

Agenda Item 4. a. Reconciling bycatch estimates for use in stock assessment and FCEY determination. (Merrill/Leaman)

Discussions at the 2014 IPHC Interim Meeting noted apparent differences between the estimated 2014 bycatch numbers asserted by the NMFS Alaska Region office and those used by IPHC for portions of the Bering Sea. Consequently, the Commission asked the staff of the two agencies to try to reconcile and resolve the apparent 2014 differences via a technical working group, before the Commission's annual meeting in January. A conference call on the issue occurred on 17 December.

After comparing methods and estimates, the group agreed that NMFS estimates of bycatch using the IPHC methodology closely matched for the full-year estimates in 2011 through 2013. In 2014, the IPHC necessarily used estimates for bycatch that were extracted from the NMFS database as of October 25, 2014, when the stock IPHC stock assessment was conducted. Subsequently, NMFS derived slightly higher bycatch amounts in the GOA, lower amounts in the BSAI, and in particular lower bycatch in Area 4CDE using data to December 16 and projecting to the end of the year. In Area 4CDE the NMFS total bycatch mortality projection was approximately 251,000 pounds lower than that used in the IPHC Interim Meeting Assessment.

The NMFS Regional office provided updated information to the IPHC on 9 January, 2015 that reflected updates to actual bycatch in the Gulf of Alaska (Areas 2C, Area 3A, and Area 3B) and the Bering Sea/Aleutian Islands (Areas 4A, 4B, 4CDE) (Table 1). These updates resulted in a 0.318 Mlb (3%) reduction from the IPHC calculations made in November. Although the aggregate change was small relative to the total bycatch, a 0.252 Mlb reduction in total estimated 2014 bycatch occurred in Area 4CDE, of which 0.161 Mlb is estimated to be O26.

The revised bycatch numbers do not affect apportionment estimates, as these are not a function of removals. Because the 2014 bycatch estimates are used as projected values for 2015, the updates do affect the catch table. An updated catch table, directly comparable to the 2015 Blue Line indicates a Blue Line FCEY for Area 4CDE of 0.52 Mlb; changes in other regulatory areas occurred, but were relatively small (Table 2). These updates will have little effect on the ICPH decision table as the magnitude of net change is too small (0.12 Mlb) to make an appreciable effect on this coastwide calculation.

Improved protocols on data-sharing could aid IPHC staff in the preparation of their bycatch estimates by providing more timely and complete access to data. The IPHC, the NFMS Regional Office, and the AFSC Observer Program have agreed that longer term improvements to our process would enhance our ability to assign bycatch to specific IPHC regulatory areas, including the U26/O26 partition with greater precision. The goal of this work during 2015 will be to develop improved data resolution and analysis procedures and a standard protocol for how estimation and projection will be conducted.

Table 1. Comparison of IPHC and NMFS annual bycatch mortality estimates, 2011-2013, and projections with data from two dates in 2014. Negative numbers (in parentheses) under Difference (IPHC-NMFS) indicate NMFS estimates are higher than IPHC estimates.

IPHC Halibut Mortality Net Weight Pounds					NMFS Halibut Mortality Net Weight Pounds							Difference (IPHC - NMFS)				
	2011	2012	2013	2014 Projected on Oct. 26/14		2011	2012	2013	2014 to 12/16	2014 projection	2014 TOTAL Projected on Dec. 16/14		2011	2012	2013	2014 Projected
2C					2C							2C				
HAL	5,590	7,243	7,343	11,819	HAL	5,608	7,429	7,379	9,207	410	9,617	HAL	(18)	(186)	(36)	2,202
3A					3A							3A				
HAL	137,691	217,104	178,588	122,255	HAL	143,524	217,102	178,647	157,293	9,021	166,314	HAL	(5,833)	2	(59)	(44,059)
POT	38,615	34,034	6,400	5,037	POT	38,649	34,035	6,391	6,258	116	6,374	POT	(34)	(1)	9	(1,337)
TRW	2,293,685	1,643,728	1,275,422	1,364,280	TRW	2,313,553	1,641,839	1,284,814	1,353,133	712	1,353,845	TRW	(19,868)	1,889	(9,392)	10,435
3B					3B							3B				
HAL	259,176	116,226	91,783	156,364	HAL	263,432	116,154	91,744	162,998	4,724	167,722	HAL	(4,256)	72	39	(11,358)
POT	35,489	35,771	18,588	18,331	POT	35,488	35,786	18,606	11,221	28	11,249	POT	1	(15)	(18)	7,082
TRW	775,261	1,188,600	751,977	956,858	TRW	774,767	1,188,457	755,322	935,307		935,307	TRW	494	143	(3,345)	21,551
4A					4A							4A				
HAL	206,752	198,351	287,819	220,168	HAL	206,738	199,450	287,604	190,815	7,260	198,075	HAL	14	(1,099)	215	22,093
POT	10,088	5,193	4,035	2,491	POT	6,567	3,485	1,396	3,385	43	3,428	POT	3,521	1,708	2,639	(937)
TRW	889,767	1,549,365	965,277	679,973	TRW	889,690	1,549,329	963,693	634,476		634,476	TRW	77	36	1,584	45,497
4B					4B							4B				
HAL	31,355	30,495	6,648	4,713	HAL	31,348	30,482	6,543	4,741		4,741	HAL	7	13	105	(28)
POT	314	1,025	1,207	671	POT	99	945	295	469		469	POT	215	80	912	202
TRW	424,534	558,356	407,071	352,328	TRW	423,733	558,048	406,949	342,721		342,721	TRW	801	308	122	9,607
4CDE					4CDE							4CDE				
HAL	459,064	489,196	330,982	439,559	HAL	460,284	490,998	330,487	392,916	10,817	403,733	HAL	(1,220)	(1,802)	495	35,826
POT	248	-	-	-	POT	219	1		76		76	POT	29	(1)	-	(76)
TRW	1,463,420	1,625,901	1,670,635	2,350,055	TRW	1,463,165	1,625,304	1,667,323	2,219,224	19,961	2,239,185	TRW	255	597	3,312	110,870
4CL					4CL							4CL				
HAL	214,111	299,163	236,784	133,542	HAL	214,556	293,279	237,089	105,347	5,593	110,940	HAL	(445)	5,884	(305)	22,602
POT	1,935	3,308	1,918	1,636	POT	1,933	3,329	1,878	2,132	60	2,192	POT	2	(21)	40	(556)
TRW	1,554,856	1,427,070	2,054,834	1,885,493	TRW	1,554,596	1,426,767	2,057,191	1,797,257	4,960	1,802,217	TRW	260	303	(2,357)	83,276
4CDE+CL					4CDE+CL							4CDE+CL				
H&L	673,175	788,359	567,766	573,100	H&L	674,840	784,278	567,576	498,263	16,410	514,673	H&L	(1,665)	4,081	190	58,427
POT	2,183	3,308	1,918	1,636	POT	2,152	3,331	1,878	2,208	60	2,268	POT	31	(23)	40	(632)
TWL	3,018,276	3,052,971	3,725,469	4,235,548	TWL	3,017,761	3,052,070	3,724,514	4,016,481	24,921	4,041,402	TWL	515	901	955	194,146
TOTAL	3,693,634	3,844,638	4,295,153	4,810,284	TOTAL	3,694,753	3,839,679	4,293,969	4,516,953	41,391	4,558,344	TOTAL	(1,119)	4,959	1,184	251,940
BSAI + GOA TOTAL	8,801,951	9,430,129	8,297,311	8,705,573	BSAI + GOA TOTAL	8,827,949	9,422,221	8,303,352	8,328,977	63,705	8,392,682	BSAI + GOA TOTAL	(25,998)	7,908	(6,041)	312,891

Table 2. Extended catch table projected for 2015 Blue Line including 2014 bycatch estimates for Areas 2C-4CDE made by the NMFS on 9 January, 2015. All values reported in millions of net pounds.

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
<u>Q26 Non-FCEY</u>									
Comm. wastage	0.02	0.17	NA	NA	0.24	0.05	0.03	0.02	0.53
Bycatch	0.07	0.22	0.01	1.16	0.77	0.49	0.34	2.91	5.96
Sport (+ wastage)	NA	NA	1.14	1.49	0.02	0.02	0.00	0.00	2.67
Pers./Subs.	NA	0.41	0.40	0.25	0.02	0.01	0.00	0.03	1.11
Total Non-FCEY	0.08	0.80	1.55	2.90	1.05	0.57	0.37	2.96	10.27
<u>Q26 FCEY</u>									
Comm. wastage	NA	NA	0.11	0.42	NA	NA	NA	NA	0.53
CSP Sport (+wastage)	0.31	0.69	0.79	1.89	NA	NA	NA	NA	3.68
Pers./Subs.	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Comm. Landings	0.41	4.27	3.40	7.79	2.46	1.39	0.73	0.52	20.98
Total FCEY	0.75	4.96	4.30	10.10	2.46	1.39	0.73	0.52	25.22
TCEY	0.84	5.75	5.85	13.00	3.51	1.95	1.10	3.48	35.48
<u>U26</u>									
Comm. wastage	0.00	0.01	0.01	0.02	0.04	0.00	0.00	0.00	0.08
Bycatch	0.00	0.02	0.00	0.48	0.46	0.37	0.05	1.66	3.04
Total U26	0.00	0.03	0.01	0.50	0.49	0.37	0.05	1.66	3.12
Total Mortality	0.84	5.78	5.85	13.50	4.01	2.32	1.16	5.14	38.60

IPHC's methodology for estimating bycatch in federal fisheries off Alaska

IPHC staff

Introduction

Discussions at the 2014 IPHC Interim Meeting noted differences between the estimated 2014 bycatch numbers asserted by the NMFS Alaska Region office and those used by IPHC for portions of the Bering Sea. IPHC has been using NMFS-generated bycatch data in its annual bycatch compilations for a number of years, along with similar projection methods, so it is unclear why any differences might have arisen. Consequently, the Commission has asked the staffs of the two agencies to try to reconcile and resolve the apparent 2014 differences via a technical working group, before the Commission's annual meeting in January. A conference all has been scheduled for mid-December, and this document was prepared to provide a basis for the working group discussions.

Data sources and processing

IPHC relies upon domestic agencies for estimates of bycatch estimates. In most instances, monitoring programs provide the necessary information. In the case of Alaska, the U.S. National Marine Fisheries Service (NMFS) operates an observer program on federal groundfish fisheries, which collects information on catches, including halibut. NMFS Alaska Region (AKR) uses the observer data to estimate bycatch by federal management area, gear, and target fishery. The estimates are regularly posted on its website for public use (<http://alaskafisheries.noaa.gov/>). IPHC accesses these reports as needed in compiling bycatch estimates required by its stock assessment. The specific report utilized by IPHC provides bycatch by NMFS statistical area, gear, target fishery and reporting week: (see http://alaskafisheries.noaa.gov/2014/car240_psc_halibut.csv as an example).

The information provided by NMFS does not conform to IPHC's needs in several ways, so the data undergo subsequent processing and recoding. For example, groundfish fishery management is conducted according to NMFS management areas, which are not exactly the same as IPHC regulatory areas. NMFS areas are assigned to IPHC areas according to the schedule shown in Table 1. Lastly, weight units are converted from metric tons, round weight, to pounds, net weight, to be consistent with standard IPHC weight accounting, according to the following:

$$W_{\text{lbs net}} = (W_{\text{mt}} \times 2205) \times 0.75$$

where $W_{\text{lbs net}}$ = weight in pounds, net weight,
 W_{mt} = weight in metric tons, round weight,
2205 is the number of pounds per metric ton, and
0.75 is the conversion from round weight to net weight for Pacific halibut

The current year stock assessment requires estimates of removals for the full calendar year from all sources. However, data inputs for the assessment are due to the assessment team prior to

the completion of the fishing year; for 2014, estimates were due by November 3. NMFS bycatch reports are usually accessed and downloaded in late October to early November to meet this goal. Because the reports only contain information for fishing through some portion of October and fishing continues for some groundfish species continues through December 31, projections of bycatch for November-December are necessary to ensure a full accounting. The projections are made by applying the average proportion taken by a similar date during the preceding 3-year period to the current partial year data, i.e., January-October, data. The projections are made by IPHC regulatory area and gear. This process has been followed for many years.

After the fishing year is finished, and not part of the accounting and projection referred to above, IPHC also applies that year's discard mortality rates (DMRs), calculated from NMFS observer data, to determine actual mortality incurred from fishing. These DMRs will be slightly different than the rolling 10-yr average used in PSC management but will be the most accurate DMRs for the completed fishing year and for estimating halibut removals and inclusion in IPHC databases.

Results specific for 2014 assessment

Work completed in 2014 was comprised of obtaining final 2013 estimates, and making preliminary estimates for the full calendar year 2014. In the case of 2013, final estimates for 2013 were obtained from the AKR web site:

(http://alaskafisheries.noaa.gov/2013/car240_psc_halibut.csv).

These estimates were reviewed and processed according to the steps outlined in the previous section. The results were added to the IPHC bycatch data set, replacing the preliminary values assembled at this same time last year.

For 2014, data retrievals from the NFMS web site took place on November 3. At that time, bycatch was reported from fishing conducted through October 25 in the Prohibited Species Bycatch Report (http://alaskafisheries.noaa.gov/2014/car240_psc_halibut.csv), which is the report IPHC has always based its estimates from. The report was downloaded, and data were processed as previously outlined. The projections for the remainder of 2014 were made by applying the proportions taken by a similar date during 2011-2013, to the 2014 partial year, i.e., January-October, data. The projections were made by IPHC regulatory area and gear. The data used as a basis of the projections and the subsequent results are shown in Table 2.

Several trends are noticed in the results from the data compilations and projections for 2014 shown in Table 2. First, trawl fishery bycatch has been declining in Area 3A during 2011-2013, from 2.3 Milbs to 1.3 Milbs in 2013, with a projected 1.4 Milbs in 2014. Second, trawl fishery bycatch has been increasing in several IPHC areas within the Bering Sea, most noticeably 4CDE and in the Closed Area (which is part of Area 4CDE), while declining in Area 4B. In 4CDE, the NMFS reports show bycatch at 1.46 Milbs in 2011 and increasing to 1.67 Milbs in 2013. While this is perhaps only a modest increase, the 2014 projection shows a sizeable jump because the amount reported through October 25 is higher than taken since 2011, at 1.86 Milbs. The expansion to account for the remaining fishing year further increases the estimate for 2014 to 2.35 Milbs. Trawl fishery bycatch in the Closed Area has also been increasing, from 1.55 Milbs in 2011 to 2.05 Milbs in 2013. However, the projected 2014 total does not show a big increase because the estimate through October is similar to past year's total.

Estimates have been aggregated up to region and gear in Table 3. The data in the table show the trends observed in 2011-2013, in which the regional bycatch level has been decreasing in the Gulf of Alaska areas and modestly increasing in the Bering Sea/Aleutian areas.

Table 1. NMFS management area reassignments used to aggregate groundfish and halibut statistics to IPHC regulatory areas.

NMFS Areas	IPHC Area	Region
650, 659	2C	GOA
630, 640, 649	3A	
610, 620	3B	
517, 518, 519	4A	BSA
541, 542, 543	4B	
508, 509, 512, 513, 514, 516, 521, 523, 524	4CDE/CL	

Table 2. Data utilized and final projections for halibut bycatch in 2014 federal fisheries off Alaska. Gear acronyms: H&L – hook and line, jig; POT = groundfish pot; TWL = trawl.

IPHC Area & Gear	FULL YEAR BYC MRT (lbs net)			BYC MRT (lbs net) THRU:			Proportion Taken			2011-13 Avg Prop.	Byc Mrt (lbs net) thru Oct 25 2014	Projected 2014 Byc Mrt (lbs net)
	2011	2012	2013	Oct. 22 2011	Oct. 27 2012	Oct. 26 2013	2011	2012	2013			
2C												
H&L	5,590	7,243	7,343	2,448	2,861	5,474	0.438	0.395	0.745	0.526	6,218	11,819
3A												
H&L	137,691	217,104	178,588	119,550	168,914	156,197	0.868	0.778	0.875	0.840	102,731	122,255
POT	38,615	34,034	6,400	38,334	30,859	5,871	0.993	0.907	0.917	0.939	4,730	5,037
TWL	2,293,685	1,643,728	1,275,422	2,151,512	1,458,426	1,204,476	0.938	0.887	0.944	0.923	1,259,529	1,364,280
3B												
H&L	259,176	116,226	91,783	215,930	85,830	79,612	0.833	0.738	0.867	0.813	127,124	156,364
POT	35,489	35,771	18,588	34,861	33,770	17,116	0.982	0.944	0.921	0.949	17,397	18,331
TWL	775,261	1,188,600	751,977	740,152	1,175,915	649,097	0.955	0.989	0.863	0.936	895,373	956,858
4A												
H&L	206,752	198,351	287,819	137,245	130,448	165,425	0.664	0.658	0.575	0.632	139,163	220,168
POT	10,088	5,193	4,035	10,055	4,912	3,572	0.997	0.946	0.885	0.943	2,348	2,491
TWL	889,767	1,549,365	965,277	789,566	1,444,931	909,728	0.887	0.933	0.942	0.921	626,126	679,973
4B												
H&L	31,355	30,495	6,648	31,355	30,495	6,648	1.000	1.000	1.000	1.000	4,713	4,713
POT	314	1,025	1,207	232	1,025	1,207	0.737	1.000	1.000	0.912	612	671
TWL	424,534	558,356	407,071	400,819	544,431	407,071	0.944	0.975	1.000	0.973	342,839	352,328
4CDE												
H&L	459,064	489,196	330,982	331,974	356,912	257,092	0.723	0.730	0.777	0.743	326,665	439,559
POT	248	0	0	248	0	0	1.000			1.000	0	0
TWL	1,463,420	1,625,901	1,670,635	1,064,238	1,402,264	1,304,594	0.727	0.862	0.781	0.790	1,856,996	2,350,055
CL												
H&L	214,111	299,163	236,784	119,864	190,380	186,775	0.560	0.636	0.789	0.662	88,360	133,542
POT	1,935	3,308	1,918	1,885	3,093	1,340	0.974	0.935	0.698	0.869	1,422	1,636
TWL	1,554,856	1,427,070	2,054,834	1,386,653	1,233,979	1,697,244	0.892	0.865	0.826	0.861	1,623,089	1,885,493
4CDE+CL												
H&L												573,100
POT												1,636
TWL												4,235,548

Table 3. Summary of bycatch estimates (pounds, net weight) by region and gear type.

	2011	2012	2013	2014 through Oct 25	Projected 2014
GOA					
H&L	402,457	340,573	277,714	236,073	290,438
POT	74,105	69,805	24,988	22,127	23,369
TWL	3,068,947	2,832,328	2,027,398	2,154,902	2,321,138
Total	3,545,508	3,242,706	2,330,101	2,413,102	2,634,945
BSA					
H&L	911,282	1,017,205	862,232	558,901	797,982
POT	12,585	9,526	7,161	4,382	4,798
TWL	4,332,577	5,160,692	5,097,817	4,449,051	5,267,849
Total	5,256,444	6,187,423	5,967,210	5,012,334	6,070,630