ADF&G TECHNICAL DATA REPORT NO. 11
(Limited Distribution)

STATE OF ALASKA
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AGE, SEX AND SIZE COMPOSITION OF PACIFIC HERRING, (Clupea pallasii), FROM SOUTHEASTERN ALASKA DURING WINTER AND SPRING, 1970-1971

By:
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1973

ALASKA DEPARTMENT OF FISH AND GAME
Subport Building, Juneau, Alaska 99801

James W. Brooks
Commissioner

ADF&G TECHNICAL DATA REPORTS

This series of reports is designed to facilitate prompt reporting of data from studies conducted by the Alaska Department of Fish and Game, especially studies which may be of direct and immediate interest to scientists of other agencies.

The primary purpose of these reports is presentation of data. Description of programs and data collection methods is included only to the extent required for interpretation of the data. Analysis is generally limited to that necessary for clarification of data collection methods and interpretation of the basic data. No attempt is made in these reports to present analysis of the data relative to its ultimate or intended use.

Data presented in these reports is intended to be final, however, some revisions may occasionally be necessary. Minor revision will be made via errata sheets. Major revisions will be made in the form of revised reports.

AGE, SEX AND SIZE COMPOSITION OF PACIFIC HERRING, Clupea pallasii, FROM SOUTHEASTERN ALASKA DURING WINTER AND SPRING, 1970-1971

By

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INTRODUCTION

This represents the first in a series of reports designed to annually discuss condition of Southeastern Alaska herring, (Clupea pallasii) stocks as determined by age composition and recruitment within those stocks. The format of this report is intended to provide the basis for the discussion of stock trends as additional years' data are acquired.

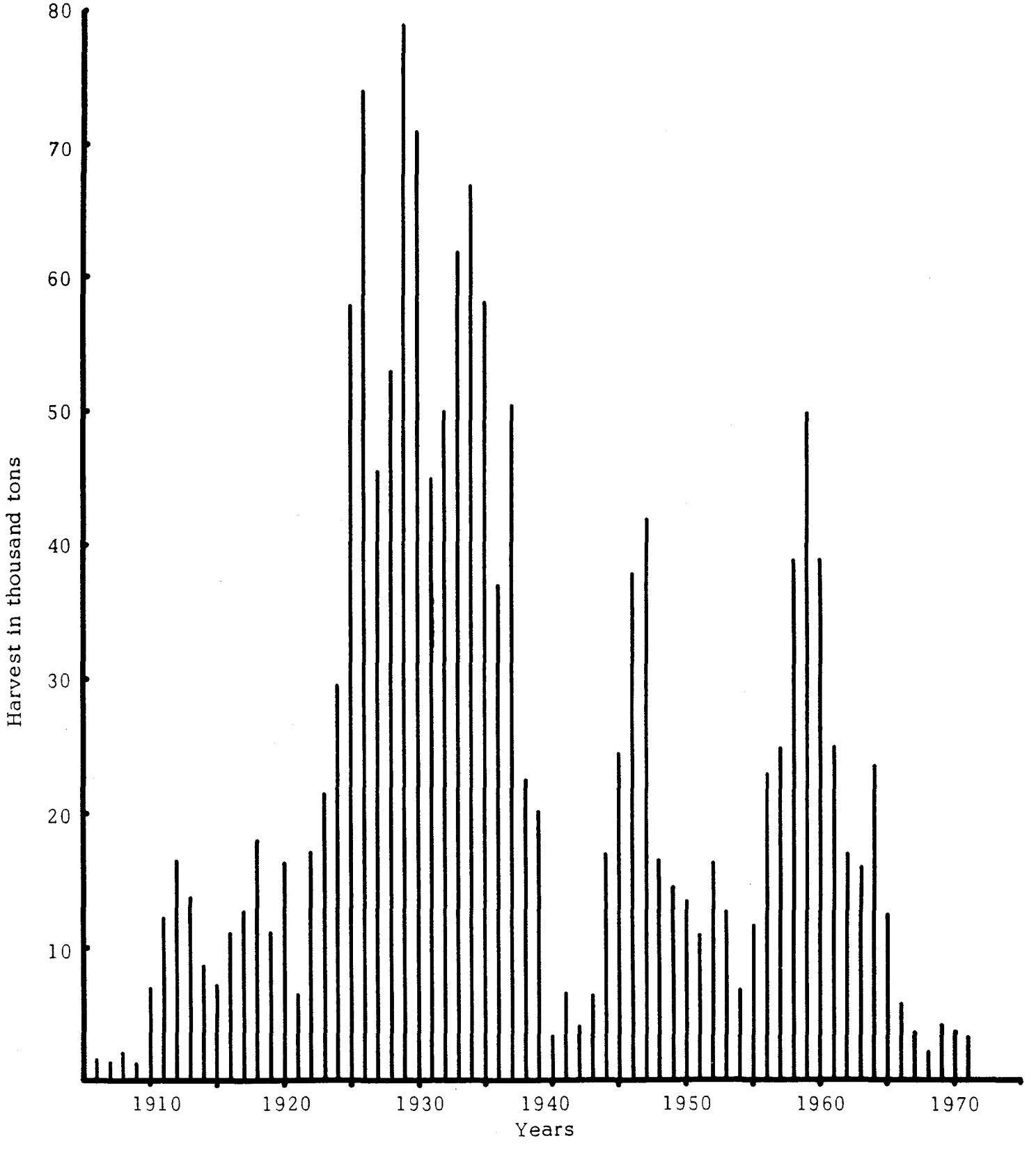
Historical Use of Stocks

Herring have been an important commercial fish in Southeastern Alaska since the early 1900's. In 1900, nearly 1,200 short tons were harvested (Figure 1). Catches climbed to 73,843 tons by 1926 and in 1929 reached the highest peak ever recorded for Southeastern Alaska of 78,749 tons (Skud, et al., 1960). The harvest dropped to a low of 3,137 tons in 1940. Following another low of 6,446 tons in 1954, catches again rose to 49,866 tons in 1959. In 1968, the lowest harvest since 1909 was recorded at 1,816 tons. The 1971 catch was just under 3,000 tons.

Herring were primarily utilized for reduction purposes during the years prior to 1967. Fishing effort decreased as reduction plants were phased out of existence by competition from foreign fisheries.

Relatively few stocks of Southeastern Alaska herring are presently fished. In recent years, demand for herring has been largely restricted to bait needs, although an upturn in their use for human consumption is anticipated.

Figure 1. Annual harvests of Southeastern Alaska herring.



Description of Present Fishery

Southeastern Alaska herring fisheries are regulated by fishing district. Seasons and quotas as defined for the 1970-71 fishing season are the principal management tools (Table 1). The fisheries are conducted with purse seines and stationary pound nets during the winter and early spring months. Nineteen seine vessels and two herring pounds participated in the fishery during 1970-71. Fisheries operated in the vicinities of Ketchikan, Wrangell, Petersburg, Sitka, and Juneau and some exploratory fishing was done in Yakutat Bay (Figure 2). The major 1970-71 herring harvests came from Carroll Inlet near Ketchikan, Sitka Sound Bay near Sitka and Auke Bay near Juneau (Table 2).

Biological Studies

The Department of Fish and Game recognizing the revival of commercial interest in herring began a study of Southeastern Alaska herring stocks in 1969. This study was not the first conducted in the region, for herring have been studied in Southeastern Alaska for more than half a century. In the 1930's, the life history and stock separation studies were dominant (Rounsefell, 1929, 1930, and 1931; Rounsefell and Dahlgren, 1935). Studies of the 1940's included those of abundance predictions (Dahlgren and Kolloen, 1943 and 1944), while the later studies of the 1950's and 1960's concentrated on fishery statistics (Skud, Sakuda and Reid, 1960) and aerial surveys of spawning herring (Skud, 1969; Montgomery, 1959). These studies represent only part of the literature available on Southeastern Alaska herring.

Our herring studies now consist of two phases. One phase utilizes special hydroacoustical gear aboard a State vessel to locate and obtain biomass estimates for fish which are congregated in large wintering schools. A second phase, which is reported here, is directed toward annually sampling known stocks for the determination of age, sex and size composition of fish within each stock. This study phase is concerned with recruitment as an indication of stock condition, and mortality of individual age groups. These objectives are intended to provide data directly applicable to management decisions.

Recruitment to the adult population occurs at ages 2, 3 and 4 for Southeastern Alaska herring. Immatures appear to school separately and are not pursued by the commercial fishery. Most fish are mature at age 4, and it is that group which best depicts relative strength of each particular year class.

Table 1. Southeastern Alaska and Yakutat herring fishery regulations, 1970-1971.

District	Season	Quota
1-9, 12, 14-16	June 1 February 28	None
10	No closed season. Quota applies during spawning period.	Not more than 200 short tons, March 1 - May 31.
11	No closed season. Quota applies during spawning period.	Not more than 750 short tons, March 1 - May 31.
13	Season closed upon obtaining quota.	During any calendar not more than 750 tons. District 13B, not more than 100 short tons. Remainder of District 13.
Yakutat	No closed season.	None

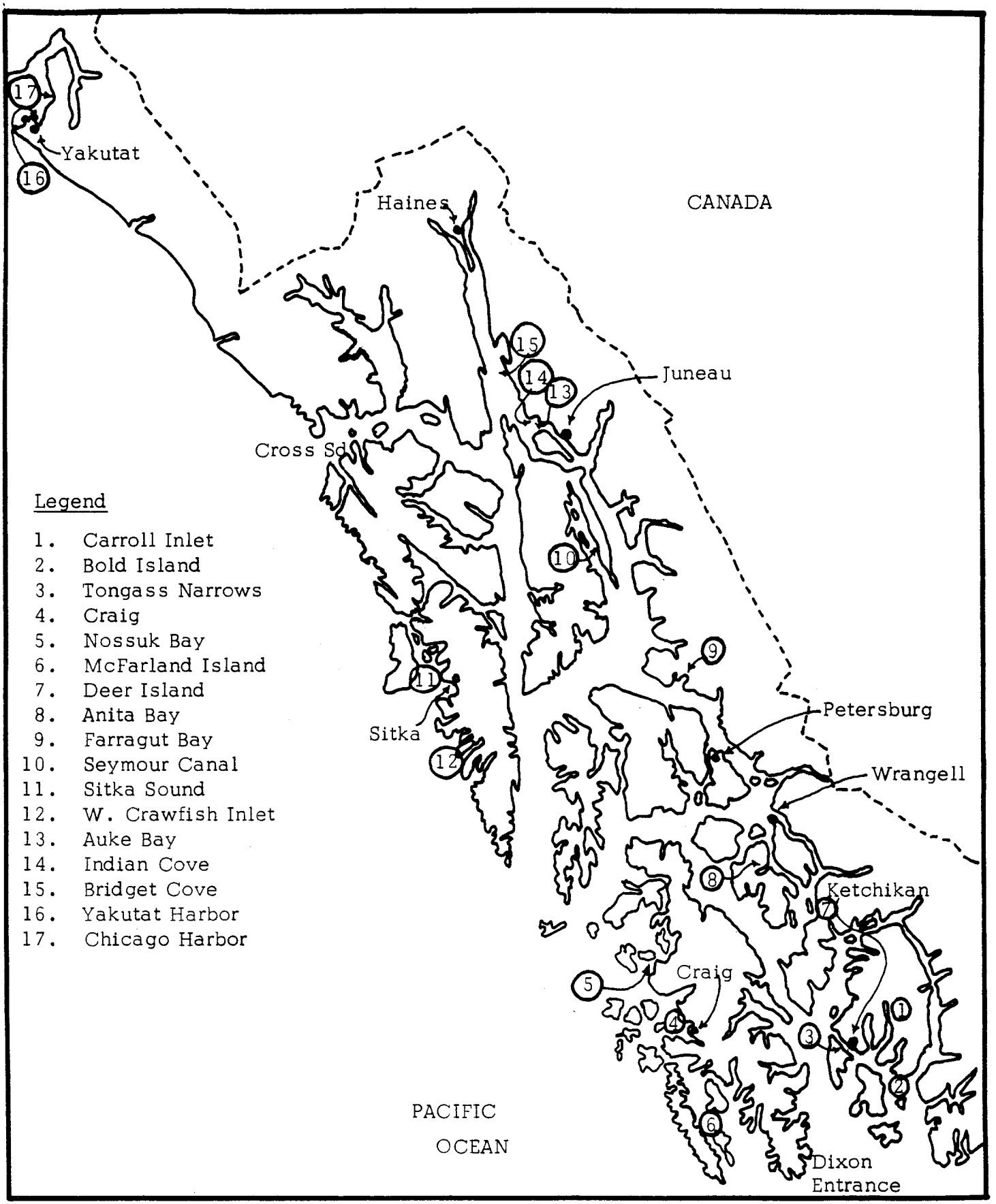


Figure 2. Sampling locations of Southeastern Alaska herring studies, winter and spring of 1970-71.

Table 2. Commercial herring catch in short tons for Southeastern Alaska, winter and spring, 1970-71.

Fishing location	Short Tons Per Month								Totals
	Nov.	Dec.	Jan.	Feb.	March	April	May	June	
Carroll Inlet	672.7	935.7	211.3						1,819.7
Tongass Narrows	48.8								48.8
Bold Island	32.1								32.1
Scow Bay		3.0							3.0
Zimovia Straits					23.2				23.2
Anita Bay					233.3				233.3
Deer Island					206.4				206.4
Farragut Bay						27.0			27.0
Seymour Canal						34.6			34.6
Washington Bay								76.4	76.4
Sitka Sound				1.7	102.6	685.9			790.2
Lisianski Inlet						64.5	35.5		100.0
Auke Bay						48.1	353.5	252.3	653.9
Yakutat Bay							44.4		44.4
Total	753.6	938.7	211.3	1.7	565.5	860.1	433.4	328.7	4,093.0

METHODS

Collection of Herring

Herring for age and growth analysis were collected by several methods. The commercial purse seine fishery provided most of the samples with fish being collected from the processors at the location the catch was landed. Some herring were collected on the spawning grounds just prior to or during active spawning by a small purse seine or a variable mesh gillnet. When the variable mesh gillnet was used, it was set for a very short period of time to help prevent saturation of any particular mesh size. When possible, repeated sets were made until a sufficient sample was obtained. All fish were frozen for later examination in the laboratory.

Laboratory Methods

In the laboratory, herring were thawed immediately prior to examination. The length of each fish from tip of snout to the caudal peduncle was recorded to the nearest whole millimeter on a caliper measuring board. The weight was taken from an electronic balance to the nearest whole gram. Sex was determined by dissection and a readable (non-regenerated) scale was selected for age determination. Scales were cleaned and dipped in a solution of 10% mucilage glue and water and placed unsculptured side down for permanent mounting on glass slides. Aging was done using a dissecting microscope, but original readings were not verified by a second reader. The fish were assigned an anniversary date for each complete growing season. All samples collected were taken after growth had ceased in the fall and before growth had resumed in the spring. For example, if a fish was hatched in the spring of 1969 and collected in the fall of 1970, two growing seasons were assumed, and the fish recorded as age 2. If the same fish had been collected in the spring of 1971 (before growth had resumed) it still would have been recorded as age 2.

All scales and original data are filed and available for review upon request.

RESULTS

This section presents age, size and sex composition data for each of 17 samples collected at 15 locations. Eleven samples were from the commercial harvest in nine separate areas. An additional six samples were obtained of spawning fish in areas where no fishery occurred (Figure 2).

Ketchikan Area

Three concentrations of herring were sampled between the dates of November 4, 1970 and April 12, 1971. Samples from Carroll Inlet (Table 3), Bold Island (Table 4) and Tongass Narrows (Table 5) were all from the commercial purse seine fishery. Sample sizes from Carroll Inlet, Bold Island and Tongass Narrows were 796, 99 and 139 fish, respectively. The latter two samples are considered minimal, and in the future samples of at least 500 fish will be sought. The 1967 year class (age 3) comprised between 41.7% and 52% of the individual samples. That year class will be fully recruited as age 4 fish.

Prince of Wales Island Area

No commercial fishery occurred on the west coast of Prince of Wales Island during the winter and spring of 1970-1971. However, this area has been the site of spawn on kelp harvest, and is monitored each year by the Department. One sample was collected with a hand purse seine near Craig during the week of April 2, 1971 (Table 6). Another sample of spawning herring was collected with a dipnet at the McFarland Islands on April 9, 1971 (Table 7). The third sample of spawning fish from the west side of Prince of Wales Island was captured with a variable mesh gillnet at Nossuk Bay on June 22, 1971 (Table 8). The McFarland Islands and Nossuk Bay samples displayed the 1967 year class dominance that was indicated for the Ketchikan area fish. The fish captured near Craig were not dominated by one age group but indicated strength in the 1965, 1966, and 1967 year classes.

These three samples were captured from spawning grounds with three types of collection gear. We know very little about the separation of herring by size or sex on the spawning ground or selectivity of gear, but we do know that the dipnet and gillnet caught 83% and 64% males, while the hand purse seine caught 55% males, which is more representative of an expected 1:1 sex ratio.

Petersburg-Wrangell Area

Three herring samples were collected from the commercial catch in this area. One sample was collected at Deer Island on March 16, 1971 (Table 9). The catch at Anita Bay was sampled on March 23, 1971 (Table 10), and that at Farragut Bay on April 26 and 27, 1971 (Table 11).

The age-frequency composition of the Farragut Bay sample was not comparable to the Deer Island-Anita Bay data. Those results may have been

Table 3. Age, size and sex composition of 796 herring collected from the commercial purse seine fishery in Carroll Inlet, Alaska, 11-5-70 to 1-6-71.

		Males				Females				
				Mean				Mean		
Age	Year	Frequency		Length	Weight	Frequency		Length	Weight	Combined
Group	Class	No.	%	mm	gm	No.	%	mm	gm	percent
II	1969	4	0.9	153	38					0.5
III	1968	98	22.5	176	76	64	17.7	177	80	20.4
IV	1967	226	52.0	191	106	188	52.1	195	110	52.0
V	1966	29	6.7	200	125	24	6.6	202	123	6.7
VI	1965	23	5.3	213	148	23	6.4	216	158	5.8
VII	1964	27	6.2	216	149	25	6.9	231	183	6.5
VIII	1963	11	2.5	230	181	22	6.1	229	182	4.1
IX	1962	12	2.8	234	199	10	2.8	230	181	2.8
X	1961	3	0.7	247	221	5	1.4	279	174	1.0
XI	1960	2	0.5	239	230					0.3
Totals		435				361				
Mean Length				193				200		
Mean Weight					110				121	
Sex Composition - 55.3% males and 44.7% females										

Table 4. Age, size and sex composition of 99 herring collected from the commercial purse seine fishery at Bold Island, Alaska, 11-6-70.

		Males				Females				
				Mean				Mean		
Age	Year	Frequency		Length	Weight	Frequency		Length	Weight	Combined
Group	Class	No.	%	mm	gm	No.	%	mm	gm	percent
II	1969	1	1.6	152	54					1.0
III	1968	10	16.4	167	72	6	15.8	172	81	16.2
IV	1967	28	45.9	193	122	19	50.0	190	115	47.5
V	1966	3	4.9	199	127	2	5.3	209	151	5.1
VI	1965	4	6.6	202	158	2	5.3	217	164	6.1
VII	1964	6	9.8	215	171	5	13.2	220	183	11.1
VIII	1963	5	8.2	214	175	4	10.5	212	158	9.1
IX	1962	1	1.6	226	214					1.0
X	1961	2	3.3	229	199					2.0
XI	1960	1	1.6	228	216					1.0
Totals		61				38				
Mean Length				195				196		
Mean Weight					130				127	
Sex Composition - 59.5% males and 40.5% females										

Table 5. Age, size and sex composition of 139 herring collected from the commercial purse seine fishery, in Tongass Narrows, Alaska, 11-30-70.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
III	1968	6	9.8	208	122	5	6.4	190	95	7.9
IV	1967	28	45.9	200	117	30	38.5	204	131	41.7
V	1966	5	8.2	215	144	11	14.1	210	133	11.5
VI	1965	7	11.5	212	139	11	14.1	210	131	12.9
VII	1964	6	9.8	225	169	9	11.5	222	160	10.8
VIII	1963	2	3.3	228	180	6	7.7	227	169	5.8
IX	1962	1	1.6	241	209	5	6.4	217	154	4.3
X	1961	4	6.6	211	154					2.9
XI	1960	1	1.6	227	173	1	1.3	234	200	1.4
XII	1959									
XIII	1958	1	1.6	250	200					0.7
Totals		61				78				
Mean Length				209				210		
Mean Weight					136				138	
Sex Composition - 45.6% males and 54.4% females										

Table 6. Age, size and sex composition of 865 herring collected on the spawning grounds by small purse seine from Craig, Alaska, 4-2-71 to 4-7-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
III	1968	20	4.3	184		12	3.0	179		3.7
IV	1967	128	27.4	192		107	26.8	192		27.1
V	1966	127	27.1	201		113	28.3	200		27.7
VI	1965	92	19.7	207		85	21.3	207		20.4
VII	1964	68	14.5	212		40	10.0	210		12.5
VIII	1963	12	2.6	217		19	4.8	208		3.6
IX	1962	12	2.6	215		13	3.3	222		2.9
X	1961	6	1.3	208		5	1.3	224		1.3
XI	1960	3	0.6	210		2	0.5	226		0.6
XII	1959									
XIII	1958					1	0.3	231		0.1
Totals		468				397				
Mean Length				202				201		
Mean Weight					-				-	
Sex Composition - 54.9% males and 45.1% females										

Table 7. Age, size and sex composition of 138 herring collected by hand held dipnet from the McFarland Islands, Alaska, 4-19-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
II	1969					1	3.3	155		0.7
III	1968	8	7.3	180		2	6.7	181		7.2
IV	1967	55	51.4	195		9	30.0	188		46.4
V	1966	4	3.7	207		8	26.7	199		8.7
VI	1965	27	24.8	208		6	20.0	210		23.9
VII	1964	5	4.6	213		1	3.3	212		4.3
VIII	1963	4	3.7	223		2	6.7	209		4.3
IX	1962	1	0.9	234		1	3.3	221		1.4
X	1961	2	1.8	218						1.4
XI	1960	2	1.8	220						1.4
Totals		109				30				
Mean Length				218				197		
Mean Weight					-				-	
Sex Composition - 83.3% males and 16.7% females										

Table 8. Age, size and sex composition of 145 herring collected by variable mesh gillnet from Nossuk Bay, Alaska, 6-22-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
III	1968	6	6.5	197	85	4	7.5	198	101	6.9
IV	1967	63	68.5	204	102	37	69.8	207	112	69.0
V	1966	6	6.5	208	99	3	5.7	219	140	6.2
VI	1965	8	8.7	222	129	1	1.7	237	176	6.2
VII	1964	7	7.6	224	150	6	11.3	232	158	9.0
VIII	1963	1	1.1	232	171	2	3.8	227	138	2.1
IX	1962									
X	1961									
XI	1960	1	1.1	249	189					0.7
Totals		92				53				
Mean Length				208				211		
Mean Weight					109				120	
Sex Composition - 64.1% males and 35.9% females										

Table 9. Age, size and sex composition of 485 herring collected from the commercial purse seine fishery from Deer Island, Alaska, 3-16-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
III	1968	31	13.4	179	66	30	11.8	177	66	12.6
IV	1967	118	51.1	185	77	143	56.3	187	81	53.8
V	1966	33	14.3	198	92	34	13.4	194	90	13.8
VI	1965	28	12.1	197	97	26	10.2	203	104	11.1
VII	1964	15	6.5	211	110	17	6.7	211	119	6.6
VIII	1963	4	1.7	203	99	4	1.6	216	128	1.6
IX	1962	1	0.4	205	96					0.2
X	1961	1	0.4	230	120					0.2
Totals		231				254				
Mean Length				190				190		
Mean Weight					83				86	
Sex Composition - 48.0% males and 52.0% females										

Table 10. Age, size and sex composition of 458 herring collected from the commercial purse seine fishery from Anita Bay, Alaska, 3-23-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
II	1969	2	0.9	164	48	5	2.2	166	45	1.5
III	1968	32	13.8	166	58	39	17.3	171	56	15.5
IV	1967	74	31.9	182	70	82	36.3	187	81	34.1
V	1966	48	20.7	186	83	44	19.5	192	85	20.1
VI	1965	47	20.3	194	100	32	14.2	201	112	17.2
VII	1966	16	6.9	198	89	18	8.0	201	103	7.4
VIII	1965	9	3.9	212	121	4	1.8	214	116	2.8
IX	1962	3	1.3	220	127	2	0.9	221	123	1.1
X	1961	1	0.4	215	130					0.2
Totals		232				226				
Mean Length				186				189		
Mean Weight					81				84	
Sex Composition - 49.9% males and 50.1% females										

Table 11. Age, size and sex composition of 587 herring collected from the commercial pound fishery in Farragut Bay, Alaska, 4-26 and 27-1971.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
III	1968	18	4.6	172	68	8	4.1	168	64	4.4
IV	1967	9	2.3	182	78	2	1.0	188	103	1.9
V	1966	44	11.3	198	102	14	7.1	205	119	9.9
VI	1965	243	62.3	203	107	117	59.4	208	127	61.3
VII	1964	47	12.1	209	118	30	15.2	217	150	13.1
VIII	1963	18	4.6	218	139	20	10.2	217	143	6.5
IX	1962	7	1.8	219	129	4	2.0	218	166	1.9
X	1961	3	0.8	226	163	2	1.0	233	194	0.9
XI	1960	1	0.2	237	156					0.2
Totals		390				197				
Mean Length				202				209		
Mean Weight					108				130	
Sex Composition - 66.1% males and 33.9% females										

influenced by the differences in seines and pounds as capture gear. A second difference in sample structure was the relative strength of age 3 fish. Herring are probably not fully recruited to the adult stocks at age 3, but recruitment of age 4 fish to Deer Island and Anita Bay appeared to be strong at 12.6% to 15.5% as compared with a contribution of 4.4% for the Farragut Bay sample.

Sitka Area

Herring were collected at two locations near Sitka between the dates of March 30 to April 17, 1971. One sample from the commercial purse seine fishery, was of fish that winter in Katlian Bay (Table 12). This stock is throught to be one of the largest in Southeastern Alaska as based on acoustical assessment. A second sample was collected with a variable mesh gillnet at West Crawfish Inlet while the fish were actively spawning (Table 13). As stated earlier, we have not yet assessed gillnet selectivity for size groups, but the predominance of 73% males in the sample indicated that the net selects males when fished on spawning grounds. Males are probably located above the females during spawning and are susceptible to floating nets while broadcasting milt over the bottom with which spawning females are associated.

Average sizes of fish from Sitka Sound and West Crawfish Inlet were not comparable. Fish captured in the Sound were larger and exhibited more strength in older age groups, although it was the only one that was subjected to commercial harvest. It is not known if we sampled two populations, or if the fish at Crawfish Inlet were a segment of the larger Sitka Sound population.

Juneau Area

Four herring samples were collected in the Juneau area between the dates of April 19 to May 5, 1971. Fish in Seymour Canal were sampled from the purse seine catches (Table 14). One sample was collected by gillnet at Auke Bay while fish were spawning (Table 15) and another was taken from the commercial pound net catch in the same locality (Table 16). A sample of spawning fish was also collected with a gillnet at Bridget Cove, north of Auke Bay in Lynn Canal (Table 17).

Seymour Canal is widely separated from the Auke Bay area. Fish sampled there were distinctive because of their size. Strength was indicated for age 5 through 9 fish, and age 6 fish comprised about 40% of the sample while age 3 and 4 fish comprised only 7.1% of the sample.

Herring of the Auke Bay-Bridget Cove area undoubtedly mix at least during the summer months. The two samples from Auke Bay revealed a strong

Table 12. Age, size and sex composition of 773 herring collected from the commercial purse seine fishery in the Sitka Sound area, Alaska, 3-30-71 to 4-1-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
III	1968	30	8.1	187	85	28	7.0	183	85	7.5
IV	1967	81	21.8	203	111	82	20.4	207	116	21.1
V	1966	112	30.2	210	129	130	32.3	216	133	31.3
VI	1965	42	11.3	217	136	35	8.7	221	139	10.0
VII	1964	56	15.1	229	150	72	17.9	227	160	16.6
VIII	1963	29	7.8	227	168	30	7.5	233	172	7.6
IX	1962	13	3.5	228	169	16	4.0	234	177	3.8
X	1961	6	1.6	233	181	6	1.5	236	171	1.6
XI	1960	2	0.5	227	165	1	0.2	235	174	0.4
XII	1959									
XIII	1958					2	0.5	246	203	0.3
Totals		371				402				
Mean Length				213				216		
Mean Weight					131				137	
Sex Composition - 49.5% males and 50.4% females										

Table 13. Age, size and sex composition of 767 herring collected by variable mesh gillnet during active spawning from West Crawfish Inlet, Alaska, 4-17-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
II	1969	2	0.4	170	53	1	0.5	155	64	0.4
III	1968	77	13.9	181	85	32	15.0	190	91	14.2
IV	1967	217	39.2	202	106	80	37.6	205	116	38.7
V	1966	120	21.7	204	114	52	24.4	212	126	22.4
VI	1965	40	7.2	209	119	13	6.1	211	122	6.9
VII	1964	82	14.8	212	122	29	13.6	217	138	14.5
VIII	1963	14	2.5	214	131	4	1.9	220	152	2.3
IX	1962	1	0.2	225	156	1	0.5	240	186	0.3
X	1961	1	0.2	216	152	1	0.5	240	200	0.3
Totals		554				213				
Mean Length				202				207		
Mean Weight					109				119	
Sex Composition - 72.6% males and 27.4% females										

Table 14. Age, size and sex composition of 491 herring collected from the commercial purse seine fishery in Seymour Canal, Alaska, 4-19-71.

		Males				Females				
				Mean				Mean		
Age	Year	Frequency		Length	Weight	Frequency		Length	Weight	Combined
Group	Class	No.	%	mm	gm	No.	%	mm	gm	percent
III	1968	6	2.4	189	82	7	2.9	189	95	2.6
IV	1967	11	4.3	198	99	11	4.6	201	120	4.5
V	1966	40	15.8	203	119	29	12.1	208	130	14.1
VI	1965	101	39.9	210	124	96	40.2	211	129	40.1
VII	1964	29	11.5	211	137	33	13.8	217	143	12.6
VIII	1963	27	10.7	211	129	24	10.0	216	146	10.2
IX	1962	22	8.7	222	148	18	7.5	223	158	8.1
X	1961	9	3.6	220	153	11	4.6	230	175	4.1
XI	1960	5	2.0	216	141	5	2.1	217	156	2.0
XII	1959	2	0.8	228	153	4	1.7	223	170	1.2
XIII	1958					1	0.4	235	182	0.2
XIV	1957	1	0.4	200	116					0.2
Totals		253				239				
Mean Length				210				213		
Mean Weight					127				137	
Sex Composition - 51.5% males and 48.5% females										

Table 15. Age, size and sex composition of 172 herring collected by variable mesh gillnet during active spawning from Auke Bay, Alaska, 5-4-71.

		Males				Females				
				Mean				Mean		
Age	Year	Frequency		Length	Weight	Frequency		Length	Weight	Combined
Group	Class	No.	%	mm	gm	No.	%	mm	gm	percent
II	1969	2	1.8	165	62	2	2.9	170	64	2.2
III	1968	52	46.4	169	70	31	44.3	167	70	45.6
IV	1967	24	21.4	187	95	12	17.1	184	94	19.8
V	1966	11	9.8	199	113	9	12.9	203	131	11.0
VI	1965	11	9.8	200	146	5	7.1	208	139	8.8
VII	1964	2	1.8	200	155	3	4.3	209	136	3.3
VIII	1963	6	5.4	217	155	3	4.3	225	174	4.4
IX	1962	2	1.8	219	157	2	2.9	224	191	2.2
X	1961	1	0.9	236	108	2	2.9	237	164	1.6
XI	1960					1	1.4	192	120	0.5
XII	1959	1	0.9	222	190					0.5
Totals		112				70				
Mean Length				184				186		
Mean Weight					95				101	
Sex Composition - 62.4% males and 37.6% females										

Table 16. Age, size and sex composition of 325 herring from commercial pound fishery in Auke Bay, Alaska, 4-30-71 to 5-4-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
II	1969	5	3.4	162	50	5	2.8	170	58	3.1
III	1968	99	67.3	167	56	113	63.5	171	64	65.2
IV	1967	29	19.7	181	70	38	21.3	187	82	20.8
V	1966	4	2.7	192	86	7	3.9	187	92	3.4
VI	1965	6	4.1	198	95	3	1.7	205	120	2.8
VII	1964	1	0.7	205	94	4	2.2	215	130	1.5
VIII	1963	2	1.4	216	127	3	1.7	219	138	1.5
IX	1962					2	1.1	224	147	0.6
X	1961					3	1.7	212	129	0.9
XI	1960									
XII	1959	1	0.7	206	116					0.3
Totals		147				178				
Mean Length				173				179		
Mean Weight					62				75	
Sex Composition - 45.6% males and 54.4% females										

Table 17. Age, size and sex composition of 295 herring collected by variable mesh gillnet during active spawning from Bridget Cove, Alaska, 5-5-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
II	1969	1	0.4	160	62	1	1.4	171	80	0.7
III	1968	23	10.3	177	83	10	14.1	176	87	11.2
IV	1967	44	19.6	193	98	18	25.4	189	103	21.0
V	1966	46	20.5	204	115	11	15.4	192	119	19.3
VI	1965	46	20.5	210	125	13	18.3	200	124	20.0
VII	1964	25	11.2	207	125	9	12.7	211	142	11.5
VIII	1963	13	5.8	216	134	3	4.2	206	141	5.4
IX	1962	20	8.9	221	142	4	5.6	219	159	8.1
X	1961	3	1.3	223	159	2	2.8	212	153	1.7
XI	1960									
XII	1959	2	0.9	233	160					0.7
XIII	1958	1	0.4	216	126					0.3
Totals		224				71				
Mean Length				203				195		
Mean Weight					116				118	
Sex Composition - 76.6% males and 23.4% females										

1968 year class which comprised 45.6% and 65.2% of the samples. The same year class comprised only 11.2% of the Bridget Cove sample, which also contained strong groups of age 4 to 7 fish. Again, differences in collecting gear may have accounted for differences in age composition. Additional samples were unavailable for the Bridget Cove area because no commercial fishery operated there during the spring of 1971.

Yakutat Area

Herring in this area were not fished commercially for many years prior to 1971 when one purse seine vessel landed about 44 tons of fish. Two samples were collected from those catches on May 7 and 20, 1971 (Tables 18 and 19). The 1968 year class dominated both samples, and the 1966 and 1967 year classes also comprised 14.8% to 23.2% of the samples. The absence or near absence of fish older than age 4 is striking; especially considering that these fish had not been previously harvested.

Table 18. Age, size and sex composition of 354 herring collected from the commercial purse seine fishery from the boat harbor, Yakutat, Alaska, 5-7-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
II	1969	3	1.6	157	42					0.8
III	1968	109	56.6	182	67	58	36.0	185	72	47.2
IV	1967	30	15.5	196	83	31	19.3	196	81	17.2
V	1966	35	18.1	205	90	47	29.2	208	97	23.2
VI	1965	8	4.1	215	99	10	6.2	218	109	5.1
VII	1964	5	2.6	206	96	11	6.8	208	103	4.5
VIII	1963	2	1.0	212	107	3	1.9	219	119	1.4
IX	1962					1	0.6	225	125	0.3
X	1961	1	0.5	232	116					0.3
Totals		193				161				
Mean Length				191				198		
Mean Weight					76				87	
Sex Composition - 54.3% males and 45.7% females										

Table 19. Age, size and sex composition of 331 herring collected from the commercial purse seine fishery from Chicago Harbor, Yakutat, Alaska, 5-20-71.

		Males				Females				
				Mean				Mean		
Age Group	Year Class	Frequency No.	%	Length mm	Weight gm	Frequency No.	%	Length mm	Weight gm	Combined percent
II	1969	2	1.2	157	40	1	0.6	145	39	0.9
III	1968	103	63.2	180	72	96	57.1	186	78	60.1
IV	1967	28	17.2	188	77	45	26.8	191	88	22.1
V	1966	27	16.6	193	87	22	13.1	202	101	14.8
VI	1965	2	1.2	205	109	3	1.8	203	142	1.5
VII	1964	1	0.6	202	103	1	0.6	232	158	0.6
Totals		163				168				
Mean Length				184				190		
Mean Weight					75				85	
Sex Composition - 48% males and 52% females										

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