

Analysis of Management Options for the Area 2C and 3A Charter Halibut Fisheries for 2019



**For the North Pacific Fishery Management Council
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Sarah Webster, Bob Powers
Alaska Department of Fish and Game

Overview

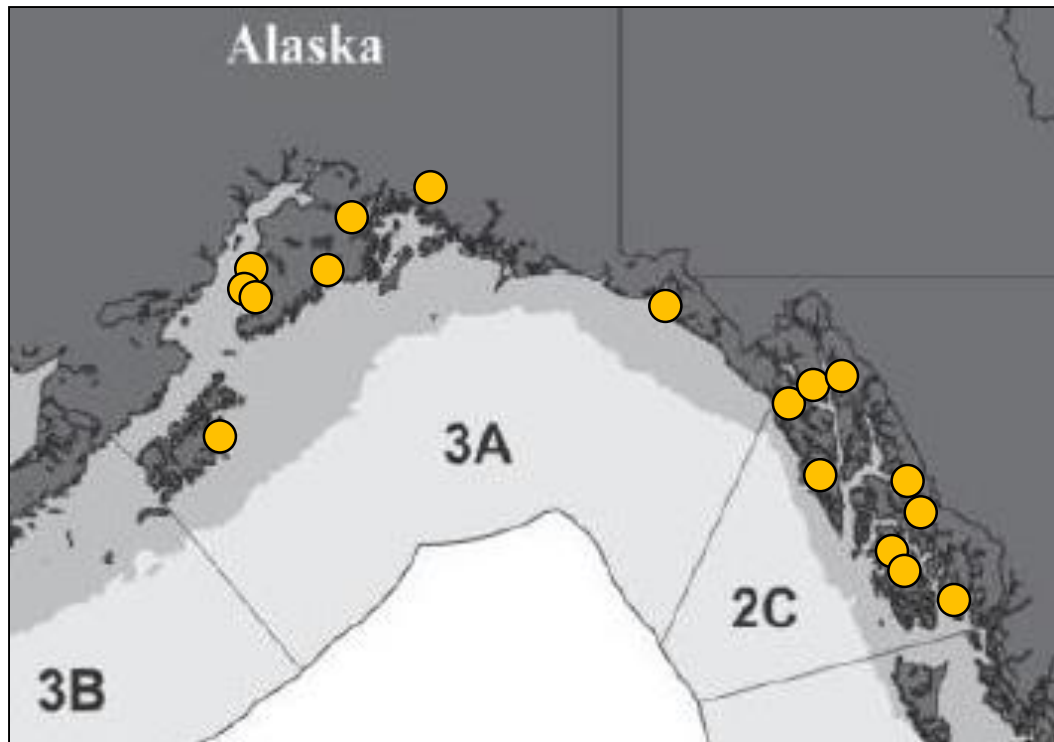
- ▶ Fishery review through 2018
- ▶ Analysis of management measures for 2019
 - ▶ Area 2C
 - ▶ Area 3A

Fishery review through 2018



Data sources

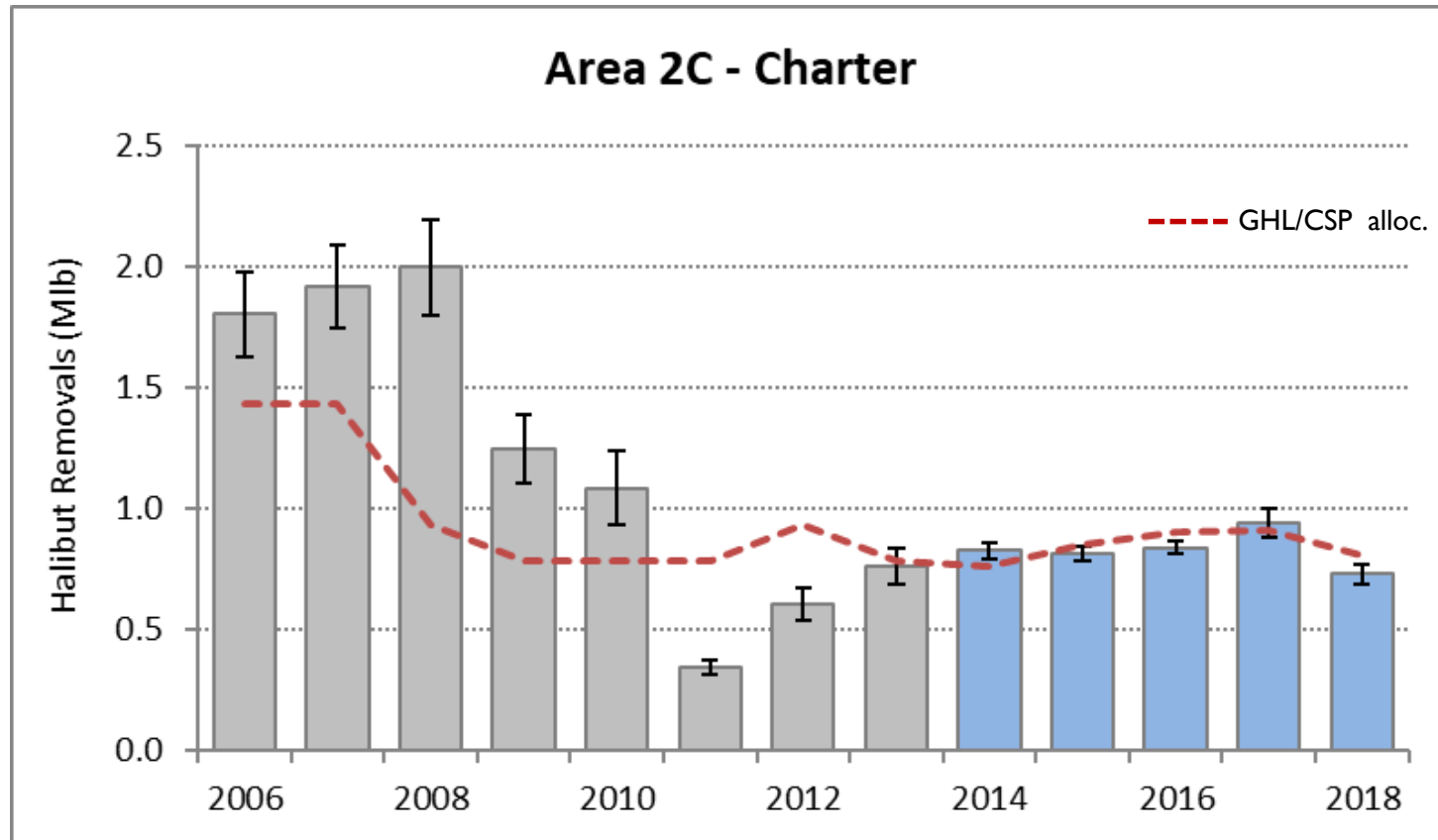
- ▶ Charter logbook (mandatory, statewide)
- ▶ Statewide harvest survey (mail)
- ▶ Creel sampling at major ports in 2C, 3A



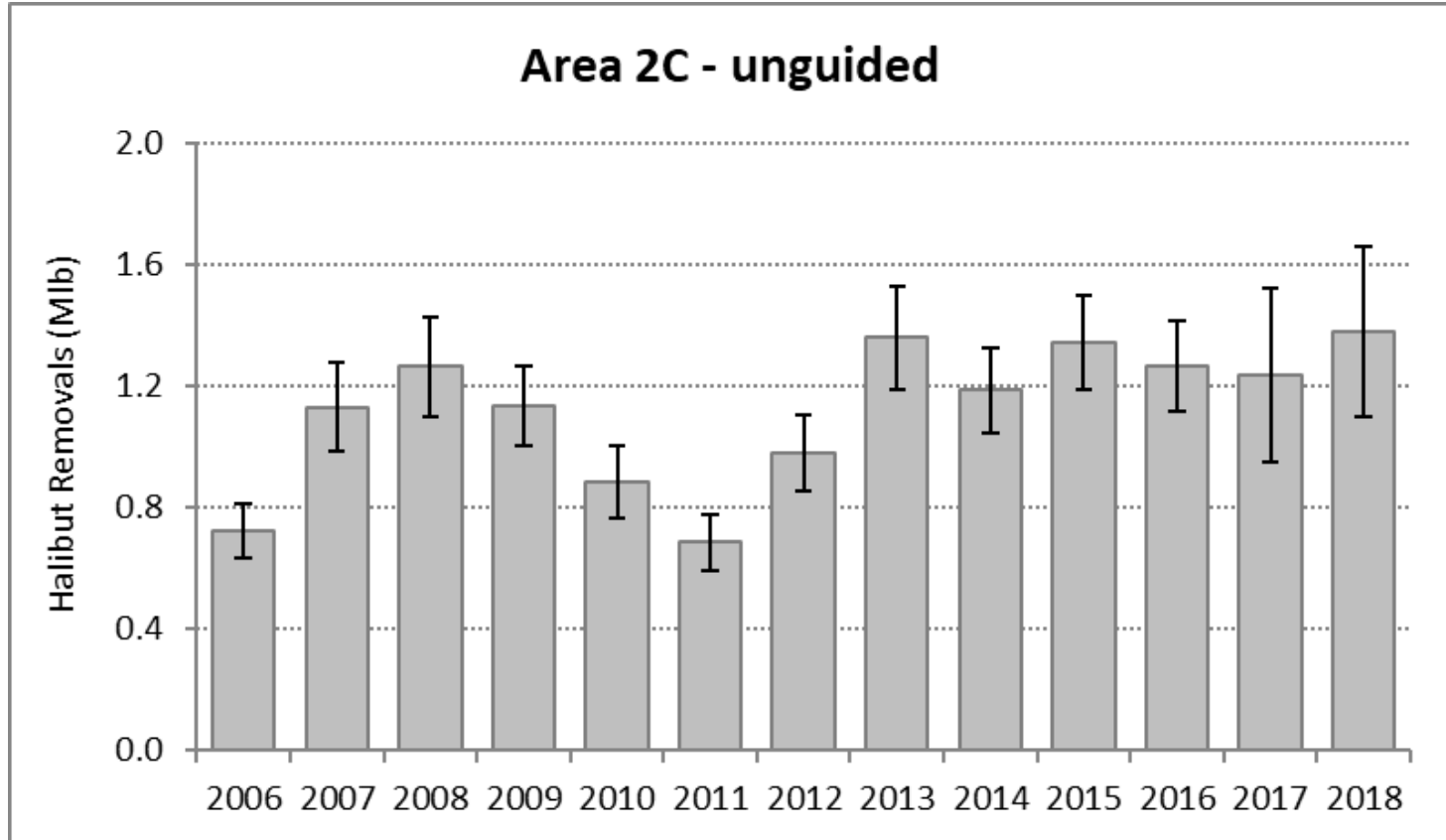
Preliminary charter estimates for 2018

Area	Mean wt (lb)	Logbook Harvest (no. fish)	Yield (lb)	Release Mort (lb)	Total Removals (lb)	Allocation (lb)	Overage (lb)	Overage %
2C	9.39	71,107	667,663	61,730	729,393	810,000	-80,607	-10.0%
3A	13.70	135,031	1,850,290	16,954	1,867,244	1,790,000	+77,244	+4.3%

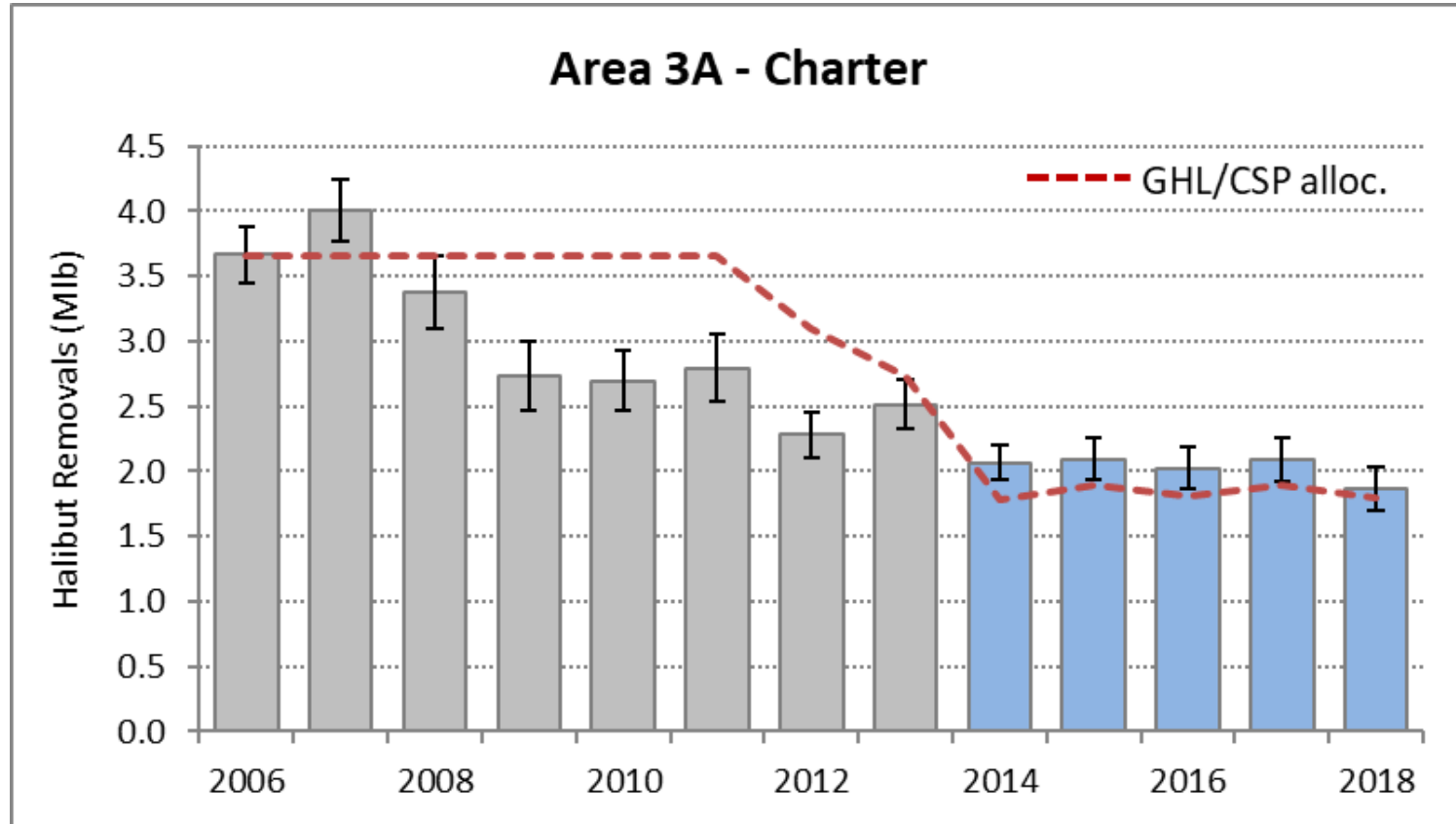
Area 2C charter



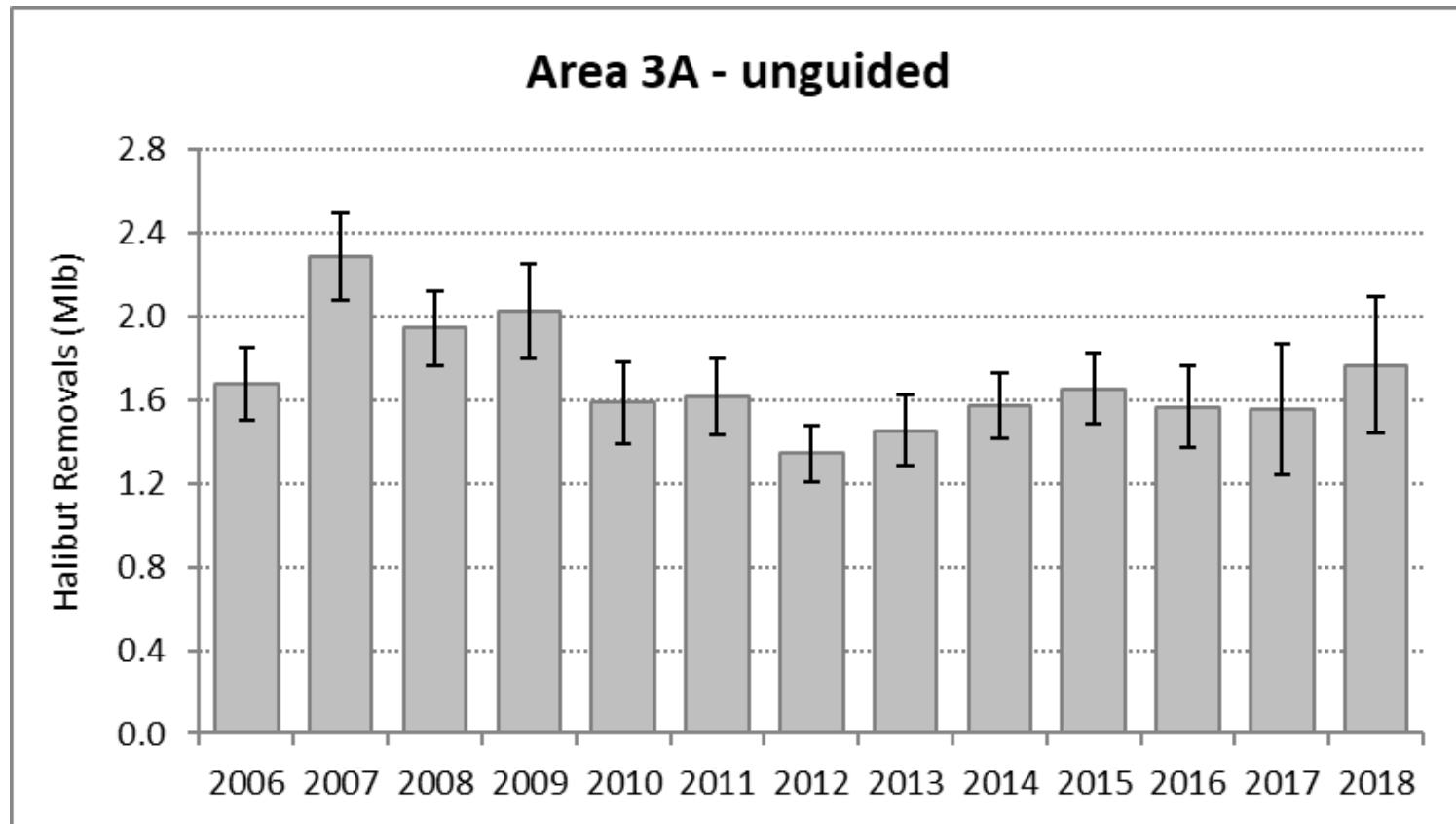
Area 2C unguided



Area 3A charter



Area 3A unguided

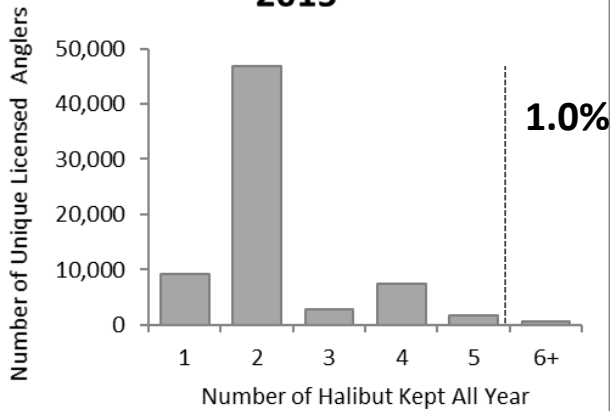


Performance of Council-recommended management measures

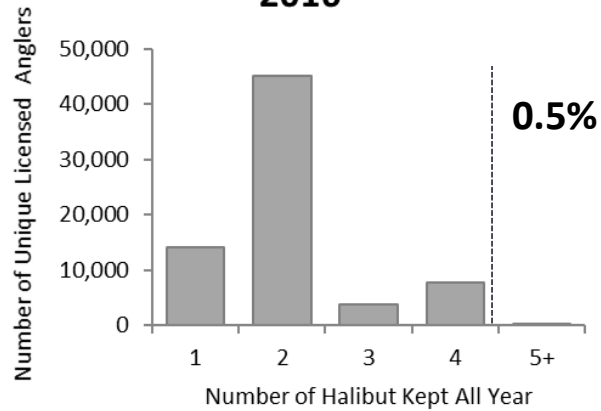
Area	Year	Management measure	Mgmt Type	Allocation (Mlb)	Removals (Mlb)	Overage (Mlb)	Overage Percent
2C	2012	One fish, U45-O68 rev. slot	GHL	0.931	0.605	-0.326	-35%
	2013	One fish, U45-O68 rev. slot	GHL	0.788	0.762	-0.026	-3%
	2014	One fish, U44-O76 rev. slot	CSP	0.761	0.827	0.066	9%
	2015	One fish, U42-O80 rev slot	CSP	0.851	0.814	-0.037	-4%
	2016	One fish, U43-O80 rev slot	CSP	0.906	0.839	-0.067	-7%
	2017	One fish, U44-O80 rev slot	CSP	0.915	0.943	0.028	3%
	2018	One fish, U38-O80 rev slot	CSP	0.810	0.729	-0.081	-10%
3A	2012	Two fish any size	GHL	3.103	2.284	-0.819	-26%
	2013	Two fish any size	GHL	2.734	2.514	-0.220	-8%
	2014	Two fish, one ≤ 29", one trip/day with halibut harvest	CSP	1.782	2.068	0.286	16%
	2015	Two fish, one ≤ 29", Thursday closed Jun 15-Aug 31, annual limit 5 halibut, one trip/day with halibut harvest	CSP	1.890	2.094	0.204	11%
	2016	Two fish, one ≤ 28", Wednesday closed all year, annual limit 4 halibut, one trip/day with halibut harvest	CSP	1.814	2.021	0.207	11%
	2017	Two fish, one ≤ 28", Wednesday closed all year, three Tuesdays closed, annual limit 4 halibut, one trip/day with halibut harvest	CSP	1.890	2.089	0.199	11%
	2018	Two fish, one ≤ 28", Wednesday closed all year, six Tuesdays closed, annual limit 4 halibut, one trip/day with halibut harvest	CSP	1.790	1.867	0.077	4%

Compliance with annual limits in Area 3A

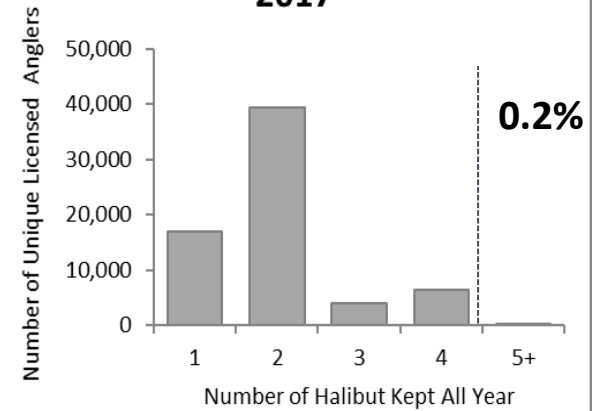
2015



2016



2017



Analysis of management measures for 2019



Photo: Kenai Riverfront Lodge

Catch allocations for 2019

- ▶ Highly variable depending on TCEY and distributed mortality limits
- ▶ <https://iphc.int/data/projection-tool>

Enter coastwide distributed mortality limit (TCEY) **40.00**

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Enter <u>distributed</u> mortality limit %	1.9%	12.3%	15.7%	40.9%	7.4%	5.5%	4.9%	11.5%	100.0%
Total by Region									
	Region 2	Region 3	Region 4	Region 4B					
	29.9%	48.3%	17.0%	4.9%					

Select bycatch option: **Previous year's bycatch**

Summary results

Projected coastwide SPR **46%**

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Total mortality limits	0.78	4.93	6.26	16.74	3.09	2.32	1.96	5.72	41.78
Distributed mortality limits (TCEYs)	0.78	4.91	6.26	16.35	2.97	2.21	1.95	4.59	40.00

Biological distribution

	Region 2	Region 3	Region 4	Region 4B
Biological stock distribution	23.1%	51.2%	20.4%	5.2%
Distributed mortality	29.9%	48.3%	17.0%	4.9%
Relative harvest rate	1.37	1.00	0.88	0.99

Detailed sector mortality information

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Commercial Discard Mortality	0.01	0.09	NA	NA	0.20	0.10	0.03	0.05	0.48
026 Bycatch	0.13	0.27	0.03	1.28	0.36	0.18	0.22	1.87	4.33
Non CSP Recreational	NA	0.05	1.38	1.74	0.00	0.01	0.00	0.00	3.18
Subsistence	NA	0.41	0.44	0.22	0.01	0.01	0.00	0.06	1.14
Total non-FCEY	0.14	0.82	1.85	3.24	0.57	0.30	0.25	1.97	9.14
Commercial Discard Mortality	NA	NA	0.06	0.40	NA	NA	NA	NA	0.43
CSP Recreational	0.29	0.58	0.81	2.29	NA	NA	NA	NA	3.97
Subsistence	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Commercial Landings	0.32	3.51	3.55	10.43	2.41	1.92	1.70	2.62	26.47
Total FCEY	0.64	4.09	4.42	13.12	2.41	1.92	1.70	2.62	30.90
							4C FCEY	1.18	
							4D FCEY	1.18	
							4E FCEY	0.26	
TCEY	0.78	4.91	6.26	16.35	2.97	2.21	1.95	4.59	40.00
U26 Bycatch	0.00	0.02	0.00	0.37	0.11	0.10	0.01	1.12	1.73
Total mortality	0.78	4.93	6.26	16.74	3.09	2.32	1.96	5.72	41.78

Catch allocations for 2019

- ▶ Highly variable depending on TCEY and distributed mortality limits

Page 2

Area	Distributed Mortality	Harvest (Mlb)	
		2019 Reference TCEY	Status Quo TCEY
2C	Space Time Model	0.81	0.73
	Status Quo	0.91	0.82
3A	Space Time Model	2.29	2.09
	Status Quo	1.89	1.76

Reference catch allocations for 2019

- ▶ Reference SPR ($SPR_{46\%}$)
- ▶ Reference Distributed Mortality Limit (Space Time Model)

Area	2019 Reference Charter Allocation (Mlb)	2018 Charter Allocation (Mlb)	Change
2C	0.81	0.81	0.0%
3A	2.29	1.79	27.9%

General methods

$$\text{Effort} \times \text{HPUE} = \text{Harvest}$$

$$\text{Harvest} \times \text{Average weight} = \text{Yield}$$

$$\text{Yield} + \text{Release Mortality} = \text{Removals}$$

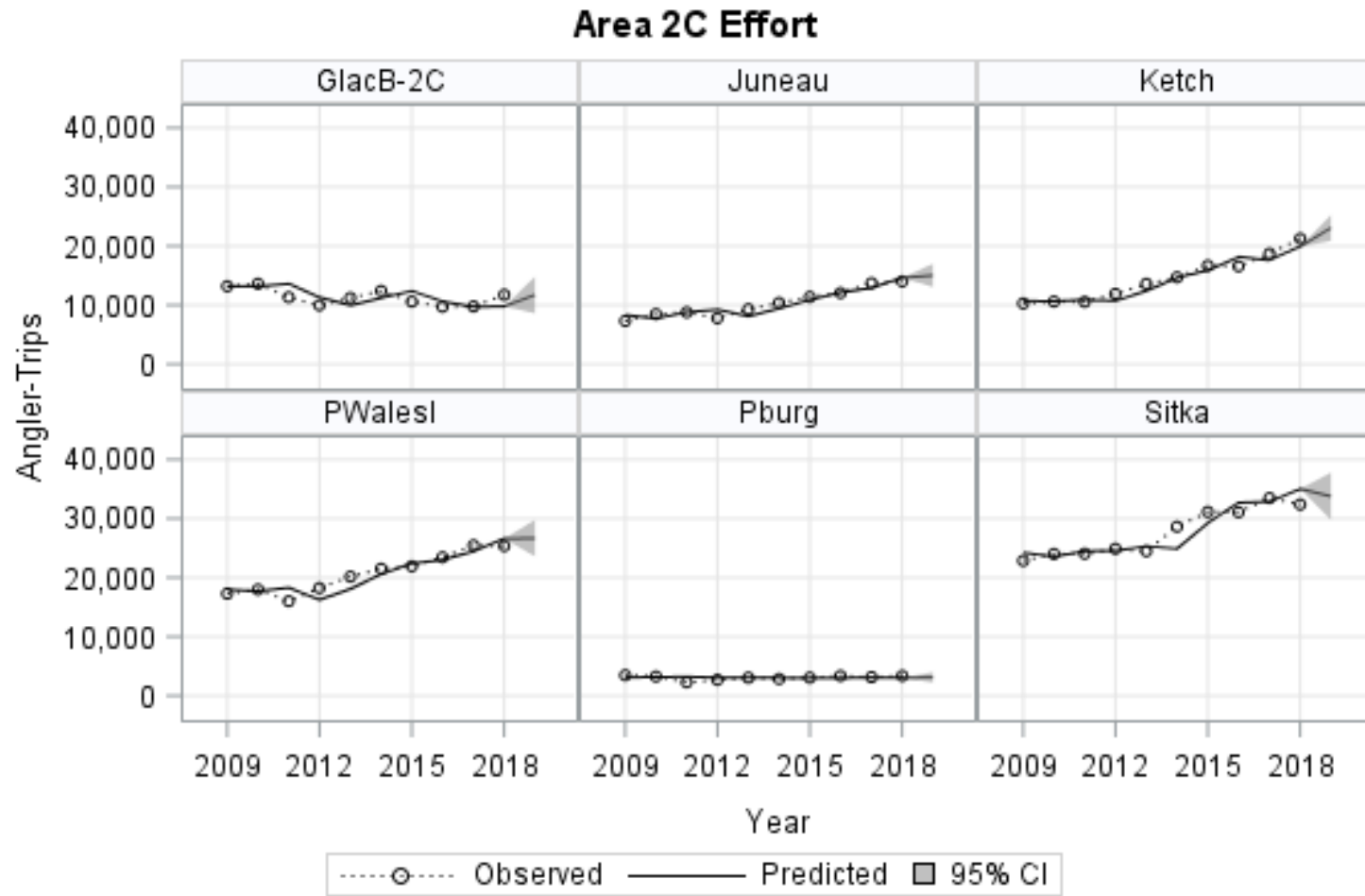


Area 2C - Measures for 2019

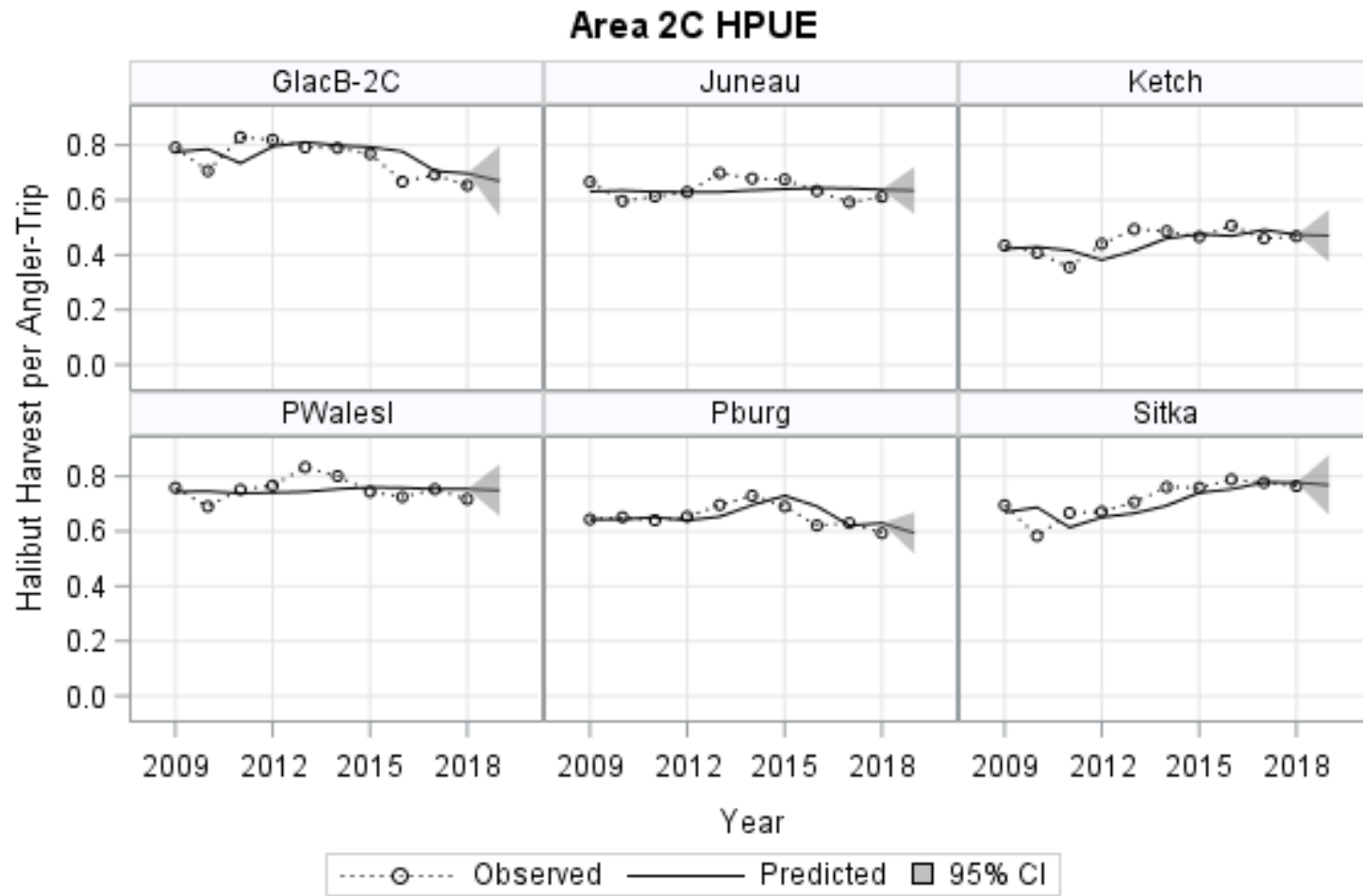
- ▶ Status quo: One fish bag limit, U38O80 reverse slot size limit
- ▶ Reverse (protected) slot limit (U35-50, O50-80)
- ▶ Reverse slot limit with annual limits of 1 – 5 halibut
- ▶ Reverse slot limit with trip limits of 1 trip per permit per vessel per day
- ▶ Reverse slot limit with a closure of one day per week
- ▶ Reverse slot limit with a combination of an annual limit and a trip limit



Area 2C Effort Forecasts



Area 2C HPUE Forecasts



2C – Status quo

- ▶ One fish bag limit, U38080 reverse slot size limit

	2018 Prelim Estimates	2019 Forecast
Harvest (number of fish)	71,107	75,998
Average Weight (lbs)	9.39	10.03
Removals (Mlb)	0.729	0.833

Area 2C – reverse slot limit

► Harvest forecast = 75,998

No annual limit

Table 6; Page 22

Lower Limit (in)	Upper Length Limit (in)															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
35	1.410	1.316	1.246	1.167	1.111	1.059	0.986	0.916	0.877	0.845	0.813	0.792	0.763	0.746	0.744	0.731
36	1.440	1.349	1.280	1.203	1.147	1.096	1.024	0.956	0.917	0.885	0.853	0.833	0.804	0.787	0.785	0.772
37	1.456	1.366	1.298	1.222	1.167	1.117	1.046	0.977	0.939	0.908	0.876	0.856	0.828	0.811	0.809	0.796
38	1.482	1.394	1.328	1.254	1.200	1.150	1.080	1.013	0.975	0.944	0.913	0.893	0.865	0.848	0.846	0.833
39	1.500	1.413	1.348	1.275	1.222	1.172	1.103	1.037	0.999	0.969	0.938	0.918	0.890	0.874	0.872	0.859
40	1.512	1.427	1.363	1.291	1.238	1.190	1.121	1.056	1.019	0.989	0.958	0.938	0.911	0.894	0.892	0.880
41	1.529	1.446	1.384	1.312	1.261	1.213	1.145	1.081	1.044	1.014	0.984	0.964	0.937	0.921	0.919	0.906
42	1.537	1.455	1.394	1.324	1.273	1.226	1.159	1.095	1.059	1.029	0.999	0.980	0.953	0.936	0.935	0.922
43	1.547	1.467	1.406	1.337	1.287	1.240	1.174	1.111	1.075	1.046	1.016	0.997	0.970	0.954	0.952	0.940
44	1.563	1.485	1.426	1.358	1.309	1.263	1.198	1.135	1.100	1.071	1.041	1.022	0.996	0.980	0.978	0.966
45	1.582	1.506	1.448	1.381	1.333	1.288	1.223	1.162	1.127	1.098	1.069	1.050	1.024	1.008	1.006	0.994
46	1.592	1.517	1.460	1.394	1.346	1.302	1.238	1.178	1.143	1.115	1.086	1.067	1.041	1.026	1.024	1.012
47	1.608	1.535	1.479	1.414	1.367	1.324	1.261	1.201	1.167	1.139	1.110	1.092	1.066	1.051	1.049	1.037
48	1.616	1.544	1.489	1.426	1.380	1.336	1.274	1.215	1.181	1.154	1.125	1.107	1.081	1.066	1.064	1.052
49	1.636	1.566	1.512	1.450	1.405	1.362	1.301	1.243	1.209	1.182	1.154	1.136	1.111	1.096	1.094	1.082
50	1.646	1.578	1.526	1.464	1.420	1.378	1.318	1.260	1.227	1.200	1.173	1.155	1.130	1.115	1.113	1.101

Area 2C – effect of annual limits

Table 7; Page 23

Annual Limit	Subarea						Area 2C
	Ketch	PWI	Pburg	Sitka	Jun	GlacB	
Estimated percent of anglers affected by the annual limit:							
1	25.1%	73.4%	45.6%	72.7%	39.8%	50.1%	57.3%
2	10.0%	47.8%	21.7%	42.8%	25.0%	29.3%	34.0%
3	2.4%	11.3%	8.2%	9.8%	12.3%	15.1%	9.6%
4	0.7%	2.1%	1.6%	1.7%	4.6%	4.4%	2.3%
5	0.2%	0.7%	0.2%	0.4%	1.2%	0.7%	0.5%
Estimated percent change in harvest relative to no annual limit:							
1	-27.8%	-57.6%	-43.6%	-56.1%	-45.6%	-50.0%	-50.2%
2	-9.7%	-26.4%	-17.9%	-24.2%	-24.0%	-25.0%	-22.6%
3	-2.4%	-6.1%	-5.6%	-5.4%	-10.4%	-10.3%	-6.3%
4	-0.7%	-1.4%	-1.0%	-1.1%	-3.7%	-2.8%	-1.6%
5	-0.2%	-0.5%	-0.1%	-0.3%	-1.1%	-0.6%	-0.5%
Projected harvest (number of halibut):							
1	7,827	8,484	1,038	11,393	5,182	3,915	37,840
2	9,790	14,708	1,512	19,674	7,244	5,876	58,804
3	10,575	18,760	1,737	24,552	8,540	7,022	71,187
4	10,766	19,717	1,823	25,672	9,179	7,611	74,769
5	10,822	19,894	1,839	25,871	9,420	7,785	75,631
No Limit	10,839	19,988	1,841	25,961	9,529	7,830	75,988



Area 2C – reverse slot limit

► Harvest forecast = 58,804

2-fish annual limit

Table 8; Page 24

Lower Limit (in)	Upper Length Limit (in)															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
35	1.090	1.016	0.961	0.901	0.858	0.818	0.762	0.708	0.678	0.653	0.628	0.613	0.590	0.578	0.576	0.566
36	1.114	1.042	0.988	0.929	0.887	0.848	0.792	0.739	0.709	0.684	0.660	0.645	0.623	0.610	0.608	0.599
37	1.126	1.055	1.002	0.944	0.903	0.864	0.809	0.756	0.726	0.702	0.678	0.663	0.641	0.628	0.627	0.617
38	1.147	1.078	1.026	0.969	0.928	0.890	0.836	0.783	0.755	0.731	0.707	0.692	0.670	0.658	0.656	0.646
39	1.161	1.093	1.042	0.985	0.945	0.908	0.854	0.802	0.774	0.750	0.726	0.712	0.690	0.678	0.676	0.666
40	1.170	1.104	1.054	0.998	0.959	0.922	0.868	0.817	0.789	0.766	0.742	0.728	0.706	0.694	0.692	0.683
41	1.184	1.119	1.070	1.015	0.976	0.940	0.887	0.837	0.809	0.786	0.763	0.748	0.727	0.715	0.713	0.704
42	1.190	1.126	1.078	1.024	0.986	0.950	0.898	0.848	0.820	0.797	0.774	0.760	0.739	0.727	0.725	0.716
43	1.198	1.135	1.088	1.034	0.997	0.961	0.910	0.860	0.833	0.810	0.788	0.773	0.752	0.741	0.739	0.730
44	1.211	1.150	1.103	1.051	1.014	0.979	0.928	0.880	0.852	0.830	0.808	0.794	0.773	0.761	0.760	0.750
45	1.226	1.166	1.121	1.069	1.033	0.998	0.948	0.900	0.874	0.851	0.829	0.815	0.795	0.783	0.782	0.773
46	1.233	1.175	1.130	1.080	1.044	1.010	0.960	0.913	0.886	0.864	0.843	0.829	0.808	0.797	0.795	0.786
47	1.246	1.189	1.145	1.096	1.060	1.027	0.978	0.932	0.905	0.884	0.862	0.848	0.828	0.817	0.815	0.806
48	1.253	1.197	1.154	1.105	1.070	1.037	0.989	0.943	0.917	0.895	0.874	0.860	0.840	0.829	0.828	0.819
49	1.268	1.213	1.171	1.123	1.089	1.057	1.009	0.964	0.938	0.917	0.896	0.882	0.863	0.851	0.850	0.841
50	1.276	1.223	1.182	1.135	1.101	1.069	1.022	0.978	0.952	0.931	0.910	0.897	0.877	0.866	0.865	0.856

Area 2C – trip limit of one trip per vessel per permit per day

Table 9; Page 27

Year	Businesses			Vessels			Bottomfish Trips		
	Number of businesses that reported more than one bottomfish trip per vessel per day	Total businesses that reported bottomfish effort	Percent of businesses that reported more than one bottomfish trip per day	Number of vessels that reported more than one bottomfish trip per day	Total number of vessels that reported bottomfish effort	Percent of vessels that reported more than one bottomfish trip per day	Bottomfish trips in excess of one trip per vessel per day (2nd, 3rd, or 4th trip)	Total number of bottomfish trips	Percent of bottomfish trips in excess of one trip per day
2007	126	404	31.2%	232	727	31.9%	903	27,456	3.3%
2008	114	404	28.2%	215	719	29.9%	823	26,221	3.1%
2009	109	366	29.8%	184	636	28.9%	623	19,333	3.2%
2010	75	349	21.5%	133	604	22.0%	613	19,985	3.1%
2011	84	288	29.2%	149	542	27.5%	1,311	19,170	6.8%
2012	82	272	30.1%	157	527	29.8%	1,131	19,853	5.7%
2013	78	259	30.1%	161	517	31.1%	1,318	21,074	6.3%
2014	81	256	31.6%	164	540	30.4%	1,557	23,173	6.7%
2015	80	256	31.3%	179	545	32.8%	1,218	23,892	5.1%
2016	99	264	37.5%	200	557	35.9%	948	24,083	3.9%
2017	97	268	36.2%	203	570	35.6%	1,192	26,093	4.6%

Area 2C – trip limit of one trip per vessel per permit per day

Year		Subarea						
		Ketch	PWI	Pburg	Sitka	Jun	GlacB	Area 2C
2007	First	11,550	39,994	5,862	33,775	9,124	16,222	116,527
	After First	169	2,050	50	281	201	1,029	3,780
	% After First	1.4%	4.9%	0.8%	0.8%	2.2%	6.0%	3.1%
2008	First	8,486	36,070	5,406	29,267	7,900	16,421	103,550
	After First	109	1,977	46	187	104	595	3,018
	% After First	1.3%	5.2%	0.8%	0.6%	1.3%	3.5%	2.8%
2009	First	4,419	12,622	2,225	15,800	4,659	10,116	49,841
	After First	52	475	21	95	214	317	1,174
	% After First	1.2%	3.6%	0.9%	0.6%	4.4%	3.0%	2.3%
2010	First	4,274	11,974	2,128	13,983	4,807	9,403	46,569
	After First	48	429	10	27	244	209	967
	% After First	1.1%	3.5%	0.5%	0.2%	4.8%	2.2%	2.0%
2011	First	3,668	11,677	1,436	15,917	5,019	9,151	46,868
	After First	78	368	8	83	352	214	1,103
	% After First	2.1%	3.1%	0.6%	0.5%	6.6%	2.3%	2.3%
2012	First	5,124	13,425	1,736	16,642	4,788	7,964	49,679
	After First	110	560	12	69	115	211	1,077
	% After First	2.1%	4.0%	0.7%	0.4%	2.3%	2.6%	2.1%
2013	First	6,521	16,028	2,104	17,178	6,267	8,767	56,865
	After First	190	782	3	87	220	113	1,395
	% After First	2.8%	4.7%	0.1%	0.5%	3.4%	1.3%	2.4%
2014	First	6,914	16,397	2,063	21,705	6,769	9,613	63,461
	After First	224	817	8	93	265	168	1,575
	% After First	3.1%	4.7%	0.4%	0.4%	3.8%	1.7%	2.4%
2015	First	7,451	15,957	2,105	23,514	7,389	7,914	64,330
	After First	311	365	16	97	298	239	1,326
	% After First	4.0%	2.2%	0.8%	0.4%	3.9%	2.9%	2.0%
2016	First	8,147	16,620	2,072	24,405	7,363	6,190	64,797
	After First	270	379	23	123	279	279	1,353
	% After First	3.2%	2.2%	1.1%	0.5%	3.7%	4.3%	2.0%
2017	First	8,220	18,684	1,955	25,880	7,769	6,520	69,028
	After First	378	488	20	138	354	249	1,627
	% After First	4.4%	2.5%	1.0%	0.5%	4.4%	3.7%	2.3%

Table 10; Page 28



Area 2C – closure of one day per week

Table 12; Page 30

Annual Limit	Subarea						
	Ketch	PWI	Pburg	Sitka	Jun	GlacB	Area 2C
Estimated percent change in harvest relative to no closed days:							
Sunday	-12.6%	-14.1%	-12.2%	-13.6%	-15.0%	-7.7%	-13.1%
Monday	-15.4%	-14.9%	-15.8%	-14.8%	-14.0%	-14.3%	-14.8%
Tuesday	-14.5%	-14.3%	-14.0%	-14.5%	-14.5%	-19.2%	-14.9%
Wednesday	-13.8%	-14.3%	-15.0%	-14.3%	-14.7%	-19.3%	-14.8%
Thursday	-15.1%	-14.8%	-16.7%	-14.9%	-14.3%	-14.5%	-14.8%
Friday	-15.6%	-14.4%	-15.9%	-14.6%	-13.5%	-14.0%	-14.5%
Saturday	-13.1%	-13.2%	-10.5%	-13.2%	-13.9%	-11.0%	-13.0%
Projected harvest (number of halibut):							
Sunday	9,477	17,162	1,616	22,434	8,096	7,230	66,016
Monday	9,173	17,014	1,551	22,128	8,194	6,712	64,773
Tuesday	9,267	17,135	1,583	22,188	8,147	6,329	64,650
Wednesday	9,348	17,130	1,565	22,236	8,132	6,317	64,729
Thursday	9,198	17,032	1,534	22,086	8,164	6,696	64,710
Friday	9,147	17,111	1,548	22,163	8,239	6,731	64,938
Saturday	9,423	17,344	1,649	22,530	8,202	6,965	66,113



Area 2C – closure of one day per week

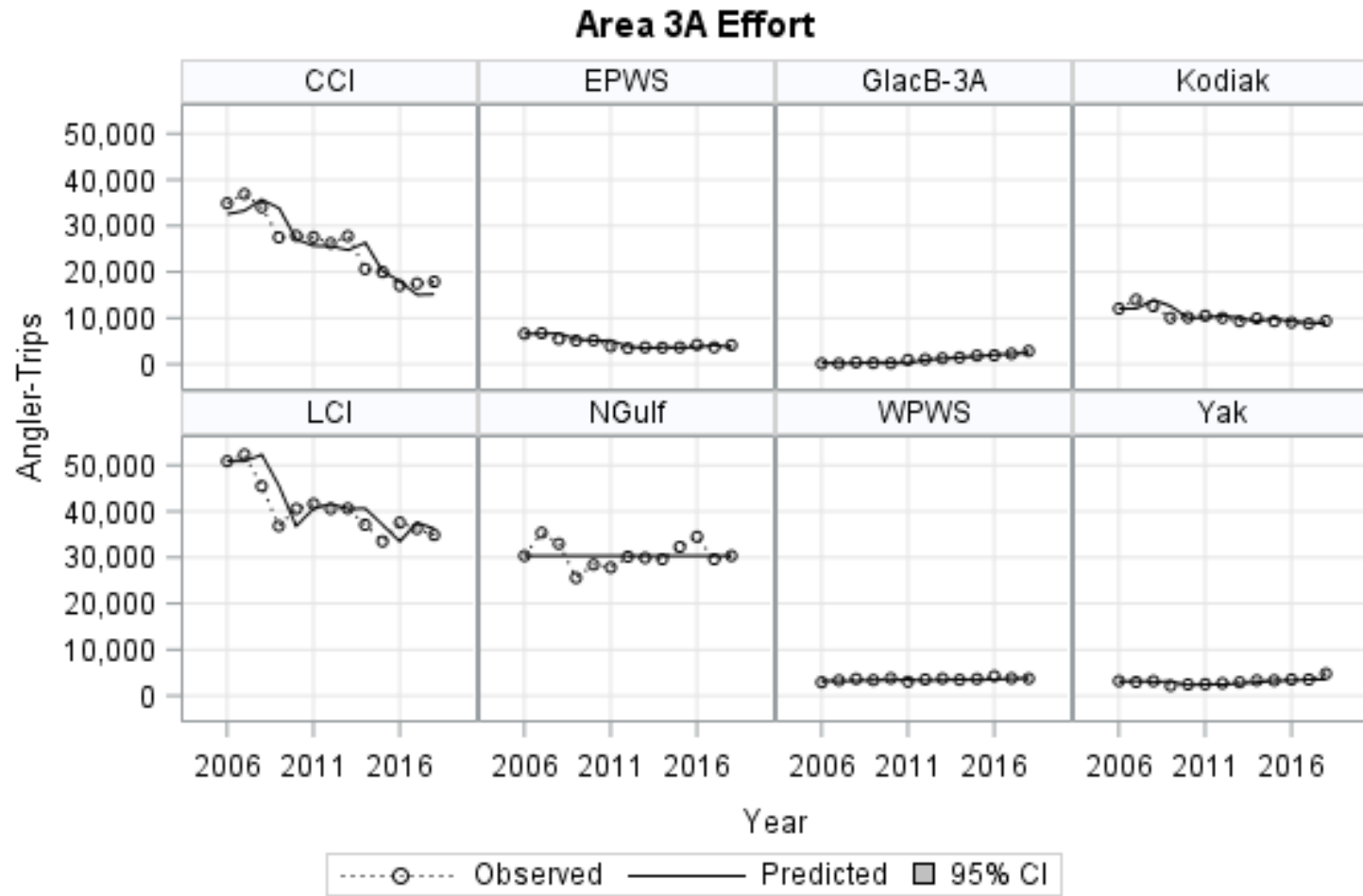
- ▶ Projected removals assume daily closures will have maximum effect, no diversion of effort to other days
- ▶ Overall effect is about 13-15% for a closed day

Area 3A Measures for 2019

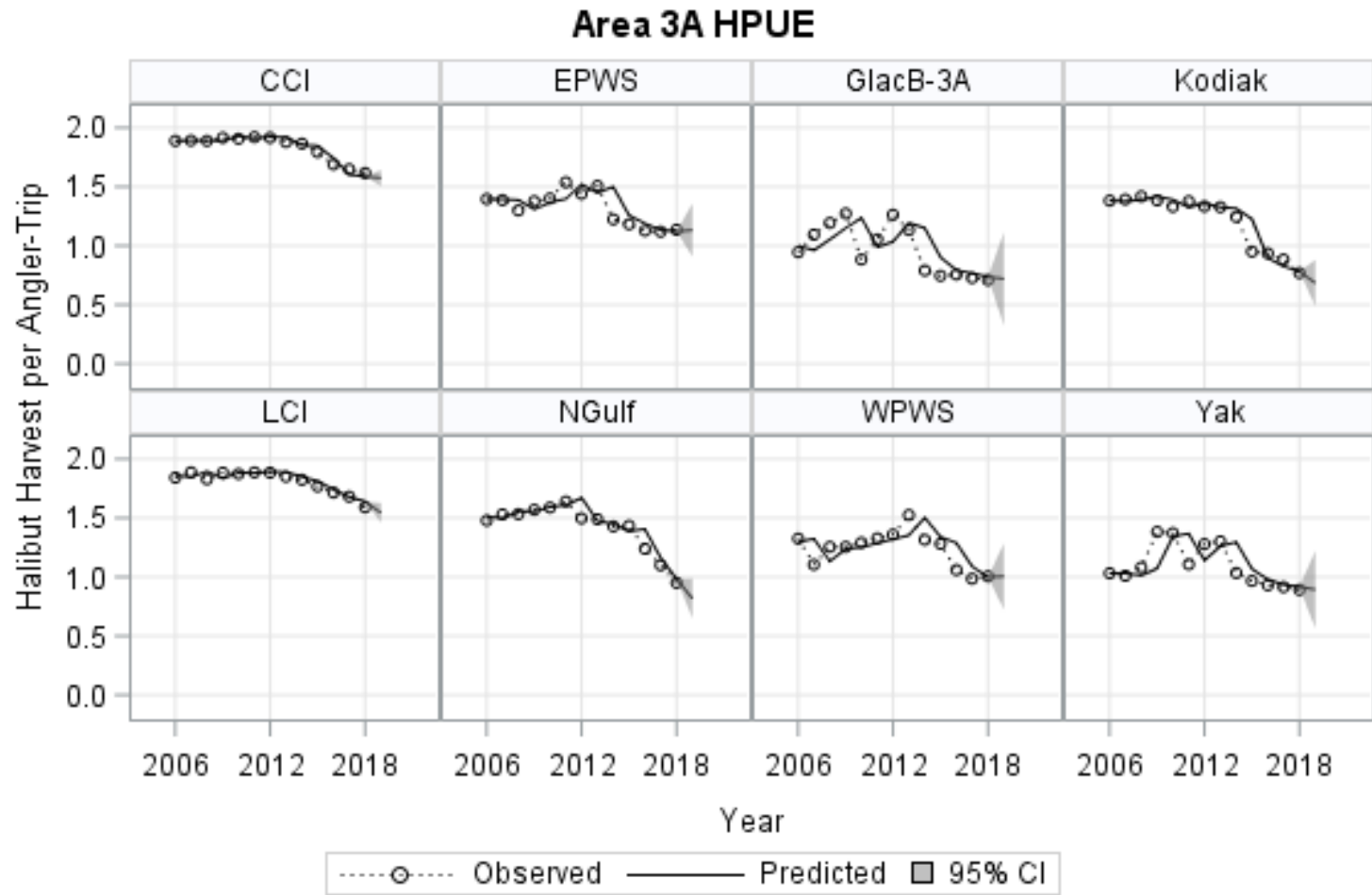
- ▶ Status quo
 - ▶ 2-fish bag limit/ one any size, one < 28 inches
 - ▶ Annual limit 4 fish
 - ▶ One trip per vessel per day and per CHP per day
 - ▶ Wednesdays closed all year, six Tuesdays closed
- ▶ Status quo a range of Tuesdays closed June – August
- ▶ Status quo with Tuesdays closed June – August and additional day of the week closures
- ▶ Status quo with reverse slot limit on one fish
- ▶ Status quo with a range of Tuesday closures and a range of size limits on the second fish (26 – 30 inches)



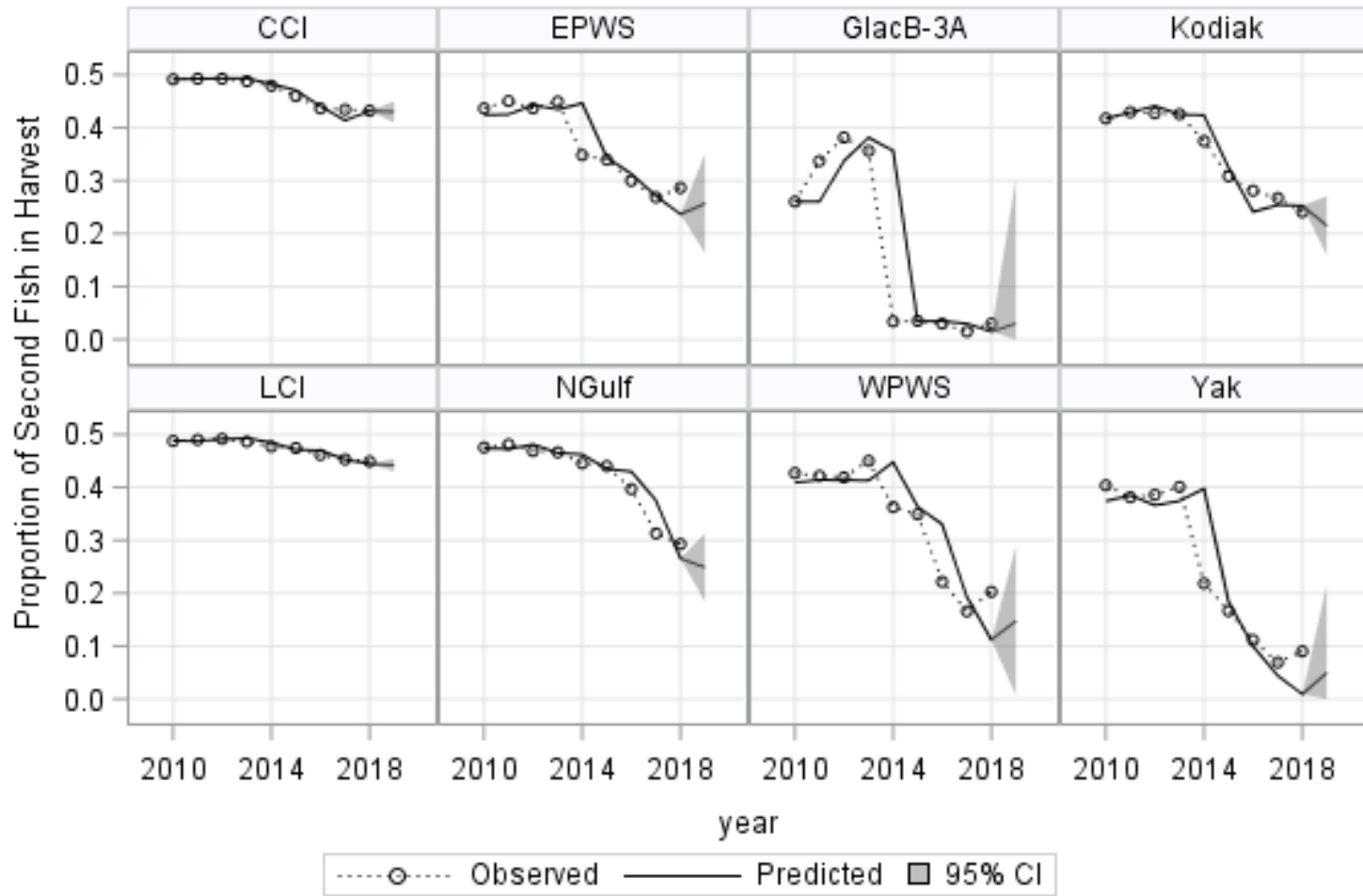
Area 3A effort



Area 3A HPUE



Area 3A – Proportions of second fish



3A – Status quo

▶ Status quo

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

	2018 Prelim Estimate	2019 Forecast
Harvest (number of fish)	135,031	127,778
Average Weight (lbs)	13.79	14.14
Removals (Mlb)	1.867	1.834

Area 3A – Status Quo with Tuesday closures June - August

► Harvest forecast = 127,778

Table 15; Page 36

Number of Closed Tuesdays	Beginning and Ending Dates	Percentage change in harvest relative to status quo	Projected Harvest (no. Fish)	Projected Removals (Mlb)
0		10.4%	141,083	2.023
1	Jul 30	8.8%	138,966	1.994
2	Jul 30 – Aug 6	7.2%	136,950	1.967
3	Jul 23 – Aug 6	5.8%	135,198	1.940
4	Jul 16 – Aug 6	4.1%	132,976	1.907
5	Jul 16 – Aug 13	2.7%	131,223	1.882
6 (status quo)	Jul 9 - Aug 13	0.0%	127,778	1.834
7	Jul 02 - Aug 13	-1.4%	126,004	1.808
8	Jul 02 - Aug 20	-2.5%	124,615	1.787
9	Jun 25 - Aug 20	-3.4%	123,371	1.770
10	Jun 18 - Aug 20	-4.6%	121,956	1.748
11	Jun 18 - Aug 27	-4.8%	121,673	1.744
12	Jun 11 - Aug 27	-5.7%	120,445	1.726
13	Jun 04 - Aug 27	-6.2%	119,814	1.718
48 (all season)	Feb 01 - Dec 31	-8.2%	117,309	1.681

Area 3A – Additional closed days June - August

► Assumes all Tuesdays (13 total) are closed June - August

Table 16; Page 37

Number of Closed Days	Sunday		Monday		Thursday		Friday		Saturday	
	Proportional Reduction in Harvest	Projected Removals (Mlb)	Proportional Reduction in Harvest	Projected Removals (Mlb)	Proportional Reduction in Harvest	Projected Removals (Mlb)	Proportional Reduction in Harvest	Projected Removals (Mlb)	Proportional Reduction in Harvest	Projected Removals (Mlb)
0	0.0%	1.718	0.0%	1.718	0.0%	1.718	0.0%	1.718	0.0%	1.718
1	-1.8%	1.689	-1.9%	1.687	-1.9%	1.687	-1.9%	1.688	-1.9%	1.688
2	-3.2%	1.664	-3.5%	1.659	-3.7%	1.656	-3.6%	1.660	-3.6%	1.659
3	-4.9%	1.637	-4.8%	1.636	-5.0%	1.634	-5.4%	1.627	-5.5%	1.627
4	-6.8%	1.606	-6.9%	1.601	-7.0%	1.600	-7.3%	1.595	-7.4%	1.593
5	-7.1%	1.597	-8.5%	1.574	-8.6%	1.574	-8.7%	1.572	-8.7%	1.572
6	-8.6%	1.571	-10.1%	1.546	-10.3%	1.545	-10.4%	1.543	-10.4%	1.542
7	-10.4%	1.540	-11.8%	1.516	-11.2%	1.530	-11.6%	1.525	-12.0%	1.515
8	-11.2%	1.527	-12.3%	1.509	-12.6%	1.507	-12.8%	1.503	-13.1%	1.497
9	-12.1%	1.509	-13.3%	1.492	-14.0%	1.481	-14.1%	1.481	-14.4%	1.475
10	-13.4%	1.487	-14.5%	1.471	-15.4%	1.458	-15.3%	1.461	-15.3%	1.458
11	-14.2%	1.472	-15.1%	1.460	-16.0%	1.449	-15.9%	1.450	-16.3%	1.441
12	-15.1%	1.456	-16.1%	1.442	-16.9%	1.433	-16.9%	1.434	-17.4%	1.423
13	-15.9%	1.444	-16.7%	1.433	-17.5%	1.423	-17.5%	1.424	-18.0%	1.410

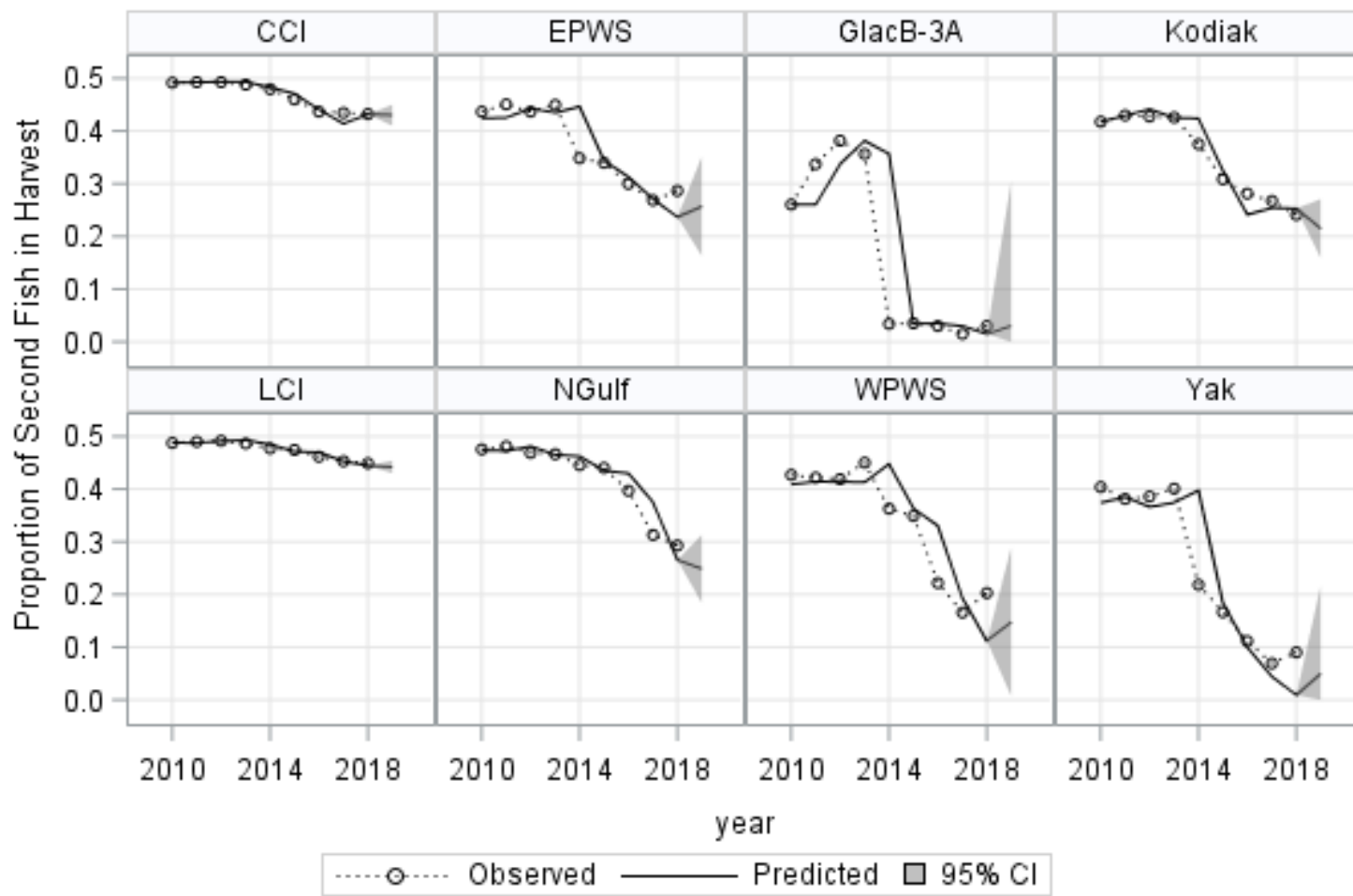
Area 3A –Daily closures June-August

- ▶ Projected removals assume daily closures will have maximum effect, no diversion of effort to other days
- ▶ Overall effect is about 0.5-2% per closed day
- ▶ Preferred dates provided to maintain recent seasonal distribution of harvest (Table 15, Figure 4)

Area 3A – Status quo + reverse slot limit

- ▶ 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 or size of second fish
 - ▶ High harvest scenario – assumes HPUE and weights of U28 fish are similar to 2013.

Area 3A – Status quo + reverse slot limit



Area 3A – Status quo + reverse slot limit

- ▶ **Low harvest scenario: 127,778 fish**
 - ▶ No slot limit needed under reference level catch allocation
 - ▶ Harvest ranges from 1.364 – 1.879 Mlb
- ▶ **High harvest scenario: 176,891 fish**
 - ▶ Workable size limits from U38050 to U50064
 - ▶ Harvest ranges from 1.858 – 2.418 Mlb

3A Status quo with range of Tuesdays closed and range of maximum size on 2nd fish

Projected Harvest (number of fish)

Year	Number of Tuesday Closures													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
2019	141,083	138,966	136,950	135,198	132,976	131,223	127,778	126,004	124,615	123,371	121,956	121,673	120,445	119,814

Projected Charter Removals (Mlb)

Size limit	Number of Tuesday Closures													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
26	1.956	1.929	1.903	1.877	1.845	1.820	1.773	1.749	1.730	1.712	1.693	1.689	1.672	1.663
27	1.983	1.955	1.928	1.902	1.869	1.845	1.797	1.772	1.753	1.735	1.715	1.712	1.694	1.685
28	2.023	1.994	1.967	1.940	1.907	1.882	1.834	1.808	1.788	1.771	1.750	1.746	1.729	1.719
29	2.049	2.019	1.992	1.965	1.932	1.906	1.857	1.831	1.811	1.793	1.772	1.768	1.750	1.741
30	2.088	2.059	2.031	2.003	1.969	1.943	1.893	1.867	1.846	1.828	1.807	1.803	1.784	1.775

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 - Fish and Game Fund

