

Commercial catch sampling

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Abstract

This paper describes the 2011 International Pacific Halibut Commission commercial catch sampling program for halibut in Alaska, British Columbia, Washington, and Oregon. Commercial catch sampling involves collecting otoliths, halibut lengths, logbook information, and final landing weights. The collected data are used in stock assessment and other research and the collected otoliths provide age composition. Lengths of sampled halibut provide the basis for estimates of mean weight and, in combination with age data, size at age analyses. Mean weights are combined with final landing weights to estimate catch in numbers. Logbook information provides weight per unit effort data, fishing location for the landed weight, and data for research projects. Finally, tags are collected to provide information on migration, exploitation rates, and natural mortality.

Fishery background

Individual quota systems remained in place in Alaska and British Columbia during 2011. The commercial fisheries off Washington, Oregon, and California (Area 2A) were allocated catch limits by the Pacific Fishery Management Council (PFMC). The PFMC allocates halibut within Area 2A among the sport, commercial, and treaty Indian user groups using a Catch Sharing Plan (CSP). Due to the mechanisms in the PFMC CSP and the adopted total Area 2A catch limit, there was no non-treaty incidental halibut catch during the limited-entry sablefish (*Anoplopoma fimbria*) longline fishery in 2011. The Area 2A directed commercial fishery was restricted to waters south of Point Chehalis, Washington (46°53'18" N. latitude) while the treaty Indian tribes' commercial fisheries were prosecuted north of Point Chehalis.

Sampling objectives

The primary objective in sampling landings of commercially caught halibut is to obtain samples, composed of halibut length measurements and sagittal otoliths, that are representative of the total commercial halibut removals. To accomplish this, random sampling techniques are applied and an equal proportion of the catch is sampled within each regulatory area over the entire landing period, using prescribed sampling rates that vary among areas and sometimes ports. In addition to catch sampling, other objectives include copying information from fishing logs, along with the respective landed weights, for as many halibut trips as possible throughout the entire season and collecting recovered tags.

Inherent in the sampling program is the positioning of field sampling staff in ports where there is an opportunity to sample a majority of the catch for each regulatory area. To ensure that proportional sampling occurs by regulatory area and port, landing patterns are reviewed annually, sampling protocols are established based on the weights landed, and sampling days are assigned in each port. In some cases, different sampling rates for a given regulatory area are assigned by port. Finally, sampling priorities by regulatory area are assigned on a port level to address situations in which multiple concurrent landings preclude the International Pacific Halibut Commission (IPHC) port sampler's ability to obtain samples from all vessels.

Selection of sample days

Sampling protocols are designed to ensure as many landings as possible have a probability of being sampled so that the sampled halibut are a representative sample from the population of landed halibut. To this end, the weekly sampling schedule (Monday through Saturday) for each port was randomized so that catch landed on each day had an equal chance of being selected for sampling. A restriction to the weekly sampling schedule was that one day per week was set aside for logbook collection only. Regulatory Area 3A was sampled for fewer than five days per week to avoid oversampling, given that only a relatively small proportion of landings needed to be sampled in order to reach the established otolith targets (see later). Therefore, the sampling days for this area were a subset of the customary five sample days in a week. Since 2010, a subset of Sunday sampling days has also been added to the sampling schedules for all ports.

Small landings and Sunday sampling

Small landings were defined to be those under 3000 pounds in Homer and Sitka, under 2000 pounds in Juneau and Petersburg, and under 1000 pounds in all other ports. Samples typically were not taken from these landings in previous years, yet in some ports they contributed a substantial proportion of the total landed catch. For the most recent five years of sampling (2006 - 2010), the proportion of fish represented in small landings has ranged from over 20% in Sitka and St. Paul to consistently less than 0.4% in Seward and Prince Rupert (Table 1). To ensure samples are representative of the commercial catch, small landings have been sampled since 2010, in approximate proportion to their contribution to the catch. We sampled small landings at ports where small landings represented greater than 0.5% of all landings, on average, over recent years. The proportion of small landings to be sampled in each port was chosen to be as close as possible to the proportion of catch contained in small landings in recent years, so that sampling effort would be approximately proportional to the 2011 catch.

Sunday landings were first sampled in 2010. If, on average, fish landed on Sunday were no different from fish landed on other days of the week, this would not be a concern. A review of 2009 landing data showed two things: 1) that Sunday landings represented a significant portion, anywhere from 2 to 11%, of the total catch delivered into some key ports; and 2) that the average size of the landings was generally smaller on Sundays than on other days of the week. This implied that the nature of the fishing was different for fish landed on Sundays; therefore, it was possible that the catch composition also differed. Sampling on at least a random subset of Sundays allows us to assess whether the catch composition does differ and to avoid any potential bias in estimates that could occur if no Sunday sampling were performed. Upon reviewing 2010 and 2011 data (Tables 2a, b), Sunday-landed, sampled halibut did differ from those landed on other days of the week. In 2010, the Sunday samples showed that the average fork lengths of halibut from Areas 2B, 2C, 3A, and 3B were greater than those of halibut landed on other days of the week. The 2010 Sunday-landed, sampled halibut were generally younger than those landed on other days of the week. In 2011, Sunday-landed, sampled halibut from Areas 2A, 2B, and 3A were, on average, longer than the ones landed on other days of the week, while those from Areas 2C, 4A, and 4C were shorter. The difference in age, in 2011, was not as great as in 2010 and the trend of younger Sunday-landed, sampled halibut was not apparent.

Sampling rates and priorities

For all Area 2A-1 (treaty Indian) fisheries, the samplers in Westport, Neah Bay, Sequim/Port Angeles, Bellingham, and La Conner sampled as many landings as possible at a rate of 10% of the hailed weight from each trip. For the Area 2A non-treaty directed commercial fishery, the samplers in Newport, Oregon sampled at 15% of the hailed weight, sampling as many landings as possible. For Area 2B, samplers in all ports sampled at 1% of the hailed weight of each landing delivered per sampling day (subject to time constraints; detailed later), sampling five days per week. For Area 2C, samplers in all ports sampled five days per week at 6% of the hailed weight, with the exception of the sampler in Juneau, who sampled five days per week at 5% of the hailed weight and the sampler in Sitka, who sampled five days per week at 7.5% of the hailed weight. Differences in sampling rates among ports within regulatory areas were due to uneven distribution of projected landings among those ports.

For halibut captured in Area 3A, the samplers in all ports sampled at 1% of the hailed weight, sampling three days per week in all ports, with the exception of the sampler in Homer, who sampled five days per week. For fish captured in Area 3B, the samplers in all ports sampled five days per week at 1%.

For fish from Areas 4A, 4B, 4C, and 4D, all samplers sampled five days per week. A 5% sampling rate was used for Area 4A, 7% of the hailed weight for Area 4B, and 4% for Areas 4C and 4D. St. Paul and Dutch Harbor were the only exceptions: the catch landed in these ports that had been captured in Areas 4C and 4D was sampled four days per week at a rate of 4% of the hailed weight in St. Paul, and in Dutch Harbor five days per week at 6%.

Samplers used their own judgment, based on a hierarchy of objectives, about which landings to sample when there were conflicts that precluded sampling all of the landings prescribed by their sampling schedule. For example, it occurred frequently that more than one boat unloaded simultaneously from the same regulatory area. In such cases, the vessel with the higher poundage was usually sampled. In instances when this did not occur, a sampler may have been working, in a port with multiple offload facilities, at a facility where there was a constant stream of halibut offloads. The sampler therefore opted to stay at the one plant rather than travel to another location. Sampling conflicts also arose from simultaneous landings of halibut from different regulatory areas. Sampling priorities by regulatory Area were assigned to resolve these conflicts. In Alaskan ports and in Bellingham, Washington, Area 4 was sampled first, followed by Area 2C (and 2A in Bellingham), then Area 3B, and finally Area 3A. The priority scheme for Area 4 catches was to sample Area 4B first, followed by Areas 4C and 4D, and then Area 4A.

Otolith sampling targets

An objective of the catch sampling program is to collect a target number of otoliths and corresponding fish lengths from each regulatory area. Otolith sampling rates established to optimize work effort and achieve target sample sizes. In 2011, a target of $1,500 \pm 500$ otoliths and halibut lengths was set for each of Regulatory Areas 2B, 2C, 3A, 3B, 4A, 4B, and Areas 4C and 4D combined (Table 3 and Table 4). In Area 2A, the target was 1,000 otoliths with corresponding fork lengths. The Area 2A target was further subdivided to obtain adequate sample sizes from the Area 2A-1 treaty Indian fisheries and the directed commercial fishery, relative to each fishery component's proportion of the overall 2A catch limit. This division resulted in a target of 650 otoliths/lengths from the treaty Indian fishery and 350 otoliths/lengths from the non-treaty directed commercial fishery. The sampling rates detailed above were calculated to meet sampling targets and to obtain otoliths and data from an equal proportion of the catch within areas.

Modifications to sampled ports

Prior to the 2009 season we reviewed landings for 2007 and 2008, comparing sampled and unsampled ports by IPHC statistical area, to ascertain whether any statistical areas were being under-sampled. We found good coverage in Areas 2B, 2C, 3A, 4C, and 4D. However, there were statistical areas in Regulatory Area 3B where the proportion of landings into sampled ports was lower than their total contribution to the Area 3B harvest. In order to correct for this difference, the port of Sand Point, Alaska was staffed for three months during the 2009, 2010, and 2011 seasons. Table 5a-c illustrates the relative proportion of catch from selected statistical areas when Sand Point was staffed, versus when this port was not staffed, for 2009 to 2011. Staffing Sand Point in 2011 resulted in more representative sampling by statistical area than would have been possible without staffing Sand Point.

Sampling rate calculations

Sampling rate calculations, the actual 2011 average halibut weight, and the proportion of catch landed in sampled ports for 2011 for the different regulatory areas are shown in Tables 3 and 4. The rates were calculated by determining the average halibut weight for each area (\bar{w}) and multiplying that weight by the otolith target for each respective area (TSS) to obtain a sample size in pounds. For each area, the sample size was divided by the available catch limit set by the IPHC (CL), then divided by the proportion of landings that were expected to be landed in sampled ports (PS) based on 2010 landings; this yielded the overall ratio of the landings to be sampled by area in sampled ports (PG). This resultant ratio was then divided by the 2010 proportion of landed weights with otolith sampling (ps) to obtain the sampling rate (sr) for each area to be used in 2011. This rate was typically rounded to the nearest 0.5%, with 1% as a minimum rate.

$$PG = (TSS \cdot \bar{w}) / (PS \cdot CL)$$

$$sr = PG / ps$$

Relative to the rates calculated using the above formula, the Area 4A and 4B rates were raised to 5% and 7%, respectively, because Dutch Harbor was the only Area 4B port staffed in 2011 and the main Area 4A port, and to mitigate potential sampling conflicts among landings from different Bering Sea regulatory areas. Staffing other Area 4B ports is challenging, as landings are sporadic and infrequent. The sampling rate for Areas 4C and 4D was raised from its nominal level to 6% in Dutch Harbor to compensate for greater sampling conflicts that occur in this port due to large landings from Area 4A and 4B in combination with high sampling rates for these areas.

Sampling the Alaskan Individual Fishing Quota fishery

To meet Alaskan sampling objectives, the ports of Dutch Harbor, Kodiak, Homer, Seward, Juneau, Sitka, Petersburg, and Bellingham were staffed throughout the entire 2011 Individual Fishing Quota (IFQ) season (March 12 through November 18). St. Paul was staffed during the Area 4C Community Development Quota (CDQ) fishery from July 1 through September 30 and Sand Point was staffed from June through August. A sampling summary is presented in Table 6. Otolith and length samples for each Alaskan regulatory area met the targets, apart from Area 4B

which was slightly under. This was mainly due to the port of Dutch Harbor not being staffed for one month during the season because of unforeseen circumstances.

Table 7 presents the proportion of sampled weight to landed weight in each sampled port. In 2011, there was less variation in these proportions for each area among ports than occurred in 2010; the regulatory area information on the Prior Notice of Landing (PNOL) List aided in minimizing this variation. The PNOL List was compiled from National Oceanic and Atmospheric Administration (NOAA) Restricted Access Management Division data on vessels notifying NOAA's Office of Law Enforcement of their intention to land IFQ fish. The PNOL List included poundage of halibut and sablefish to be landed, by vessel name; the accompanying Alaska Department of Fish and Game number; the unloading port; and the unloading location, date, and time. The advance knowledge of which regulatory area the catch was coming from helped samplers set sampling priorities. For landings of catch taken from multiple regulatory areas, the knowledge of the amount of catch from each regulatory area for a given landing would further reduce these variations.

IPHC samplers copied approximately 2,550 Alaskan fishing logs from ports where the IPHC had a presence, and another 425 logs for Alaskan landings delivered to other ports (Table 8). Samplers had an opportunity to collect logs from other locations when they encountered transient halibut vessels in their own ports.

Sampling the Canadian Individual Vessel Quota fishery

IPHC samplers staffed the ports of Prince Rupert, Port Hardy, and Vancouver from March 12 through November 18, 2011. The samplers collected 1,376 otoliths, which fell within the target range of 1000-2,000 (Table 6). The landed weight represented by this otolith sampling accounted for almost one half of the coast-wide Area 2B landed weight. The number of otoliths collected decreased in 2011 compared to the number collected in 2010 (1,413 otoliths) largely due to lower proportions of sampled weight to weight landed in Prince Rupert (0.52) and Vancouver (0.61) in 2011 compared to 2010 (0.61 and 0.67, respectively) The percentage of the catch sampled in all of Area 2B in 2011 (46%; Table 6) was only one percent lower than in 2010. IPHC samplers collected 485 Canadian logs from ports where the IPHC has a presence, and another 40 logs for Canadian landings delivered to other ports in British Columbia (Table 7). Most of the Area 2B catch (91%) was landed in the three sampled Canadian ports (Table 3). The average proportion of sampled weight to landed weight in the three ports was 0.47.

Washington and Oregon

Treaty Indian managers worked cooperatively with the IPHC and sampled the Area 2A-1 catch. In the past, the Makah, Quinault, and Quileute tribes participated in the IPHC's sampling program. The Quileute tribe has not participated in the sampling program since 2002. Because of increased fishing in the Puget Sound, three more tribes, the Lummi, Swinomish, and Jamestown, collected logs and sampled for the first time in 2011. In 2011, the sampling target of 650 otoliths was met and exceeded (1,310) because of the participation of the three new tribes (Table 6). The Makah tribe collected almost 60% of the otoliths. Sampling by the tribes can only be done opportunistically and is dependent on availability of tribal fisheries staff; hence, greater contributions were obtained from some tribes than from others. The number of fishing logs collected increased substantially, from 15 in 2010 to 305 in 2011 (Table 8); once again, this was because of the greater number of tribes participating in the program in 2011.

The Area 2A non-treaty commercial sampling was conducted solely in Newport, Oregon in 2011, where the sampling target (350 otoliths) was met and exceeded, with 650 fish sampled. This occurred because the IPHC samplers collected otoliths from 42% of the catch landed in Newport (Table 6) during the two openings (June 29 and July 13). Typically, sampling also occurs in Bellingham, Washington during the incidental halibut catch in the limited-entry sablefish longline fishery; however, there was no poundage available to this fishery in 2011.

In 2011, the samplers collected 37 logs from the directed commercial fishery (Table 8), an increase from the 21 collected in 2010. This increase is largely due to the fact that there were two openings in 2011 compared to only one in 2010, despite the fact that there were fewer participants in the fishery in 2011 than in 2010.

Halibut tag collection

U.S. and Canadian samplers collected 26 wire tags in 2011. Three of these were from the double-tagging project carried out in the autumn of 2003, in which halibut were tagged with both a PIT tag and a wire tag. Tags from the wire/PIT double tag study were recovered in Port Hardy (two tags) and Prince Rupert (one tag). Nine tags from the 2010 Aleutian Island wire tag release were recovered in Dutch Harbor. One halibut with an attached PAT tag was redeemed in 2011 in Dutch Harbor. The PAT tag was deployed in 2009, but was damaged and failed to detach and pop up in 2010 as programmed. Port samplers collected nine tags from the 2009 Dummy Archival/wire double tag study: five in Kodiak and two each in Homer and Seward. Two Homer Derby tags were recovered: one in Homer (released in 2003) and one in Seward (released in 2005). One tag from the 1995 trawl mortality study was recovered in Sitka as well as a 'rogue' tag from an unauthorized halibut tag release. Tag data collected dockside included fork lengths, otoliths, and location of the recoveries. Additional wire tag information can be found within this volume (Forsberg, 2012).

References

Forsberg, J. E. 2012. Tagging studies. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2011: 471-474.

Table 1. Proportion of catch from small landings at IPHC-sampled ports.

Port	Reg Area*	2006	2007	2008	2009	2010	2011 proportion applied	No. small landing sampling days
Port Hardy	2B	0.3	0.4	0.5	0.9	1.0	1	2
Prince Rupert	2B	0.1	0.1	0.1	0.1	0.1	0	0
Petersburg	2C	5.2	4.9	5.3	5.9	8.1	6	8
	2C	12	12	13.8	18.4	20.2		
Sitka	3A	3.5	3.0	3.2	1.7	3.9	17	30
	2C	4.4	5.1	5.9	5.0	9.0		
Juneau	3A	0.8	0.8	1.0	1.0	1.8	7	11
Seward	3A	0.2	0.2	0.2	0.2	0.3	0	0
Homer	3A	2.0	1.8	1.4	1.5	1.5	1.5	3
	3A	0.8	1.0	0.7	0.7	0.7		
Kodiak	3B	0.1	0.1	0.1	0.1	0.1	1	2
Sand Point	3B	0.4	0.5	0.2	0.7	0.3	0	0
Dutch Harbor	4A	0.2	0.1	0.2	0.4	0.2	0	0
St Paul	4C	18.6	21.3	16.3	12.5	10.3	13	6

* "Reg Area" refers to the source of the landings, and data are only shown if there were at least ten small landings in one of the four years.

Table 2a. Mean fork length and mean age from halibut sampled on Sundays vs. other days of the week, 2010, by IPHC regulatory area.

Regulatory Area	Mean fork length (SE)	Mean fork length (SE)	Mean age (SE)	Mean age (SE)
	Sunday (cm)	Mon-Sat (cm)	Sunday (years)	Mon-Sat (years)
2A	94.5 (1.0)	94.1 (0.4)	11.4 (0.2)	11.4 (0.1)
2B	103.3 (4.3)	98.8 (0.5)	10.8 (0.3)	11.6 (0.1)
2C	110.8 (2.3)	104.7 (0.5)	12.0 (0.3)	12.2 (0.1)
3A	107.1 (3.0)	97.4 (0.3)	13.7 (1.0)	15.2 (0.1)
3B	98.8 (2.1)	95.9 (0.3)	11.3 (0.4)	12.8 (0.1)
4A	93.2 (1.7)	99.9 (0.4)	10.5 (1.7)	14.0 (0.1)
4B	-	107.5 (0.3)	-	16.4 (0.1)
4C	101.2 (3.4)	101.4 (0.5)	12.4 (0.7)	13.2 (0.1)
4D	100.2 (2.1)	102.8 (0.5)	14.2 (0.7)	16.2 (0.1)

Table 2b. Mean fork length and mean age from halibut sampled on Sundays vs. other days of the week, 2011, by IPHC regulatory area.

Regulatory Area	Mean fork length (SE)	Mean fork length (SE)	Mean age (SE)	Mean age (SE)
	Sunday (cm)	Mon-Sat (cm)	Sunday (years)	Mon-Sat (years)
2A	118.2 (4.0)	111.3 (1.0)	12.2 (0.5)	11.6 (0.1)
2B	101.3 (2.3)	97.8 (0.5)	12.3 (0.5)	11.8 (0.1)
2C	104.8 (2.4)	106.4 (0.6)	12.4 (0.4)	12.8 (0.1)
3A	99.6 (1.7)	95.6 (0.3)	15.0 (0.4)	15.0 (0.1)
3B	94.8 (1.5)	94.9 (0.4)	12.0 (0.3)	12.8 (0.1)
4A	99.2 (1.7)	103.7 (0.5)	15.5 (0.7)	15.6 (0.2)
4B	-	109.0 (0.7)	-	16.0 (0.2)
4C	97.7 (1.6)	100.3 (0.7)	17.2 (1.2)	12.6 (0.2)
4D	-	99.4 (0.5)	-	14.7 (0.2)

Table 3. 2011 otolith targets and data used in determining the sampling rates for IPHC Regulatory Areas 2B, 2C, 3A, and 3B.

	Regulatory Areas			
	2B	2C	3A	3B
Otolith target (no.)	1,500	1,500	1,500	1,500
2010 Average halibut weight (lbs)	22.52	27.29	20.85	19.67
Sample size (000 lbs)	33.8	40.9	31.3	29.5
2011 Catch limit (000 lbs)	6,730	2,330	14,360	7,510
2010 Landings into sampled ports (000 lbs)	6,020	3,184	16,924	8,840
Proportion landed in 2010 sampled ports	0.909	0.732	0.842	0.887
Overall ratio to be sampled in 2011	0.006	0.024	0.003	0.004
Proportion of 2010 landed weight with otolith sampling	0.521	0.410	0.251	0.401
Sampling ratio for estimated weight available for sampling in 2011	0.011	0.059	0.010	0.011
2011 Final sampling rates (%)	1.0	6.0	1.0	1.0
2011 Average halibut weight	21.55	28.46	19.44	18.86
2011 proportion landed in sampled ports	0.905	0.722	0.845	0.863

Table 4. 2011 otolith targets and data used in determining the sampling rates for IPHC Regulatory Areas 2A-1, 2A, 4A, 4B, and 4C&D.

	Regulatory Areas				
	2A-1	2A	4A	4B	4C&D*
Otolith target (no.)	650	350	1,500	1,500	1,500
2010 Average halibut weight (lbs)	19.51	16.95	22.85	29.67	24.58
Sample size (000 lbs)	12.7	5.9	34.3	44.5	36.9
2011 Catch limit (000 lbs)	293	159	2,410	2,180	3,380
2010 Landings into sampled ports (000 lbs)	110	80	1,499	836	2,460
Proportion landed in 2010 sampled ports	0.440	0.601	0.661	0.466	0.829
Overall ratio to be sampled in 2011	0.098	0.062	0.022	0.044	0.013
Proportion of 2010 landed weight with otolith sampling	0.920	0.643	0.546	0.765	0.394
Sampling ratio for estimated weight available for sampling in 2010	0.107	0.096	0.039	0.057	0.033
2011 Final sampling rates (%)	10	15	5.0	7.0	4.0
2011 Average halibut weight	17.76	17.43	25.98	31.12	22.62
2011 proportion landed in sampled ports	0.924	0.506	0.733	0.385	0.788

*4C&D includes CDQ

Table 5a. The proportion of IPHC Regulatory Area 3B catch that was landed from each of six statistical areas, including and excluding the port of Sand Point, Alaska in 2009.

Statistical Area	Proportion in sampled ports including Sand Point	Proportion in sampled ports excluding Sand Point	Proportion in all ports
290	43	48	42
300	24	26	23
310	11	11	11
320	16	11	15
330	4	3	7
340	1	2	3

Table 5b. The proportion of IPHC Regulatory Area 3B catch that was landed from each of six statistical areas, including and excluding the port of Sand Point, Alaska in 2010.

Statistical Area	Proportion in sampled ports including Sand Point	Proportion in sampled ports excluding Sand Point	Proportion in all ports
290	37	46	36
300	23	26	21
310	11	10	11
320	24	15	22
330	3	2	6
340	2	2	5

Table 5c. The proportion of IPHC Regulatory Area 3B catch that was landed from each of six statistical areas, including and excluding the port of Sand Point, Alaska in 2011.

Statistical Area	Proportion in sampled ports including Sand Point	Proportion in sampled ports excluding Sand Point	Proportion in all ports
290	33	46	32
300	19	24	17
310	14	12	13
320	23	8	20
330	6	5	11
340	4	5	7

Table 6. Summary of 2011 otolith targets, collected otoliths, vessels sampled and the percentage of the total landed weight, represented by the weight of landings from which otoliths were sampled.

Regulatory Area	Otolith Target	Collected otoliths	No. landings sampled	% of catch sampled-lbs
2A-1	650	1,310	153	56
2A	350	650	35	42
2B	1,500	1,376	148	46
2C	1,500	1,120	60	26
3A	1,500	2,199	139	29
3B	1,500	1,338	81	35
4A	1,500	1,373	41	28
4B	1,500	858	14	17
4C&D	1,500	1,654	52	27
Totals	11,500	11,878	723	32

Table 7. Proportion of total 2011 halibut landings represented by the weight of landings from which otoliths were sampled, separated by IPHC Regulatory Area, and listed by key ports.

Port	2A	2B	2C	3A	3B	4A	4B	4C&D
Newport	0.83							
Neah Bay	0.86							
Bellingham	0.32		0.51	0.62				
Vancouver		0.61						
Port Hardy		0.48						
Prince Rupert		0.52						
Petersburg			0.40	0.28				
Sitka			0.35	0.35				
Juneau			0.27	0.28				
Seward				0.37	0.82	1.00		
Homer				0.42	0.44	1.00		
Kodiak				0.19	0.29	0.21		0.88
Dutch Harbor					0.31	0.38	0.43	0.37
Sand Point					0.42		1.00	1.00
St. Paul								0.29

Table 8. The number of halibut fishing logs collected from landings into key ports in 2011, as well as the total number of logs collected from all ports.

Port	United States	Canada	
Newport	37		
Neah Bay	32		
Bellingham	247		
Port Hardy		254	
Prince Rupert		201	
Vancouver		30	
Petersburg	174		
Sitka	306		
Juneau	146		
Seward	275		
Homer	429		
Kodiak	486		
Dutch Harbor	163		
Sand Point	134		
St. Paul	409		
			Grand total
Total key ports	2,838	485	3,323
Total all ports	3,264	525	3,789