

Analysis of Management Options for the Area 2C and 3A Charter Halibut Fisheries for 2020



**For the North Pacific Fishery Management Council
December 2019**

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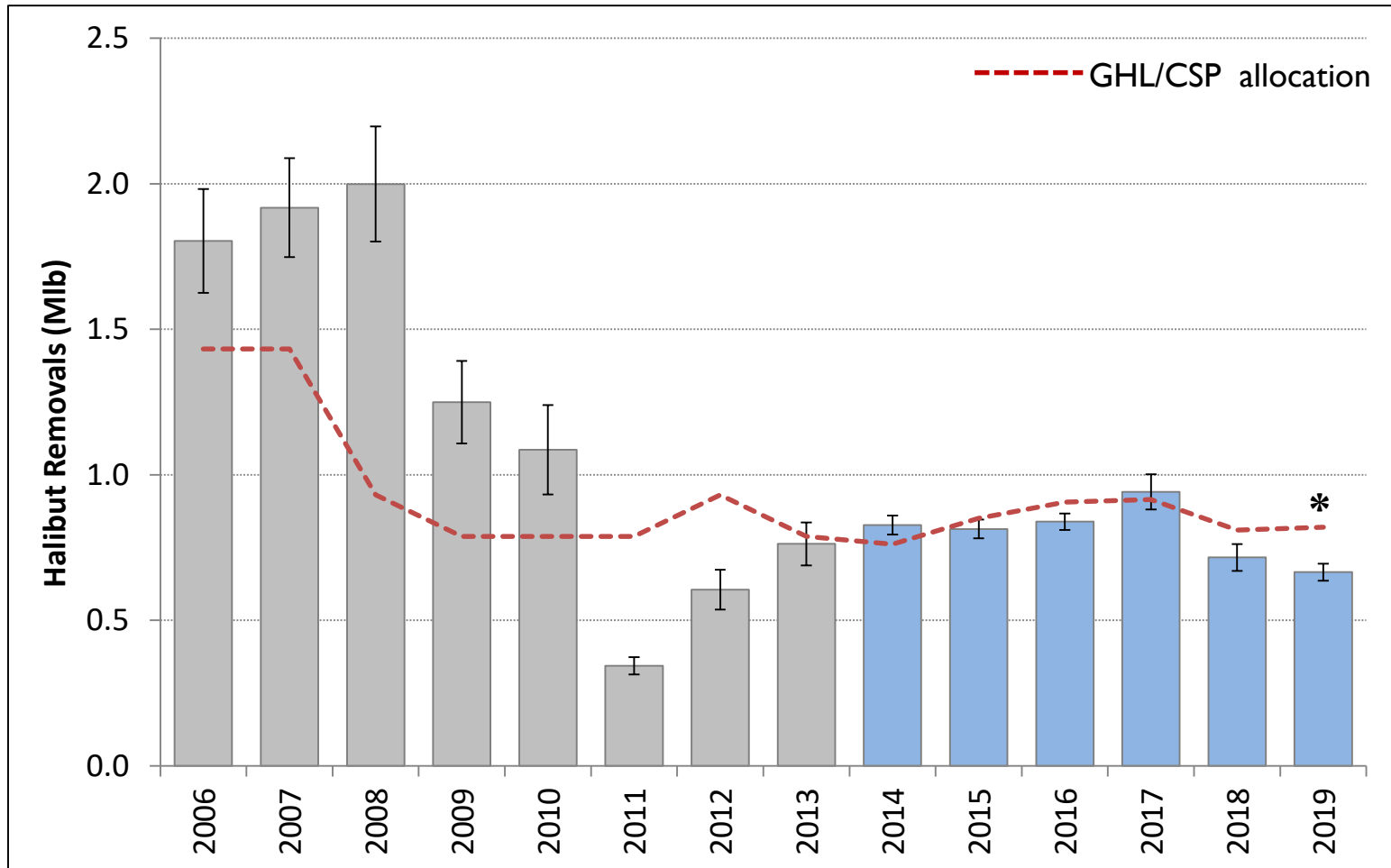
Fishery Review Through 2019



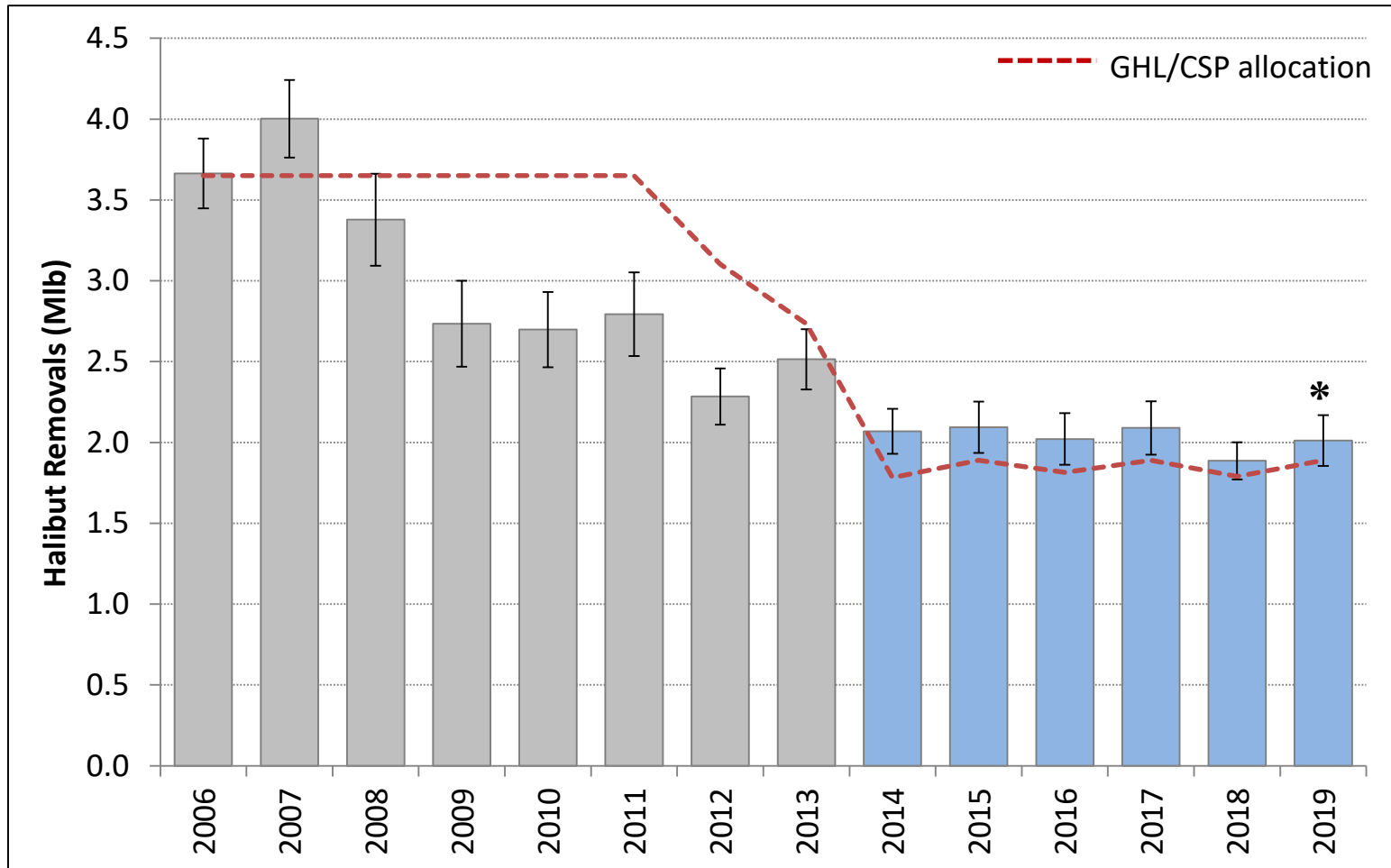
Preliminary Charter Estimates for 2019

Area	Mean wt (lb)	Logbook Harvest (no. fish)	Yield (lb)	Release Mortality (lb)	Total Removals (lb)	Allocation (lb)	Overage (lb)	Overage %
2C	9.39	67,529	633,993	31,295	665,288	820,000	-154,712	-18.9%
3A	14.52	137,731	1,999,631	12,615	2,012,246	1,890,000	+122,246	+6.5%

Area 2C



Area 3A

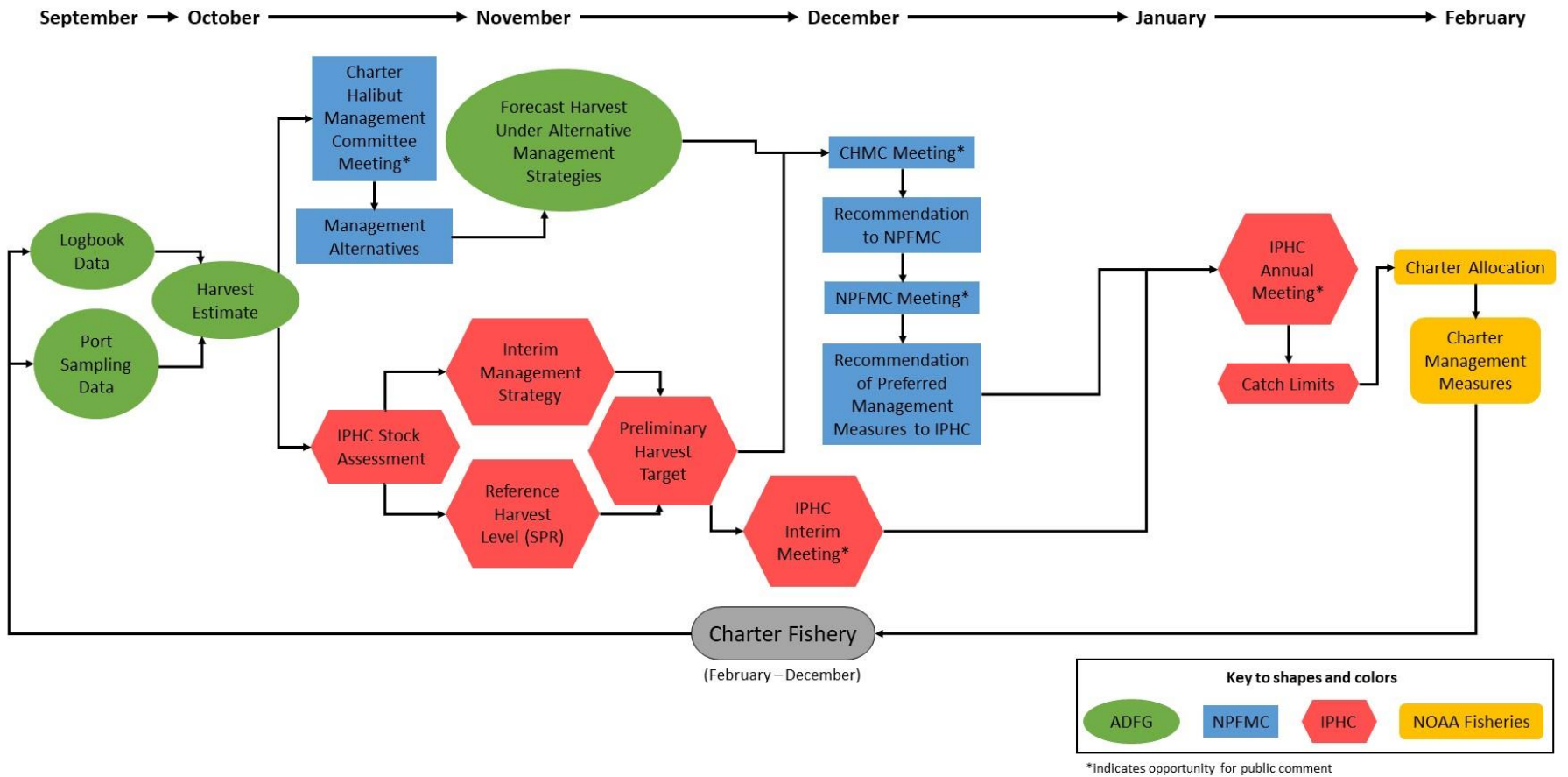


Analysis of Management Measures for 2020



Photo: Kenai Riverfront Lodge

Charter Halibut Management Process



2019 Stock Assessment and 2020 Coastwide TCEY

- ▶ Change in Reference TCEY from 2018 to 2019 is mostly influenced by inclusion of sex ratio data from commercial fishery
- ▶ Stock is currently decreasing slowly due to low recruitment in 2006 - 2010
- ▶ 2020 allocation highly variable depending on coastwide TCEY
 - ▶ Reference coastwide TCEY is 31.90 MIb ($F_{46\%}$)
 - ▶ Status quo coastwide TCEY is 38.60 MIb ($F_{40\%}$)
- ▶ Won't know coastwide TCEY until February 2020

Charter Allocations for 2020

- ▶ Highly variable depending on TCEY
 - ▶ Reference coastwide TCEY
 - ▶ Status quo coastwide TCEY
- ▶ Additional variability depending on distribution procedures
 - ▶ 2019 AM-095 procedures
 - ▶ 2019 IM-095 U26 bycatch mitigation
 - ▶ Setline survey distribution

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Area	2020 Charter Allocation (Mlb)		
	2019 Allocations	Reference TCEY	Status Quo TCEY
2C	0.82	0.60	0.80
3A	1.89	1.24	1.66

Area 2C - Measures for 2020

- ▶ Status quo: One fish bag limit, size limit of less than or equal to 38 inches or greater than or equal to 80 inches (reverse slot)
- ▶ Reverse slot limits ranging from U35-50 and O50-80
- ▶ Reverse slot limits (U35-50, O50-80) with annual limits of 1 – 4 halibut
- ▶ Reverse slot limits with lower limits of the protected slot ranging from 35 to 50 inches and an upper limit of 80 inches with 1 – 17 Wednesdays or Sundays closed throughout the season, or a Wednesday or Sunday closure for the year
- ▶ Reverse slot limits with lower limits of the protected slot ranging from 35 to 50 inches and an upper limit of 80 inches with 1 – 17 Wednesdays or Sundays closed throughout the season, or a Wednesday or Sunday closure for the year combined with an annual limit of 3 or 4 fish
- ▶ Reverse slot limits with a lower limit ranging from 40 – 50 inches and an upper limit of 80 inches through July 1, July 15, or August 1, and a reverse slot limit with a lower limit ranging from 35 – 50 inches and an upper limit of 80 inches beginning July 1, July 15, or August 1, respectively



2C – Status Quo

- ▶ One fish bag limit, U38-O80 reverse slot size limit

	2020 Forecast	2019 Prelim Estimate
Harvest (number of fish)	68,737	67,529
Average Weight (lbs)	9.87	9.39
Removals (Mlb)	0.726	0.665

Area 2C – Reverse Slot Limit

► Harvest forecast = 68,737

No annual limit

Table 6; Page 21

Lower Limit (in)	Upper Length Limit (in)															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
35	1.227	1.145	1.082	1.013	0.962	0.917	0.853	0.792	0.757	0.730	0.702	0.684	0.658	0.644	0.642	0.631
36	1.257	1.177	1.116	1.047	0.997	0.952	0.890	0.829	0.794	0.767	0.740	0.721	0.696	0.682	0.680	0.669
37	1.274	1.195	1.134	1.066	1.017	0.973	0.911	0.851	0.816	0.789	0.762	0.744	0.719	0.705	0.703	0.692
38	1.301	1.223	1.164	1.097	1.048	1.005	0.943	0.884	0.850	0.823	0.796	0.778	0.753	0.739	0.737	0.726
39	1.320	1.244	1.185	1.119	1.071	1.027	0.967	0.908	0.874	0.847	0.820	0.802	0.778	0.764	0.762	0.751
40	1.335	1.260	1.202	1.137	1.089	1.046	0.986	0.928	0.894	0.868	0.841	0.823	0.799	0.785	0.783	0.772
41	1.354	1.280	1.224	1.159	1.112	1.070	1.010	0.952	0.919	0.893	0.866	0.849	0.824	0.810	0.809	0.798
42	1.365	1.293	1.237	1.173	1.126	1.085	1.025	0.968	0.935	0.909	0.883	0.865	0.841	0.827	0.826	0.815
43	1.378	1.307	1.252	1.189	1.143	1.101	1.043	0.986	0.953	0.927	0.901	0.884	0.860	0.846	0.844	0.834
44	1.398	1.328	1.274	1.211	1.166	1.125	1.067	1.011	0.978	0.953	0.927	0.909	0.886	0.872	0.870	0.860
45	1.419	1.351	1.298	1.236	1.192	1.151	1.094	1.038	1.006	0.981	0.955	0.938	0.914	0.901	0.899	0.888
46	1.432	1.365	1.313	1.252	1.208	1.168	1.111	1.056	1.024	0.999	0.973	0.956	0.933	0.919	0.918	0.907
47	1.451	1.386	1.334	1.274	1.231	1.191	1.135	1.081	1.049	1.024	0.999	0.982	0.958	0.945	0.943	0.933
48	1.463	1.399	1.348	1.289	1.246	1.207	1.151	1.097	1.066	1.041	1.016	0.999	0.975	0.962	0.960	0.950
49	1.486	1.423	1.373	1.315	1.272	1.234	1.179	1.125	1.094	1.070	1.045	1.028	1.005	0.992	0.990	0.980
50	1.500	1.439	1.390	1.333	1.291	1.253	1.198	1.145	1.115	1.091	1.066	1.049	1.026	1.013	1.011	1.001

Area 2C – Reverse Slot Limit

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43	1.378	1.307	1.252	1.189	1.143	1.101	1.043	0.986	0.953	0.927	0.901	0.884	0.860	0.846	0.844	0.834
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45	1.419	1.351	1.298	1.236	1.192	1.151	1.094	1.038	1.006	0.981	0.955	0.938	0.914	0.901	0.899	0.888
46	1.432	1.365	1.313	1.252	1.208	1.168	1.111	1.056	1.024	0.999	0.973	0.956	0.933	0.919	0.918	0.907
47	1.451	1.386	1.334	1.274	1.231	1.191	1.135	1.081	1.049	1.024	0.999	0.982	0.958	0.945	0.943	0.933
48	1.463	1.399	1.348	1.289	1.246	1.207	1.151	1.097	1.066	1.041	1.016	0.999	0.975	0.962	0.960	0.950
49	1.486	1.423	1.373	1.315	1.272	1.234	1.179	1.125	1.094	1.070	1.045	1.028	1.005	0.992	0.990	0.980
50	1.500	1.439	1.390	1.333	1.291	1.253	1.198	1.145	1.115	1.091	1.066	1.049	1.026	1.013	1.011	1.001

Area 2C – Effect of Annual Limits

Table 7; Page 22

Annual Limit	Subarea						Area 2C
	Ketch	PWI	Pburg	Sitka	Jun	GlacB	
Estimated percent of anglers affected by the annual limit:							
1	22.7%	71.2%	55.8%	69.5%	37.9%	45.2%	54.0%
2	8.4%	42.0%	29.1%	37.9%	23.5%	25.5%	29.8%
3	1.5%	10.1%	10.5%	9.0%	15.0%	13.9%	9.0%
4	0.3%	1.8%	3.1%	1.7%	7.1%	5.3%	2.5%
Estimated percent change in harvest relative to no annual limit:							
1	-24.9%	-55.7%	-50.0%	-54.3%	-46.0%	-47.6%	-48.7%
2	-7.9%	-24.2%	-22.1%	-22.5%	-25.5%	-24.0%	-21.5%
3	-1.6%	-5.6%	-7.6%	-5.2%	-12.8%	-10.6%	-6.5%
4	-0.4%	-1.2%	-2.3%	-1.1%	-4.7%	-3.4%	-1.8%
Projected harvest (number of halibut):							
1	7,095	7,503	845	10,947	5,023	3,872	35,284
2	8,702	12,841	1,317	18,555	6,925	5,622	53,962
3	9,301	15,996	1,563	22,703	8,104	6,608	64,274
4	9,409	16,750	1,652	23,685	8,856	7,145	67,497
No Limit	9,451	16,952	1,691	23,955	9,295	7,393	68,737

Area 2C – Effect of Annual Limits

4-fish Annual Limit

Table 8; Page 23

Lower Limit (in)	Upper Length Limit (in)															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
35	1.205	1.124	1.063	0.994	0.944	0.900	0.838	0.778	0.743	0.717	0.690	0.671	0.646	0.632	0.631	0.620
36	1.235	1.156	1.096	1.028	0.979	0.935	0.874	0.814	0.780	0.753	0.726	0.708	0.684	0.670	0.668	0.657
37	1.251	1.174	1.114	1.047	0.999	0.955	0.894	0.835	0.801	0.775	0.748	0.730	0.706	0.692	0.690	0.679
38	1.278	1.202	1.143	1.077	1.029	0.986	0.926	0.868	0.834	0.808	0.782	0.764	0.739	0.726	0.724	0.713
39	1.296	1.221	1.164	1.099	1.051	1.009	0.949	0.891	0.858	0.832	0.806	0.788	0.764	0.750	0.748	0.738
40	1.311	1.237	1.181	1.116	1.069	1.027	0.968	0.911	0.878	0.852	0.826	0.808	0.784	0.771	0.769	0.758
41	1.330	1.258	1.202	1.138	1.092	1.050	0.992	0.935	0.902	0.877	0.851	0.833	0.809	0.796	0.794	0.783
42	1.341	1.270	1.215	1.152	1.106	1.065	1.007	0.950	0.918	0.893	0.867	0.850	0.826	0.812	0.811	0.800
43	1.354	1.284	1.229	1.167	1.122	1.081	1.024	0.968	0.935	0.910	0.885	0.868	0.844	0.831	0.829	0.818
44	1.373	1.304	1.251	1.189	1.145	1.105	1.048	0.992	0.960	0.936	0.910	0.893	0.870	0.856	0.855	0.844
45	1.394	1.327	1.274	1.214	1.170	1.131	1.074	1.019	0.988	0.963	0.938	0.921	0.898	0.884	0.883	0.872
46	1.407	1.341	1.289	1.230	1.186	1.147	1.091	1.037	1.006	0.981	0.956	0.939	0.916	0.903	0.901	0.891
47	1.425	1.361	1.310	1.251	1.209	1.170	1.115	1.061	1.030	1.006	0.981	0.964	0.941	0.928	0.926	0.916
48	1.437	1.374	1.324	1.266	1.224	1.185	1.130	1.077	1.046	1.022	0.997	0.981	0.958	0.945	0.943	0.933
49	1.459	1.397	1.348	1.291	1.250	1.212	1.158	1.105	1.074	1.051	1.026	1.010	0.987	0.974	0.972	0.962
50	1.474	1.413	1.365	1.309	1.268	1.230	1.177	1.125	1.094	1.071	1.046	1.030	1.008	0.995	0.993	0.983

3-fish Annual Limit

Lower Limit (in)	Upper Length Limit (in)															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
35	1.147	1.070	1.011	0.946	0.899	0.857	0.797	0.740	0.707	0.682	0.656	0.639	0.615	0.602	0.600	0.590
36	1.175	1.100	1.043	0.978	0.931	0.890	0.831	0.774	0.742	0.717	0.692	0.674	0.651	0.638	0.636	0.626
37	1.191	1.117	1.060	0.996	0.950	0.909	0.851	0.795	0.762	0.737	0.712	0.695	0.672	0.659	0.657	0.647
38	1.216	1.143	1.088	1.025	0.979	0.939	0.881	0.825	0.793	0.769	0.744	0.727	0.704	0.691	0.689	0.679
39	1.234	1.162	1.107	1.045	1.000	0.960	0.903	0.848	0.816	0.792	0.767	0.750	0.727	0.714	0.712	0.702
40	1.248	1.178	1.123	1.062	1.018	0.978	0.921	0.866	0.835	0.811	0.786	0.770	0.747	0.734	0.732	0.722
41	1.266	1.197	1.143	1.083	1.039	1.000	0.944	0.889	0.858	0.834	0.810	0.793	0.770	0.758	0.756	0.746
42	1.276	1.208	1.156	1.096	1.052	1.013	0.958	0.904	0.873	0.849	0.825	0.809	0.786	0.773	0.772	0.762
43	1.288	1.222	1.170	1.110	1.067	1.029	0.974	0.921	0.890	0.866	0.842	0.826	0.803	0.790	0.789	0.779
44	1.307	1.241	1.190	1.132	1.089	1.051	0.997	0.944	0.914	0.890	0.866	0.850	0.828	0.815	0.814	0.804
45	1.327	1.263	1.213	1.155	1.114	1.076	1.022	0.970	0.940	0.916	0.893	0.877	0.854	0.842	0.840	0.831
46	1.339	1.276	1.227	1.170	1.129	1.092	1.038	0.987	0.957	0.934	0.910	0.894	0.872	0.859	0.858	0.848
47	1.357	1.295	1.247	1.191	1.150	1.114	1.061	1.010	0.980	0.957	0.934	0.918	0.896	0.883	0.882	0.872
48	1.369	1.308	1.260	1.205	1.165	1.128	1.076	1.025	0.996	0.973	0.950	0.934	0.912	0.900	0.898	0.889
49	1.389	1.330	1.283	1.229	1.189	1.154	1.102	1.052	1.022	1.000	0.977	0.961	0.939	0.927	0.926	0.916
50	1.403	1.345	1.299	1.245	1.206	1.171	1.120	1.070	1.041	1.019	0.996	0.981	0.959	0.947	0.945	0.936

Area 2C – Closure of One Day per Week

- ▶ Projected under various numbers of closed days throughout year with approximately 2/3 prior to July 31
- ▶ Projected removals assume daily closures will have maximum effect, no diversion of effort to other days
- ▶ Full year closure of Sundays: maximum 13.5% reduction in harvest
- ▶ Full year closure of Wednesdays: maximum 14.7% reduction in harvest

Area 2C – Closure of One Day per Week

Table 9; Page 25

Number of Closed		Percentage Change	Projected Harvest
Wednesdays	Beginning and Ending Dates	in Harvest Relative to Status Quo	(no. Fish)
0		0.0%	68,737
1	July 29	-1.3%	67,869
2	July 29 - August 05	-2.0%	67,329
3	July 22 - August 05	-3.4%	66,408
4	July 15 - August 05	-4.9%	65,396
5	July 15 - August 12	-6.0%	64,596
6	July 08 - August 12	-7.3%	63,748
7	July 01 - August 12	-8.4%	62,993
8	July 01 - August 19	-9.2%	62,416
9	June 24 - August 19	-10.5%	61,527
10	June 17 - August 19	-11.5%	60,804
11	June 17 - August 26	-12.2%	60,380
12	June 10 - August 26	-13.0%	59,776
13	June 03 - August 26	-13.4%	59,503
14	June 03 - September 02	-13.8%	59,263
15	May 27 - September 02	-14.2%	58,999
16	May 20 - September 02	-14.4%	58,866
17	May 20 - September 09	-14.5%	58,764
48 (all season)	February 01 - December 31	-14.7%	58,638

Area 2C – Closure of One Day per Week

Table 10; Page 26

Lower Limit (in)	Number of Wednesday Closures																		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	All
35	0.631	0.623	0.618	0.609	0.600	0.593	0.585	0.578	0.573	0.564	0.557	0.553	0.548	0.545	0.543	0.540	0.539	0.538	0.537
36	0.669	0.660	0.655	0.646	0.636	0.629	0.620	0.613	0.607	0.598	0.591	0.587	0.581	0.578	0.576	0.573	0.572	0.571	0.570
37	0.692	0.683	0.677	0.668	0.658	0.650	0.641	0.634	0.628	0.619	0.611	0.607	0.601	0.598	0.596	0.593	0.591	0.590	0.589
38	0.726	0.717	0.711	0.701	0.691	0.682	0.673	0.665	0.659	0.650	0.642	0.637	0.631	0.628	0.625	0.622	0.621	0.620	0.619
39	0.751	0.741	0.735	0.726	0.714	0.706	0.696	0.688	0.682	0.672	0.664	0.659	0.652	0.649	0.647	0.643	0.642	0.641	0.640
40	0.772	0.762	0.756	0.746	0.735	0.725	0.716	0.707	0.701	0.691	0.682	0.677	0.671	0.667	0.665	0.661	0.660	0.659	0.658
41	0.798	0.788	0.781	0.771	0.759	0.750	0.740	0.731	0.724	0.714	0.705	0.700	0.693	0.690	0.687	0.683	0.682	0.681	0.680
42	0.815	0.804	0.798	0.787	0.775	0.765	0.755	0.746	0.740	0.729	0.720	0.715	0.707	0.704	0.701	0.698	0.696	0.695	0.694
43	0.834	0.823	0.816	0.805	0.793	0.783	0.773	0.764	0.757	0.746	0.737	0.731	0.724	0.720	0.717	0.714	0.712	0.711	0.710
44	0.860	0.849	0.842	0.831	0.818	0.808	0.797	0.788	0.780	0.769	0.760	0.754	0.746	0.743	0.740	0.736	0.734	0.733	0.732
45	0.888	0.877	0.870	0.858	0.845	0.835	0.824	0.814	0.806	0.795	0.785	0.779	0.771	0.768	0.764	0.761	0.759	0.757	0.756
46	0.907	0.895	0.888	0.877	0.863	0.852	0.841	0.831	0.824	0.812	0.802	0.796	0.788	0.784	0.781	0.777	0.775	0.773	0.772
47	0.933	0.921	0.913	0.901	0.888	0.876	0.865	0.855	0.847	0.835	0.824	0.818	0.810	0.806	0.803	0.799	0.797	0.795	0.794
48	0.950	0.938	0.930	0.918	0.904	0.893	0.881	0.871	0.863	0.850	0.840	0.834	0.825	0.821	0.818	0.813	0.811	0.810	0.809
49	0.980	0.967	0.960	0.947	0.932	0.921	0.908	0.898	0.889	0.877	0.866	0.860	0.851	0.846	0.843	0.839	0.837	0.835	0.834
50	1.001	0.988	0.980	0.967	0.952	0.940	0.928	0.917	0.909	0.895	0.885	0.878	0.869	0.865	0.861	0.857	0.855	0.853	0.852

Area 2C – Closure of One Day per Week with Annual Limits

4-fish annual limit

Table 14; Page 30

Lower Limit (in)	Number of Wednesday Closures																		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	All
35	0.620	0.612	0.607	0.599	0.589	0.582	0.575	0.568	0.562	0.554	0.548	0.544	0.538	0.536	0.533	0.531	0.530	0.529	0.528
36	0.657	0.649	0.644	0.635	0.625	0.617	0.609	0.602	0.597	0.588	0.581	0.577	0.571	0.568	0.566	0.563	0.562	0.561	0.560
37	0.679	0.671	0.665	0.656	0.646	0.638	0.630	0.623	0.617	0.608	0.601	0.596	0.590	0.587	0.585	0.582	0.581	0.580	0.579
38	0.713	0.704	0.698	0.689	0.678	0.670	0.661	0.653	0.647	0.638	0.630	0.626	0.619	0.616	0.614	0.611	0.610	0.609	0.608
39	0.738	0.728	0.722	0.713	0.702	0.693	0.684	0.676	0.670	0.660	0.652	0.647	0.641	0.638	0.635	0.632	0.631	0.629	0.628
40	0.758	0.749	0.743	0.733	0.721	0.712	0.703	0.695	0.688	0.678	0.670	0.665	0.659	0.656	0.653	0.650	0.648	0.647	0.646
41	0.783	0.773	0.767	0.757	0.745	0.736	0.726	0.718	0.711	0.701	0.693	0.688	0.681	0.677	0.675	0.671	0.670	0.668	0.667
42	0.800	0.790	0.784	0.773	0.761	0.752	0.742	0.733	0.726	0.716	0.707	0.702	0.695	0.691	0.689	0.685	0.684	0.682	0.681
43	0.818	0.808	0.801	0.791	0.779	0.769	0.759	0.750	0.743	0.732	0.723	0.718	0.711	0.707	0.704	0.701	0.699	0.698	0.697
44	0.844	0.833	0.827	0.816	0.803	0.793	0.783	0.774	0.766	0.755	0.746	0.741	0.733	0.730	0.727	0.723	0.721	0.720	0.719
45	0.872	0.861	0.854	0.843	0.830	0.820	0.809	0.799	0.792	0.781	0.771	0.765	0.758	0.754	0.751	0.747	0.745	0.744	0.743
46	0.891	0.879	0.872	0.861	0.848	0.837	0.826	0.817	0.809	0.797	0.788	0.782	0.774	0.770	0.767	0.763	0.761	0.760	0.759
47	0.916	0.904	0.897	0.885	0.872	0.861	0.849	0.840	0.832	0.820	0.810	0.804	0.796	0.792	0.788	0.785	0.783	0.781	0.780
48	0.933	0.921	0.914	0.902	0.888	0.877	0.865	0.855	0.847	0.835	0.825	0.819	0.811	0.806	0.803	0.799	0.797	0.796	0.794
49	0.962	0.950	0.942	0.930	0.916	0.904	0.892	0.882	0.874	0.861	0.851	0.844	0.836	0.831	0.828	0.824	0.822	0.820	0.819
50	0.983	0.970	0.963	0.950	0.935	0.924	0.911	0.901	0.893	0.880	0.869	0.862	0.854	0.849	0.846	0.842	0.839	0.838	0.837

Area 2C – Mid-season Change in Reverse Slot

- ▶ Option explored, but analysis not complete
- ▶ Management measure would result in change in effort that cannot be modeled with available data
- ▶ Management measure would affect proportion of fish harvested before and after July 31
 - ▶ Inhibit ability to reliably estimate preliminary harvest
 - ▶ Estimate will be biased high if effort shifts to early season
 - ▶ Inhibit ability to reliably forecast harvest
 - ▶ Forecasts will result in more restrictive management measures under a given set of regulations if preliminary harvest estimate is biased high

Area 3A Measures for 2020

- ▶ Status quo
 - ▶ 2-fish bag limit, one fish any size, one fish < 28 inches
 - ▶ Annual limit 4 fish
 - ▶ One trip per vessel per day and per CHP per day
 - ▶ Wednesdays closed all year, five Tuesdays closed
- ▶ Status quo with a range of Tuesdays closed June – August
- ▶ Status quo with Tuesdays open all year and a range of open Wednesdays



3A – Status Quo

- ▶ Status quo
 - ▶ 2-fish bag limit, one fish any size, one fish < 28 inches
 - ▶ Annual limit 4 fish
 - ▶ One trip per vessel per day and per CHP per day
 - ▶ Wednesdays closed all year, five Tuesdays closed

	2020 Forecast	2019 Prelim Estimate
Harvest (number of fish)	132,453	137,731
Average Weight (lbs)	14.48	14.52
Removals (Mlb)	1.938	2.012

Area 3A – Closure of One Day per Week

- ▶ Projected under various numbers of closed days throughout year with approximately 2/3 prior to July 31
- ▶ Projected removals assume daily closures will have maximum effect, no diversion of effort to other days

Area 3A – Tuesday Closures June - August

► Harvest forecast = 132,453

Table 22; Page 38

Number of Closed Tuesdays	Beginning and Ending Dates	Percentage change in harvest relative to status quo	Projected Harvest (no. Fish)	Projected Removals (Mlb)
0		7.5%	142,407	2.083
1	July 28	6.1%	140,593	2.057
2	July 28 - August 04	4.5%	138,359	2.023
3	July 21 - August 04	3.1%	136,591	1.995
4	July 14 - August 04	1.6%	134,563	1.967
5 (status quo)	July 14 - August 11	0.0%	132,453	1.938
6	July 07 - August 11	-1.6%	130,399	1.909
7	June 30 - August 11	-2.9%	128,616	1.883
8	June 30 - August 18	-4.0%	127,179	1.861
9	June 23 - August 18	-4.9%	125,953	1.844
10	June 16 - August 18	-6.0%	124,505	1.821
11	June 16 - August 25	-6.2%	124,226	1.817
12	June 09 - August 25	-7.2%	122,981	1.798
13	June 02 - August 25	-7.6%	122,370	1.791
48 (all season)	February 01 - December 31	-9.5%	119,851	1.754

Acknowledgements

- ▶ Bob Powers – logbook data summaries
 - ▶ Scott Meyer – data analysis advice
 - ▶ Jim Hasbrouck – technical advice and review
 - ▶ Diana Tersteeg and Mike Jaenicke – Southeast data
 - ▶ Martin Schuster and Marian Ford – Southcentral data
 - ▶ Countless technicians – halibut measurements and angler interviews
 - ▶ Charter operators, crews, clients
-
- ▶ Funding:
 - State of Alaska General Funds
 - DJ-WB Federal Aid in Fish Restoration
 - Fish and Game Fund



Extra slides

Additional 3A Analyses

- None of the requested 3A alternatives are within Reference or Status Quo TCEY scenario allocation
- Analyzed additional management measures as requested in past analyses
 - Change minimum size limit and day of week closures
 - Change annual limits with changes to size limit and day of week closures
 - Additional day of the week closures (Monday and Thursday)
 - Implement reverse slot limit on “first” fish, maintain 28” size limit on “second” fish
 - Implement 1-fish daily bag limit

Change in Maximum Size Limit with Tuesday Closures

Size limit	Total number of closed Tuesdays									
	5	6	7	8	9	10	11	12	13	48
26	1.874	1.846	1.821	1.799	1.783	1.761	1.757	1.738	1.732	1.696
27	1.899	1.871	1.845	1.823	1.807	1.784	1.780	1.762	1.755	1.719
28	1.938	1.909	1.883	1.861	1.844	1.821	1.817	1.798	1.791	1.754
29	1.964	1.934	1.908	1.885	1.869	1.845	1.841	1.822	1.815	1.777
30	2.003	1.972	1.946	1.923	1.906	1.882	1.878	1.858	1.851	1.813



Status Quo with Changes in Annual Limits

Annual Limit			
	2	3	4
Projected Harvest	119,660	127,656	132,453

Projected Yield			
Annual Limit			
Size limit	2	3	4
26	1.700	1.814	1.874
27	1.722	1.838	1.899
28	1.758	1.876	1.938
29	1.781	1.900	1.964
30	1.816	1.938	2.003



Status Quo with 3-fish Annual Limit and Tuesday Closures

Size limit	Total number of closed Tuesdays									
	5	6	7	8	9	10	11	12	13	48
26	1.814	1.787	1.762	1.742	1.726	1.704	1.701	1.683	1.676	1.642
27	1.838	1.811	1.786	1.765	1.749	1.727	1.723	1.705	1.699	1.664
28	1.876	1.848	1.823	1.801	1.785	1.763	1.759	1.741	1.734	1.698
29	1.900	1.872	1.846	1.825	1.808	1.786	1.782	1.763	1.756	1.720
30	1.938	1.909	1.883	1.861	1.844	1.821	1.817	1.798	1.791	1.754

Status Quo with 2-fish Annual Limit and Tuesday Closures

Size limit	Total number of closed Tuesdays									
	5	6	7	8	9	10	11	12	13	48
26	1.700	1.674	1.651	1.632	1.618	1.597	1.594	1.577	1.571	1.539
27	1.722	1.697	1.673	1.654	1.639	1.618	1.615	1.598	1.592	1.559
28	1.758	1.732	1.708	1.688	1.673	1.652	1.648	1.631	1.625	1.592
29	1.781	1.754	1.730	1.710	1.695	1.674	1.670	1.653	1.646	1.613
30	1.816	1.789	1.765	1.744	1.728	1.707	1.703	1.685	1.679	1.644

Status Quo with All Tuesdays Closed and Monday Closures

Size limit	Total number of closed Mondays														ALL
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	
26	1.695	1.667	1.641	1.619	1.588	1.563	1.537	1.510	1.503	1.488	1.469	1.460	1.444	1.437	1.405
27	1.718	1.689	1.663	1.641	1.610	1.584	1.558	1.530	1.524	1.508	1.489	1.480	1.464	1.456	1.423
28	1.754	1.724	1.698	1.675	1.643	1.617	1.590	1.562	1.555	1.539	1.520	1.510	1.494	1.486	1.453
29	1.777	1.747	1.720	1.697	1.664	1.638	1.611	1.582	1.575	1.559	1.540	1.530	1.514	1.505	1.472
30	1.812	1.781	1.754	1.731	1.697	1.670	1.643	1.614	1.607	1.590	1.570	1.560	1.544	1.535	1.501

Number of Closed Mondays	Percentage reduction in harvest	Projected Harvest (no. Fish)	Projected Removals (Mlb)
0	-9.5%	119,851	1.754
1	-11.1%	117,743	1.724
2	-12.5%	115,950	1.698
3	-13.6%	114,447	1.675
4	-15.3%	112,195	1.643
5	-16.6%	110,424	1.617
6	-18.0%	108,623	1.590
7	-19.5%	106,681	1.562
8	-19.8%	106,198	1.555
9	-20.6%	105,113	1.539
10	-21.7%	103,744	1.520
11	-22.2%	103,106	1.510
12	-23.0%	102,031	1.494
13	-23.5%	101,382	1.486
All	-25.1%	99,269	1.453



Status Quo with All Tuesdays Closed and Thursday Closures

Size limit	Total number of closed Thursdays														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	All
26	1.695	1.666	1.637	1.618	1.588	1.564	1.537	1.524	1.503	1.479	1.458	1.450	1.436	1.428	1.386
27	1.718	1.689	1.659	1.640	1.609	1.585	1.557	1.545	1.523	1.499	1.478	1.470	1.456	1.447	1.405
28	1.754	1.724	1.693	1.674	1.642	1.618	1.589	1.577	1.555	1.530	1.508	1.500	1.486	1.477	1.434
29	1.777	1.746	1.716	1.696	1.664	1.639	1.610	1.597	1.575	1.550	1.528	1.520	1.505	1.496	1.453
30	1.812	1.781	1.749	1.730	1.697	1.671	1.642	1.629	1.606	1.581	1.558	1.550	1.535	1.525	1.481

Number of Closed Thursdays	Percentage reduction in harvest	Projected Harvest (no. Fish)	Projected Removals (Mlb)
0	-9.5%	119851	1.754
1	-11.1%	117755	1.724
2	-12.7%	115651	1.693
3	-13.7%	114256	1.674
4	-15.4%	112116	1.642
5	-16.7%	110348	1.618
6	-18.1%	108440	1.589
7	-18.9%	107462	1.577
8	-20.0%	105929	1.555
9	-21.2%	104329	1.530
10	-22.4%	102810	1.508
11	-22.8%	102210	1.500
12	-23.6%	101215	1.486
13	-24.1%	100515	1.477
All	-26.3%	97627	1.434

Area 3A – Status Quo with Reverse Slot Limit on First Fish

- ▶ Equivalent to different max size limits on both fish, but opportunity to harvest exceptional fish
- ▶ Size limit on first fish could increase retention of second fish
- ▶ Two harvest scenarios bracket likely range of harvest
 - ▶ Low harvest scenario – same HPUE as status quo, assumes no increase in harvest of second fish
 - ▶ High harvest scenario – assumes HPUE similar to 2013
- ▶ Used 4% release mortality inflation

Area 3A – Status Quo with Reverse Slot Limit on First Fish

- ▶ **Low harvest scenario: 132,453 fish**
 - ▶ No reverse slots work under Reference TCEY
 - ▶ Several options ranging from U38O60 to U44O80 for Status quo TCEY allocation scenario
 - ▶ Yield ranges from 1.461 – 1.994 Mlb
- ▶ **High harvest scenario: 174,415 fish**
 - ▶ No workable size limits
 - ▶ Yield ranges from 1.891 – 2.456 Mlb

Reverse Slot – Low Harvest Scenario

		Upper Length Limit (in)										
		60	62	64	66	68	70	72	74	76	78	80
Lower Length Limit (in)	35	1.559	1.540	1.517	1.498	1.488	1.482	1.477	1.474	1.471	1.467	1.461
	36	1.600	1.580	1.557	1.538	1.528	1.523	1.518	1.515	1.512	1.508	1.502
	37	1.620	1.600	1.578	1.559	1.549	1.543	1.538	1.535	1.532	1.528	1.522
	38	1.647	1.628	1.605	1.586	1.576	1.571	1.566	1.563	1.559	1.556	1.550
	39	1.671	1.652	1.629	1.610	1.600	1.595	1.590	1.587	1.584	1.580	1.574
	40	1.689	1.670	1.647	1.629	1.619	1.613	1.608	1.605	1.602	1.598	1.593
	41	1.707	1.688	1.665	1.647	1.637	1.631	1.626	1.623	1.620	1.617	1.611
	42	1.720	1.701	1.679	1.660	1.650	1.645	1.640	1.637	1.634	1.630	1.625
	43	1.742	1.723	1.700	1.682	1.672	1.667	1.662	1.659	1.656	1.652	1.646
	44	1.753	1.734	1.712	1.693	1.683	1.678	1.673	1.670	1.667	1.663	1.658
	45	1.767	1.748	1.726	1.708	1.698	1.693	1.688	1.685	1.682	1.678	1.672
	46	1.777	1.758	1.736	1.718	1.708	1.702	1.697	1.694	1.691	1.688	1.682
	47	1.794	1.775	1.753	1.735	1.725	1.720	1.715	1.712	1.709	1.705	1.700
	48	1.805	1.786	1.764	1.746	1.737	1.731	1.726	1.723	1.720	1.717	1.711
	49	1.825	1.806	1.785	1.767	1.757	1.752	1.747	1.744	1.741	1.737	1.731
	50	1.841	1.823	1.802	1.784	1.774	1.769	1.764	1.761	1.758	1.754	1.749
	51	1.857	1.839	1.817	1.800	1.790	1.784	1.780	1.777	1.774	1.770	1.765
	52	1.874	1.856	1.835	1.817	1.807	1.802	1.797	1.794	1.791	1.788	1.782
	53	1.885	1.867	1.846	1.828	1.818	1.813	1.808	1.805	1.802	1.799	1.793
	54	1.905	1.887	1.866	1.848	1.839	1.833	1.828	1.825	1.823	1.819	1.814
	55	1.914	1.896	1.875	1.857	1.848	1.842	1.838	1.835	1.832	1.828	1.823
	56	1.929	1.912	1.891	1.873	1.864	1.858	1.853	1.851	1.848	1.844	1.839
	57	1.946	1.928	1.907	1.890	1.880	1.875	1.870	1.867	1.865	1.861	1.856
	58	1.961	1.944	1.923	1.906	1.896	1.891	1.886	1.883	1.880	1.877	1.872
59	1.976	1.959	1.938	1.921	1.912	1.906	1.902	1.899	1.896	1.892	1.887	
60	1.994	1.977	1.956	1.939	1.930	1.925	1.920	1.917	1.914	1.910	1.905	

High harvest scenario table is not included in this presentation. All options are above 1.66 Mlb.

Cannot ascertain whether reverse slot limit will result in high or low harvest scenario. Probably somewhere in between.



One Fish Daily Bag Limit

- ▶ Harvest forecast: 84,166 fish (62% of status quo)
- ▶ Not possible to estimate average weight with certainty (unknown degree of high-grading)
- ▶ Used 2% release mortality inflation
- ▶ Explored several options
 - ▶ Average weight of fish in 2019 + 36%
 - ▶ Average weight of fish over 28 inches in 2019
 - ▶ Average weight of fish over 28 inches in 2019 + 20%
- ▶ All three scenarios above reverence and status quo TCEY allocation scenarios

Harvest (no. fish)	Size	Mean weight	Removals
84,166	2019 All+36%	21.14	1.815
84,166	2019 O28	21.46	1.842
84,166	2019 O28+20%	25.75	2.211