

Age distribution of the commercial halibut catch for 2008

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Abstract

The age distribution of halibut sampled from the 2008 commercial catch is summarized. Fish from five to 50 years old were captured, with 12-year-olds comprising the largest age group in the overall catch. Average age for all areas combined was slightly higher than in 2007.

Age distribution

The 1996 year class (12-year-olds) accounted for the largest proportion (in numbers) of the sampled commercial catch (11%) for all areas combined in 2008 (Table 1). The next most abundant year classes were 1995 and 1998, each accounting for slightly over 10% of the sampled catch for all areas combined. Twelve-year-olds were the most abundant age class in Regulatory Areas 3B and 4B, and the second most abundant in Area 4D. In Areas 2B, 4A, and 4C, 10-year olds (1998 year class) made up the most abundant age class. Eleven-year-olds (1997 year class) made up the most abundant age class in Regulatory Area 2A, while 13-year-olds (1995 year class) were the most abundant age class in Areas 2C and 3A.

The average values for age, length, and estimated weight by regulatory area for 2008 are presented in Table 2. Average size (measured fork length) of sampled halibut increased in Areas 2B, 2C, 4A, and 4B in 2008 but decreased in all other areas. Average fork length for all areas combined decreased by 1.2 centimeter in 2008.

Average age of fish sampled from Areas 2B, 2C, 3A, 4A, 4C, and 4D increased in 2008 relative to 2007, while average ages from Areas 2A and 4B decreased (Table 3). The average age of fish sampled from 3B remained the same in 2007 and 2008. The average age from all areas combined in 2008 was slightly higher than in 2007, and overall average age in 2008 was one year higher than it was in 1999.

The youngest and oldest halibut in the 2008 commercial, or *market*, samples were determined to be five and 50 years old, respectively. The five-year-old was captured in Area 3B and measured 111 cm. The 50-year-old was captured in Area 4D, and had a fork length of 172 cm. The largest halibut in the 2008 commercial samples was a 203-cm fish from Area 4D, which was determined to be 32 years old.

Table 4 contains percent agreement values for quality control (QC) readings. All QC readings from 2002 through 2007 were conducted on burned or baked otolith sections. QC readings for years prior to 2002 were either surface ages or burned/baked section ages. QC readings for the 2008 commercial samples were not complete and had not been entered at the time of writing. Ten percent of the market samples will be read twice for QC. The remainder of the QC readings of 2008 market samples will be performed over the winter of 2008-09.

Production aging timeline

The peak month for aging commercial and setline survey otoliths in 2008 was October, followed by August and September (Fig. 1). October was also the peak month for aging in 2007.

Otoliths from the 2008 commercial samples were aged between April and November, with October being the busiest month. Current-year setline survey otoliths were aged between June and October, with August being the busiest month. In previous years, ages from some regulatory areas were not used in the stock assessment, so otoliths from those areas were designated 'non-priority' when scheduling age reading for the assessment deadline. Between 2003 and 2006, ages from Areas 2A, 4C, and 4D were not used in the stock assessment. This meant that otoliths from those areas did not need to be aged by the October 15 deadline, although ages for most of the otoliths from non-priority areas were usually available by the end of October. The previous deadline for non-priority ages was December 30 of the collection year. The current coastwide assessment requires ages from all areas, so the 2007 deadline for 2A, 4C, and 4D ages was moved up from December 30 to the same date (October 15) as other priority-area ages.

Almost 310 otoliths were collected from recaptured tagged fish in 2008. These samples were mainly recoveries from the 2003/2004 PIT tag releases or the 2003 double-tagging experiment (Forsberg 2009). Tag recovery otoliths are aged the year following recovery. Four hundred and forty-one tag recovery otoliths collected in 2007 were aged in 2008.

The commercial otolith collection target is 1,500 (± 500) per regulatory area for Areas 2, 3, 4A, 4B, and 1,500 (± 500) for Areas 4C and 4D combined. Otolith targets were met or exceeded in all areas in 2008.

In 2008, port samplers reported collecting over 14,400 market sample otoliths; however, only 12,924 otoliths had been aged at the time of writing the RARA. Several hundred otoliths had not yet been processed or aged, and some of the difference in totals was due to the combined result of discards (crystallized, right-side, or broken otoliths; mixed-up samples) and counting errors (incorrect otolith totals reported on market sample forms). However, the main difference between the number collected and aged in 2008 was due to extra 4B otoliths that were collected and not used. In early August, there was concern that the collection goal of 1,500 otoliths for Area 4B would not be met by the end of the season because compared with previous years, a larger proportion of 4B fish was being delivered to unstaffed ports. To ensure that the collection goal would be achieved, samplers were instructed to double sampling effort from 4B deliveries by collecting two samples from each 4B offload. The 4B sampling rate was 15% (by weight) in 2008. Once the first sample of 15% was collected, a second random sample was taken at the same rate. However, 4B landings into sampled ports increased during August, to the extent that the collection goal was met without the extra samples. The decision was made to exclude the extra 4B samples from the stock assessment, so the second samples collected from each of the double-sampled trips (a total of 960 otoliths from six deliveries) were not aged, nor were the fork lengths entered into the database (Hutton and MacTavish 2009).

References

- Forsberg, J. E. 2009. Tagging studies. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2008: 431-438.
- Hutton, L. M. and MacTavish, K. A. 2009. Commercial catch sampling. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2008: 71-78.

Table 1. Age distribution of commercial catch of Pacific halibut by regulatory area, 2008.

Age (years)	Regulatory Area									Total
	2A	2B	2C	3A	3B	4A	4B	4C	4D	
5					1					1
6		1	2	1	1	4				9
7	9	20	28	5	16	1	6	3	1	89
8	88	92	65	24	54	41	20	36	12	432
9	205	194	125	78	166	127	49	84	37	1,065
10	241	200	113	119	148	250	125	113	90	1,399
11	262	170	122	133	176	192	127	52	87	1,321
12	232	167	135	192	190	156	183	44	128	1,427
13	207	148	176	251	168	141	147	36	126	1,400
14	131	120	141	229	143	114	123	29	132	1,162
15	66	78	82	139	67	70	118	17	95	732
16	48	40	46	107	49	55	100	7	59	511
17	36	25	28	143	50	41	39	7	51	420
18	21	20	33	101	41	78	28	4	38	364
19	18	11	34	101	53	80	37	9	39	382
20	16	24	37	120	58	114	55	5	40	469
21	12	22	34	109	78	104	71	4	47	481
22	16	14	21	76	50	75	48	4	39	343
23	4	6	6	64	20	40	19	2	15	176
24	4	5	5	51	16	27	18		12	138
25	1	3	3	44	14	18	29	1	26	139
26	3	9	9	68	17	163	89	6	100	464
Total	1,620	1,369	1,245	2,155	1,576	1,891	1,431	463	1,174	12,924

Table 2. 2008 commercial samples: average length, age, weight by regulatory area, and otoliths collected and aged.

Regulatory Area	Average age (years)	Average length (cm)	Average weight (lbs)¹	Otoliths collected	Otoliths aged³
2A	12.0	93.4	17.7	1,683	1,620
2B	12.2	96.8	21.0	1,415	1,369
2C	13.1	107.0	29.2	1,279	1,245
3A	16.1	100.0	22.6	2,267	2,155
3B	13.8	97.2	20.4	1,718	1,576
4A	16.1	104.3	26.7	1,948	1,891
4B	15.7	109.2	32.1	² 1,452	1,431
4C	11.7	103.8	26.3	480	463
4D	16.1	102.8	25.0	1,219	1,174
All Areas	14.3	101.0	23.9	²13,461	12,924

¹Weights calculated from measured fork lengths entered through November 16, 2008

²An additional 960 otoliths were collected from Area 4B but not used for stock assessment

³Numbers of otoliths aged by November 16, 2008

Table 3. Mean age (in years) and estimated mean weight¹ (in pounds) of sampled commercially-caught Pacific halibut by regulatory area, 1999-2008.

Reg, Area		Year									
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
2A	Age	11.3	12.1	12.8	13.3	12.1	11.2	11.9	13.4	12.3	12.0
	Weight	19.8	21.3	25.2	23.6	20.0	19.9	20.9	19.2	19.6	17.7
2B	Age	12.6	12.5	12.8	13.0	12.3	11.7	12.0	11.8	11.8	12.2
	Weight	23.3	23.3	23.7	23.5	22.4	21.2	21.0	20.5	20.9	21.0
2C	Age	12.8	13.0	13.2	13.6	13.6	13.1	12.4	12.4	12.7	13.1
	Weight	28.7	28.9	29.4	34.4	33.0	30.9	29.3	28.6	28.1	29.2
3A	Age	14.1	14.5	14.9	15.8	15.3	15.9	15.6	15.5	16.0	16.1
	Weight	24.5	26.7	27.2	26.5	26.6	26.4	25.2	25.0	22.9	22.6
3B	Age	14.2	14.2	14.7	15.2	14.6	15.0	14.4	14.3	13.8	13.8
	Weight	26.8	25.0	25.3	24.8	23.7	22.9	23.8	21.9	22.9	20.4
4A	Age	12.9	13.8	14.5	14.5	15.1	14.3	13.3	14.5	14.5	16.1
	Weight	28.9	30.0	29.1	32.1	34.5	29.0	28.7	27.9	25.4	26.7
4B	Age	15.1	15.3	16.0	16.4	17.0	15.4	15.8	15.0	16.0	15.7
	Weight	30.5	34.8	29.2	31.8	29.6	26.8	24.0	27.1	30.4	32.1
4C	Age	12.3	13.4	13.7	13.8	11.9	12.1	10.6	10.5	11.0	11.7
	Weight	35.1	33.8	32.4	30.2	27.5	24.7	29.8	30.6	27.9	26.3
4D	Age	12.5	13.9	16.0	15.5	15.0	13.1	13.4	16.7	15.3	16.1
	Weight	24.8	30.8	32.9	32.4	35.1	33.3	30.5	28.3	26.6	25.0
All Areas	Age	13.3	13.7	14.2	14.7	14.5	13.5	13.4	14.0	14.1	14.3
	Weight	26.8	27.7	27.6	28.6	27.8	25.8	25.9	24.8	24.9	23.9

¹Weights calculated from measured fork lengths

Table 4. Between-reader percent agreement for market sample ages 1996-2007 (CV=coefficient of variation, APE=average percent error).

Year	Tot. aged	No. aged twice	% agreement (± 1 year)	CV	APE
1996	13,452	1,839	92.3	2.8	2.0
1997	15,500	2,203	93.6	2.4	1.7
1998	14,395	2,110	91.9	2.6	1.8
1999	12,796	1,117	92.0	2.5	1.8
2000	13,982	1,002	88.8	3.0	2.1
2001	13,181	2,025	86.3	3.9	2.8
2002	17,770	2,135	87.9	3.2	2.3
2003	13,738	984	82.6	3.9	2.8
2004	11,866	809	82.6	3.6	2.5
2005	13,945	1,315	85.9	3.7	2.6
2006	12,330	1,241	88.3	3.5	2.5
2007	13,910	1,488	85.8	3.9	2.8

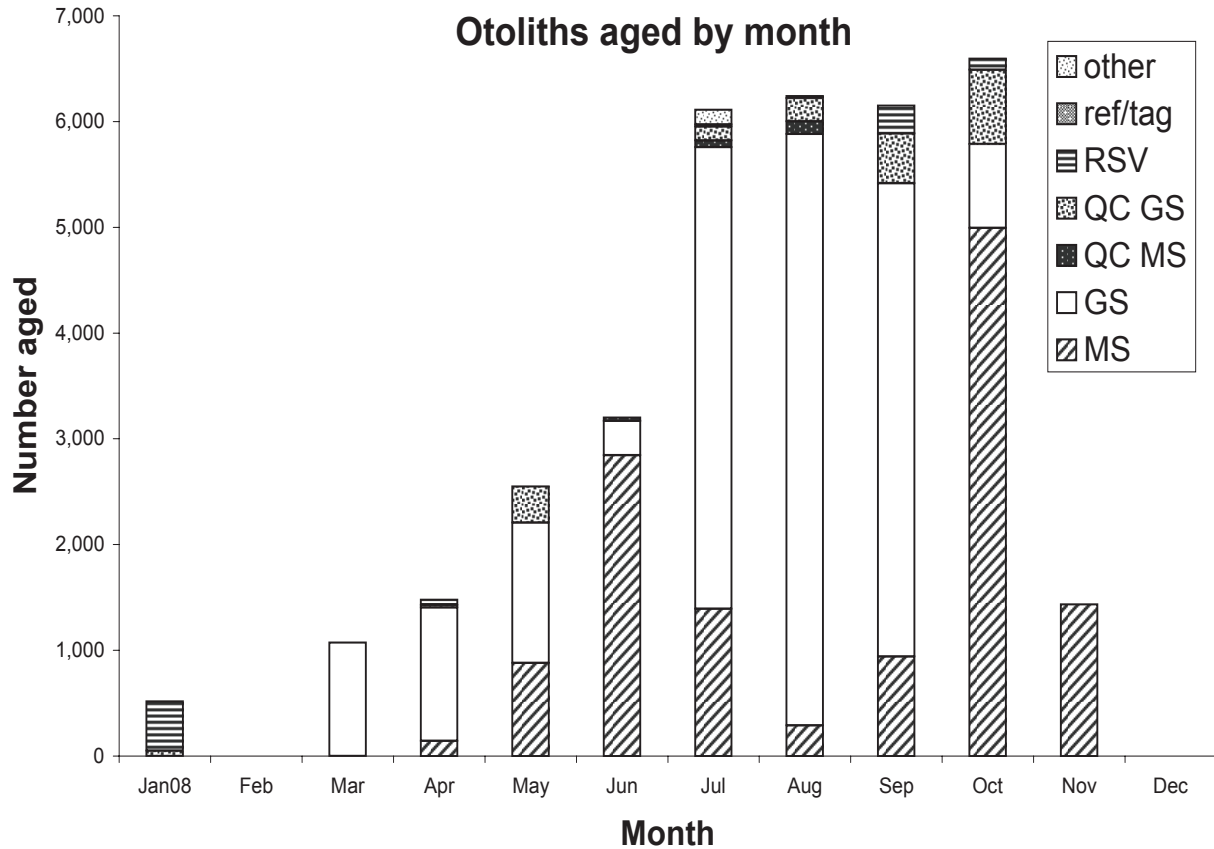


Figure 1. Aging workload January through November of 2008. “Other” category includes otoliths for research projects, reference set, tag recovery ages, Alaskan sport otoliths, and resolved ages. “Resolved” age refers to a single age assigned by two readers viewing the otolith together under a microscope with two sets of eyepieces, or a third independent age assigned by the senior reader. “QC” refers to second or quality control ages; “GS” refers to general series (IPHC setline and NMFS trawl survey); and “MS” refers to market sample (commercial) otoliths.