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(PATINOPECTEN CAURINUS) FISHERY OFF YAKUTAT ALASKA

JULY 1993

Observations were carried out aboard two commercial vessels participating in the Yakutat area scallop fishery which opened on July 1, 1993. The F/V Provider conducted fishing operations near Mt. St. Elias and Icy Bay whereas the F/V Carolina Girl II conducted fishing operations off the mouth of the Dangerous River. Both vessels used two 15' New Bedford type scallop dredges fabricated with 4" internal diameter steel rings. The dredges on the F/V Provider did not have chaffing gear of any type whereas the dredges on the F/V Carolina Girl II had "split tires" on the lower part of the chain bag. Neither dredge used "donut spacers" in the apron or in any other part of the dredge. A summary of vessel operations is presented in Table I. Vessel harvesting operations for both vessels were similar with catch rates of approximately 0.6 baskets of scallop shellstock per minute of towing time. Notable differences in vessel operations related to vessel configuration (eastern versus western rig), freezer processing versus ice stowage and crew experience. The F/V Provider and crew had previous experience operating in the Alaskan scallop fishery whereas the F/V Carolina Girl II was on its maiden trip in the Alaskan fishery. Harvest rates, although variable, did not demonstrate trends that would indicate decreasing stock abundance during the course of the July quota period. During July 4-16, 1993, the F/V Carolina Girl II operated in virtually the same spot using approximately the same tow tract with variations in turning and the direction of the tow with consistent catch rates. Sixty minute tows consistently averaged 40 baskets/tow throughout this period. Harvest rates on the F/V Provider operating near Mt. St. Elias showed no decline after three days of fishing operations.

Shell height frequency distribution of scallops in the Dangerous River area indicate several successive year classes in the population; YC1 + approx. 32mm, YC2 + approx. 52mm, YC3 + approx. 72mm, YC4 + approx. 92mm. A similar shell-height frequency distribution was not found in the Icy Bay resource area with only a few individuals in the 32-37mm size range and in the 72mm size range. With 4" dredge rings, it is difficult to assess the abundance of scallops less than 90mm, however the use of a survey dredge with 2" rings probably would be more effective for a resource survey.

Observations of scallop gonad conditions, indicated that nearly all had recently spawned. Gonads were translucent and absent of any coloration as an indicator of sex. Only two individuals were observed with gonads that were partially spent. Based on several years of data on the timing and frequency of gonad maturation and spawning for the Atlantic sea scallop, (Placopecten magellanicus), the spawning event for Patinopecten caurinus is, in comparison, highly synchronous. Consequently, shell

height frequency distributions could be a good indicator of year class survival or strength for ages one to four.

Shell Height Frequency

At the end of each tow that was sampled, the crew was allowed to select scallops which would be retained for shucking. The quantity of retained scallops was determined by counting the number of baskets (1.5 bu) in each tow. A sub-sample of 2 or 3 baskets were set-aside for shell height determination. Discarded scallops (those not retained by the crew) were collected from the deck and set-aside for shell height determination. Depending upon the number of discards, sampling constituted all of the remaining scallops or in some cases, one-half of those scallop left on deck. Shell height (SH) was determined at 5 mm intervals using an automatic scallop measuring/counting device (NMFS, Woods Hole, MA).

The dominant size (SH) of scallops in the commercial fishery in the Icy Bay resource area was in the 110-120 mm range and accounted for 54% of the total catch. In contrast, the dominant size in the Dangerous River resource area was 105-115 mm and accounted for 39% of the total catch. In addition, the Dangerous River resource area had 14% of the total catch in the 125-140 mm range whereas in the Icy Bay resource area, 125-140 mm scallops accounted for 9% of the total catch. In comparing the size frequency of scallops harvested in two resource areas by two different vessels, it should be understood that these differences could also reflect the differential selectivity of the gear, the vessel or both.

Nonetheless, the frequency distribution of commercially harvested scallops could provide useful information in managing the stock by resource area. As indicated by scallop meat yields of various size scallops in the Dangerous River resource area (Table 4) it would make little sense to harvest a particular resource area when the predominant size of the scallops are in the 90-110 mm range or smaller.

Meat Counts

Meat counts (meats per pound) were determined by counting the number of scallops meats in a "standard" nine ounce frosting cup which approximately one pound of scallops when filled. Average meat counts represents the mean of five countings. Meat counts for 10 mm shell height intervals were determined by sorting 86 to 299 scallops for each size interval. Scallops were shucked and meats counted using a frosting cup; average meat counts represents the mean of five countings . Yields were calculated by using shell height frequency data and meat counts for 10 mm shell height intervals.

Acknowledgements

The author wishes to thank Captain Juan Araiza of the F/V Carolina Girl II and Captain Mark Kandianis of the F/V Provider and crews for their cooperation during this study. Special appreciation is given to the staff at the Alaska Department of Fish and Game Station in Yakutat for their fine hospitality and assistance. Funding for this study was provided by the Alaska Sea Grant College Program, the Virginia Sea Grant College Program and the Alaska Department of Fish and Game.

TABLE 1

Summary of vessel operations during July 1993
Yakutat, Alaska scallop fishery

F/V Provider: July 1-3, 1993; Mt. St. Elias - Icy Bay
59° 44' N 141' 41° W - 59° 58' N 142' 24° W

	ALL TOWS (N=42)		SAMPLED TOWS* (N=7)	
	RANGE	MEAN	RANGE	MEAN
Tow Time (min)	37 - 85	56	50 - 69	56.0
Tow Speed (kn)	4.6 - 5.0	4.6	4.7 - 5.0	4.9
Depth (fm)	36 - 40		37 - 40	
Catch/Tow (baskets**)	8 - 63	32.9	17 - 56	34.6
Catch/Min. Tow Time	0.14 - 1.13	0.59	0.41 - 0.94	0.61

F/V Carolina Girl II: July 4-6, 1993; Dangerous River
59° 18' N 139° 24' W

	ALL TOWS (N=21)		SAMPLED TOWS* (N=7)	
	RANGE	MEAN	RANGE	MEAN
Tow Time (min)	15 - 80	56	44 - 60	57.6
Tow Speed (kn)	4.5 - 5.5	5.2	5.4 - 5.5	5.5
Depth (fm)	49 - 60		49 - 60	
Catch/Tow (baskets**)	18 - 47	35.4	25 - 45	34.8
Catch/Min. Tow Time	0.32 - 1.20	0.64	0.33 - 0.75	0.61

* Shell height of retained and discarded scallops.

** One basket = 1.5 bushel.

TABLE 2.

Size composition of Alaskan sea scallops *Patinopecten caurinus* harvested in the Icy Bay resource area near Mt. St. Elias. Scallops were grouped at shell heights in 5 mm intervals. Discards are scallops not retained by crew for shucking.

Midpoint	Retained	Discards	Total	%
2	0	0	0	0
7	0	0	0	0
12	0	0	0	0
17	0	0	0	0
22	0	0	0	0
27	0	0	0	0
32	0	4	4	0.01
37	0	1	1	0
42	0	0	0	0
47	0	0	0	0
52	0	0	0	0
57	0	0	0	0
62	0	1	1	0
67	0	6	6	0.02
72	0	25	25	0.06
77	0	24	24	0.06
82	0	12	12	0.03
87	20	18	38	0.1
92	118	39	157	0.4
97	401	67	468	1.2
102	1730	127	1857	4.78
107	5058	180	5238	13.48
112	10279	163	10442	26.87
117	10389	98	10487	26.99
122	4964	40	5004	12.88
127	1758	2	1760	4.53
132	938	0	938	2.41
137	783	0	783	2.02
142	679	0	679	1.75
147	347	0	347	0.89
152	156	0	156	0.4
157	158	0	158	0.41
162	96	0	96	0.25
167	139	0	139	0.36
172	21	0	21	0.05
177	15	0	15	0.04
Totals	38049	807	38856	100

TABLE 3.

Size composition of Alaska sea scallops *Patinopecten caurinus* harvested in the Dangerous River resource area near Yakutat, Alaska. Scallops were groups at shell heights in 5 mm intervals. Discards are scallops not retained by crew for shucking.

Midpoint	Retained	Discards	Total	%
2	0	0	0	0
7	0	0	0	0
12	0	0	0	0
17	0	0	0	0
22	0	6	6	0.01
27	0	66	66	0.16
32	0	144	144	0.35
37	0	70	70	0.17
42	0	32	32	0.08
47	0	108	108	0.26
52	0	274	274	0.66
57	0	228	228	0.55
62	0	126	126	0.3
67	0	114	114	0.27
72	0	166	166	0.4
77	15	142	157	0.38
82	333	120	453	1.09
87	809	138	947	2.28
92	801	78	879	2.11
97	1509	56	1565	3.76
102	5424	96	5520	13.28
107	8020	42	8062	19.39
112	8072	34	8106	19.5
117	4767	6	4773	11.48
122	3293	2	3295	7.93
127	2533	2	2535	6.1
132	2087	0	2087	5.02
137	1139	0	1139	2.74
142	496	0	496	1.19
147	131	0	131	0.32
152	91	0	91	0.22
157	0	0	0	0
Totals	39520	2050	41570	100

TABLE 4.

Meat counts (meats per pound, MPP) for selected shell height intervals of scallops harvested in the vicinity of the Dangerous River, Yakutat, Alaska
Depth range: 49 - 60 fms

Shell Height (mm)	N	Average Meat Count MPP**	Range
90-100	140	63.2	62 - 64
100-110	229	46.6	45 - 48
110-120	167	37.0	35 - 40
120-130	132	29.0	28 - 30
130-140	86	23.0	22 - 24

* Average of five counts.

FIGURE 1.

Percent composition of shell height frequencies of Alaska sea scallops *Patinopecten caurinus* harvested in two resource areas during July 1993. Data is from a series of tows by a commercial scallop vessel using 15 ft. dredges constructed with 4.0 inch internal diameter rings.
Mt. St. Elias - Icy Bay N = 7 tows; Dangerous River N = 7 tows.

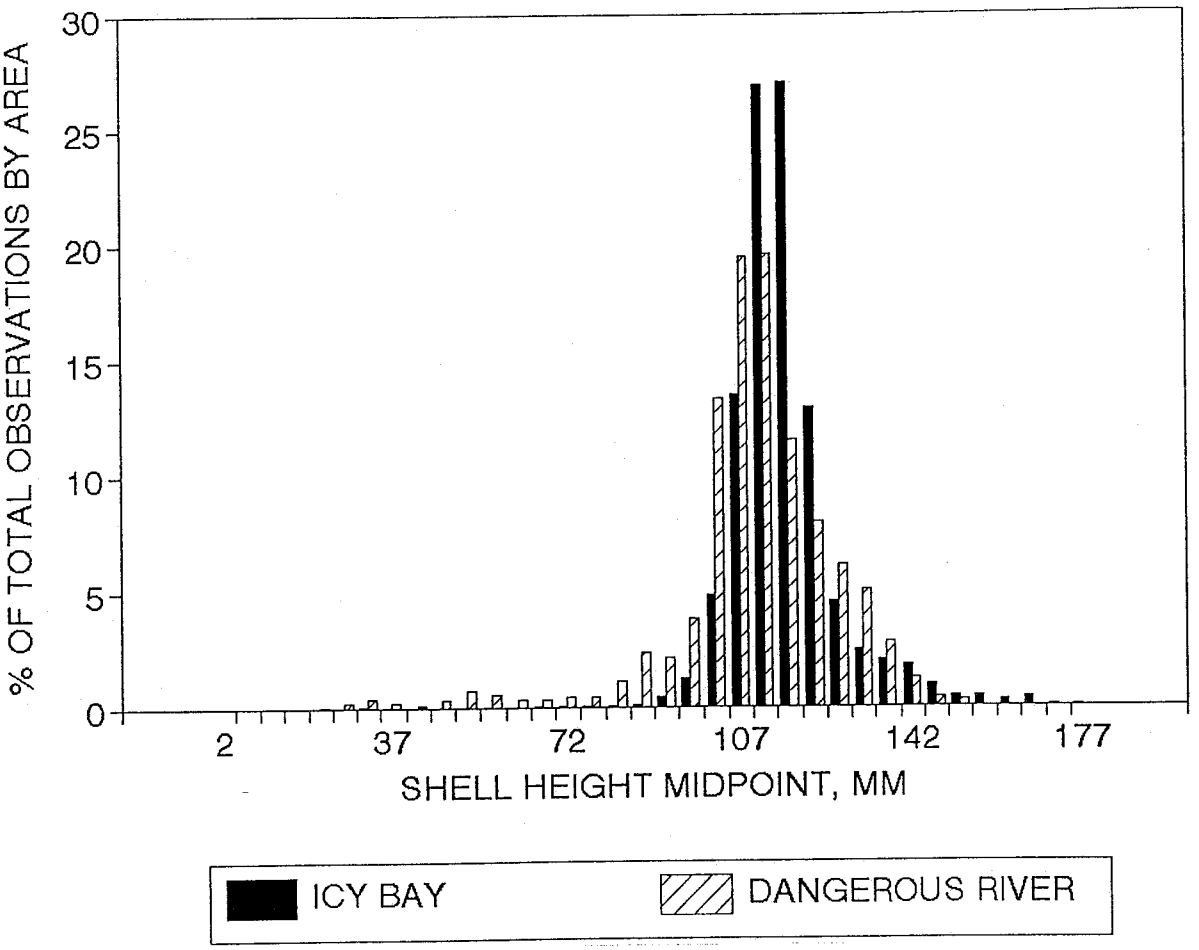

FIGURE 2.

Shell height frequency distribution of Alaska sea scallops *Patinopecten caurinus* harvested in two resource areas during July 1993. Data is from a series of tows by a commercial scallop vessel using 15 ft. dredges constructed with 4.0 inch internal diameter rings. Mt. St. Elias - Icy Bay N = 7 tows; Dangerous River N = 7 tows.

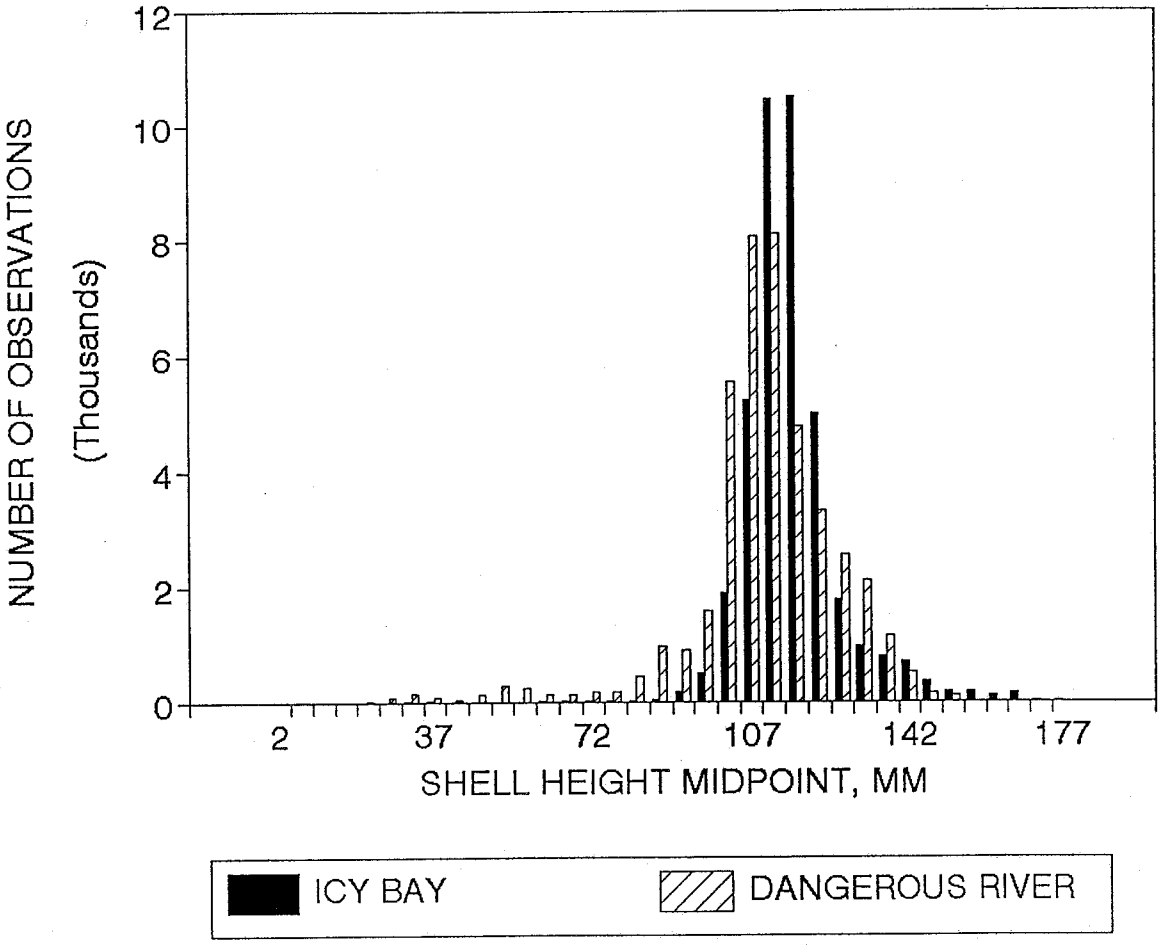

FIGURE 3.

Size composition of Alaskan sea scallops *Patinopecten caurinus* harvested in the Icy Bay resource area near Mt. St. Elias. Scallops were grouped at shell heights in 5 mm intervals. Discards are scallops not retained by crew for shucking.

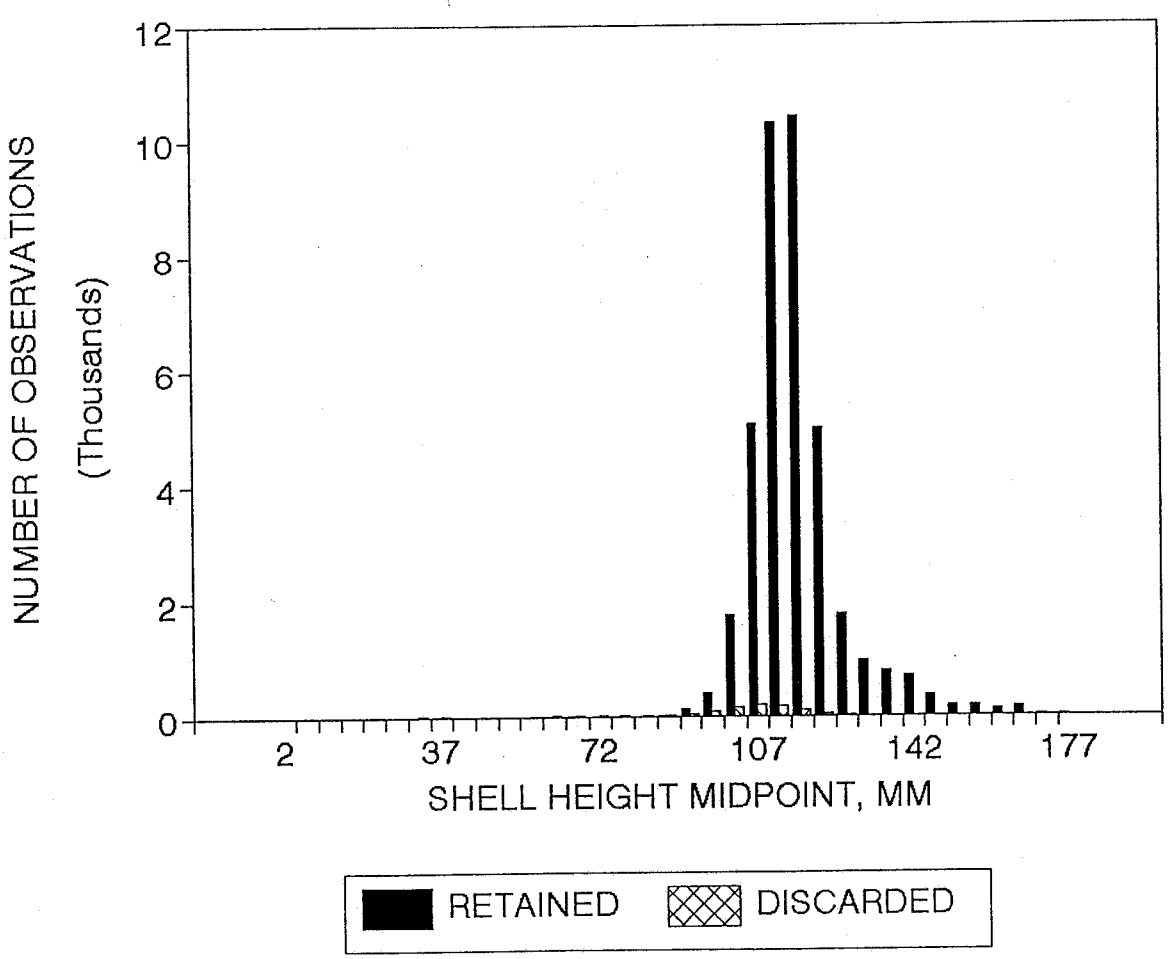

FIGURE 4.

Size composition of Alaska sea scallops *Patinopecten caurinus* harvested in the Dangerous River resource area near Yakutat, Alaska. Scallops were grouped at shell heights in 5 mm intervals. Discards are scallops not retained by crew for shucking.