



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

IPHC-2017-AM093-AR11

Received: 04 January 2017

Department of Fish and Game

DIVISION OF SPORT FISH

3298 Douglas Place
Homer, AK 99603
Main: 907-235-8191
Fax: 907-235-2448

P.O. Box 110024
Juneau, AK 99811-0024
Main: 907-465-4270
Fax: 907-465-2034

November 4, 2016

Claude Dykstra
International Pacific Halibut Commission
P.O. Box 95009
Seattle, WA 98145

Dear Mr. Dykstra:

This letter represents our report on the Alaska recreational halibut fishery in support of the annual IPHC stock assessment. This year's letter provides:

1. Final 2015 estimates of sport fishery harvest and yield by IPHC regulatory area,
2. Preliminary 2016 estimates of harvest and yield by IPHC area,
3. Final 2015 and preliminary 2016 estimates of sport fishery release mortality by IPHC area, and
4. Final 2015 and preliminary 2016 estimates of sport fishery yield prior to the mean IPHC longline survey date in Areas 2C and 3A.

Each section includes a summary of the methods used and basic results. More detailed information on methods can be found in the following project operational plans:

Southeast Region creel sampling: <http://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.1J.2015.06.pdf>

Southcentral Region creel sampling: <http://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.2A.2016.20.pdf>

Statewide halibut estimation: <http://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.4A.2014.08.pdf>

We hope this information satisfies the IPHC's needs. Please feel free to contact us if you require clarification or additional information.

Sincerely;

(sent via email)

Scott Meyer, Mike Jaenicke, Diana Tersteeg, and Barbi Failor
Fishery Biologists

Final Estimates of 2015 Sport Harvest and Yield

In November 2015 we provided preliminary estimates of the 2015 sport harvest for Areas 2C, 3A, 3B, and 4. This letter provides final estimates based on Alaska Department of Fish and Game (ADF&G) saltwater logbook data as of October 13, 2016, and final estimates from the ADF&G Statewide Harvest Survey (SWHS). The final estimates for Area 2C and 3A will also be posted on the North Pacific Fishery Management Council web site.

The Area 2C charter fishery regulations for 2015 included a one-fish daily bag limit and reverse slot (or “protected slot”) limit that allowed harvest of halibut less than or equal to 42 inches and halibut greater than or equal to 80 inches. The Area 3A charter regulations included a two-fish bag limit with a maximum size on one of the fish of 29 inches, a limit of one trip per charter vessel per day, a Thursday closure for the period June 15 – August 31, and a 5-fish annual limit (without a harvest recording requirement). Charter captains and crew were not allowed to retain halibut while guiding clients in Area 2C or Area 3A under regulations of the North Pacific Fishery Management Council’s Catch Sharing Plan (CSP) for these areas. Charter fishery regulations in the remainder of the state included a daily bag limit of two fish of any size, and there was no prohibition on retention of halibut by captains or crew. Noncharter (or unguided) fisheries statewide were also managed under a two-fish bag limit with no size limit.

Methods:

For Areas 2C and 3A, sport fishery yield was calculated separately for the charter and noncharter sectors as the product of the number of fish harvested and average weight of harvested halibut. Yield estimates do not include release mortality (provided later in this document). Estimates were done for six subareas in Area 2C and eight subareas in Area 3A and summed. Charter harvest was based entirely on logbook data, per the provisions of the CSP. Noncharter harvest was estimated through the SWHS. Standard errors of the SWHS estimates for the noncharter sector were obtained by bootstrapping. Average net weight was estimated by applying the IPHC length-weight relationship to length measurements of halibut harvested at major ports in Areas 2C and 3A. All fish from each vessel-trip selected for sampling were measured. Two-stage bootstrapping was used to estimate the standard errors of average weight. The estimate of charter average weight for Homer was stratified to account for differences in sizes of halibut cleaned at sea and cleaned onshore. Length measurements from the Glacier Bay subarea included fish caught in Areas 3A and 2C. All noncharter harvest in the Glacier Bay subarea was assumed to have occurred in Area 2C. Charter-caught halibut taken under a Guided Angler Fish (GAF) permit from the National Marine Fisheries Service were not included in charter harvest calculations because the CSP specifies that this harvest accrues toward the commercial catch limit.

Final estimates of sport fishery yield for Areas 3B and 4 are for the charter and noncharter sectors combined and are based entirely on the SWHS. Because ADF&G does not sample the sport harvest in these areas, we followed past practices of the IPHC and used the average weight of Kodiak sport harvest as a proxy for average weight in Areas 3B and 4. In past years we applied a weighted mean of the Kodiak charter and noncharter average weights – this year we substituted the noncharter weight only, as all anglers in Areas 3B and 4 were under the same regulations as the noncharter fishery. Even so, use of the Kodiak average weight may bias the yield estimates for these areas. Anecdotal reports from the Dutch Harbor/Unalaska area suggest that average weight is higher than at Kodiak.

As has been done historically, harvest from SWHS Area R (Alaska Peninsula and Aleutian Islands south of Cape Douglas) was apportioned to IPHC Areas 3B and 4 using specific locations reported in the survey. In some years, Area R harvest estimates have included harvests for sites that are actually in Area 3A. Since 1991, the estimated harvest of Area 3A halibut included in Area 3B estimates has ranged from 0 to 728 fish per year (average = 131). We continue to report these Area 3A harvests in Area 3B because the number of SWHS responses on which they are based is too small to reliably apportion between charter and noncharter as well as between Areas 3A and 3B. This accounting approach has more impact on the Area 3B sport harvest estimate than the Area 3A estimate because the Area 3A harvest is much higher.

Results:

The 2015 Area 2C overall sport yield, excluding release mortality, was estimated at 2.094 million pounds (Table 1). The charter portion was 0.768 Milb (37%) and the noncharter portion was 1.327 Milb (63%). Estimated harvests (in numbers of fish) were 65,656 for the charter sector, 73,816 for the noncharter sector, and 139,472 overall. Average net weight was estimated at 11.69 lb for the charter harvest, 17.97 lb for the noncharter harvest, and 15.02 lb overall. Average weights were based on length measurements of 5,239 charter fish and 4,465 noncharter fish.

The Area 3A overall sport yield estimate was 3.682 Milb, with 2.067 Milb (56%) from the charter sector and 1.616 Milb (44%) from the noncharter sector (Table 1). Estimated harvests were 163,632 for the charter sector, 136,225 for the noncharter sector, and 299,857 halibut overall. Average net weight was estimated at 12.63 lb for the charter fishery, 11.86 lb for the noncharter fishery, and 12.28 lb overall. Average weight was estimated from length data from 4,698 charter halibut and 2,621 noncharter halibut.

The final estimates of charter halibut yield were about 4% lower than last year's preliminary estimate in Area 2C and about 2% higher than the preliminary estimate in Area 3A. These differences were due to errors in estimating the proportions of harvest taken through July 31, the cutoff date for using logbook data. In contrast, the final estimates of noncharter yield were 18% higher in Area 2C and 8% higher than the preliminary estimate for Area 3A. The preliminary estimates were derived from simple exponential time series forecasts (SAS ESM procedure) and large forecasting errors are expected due to high annual variability in the harvest time series.

The final harvest estimates for western areas were 323 halibut in Area 3B and 448 halibut in Area 4 (Table 1). Applying the Kodiak average weight of 15.21 lb resulted in yield estimates of 0.005 Milb in Area 3B and 0.007 Milb in Area 4. These final estimates were less than one-half of last year's preliminary estimates, again because of forecasting errors from a highly variable harvest time series.

Preliminary 2016 Estimates of Harvest and Yield

Methods:

As in 2015, sport charter catch accounting in 2016 for Areas 2C and 3A is based on numbers of halibut reported harvested in ADF&G mandatory charter logbooks. Harvest and release estimates from the SWHS are still used for all noncharter fishery estimates as well as total sport fishery estimates for Areas 3B and 4. Neither complete logbook data nor SWHS estimates are available yet for the current year, and creel sampling is not designed to produce estimates of harvest. A variety of methods were used to provide preliminary estimates of the numbers of fish harvested by each sector or regulatory area.

Charter harvest for Areas 2C and 3A was projected from partial-year logbook data. As of mid-October, logbook data were entered and available for trips taken through July 31. Areas 2C and 3A are divided into several subareas closely corresponding to state management areas. Harvest data were available for each subarea through July. These data were expanded by forecasting the proportion of harvest taken through July in each subarea. Forecasts and their standard errors were obtained from a simple exponential smoother using 2006-2015 logbook data as of October 13, 2016. An additional adjustment was made to these forecasts to account for late logbook submissions and other reporting errors resolved in the final logbook data. These minor adjustments increased the harvest in each area by around 1%.

Noncharter harvest in Areas 2C and 3A, and overall sport harvests for Areas 3B and 4 were projected from the existing time series of SWHS estimates using simple exponential smoother forecasts. Charter and noncharter yield were estimated by multiplying the subarea harvest forecasts by the corresponding estimates of average weight. Average weights were estimated by applying the IPHC length-weight relationship to length measurements of harvested halibut obtained through sampling of the recreational harvest. No sampling was conducted in Areas 3B or 4 in 2016, so the Kodiak area average weight from the noncharter fishery was again substituted for these areas.

Results:

The preliminary 2016 halibut yield estimates for Area 2C, excluding release mortality, were 0.792 Mlb for the charter sector and 1.308 Mlb for the noncharter sector, for a total sport yield of 2.100 Mlb (Table 2). Estimated harvests (in numbers of fish) were 66,286 for the charter sector, 68,622 for the noncharter sector, for a total sport harvest of 134,908 halibut. Sixty-five percent of the charter harvest was projected to have been taken through the end of July. Estimated average weights were 11.95 lb for the charter sector, 19.05 lb for the noncharter sector, and 15.56 lb overall. Average weights for Area 2C were based on length measurements of 5,653 charter halibut and 4,984 noncharter halibut.

The preliminary yield estimates for Area 3A were 1.964 Mlb for the charter sector and 1.528 Mlb for the noncharter sector, for a total sport fishery yield of 3.492 Mlb (Table 2). Corresponding estimates of harvest were 155,032 charter halibut and 129,507 noncharter halibut, for a total of 284,539 halibut. Sixty-eight percent of the charter harvest was projected to have been taken through the end of July. Estimated average weights in Area 3A were 12.67 lb for the charter harvest, 11.80 lb for the noncharter harvest, and 12.27 lb overall. Average weights were estimated from length measurements from 4,435 charter and 2,022 noncharter halibut.

The preliminary harvests for 2016 were 376 halibut in Area 3B and 905 halibut in Area 4. Applying the noncharter average weight of 13.26 lb from Kodiak resulted in yield projections of 0.005 Mlb in Area 3B and 0.012 Mlb in Area 4 (Table 2). Large confidence intervals indicate substantial uncertainty in these estimates due to use of a time series forecast applied to highly variable harvest estimates that are based on relatively low numbers of responses in the SWHS. Use of the Kodiak noncharter average weight as a proxy for average weight in these areas adds additional uncertainty.

Final 2015 and Preliminary 2016 Estimates of Release MortalityMethods:

Release mortality (R) was calculated in pounds net weight for each subarea of Areas 2C and 3A as:

$$R = \hat{N} \cdot DMR \cdot \hat{w}$$

where

\hat{N} = the number of fish released,

DMR = the assumed short-term discard mortality rate due to capture, handling, and release, and

\hat{w} = the estimated average net weight (in pounds) of released fish.

The numbers of halibut released (\hat{N}) in the charter sector in 2015 were based on final logbook data. The numbers of halibut released in 2016 were projected using logbook data through July 31. The projections used simple exponential forecasts of the proportion of releases through July 31 from 2006-2015 data. For the noncharter fishery, and the overall sport fisheries in Areas 3B and 4, the estimated number of fish released in each subarea in 2015 was obtained from the SWHS. The projections for 2016 were simple exponential time series forecasts using previous release numbers from the SWHS.

Assumed mortality rates ($DMRs$) were 5% for Area 3A charter-caught halibut, 6% for Area 2C charter and Area 3A noncharter, and 7% for Area 2C noncharter halibut. These rates were developed by assuming a 3.5% mortality rate for halibut released on circle hooks and a 10% mortality rate for halibut released on all other hook types. The hook type data were collected in 2007 and 2008 in Area 2C, and every year since 2007 in Area 3A. These rates were applied to the reported number of fish released on each hook type to calculate a weighted mean mortality rate for each user group in each subarea. These weighted mean rates were then rounded up to the next whole percentage point to address uncertainty and account for possible cumulative

effects of multiple recaptures. A discard mortality rate of 6% was assumed for Areas 3B and 4, as no data on hook use were collected.

For most IPHC regulatory areas, the average weights of released fish in each subarea were estimated through modeling. For the noncharter fishery in Area 2C, and all fisheries in Areas 3A, 3B, and 4, the length distribution of released fish was estimated using a logistic model of the probability of retaining a fish as a function of length (selection curve). The selection curve allows estimation of the number of fish released for each length from the sample distribution of fish harvested at each length. The size distribution of harvest from the Kodiak noncharter fishery was used to model releases at length for Areas 3B and 4. The selection curve was fit to empirical data from a variety of saltwater and freshwater species that suggested that, on average, about 22% of fish caught were retained at the 10th percentile for length in the harvest, and about 83% of the fish were retained at the 90th percentile for length. The values for halibut are unknown, but the model was fit using these percentages as initial values. Parameters of the selection curve were selected for each subarea and sector by minimizing the relative difference between these empirical data points and their predicted values, while imposing the constraint that the predicted numbers of fish released from these curves equaled the final 2015 estimates or 2016 forecasts. The resulting length distributions of released fish were partitioned into U26 (<26 inch) and O26 (\geq 26 inch) components, and average weight was calculated using the IPHC length-weight relationship. The U26 and O26 separation was done for consistency with how these two size classes of waste have been handled by the IPHC.

For the Area 2C charter fishery, additional steps were needed to estimate release mortality due to the reverse slot limits in place in 2015 and 2016. In 2015, charter anglers were prohibited from harvesting fish between 42 and 80 inches in length. The protected slot was 43-80 inches in 2016. This required partitioning the released fish into size categories as follows: in 2015 the size classes were U42 (\leq 42 inches), 42-80, and O80 (\geq 80 inches). In 2016 the size classes were U43, 43-80, and O80. The proportions of fish in each size class were obtained from creel survey interviews where anglers were asked to report the numbers of released fish by size class. The average weight of released fish in the U42 (2015) and U43 (2016) size classes was estimated using the modeling procedure described above. The average weights of released fish in the protected slot and above the upper limit were estimated as the average weight of fish in these size ranges in 2010, the most recent year without a charter size limit.

The North Pacific Fishery Management Council's Scientific and Statistical Committee reviewed the logistic modeling approach in 2007 and concluded that it provided "reasonable" estimates of average weight given the lack of data. One problem inherent in this method is that the size distribution of released fish is truncated at the size of the smallest fish measured in the harvest sample. It is likely that some halibut are released that are smaller than the smallest halibut retained and measured. Therefore, the method may in effect underestimate the numbers of U26 fish released but overestimate their average weight. Because the model assumes that the percent of fish kept at length never exceeds 95%, it may also overestimate the numbers of O26 fish released, but probably has little effect on their average weight.

Results:

For 2015, estimated U26 release mortality was 0.003 Milb in Area 2C, 0.015 Milb in Area 3A, and virtually zero in Areas 3B and 4 (Table 3). Estimated O26 release mortality was 0.062 Milb in Area 2C, with 0.046 Milb of that coming in the charter fishery. The size class breakdown of the Area 2C charter O26 release mortality indicated that while the majority of fish released were in the length range 26-42 inches, the poundage of release mortality was greater in the 42-80 inch protected slot because of the higher average weight (Table 4). Estimated O26 release mortality in Area 3A was 0.058 Milb, with 0.027 Milb from the charter fishery (Table 3). Areas 3B and 4 each had negligible amounts of release mortality from the sport fishery.

Preliminary estimates of release mortality for 2016 were similar in magnitude to 2015 estimates. Mortality of U26 halibut was 0.004 Milb in Area 2C, 0.020 Milb in Area 3A, and virtually zero in Areas 3B and 4 (Table 5). Mortality of O26 releases in Area 2C was estimated at 0.069 Milb, with 0.052 Milb of that from the charter fishery. Of the O26 charter release mortality in Area 2C, almost one-half was due to releases of fish in the 43-

80 inch protected size class (Table 4). Mortality of O26 releases in Area 3A was 0.040 Mlb, with 0.023 Mlb of that coming from the noncharter fishery (Table 5). The O26 release mortality was negligible in Area 3B and Area 4.

The 2015 total sport fishery removals, including harvest and all sizes of release mortality, added up to 2.160 Mlb in Area 2C and 3.755 Mlb in Area 3A. Release mortality made up 3.0% of all Area 2C removals and 1.9% of Area 3A removals. For 2016, the preliminary estimates of total sport removals are 2.173 Mlb in Area 2C and 3.551 Mlb in Area 3A. Release mortality accounted for 3.4% of Area 2C removals and 1.7% of Area 3A removals in 2016.

Sport Fishery Yield Prior to the Mean IPHC Survey Dates in 2015 and 2016 (Areas 2C and 3A only)

This information is provided to aid the IPHC's adjustment to survey CPUE that is used to apportion estimated exploitable biomass among regulatory areas. The mean survey dates for 2015 were July 3 in Area 2C and June 18 in Area 3A. The mean survey dates for 2016 were June 25 in Area 2C and July 4 in Area 3A.

Methods:

The proportions of harvest prior to the mean survey date were calculated separately for the charter and noncharter sectors. For the charter sector, the proportion of harvest taken prior to the mean survey date in 2015 was obtained from logbook harvest data. For 2016, the preliminary estimate was based on the average proportion of logbook harvest prior to the mean survey date over the last three years. For the noncharter sector, the proportions were calculated based on harvest reported in dockside interviews. These proportions were calculated separately for each subarea of Area 2C and 3A and weighted by the 2015 final estimated harvests or the 2016 projected harvests in each subarea to derive the overall proportions. The total sport yield taken prior to the mean survey date was calculated by multiplying the charter and noncharter proportions by their respective final or projected yields and summing.

Results:

In 2015, an estimated 0.574 Mlb of halibut were taken by the sport fishery in Area 2C prior to July 3, and an estimated 0.753 Mlb were taken in Area 3A prior to June 18. In 2016, an estimated 0.466 Mlb of halibut were harvested by the sport fishery in Area 2C prior to June 25, and about 1.295 Mlb of halibut were taken in Area 3A prior to July 4 (Table 6). About 22% of the 2016 overall sport harvest was projected to have been taken prior to the mean survey date in Area 2C, compared with about 37% in Area 3A. The preliminary estimates for 2016 will be updated next year once logbook data, interview data, and SWHS estimates are finalized.

Table 1. Final estimates of the 2015 sport halibut harvest (numbers of fish), average net weight (pounds), and yield (millions of pounds net weight) in Areas 2C, 3A, 3B, and 4. "NA" indicates no estimate is available.

IPHC Area	Sector	Harvest (no. fish)	Average Net Wt. (lb)	Yield (Mlb)	95% CI for Yield (Mlb)
Area 2C	Charter	65,656	11.69	0.768	0.743 – 0.793
	Noncharter	73,816	17.97	1.327	1.176 – 1.477
	Total	139,472	15.02	2.094	1.942 – 2.247
Area 3A	Charter	163,632	12.63	2.067	1.912 – 2.221
	Noncharter	136,225	11.86	1.616	1.450 – 1.781
	Total	299,857	12.28	3.682	3.456 – 3.909
Area 3B	Total	323	15.21 ^a	0.005	NA
Area 4	Total	448	15.21 ^a	0.007	NA

^a – No size data were available from Areas 3B and 4, so the noncharter average weight from Kodiak was substituted.

Table 2. Preliminary estimates of the 2016 sport halibut harvest (numbers of fish), average net weight (pounds), and yield (millions of pounds net weight) in Areas 2C, 3A, 3B, and 4.

IPHC Area	Sector	Harvest (no. fish)	Average Net Wt. (lb)	Yield (Mlb)	95% CI for Yield (Mlb)
Area 2C	Charter	66,286	11.95	0.792	0.755 – 0.829
	Noncharter	68,622	19.05	1.308	1.044 – 1.571
	Total	134,908	15.56	2.100	1.834 – 2.365
Area 3A	Charter	155,032	12.67	1.964	1.799 – 2.129
	Noncharter	129,507	11.80	1.528	1.272 – 1.783
	Total	284,539	12.27	3.492	3.188 – 3.796
Area 3B	Total	376	13.26 ^a	0.005	0.000 – 0.014
Area 4	Total	905	13.26 ^a	0.012	0.000 – 0.036

^a – No size data were available from Areas 3B and 4, so the noncharter average weight from Kodiak was substituted.

Table 3. Final estimates of release mortality for sport fisheries in Areas 2C, 3A, 3B, and 4 in 2015. Some columns may not appear to add correctly due to rounding.

IPHC Area	Size Class	Sector	Estimated No. Halibut Released	Assumed Mortality Rate	Number Released that Died	Estimated Average Net Weight (lb)	Release Mortality (Mlb)
Area 2C	U26	Charter	5,461	6.0%	328	3.27	0.001
		Noncharter	9,233	7.0%	646	3.23	0.002
		Total	14,693		974	3.24	0.003
	O26	Charter	28,782	6.0%	1,727	26.69	0.046
		Noncharter	21,878	7.0%	1,531	10.64	0.016
		Total	50,661		3,258	19.14	0.062
Area 3A	U26	Charter	48,515	5.0%	2,426	3.72	0.009
		Noncharter	28,935	6.0%	1,736	3.48	0.006
		Total	77,450		4,162	3.62	0.015
	O26	Charter	71,629	5.0%	3,581	7.61	0.027
		Noncharter	66,355	6.0%	3,981	7.71	0.031
		Total	137,984		7,563	7.66	0.058
Area 3B	U26	Total	21	6.0%	1	3.10	0.000
	O26	Total	42	6.0%	2	11.52	0.000
Area 4	U26	Total	79	6.0%	5	3.09	0.000
	O26	Total	126	6.0%	8	9.99	0.000

Table 4. Breakdown of Area 2C estimates of O26 charter release mortality by size class for 2015 (final) and 2016 (preliminary). Some columns may not appear to add correctly due to rounding.

Year	Size Class (inches)	Estimated No. Halibut Released	Assumed Mortality Rate	Number Released that Died	Estimated Average Net Weight (lb)	Release Mortality (Mlb)
2015	O26U42	21,402	6.0%	1,284	9.40	0.012
	O42U80	6,578	6.0%	395	56.31	0.022
	O80	803	6.0%	48	244.70	0.012
	Total O26	28,782		1,727	26.69	0.046
2016	O26U43	19,141	6.0%	1,148	9.86	0.011
	O43U80	6,826	6.0%	410	59.26	0.024
	O80	1,090	6.0%	65	244.70	0.016
	Total O26	27,058		1,623	31.78	0.052

Table 5. Preliminary estimates of release mortality for sport fisheries in Areas 2C, 3A, 3B, and 4 in 2016. Some columns may not appear to add correctly due to rounding.

IPHC Area	Size Class	Sector	Estimated No. Halibut Released	Assumed Mortality Rate	Number Released that Died	Estimated Average Net Weight (lb)	Release Mortality (Mlb)
Area 2C	U26	Charter	5,880	6.0%	353	3.63	0.001
		Noncharter	10,720	7.0%	750	3.36	0.003
		Total	16,600		1,103	3.44	0.004
	O26	Charter	27,058	6.0%	1,623	31.78	0.052
		Noncharter	22,355	7.0%	1,565	11.40	0.018
		Total	49,413		3,188	21.78	0.069
Area 3A	U26	Charter	63,259	5.0%	3,163	3.70	0.012
		Noncharter	41,647	6.0%	2,499	3.39	0.008
		Total	104,906		5,662	3.56	0.020
	O26	Charter	40,832	5.0%	2,042	8.07	0.016
		Noncharter	49,466	6.0%	2,968	7.78	0.023
		Total	90,298		5,010	7.90	0.040
Area 3B	U26	Total	107	6.0%	6	3.47	0.000
	O26	Total	60	6.0%	4	9.18	0.000
Area 4	U26	Total	678	6.0%	41	3.49	0.000
	O26	Total	366	6.0%	22	7.87	0.000

Table 6. Estimated sport harvest prior to the mean IPHC survey dates in 2015 (final) and 2016 (preliminary) in Areas 2C and 3A.

Year	Area	Mean Survey Date	Charter		Noncharter		Total	
			Percent	Harvest (Mlb)	Percent	Harvest (Mlb)	Percent	Harvest (Mlb)
2015	2C	July 03	32.4%	0.160	31.2%	0.414	27.4%	0.574
	3A	June 18	19.6%	0.406	21.5%	0.347	20.4%	0.753
2016	2C	June 25	20.8%	0.165	23.0%	0.301	22.2%	0.466
	3A	July 04	33.6%	0.659	41.6%	0.636	37.1%	1.295