario. Projections do not account for any changes to angler behavior due to the current pandemic or economy. Projected removals estimates under all reverse slot limits with lower limits from 35 to 50 inches and upper limits from 50 to 80 inches can be found in *Webster, S. and R. Powers 2019. Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019.*

| | Estimated Removal with 100% Nonresident Participation After June 30 | Estimated Removal with 50% Nonresident Participation After June 30 |
|--|--|---|
| February - June Removal (U40 O80) | 3,698 | 3,698 |
| July - December Removal (U45 O80) | 660,433 | 336,368 |
| Annual Removal | 664,131 | 340,067 |

Table 6. Area 2C projected charter halibut removals\ with explicit dates for regulation changes.

Projected removal for 2020 from all charter halibut anglers in Area 2C under a change in the reverse slot limit from less than or equal to 40 inches or greater than or equal to 80 through explicit dates (June 30, July 15, July 31, and August 15) to less than or equal to 45 inches or greater than or equal to 80 inches for the remainder of the season, and necessary reduction in removal to remain below the 2020 Area 2C charter allocation of 780,000 lbs. All scenarios assumed the three-year average proportion of removals from 2017 – 2019 would occur during each date range in each subarea and do not reflect any shift in effort that may occur due to the regulation change. The recent three-year average was used to account for longer-term changes that may have occurred among subareas (i.e. timing of tourism, changes to non-halibut fishing regulations) while accounting for interannual variability (i.e. weather). Projections do not attempt to account for current travel restrictions or any changes to angler behavior due to the current pandemic or economy. Projected removals estimates under all reverse slot limits with lower limits from 35 to 50 inches and upper limits from 50 to 80 inches can be found in *Webster, S. and R. Powers 2019. Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019.*

| Regulation Change Date | U40 O80 Removal | U45 O80 Removal | Annual Removal | Necessary Reduction |
|-------------------------------|------------------------|------------------------|-----------------------|----------------------------|
| June 30 | 222,495 | 631,079 | 853,574 | -8.6% |
| July 15 | 351,627 | 483,810 | 835,438 | -6.6% |
| July 31 | 503,498 | 309,679 | 813,177 | -4.1% |
| August 15 | 640,021 | 152,932 | 792,954 | -1.6% |

Table 7. Area 3A projected proportion of removal in 2020 by semi-monthly period under status quo regulations. Projections used the proportion of harvest within each date range by subarea* for 2019 (most recent year) and the three-year average of the proportion of harvest by subarea from 2017 - 2019. Both analyses assumed all Tuesdays and Wednesdays were closed in the base years. Proportions were applied to 2020 harvest forecast in each subarea during each date range in the 2020 season. Average weight forecasts were applied to subarea forecasts to estimate yield, then multiplied by the 2020 release mortality inflation factor, to estimate removal. Analysis was subarea specific to account for spatial differences that may affect halibut harvest and removals (i.e. business practices, available facilities, ecological factors).
*A list of subareas can be found in *Webster, S. and R. Powers 2019. Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019.*

| Date Range | Projections Using 2019 Data | Projections Using Three-Year Average (2017 - 2019) |
|--------------------------|----------------------------------|--|
| | Proportion of Removals (lbs.) | Proportion of Removals (lbs.) |
| February 1 - 15 | 0.0% | 0.0% |
| February 16 - 29 | 0.0% | 0.0% |
| March 1 - 15 | 0.0% | 0.0% |
| March 16 - 31 | 0.0% | 0.0% |
| April 1 - 15 | 0.0% | 0.1% |
| April 16 - 30 | 0.3% | 0.3% |
| May 1 - 15 | 1.3% | 1.4% |
| May 16 - 31 | 5.3% | 4.7% |
| June 1 - 15 | 9.2% | 9.2% |
| June 16 - 30 | 13.7% | 13.5% |
| July 1 - 15 | 17.4% | 18.1% |
| July 16 - 31 | 18.9% | 20.6% |
| August 1 - 15 | 17.6% | 15.4% |
| August 16 - 31 | 11.2% | 10.9% |
| September 1 - 15 | 3.8% | 4.5% |
| September 16 - 30 | 1.0% | 1.2% |
| October 1 - 15 | 0.1% | 0.1% |
| October 16 - 31 | 0.0% | 0.0% |
| November 1 - 15 | 0.0% | 0.0% |
| November 16 - 30 | 0.0% | 0.0% |
| December 1 - 15 | 0.0% | 0.0% |
| December 16 - 31 | 0.0% | 0.0% |

Table 8. Area 3A proportion of total charter halibut harvest by resident anglers. Proportion of total annual charter halibut harvest in Area 3A by resident anglers from 2006 – 2019.

| Year | Proportion Resident Harvest (no. fish) |
|-------------|---|
| 2006 | 29.5% |
| 2007 | 23.6% |
| 2008 | 23.3% |
| 2009 | 28.3% |
| 2010 | 29.9% |
| 2011 | 28.3% |
| 2012 | 27.4% |
| 2013 | 27.4% |
| 2014 | 22.4% |
| 2015 | 23.2% |
| 2016 | 21.4% |
| 2017 | 19.6% |
| 2018 | 17.7% |
| 2019 | 18.7% |

Table 9. Area 3A projected charter halibut removal from resident anglers. Projected removal for 2020 from resident charter halibut anglers in Area 3A under a two fish bag limit with one fish of any size and one less than or equal to 26 inches, Tuesday and Wednesday closures for the entire year, and a four fish annual limit (status quo); and a two fish bag limit with no size restrictions, no closure days, and no annual limit (proposed regulations). Under status quo regulations, the low removal estimates used the 2020 projected removals for each subarea and applied the proportion of resident harvest in that subarea in 2018, the year with the lowest proportion of resident harvest in Area 3A. The high removals estimate used the 2020 projected removals for each subarea and applied the proportion of resident harvest in that subarea in 2010, the year with the highest proportion of resident harvest in Area 3A. Proposed regulation estimates used the same low and high proportions of resident harvest. Both low and high proposed regulation estimates used the 2020 forecast for all days of the week open* and applied the number of fish harvested by anglers in each subarea from 2014, the most recent year without annual limits*. The low removal estimate under the proposed regulation used the 2020 forecast of the proportion of second fish in the harvest for each subarea and the 2013 average weight for each subarea; 2013 was the most recent year with a bag limit of two fish of any size, no annual limit, and the lowest average weight of any year without size limits. The high removal estimate under the proposed regulation used the 2013 proportion of second fish in the harvest for each subarea and the 2019 average weight of O28 fish in each subarea; 2019 had the lowest proportion of second fish retained since size and annual limits were implemented* and all O28 fish in 2019 were not size restricted. Projections do not account for any changes to angler behavior due to the current pandemic or economy, or removal under status quo regulations until new regulations are implemented. Low and high removal estimates are provided to help characterize the uncertainty in removal estimates. *See Webster, S. and R. Powers 2019. *Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019* and Webster, S. and R. Powers 2020. *Supplemental analysis of management options for the 3A charter halibut fishery for 2020: A report to the North Pacific Fishery Management Council, January 2020* for additional information on proportions of second fish and forecasting methods under alternative management strategies.

| Scenario | 1-Fish Any Size, 1-Fish Under 26 Inches, Tuesdays and Wednesdays Closed, 4-Fish Annual Limit (Status Quo) | 2-Fish Any Size, No Closure Days, No Annual Limit (Proposed Regulations) |
|-------------------------------------|--|---|
| Low Removal Estimate (lbs.) | 328,292 | 413,241 |
| High Removal Estimate (lbs.) | 504,303 | 1,331,368 |

Table 10. Area 3A projected charter halibut annual removals from all anglers under proposed regulations. Projected removals for 2020 from all charter halibut anglers in Area 3A under a two fish bag limit with no size restrictions, no closure days, and no annual limit and necessary reduction in removals to remain below the 2020 Area 3A charter allocation of 1,700,000 lbs. Both low and high harvest scenarios under proposed regulations used the 2020 forecast for all days of the week open* and applied the number of fish harvested by anglers in each subarea from 2014, the most recent year without annual limits*. The low removal estimate used the 2020 forecast for the proportion of second fish in the harvest for each subarea and the 2013 average weight for each subarea, the most recent year with a bag limit of two fish of any size, no annual limit, and the lowest average weight of any year without size limits. The high removal estimate used the 2013 proportion of second fish in the harvest for each subarea and the 2019 average weight of O28 fish in each subarea; 2019 had the lowest proportion of second fish retained since size and annual limits were implemented* and all O28 fish in 2019 were not size restricted. Projections do not account for any changes to angler behavior due to the current pandemic or economy, or harvest under status quo regulations until new regulations are implemented. Low and high removal estimates are provided to help characterize the uncertainty in harvest estimates. *See Webster, S. and R. Powers 2019. *Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019* and Webster, S. and R. Powers 2020. *Supplemental analysis of management options for the 3A charter halibut fishery for 2020: A report to the North Pacific Fishery Management Council, January 2020* for additional information on proportions of second fish and forecasting methods under alternative management strategies.

| | Removal Estimate | Necessary Reduction in Removal |
|------------------------------|-------------------------|---------------------------------------|
| Low Removal Scenario | 2,306,286 | -26.3% |
| High Removal Scenario | 4,511,204 | -62.3% |

Table 11. Example of Area 3A projected charter halibut removal with interstate travel restrictions through June 30. Projected removal for 2020 from charter halibut anglers in Area 3A under a change in the regulations from a two fish bag limit with no size restrictions, no closure days, and no annual limit through June 30 to a two fish bag limit with one fish of any size and one less than or equal to 26 inches, Tuesday and Wednesday closures for the entire year, and a four fish annual limit through the end of the year. Two different scenarios are included. Both scenarios assume that only resident anglers participate in the fishery while travel restrictions are in effect. The high removal scenario approach described in Table 10 (2013 proportion of second fish and 2019 O28 average weight*) was used for the estimates under proposed regulations and used the proportion of total annual harvest taken by residents through June in each subarea in 2006. 2006 had the highest proportion of harvest by residents through June and was selected to reflect a potential increase in effort related to less restrictive regulations. One scenario assumed 100% of both resident and nonresident harvest would occur once travel restrictions are lifted and the proportion of harvest from July to December would be equal to 2019 to reflect current conditions under status quo regulations. A second scenario assumed 100% of resident harvest and 50% of nonresident harvest would occur from July to December and otherwise follows the same estimation methods as the first scenario. Projections do not account for any changes to angler behavior due to the current pandemic or economy, or harvest under status quo regulations until new regulations are implemented. *See Webster, S. and R. Powers 2019. *Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019* and Webster, S. and R. Powers 2020. *Supplemental analysis of management options for the 3A charter halibut fishery for 2020: A report to the North Pacific Fishery Management Council, January 2020* for additional information on proportions of second fish and forecasting methods under alternative management strategies.

| | Estimated Removal with 100% Nonresident Participation After June 30 | Estimated Removal with 50% Nonresident Participation After June 30 |
|---|--|---|
| February - June Removal (Proposed Regulations) | 551,355 | 551,355 |
| July - December Removal (Status Quo Regulations) | 1,164,039 | 684,081 |
| Annual Removal | 1,715,393 | 1,235,435 |

Table 12. Area 3A projected charter halibut removal with explicit dates for regulation changes.

Projected removal for 2020 from all charter anglers in Area 3A under a change in the regulations from a two fish bag limit with no size restrictions, no closure days, and no annual limit through explicit dates (June 30, July 15, July 31, and August 15) to a two fish bag limit with one fish of any size and one less than or equal to 26 inches, Tuesday and Wednesday closures, and a four fish annual limit for the remainder of the season, and necessary reduction in removal to remain below the 2020 Area 3A charter allocation of 1,700,000 lbs. All scenarios assumed the three-year average proportion of removals from 2017 – 2019 would occur during each date range in each subarea and do not reflect any shift in effort that may occur due to the regulation change. The recent three-year average was used to account for longer-term changes that may have occurred among subareas (i.e. timing of tourism, changes to non-halibut fishing regulations) while accounting for interannual variability (i.e. weather). Both low and high removal scenarios used the 2020 forecast for all days of the week open* and applied the number of fish harvested by anglers in each subarea from 2014, the most recent year without annual limits*. The low removal estimate under the proposed regulations used the 2020 forecast for the proportion of second fish in the harvest for each subarea and the 2013 average weight for each subarea*, the most recent year with a bag limit of two fish of any size, no annual limit, and the lowest average weight of any year without size limits. The high removals estimates under the proposed regulations used the 2013 proportion of second fish in the harvest for each subarea and the 2019 average weight of O28 fish in each subarea*; 2019 had the lowest proportion of second fish retained and all O28 fish in 2019 were not size restricted. Projections do not attempt to account for current travel restrictions or harvest under status quo regulations until new regulations are implemented, and do not otherwise account for any changes to angler behavior due to the current pandemic or economy. *See Webster, S. and R. Powers 2019. *Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2020: A report to the North Pacific Fishery Management Council, December 2019* and Webster, S. and R. Powers 2020. *Supplemental analysis of management options for the 3A charter halibut fishery for 2020: A report to the North Pacific Fishery Management Council, January 2020* for additional information on proportions of second fish and forecasting methods under alternative management strategies.

| Low Harvest Scenario | | | | |
|-------------------------------|-------------------------------------|---------------------------------------|-----------------------|----------------------------|
| Regulation Change Date | Proposed Regulations Removal | Status Quo Regulations Removal | Annual Removal | Necessary Reduction |
| June 30 | 679,645 | 1,201,871 | 1,881,516 | -9.6% |
| July 15 | 1,098,871 | 895,031 | 1,993,902 | -14.7% |
| July 31 | 1,578,100 | 546,270 | 2,124,370 | -20.0% |
| August 15 | 1,928,140 | 285,336 | 2,213,475 | -23.2% |

| High Harvest Scenario | | | | |
|-------------------------------|-------------------------------------|---------------------------------------|-----------------------|----------------------------|
| Regulation Change Date | Proposed Regulations Removal | Status Quo Regulations Removal | Annual Removal | Necessary Reduction |
| June 30 | 1,291,537 | 1,201,871 | 2,493,408 | -31.8% |
| July 15 | 2,104,871 | 895,031 | 2,999,902 | -43.3% |
| July 31 | 3,036,499 | 546,270 | 3,582,769 | -52.6% |
| August 15 | 3,738,667 | 285,336 | 4,024,002 | -57.8% |