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1989 Rivers Inlet Echo Sounding Program

Summary Report

by

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ABSTRACT

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Sockeye salmon escapement past the Rivers Inlet (Department of Fisheries and Oceans, Statistical Area 9) commercial fishery is monitored by an echo sounding program conducted at the head of the inlet. This report summarizes the field data collected during the 1989 Rivers Inlet echo sounding program.

RESUME

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La pêche commerciale du saumon sockeye qui rémonte le bras de mer Rivers (ministère des Pêches et des Océans, secteur statistique no 9) est controlée au moyen d'un systeme d'écho-sondage mis en placè a l'extremite du bras de mer. Ce rapport recapitule les données fournies par le programme d'echo-sondage du bras de mer Rivers durant 1989.

INTRODUCTION

Rivers Inlet is located in the Department of Fisheries and Oceans Statistical Area 9 in the Central Coast area of British Columbia (Fig. 1). Rivers Inlet has the largest returning sockeye stock in the Central Coast. Owikeno Lake and its tributaries produce the majority of Rivers Inlet sockeye. The Wannock River drains Owikeno Lake into Rivers Inlet.

After passing through the Rivers Inlet fishing area (management subareas 9-2,3,4 & 11) sockeye tend to hold at the head of Rivers Inlet before continuing up the Wannock River. Wood and Mason (1971) determined that the Rivers Inlet sockeye stock size could be estimated using hydroacoustic techniques.

Goruk and Thomson (1988) and Wood and Mason (1971) discussed characteristics of the Rivers Inlet sockeye salmon stock used in determining the hydroacoustic sampling procedure. Dense daytime schools of sockeye ascend and disperse at night allowing individual salmon targets to be distinguished on the echogram. Most of the targets (95 to 99%) are found in the top 10 fathoms. Adult salmon tend to avoid the freshwater layer that exists at the surface of the inlet thus minimizing vessel avoidance to some extent.

The Rivers Inlet Echosounding Program has been operated since 1967. Data collected during the program is used inseason to manage the commercial sockeye fishery.

METHODS

The Rivers Inlet Echosounding program was conducted from July 11 to July 27, 1989. The Walker Rock, a 12 m seine vessel belonging to the Department of Fisheries and Oceans, was used for the program. The Walker Rock was equipped with a Simrad EY-M dry paper recorder and a Simrad 74AA/AP (70 kHz) transducer. The beam angle of the transducer has been measured at 30 degrees. The Simrad EY-M recorder was operated at settings of Gain = 9 and Time-varied Gain (TVG) = 40 log R. A Furuno color echosounder was used when navigating to and from the grid site. This sounder was also used during the first night of the survey when no power cord was available for the Simrad. The echosounders were used individually because of interference created when both units were operated. No quantitative data was collected with the Furuno color echosounder.

Eleven transects in the Miss Robyn and R.D. 102 grids were sounded nightly (Fig. 2). Soundings began after dusk at the head of the inlet and continued seaward to the last transect off McAllister Point. Soundings were completed before dawn. Soundings were initiated and terminated one cable (180 m) from the beach. The echogram was marked at the start and end of each transect. The duration of each transect was timed with a stopwatch. The engine speed of the Walker Rock was kept at 800 R.P.M. during transects.

Targets on the echogram were counted in five depth divisions between 1 and 10 m. The depth divisions were 1-2 m, 2-3 m, 3-5 m, 5-7 m, and 7-10 m.

Calculations for estimating sockeye abundance from echosounding counts are described by Goruk and Thomson (1988). A micro computer was used to perform the calculations.

RESULTS & DISCUSSION

Table 1 and Figure 3 show the 1989 Rivers Inlet daily sockeye estimates in the echosounding grid area. The daily sockeye estimate in the grid remained below 26,290 until July 22 when it increased to 130,000. Sockeye estimates then increased to a maximum of 213,588 on the last night of the survey (July 26/27). Weather and transect time data appear in the Field Notes.

Three commercial fisheries were held to target on Rivers Inlet sockeye stocks. These 48 hour fisheries began at 18:00 hours of July 2, July 9 and July 16. Fishing was open to gillnet and troll gear in management subareas 9-2, 9-3, 9-4 and 9-11. Gillnets were restricted to a mesh size less than 150 mm. Table 2 shows commercial gillnet catch by day in Rivers Inlet. No trollers participated in these fisheries.

Rivers Inlet (management subareas 9-2, 9-3, 9-4 and 9-11) was opened for three 24 hour fisheries to test chum salmon strength beginning at 18:00 hours on July 30, August 6 and August 10. Gillnets were restricted to a mesh size greater than 149 mm. A strike by the United Fishermen and Allied Workers Union (UFAWU) took place from July 21 to August 7. Consequently no gillnetters participated in the July 30 fishery. Three trollers caught 480 sockeye, 60 coho, 410 pink, and 120 chum salmon in the July 30 fishery. Subsequent openings to test chum strength were limited to gillnet only. Catches appear in Table 2.

The Owekeeno Band harvested approximately 1000 sockeye from the Wannock River and Rivers Inlet. Catches from the gillnet fishery in the Wannock River (approximately 70% of the total catch) appear in Appendix 1. The Heiltsuk Band (Bella Bella) harvested 3485 sockeye, 34 coho, 56 pink and 24 chum salmon on July 24 with the seiner M.V. Western Leader. One chinook was caught and released. Catch data from this seine fishery appear in Appendix 2.

Scale samples were collected in the commercial gillnet fishery and the Indian Food Fishery. Age results are given in Table 3. Age 4_2 and 5_2 sockeye accounted for 41.7% and 53% of the samples respectively.

Tidal heights at Wadhams, Rivers Inlet for the month of July 1989 appear in Figure 4. A tide table for Wadhams appears in Appendix 3.

To test the hypothesis that not all targets appearing on the echogram were sockeye, a seiner was chartered in 1989 to determine species composition. The charter was cancelled on July 24 due to a lack of targets in the grid area. Pink salmon, walleyed pollock, chinook grilse and sockeye were caught in the sport fishery within the grid area presenting potential species recognition problems in the survey.

REFERENCES

Goruk, R.D. and B.L. Thomson. 1988. Rivers Inlet echo sounding program 1967-1988. Can. Man. Rep. Fish. Aquat. Sci. 1989. iii + 27 p. + Appendices.

Wood, F.E.A. and B. Mason. 1971. Echo sounder enumeration of Rivers Inlet sockeye salmon, 1967-1970. Tech. Report 1971-12, Canadian Dept. Fisheries and Forestry, Fisheries Service.

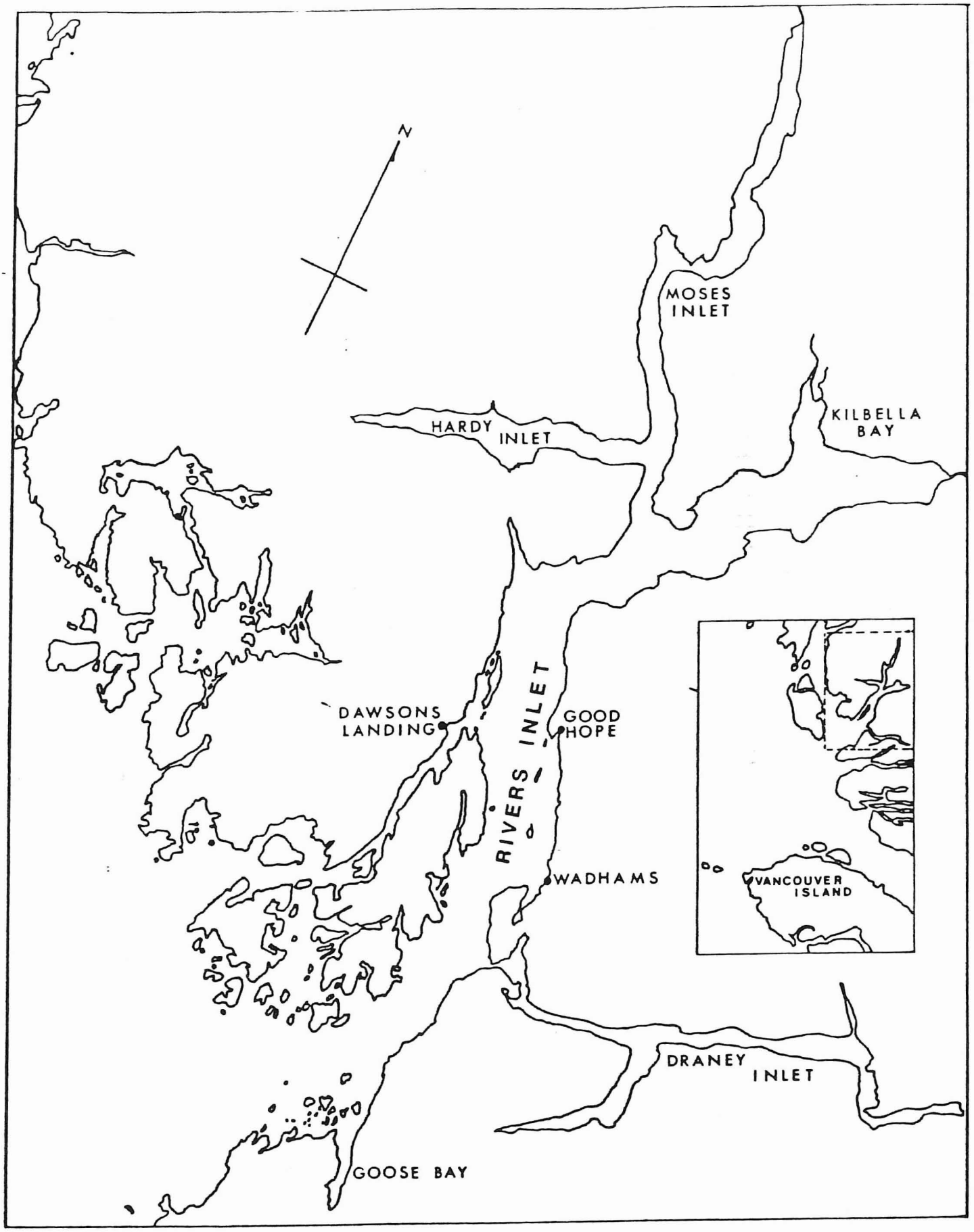


FIGURE 1. Rivers Inlet (Statistical Area 9), B.C.

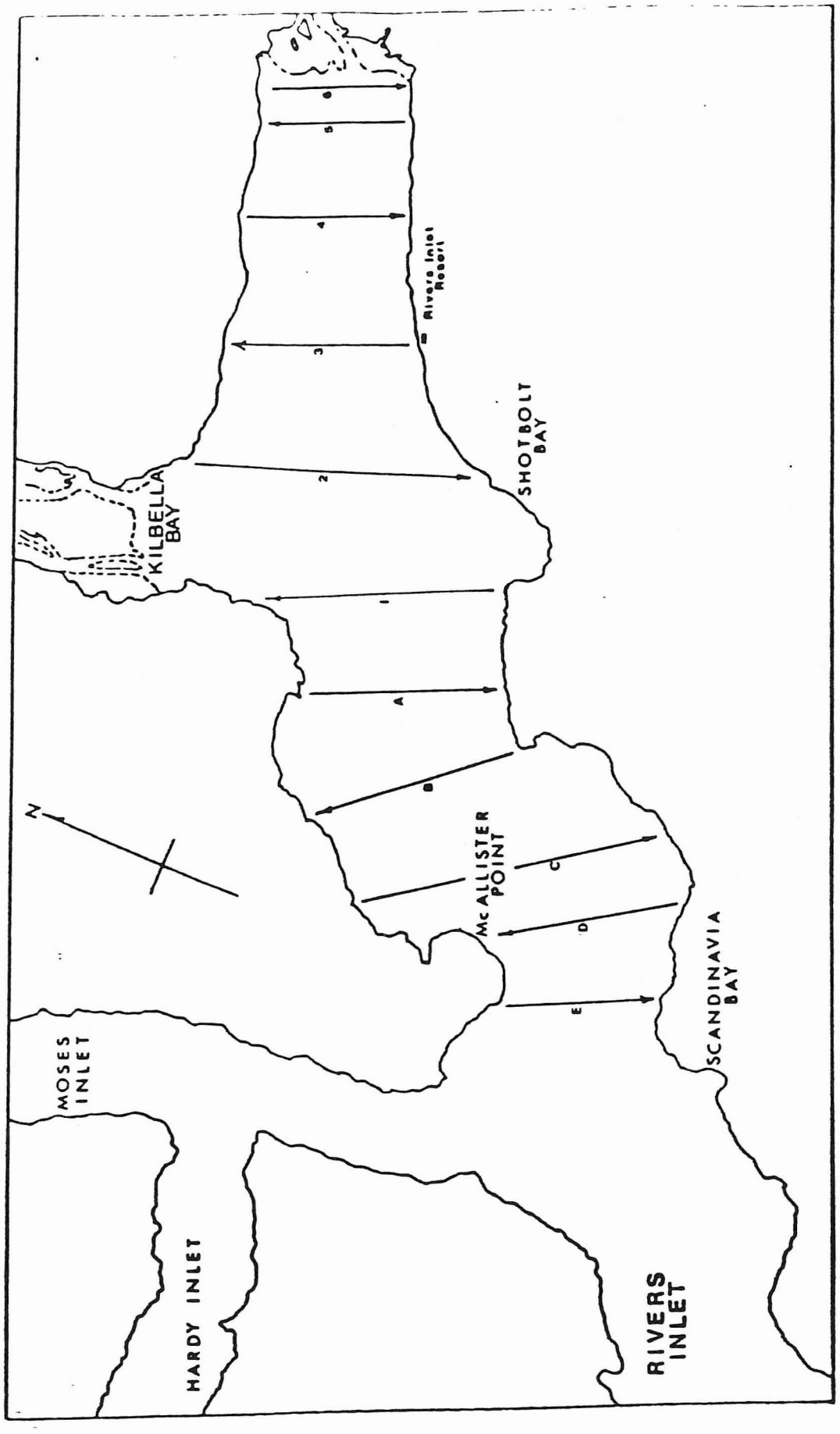


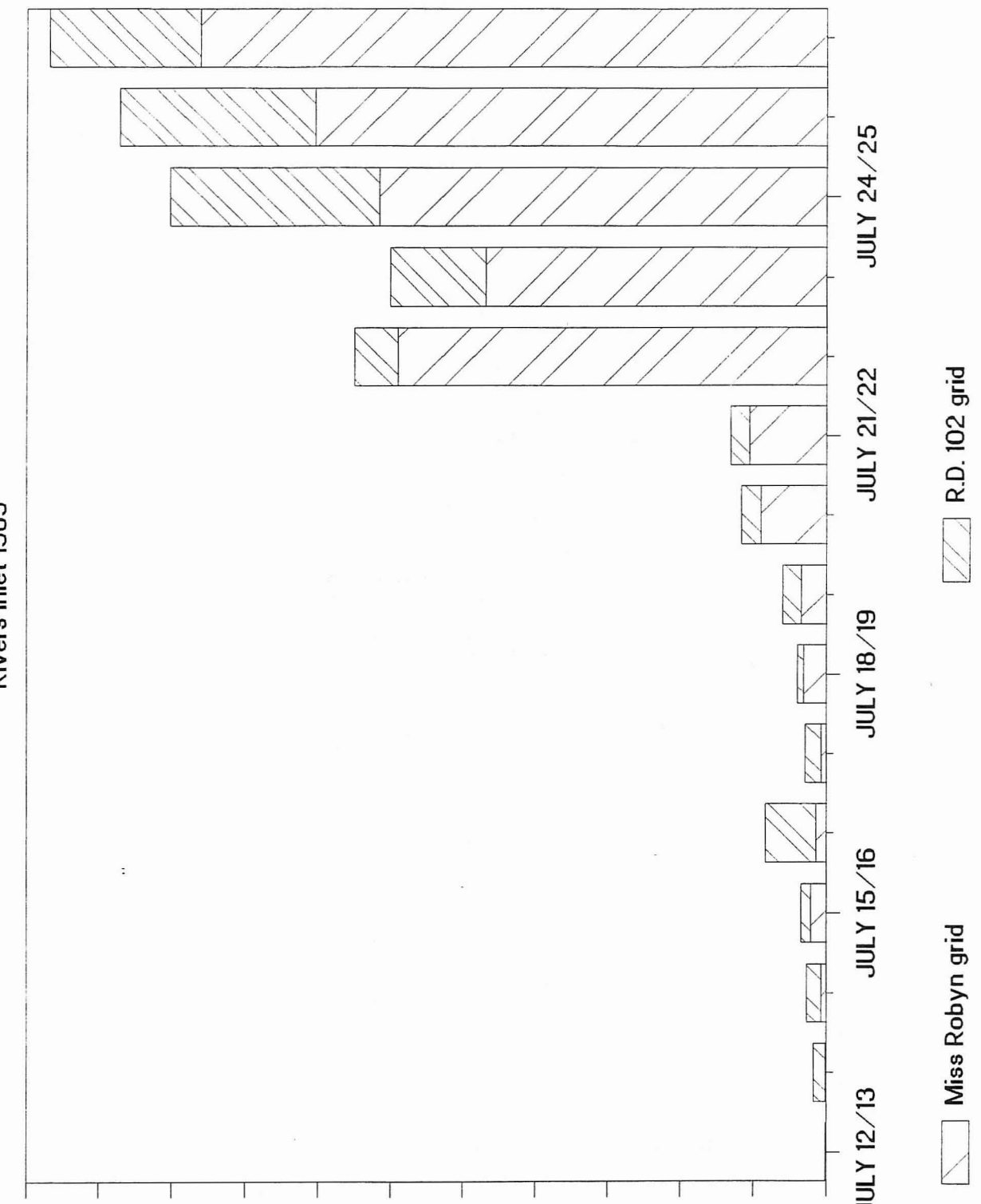
FIGURE 2. Miss Robyn Grid and R.D. 102 Grid, Rivers Inlet.

Table 1: 1989 ECHO SOUNDING RESULTS

	MISS ROBYN GRID							RD 102 GRID						
DATE	6	5	4	3	2	1	TOTAL MISS ROBYN	A	B	C	D	E	TOTAL RD 102 GRID	TOTAL ALL GRIDS
JULY 12/13	0	0	0	0	0	0	0	0	0	271	0	0	271	271
JULY 13/14	149	0	0	0	287	0	437	0	0	2312	829	0	3141	3577
JULY 14/15	0	0	315	0	689	437	1442	674	2825	434	0	0	3932	5375
JULY 15/16	286	377	158	290	1755	1371	4237	539	272	1590	259	0	2660	6897
JULY 16/17	566	238	0	1162	431	437	2834	867	0	7028	3005	2871	13780	16614
JULY 17/18	316	209	1006	0	0	0	1531	562	1223	867	950	568	4170	5701
JULY 18/19	2643	781	1052	290	431	1021	6218	337	1086	0	259	0	1683	7901
JULY 19/20	1313	683	940	1858	1437	643	6874	337	1902	1861	244	782	5126	12000
JULY 20/21	4178	1031	2546	436	203	206	17870	159	815	542	1502	2380	5398	23269
JULY 21/22	0	209	2324	15993	2528	0	21053	721	815	2873	829	0	5237	26290
JULY 22/23	15328	30760	13534	5053	15059	37421	117956	1775	4021	4012	1088	1209	12105	130061
JULY 23/24	89	961	6610	30867	37993	17118	93639	876	21956	1247	2192	213	26486	120125
JULY 24/25	358	961	11396	26918	50873	32592	123098	36549	17610	2223	1036	0	57419	180517
JULY 25/26	0	4586	43369	22561	31500	38774	140790	24075	7119	14353	6408	1450	53405	194195
JULY 26/27	185	6328	35932	33071	45779	50962	172257	16748	7009	7122	6045	4407	41331	213588

#'S MAY DIFFER SLIGHTLY FROM FIELD SHEET TOTALS DUE TO ROUNDING ERRORS

Figure 3: Echosounding Estimates



1989 Rivers Inlet Echosounding Program Field Notes:

These notes consist of a diary of the times each transect was run, weather and water conditions, guests or extra DFO staff on board and sightings of fish. Times of each transect have been collected for correlation with tidal information. Exact duration of each transect was recorded with a stop watch for use in the calculations of fish density.

The Department of Fisheries and Oceans MV Walker Rock was operated by Captain T.R. (Bob) Alton. Ivan Winther (Biologist, Central Coast) conducted the echosounding.

During each transect the Walker Rock was run at a speed of 800 RPM with the Simrad EY-M paper sounder set at gain = 9 and TVG = 40 log R.

July 11/12 Depart Dawsons 2130, return 0300. Ron Goruk aboard. Weather calm, foggy. No power cord was available for the paper sounder so the color sounder was used. Echosounding procedures were reviewed. No targets were observed on the color sounder and no fish were seen jumping.

July 12/13 Power cord installed on the Walker Rock. Depart Dawsons 2030, return 0430. Weather warm, thunder showers and lightning. One jumper at Stone Pt. and a couple of small schools on the color sounder.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2248 - 2258	(9 : 57.25)
Transect #5	2258 - 2309	(11 : 05.50)
Transect #4	2318 - 2331	(12 : 46.77)
Transect #3	2338 - 2354	(15 : 41.85)
Transect #2	0006 - 0031	(25 : 03.97)
Transect #1	0039 - 0101	(22 : 20.69)
R.D. 102 Grid		
Transect A	0115 - 0129	(14 : 19.18)
Transect B	0135 - 0152	(17 : 45.65)
Transect C	0202 - 0228	(24 : 47.06)
Transect D	0235 - 0251	(15 : 32.82)
Transect E	0258 - 0312	(13 : 03.51)

July 13/14 Depart Dawsons 2000, return 0400. Weather clear and calm. Excellent conditions for spotting jumpers and finners. Approximately 50 fish spotted but nothing on the sounder. A few large targets around 20 fm.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2235 - 2243	(8 : 18.95)
Transect #5	2244 - 2254	(9 : 54.55)
Transect #4	2302 - 2314	(11 : 30.33)
Transect #3	2321 - 2334	(13 : 17.94)
Transect #2	2345 - 0004	(19 : 05.33)
Transect #1	0011 - 0031	(21 : 03.90)

R.D. 102 Grid		
Transect A	0042 - 0055	(12 : 16.41)
Transect B	0059 - 0113	(13 : 20.34)
Transect C	0119 - 0141	(21 : 52.79)
Transect D	0146 - 0201	(14 : 49.51)
Transect E	0207 - 0218	(10 : 36.12)

July 14/15 Depart Dawsons 2100, return 0430. Weather clear, wind W 0-5 kn. Very few jumpers. Some reports of fish moving up the Wannock.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2244 - 2253	(9 : 21.44)
Transect #5	2254 - 2306	(10 : 53.94)
Transect #4	2314 - 2327	(12 : 30.64)
Transect #3	2334 - 2350	(15 : 12.74)
Transect #2	0000 - 0025	(25 : 12.92)
Transect #1	0033 - 0058	(24 : 26.26)
R.D. 102 Grid		
Transect A	0110 - 0124	(13 : 53.60)
Transect B	0129 - 0146	(16 : 50.40)
Transect C	0154 - 0217	(23 : 01.00)
Transect D	0223 - 0240	(16 : 22.75)
Transect E	0247 - 0259	(12 : 09.17)

July 15/16 Depart Dawsons 2030, return 0330. Weather overcast, rain, wind W 0-5 kn. Very few jumpers. A few targets on the colored sounder.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2227 - 2235	(7 : 53.53)
Transect #5	2236 - 2246	(9 : 53.61)
Transect #4	2254 - 2305	(11 : 01.54)
Transect #3	2311 - 2324	(13 : 04.54)
Transect #2	2336 - 2357	(21 : 01.40)
Transect #1	0003 - 0022	(19 : 02.89)
R.D. 102 Grid		
Transect A	0031 - 0043	(12 : 02.69)
Transect B	0048 - 0101	(13 : 30.04)
Transect C	0107 - 0129	(21 : 29.98)
Transect D	0133 - 0149	(15 : 56.72)
Transect E	0201 - 0212	(11 : 04.60)

July 16/17 Depart Dawsons 2030, return 0330. Weather low ceiling, fog, heavy rain, wind W 0-5 kn. Fishery open at 1800 with approximately 50 gillnetters around Stone Point. More jumpers than seen to date but still not many.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2224 - 2233	(8 : 52.03)
Transect #5	2234 - 2244	(10 : 07.53)
Transect #4	2251 - 2302	(11 : 45.57)
Transect #3	2309 - 2323	(14 : 00.16)
Transect #2	2334 - 2356	(21 : 57.33)
Transect #1	0004 - 0025	(21 : 32.73)

R.D. 102 Grid		
Transect A	0038 - 0053	(14 : 17.50)
Transect B	0100 - 0113	(13 : 08.52)
Transect C	0119 - 0139	(20 : 25.62)
Transect D	0146 - 0201	(14 : 54.91)
Transect E	0210 - 0222	(11 : 53.31)

July 17/18 Depart Dawsons 2030, return 0400. Weather calm, high overcast, showers, some fog. Fishery still open with the same effort (50 gillnetters) around Stone Point. Very few jumpers.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2224 - 2232	(8 : 39.11)
Transect #5	2234 - 2243	(9 : 41.12)
Transect #4	2249 - 2302	(12 : 00.49)
Transect #3	2307 - 2322	(14 : 00.33)
Transect #2	2330 - 2352	(21 : 10.75)
Transect #1	2359 - 0021	(21 : 51.14)
R.D. 102 Grid		
Transect A	0035 - 0049	(14 : 38.90)
Transect B	0053 - 0108	(14 : 10.40)
Transect C	0116 - 0138	(22 : 29.05)
Transect D	0145 - 0200	(15 : 11.08)
Transect E	0208 - 0218	(10 : 06.26)

July 18/19 Depart Dawsons 2030, return 0300. Weather high overcast, showers, wind SW 0-5 kn. Fishery closed 1800. Few jumpers.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2215 - 2225	(9 : 38.87)
Transect #5	2226 - 2237	(11 : 00.44)
Transect #4	2242 - 2254	(11 : 58.58)
Transect #3	2259 - 2313	(13 : 34.59)
Transect #2	2320 - 2341	(21 : 20.31)
Transect #1	2346 - 0008	(21 : 44.35)
R.D. 102 Grid		
Transect A	0018 - 0032	(14 : 00.84)
Transect B	0037 - 0051	(13 : 51.87)
Transect C	0057 - 0118	(21 : 32.91)
Transect D	0018 - 0032	(14 : 32.99)
Transect E	0037 - 0051	(10 : 58.44)

July 19/20 Depart Dawsons 2030, return 0330. Weather high overcast, showers, wind SW 0-5 kn. Few jumpers and very little showing on the color sounder.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2220 - 2230	(9 : 30.34)
Transect #5	2231 - 2241	(10 : 00.33)
Transect #4	2245 - 2256	(10 : 38.81)
Transect #3	2301 - 2315	(14 : 27.82)
Transect #2	2323 - 2346	(22 : 52.61)
Transect #1	2353 - 0015	(22 : 49.05)

R.D. 102 Grid		
Transect A	0026 - 0039	(12 : 48.36)
Transect B	0043 - 0056	(12 : 30.27)
Transect C	0101 - 0123	(21 : 30.22)
Transect D	0130 - 0143	(13 : 00.47)
Transect E	0148 - 0200	(11 : 30.74)

July 20/21 Depart Browns Bay 2130, return to Dawsons 0300. Weather calm, overcast, rain, some fog. Few jumpers.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2205 - 2214	(9 : 12.82)
Transect #5	2215 - 2225	(9 : 40.11)
Transect #4	2230 - 2241	(11 : 35.51)
Transect #3	2247 - 2301	(14 : 28.56)
Transect #2	2309 - 2329	(20 : 23.15)
Transect #1	2336 - 2357	(20 : 53.92)
R.D. 102 Grid		
Transect A	0008 - 0022	(13 : 05.24)
Transect B	0025 - 0039	(12 : 29.74)
Transect C	0044 - 0105	(20 : 24.36)
Transect D	0112 - 0127	(14 : 59.75)
Transect E	0113 - 0145	(11 : 52.47)

July 21/22 Depart Dawsons 2030, return 0400. Weather overcast, calm. Vern Sampson (guardian, MV Hookline #3) aboard as an observer. Percy Walkus (Oweekeno Band) also aboard as an observer for the first four transects. Percy reported a pod of killer whales at the head of the inlet at 2000. Few jumpers.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2232 - 2242	(9 : 00.42)
Transect #5	2243 - 2253	(9 : 59.94)
Transect #4	2257 - 2308	(10 : 34.74)
Transect #3	2313 - 2328	(14 : 43.39)
Transect #2	2335 - 2358	(23 : 14.97)
Transect #1	0008 - 0029	(19 : 52.19)
R.D. 102 Grid		
Transect A	0036 - 0049	(13 : 30.44)
Transect B	0054 - 0108	(13 : 40.40)
Transect C	0115 - 0136	(21 : 32.39)
Transect D	0143 - 0156	(12 : 46.38)
Transect E	0202 - 0214	(11 : 34.96)

July 22/23 Depart Dawsons 2030, return 0400. Weather 30% cloudy, wind NW 0-5 kn. Largest showing of jumpers to date (>200), mostly at the head of the inlet.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2217 - 2226	(8 : 49.38)
Transect #5	2227 - 2237	(9 : 23.38)
Transect #4	2241 - 2252	(10 : 47.25)
Transect #3	2257 - 2311	(14 : 00.39)
Transect #2	2318 - 2340	(21 : 30.21)
Transect #1	2346 - 0006	(19 : 54.74)
R.D. 102 Grid		
Transect A	0014 - 0027	(13 : 22.53)
Transect B	0031 - 0044	(12 : 51.31)
Transect C	0050 - 0110	(19 : 49.84)
Transect D	0118 - 0132	(13 : 49.10)
Transect E	0138 - 0149	(11 : 13.38)

July 23/24 Depart Dawsons 2000, return 0330. Weather 10% cloudy, wind NW 5-10 kn. Good showing of jumpers on the sportfish boundary.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2240 - 2249	(9 : 50.57)
Transect #5	2251 - 2302	(10 : 59.13)
Transect #4	2307 - 2319	(11 : 34.91)
Transect #3	2325 - 2339	(14 : 00.39)
Transect #2	2346 - 0009	(23 : 10.93)
Transect #1	0016 - 0038	(22 : 00.92)
R.D. 102 Grid		
Transect A	0046 - 0100	(13 : 30.44)
Transect B	0102 - 0116	(13 : 31.23)
Transect C	0121 - 0142	(20 : 49.17)
Transect D	0149 - 0204	(14 : 13.02)
Transect E	0209 - 0221	(11 : 31.82)

July 24/25 Depart Dawsons 1730, return 0400. Weather clear, wind NW 5-10 kn. Tom Wilson (Fishery Officer, Area 9) aboard as an observer. Indian Food Fish seiner from Bella Bella fishing at the head in the afternoon. Chinook grilse, pinks and pollock being caught in the sport fishery.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2240 - 2250	(10 : 01.24)
Transect #5	2251 - 2303	(11 : 22.87)
Transect #4	2307 - 2321	(13 : 04.74)
Transect #3	2328 - 2345	(16 : 25.06)
Transect #2	2352 - 0016	(24 : 04.23)
Transect #1	0024 - 0046	(22 : 54.79)
R.D. 102 Grid		
Transect A	0055 - 0110	(15 : 18.52)
Transect B	0114 - 0129	(15 : 06.28)
Transect C	0134 - 0159	(25 : 00.33)
Transect D	0209 - 0223	(14 : 09.96)
Transect E	0228 - 0241	(12 : 15.68)

July 25/26 Depart Dawsons 2030, return 0330. Weather clear, wind NW 0-5 kn. Few jumpers.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2239 - 2248	(8 : 47.19)
Transect #5	2249 - 2259	(9 : 53.83)
Transect #4	2303 - 2315	(11 : 38.02)
Transect #3	2321 - 2334	(13 : 32.13)
Transect #2	2341 - 0002	(21 : 03.52)
Transect #1	0008 - 0027	(19 : 41.99)
R.D. 102 Grid		
Transect A	0034 - 0047	(13 : 01.85)
Transect B	0050 - 0103	(13 : 18.21)
Transect C	0109 - 0130	(20 : 28.68)
Transect D	0136 - 0150	(13 : 55.57)
Transect E	0154 - 0205	(11 : 16.06)

July 26/27 Depart Dawsons 2030, return 0400. Weather overcast, wind NW 5-15. Greg Rahier (Fishery Officer, Area 9) aboard as an observer. Few jumpers.

Miss Robyn Grid	Times	(min:sec)
Transect #6	2216 - 2226	(9 : 53.39)
Transect #5	2228 - 2239	(11 : 12.56)
Transect #4	2244 - 2255	(11 : 50.34)
Transect #3	2301 - 2316	(15 : 10.3)
Transect #2	2326 - 2350	(23 : 54.43)
Transect #1	0001 - 0028	(27 : 23.93)
R.D. 102 Grid		
Transect A	0036 - 0051	(15 : 06.95)
Transect B	0059 - 0115	(15 : 49.11)
Transect C	0121 - 0145	(24 : 06.96)
Transect D	0152 - 0208	(15 : 16.87)
Transect E	0213 - 0225	(12 : 06.33)

Table 2: AREA 9 GILLNET FIELD CATCH FIGURES - 1989

Week	Date	Opr	Sockeye	Coho	Pink	Chum	Chin	Jack	Sthd
WEEK 27	02-Jul	153	2926	272	74	732	16	21	12
	03-Jul	121	5346	389	76	1132	138	87	23
	TTD	274	8272	661	150	1864	154	108	35
WEEK 28	09-Jul	227	13044	249	321	894	157	81	13
	10-Jul	162	12561	483	331	1960	223	34	12
	TFW	389	25605	732	652	2854	380	115	25
	TTD	663	33877	1393	802	4718	534	223	60
WEEK 29	16-Jul	145	14461	277	704	455	81	38	7
	17-Jul	164	13453	38	33	103	5	0	0
	TFW	309	27914	315	737	558	86	38	7
	TTD	972	61791	1708	1539	5276	620	261	67
WEEK 30	CLOSED								
WEEK 31*	30-Jul	0	0	0	0	0	0	0	0
	TTD	972	61791	1708	1539	5276	620	261	67
WEEK 32	07-Aug	13	508	113	506	789	23	0	4
	TTD	985	62299	1821	2045	6065	643	261	71
WEEK 33	13-Aug	9	535	232	1615	225	6	2	1
	TTD	994	62834	2053	3660	6290	649	263	72

* Note troll catches in text for Week 31.

Table 3: 1989 RIVERS INLET SOCKEYE SCALE SAMPLES

GEAR	DATE	TOTAL	AGE 3(1)	4(1)	4(2)	5(2)	5(3)	6(3)
GILLNET	03-Jul-89	22		1	5	13		3
GILLNET	03-Jul-89	8			3	3	1	1
GILLNET	04-Jul-89	22			6	14		2
GILLNET	04-Jul-89	23			3	19	1	
GILLNET	10-Jul-89	23		1	4	17		1
GILLNET	10-Jul-89	25		1	8	15		1
GILLNET	17-Jul-89	18			4	14		
GILLNET	17-Jul-89	23			14	9		
GILLNET	17-Jul-89	11		1	1	8	1	
GILLNET	18-Jul-89	13		1	4	8		
GILLNET	18-Jul-89	22			8	14		
GILLNET	18-Jul-89	24			13	10		1
IFF SEINE	24-Jul-89	106			62	43	1	
GILLNET	08-Aug-89	22	1		16	5		
TOTAL		362	1	5	151	192	4	9
%		100.0%	0.3%	1.4%	41.7%	53.0%	1.1%	2.5%

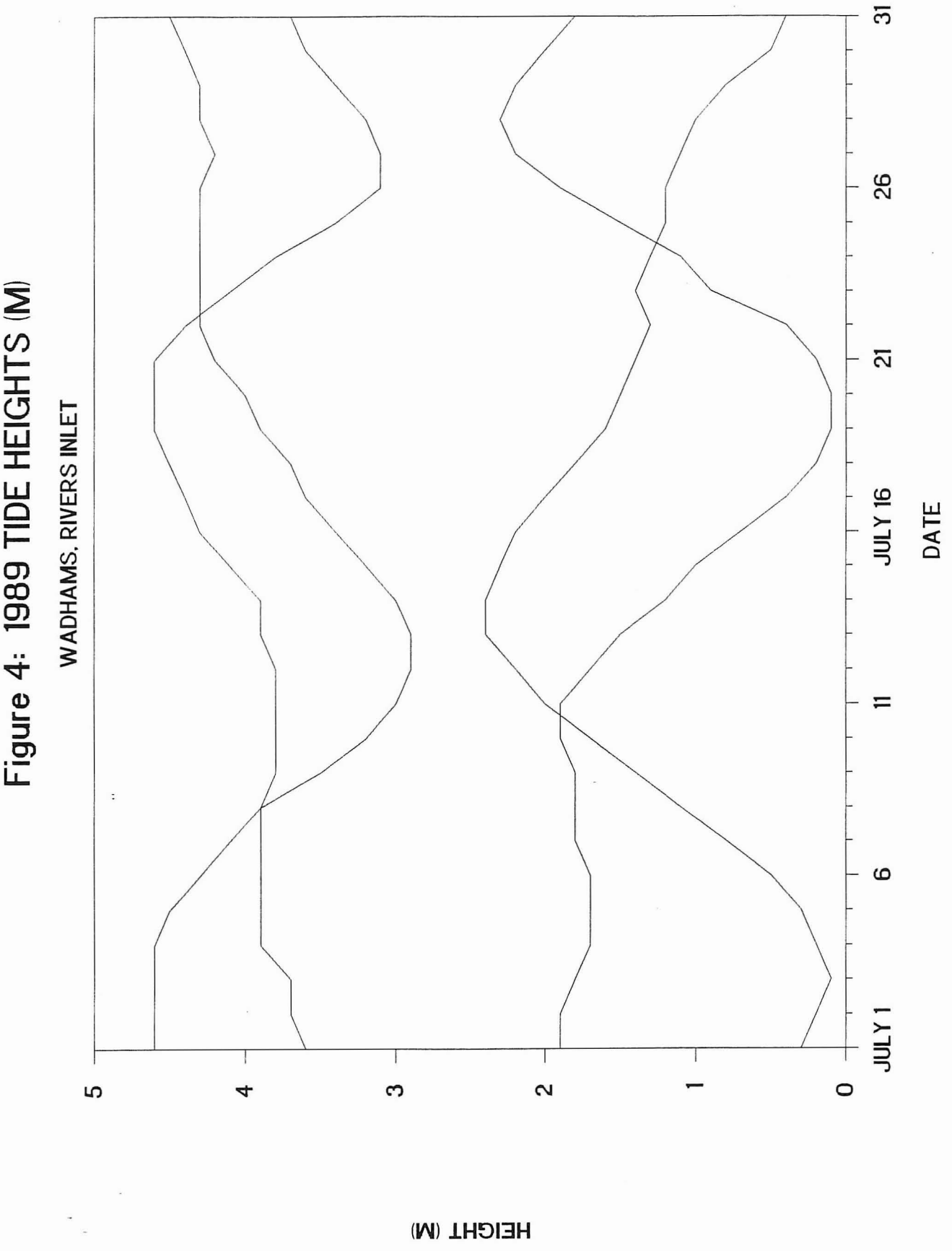


Figure 4: 1989 TIDE HEIGHTS (M)
WADHAMS, RIVERS INLET
HEIGHT (M)
0
1
2
3
4
5
JULY 1
6
11
JULY 16
21
26
31
DATE

Appendix 1: Wannock River Indian Food Fish - Gillnet
Operator: John Johnson - Owekeeno Band
Gillnet 50 feet long 30 meshes deep

Date	Catch Sockeye	Other*	Notes
July 4			First sockeye jumpers in Wannock
7	12		
9	34	1 sthd	
10	3		Seal problem
11	41		3 sets
12	65		2 sets
13	52		2 sets
17	64		2 sets
18	100		3 sets
19	14	1 cm	1 set
22	30		1 set
25	13		1 set
29	106	2 pk, 1 cm	Increased numbers of sockeye jumpers
31	107	1 pk, 1 cm	4 sets
Aug 1	59	1 cm	3 sets

Appendix 2: Rivers Inlet Indian Food Fish - Seine
Vessel: Western Leader
Operator: Eric Wilson

Time Set	Haul	Location	Catch (sx-co-pk-cm-ck)*
15:40	16:05	Rutherford Pt.	750-10-25-14-0
16:56	17:28	Shotbolt Bay	355-4-5-6-0
18:09	18:30	1 mi. W of Wannock R.	507-4-8-2-0
19:08	19:18	1 mi. W of Wannock R.	716-6-8-3-0
19:51	20:00	Sport Fish boundary	1157-10-4-4-1**
		Total	3485-34-56-29-1

* sx = sockeye, co = coho, pk = pink, cm = chum, ck = chinook
sthd = steelhead
** chinook was released

Appendix 3: 1989 TIDE HEIGHT (M) AT WADHAMS, RIVERS INLET (PST)

DATE	TIME	HEIGHT (M)	DATE	TIME	HEIGHT (M)	DATE	TIME	HEIGHT
JULY 1	0528	0.3	JULY 12	0148	1.7	JULY 23	0327	4.1
	1147	3.6		0737	2.9		0953	0.9
	1713	1.9		1253	2.2		1612	4.3
	2307	4.6		1932	3.8		2233	1.4
JULY 2	0613	0.2	JULY 13	0253	1.5	JULY 24	0422	3.8
	1237	3.7		0907	2.9		1033	1.1
	1803	1.9		1403	2.4		1657	4.3
	2357	4.6		2027	3.9		2338	1.3
JULY 3	0703	0.1	JULY 14	0353	1.2	JULY 25	0527	3.4
	1317	3.8		1017	3.0		1118	1.5
	1853	1.8		1513	2.4		1747	4.3
JULY 4	0048	4.6		2122	3.9	JULY 26	0048	1.2
	0743	0.2	JULY 15	0443	1.0		0647	3.1
	1402	3.9		1107	3.2		1218	1.9
	1938	1.7		1618	2.3		1847	4.3
JULY 5	0128	4.5		2212	4.1	JULY 27	0208	1.1
	0823	0.3	JULY 16	0528	0.7		0822	3.1
	1442	3.9		1152	3.4		1333	2.2
	2023	1.7		1708	2.2		1957	4.2
JULY 6	0212	4.3		2302	4.3	JULY 28	0323	1.0
	0858	0.5	JULY 17	0608	0.4		0947	3.2
	1517	3.9		1227	3.6		1458	2.3
	2108	1.7		1753	2.0		2102	4.3
JULY 7	0258	4.1		2347	4.4	JULY 29	0428	0.8
	0933	0.8	JULY 18	0648	0.2		1057	3.4
	1557	3.9		1307	3.7		1613	2.2
	2153	1.8		1833	1.8		2207	4.3
JULY 8	0337	3.9	JULY 19	0027	4.6	JULY 30	0523	0.5
	1008	1.1		0723	0.1		1142	3.6
	1632	3.9		1337	3.9		1708	2.0
	2237	1.8		1918	1.6		2302	4.4
JULY 9	0422	3.5	JULY 20	0112	4.6	JULY 31	0608	0.4
	1043	1.4		0758	0.1		1227	3.7
	1702	3.8		1412	4.0		1758	1.8
	2338	1.8		2003	1.5		2352	4.5
JULY 10	0517	3.2	JULY 21	0157	4.6			
	1118	1.7		0838	0.2			
	1758	3.8		1452	4.2			
JULY 11	0043	1.9		2040	1.4			
	0617	3.0	JULY 22	0242	4.4			
	1203	2.0		0913	0.4			
	1842	3.8		1327	4.3			
				2138	1.3			