

Cruise report for the 2008 NMFS Bering Sea trawl survey

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Abstract

The IPHC has participated in the NMFS annual Bering Sea shelf trawl survey since 1998. The 2008 survey took place from June 4 to July 28 and included two vessels. One vessel had an IPHC sampler that assessed Pacific halibut for length, otoliths, gender, maturity, and prior hooking injuries, resulting in 1,570 samples. In addition, all halibut greater than 55 cm fork length were scanned for PIT tags.

Introduction

In 2008 the International Pacific Halibut Commission (IPHC) participated in the National Marine Fisheries Service (NMFS) annual Bering Sea shelf trawl survey for the eleventh straight year. The survey is a continuation of a time series started in 1975, and continued annually since 1979.

Two chartered fishing vessels were each staffed by six scientific crew who carried out objectives related to stock assessment and year-class strength for numerous species. An IPHC biologist was aboard one vessel for the duration. The objective was to collect Pacific halibut (*Hippoglossus stenolepis*) data and assist the NMFS in attaining survey goals.

Objectives

The IPHC objective was to sample 100% of the halibut caught on the IPHC-staffed vessel for length, gender, maturity, otoliths, and prior hooking injuries. In addition, all halibut ≥ 55 cm fork length were scanned for PIT tags. Data collected on the trawl survey along with IPHC setline survey data and commercial catch information were used to create abundance estimates and map year-class strengths. The information on prior hooking injuries was used to supplement data for an IPHC special project also described in this report.

The primary NMFS objective was to continue the annual series of crab and groundfish assessment surveys for the eastern Bering Sea to provide information for:

- the North Pacific Fishery Management Council on the distribution, abundance, and biological condition of important groundfish and crab resources;
- the U.S. fishing industry on catch-per-unit effort and size composition; and
- the support of ongoing studies on the biology, behavior, and dynamics of key ecosystem components.

Survey area, vessels, and itinerary

The survey spanned a geographical region from the eastern Bering Sea continental shelf from inner Bristol Bay to the shelf break, and between Unimak Pass to north of St. Matthew Island (Fig. 1). Two vessels were chartered by NMFS: *F/V Aldebaran* and *F/V Arcturus*. An IPHC biologist was aboard the *Aldebaran* for the duration of the charter.

The scientific crew boarded the *Aldebaran* on May 30, where the first several days were spent setting up gear and testing equipment. The first standard survey tow was conducted on June 4, and the final regular tow took place on July 24. On July 26, both vessels returned to Dutch Harbor for the conclusion of the charter.

Survey design

The survey consisted of 376 stations positioned on a 20 nmi x 20 nmi grid on the continental shelf in the eastern Bering Sea, in depths ranging from 30-200 m. In areas surrounding St. Matthew and the Pribilof Islands, grid block corners were also sampled to better assess blue king crab (*Paralithodes platypus*) concentrations. Survey sampling began in Bristol Bay and progressed westward toward the EBS outer shelf along alternate grid columns.

A NMFS 83-112 Eastern trawl, which has a 25.3-m (83 ft) headrope and 34.1-m (112 ft) footrope, was used. The net was attached to 54.9-m (30 fathoms) paired dandyline. Each lower dandyline had a 0.61-m chain extension connected to the lower wing edge to improve bottom tending characteristics. Steel “V”-doors measuring 1.8 x 2.7 m and weighing 816 kg were used to spread the net. Equipment that recorded data about each tow was attached to the trawl net: net mensuration equipment recorded net height and width while fishing; a Seabird data logger recorded temperature and depth; and a tilt sensor was used to detect when the footrope was in contact with the bottom.

Halibut sampling

Halibut were sampled for length on all standard survey tows aboard both vessels. Halibut from tows aboard the *F/V Aldebaran* were additionally sampled for otoliths, gender, maturity, prior hooking injuries, and scanned for PIT tags if ≥ 55 cm. Halibut caught in tows at the corner crab stations, the duplicate tows, and all tows aboard the *F/V Arcturus* were excluded from the individual specimen sampling but were measured and scanned, then discarded alive if possible.

A determination of gender and maturity was made for each sampled halibut. Female fish were assessed with four stages of maturity: immature, ripening, ripe/spawning, and spent/resting. Males had only two maturity stages: immature and mature. Immature for both genders meant that the fish would not participate in the upcoming spawning season. The other stages represented various phases of the spawning process and fish in those categories were considered mature enough that they could participate in the upcoming spawning season.

Information concerning injuries to the mouth, jaw, or eye caused from longline gear has been collected in recent years as part of an IPHC special project. The objective was to assess the types of hooking injuries a fish might sustain and still survive. Results from this project can be found in Kaimmer and Leickly (this volume).

Results

The *F/V Aldebaran* performed 207 standard tows, and three additional tows which were deemed unusable. On average, four to six tows were conducted daily. In total, 1,711 halibut were captured and sampled: 1,119 on trip one, 478 on trip two, and 114 on trip three. Of those sampled, 868 were female, 841 were male, and two were unidentified. Table 1 shows the number of halibut sampled for each length category and gender, and Table 2 shows maturity by length.

Prior hooking injuries were found on 2.4% of the fish; 18 showed minor damage, 23 showed moderate damage, and none was severely damaged.

All halibut encountered that were ≥ 55 cm fork length were scanned for PIT tags regardless of whether they fell within the otolith sample. In all, 375 halibut were scanned and no tags were detected. For more information on the PIT tag project see Forsberg, this volume.

References

- Forsberg, J. E. 2009. Portside and survey vessel sampling for recovered PIT tags in Pacific halibut. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2008 403-430.
- Kaimmer, S. M., and Leickly, R. C. 2008. Prior hook injuries: results from the 2007 IPHC SSA and NMFS surveys. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2007: 497-508.
- Sadorus, L. L. and Wilkins, M. 2008. Cruise report for the 2007 NMFS Gulf of Alaska Trawl Survey. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2007: 533-542.

Table 1. Number of halibut sampled by 5-cm length category and gender (Female (F), Male (M), Unidentified (U)) for all standard sampled stations in the 2008 NMFS Bering Sea trawl survey.

Length (cm)	Trip 1			Trip 2			Trip 3			Grand Total
	F	M	U	F	M	Total	F	M	Total	
10-14	2	2	4							4
15-19	13	12	26							26
20-24	24	28	53		1	1		1		55
25-29	127	115	242	6	3	9	6	3	9	260
30-34	90	92	182	21	7	28	1	1	2	212
35-39	46	67	113	27	25	52	2	2	2	167
40-44	69	100	169	58	51	109	7	4	11	289
45-49	31	48	79	42	48	90	5	3	8	177
50-54	45	33	78	26	23	49	4	4	8	135
55-59	19	31	50	16	21	37	5	3	8	95
60-64	26	23	49	15	13	28	4	6	10	87
65-69	15	13	28	15	11	26	8	4	12	66
70-74	16	5	21	9	7	16	5	2	7	44
75-79	11	3	14	8	4	12	4	3	7	33
80-84	5	3	8	6	1	6	2	3	5	19
85-89		1	1	3	1	4	4	2	6	11
90-94			2	2	2	4	1	1	2	6
95-99	2				1	1	5	4	9	12
100-104							2	1	3	3
105-109				3	1	4	3		3	7
110-114					1	1				1
115-119				1		1	1		1	2
Grand Total	541	576	1,119	258	220	478	69	45	114	1,711

Table 2. Maturity of Pacific halibut caught on the NMFS BS trawl survey in 2008 as assessed by the IPHC sea sampler. For females: 1 = immature, 2 = ripening, 3 = ripe/spawning, and 4 = spent/resting. For males: 1 = immature and 2 = mature.

Length	Females			Males			Grand Total
	1	2	Total	1	2	Total	
10-14	2		2	2		2	4
15-19	13		13	12		12	26
20-24	24		24	30		30	55
25-29	139		139	121		121	260
30-34	112		112	99	1	100	212
35-39	75		75	84	8	92	167
40-44	134		134	118	37	155	289
45-49	78		78	51	48	99	177
50-54	75		75	33	27	60	135
55-59	40		40	18	37	55	95
60-64	45		45	12	30	42	87
65-69	38		38	2	26	28	66
70-74	30		30		14	14	44
75-79	23		23		10	10	33
80-84	13		13		6	6	19
85-89	7		7		4	4	11
90-94	3		3		3	3	6
95-99	7		7		5	5	12
100-104	2		2		1	1	3
105-109	3	3	6		1	1	7
110-114					1	1	1
115-119	1	1	2				2
Grand Total	864	4	868	582	259	841	1,709

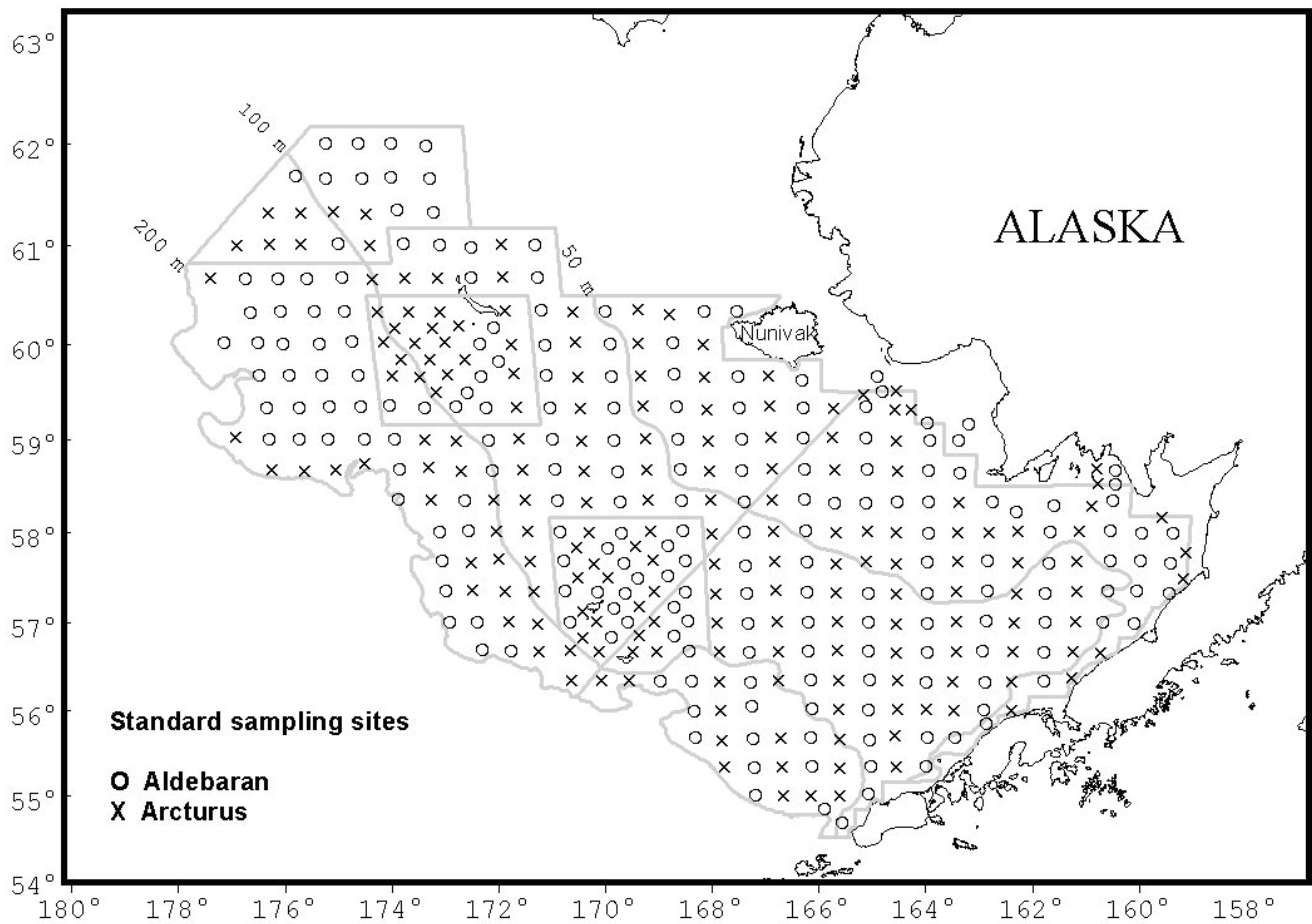


Figure 1. Stations fished for the Bering Sea NMFS bottom trawl survey in 2008. Note that due to in-season adjustments, vessel designations for each station may not be accurate.