

ANNUAL REPORT 1962
COOK INLET AREA
COMMERCIAL FISHERIES DIVISION
ALASKA DEPARTMENT OF FISH AND GAME

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T A B L E O F C O N T E N T S

Introduction	1
Licenses, 1962	3
Processors	4
Tables	
Weekly Pack by Companies	
Berman Packing Company	7
Columbia-Wards Fisheries	8
Emard Packing Company	9
Halibut Producers Co-op	10
Hallstead Packing Company	11
Horton's Wholesale	12
Kenai Packers	13
Seldovia-Port Graham Consolidation	14
Snug Harbor Packing Company	15
Tidewater Packing Company	16
1962 Salmon Pack by Companies	17
Freezer Operations	18
Freezer Fish in Fish Only	19
Smoking Operations	21
Salmon Catch by Statistical Area and Gear	22
Total Cumulative Pack Cook Inlet	23
Shellfish	24
Freshwater Fishing Operations	29
1962 Salmon Catch by District and Gear	32
Salmon	33
Observations on Offshore Seismographic Work, Cook Inlet, 1962	51
Cook Inlet Seismographic Observations	59
Fishermen's Corner	66
Temporary Employees	67
Needs for Future	68

INTRODUCTION

The year 1962 saw the largest salmon pack in Cook Inlet on record--records prior to 1930 do not separate Cook Inlet's catch from other Districts of Central Alaska. Nearly 200,000 cases of the approximately 427,000 packed were pink salmon.

Since 1960 was the first year of management of the fishery by the Department of Fish and Game at least some credit for the high pink pack of 1962 must be given to this Department. Escapement of pink salmon as well as other species in 1960 was at a high level, and protection efforts in that year insured this level.

The year 1962 was also a record year for king crab production for Cook Inlet, and somewhat over 6,700,000 pounds were landed from this area. Again actions and recommendations of the field staff to the Board of Fish and Game which led to a no pot limit fishery in the Kamishak Bay District (where approximately 4,000,000 pounds were taken in 1962) should be given credit for this production. In 1959, the last year of management by the Federal Government, the pot limit for the entire Cook Inlet Commercial Fisheries Area was 15, and all boats fishing for king crab were relatively small and capable of fishing in sheltered waters only.

And prior to 1961 no king crab production was on record for Kamishak Bay. There was even some question as to whether the area could support a commercial fishery, for the size of the crab population there was a complete unknown. The tremendous development of this fishery upon actions of the Board of Fish and Game demonstrates vividly effects that regulations made by this body can have.

At the end of 1962 approximately 12 vessels in the 55 to 100 foot size were operating or expected to operate in the king crab fishery from the port of Seldovia.

Also approximately \$200,000 worth of small boats had been purchased by commercial fishermen of Homer during the fall of 1962--fishermen who were eyeing the Dungeness and salmon fisheries, of the more sheltered areas of Kachemak Bay and the Outer District.

The petroleum industry centered in the Cook Inlet basin continued to expand during 1962. By the end of the year over 70 permits had been issued (since 1960) for onshore seismic operations. Since 1959 five marine seismic operations using conventional methods (explosives) have been conducted in Cook Inlet, and around a dozen sparker-type operations were completed.

In 1961 2,000 adult spawning pink salmon were introduced into Fritz Creek, and in 1962 another 2,500 were placed into the stream. An aluminum fishway was also installed permanently at the falls of this stream. The first return to Fritz Creek from the transplant should be in 1963. Because the winter of 1961-62 was extremely cold, with low water levels in streams, a heavy mortality of eggs and fry resulting from the 1961 transplant is possible, and a heavy return is not really expected in 1963.

Advisory groups were not particularly active during 1962, and meetings were attended by staff members at the Homer-Seldovia, Central Kenai, and Anchorage Advisory group meets. The Kenai and Seward Advisory groups were totally inactive.

At the conclusion of the year the Commercial Fisheries and Protection Divisions at Homer were preparing to move into new quarters. Large office, warehouse, and fenced parking space will be leased for a ten year period starting January 15. A more efficient operation should result from this move.

So the year 1962 has proved that methods of management used by the Department are valid--it's hard to deny this in the face of record landings of both king crab and salmon--and the Department has grown into new, efficient, and more comfortable quarters.

COMMERCIAL FISHING LICENSES

COOK INLET - 1962

	<u>Resident</u>	<u>Nonresident</u>	<u>Total</u>
Commercial fishermen	1,494	367	1,861
Beach seine	5		5
Beam trawl	1		1
Clam digger	80	8	88
Drift gill net	260	112	372
Hand purse seine	84	7	91
Long line	33	1	34
Otter trawl	3	3	6
Set gill net	589	28	617
Shellfish pots	81	4	85
Troll	9		9
Vessel	337	126	463
Dory	515	21	536

Value of licenses sold at the Homer office in 1962, \$50,078.50.

For comparison, in 1960, when agents other than Department of Fish and Game personnel sold these too, sales at the Homer office totalled \$11,980.00. In 1961, when all commercial fishing licenses were sold by the Department, sales at the Homer office totalled \$44,092.50.

<u>Name and Business Address</u>	<u>Superintendent</u>	<u>Plant Location</u>	<u>No. of Lines</u>	<u>Product</u>
Alaska Fish & Farm Products, Inc. Box 74 Anchorage, Alaska	K. C. Britt	Anchorage		Salmon - Frozen & Fresh Halibut - Fresh & Frozen Cod - Frozen
Alaskan Sea Foods Box 152 Homer, Alaska	Eugene V. Browning	Homer		Shrimp - Fresh Crab - Fresh & Cold Pack
Alidas Alaskan Gifts Box 62 Anchor Point, Alaska	Ray Charlton	Anchor Point	1 - $\frac{1}{2}$ # Flats	Salmon - Frozen, Canned
Berman Packing Co. 1808 Northern Life Tower Seattle 1, Washington	O. R. Bertosen	Ninilchik	1 - 1# Talls 1 - $\frac{1}{2}$ # Flats	Salmon - Frozen, Canned
Columbia-Wards Fisheries P. O. Box 30, University Station Seattle, Washington	A. R. Pearmain	Kenai	2 - 1# Talls 1 - $\frac{1}{2}$ # Flats 1 - $\frac{1}{4}$ # Flats	Salmon - Canned
East Point Seafood Co. Box 677 Seward, Alaska	James Major	Seward	1 - $\frac{1}{2}$ # Flats	Shrimp - Canned
Ekren Packing Company Kasitna Bay, Alaska	John A. Ekren	Kasitna Bay	1 - $\frac{1}{2}$ # Flats	Dungeness - Canned
Emard Packing Co., Inc. 611 Lowman Building Seattle 4, Washington	S. T. Olson	Anchorage	1 - 1# Talls 1 - $\frac{1}{2}$ # Flats	Salmon - Canned
Halibut Producers Cooperative 4501 Shilshole Ave. N. W. Seattle 7, Washington	Terrell Schenk	Seward	1 - 4 $\frac{1}{2}$ oz Flat	Shrimp - Canned, Frozen Crab - Frozen Salmon - Frozen
Harrington's Fish Shack Anchor Point, Alaska	Vern Harrington	Anchor Point	Hand Pack	Salmon - Canned, Smoked

<u>Name and Business Address</u>	<u>Superintendent</u>	<u>Plant Location</u>	<u>No. of Lines</u>	<u>Product</u>
Homer Brand Sea Food P. O. Box 313 Homer, Alaska	Henry J. Hunter	Homer		King Crab - Fresh, Frozen Tanner - Frozen
Hallstead Packing Co. Homer, Alaska	Earl P. Hallstead	Kasitsna Bay	Hand Pack	Salmon - Canned Butter Clam - Canned
Horton's Sales & Sea Foods Seward, Alaska	Helen & Henry Horton	Seward	Hand Pack	Salmon - Canned
Jensen & Co. Box 123 Ninilchik, Alaska	Torvald Jensen	Deep Creek (Ninilchik)		Salmon - Smoked
Kenai Packers 2601 42nd Ave., West Seattle, Washington	H. A. Daubenspeck	Kenai	1 - 1 $\frac{1}{2}$ # Talls 1 - $\frac{1}{2}$ # Flats	Salmon - Canned
New Nelco, Inc. 527 Finch Bldg. Aberdeen, Washington	Chris Nelson	Floating Cannery (Tokland, Wash.)		Crab - Fresh, Frozen Salmon - Fresh, Frozen
Pacific Alaskan Seafoods Box 487 Homer, Alaska	Lee K. Shelford	Homer Spit		Halibut - Fresh, Frozen Crab - Fresh
Polar Packing Co. Box 678 Homer, Alaska	Dick Haltiner	Homer Spit	Hand Pack	Halibut - Canned Salmon - Canned Crab - Canned
Seldovia-Port Graham Consolidation 2360 Commodore Way Seattle 99, Washington	J. J. Lind	Seldovia	1 - 1 $\frac{1}{2}$ # Talls 1 - $\frac{1}{2}$ # Flats	Crab - Canned Salmon - Canned
- Port Chatham Packing Co., Inc.	Erling Nilson	Seldovia	1 - 1 $\frac{1}{2}$ # Talls	Salmon - Canned, Smoked
Snug Harbor Packing Company 204 Administration Bldg. Seattle 99, Washington	J. R. Fribrock	Cook Inlet	1 - 1 $\frac{1}{2}$ # Talls 1 - 1 $\frac{1}{2}$ # Flats	Salmon - Canned

<u>Name and Business Address</u>	<u>Superintendent</u>	<u>Plant Location</u>	<u>No. of Lines</u>	<u>Product</u>
- Pacific American Fisheries	Victor Olson	Snug Harbor		
Donald C. Strutz Box 192 Seward, Alaska	Donald C. Strutz	Anchorage		Salmon - Fresh, Smoked
Sutterlin & Wendt 701 Central Bldg. Seattle, Washington	Richard H. Sutterlin	Seldovia	1 - 4 3/4oz Flat	Shrimp - Canned Crab - Frozen
Tidewater Packing Co. P. O. Box 1842 Anchorage, Alaska	Ray Coffin	Anchorage	1 - 1/2# Flats	Salmon - Canned
Wakefield Fisheries Seldovia, Alaska	Chas. S. Hendrix	Seldovia		Crab - Frozen Halibut - Frozen

COOK INLET PACK BY WEEK - 1962

BERMAN PACKING CO.

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
July 1	0	655	0	0	0	655
July 8	0	794	0	0	0	794
July 17	0	1,784	0	57	326	2,167
July 22	0	1,698	93	193	432	2,416
July 30	0	360	103	615	49	1,127
August 5	0	106	220	3,582	305	4,213
August 12	0	17	124	2,712	0	2,853
August 19	0	10	235	2,191	0	2,436
August 26	0	8	221	197	0	426
September 2	0	0	0	0	0	0
September 9	0	0	0	0	0	0
September 16	<u>0</u>	<u>0</u>	<u>113</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	0	5,432	996	9,547	1,112	17,200
Cannery Annual Report	0	5,057	600	10,493	919	17,069

COOK INLET PACK BY WEEK - 1962

COLUMBIA-WARDS FISHERIES

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
June 10	30	177	0	0	0	207
June 17	51	444	0	0	0	495
June 24	38	166	0	0	0	204
July 1	6	332	0	0	26	364
July 8	34	2,687	25	18	4,144	6,908
July 17	71	6,366	58	220	7,076	13,791
July 22	16	9,556	532	1,189	4,663	15,956
July 30	26	1,796	393	1,932	1,153	5,300
August 5	28	295	521	12,114	769	13,727
August 12	25	75	538	21,457	81	22,176
August 19	<u>5</u>	<u>16</u>	<u>252</u>	<u>10,488</u>	<u>0</u>	<u>10,761</u>
Total	330	21,910	2,319	47,418	17,912	89,889
Cannery Annual Report	333	21,992	2,376	54,803	17,974	97,478

COOK INLET PACK BY WEEK - 1962

EMARD'S PACKING CO.

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
June 10	1,028	76	0	0	0	1,104
June 17	1,197	90	0	0	0	1,287
June 24	437	32	0	0	0	469
July 1	77	87	2	0	10	176
July 8	5	540	30	10	27	612
July 17	0	365	82	82	36	565
July 22	0	6,508	3,458	4,003	4,945	18,914
July 30	0	1,028	5,951	5,009	5,245	17,233
August 5	0	170	2,565	564	1,532	4,831
August 12	0	12	461	56	323	852
August 19	0	3	195	50	821	1,069
August 26	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	2,744	8,911	12,744	9,774	12,939	47,112
Cannery Annual Report	6,909	8,859	13,661	13,567	15,512	58,508

COOK INLET PACK BY WEEK - 1962

HALIBUT PRODUCERS CO-OP

(Fish Only In Pounds)

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
July 8	1,792	312	48	17	6	2,175
July 17	590	0	0	0	0	590
July 22	4,453	6,019	1,866	19,125	0	31,463
July 30	360	0	0	1,045	0	1,405
August 5	7,709	0	25,770	254	0	33,733
August 12	6,055	0	41,367	172	0	47,594
August 19	3,871	73	26,326	3,792	69	34,131
August 26	0	24	28,485	28,405	0	56,914
September 2	0	1,393	33,447	860	0	35,700
September 9	0	0	76,942	192	12	77,146
September 16	<u>0</u>	<u>0</u>	<u>94,683</u>	<u>60</u>	<u>0</u>	<u>94,743</u>
Total	24,830	7,821	328,934	53,922	87	415,594
Cannery Annual Report	22,486	2,168	385,526	15,915	81	426,176

COOK INLET PACK BY WEEK - 1962

HALLSTEAD PACKING CO.

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
June 17	0	7	0	0.5	0	7.5
June 24	8.5	0	0	0	0	8.5
July 1	0	1	0	1	0	2
July 8	0	0	0	3	0	3
July 17	0	0	0	0	0	0
July 22	0	0	0	0	0	0
July 30	<u>2.5</u>	<u>0</u>	<u>0</u>	<u>.5</u>	<u>0</u>	<u>3</u>
Total	11	8	0	5	0	24
Cannery Annual Report	0	16	5	4	4	29

COOK INLET PACK BY WEEK - 1962

HORTON'S WHOLESALE

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
July 1	3	6	0	0	0	9
July 8	<u>1</u>	<u>7</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>8</u>
Total	4	13	0	0	0	17
Cannery Annual Report	4.5	52.2	8	0	0	64.7

COOK INLET PACK BY WEEK - 1962

KENAI PACKERS

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
June 10	217	161	0	0	0	378
June 17	699	700	0	0	0	1,399
June 24	0	628.5	146	0	0	774.5
July 1	0	690	0	0	0	690
July 8	0	3,599.5	36.5	0	3,613.5	7,249.5
July 17	81.5	5,682.5	208	278	13,340	19,590
July 22	28.5	14,417.5	985	1,863	4,168.5	21,462.5
July 30	51	4,665.5	2,790	2,790	3,070	13,366.5
August 5	25.5	688.5	1,925	12,404	984	16,027
August 12	6.5	5	112.5	14,138	15	14,277
August 19	19	214	93	14,420.5	987	15,733.5
August 26	<u>22</u>	<u>41</u>	<u>334</u>	<u>1,336.5</u>	<u>24</u>	<u>1,757.5</u>
Total	1,150	31,493	6,630	47,230	26,202	112,705
Cannery Annual Report	1,150	31,453	6,922	47,096	23,755	110,376

COOK INLET PACK BY WEEK - 1962

SELDOVIA-PORT GRAHAM CONSOLIDATION

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
June 10	77	70	0	0	3	150
June 17	132	170	0	1	23	326
June 24	12	123	0	29	182	346
July 1	0	238	0	369	178	785
July 8	1	2,062	31	1,773	4,832	8,699
July 17	4	3,292	58	6,799	7,738	17,891
July 22	0	4,050	474	7,311	5,532	17,367
July 30	1	295	279	14,502	2,918	17,995
August 5	1	112	153	14,925	640	15,831
August 12	1	63	101	10,019	482	10,666
August 19	0	59	71	8,649	1,656	10,435
August 26	<u>0</u>	<u>2</u>	<u>9</u>	<u>411</u>	<u>1,238</u>	<u>1,660</u>
Total	229	10,536	1,176	64,788	25,422	102,151
Cannery Annual Report	229	10,536	1,176	64,738	25,422	102,101

COOK INLET PACK BY WEEK - 1962

SNUG HARBOR PACKING COMPANY

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
June 24	0	367	0	7	70	444
July 1	0	494	2	66	172	734
July 8	0	2,527	28	684	4,836	8,075
July 17	0	4,219	64	1,143	5,797	11,223
July 22	0	3,493	556	2,300	5,275	11,624
July 30	0	0	650	1,900	2,350	4,900
August 5	0	73	837	2,284	1,945	5,139
August 12	0	35	920	6,554	3,120	10,629
August 19	<u>42.5</u>	<u>11</u>	<u>534</u>	<u>2,405</u>	<u>0</u>	<u>2,992.5</u>
Total	42.5	11,219	3,591	17,343	23,565	55,760.5
Cannery Annual Report	0	11,119	3,591	17,415	23,976	56,101

COOK INLET PACK BY WEEK - 1962

TIDEWATER PACKING COMPANY

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
September 9	0	24	80	10	29	143
September 22	<u>0</u>	<u>0</u>	<u>19</u>	<u>0</u>	<u>1</u>	<u>20</u>
	0	24	99	10	30	163
Cannery Annual Report	55	152	240	221	118	786

1962 SALMON PACK BY COMPANIES

(Data - Annual Report of Companies)

<u>Company Name</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
Berman Packing Co.	0	5,057	600	10,493	919	17,069
Columbia-Wards Fisheries	333	21,992	2,376	54,803	17,974	97,478
Emard Packing Co.	6,909	8,859	13,661	13,567	15,512	58,508
Hallstead Packing Co.	0	16	5	4	4	29
Horton's Wholesale	4.5	52.2	8	0	0	64.7
Kenai Packers	1,150	31,453	6,922	47,096	23,755	110,376
Seldovia-Port Graham	229	10,536	1,176	64,788	25,422	102,151
Smug Harbor	0	11,119	3,591	17,415	23,976	56,101
Tidewater Packing Co.	<u>55</u>	<u>152</u>	<u>240</u>	<u>221</u>	<u>118</u>	<u>786</u>
TOTAL Cases	8,680.5	89,236.2	28,579	208,387	107,680	442,562.7

FREEZER OPERATIONS

(Individual Fish)

<u>Company Name</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
Berman Packing Co.	565	0	0	0	8,412	8,977
Snug Harbor Packing Co.	271	0	0	0	808	1,079
Emard Packing Company	<u>0</u>	<u>0</u>	<u>5,500</u>	<u>0</u>	<u>0</u>	<u>5,500</u>
Totals	836	0	5,500	0	9,220	15,556

FREEZER OPERATIONS

(Pounds of Fish)

Halibut Producers Co-op	24,830	7,821	328,934	53,922	87	415,594
Torvald Jensen & Co.	<u>26</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>740</u>	<u>766</u>
Totals	24,856	7,821	328,934	53,922	827	416,360

FREEZER FISH IN FISH ONLY

BERMAN PACKING COMPANY

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
July 1	207	0	0	0	0	207
July 8	86	0	11	73	3,684	3,854
July 17	78	0	64	0	3,133	3,275
July 22	72	0	0	0	1,110	1,182
July 30	74	0	0	0	467	541
August 5	33	0	0	0	0	33
August 12	5	0	0	0	9	12
August 19	4	0	0	0	7	11
August 26	6	0	0	0	2	8
September 2	<u>0</u>	<u>0</u>	<u>951</u>	<u>182</u>	<u>2</u>	<u>1,135</u>
Total	565	0	1,026	255	8,414	10,260

FREEZER FISH IN FISH ONLY

EMARD PACKING COMPANY

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
August 5	0	0	5,500	0	0	5,500

SMOKING OPERATION

(In Pounds)

<u>Company Name</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
Jensen & Co.	65	0	320	0	1,746	2,131
Donald Strutz	<u>527</u>	<u>52</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>579</u>
	592	52	320	0	1,746	2,710

SALMON CATCH BY STATISTICAL AREA AND GEAR - 1962

<u>Area</u>	<u>Gear</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>
231	Hand Purse Seine <i>Eastern</i>	0	0	3,728	49	10
232	Hand Purse Seine <i>Outer</i>	0	8,427	1,045	135,988	541
241	Hand Purse Seine } <i>Southern</i>	45	4,776	814	551,843	7,531
241	Set Gill Net }	13	11,793	1,281	12,207	1,558
242	Hand Purse Seine <i>Outer</i>	2	270	848	1,548,035	126,209
244	Drift Gill Net	160	513,310	35,193	497,329	678,917
244	Set Gill Net <i>N.C.</i>	4,628	392,933	57,580	1,887,974	984
245	Drift Gill Net <i>S.C.</i>	896	30,711	6,030	7,094	74,111
245	Set Gill Net	2,894	39,757	58,961	11,971	64,310
246	Set Gill Net	1,845	35,960	19,020	16,745	5,275
247	Set Gill Net <i>Northern</i>	9,778	130,934	172,562	279,599	143,757
248	Drift Gill Net <i>Klamath</i>	0	20	11	219	6,058
		20,261	1,168,891	357,073	4,949,053	1,109,261

TOTAL CUMULATIVE PACK COOK INLET - 1962

<u>Week Ending</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>
23 June 10	1,352	484	0	0	3	1,839
24 June 17	3,586	1,895	0	65	26	5,572
25 June 24	4,183.5	3,204.5	146	37.5	278	7,849.5
26 July 1	4,335.5	5,701.5	150	473.5	664	10,324.5
July 8	5,060.5	17,911	300.5	2,958	18,116.5	44,346.5
July 15 ⁵	*4,209	39,626.5	770.5	11,540.5	52,426.5	108,573
July 22	4,253.5	79,349	6,868.5	28,399.5	77,445	196,315.5
July 30	4,334	87,493.5	17,034.5	55,148	92,230	256,240
August 5	4,388.5	88,938	23,255.5	101,021	98,405	316,008
August 12	4,421	89,145	24,512	155,957	102,426	376,460
August 19	4,487.5	89,358	26,892	194,160.5	105,889	420,787
August 26	4,509.5	89,409	27,456	196,105	107,151	424,630.5
September 2	4,509.5	89,409	27,456	196,105	107,151	424,630.5
September 9	4,509.5	89,433	27,536	196,115	107,181	424,773.5
September 16	4,510.5	89,546	27,668	196,115	107,181	425,020.5

* Corrected Total

SHELLFISH

King Crab:

During 1962, the Kamishak Bay District was fished for king crab on a year around basis for the first time. This district yielded more production than any area in Cook Inlet. The Outer District and Kachemak Bay king crab production remained about the same as 1961, although catches from the Outer District just after the first of the year were extremely encouraging (Table King Crab Catch Statistics).

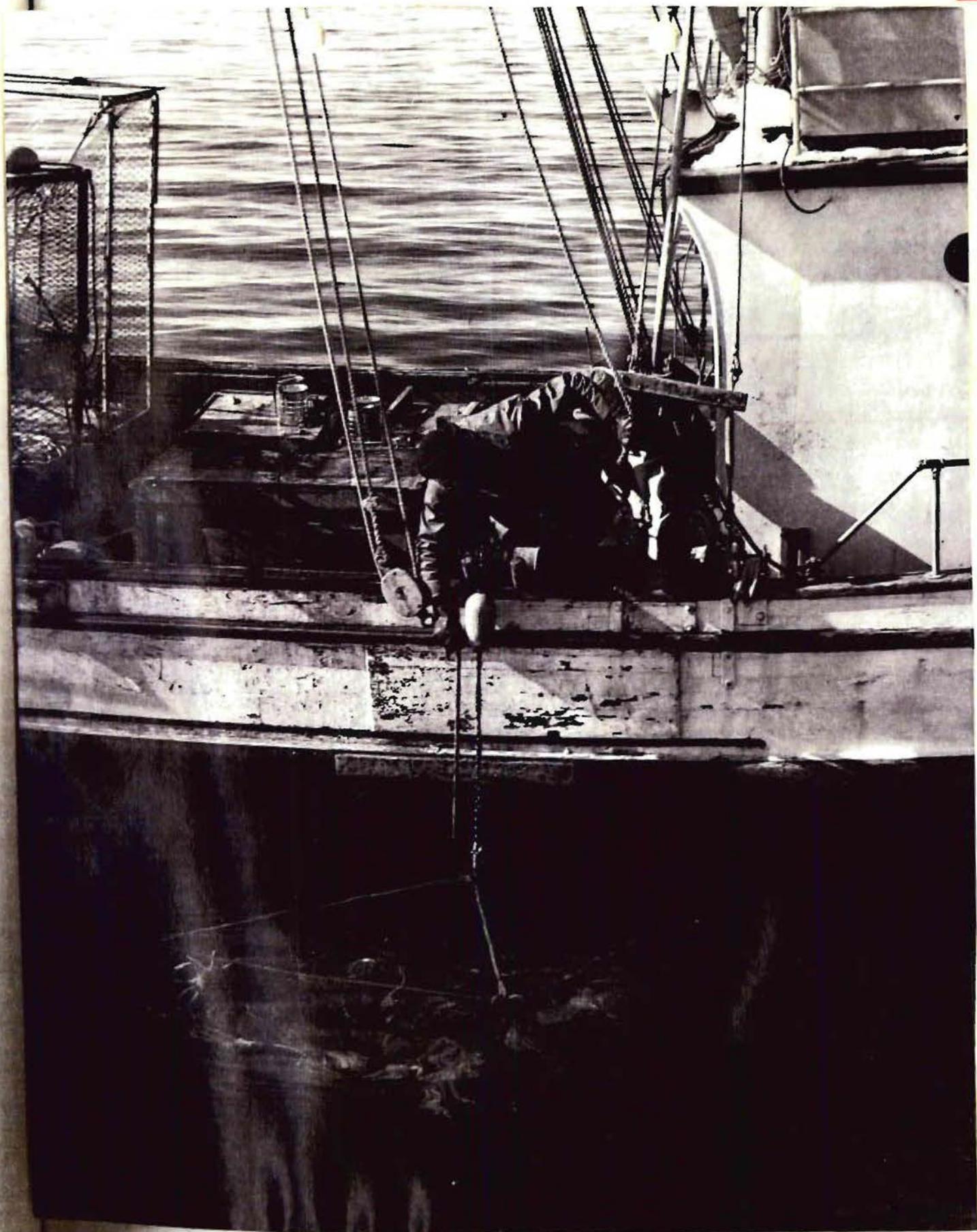
The Kamishak Bay king crab fishery, although relatively new, produced 4,162,807 pounds of the total 6,704,651 taken from Cook Inlet. Extremely favorable spring and summer weather greatly aided the movement of fishing vessels to and from that district, and as a result, an indication of the potential of this new area has been ascertained.

Average size and weights of the Kamishak Bay king crab held up throughout the year, while the average weight of crab from Kachemak Bay followed the general trend established in past years of falling off to smaller sizes after June 1st.

During the year a program of commercial catch sampling and measuring was carried out by Department biologists. During the year over 15,000 male king crab were measured from the various areas of Cook Inlet. These measurements proved invaluable as the data was used in conjunction with information received through tagging programs to provide the basis for recommending an increased minimum size limit for king crab in Cook Inlet.

Due to an increased number of female crab in some areas of Alaska bearing few, and in some instances no eggs, there was concern that the fishery might possibly have cropped too heavily the number of spawning size male crab. The general trend of this crab fishery has been selective on the larger male crab, and, it was felt that this size group, i.e. large non-molting, hardshell male crab were the ones most likely to spawn successfully with the larger females. This concern was deepened by the possibility that new-shell males, or recently molted males, of the various size groups do not add significantly to the spawning success of the crab population. One further biological aspect was encountered which cast doubt upon the small male crab as suitable spawning stock. This was that the small crabs, just above six and one-half inches in carapace width, and those in the sublegal size groups, usually spawn from four to six weeks before the larger crab begin their reproduction cycle. There is doubt that these smaller male crab can recuperate rapidly enough to successfully spawn with a larger female four to six weeks after spawning with female crabs of a size and age group similar to their own. This is an extremely important unknown--the ability of smaller male crabs to adequately fertilize the eggs of large female crabs, particularly since it is known that a spawning female must be fertilized within five days of ovulation, and more likely within two days, or her eggs will not develop.

If in the areas where barren females have been encountered the lack of eggs is due to lack of adequate male crab for spawning purposes, then the



Pulling a king crab pot--Kachemak Bay. 1962 king crab landings for Cook Inlet set record.

lower spawning potential of smaller male crab is particularly significant. Large numbers of new-shell male crab of the smaller size group in the spawning population, resulting in barren females showing a few weeks later, may possibly indicate that this group of males is not capable of suitable reproduction. These various assumptions substantiated by biological indication of female barrenness in some areas, the size, age, and shell condition of males in the spawning population, and the reduction of numbers of large hardshell males in the spawning areas, led to the recommendation to the Board of Fish and Game by the staff from Kodiak and Cook Inlet for an increase in minimum legal size.

An increase in minimum size also will get the advantage of an approximate 25 percent growth increment of crab in the size range between six and one-half and seven and one-half inches. It has been determined through tagging programs that male crab in this size group increase annually approximately three-quarters of an inch in width and about one pound in weight.

Dungeness Crab:

During 1962, the Dungeness crab fishery was within Kachemak Bay. Production from Kachemak Bay compared to the known Dungeness crab range in Cook Inlet has led to much optimism about future commercial Dungeness crab operations.

At no time in 1962 were there more than four or five boats operating in Kachemak Bay for Dungeness crab. These crab were processed in Seldovia and Homer, and for a limited time, a floating freezer ship processed Dungeness crab at Halibut Cove.

The average crab was slightly over two pounds. Total production was 204,573 crab; total weight landed was 460,725.

Razor Clams:

During April, May, June, and early July, there was a commercial razor clam operation at Polly Creek. This was the third consecutive year for this operation. During these months 195,650 pounds of clams were harvested and tendered to Kodiak for processing.

This year, as in 1961, cold early spring temperatures curtailed early digging production. However, as the weather warmed, a corresponding increase in clam production was noted. The highest daily production occurred in early June, when on a peak day 44 diggers took 503 boxes of razor clams.

Production was approximately 500 boxes below 1961. This was believed due primarily to severity of early spring weather conditions.

Examination of the commercial catch as well as samples dug from the beach indicate that the catch composition was composed of 26 percent between four and one-half and five inches in length; 71 percent between five and six inches; three percent above six inches.

Preliminary examinations of the sublegal clam stocks by screening indicate that reproductive success was good for both 1960 and 1961. Success of the 1962 spat fall have not yet been determined.

Polly Creek razor clams reach commercial size at about four and one-half inches, and six or seven years of age. Examinations of clam gonads at this beach have shown that over 60 percent of the razor clams are mature, or maturing, at approximately five years of age or four inches in length. There is a definite spawning stock at Polly Creek of one age class, and possibly even two, that are mature, and yet not harvested by the commercial fishery. With this spawning population of sublegal clams it appears quite unlikely that Polly Creek is in any immediate danger of over exploitation.

Shrimp:

Very few shrimp trawlers were active in the Cook Inlet District during 1962. Most of the shrimp taken came from Kachemak Bay.

Cook Inlet shrimp processors were active throughout the year; however, the majority of shrimp processed came from the Kodiak Island area.

Very little change in the operation plans of these processors appears likely. Most operators plan to depend on the bulk of production from shrimp from the Kodiak area, with supplemental catches by local small boats from the Cook Inlet area.

During 1962 total Cook Inlet shrimp production was 532,291 pounds live weight.

KING CRAB CATCH STATISTICS

<u>Year</u>	<u>Area</u>	<u>Date</u>	<u>Landings</u>	<u>Crab</u>	<u>Pounds</u>	<u>Average Weight</u>	<u>Catch - Effort</u>
1960	Kachemak	Prior 1 June	1,512	255,767	2,749,086	10.74	169.15
1961	Kachemak	Prior 1 June	1,680	180,147	1,715,148	9.52	107.23
1962	Kachemak	Prior 1 June	988	128,706	1,210,743	9.40	130.26
1960	Kachemak	After 1 June	815	185,007	1,320,606	7.13	227.00
1961	Kachemak	After 1 June	864	169,636	1,273,732	7.50	196.33
1962	Kachemak	After 1 June	491	93,367	632,692	6.77	190.15
1961	Kamishak	Prior 1 June	71	27,512	244,329	8.88	387.49
1962	Kamishak	Prior 1 June	127	143,501	1,389,988	9.68	1129.90
1961	Kamishak	After 1 June	108	111,788	961,350	8.59	1035.07
1962	Kamishak	After 1 June	228	312,675	2,772,263	8.86	1371.38
1960	Outer	After 1 June	47	4,228	42,137	9.96	89.95
1961	Outer	Prior 1 June	16	6,598	61,837	9.37	412.37
1962	Outer	Prior 1 June	68	36,501	378,975	10.38	536.77



Small boat, big pots, Kachemak Bay. "Hayrack" on stern is common on small Cook Inlet boats for handling king crab pots.

FRESHWATER FISHING OPERATIONS

Since 1960, various individuals have been issued permits to fish commercially during winter through the ice in certain lakes. The main lakes involved include Tustumena, Skilak, Kenai, Bear Lake, and Upper and Lower Trail Lake. Permits issued specifically prohibit sale of rainbow trout, and list lake trout, Dolly Varden, and whitefish as those that may be sold. Rainbow trout must be utilized by the individual to whom the permit is issued, or they must be turned in to the Department of Fish and Game.

The lakes listed are all silty, and most are unimportant from a sports standpoint, Kenai Lake being a possible exception. All permits are cleared by the Sport Fish Division before issuance.

Catches have generally been small. The best catches per unit of effort seem to have come from Bear Lake and Skilak Lake. All fishermen must report their catches to the Department.

Messrs. Eugene Smith and Joseph Megargel, both of Coho, were most active in their attempts to learn the potential of Tustumena Lake. Mr. Smith obligingly submitted a rather detailed report of their work, the important points of which are hereby summarized:

Operations started November 4, 1961, and continued until March 25, 1962. Transportation was by dog team and snowshoes, a method that limited operations. Two weeks of fishing in early November (1961) was conducted by dory on the lake. Ice formed and stopped this method by November 25.

Areas fished included slackwater, and off the mouths of Indian and Moose Creeks, Bear Creek, and Nikolai Creek. Nets were set on the south side of Caribou Island in early November and were productive until mid-December. Most productive areas were slackwater and Nikolai Creek.

Ice reached a thickness of 30 inches in March. Average depth of ice during winter was 22 inches. Water temperature averaged 35 degrees in depths from a few feet up to 100 feet. A reading of 38 degrees was obtained at the mouth of Indian Creek in 100 feet of water. All temperatures were taken in February.

Small numbers of whitefish, average 12 inches in length, were taken throughout the fishing period. During early fishing (November and December) about 10 percent Dolly Varden were taken in each set. Through January, February, and March this percentage dropped to less than two percent per set.

One salmon was taken December 6. This was a male red salmon, at Caribou Island, taken in a three-inch mesh net. This fish was turned in to the Department office at Homer.

A "jigger" was used to run lines under the ice--an instrument used and well known in the Great Lakes and northern states area where winter fisheries exist.

Total catch was:

Lake trout	816
Dolly Varden	177
Whitefish	32
Rainbow trout	6 (one of these was 28 inches in length)

The fish averaged one pound (dressed), with the largest weighing eight pounds.

Scale samples were taken from some of these fish. (These were read at the Homer office, as follows:)

Tustumena Lake

1961-62 Winter Fishery

Lake Trout

Age in Years	Length in Inches
6	10.5, 12, 11.5, 12.75, 13.5, 14.5
7	16, 18, 14, 15
8	19, 22
9	17.5, 14.5, 20, 20.5
10	14.5
11	22
12	13, 21, 22.5
13	19, 26, 24, 23.5, 22.5
14	23

Whitefish

8	13, 13, 13, 13
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Gear used consisted of:

- 1 3-inch mesh net, imported from Edmonton, Alberta. This net was 50 fathoms in length, and 12 feet deep.
- 1 3½-inch mesh, 50 fathoms, 6 feet deep--purchased in Wisconsin.
- 1 2-inch mesh, 10 fathoms, 6 feet deep
- 1 3½-inch mesh, 15 fathoms, 5 feet deep
- 1 5-inch mesh, 25 fathoms (commercial salmon net)
- 1 6-inch mesh, 25 fathoms (commercial salmon net)

All mesh sizes are stretch measure.

Nets were fished daily before December, and every fifth day after December. Fishing was on an experimental basis, and no attempt was made to exploit favorable fishing locations. Nets were often moved out of productive areas after the yield was determined.

Fish were dressed immediately upon landing them, frozen and glazed. They were dressed with heads and tails removed. Prices received in local markets averaged 49 cents per pound to the fishermen, and retailed at 69 cents a pound. The market was steady, but it could have been flooded.

Recommendations for fishing this lake include: Use of nets with three-inch and four-inch stretch measure, and a depth of not less than 12. Length should be 50 fathoms. Mesh ply should not be more than three ply--the lighter the better.

Favorable locations include creek mouths mostly, in water from 16 to 90 feet deep. Nets should be on bottom, and the floats should not be allowed to touch ice.

A chain saw works well in cutting into the ice. The saw should not be allowed to cut through to water--the last few inches should be cut with an ice chisel.

1962 SALMON CATCH BY DISTRICT AND GEAR

NORTHERN DISTRICT

<u>Gear</u>	<u>King</u>	<u>Red</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>
Set	<u>9,778*</u>	<u>130,954</u>	<u>172,562*</u>	<u>279,599</u>	<u>143,757</u>
Sub Total	9,778	130,954	172,562	279,599	143,757

NORTH CENTRAL DISTRICT

Set	6,787	247,200	68,778	920,439	12,829
Drift	<u>701</u>	<u>156,378</u>	<u>19,306</u>	<u>212,823</u>	<u>195,342</u>
Sub Total	7,488	403,578	88,084	1,133,262	208,171

SOUTH CENTRAL DISTRICT

Set	2,471	216,741	65,083	977,038	44,347
Drift	<u>177</u>	<u>382,181*</u>	<u>77,724</u>	<u>239,747</u>	<u>551,016*</u>
Sub Total	2,648	598,922	142,807	1,216,785	595,363

SOUTHERN DISTRICT AND CHINITNA BAY

Set	100	13,907	2,722	12,455	14,466
H.P.S.	<u>45</u>	<u>5,176</u>	<u>826</u>	<u>551,900</u>	<u>10,425</u>
Sub Total	145	19,083	3,548	564,355	24,891

KAMISHAK BAY

H.P.S.		<u>18</u>	<u>89</u>	<u>6,300</u>	<u>37,346</u>
Sub Total		18	89	6,300	37,346

OUTER DISTRICT

H.P.S.	<u>2</u>	<u>8,597</u>	<u>1,883</u>	<u>1,683,023*</u>	<u>126,750</u>
Sub Total	2	8,597	1,883	1,683,023	126,750

EASTERN DISTRICT

H.P.S.			<u>3,728</u>	<u>49</u>	<u>10</u>
Sub Total			3,728	49	10

All Districts

Total	20,061	1,161,152	412,701	4,883,373	1,136,288
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Total Salmon Caught 7,613,575

*Largest caught by species

SALMON

There seemed to be no end to the salmon run of 1962 in Cook Inlet. The season started off normally, but the runs built and built to unprecedented highs. The seine fishery in the Outer District was opened by field announcement late, on July 9th, the latest opening for the area in the records of recent years. Once opened it never closed. Fishing time jumped from the normal four to five days a week on August 6, then to seven days on August 11th. Pinks normally come into this District in strength after the chums have spawned. In 1962 pinks were in Port Dick in strength at the opening, and fresh fish were still showing when fishermen left the area due to lack of tender service.

The seine fishery accounted for about 30 percent of the total numbers of fish taken in the Inlet. Normal catch of seine fish usually is between 15 and 20 percent of the total fish taken in the Inlet Districts.

From mid-season on when it was evident that the Cook Inlet runs were unusually strong, no tender service was available to fishermen east of Nuka Island, and only sporadic service was available in Nuka Passage. Heavy runs of pinks and silvers occurred at Aialik Bay, and in the East Arm of Nuka Bay: these went unharvested.

Kamishak Bay was opened by field announcement July 19, but fishing was so good in other Districts that fishermen had little incentive to move into the bad-weather area of Kamishak. A few fishermen wanted to go there, but could not because no cannery could or would provide tender service; all tenders were working full-time handling other areas. Kamishak fish went unharvested.

During one fishing period, Monday, July 16, approximately 659,000 fish were taken above Anchor Point--nearly nine percent of the total catch for the season of about 7,500,000 for all of the Cook Inlet District. The bulk of these fish were red salmon.

On July 23, fishing time for the Inlet above Anchor Point was increased from the normal two days a week to three days a week. This increase in time came a week or ten days earlier than normal. Again on the 29th of July, a further increase to five days a week was given for the area above Anchor Point. And on August 11, when pink salmon were literally boiling into Kenai River and showing extremely well in the Kasilof River, seven day a week fishing was announced for those Districts above Anchor Point.

On July 31, in an unprecedented (for Cook Inlet) move, drift gear was allowed into the Kamishak Bay District, which previously had only known seines (and traps many years ago). This move was called for because there was essentially no seine fishing pressure in the District, though seven day a week fishing had been announced for the District on July 29.

About four drift fishermen moved into the Iliamna Bay and Iniskin Bay area briefly. They caught few fish, had no tender service, and found that there were so many rocks and so much bad weather that they couldn't fish properly.

They assured representatives of the Department that they would never again want to try drifting in the Kamishak Bay District.

More data of value for the management of the salmon fishery in Cook Inlet becomes available each season. Most of this data is general, and results from observation of the fishery. During 1962, and during 1961, it appeared that the peak of the run of pink salmon bound for the Susitna Basin--a significant portion of the Cook Inlet pink run--arrived in the neighborhood of the Forelands and Kalgin Island about July 20 to July 25. This is about a week or ten days earlier than the heavy pink runs that appear on the east side beaches in the vicinity of the Kenai and Kasilof Rivers. Each year (1961, 1962) the pink run moved through the fishery and entered the Susitna River during periods closed to commercial fishing. Each year additional fishing time was probably justifiable during this run for the area above the Forelands.

An indication of the strength of this run came from the fact that on July 19th, approximately 34 percent of the catch consisted of pinks--and the main gear in use at the time was red gear, which has a normal mesh size of five inches or greater. The only pinks caught were the larger ones, mostly males. The sudden increase of pinks became evident first on the above date, for on the 16th of July, the preceding open fishing period, only approximately nine percent pinks were taken below the Forelands, and about 27 percent pinks above the Forelands; most of the latter were taken on the last part of the last fishing tide, and mostly in Trading Bay, the fishing area just above the Forelands.

Again on July 23, the drift fleet took about 26 percent pinks, still using drift gear. Above the Forelands the pink catch soared to about 45 percent. At this time some of the set net fishermen above the Forelands were using pink salmon gill nets.

It was on this day that sufficient data became available on escapement to warrant increased fishing time for the Inlet above Anchor Point, and, as already pointed out (above) fishing time was increased to three days a week.

This increase in fishing time benefited fishermen below the Forelands far more than it did those above. Shortly after the three day period was announced many fishermen above the Forelands stopped fishing because of a lack of fish.

Little need be said about the red run for the Inlet other than the statement that it appears to have recovered somewhat from the apparent over-fishing that occurred in the early 1950's. This run was strong in the Inlet this year, and both set net fishermen and drift fishermen did well in general. Distribution of fish between drift and set net gear was about normal, with the drifters taking about 24.7 percent of total fish caught in the Inlet, and the set nets taking about 45 percent. The remaining 30 percent were of course taken by the seine fishermen below Anchor Point.

During the peak of the red salmon run Ben Hilliker, a permanent biologist on the Cook Inlet staff, spent several weeks aboard tenders and fishing boats in the North Central and South Central Districts. Observations of value for management purposes for the 1962 season were made.

This biologist cautioned that some of his observations were probably oversimplified. Nevertheless they were of interest and of value. He observed that fish tend to follow on either side of the tide rips, of which there are four major ones. Fishing is best at either high or low slack for drift fishermen.

A moderate blow or rough weather in late June or early July scatters fish or breaks up concentrations of migrating salmon, but they still stay well offshore. A blow late in July tends to not only scatter fish, but it moves them more rapidly into the river mouths and along the beaches. This is probably due to a more advanced stage of gonadal maturation, but it is still an important aspect that must be considered in the management of the drift and set net fishery of these Districts.

No evidence was found to support a milling or schooling area in the vicinity of Kalgin Island. In fact it appears that fish move steadily through the area around Kalgin Island. This is supported by catches made by the drift fishery, for at the opening of each fishing period a concentration of boats is normally found north of Kalgin Island. This changes gradually until in late afternoon and early evening when the fishing is from mid-Kalgin to as far south as the latitude of Ninilchik. This does not appear to be a concentration of one large school of salmon, but rather a "wave" type migration composed of many schools of mixed species moving steadily up the Inlet.

Sockeyes appear to favor the east shore, from the middle rip east. In the middle of the Inlet this year reds and chums were mixed and migrating together. The chums did not move inside the east rip in any numbers.

Cohos were not found to follow any set migratory pattern, however, the bulk of these fish were taken east of the middle rip or closely adjoining this rip from south to north along Kalgin Island.

Pink salmon favored the Kalgin or western rip and the middle rip. Pink salmon moving into the Kenai or Kasilof Rivers appear to move along the eastern rip then hit the beach (Kalifonski, Humpy Point) before entering the streams.

In the seine fishery the story of the season could be told by recounting the number of times stream markers were moved inward, or completely removed. Pink salmon were present in tremendous numbers in all of the important streams of the Southern, Outer, Kamishak Bay Districts. On at least 15 occasions stream markers were moved inward, or as happened in some cases, they were completely removed to allow fishermen to fish to the stream mouths.

A number of these marker removals were handled by firing of flares, so as to allow all fishermen an equal opportunity to catch their share. Such events were always publicized as much in advance as possible. An estimated 300,000 pink salmon were taken during these flare openings, with the bulk of these coming from Tutka Bay Lagoon, Seldovia Bay, Port Dick, and Nuka Island.

The Cook Inlet salmon season ended when the canneries closed--at which time all seven Districts of the Area were open to fishing seven days a week.

In summary, the red, chum, and coho runs were excellent; the pink run was tremendous. And the king run compared with the normal of former years was a failure. (See following section on the king salmon in Cook Inlet.)

The King Salmon in Cook Inlet:

Cook Inlet's consistent, large, and high quality king salmon pack was famous for many years. Records for the period prior to 1930 are incomplete; however, it is known that the Inlet's king salmon were important to the salmon industry in the early 1900's.

From 1930 until the late 1940's the average pack of kings for the Inlet was between 20,000 and 25,000 cases. Fishing gear used during these years included only traps and stake or set nets.

Prior to 1948 no other type of gear made significant catches of kings in the Inlet. In 1948 a small number (80) of drift boats started fishing. This number skyrocketed until a peak of 560 was reached in 1951.

During the years that drift boats increased there was a moderate decrease of set net gear. However, the combined set net, trap, drift net fishing pressure

was considerably greater than the set net-trap pressure previously exerted.

Peak of the drift fleet occurred in 1951. The peak of the king salmon catch also occurred in 1951, and in that year 64,000 cases of kings were packed.

Since 1951 there has been a steady downward trend in catch figures for king salmon for the Inlet, until during the past two years about 20,000 fish were taken, or around 4,500 cases.

It appears that in the peak production year the catch that had previously normally been taken, plus a large part of the normally expected escapement, went into the can. As a result a distinct downward trend occurred and has continued to occur to this day.

Traps were last used in Cook Inlet in 1958. Many fishermen believed that upon elimination of traps escapement of king salmon would increase and that the run would once again build. Actually, upon elimination of traps, set nets caught those fish that would have been taken by the traps, and very little actual change in catch occurred. The catch of kings for 1958 and 1959 about the same. No particularly heavy king escapement is recorded in data that the State of Alaska received from the U. S. Fish and Wildlife Service.

Salmon season opened between May 20 and 25 for as far back as records can be found for Cook Inlet. The early season is traditionally the king season, and about 50 percent of the king salmon have been packed by June 7 or 8.

In 1961 salmon season opened June 8. This was in hopes that it would cut the commercial catch in half and allow more escapement.

Such a late opening virtually eliminated the drift fishery for kings, as may be seen from the following:

Drift caught king salmon, individual fish, Cook Inlet:

<u>Year</u>	<u>Number</u>
1958	3,883
1959	5,891
1960	3,304
1961	1,186*
1962	1,056

*First year with a June opening date.

Cook Inlet commercial fishermen are no longer purchasing king gear; all use red gear and pink gear. Some old king gear is still used, but it is rapidly wearing out and likely will not be replaced.

The bulk of commercially caught kings in Cook Inlet are from the Susitna Basin. Field personnel working for the Commercial Fisheries Division had great

difficulty in finding spawning king salmon in the Susitna Basin in 1960, 1961, and 1962, despite flying hundreds of hours on stream surveys and specifically looking for king salmon. Other species of salmon were commonly found and good counts of them made.

It is obvious that the king salmon of Cook Inlet is greatly reduced in numbers. No cause other than fishing pressure is known to have caused this reduction. It appears that the only possible method to retain and/or re-build this species in Cook Inlet is to curtail fishing pressure. A certain curtailment has already been affected. Further curtailment may be necessary.

Escapement, 1962:

Northern District:--But one reliable count has been obtained annually from drainages in the Northern District, and this is at Fish Creek, on Knik Arm, where a counting station is operated during July. The count of 69,384 for 1962 was slightly above the 16-year average of 61,000.

A very high proportion of the 1961 red escapement into Fish Creek consisted of jacks--about 6,500. Applying the common rule of thumb figure that jacks represent about 10 percent of the run that will appear the following year seems to work out pretty close in this instance.

During 1962 the jack count was only about 4,500. If the rule of thumb method is valid a somewhat below normal run can be expected in 1963.

Fish Creek has a long history of personal use, subsistence, or sports fishing. During 1962 this stream was closed during July for salmon fishing, but it was open to trout fishing. The temporary employee who manned the counting station located at the bridge crossing Fish Creek reported that there were no trout from about a mile upstream from the bridge to the mouth of Fish Creek. Yet "sportsmen" constantly fished this area with large daredevils or other large tackle. One Sunday afternoon prior to August 1, there were 17 cars at Fish Creek, parked there presumably by trout fishermen.

On August 1st, when salmon season opened in Fish Creek, at 4:00 a.m., there were 45 fishermen on the creek. Of these 45, 43 were snagging or trying to snag salmon. The other two fishermen were actually fishing.

The majority of people snagging fish wasted many salmon. They wanted silver salmon only, and frequently when they snagged a pink salmon (at this time the main species were pinks and silvers) they put their foot on the fish and ripped hooks out. Often they didn't bother to toss the fish back into the stream, but left them on the bank. Many fish that were kicked back into the water were seen floating with the current, belly up.

This situation was encouraged by a report in the ANCHORAGE TIMES for August 3, 1962, when a biologist of the Department was quoted as saying that: "The popular method for catching silvers in Cottonwood Creek is with cluster eggs while the majority of reds are being taken with snag gear."

Cottonwood Creek and Fish Creek are adjoining streams that enter Knik Arm about seven miles apart.

This biologist was further quoted as giving, "The following tips and comments....Fish Creek opened Wednesday with high prospects of success for pinks using snag gear. Moderate numbers of silvers and large numbers of pink salmon in bright condition are reported."

Fish Creek is a small stream with an average width of perhaps 15 to 20 feet, and an average depth of perhaps a foot. It can easily be waded at almost any point. Salmon in the stream are highly visible and easily snagged.

Gear suitable for snagging salmon is presumably illegal. The temporary biologist manning the counting station became so busy citing snag fishing "sportsmen" into court and appearing in court that he no longer had time to make his salmon counts. Accordingly, he was removed from the station and given another assignment.

Stream surveys in the Susitna drainages normally yield little information because of the glacial waters. The clear-water Talichulitna, which is a major pink producer, this year held an estimated 1,000,000 pink spawners. This is similar to escapement into that stream for 1960.

Aerial surveys as usual for this area were inconclusive. Two old-timers who have resided in their respective areas for 30 or more years claim that salmon escapement this year was the best they had ever seen. One of these individuals was Jimmy St. Clair, who works as a Protection Aide for the Department summers throughout the Susitna Basin from Alexander to 70 and 80 miles upstream. The second was Bob Mathison, who lives on the lower Chickaloon River on Turnagain Arm.

Fishermen's reports from the vicinity of Beluga River also indicated a heavy pink escapement into the small streams of that drainage.

North Central District:--Escapement into the Kenai River was apparently heavy for red salmon and pink salmon. The counting tower at Lower Russian Lake was manned for the third season.

<u>Year</u>	<u>Red</u>	<u>Silver</u>	<u>King</u>	<u>Pink</u>
1960	37,680			
1961	22,814			
1962	48,214	2,105	58	2,203

The counting tower was manned through August for the first time in an attempt to evaluate the silver salmon run.

"Sportsmen" (mostly snaggers) caught 4,709 red salmon between June 15 and August 15, from Russian River during the 1962 run, this from a creel check study made by the Sport Fish Division.

Escapement into the Kasilof River and Tustumena Lake was good. Again, because of silty water, exact figures are impossible to obtain by visual methods.

South Central District:--The only streams in this District of importance to the salmon fishery are on the west side, and no specific information was gathered on escapement in this area.

Southern District:--Escapement of pink salmon into Port Graham River, Seldovia River, Jakalof Stream, Tutka Bay Lagoon, China Poot, and Mallary Bay Stream was at a very high level. Markers were moved inward or completely removed at Seldovia, Tutka Bay Lagoon, China Poot, and Mallard Bay Stream during the season because of the great abundance of fish.

Kamishak Bay District:--Fewer than six salmon fishing boats fished this District in 1962. Escapement in all streams surveyed was at an extremely high level. Bruin Bay Stream in particular had a tremendous number of pink spawners. Because of the great height of activity in all other District, few stream surveys were made of this District in 1962. Plans for the 1963 season include opening this District early (it opens by field announcement) and moving stream markers inward at almost all streams. It is hoped this will encourage fishermen to move into this District, get tenders started servicing the District, and put it on a paying basis.

Bad weather, uncharted reefs and rocks, and few really good seining beaches combine to protect salmon in this area. Fishermen are fortunate to be able to fish two or three days out of the present five day a week fishing period established for this District.

It is felt that the only logical way to encourage use of this District will be to open it for seven days a week, move stream markers inward, and in this way attempt a harvest. If escapement lags, the area can be closed to fishing.

Outer District:--Normally the Outer District opens about July 4th, and closes in around two weeks for a period of ten days or two weeks, then re-opens. In 1962 the District was opened (it is opened by field announcement) on July 9th, and it remained open continuously until fishermen left the area. Stream markers were moved inward in many locations, and still fish continued to pour onto the spawning grounds. Escapement into all streams normally used by salmon in the Outer District was at an extremely high level during the 1962 season.

Eastern District:--This District suffered from lack of attention from fishermen in 1962 for two reasons. The first and main reason was the heavy runs of fish in the Port Dick, Nuka Bay areas, and second the lack of tender service and difficulty in finding a market for fish in the Seward area.

Escapement into streams of the Eastern District was good.

Test Fishing Program, Kenai and Kasilof Rivers:

In June, July, and August, 1962, a test fishing program was initiated with gill nets in the Kenai and Kasilof Rivers. Main objective was to determine, if possible, extent of escapement of red salmon. Other objectives were to determine dates of peak escapement, and racial differences between red salmon that spawn in these two drainages.

The initial plan was to use a set net that would cover about one-fourth to one-fifth of the river immediately above the influence of the largest tides. It was hoped that by fishing above tidal influence the samples obtained would come from fish committed to migration upstream.

A schedule of fishing times was prepared, with fishing to commence one hour after high tide, a time that was believed most likely to catch fish moving upstream. Fishing was alternated between the Kasilof and Kenai Rivers, sampling two consecutive tides on one before moving to the other.

Fishing sites were selected by surveying the streams from an airplane, and permission was obtained from landowners to operate from their property. Two boats were used, one in each river.

A 12 fathom gill net, ten feet in depth, of five and one-quarter inch mesh (stretched measure) was used; this is standard red salmon gear on the Inlet.

Early attempts to fish in the river met with failure, primarily because the net bellied downstream. Salmon avoided the net. In the Kenai River moss clogged the net, and snags gave trouble. In order to catch fish it was necessary to move downstream into the area of the river where the current moved upstream due to tide. This bellied the net properly, stretching the mesh, and allowing fish to become gilled.

It was soon evident that Kenai River fish moved upstream in two definite periods. The first came when incoming tide first slackened river current, continuing for about 42 minutes. A fishless period then occurred until one and one-half hours before high tide. From then until high tide fish moved upstream. This movement stopped at peak tide when the river current turned and started to move downstream. Few fish moved downstream in the Kenai River. When current changed they held steady. This was determined by fishing ebb tide and catching no fish.

On the Kasilof River fish moved steadily upstream at the test site during the rising tide.

After experimentation a consistent method of setting the net was used; the buoy on the anchor line was attached to the end of the net, the net piled on the bank, and the anchor and buoy towed straight offshore to where the anchor was dropped overboard.

Just prior to the main run of red salmon in the Kenai River, melting glaciers raised the water level, and the stream ceased to reverse flow in the area selected, even under the influence of 20-foot tides. As a result it was necessary to move three-quarters of a mile further downstream where the current did change, except during the smallest tides. The previously determined timing of fish movement periods were found useless in this location, but after several days of steady fishing it was found that fish moved upstream constantly with rising tide at this site, with no interruption of movement.

From this time on fishing was conducted on a regular schedule, starting two and one-half hours to two hours before high tide. On days when tide was insufficient to reverse the current, drifting was resorted to in an attempt to determine numbers of fish moving in the river.

A variable, difficult to overcome, was encountered on extreme tides (20 feet or over) on the Kenai River. During the flood the current increased in strength until the net would be pulled out fairly flat once about ten fish were in the net. As a result fish were caught rapidly for five minutes or so, but fewer and fewer after the net began laying flat.

Since only a portion of the rivers were being fished, it was felt that a complete stream block from time to time might give the proportion of fish actually taken in the normal (partial coverage of stream) fishing routine. This was first attempted in the Kasilof River. When time came to haul in the net the current had slackened, and had insufficient force to swing the net into the shore. The lead line was on bottom most of the way across, which made towing it nearly impossible. As a result the net was hauled and picked from the boat to shore in about one hour; actual fishing time was four hours. The validity of the information obtained thusly was questionable.

The complete block on the Kenai River also failed. The current became so powerful the net could not be held. It took a full hour of picking and hauling to retrieve the net, and this of course reduced accuracy of data obtained considerably.

The number of salmon caught per unit of time was the scale used to determine relative numbers of fish moving in the river. When the time could not be determined with accuracy in relation to tidal movements, no great credence was given the figures obtained.

Water level of the Kenai River, after a brief high spell, returned to normal and fishing was carried out regularly.

On the Kasilof River water level remained high from the end of July until the end of August, and nothing less than a 20-foot tide would reverse the current at the location fished. As a result the Kasilof River was drifted during each fishing time.

A rough determination of the catch by set netters on either side of the mouths of both the Kenai and Kasilof Rivers was made during the test fishing

work. In order to get some idea of the catch per unit of effort it was decided to determine how many fish were taken for the first 500 fathoms of gear nearest the river mouths, on both sides. The fishermen's catch was determined at the cannery, and once each two weeks a check was made to determine how much gear each fisherman was fishing.

All fish that were killed during the test fishing were measured, weighed, sexed, and scale samples taken. Fish were then turned over to Columbia-Wards Fisheries for canning, and the State received credit for them.

The greatest variable encountered in this program stemmed from variations in water level of the rivers--both due to high and low tides, and from greater or lesser flow of water in the river due to glacier run-off and rains.

The Kenai River Run of Red and Pink Salmon:--Test fishing commenced June 10th on the Kenai River and continued regularly according to schedule until August 20.

No large number of reds moved into the Kenai River in June, although two small peaks occurred, one on the 10th and the other on the 20th. These peaks did not last more than two tides, nor were more than 19 fish per hour caught.

A steady flow of fish appeared to be present, but always in such small numbers that only two or three an hour were taken on a normal day. The majority of fish were small (5-6 pounds) but well proportioned. They were fat, trim and thick through the back in contrast to the Kasilof River reds which were very small all during the run (3-5 pounds) and were long, skinny, and thin through the back.

Fish continued to be taken at an average of two fish per hour until well into July. On the 15th of July, a 20-minute drift yielded six reds, 2 pinks, and two silvers; these were the first pinks and silvers taken during 1962. After this date one or two pinks were normally taken with each fishing effort, but silvers showed up only occasionally.

On July 17, red salmon moved into Kenai River in greater numbers. Starting on the 17th, seven fish per hour were taken, and the figure rapidly climbed to 80 per hour, and on the 20th of July peaked out at 110 reds per hour. These fish were larger (7-10 pounds) but otherwise appeared similar to previously taken Kenai fish. The main run appeared to last at least five tides; three of these tides were fished. The smallest catch was 70 fish per hour and the highest was 110 per hour during this period.

On July 21, the rate dropped abruptly to eight fish per hour, but again climbed to 28 per hour on the 22nd. On the 23rd, the last catch of size, 24 per hour, was made, and from this date on very few reds moved up.

At this time pink salmon became more numerous, but due to their habit of facing incoming tide, very few were caught compared to the number in the stream.

On the 27th, pinks began showing in very large numbers. The faster the current moved upstream, the fewer were caught, even though many were jumping and rolling. On the 29th of July, 28 pinks were caught in six minutes, for a total rate of 280 pinks per hour. Six reds were also taken at this time. The latter were considerably different from the bulk of Kenai reds taken; the body was longer and more cylindrical, and the tail was very large. After this one tide none of these fish appeared again until August 4, when another three were taken.

Meanwhile the river was absolutely loaded with pink salmon. This condition lasted for 15 days (July 28 until August 13). One man reached into the water with his hand and grabbed out several pinks even though he couldn't see over six inches into the water. They were smashing themselves into the boat dock. Occasionally a "swarm" about 30 feet across would suddenly boil to the surface and send spray flying. During this time no reds and but a few silvers were caught in test fishing efforts.

Pink salmon did not reach the Soldotna bridge until the 12th of August in any numbers. On that date large numbers were observed in the Kenai River. Even though there was a super-abundance of pinks in the river, the five and one-quarter inch mesh gill net was not very efficient in catching them. Later in the season few pinks were seen jumping, although they were extremely active and jumped frequently during the early part of their run.

In summary, the Kenai River red salmon run of 1962 was large, and it peaked near the 20th of July. An extremely large run of pink salmon occurred during the period July 28-August 13. Few king or silver salmon were caught.

The Run of Red and Pink Salmon in the Kasilof River:--Test fishing commenced in the Kasilof River on June 11th. Reds were caught at the fishing site at an average rate of five-six fish per hour for the month of June, and the first and only peak occurred during the first week in July.

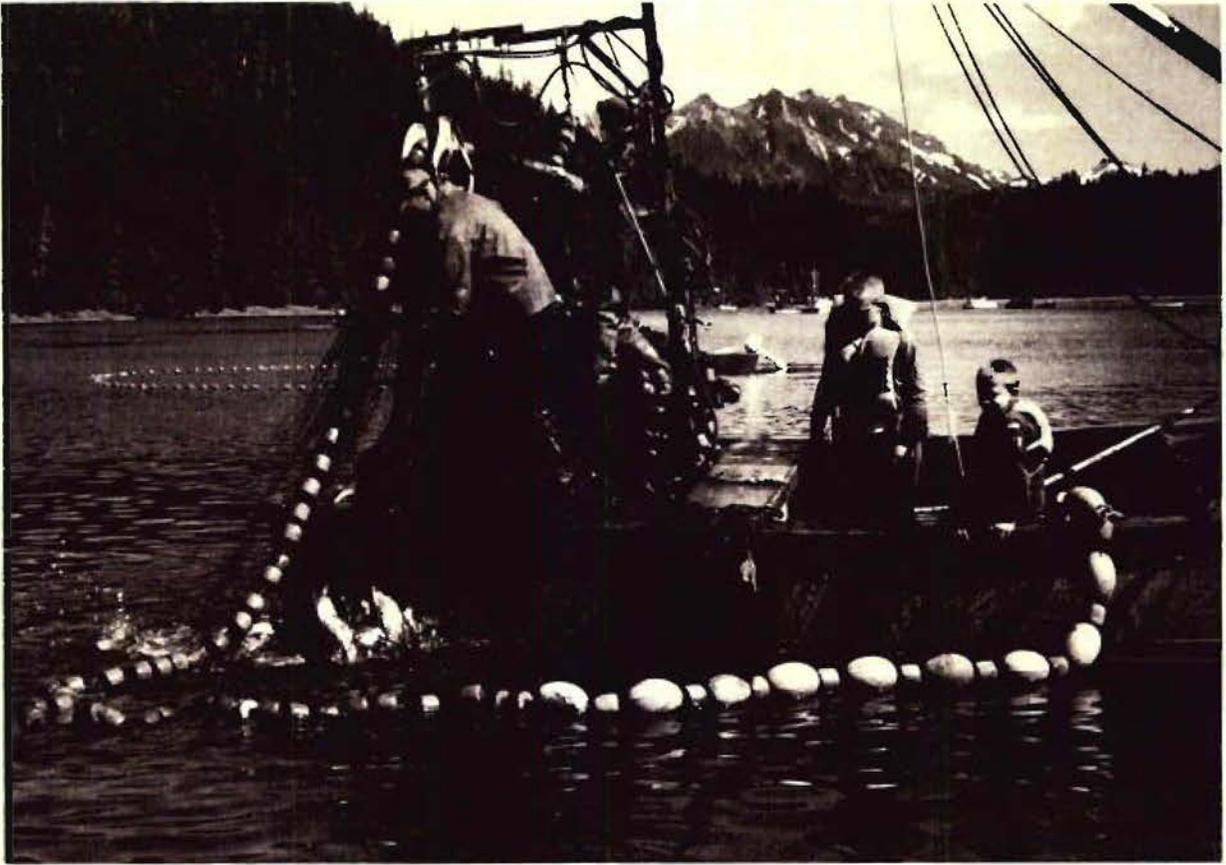
Fish were caught on June 30 at a rate of eight per hour. On July 1st, a heavy run of reds appeared, and the catch jumped to 50 per hour. This figure dropped to 36 per hour next day and on the next fishing attempt on July 3, fish were taken at a rate of 66 per hour, the highest figure recorded for the season.

On the next tide the catch dropped to 15 per hour, and then it dropped off to very few. By this date the Kasilof River had risen considerably and drifting was the only method that could be used to sample the run.

Red salmon next showed on July 12, when a 15-minute drift yielded 12 reds. Nearly all of these were males and they were of a uniform size.

Small peaks which occurred usually consisted of a preponderance of males or females, and they were of uniform size and color.

Reds continued to move in small numbers until July 23. After that date reds dropped off rapidly until the last one was taken on July 26.



Finishing a set- a hand purse seine in Tutka Bay Lagoon with pink salmon at a special opening.

A few pinks were taken after July 16, but they didn't appear in strength until August 3, when a one-hour drift yielded ten. The fish remained present in these relative numbers for four days, and then on August 7, an increase in pinks occurred, but no really large numbers moved in. The apparent peak of the pink run occurred August 8th, when a 15-minute drift yielded 42 pinks. By the 9th of August the catch was 40 pinks per hour, which continued until August 11. It then dropped slowly until by August 16th, an hour of drifting caught only two pinks.

In summary, the Kasilof red salmon run was fair, with a peak during the first week of July. The pink run also seemed just fair. No exceptionally large numbers of pinks entered the river while the test fishing was being done. Kings appeared more plentiful than in Kenai River and they were present until well into July. Silver salmon, as in the Kenai River, were caught only occasionally.

Miscellaneous Data Collected During Test Fishing in Kenai and Kasilof Rivers:--The bulk of the Kenai River red salmon are thick through the back, and, looking from the side, fat and powerful appearing. The Kasilof red is thin, slim, and smaller than the Kenai red. Given a pile of mixed Kenai and Kasilof reds one familiar with both types could easily sort them. There were few exceptions.

There was an early August Kenai red salmon of different appearance. This fish was long, cylindrical, and had an exceptionally large tail. Fishermen claim to be acquainted with this fish, but state they are rarely caught commercially.

Set net fishing pressure made a sizeable difference in daily escapement. During the two days a week fishing time, the best fishing for the test net was during the open fishing periods. Fish required from one to two days to reach the test fishing sites. For example, the set net fishery peaked on the 16-17 of July, for red salmon; the test fishing records indicated a peak on the 20th of July.

River levels had no noticeable effect on test fishing success. When fish hit the beach they usually moved up the rivers without waiting. The only exception was after a strong onshore wind. This often pushed fish into the rivers, where they would be observed in and near the mouths--and set netters along the beaches would make good catches--but it would be several days before they arrived at the test fishing sites.

Stream Clearance:

The bulk of stream clearance work in Cook Inlet is in the Susitna Basin, and the crew of two men assigned this project, as usual, operated from Anchorage.

Beaver dams removed were located as follows:

<u>Stream</u>	<u>No. Dams</u>
Rainbow Creek, near Wasilla	1
Cottonwood Creek, Knik Arm	2
Packer's Creek, Kalgin Island	2
Campbell Creek, Anchorage	1
Lake Creek, Nancy Lake	5
Lynx Lake	7
Fish Creek, Red Shirt Lake	7
Trinity Creek	5
Sucker Creek	<u>2</u>
	32

In addition, two large boulders were blown from Rocky Creek near Rocky River in the Outer District, and a log jam removed from the entrance to Anderson Lake, on Anderson Beach. Both the boulders and log jam were blocking fish.

A trained and experienced explosives handler who held an Alaska state license for using explosives was in charge of the stream clearance work in 1962. He recommended, after trial, that 40 per cent gelatine dynamite be used for this work, not 40 per cent gelatine extra. Fumes from the latter are too toxic.

Further recommendations include the use of rubber gloves in handling explosives, and the use of hard hats. He also recommended that when traveling down a stream on a beaver dam clearing assignment, a boat always be taken. If the going gets rough walk the boat in the water, and if necessary, cache the outboard so it can be picked up on return. Do not leave the boat and strike out afoot.

Age of Cook Inlet Salmon at Maturity:

Few records of various salmon studies made by the Federal Government were turned over to the State in 1960, at the time authority for management of the resource was transferred. Since 1960, a few series of scale samples have been obtained and read.

One project that was followed was a Federal "crash" program involving taking numerous samples of length, and some scale samples, at random, from tenders and fish scows in the Inlet. This work started in 1961, and it concluded in 1962. The results of this are shown following.

Obviously the weakness of this type program is that though we might know the age of the fish from which a scale was obtained, we have no idea where that fish was bound. We can deal in generalities about the ages of Cook Inlet fish with this data, but we cannot state, for example, that a certain percentage of red salmon bound for the Kenai River were such and such an age.

During 1962, a test fishing program was carried out in the Kasilof and

Kenai Rivers. An attempt was made to minimize the kill of salmon, but because a gill net was used a certain number were unavoidably killed. Each of these was measured and weighed and a scale sample taken. Since the sample came from fish that were taken well upstream, it is reasonably safe to assume that these fish were in their home streams.

A smattering of information exists in old Fish and Wildlife records as to the ages of red salmon from the Inlet, though nothing indicates where the samples were obtained.

Further, one report on the ages of king salmon was found in the Fish and Wildlife Service records. Also in 1961, a series of king salmon scales was taken by our Department.

The various reports are rather scattered, and in order to make them generally available, they are included in this report.

From unmarked Fish and Wildlife Service report: Age composition of Cook Inlet red salmon, from catch.

Year	Sample	3 ₂	4 ₂	4 ₃	5 ₂	5 ₃	6 ₂	6 ₃	6 ₄	7 ₃	7 ₄
1952	2,938	.3	7.2	.3	40.9	19.9	0.8	29.4	.8	.1	.3
1953	3,061		17.1	.1	44.4	18.9	.2	18.5	.3		.1
1954	2,637		10.8		58.4	8.3	0.2	20.6	.2	.1	.5

The following is from the 1962 test fishing program of the Kenai and Kasilof Rivers. Scales were impressed on plastic and read by Jean Dunn, of the Fish and Wildlife Service, Montlake Laboratory, Seattle.

Kenai River (red salmon only). Number of samples in each class is in parentheses.

Year	Sample	4 ₂	5 ₂	5 ₃	6 ₃	6 ₄
1962	47	14.9 (7)	55.3 (26)	14.9 (7)	12.8 (6)	2.0 (1)

Kasilof River (red salmon only).

Year	Sample	4 ₂	5 ₂	5 ₃	6 ₃
1962	66	34.8 (23)	62.1 (41)		3.0 (2)

The following is from the Federal "crash" program for 1961 (red salmon only). Parent streams of these fish unknown. Number of samples in each class is in parentheses.

Year	Sample	3 ₂	3 ₁	3 ₀	4 ₂	4 ₁	4 ₀	5 ₂	5 ₁
1961	1,018	.01 (1)	14.6 (149)	0.3 (3)	2.9 (30)	78.38 (798)	.01 (1)	3.0 (31)	.49 (5)

The following is from the Federal "crash" program for 1962 (red salmon only). Parent streams of these fish unknown. Number of samples in each class is in parentheses.

Year	Sample	4 ₂	4 ₃	5 ₂	5 ₃	6 ₂	6 ₃
1962	2,760	34.6 (823)		58.3 (1387)	6.4 (153)	.1	.7 (16)

The following is from the Federal "crash" program for 1962 (chum salmon only). Fish taken in Port Dick area. Number of samples in each class is in parentheses.

Year	Sample	3	4	5
1962	240	13.9 (37)	84.2 (224)	1.9 (5)

Age of Cook Inlet King Salmon:

Three series of scale readings from Cook Inlet king salmon are on file in this office. The best sample, from fish on both the east and west side of the Inlet and as far north as Point McKenzie, was taken by the Fish and Wildlife Service. They were read by Ken Mosher, of the Fish and Wildlife Service, as follows: Number of samples in each class is in parentheses.

Year	Sample	3's	4's	5's	6's
1954	258	1.55 (4)	35.66 (92)	46.90 (121)	15.89 (41)

A second series of scales were taken from king salmon in the vicinity of Kalgin Island in the summer of 1961. They were taken from the commercial catch by Ben Hilliker, of this Department, and read by Rae Baxter, also of this Department.

Year	Sample	3	4	5
1961	21	14.2 (3)	28.5 (6)	57.1 (12)

The third series were taken by Jean Dunn, at the time Sports Fish Biologist

for this Department, at Seward. All samples were of fish caught in Anchor River in 1960 by sports fishermen. The Bureau of Commercial Fisheries read the scales for Dunn. Number of samples in each age class in parentheses.

Year	Sample	62	52	42	32	31
1960	199	10.1 (20)	76.9 (153)	6.5 (13)	3.0 (6)	1.5 (2) (5 unaccounted for)

Subsistence Take of Salmon:

A permit was required for the first time this year to take salmon for subsistence purposes. One condition of the permits that were issued was a requirement to report numbers of salmon taken.

A total of 192 permits were issued. About 60 permit holders did not report their catches so letters requesting them were sent. In the end, reports were obtained on all but 13 permit holders.

During this year the 179 permit holders who reported their catches took:

<u>Kings</u>	<u>Chums</u>	<u>Silvers</u>	<u>Reds</u>	<u>Pinks</u>	<u>Other</u>
45	391	3,574	770	417	47

Of the total of 5,101 fish taken, silvers made up about 70 per cent. subsistence season was set so that silver salmon would form the bulk of the subsistence catch, and these figures indicate that dates set have accomplished that purpose.

Fritz Creek Program:

In 1961, approximately 2,000 adult pink salmon were introduced into Fritz Creek in Kachemak Bay from China Poot stream. (See 1961 Annual Report, Cook Inlet.)

This year the aluminum fishway was installed permanently at the Fritz Creek falls, and a similar transplanting program completed, this time with 2,500 adult spawning pink salmon.

Transplanting started August 15, and continued through August 20, with the following results:

Wednesday, August 15

Total pinks captured and put into live tank	520
Mortality	20
Introduced into Fritz Creek	500

Thursday, August 16

Total pinks captured and put into live tank	450
Mortality	0
Introduced into Fritz Creek	450

Friday, August 17

No transplant made. The attempt to seine in China Foot Stream took too long and tide was too low when set completed. Fish released from seine.

Saturday, August 18

Total into tank	520
Mortality	0
Introduced into Fritz Creek	520

Sunday, August 19

Total into tank	520
Mortality	0
Total into Fritz Creek	520

Monday, August 20

Total into tank	525
Mortality	10
Introduced into Fritz Creek	525

Five day total into Fritz Creek	2,505
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On August 20, last day of the transplant, 75 pinks were seen above the ladder from one-half to three-fourths mile upstream. Another 150 fish were seen outside the fence that was erected to keep fish in the stream. Tides were higher than judged, and the fence was not built sufficiently high enough to keep from flooding over the top.

On August 21, 520 fish were observed below the ladder, and 76 were counted above the ladder for a distance of about three-fourths mile. No spawning activity was observed. No pairing was observed. Fish appeared vigorous. Fighting was observed in a pool containing ten pinks.

On August 29, 89 pinks were observed above the ladder and 778 below it. Seagull predation appeared heavy.

September 4, 500 fish were observed below the ladder, and 28 above. Much spawning activity was noticed. About 50 dead fish were seen from the fence to the mouth of the stream.

September 6th, nearly 100 dead or dying fish were observed below the fence at low tide.

OBSERVATIONS ON OFFSHORE SEISMOGRAPHIC WORK

COOK INLET

1962

BY

ROBERT H. MOSS

TABLE OF CONTENTS

Introduction

Method of Operation

Seismic Operational Difficulties

Observations and Fish Kill

APPENDIX

I List of References

II Pictures

III Chart Showing Location of Offshore Area Surveyed

INTRODUCTION

In March of 1962 an Aquatic Seismic Exploration Permit was granted to Shell Oil Company to conduct a reconnaissance seismic program in Cook Inlet from April 1, 1962 to April 30, 1962. The permit was a standard Alaska Department of Fish and Game one without any sections or subsections waived. The portion covered extended from 3 miles North of Kenai River to 2 miles south of Pt. Possession and included areas extending to either shore. Preliminary plans were to shoot over 300 miles of lines. However, the final amount was somewhat less due to the shallow water along the shorelines. This permit area was also included in a survey conducted by Standard Oil in 1959 (Weberg, C. A. and Rearden, J. D.). The actual shooting commenced on April 6, 1962 and was concluded on April 29, 1962. A total of 1735 seismic explosions were made during 17 days of actual recording. Technical difficulties and hydrographic conditions accounted for the additional time necessary to conclude the project.

METHOD OF OPERATION

Shell Oil Seismic Party #38 conducted the work using two specialized Shell Company boats, the MISS BETTY and the MISS HELEN. Two chartered boats, the EUDORA and the MELODY completed the flotilla.

Both the MISS BETTY and the MISS HELEN were specifically designed 110 foot steel boats for this type of work. The MISS BETTY served as the shooting boat, carried the explosives and, with its clear canopy surface over the stern, served as a helicopter landing port on occasions. The MISS HELEN had the recording equipment and a large hydraulic reel to handle the seismic cable. Programming and various decisions necessary in the operation were initiated from this vessel. The EUDORA, slightly under 100 feet in length with a regular helicopter platform, was to serve as a tail boat on the cable. However, tidal currents did not permit this type of operation and the vessel served as an errand boat and frequently as a "sparker" for seismic recording along the shallow shorelines. The MELODY, a chartered 47 foot wood hulled vessel, was the Fish and Game Department's observation boat.

With the exception of several minor procedures and a different type of cable, the operation was very similar to the one reported in some detail by Weberg and Rearden in 1959. This cable did not float but remained approximately 35 feet below the surface. This was accomplished by filling it with a light oil and is called a Palsey cable. A $\frac{1}{2}$ inch cork composition cable was tapped to the main cable for added floatation due to the cold water. The two center sections were dead as the shot velocity at this point is too violent for accurate recording. The front end of the cable has a large heavy shoe horn type weight for a suppressor. A buoy runs to the surface to mark the suppressor's location. At the end of the 2600 foot cable another buoy is attached for a marker.

The shooting boat was kept 50 feet abeam of the shooting buoy which was towed at a constant distance astern of the recording vessel. Just prior to detonating the charge, the seismic cable is allowed to run out as the recording vessel moves ahead. Thus the cable is, in affect, lying dead in the water which results in clearer recording. The cable slack is then reeled in hydraulically in time to release again for the next shot.

The shooting crew consisted of 4 men who rotated jobs. For safety reasons, two terminals and a key must be closed on the shooting boat after which a key is closed on the recording boat and then the charge fires automatically when the recording drum revolves to zero.

Petronite (Atlas), a nitro carbonitrate, was used in amounts of 10 and 16 $\frac{2}{3}$ pounds at depths of 3 and 4 feet below the surface for the majority of shots. However, 25 pounds of Vibronite and 3 $\frac{1}{2}$ and 4 feet was used in 66 shots and 5 shots of 5 pounds of Nitromon at a depth of 3 feet.

Two series of refraction shots were made in the middle of the Inlet north of the Forelands and south of Middle Ground Shoals in 11 fathoms of water. All shots were made next to an anchored buoy with the recording boat moving away. Charges ran from $16 \frac{2}{3}\#$ to $150\#$ of Vibronite and were exploded each time the recording vessel traveled 2300 ft. Although permission for such heavy charges was granted with reservation, the conditions for observation were good. It is interesting to note that only one 5" herring (*Clupea pallasii*) was seen. None of the numerous gulls picked up any fish from the 32 shots which were usually set off at 40 feet.

Two series of 11 shots each were made during velocity shooting. The shooting boat moved ahead to the 11th shot point, turned around, and then both the shooting and recording boat ran toward each other, passing on parallel courses at shot point 6. At each 1300 foot interval traveled $33 \frac{1}{3}\#$ Petronite was detonated. No cable is used by the recording vessel and generally an odd number of shot points are used for this type of shooting.

Helicopters were utilized for transferring personnel, emergency parts, mail, and records from Anchorage to the boats. Spring breakup and the remoteness of the shoreline from roads made this method very practical.

SEISMIC OPERATIONAL DIFFICULTIES

Climatic and hydrographic conditions mainly caused the delays and difficulties encountered during the operation. As late as the last week in April, ice was still in abundance around Anchorage. It had ceased by then, however, to be a programing factor in the area of actual work. Such was not the case during the first weeks work when ice floes often necessitated moving to different lines or replacing cable buoys that had been sheared off. The MELODY and EUDORA, both wooden hulls were not able to move as freely as the other two vessels in the ice.

Tidal currents in upper Cook Inlet are particularly severe, running as strong as 8 or 10 knots. Normal towing time for the recording vessel was 2 to 3 minutes for each 1300 foot interval. In one instance it was necessary to run 20 minutes against the current to travel this distance. The specialized seismic boats, with twin engines and hydraulic cable reel were very adaptable to these conditions and frequently shifted to different lines to proceed under more favorable conditions.

A sunken cable prevented working in waters less than 9 fathoms. In spite of this precaution, it did snag up and was parted from the recording boat. Two days were spent dragging for the lost cable by the observation vessel as well as the seismic boats. Approximately one half was retrieved in a partially repairable condition. Additional sections were flown in from Texas to finish the program.

OBSERVATIONS AND FISH KILL

Conditions were generally favorable for observing fish kills except for the characteristically muddy water of Cook Inlet. Sea gulls were often present to search the boils. Satisfactory observation from the shooting boat was possible the first few days, when working in the ice. Standard procedure of watching gulls and running through each boil was carried out by the observation vessel. On 6 days negligible numbers of herring (*Clupea pallasii*) measuring about 3 inches in length were seen. In addition a total of less than 10 tomcod (*Microgadus proximus*), ranging from 5" to 11" were counted during the 17 days of actual shooting. In conclusion, the observer feels that the area was particularly void of fish during the operation.

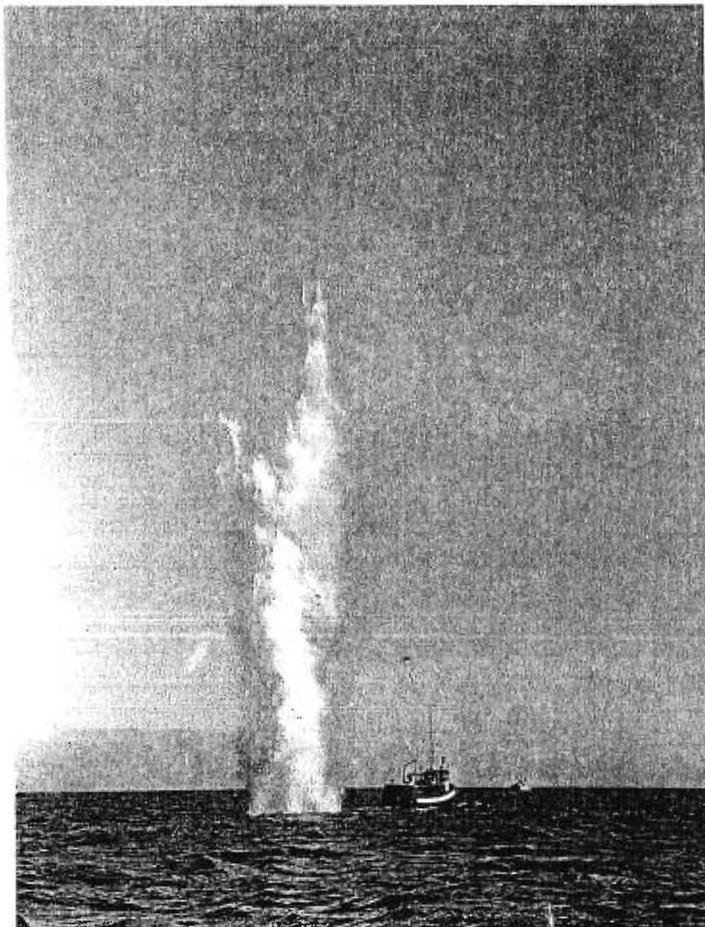
APPENDIX I

LIST OF REFERENCES

- Clemens, W. A., and Wilby, G. V., "Fishes of the Pacific Coast of Canada".
- Weberg, C. A. and Rearden, J. D., "Observations on offshore Seismographic Work in Alaska, January June 1959"
Alaska Department of Fish and Game 1959.

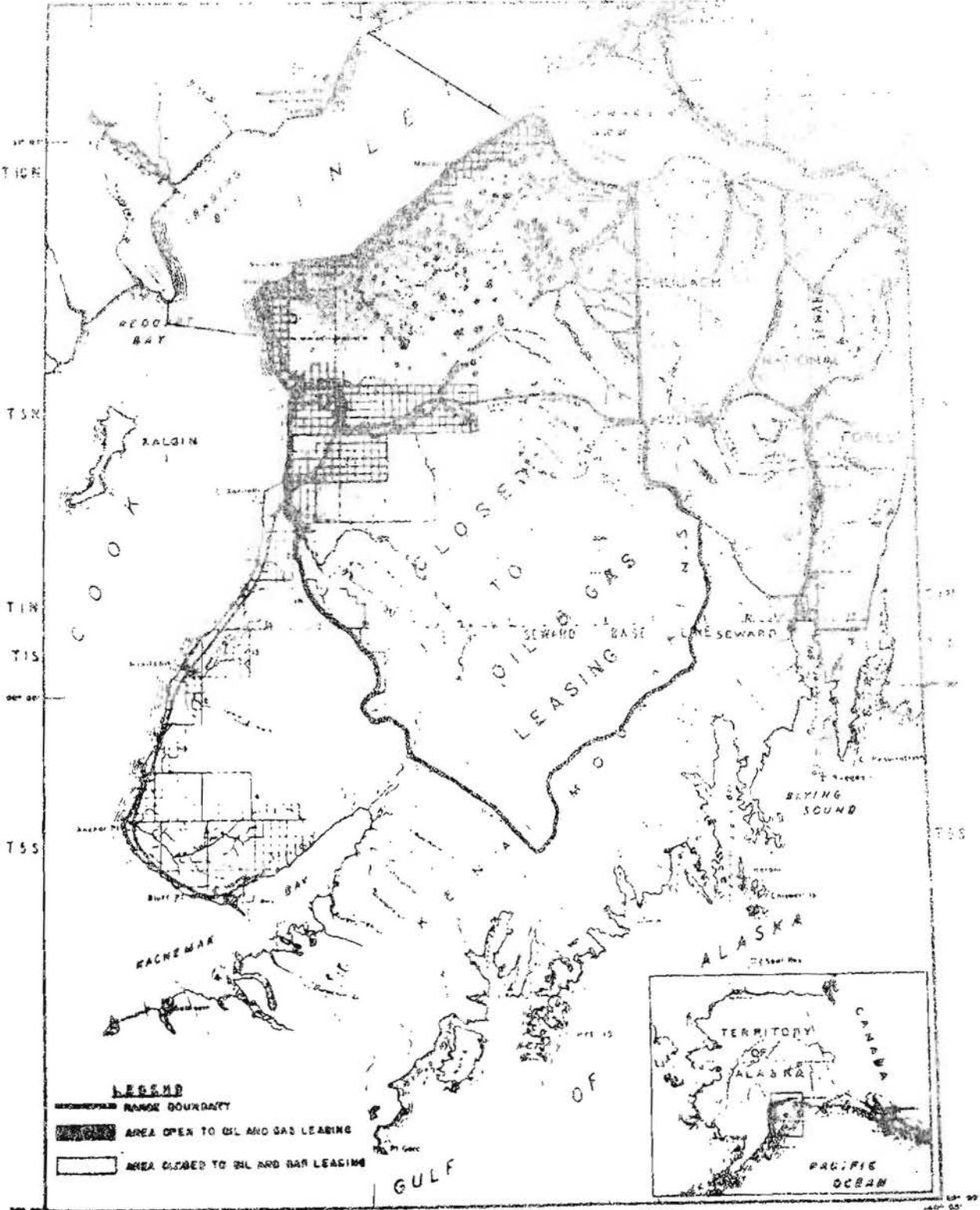


150 pounds of explosive at a depth of 40 feet.





Helicopter approaching MISS BETTY



150° 00'

SEWARD MERIDIAN

155° 00'

Scale

1:500 000
1924

Survey Area
Test Shots

COOK INLET SEISMOGRAPHIC OBSERVATIONS

OCTOBER - NOVEMBER 1962

by Daniel P. Hennick
Larry B. Jennings

ALASKA DEPARTMENT OF FISH AND GAME

INTRODUCTION:

In September of 1962, a permit was granted by the Alaska Department of Fish and Game to the United Geophysical Corporation to conduct for its client, Hunt Oil Company, a conventional seismic survey in Cook Inlet, near the vicinity of Kalgin Island. The terms of this permit provided certain conditions be met. One of these conditions specified that an observation vessel be made available so that a biologist of the Alaska Department of Fish and Game could be on hand to supervise the seismic operation as regards damages sustained to the fishery resources of the Cook Inlet area. This is a service which is mutually beneficial to both the seismic operators and to the fishery interests of the area.

A second condition specified that a maximum of 16 2/3 pounds of nitromon be used per shot point, These charges were exploded 3 to 8 feet beneath the surface of the water. During this operation, larger charges were allowed in areas where no fish kill was recorded by the observer. Various other specifications were also required such as, type of charge to be used, area in which work could be conducted, safety precautions and so on.

VESSELS:

Four vessels were chartered by the corporation for the Cook Inlet seismic work, they were the M/V Leading Lady, the recording vessel, the M/V Ketovia, the shot vessel, the M/V Ripple, the hold back vessel and the M/V Mist, the observation vessel. All vessels were on charter from the Kodiak area. A nitromon charge exploded prematurely causing the loss of two lives and the sinking of the vessel Ketovia near the cessation of the operation.

OBSERVATIONS:

In order that state personnel could become more familiar with the increasing amount of offshore seismic work in Alaskan waters, two biologists alternated working periods during this operation. Biologists Dan Hennick and Larry Jennings from the Westward Region were selected as the observers. The operation extended from October 15, 1962 until November 21, 1962.

This was the first time a seismic operation was conducted in the late fall in the Cook Inlet area. Little or no mortality was expected during this period since the salmon runs had ended and downstream salmon migrations had not begun. A small late silver run was reported to exist, however, none were killed as a result of the seismic operation. True to expectations, only a small mortality occurred throughout the operation with one exception. On October 21, 1962 while working along line 7, (Figure 1) a heavy mortality occurred on immature herring, Clupea palasi, ranging from 1/2 inch to 2 inches in length. Depth readings along this line indicated that it was a shoal area, ranging from 3 to 10 fathoms. This is significant in that in almost every instance where mortality occurred, it was in water of 10 fathoms or less.

The observer aboard the M/V Mist approved an increase to 33 1/3 pounds of nitromon at the beginning of line 7. Immediately after shooting began, a heavy mortality of young herring occurred. An urgent call from the observer to the seismic party leader cut the shot size back to 16 2/3 pounds of explosives. A count of dead fish indicated that the larger charge killed 1,000 to 2,000 young herring and 100 to 200 small tomcod (Microgadus proximus) per shot point. Cutting the shot size back to 16 2/3 pounds reduced the mortality to approximately half. It should be noted that mortality estimates were made on a visible basis, to what extent fish were killed or damaged under the water is unknown.

It is virtually impossible to use any sort of trawl or net in the strong tidal currents around Kalgin Island; only a hand dip net was utilized to recover dead or injured fish. Also, to some extent, dirty water hampered visual sightings. Line number 7 (darkened line shown on Figure 1) was the only area where mortality of any consequence occurred during the entire operation. In all cases of kill or injury, only two species of fish were involved, herring and tomcod. In areas where the mortality was nil, shot point charges up to 100 pounds of nitromon were allowed with no apparent damage sustained.

It is quite significant to note that young herring were killed up to 100 yards away from nitromon explosions of 16 2/3 pounds. Larger charges of 33 2/3 pounds, 50 pounds and 100 pounds inflicted damage up to 300 yards away from the center of the explosion. So far as is known, this is a greater distance than previously noted during the course of any seismic work in Alaska. This fact prodded the observers to make a preliminary examination of the stricken herring in an attempt to determine why herring were so adversely affected.

Recent studies indicate that species of fish which possess a hydrostatic organ or swim bladder, (most pelagic species) are more susceptible to shock waves traveling through the water than are other species lacking this organ.

It has also been shown that shellfish, which have no hydrostatic organ do not exhibit high mortality rates due to underwater explosions which tends to substantiate the above hypothesis. Transversing along this line of thought, we find that herring have a unique modification of the swim bladder. The swim bladder of the herring is a silvery body which lies above the digestive tract and fills a good part of the peritoneal cavity. At the anterior end of the air bladder, a slender air-filled tube divides and enters the skull. Inside the head, the tube enlarges into a small pear-shaped cavity. This modification of the swim bladder is, of course, for the detection and amplification of sound waves.

Dissectional examination of the injured herring exhibited rupture of many or all of these delicate membranes. A rupture of this sort will necessarily effect the functions of the ear. Investigating a little further, we find that the ear of the herring has several functions (1) the maintenance of regulation of muscular tone. (2) the detection of changes of the body position in relationship to the pull of gravity. (3) the detection of acceleration of movement of the body in any direction. (4) the reception of sound.

Observations of the herring injured from the Cook Inlet seismic blasts exhibited a random movement; they are seen swimming in circles belly up, swimming on their sides heads down with the tail out of the water, and so on. Very few fish were killed outright, many lived up to one hour after the blast; but movement was greatly impaired in all injured fish. It is quite evident that the functions of the ear are impaired or totally destroyed. As mentioned before, dissection of the ear and swim bladder tends to substantiate this hypothesis.

Therefore, this may be one explanation as to the reason herring are so adversely effected for greater distances than previously observed in other species. It logically follows that fish injured in this manner will eventually die. It is also very possible that the fluid-filled semicircular canals are damaged, which surely would result in malfunctions of the ear. This could not be determined to any degree of accuracy in the field. Minute and detailed examination of all components of the ear is needed to determine the full extent of damage sustained to the internal ear of fishes caused by underwater explosions.

Further dissection of injured herring provided a second factor contributing to mortality rates. In almost every instance when fish were examined, it was noted that areas of high body fluid (blood) concentration and low muscle structure were partially or completely destroyed. Organs effected in this manner are the large arteries in the head and ears, the liver, kidney and spleen. Also in many cases, hemorrhaging was noted in the gill cavity, around the eyes and the anus.

Approximately 200 herring were dissected, and perhaps 5 per cent had a rupture of the body wall and stomach. An exception to this hypothesis is the heart which seemingly suffered little damage. However, this is

understandable since the heart is composed of large amounts of muscle tissue. It logically follows that the closer to the blast area, and the more violent the explosion, the greater the damage to the fish.

It is well remembered that the above hypotheses are just that, hypotheses. Further investigation is needed and should be conducted to discover exactly how and why fish are effected by underwater explosions. With this knowledge, one could more easily determine the effects of the increasing number of offshore seismic operations in Alaskan waters, and therefore better control them in the future as regards damage which could be sustained to the fishery resources of Alaska.

DAILY ITINERARY:

- Oct. 17 Left Homer to make trial shots to test geophone cable. Made 7 test shots with 16 $\frac{2}{3}$ pounds nitromon S. No apparent damage, and no dead fish seen.
- Oct. 18 Left Homer for Seldovia.
- Oct. 19 Shot line 7 with 33 $\frac{1}{3}$ pounds nitromon S. Made only two shots. No kill.
- Oct. 20 Shot line 7 with 33 $\frac{1}{3}$ pounds nitromon S. No kill.
- Oct. 21 Shot line 7 with 33 $\frac{1}{3}$ pounds nitromon S. in 4 fathoms of water. Large numbers of immature herring 1 to 2 inches long were killed, estimated 1,000 to 2,000 killed per blast. Called to have charge cut back to 16 $\frac{2}{3}$ pounds. Approximately 100 to 200 tomcod were also killed.
- Oct. 22-24 In Kenai refueling and getting groceries.
- Oct. 25 Shot line 5 with 33 $\frac{1}{3}$ pounds. Killed approximately 1,200 herring and 50 tomcod in a day's shooting.
- Oct. 26 Shot lines 2 and 3 with 33 $\frac{1}{3}$ pounds and 50 pounds of nitromon S. Very small kill of tomcod.
- Oct. 27 Weather bound.
- Oct. 28 Finished line 3 and worked line 6 until dark. Used 50 pounds nitromon S. and killed about 20-30 tomcod all day.
- Oct. 29 Shot line 1 south and finished up lines 3 and 5. Used 33 $\frac{1}{3}$ pounds nitromon S. and no fish kill resulted. Operation stopped in early afternoon because of rough weather.
- Oct. 30 Shot lines 4 and 6 with 50 pounds nitromon S. and no fish kill resulted.

- Oct. 31 Worked line 1, but had to discontinue it because of strong tides. Went to line 9 and worked it with 33 1/3 pounds and 50 pounds nitromon S. First shot on line 9 killed approximately 600 small herring, but the rest of the shots resulted in very insignificant kills.
- Nov. 1 Shot line 1 with 50 pounds nitromon. No kill. Finished up north end of line 2 with 50 pounds nitromon S. No kill. Started line 5. No fish kill with 50 pounds nitromon S.
- Nov. 2 Weather-bound. Went to Kenai.
- Nov. 3 Shot rest of line 5 with 50 pounds nitromon S. No fish kill.
- Nov. 4 Shot line 1 with 50 pounds nitromon S. No fish kill.
- Nov. 5 Shot line 7 using 50 pounds nitromon S. Kill of about 800 herring during the entire day. Water was shallow here, only 2-4 fathoms deep. Shot line 8 with 50 pounds nitromon S. No kill.
- Nov. 6 Shot line 2 with 50 pounds nitromon S. in water 2-8 fathoms in depth. Kill of about 800 herring and 50 tomcod in a day's shooting.
Shot line 10 with 50 pounds nitromon S. Had to stop after 5 shots because of strong tides. No fish kill.
- Nov. 7 One of the shoran stations went out and had to be repaired. Was finally fixed about noon. Shot part of line 10 with 50 pounds nitromon S. No fish kill. Shot the rest of line 2 with 50 pounds nitromon S. No fish kill.
- Nov. 8 In Kenai.
- Nov. 9 In Kenai.
- Nov. 10 In Kenai.
- Nov. 11 Shot once on line 1, but had to quit because of strong tides. Waited until slack tide then went back to line 8. Used 50 pounds nitromon S. and had no fish kill.
- Nov. 12 Shot line 3. After about 10 shots, permission was granted to use 100 pounds nitromon S. Still no fish kill.
Shot part of line 9 in 4-40 fathoms of water using 100 pounds nitromon. Approximately 5-10 herring showing per shot. No significant kill.

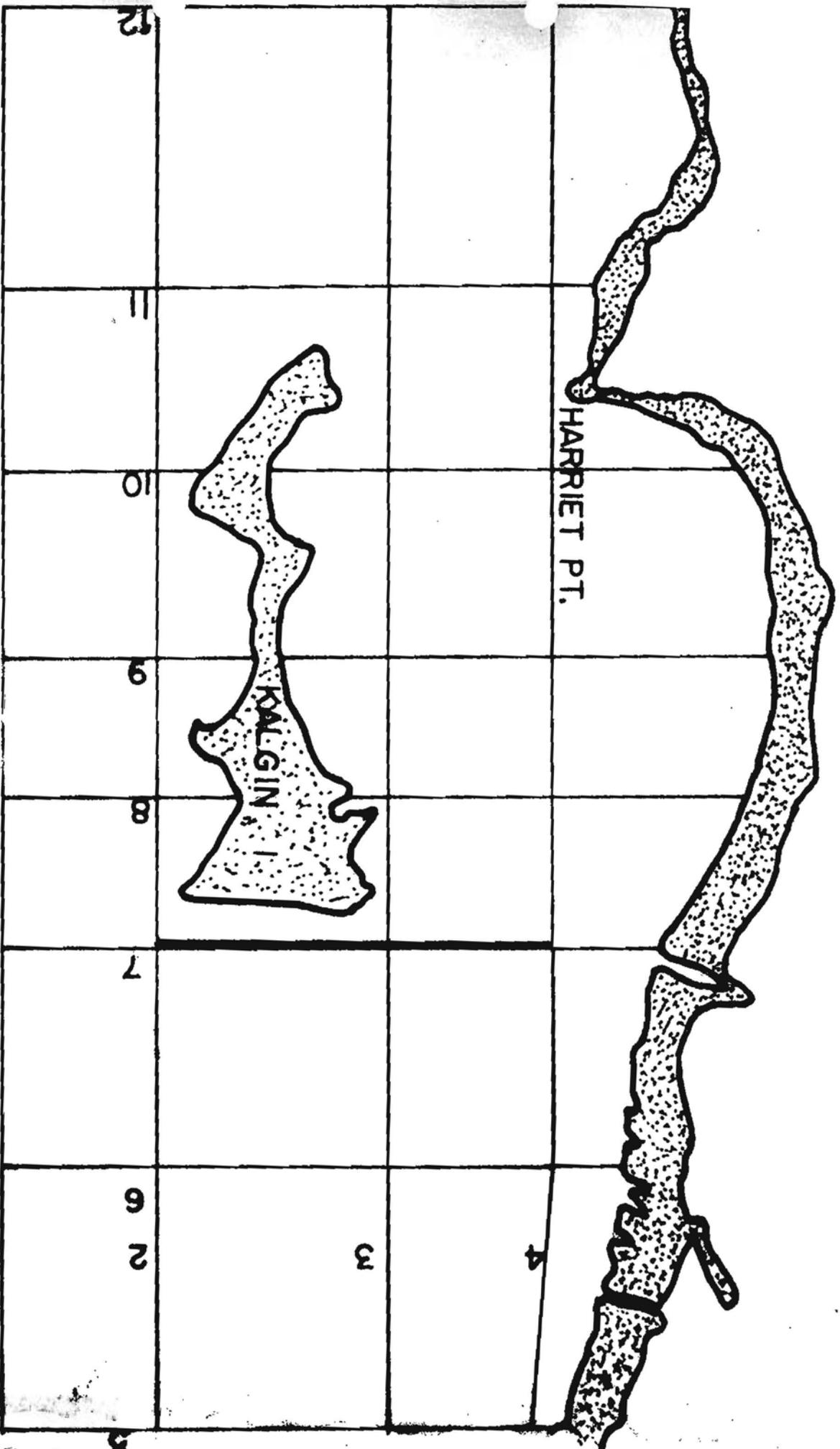
- Nov. 13 Shot line 3 using 100 pounds nitromon S. No kill.
Attempted to work line 4, but tide was too strong.
Worked line 7 with 100 pounds nitromon S., but quit
after 3 shots because of strong tide.
- Nov. 14 Weather-bound.
- Nov. 15 Worked line 10 using 100 pounds nitromon S. No fish
kill.
- Nov. 16 Weather-bound.
- Nov. 17 Weather-bound.
- Nov. 18 Weather-bound in morning, but by afternoon weather had
calmed down. Shot line 10 with 100 pounds nitromon S.
Kill of about 100 herring, 10 tomcod, and 2 jelly fish during
the day's shooting. Water exceptionally clear today.
- Nov. 19 Moved shoran stations. Shot part of line 4 with
100 pounds nitromon. No fish kill.
- Nov. 20 Shot line 1 with 50 and 100 pounds of nitromon S. No
fish kill.
Started working line 11 with 50 pounds nitromon S., but
the shot boat ("Ketovia") blew up and sunk; operations were
discontinued.

RECOMMENDATIONS FOR FUTURE OPERATIONS

1. The observation boat should be used exclusively for observing. It should not be expected to run errands.
2. The observation boat should be required to have good anchor gear. Several times during the Cook Inlet operation, the boat either dragged or broke anchor, thus seriously endangering the lives of the crew members and the observer.
3. Adequate life-saving gear should be available on the observation boat for emergencies which may arise.
4. The observation boat should not at any time carry explosives.
5. All blasting operations should stop at dusk, and not begin until the next morning when there is adequate light to see well. This will help prevent accidents and will enable the observer to easily see any fish kill without the aid of artificial lights.

cc: W. Kirkness
S. Swanson
R. Simon
G. Davenport
D. Hennick
L. Jennings

FIGURE 1



OCTOBER - NOVEMBER 1962

-12 SHOT LINES

HIGH MORTALITY

FISHERMEN'S CORNER

For the third consecutive salmon season a 6-day a week radio program of not (normally) over five minutes duration was presented on a large commercial radio station in Anchorage.

During 1961 and 1962 written material was prepared and sent to this station for presentation by various announcers. The two or three day time lag from the day material left Homer and was aired dated news, and lessened its value considerably.

In 1962 the time lag was eliminated. Each day, six days a week, from June 5 until July 31, the Area Biologist telephoned the radio station (usually around 8:00 P. M.) and recorded a message to the fishermen of the Inlet. This recording was played over the air at 9:30 P. M. each evening.

Up-to-the-day conditions in all Districts were covered, with reports on catch, species composition, and expected runs. All emergency announcements were given on this program.

It was found that this up-to-date report cut down phone calls to the office by fishermen wanting to know when an area was to be opened, or wanting to know where to go fishing. It also forced the Area Biologist to summarize each day, conditions throughout the Inlet, making it easier to keep on top of developing runs.

Fishermen's Corner will probably be continued each summer.

TEMPORARY EMPLOYEES

<u>Name</u>	<u>Period of Employment</u>	<u>Assignment</u>
Marshall Danby	5/15 to 8/31	Fish Creek counting station, various others.
Dave Emery	5/25 to 9/18	Lake Creek counting tower, Delight Creek project.
James Erickson	6/1 to 8/15	Lake Creek counting tower, Mallard Creek study.
Larry Jennings	6/11 to 8/31	Russian Lake counting tower.
Bertha Myer	3/19 to 9/30	Clerk typist.
Emil Nelson	6/1 to 8/30	Kenai-Kasilof River test fishing.
Julius Renolds	6/19 to 9/7	Anchorage office - In charge Susitna Basin.
Noel Rich	6/1 to 8/21	Kenai-Kasilof River test fishing.
Donald Stewart	6/15 to 9/7	Collect shellfish data, Seldovia.
Warren Woodworth	6/15 to 8/23	Assistant to Reynolds in Anchorage.
Richard Mitchell	6/12 to 8/15	Federal catch sampling program - In charge.
Richard Humphreys	6/12 to 9/7	Federal catch sampling program.
Robert Moss	April 1 - April 30	Biologist observer, offshore Shell Oil Seismic operation.

NEEDS FOR FUTURE

1. No progress was made during the past year in working on a method to determine escapement of salmon into silty streams. This is the number one management problem of the salmon fishery of Cook Inlet. Until this problem is solved, management will be by guess. Presently 70 per cent of the fish taken in the Inlet are normally taken above Anchor Point - and the streams these fish are bound for are glacial streams where escapement evaluation is impossible.
2. After a method of determining escapement is developed, a continuing study of spawning results - egg digging, and downstream smolt and fry counts - should be started, with the eventual goal of predicting returns.
3. The present staff of three biologists is too small to adequately manage and protect the Cook Inlet fisheries. Continual demands of time by requests from oil companies for seismic permits cut into the effectiveness of the present staff for more to the point management efforts.

The most important spawning area of the Cook Inlet area is that of the Susitna Basin. A permanent biologist is needed at Anchorage to give badly required attention to this area.