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## Status of Atlantic Salmon (*Salmo salar* L.) in Gander River, Notre Dame Bay (SFA 4), Newfoundland, 1997

by

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### **Abstract**

The status of Atlantic salmon in Gander River in 1997 was determined using counts of small and large salmon from a counting fence located on the main stem just above head of tide, recreational fishery data, and biological characteristics information. Total returns of small salmon in 1997 decreased by 56% from 1996 and were the lowest since the implementation of the commercial salmon fishery moratorium in 1992. Returns of large salmon in 1997 however increased by 7% over 1996 and were the second highest of the moratorium years. The percentage of conservation egg requirement achieved in 1997 (63%) was the lowest of the moratorium years.

### **Résumé**

L'état du saumon de l'Atlantique de la rivière Gander en 1997 a été déterminé à partir des dénombrements des petits et grands saumons à une installation de comptage située sur le cours principal, tout juste en amont de la limite de marée, des données de la pêche récréative et de renseignements sur les caractéristiques biologiques. Les remontées totales de petits saumons de 1997 ont diminué de 56 % par rapport à 1996 et sont les plus faibles notées depuis l'imposition du moratoire sur la pêche commerciale du saumon en 1992. Les remontées de grands saumons de 1997 ont cependant été supérieures de 7 % à celles de 1996 et les deuxièmes plus élevées de la période du moratoire. Le pourcentage de la ponte nécessaire à la conservation atteint en 1997 (63 %) a été le plus faible de la période du moratoire.

## Introduction

The Gander River, with a drainage area of 6,398 km<sup>2</sup> (Porter *et al.* 1974), is the third largest in insular Newfoundland. The river is located in Salmon Fishing Area (SFA) 4 (Notre Dame Bay) (Fig. 1). In addition to being one of the most important Atlantic salmon angling rivers in insular Newfoundland, the river has historically supported a relatively large angler guiding and outfitting industry.

In response to concerns from angler groups that returns to the river were declining, the Department of Fisheries and Oceans in cooperation with the Gander Rod and Gun Club and the Gander Bay-Hamilton Sound Development Association, initiated a 3-year study to determine the status of the Gander River Atlantic salmon population in 1989. The results of this study (O'Connell and Ash MS 1992) showed that for the period 1989-91, Gander River received only 36-44% of its conservation egg requirement.

In this paper, we examine the status of Atlantic salmon in Gander River in 1997, the sixth year of the commercial salmon fishery moratorium. Counts obtained from a counting fence are used in conjunction with recreational fishery data and biological characteristics data to calculate total river returns and egg deposition. Status of stock is evaluated against a conservation egg requirement (calculated in terms of fluvial and lacustrine habitats) derived for Gander River.

### *Management Measures, Past and Present*

The introduction of the commercial Atlantic salmon fishery moratorium in insular Newfoundland in 1992 followed a major management plan introduced in 1984 (O'Connell *et al.* 1992a; May 1993), which was modified in 1990 and 1991 to include a commercial fishery quota in each SFA (O'Connell *et al.* MS 1992b). Elements of this management regime continued into the moratorium years. In addition to the closure of the commercial Atlantic salmon fishery in 1992, a moratorium was placed on the Northern Cod Fishery, which should have eliminated by-catch in cod fishing gear in SFAs 1-9. This moratorium remained in effect in 1997.

A quota on the number of fish that could be retained in the recreational fishery was introduced in each SFA in 1992 and 1993. The quota was assigned for each SFA as a whole as opposed to individual river quotas. Only hook-and-release fishing was permitted after the quota was caught. Recreational fishery quotas were eliminated in 1994. In place of quotas, for insular Newfoundland, the season bag limit for retained small salmon was lowered from eight to six fish, three to be caught prior to July 31 and three after that date. Hook-and-release fishing only was permitted after the bag limit of three was reached in each time period. These measures remained in effect in 1995-97. As in previous years, retention of large salmon was not permitted in insular Newfoundland. Rivers in SFA 4 were closed to retention of small salmon on July 28 when an in-season review projected that overall returns would be substantially lower than expected. Hook-and-release fishing only was permitted (only in the AM) at that point; however, on August 1, low water levels and high water temperatures forced the complete closure of several rivers in SFA 4, including all tributaries of Gander River, until the end

of the season. On August 20, the main stem of Gander River and all SFA 4 rivers except those closed for low water levels and high water temperatures, were opened to all day hook-and-release fishing. In 1997, there was a fall hook-and-release fishery in the main stem of Gander River below Gander Lake during September 2-30; a similar fishery occurred in 1995 (September 9-October 8) and 1996 (September 3-September 29).

## Methods

Recreational fishery data and counts of adult salmon in 1997 were compared to two pre-salmon moratorium means (1984-89 and 1986-91) and to the 1992-96 mean during the moratorium. The 1984-89 mean corresponds to years under the major management changes in the commercial fishery in the Newfoundland Region, cited above. The 1986-91 mean incorporates the quota years of 1990 and 1991. The mix of management measures in effect during 1984-89 on the one hand and the imposition of commercial quotas in 1990 and 1991 on the other, should be kept in mind when making evaluations based on the 1986-91 mean.

### *Adult salmon counting equipment*

The location of the counting fence is shown in Fig. 1. Counts of adult Atlantic salmon were obtained with a positive image closed-circuit television (CCTV) system, which was operated in the boat passage in the counting fence, and by viewing VTR tapes. Visual counts were simultaneously conducted in the boat passage in order to categorize fish as small (< 63 cm) or large ( $\geq 63$  cm) salmon. Counts were also obtained with a conventional adult trap installed in the counting fence. Counts for Salmon Brook were obtained with a conventional adult trap installed in the fishway.

### *Recreational fishery data*

Prior to 1997, catch and effort data for each river were collected by Department of Fisheries and Oceans (DFO) River Guardians and processed by DFO Science Branch staff, according to procedures outlined in Ash and O'Connell (1987). Rivers with counting facilities had information separated above and below the counting facilities. No data were available from River Guardians for Gander River in 1997. Data for 1997, which at this stage have to be regarded as preliminary, were derived from the License Stub Return System (O'Connell *et al.* MS 1998a). It was not possible to apportion information above and below the counting fence with the License Stub. This was accomplished by applying the mean values for above and below for the period 1993-96 to the estimate for the entire river from the License Stub Return.

The License Stub Return System for collecting recreational fishery data represents a complete departure from the previous DFO River Guardian method. Details on the methodology employed in the Stub Return System and a comparison of stub data with DFO River Guardian data for 1994-97 are provided in O'Connell *et al.* (MS 1998a). Overall, estimates of released small and large salmon from the stub were substantially higher than estimates from River Guardians while the two methods were closer with respect to estimates of small salmon retained. This has to be kept in mind when comparing

catches in 1997 with previous years. There is evidence that effort expenditure was under-reported by the stub method and hence this information will not be used in the present document. Analyses are currently being carried out to adjust for under-reporting. The stub estimate for the number of large salmon released for 1997 is incomplete.

### ***Biological characteristics***

Biological characteristics information on adult Atlantic salmon in Gander River was obtained by sampling recreational catches. Information used in the calculation of egg deposition (mean weight and proportion female) for fish < 63 cm in length (small salmon) is shown in Table 1. Because the sample sizes for weight and proportion female in 1987 were small, the means for the pre-moratorium years 1984-91 were used to calculate egg deposition in that year. Similarly, the means for the moratorium period (1992-97) were used for 1997.

A mean weight of 3.13 kg and a proportion of female value of 0.77 (O'Connell *et al.* MS 1997a) was used to calculate egg deposition for fish  $\geq$  63 cm in length (large salmon) for all years.

Fecundity was determined from ovaries collected in the recreational fishery. Ovaries were stored in Gilson's fluid until ovarian tissue had broken down after which time eggs were transferred to 10% formalin. Eggs, which for the most part were in early stages of development, were counted directly. The following annual relative fecundity (eggs/kg) values were available for small salmon for Gander River:

<b>Year</b>	<b>Eggs/kg</b>	<b>N</b>
1984	1,811	60
1985	1,524	73
1986	1,656	34
1987	1,811	13
1988	2,020	31
1989	1,989	29
1990	1,739	128
1992	1,831	77
1993	1,638	25
Mean	1,752	470

The mean for all years combined was used in 1987, 1991, and 1994-97. The same relative fecundity values were used for both small and large salmon.

### ***Total river returns, spawning escapement, and egg deposition***

Calculations were performed for small and large salmon separately. Total egg deposition was obtained by summing depositions for small and large salmon.

#### Total river returns

Total river returns (TRR) were calculated as follows:

$$\text{TRR} = \text{RC}_b + \text{C} + \text{HRM}_b \quad (1)$$

where,

$\text{RC}_b$  = recreational catch below counting fence

C = count of fish at counting fence

$\text{HRM}_b$  = hook-and-release mortalities (10% of hook-and-release fish) below counting fence in 1993-96 (see O'Connell *et al.* MS 1997b)

A partial count of small and large salmon was obtained at the counting fence in 1992. High water levels caused a delay in counting fence installation until July 1. During the period of delay, fish were counted upriver at the Salmon Brook fishway and also there were some angling catches. The numbers of small and large salmon entering Gander River prior to July 1 in 1989 and 1990 represented on average 4.8% and 7.5% of the total counts. The total counts of small and large salmon for 1992 were adjusted using these percentages and daily counts estimated as the the product of the average proportion of total count (for 1989-90) on a daily basis and estimated total count. Information for 1991 was not used because in that year timing of adult migration was later than in 1989 and 1990 (O'Connell and Ash MS 1992). A similar approach was used to adjust the counts of small and large salmon at the Salmon Brook fishway in 1990. In that year, counts were not obtained during the last two weeks of the run prior to the cessation of counting operations because of extremely low water conditions. The average percentage of small and large salmon counted at the fishway up to August 16 during the period 1984-91 (exclusive of 1987) was 95 and 90.

#### Spawning escapement

Spawning escapement (SE) was calculated as follows:

$$\text{SE} = \text{FR} - \text{RC}_a - \text{HRM}_a \quad (2)$$

where,

FR = fish released from counting fence

RC<sub>a</sub> = recreational catch above counting fence

HRM<sub>a</sub> = hook-and-release mortalities (10% of hook-and-release fish) above counting fence in 1993-96 (see O'Connell *et al.* MS 1997b)

### Egg deposition

Egg deposition (ED) was calculated as follows:

$$ED = SE \times PF \times RF \times MW \quad (3)$$

where,

SE = number of spawners

PF = proportion of females

RF = relative fecundity (No. eggs/kg)

MW = mean weight of females

The phenomenon of atresia occurs in Atlantic salmon in insular Newfoundland (O'Connell and Dempson MS 1997). Since the egg deposition calculations above were based on eggs in early stages of development, they should be regarded as potential egg depositions.

### ***Conservation egg deposition and spawner requirements***

The conservation egg deposition and spawner requirements for Gander River were developed by O'Connell and Dempson (MS 1991). The egg requirement for classical fluvial parr rearing habitat (Elson 1957) was 240 eggs/100 m<sup>2</sup> (Elson 1975); the requirement for lacustrine habitat was 368 eggs/ha (O'Connell and Dempson 1995). **It should be noted that Gander Lake was not included in the calculation of the egg deposition requirement.**

Accessible rearing habitat and conservation egg and spawner requirements in terms of fluvial and lacustrine habitats were as follows:

	Lacustrine	Fluvial	Total
<b>Accessible habitat</b>	21,488 ha	159,560 units	
<b>Eggs (No. x 10<sup>6</sup>)</b>	7.917	38.294	46.211
<b>Small salmon (No.)</b>	3,739	18,089	21,828

The adult conservation spawning requirement was calculated in terms of small salmon only. Egg deposition from large salmon was considered as a buffer.

### *Net marks*

Since 1994, adult salmon entering the adult trap installed in the counting fence have been examined for the incidence of net marks.

## **Results**

### Recreational fishery

Catch and effort data are presented in Appendix 1. Catches for all years prior to 1992 represent retained catch for the entire angling season. Total catch for 1997 (retained plus released fish) is compared to years prior to 1992 and 1992-96. There was no estimate of released fish during the period of retention of catch in 1992 which could impact on comparisons. Calculation of catch per unit of effort (CPUE) in terms of retained fish only was not possible since effort figures apply to both retained and released fish collectively. For reasons pointed out above, effort and CPUE information are not available for 1997.

The total catch of small salmon (retained plus released fish) in 1997 decreased from 1996 (56%) and the 1984-89 (22%) and 1992-96 (39%) means but increased slightly over the 1986-91 (6%) mean. The number of small salmon retained in 1997 was the lowest of the time series. The number of small salmon released in 1997 decreased from 1996 (29%) and the 1992-96 mean (12%); the number of large salmon released (partial estimate) was the highest on record.

Thirty-eight small and 3 large salmon were released in the fall hook-and-release fishery in 1997; effort expenditure was 100 rod days. In 1996, 128 small and 17 large salmon were released; effort expended was 231 rod days. In 1995, 30 small and 9 large salmon were released with an effort expenditure of 158 rod days.

### Counts at counting fence and fishway

Counts of small and large salmon for the Gander River counting fence for the period 1989-97 are shown in Table 2 and Fig. 2. The count of small salmon in 1997 decreased from 1996 (56%) and was the lowest of the moratorium years (decreased by 51% from the 1992-96 mean); the count however was higher than the pre-moratorium mean for 1989-91 (45%). The count of large salmon was the highest since 1992, increasing slightly over that of 1996 (7%) and decreasing slightly from the mean for 1992-96 (4%). The distribution of daily counts of small salmon in 1997 was relatively flat compared to other years since 1992 (Fig. 3). The peak daily count in 1997 occurred in early July compared to late June in 1996. The peak count for large salmon occurred in late July, and in contrast to the other years, most returns were concentrated in August. The median daily count of small salmon in 1997 was encountered around the third week of July in 1997 compared to the first week of July in



1996 (Fig. 4). The median for large salmon in 1997 was the latest of the moratorium years and occurred approximately 12 days later than that of small salmon. The number of days between the medians for small and large salmon was highest in 1997 while in 1992 and 1993 the medians coincided.

Counts of small and large salmon for the fishway located in Salmon Brook tributary for the period 1974-97 are shown in Table 3 and Fig. 2. The count of small salmon in 1997 decreased from 1996 and the means (51, 57, 35, and 63%, respectively). The count of large salmon in 1997 increased slightly over 1996 (6%) but was well above the 1984-89 (437%) and 1986-91 (804%) means; the 1997 count increased by 17% over the mean for 1992-96.

#### Total river Returns, Spawning escapement, and percentage of conservation requirement achieved

Total river returns, spawning escapement, potential egg deposition, and percentage of conservation requirement achieved for Gander River in 1989-97 are presented in Table 4. The percentage of conservation egg requirement achieved for 1989-97 is also shown in Fig. 5. Less than 50% of conservation requirement was achieved for small salmon in terms of egg deposition prior to the moratorium. During the moratorium, target conservation egg requirement was achieved in 1992, 1993, and 1996, although the years 1994 and 1995 were close to requirement at 91 and 95%. The lowest percentage of conservation egg requirement achieved was in 1997. The conservation requirement for small salmon was met only in 1993. The highest proportionate contribution to total egg deposition by large salmon occurred in 1992 followed by 1997.

#### Net marks

The numbers of small and large salmon examined for net marks and the numbers and percentages bearing net marks in 1994-96 were as follows:

Year	Small salmon (No.)			Large salmon (No.)			Total (No.)		
	Examined	Marked	%	Examined	Marked	%	Examined	Marked	%
1994	223	36	16.1	10	1	10.0	233	37	15.9
1995	233	16	6.9	13	6	46.1	246	22	8.9
1996	407	52	12.8	34	2	5.9	441	54	12.2
1997	162	27	16.7	33	4	12.1	195	31	15.9

The highest percentage of small salmon with net marks occurred in 1997 while for large salmon it occurred in 1995. For small and large salmon combined (total), the incidence in 1997 was the same as in 1994, the highest of the four years.

## Discussion

O'Connell *et al.* (MS 1997b) used an analysis of trends in numbers of small salmon recruits and spawners to provide an estimate of anticipated total returns to Gander River in 1997. Approximately 29,640 small salmon (with estimated upper and lower values of 16,080 and 39,580) were expected to return in 1997. However, actual returns of 10,591 small salmon fell below the lower value. The lower than expected returns for Gander River in 1997 was consistent with observations for other rivers with counting facilities in insular Newfoundland, particularly on the Northern Peninsula and northeast and east coasts. For detailed analyses examining possible reasons for the overall low returns of small salmon in insular Newfoundland in 1997, which includes information and discussion for Gander River, see Dempson *et al.* (MS 1998) and O'Connell *et al.* (MS 1998b).

The occurrence of net marks was likely the result of encounters with illegal and legal fishing gear in coastal waters and illegal gear in the river below the counting fence. It is not possible to accurately estimate the extent of such removals. Therefore total returns considered in the context of being equivalent to total production during the moratorium have to be regarded as minimum values.

Cautions associated with the parameter values used to calculate the conservation egg requirement have been discussed previously by O'Connell and Dempson (1995) and will not be dealt with here.

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Table 1. Biological characteristics data for female small salmon and with sexes combined plus unsexed fish by year and for pre-moratorium (1984-91) and moratorium (1992-97) periods for Gander River (SFA 4), Newfoundland. WW = whole weight (kg); FL = fork length (cm); RS = repeat spawning grilse.

Year	Sexes combined plus unsexed								Females						% Female	
	$\bar{X}$ WW	SD	N	$\bar{X}$ FL	SD	N	% RS	N	$\bar{X}$ WW	SD	N	$\bar{X}$ FL	SD	N	Female	N
1984	1.54	0.35	109	51.3	3.80	109	2.8	3	1.54	0.39	71	51.1	3.89	71	65	71
1985	1.62	0.33	111	51.0	3.66	113	1.8	2	1.63	0.34	82	51.0	3.59	84	74	84
1986	1.61	0.35	51	52.1	3.27	51	11.8	6	1.76	0.30	32	53.1	2.90	32	82	32
1987	1.49	0.37	19	50.6	3.50	19	0.0	0	1.47	0.40	15	49.8	3.45	15	79	15
1988	1.63	0.33	40	52.6	3.56	40	5.0	2	1.61	0.33	33	52.4	3.74	33	83	33
1989	1.60	0.38	187	52.8	4.11	186	9.4	17	1.66	0.39	89	53.5	4.13	88	83	89
1990	1.80	0.47	245	53.7	4.07	245	5.4	13	1.84	0.48	170	54.0	4.24	170	73	170
1991	1.70	0.46	142	52.8	3.93	141	0.7	1	1.66	0.47	110	52.3	3.90	109	85	110
1992	1.80	0.44	149	54.3	3.80	172	0.0	0	1.78	0.44	87	54.6	4.02	108	65	109
1993	1.86	0.41	144	55.1	3.98	145	5.6	8	1.85	0.39	73	55.0	3.28	73	70	73
1994	1.75	0.49	196	53.6	4.18	196	7.5	13	1.83	0.46	101	54.1	4.25	101	73	101
1995	1.73	0.51	76	52.5	4.73	73	2.7	2	1.72	0.51	48	52.1	5.13	46	66	48
1996	1.95	0.57	105	54.6	4.40	120	5.9	7	1.95	0.56	68	54.6	4.35	71	70	71
1997	1.59	0.38	24	54.2	4.73	202	26.0	50	1.58	0.40	14	54.1	4.11	14	78	14
Pre-moratorium																
1984-91	1.66	0.42	904	52.5	4.01	904	4.9	44	1.6899	0.431	602	52.6	4.10	602	77	604
Moratorium																
1992-97	1.81	0.47	694	54.2	4.33	908	9.2	80	1.83	0.47	391	54.2	4.21	413	69	416

Table 2. Counts of Atlantic salmon at the Gander River counting fence, 1989-97. Adjusted counts are bold and in italics.

Year	Small	Large
1989	7743	473
1990	7520	508
1991	6445	670
1992	<b><i>18179</i></b>	<b><i>4162</i></b>
1993	25905	1734
1994	18080	1072
1995	22002	1121
1996	23665	1753
1997	10474	1883
$\bar{X}$ 86-91	7236	550
95% LCL	5512	289
95% UCL	8960	811
N	3	3
$\bar{X}$ 92-96	21566	1968
95% LCL	17309	394
95% UCL	25824	3543
N	5	5

Table 3. Counts of small and large salmon at Salmon Brook fishway, 1974-97. Partial counts are in parentheses and are not included in the means. Adjusted counts are bold and in italics.

Year	Small salmon	Large salmon
1974	857	9
1975		
1976		
1977		
1978	755	52
1979	(404)	(6)
1980	997	15
1981	2459	33
1982	1425	18
1983	978	12
1984	1081	38
1985	1663	26
1986	1064	12
1987	493	9
1988	1562	24
1989	596	24
1990	<b>345</b>	<b>8</b>
1991	245	2
1992	1168	101
1993	1560	87
1994	968	83
1995	1600	125
1996	946	112
1997	465	119
—		
$\bar{X}$ 84-89	1076.5	22.2
95% LCL	572.9	11.2
95% UCL	1580.1	33.2
N	6	6
—		
$\bar{X}$ 86-91	717.5	13.2
95% LCL	190.5	3.7
95% UCL	1244.5	22.6
N	6	6
—		
$\bar{X}$ 92-96	1248.4	101.6
95% LCL	857.2	80.0
95% UCL	1639.6	123.2
N	5	5

Table 4. Total river returns, spawning escapements, and percentage of conservation requirement achieved in terms of small salmon and eggs for Gander River, 1989-97.

Year	Total returns		Prop. Large	Spawning escapement		Egg deposition		% cons. req. achieved		Eggs per 100 sq. m
	(No.)			(No.)		(Millions)				
	Small	Large		Small	Large	Small	Large	Small	Eggs	
1989	7743	473	0.058	6570	473	18.005	2.264	30.1	44	127
1990	7740	508	0.062	6585	508	15.381	2.126	30.2	38	110
1991	6745	670	0.090	5565	670	13.757	2.825	25.5	36	104
1992	18179	4180	0.187	17143	4180	36.317	18.422	78.5	118	343
1993	26205	1734	0.062	24739	1725	52.477	6.800	113.3	128	372
1994	18273	1072	0.055	16106	1068	37.697	4.504	73.8	91	264
1995	22266	1121	0.048	19606	1114	38.994	4.696	89.8	95	274
1996	23946	1753	0.068	20822	1746	49.796	7.362	95.4	124	358
1997	10591	1883	0.151	9519	1868	21.058	7.877	43.6	63	181

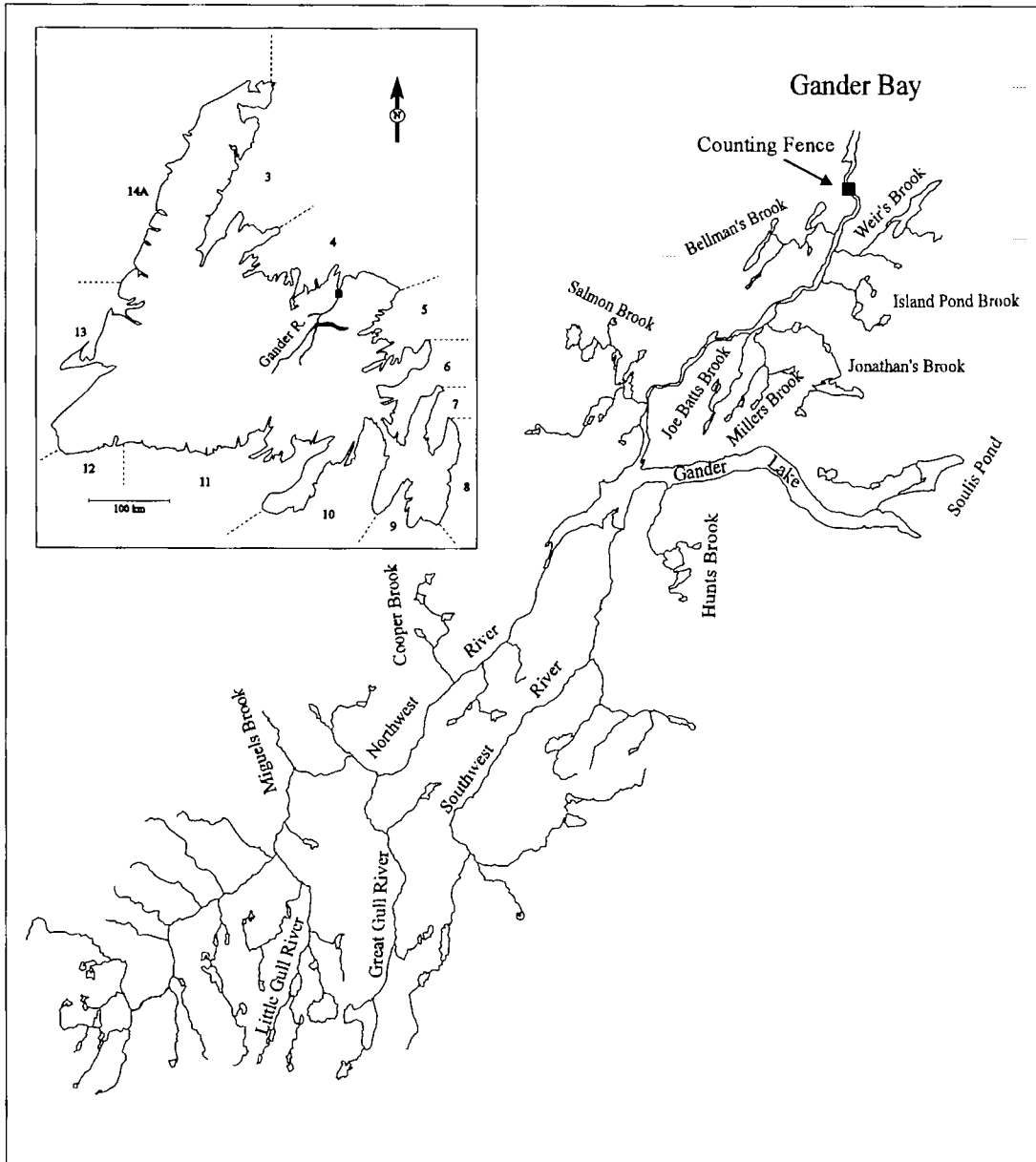


Fig. 1. Map showing the Gander River watershed and location of the counting fence (square symbol). Inset shows the Salmon Fishing Areas in Newfoundland and the location of Gander River.



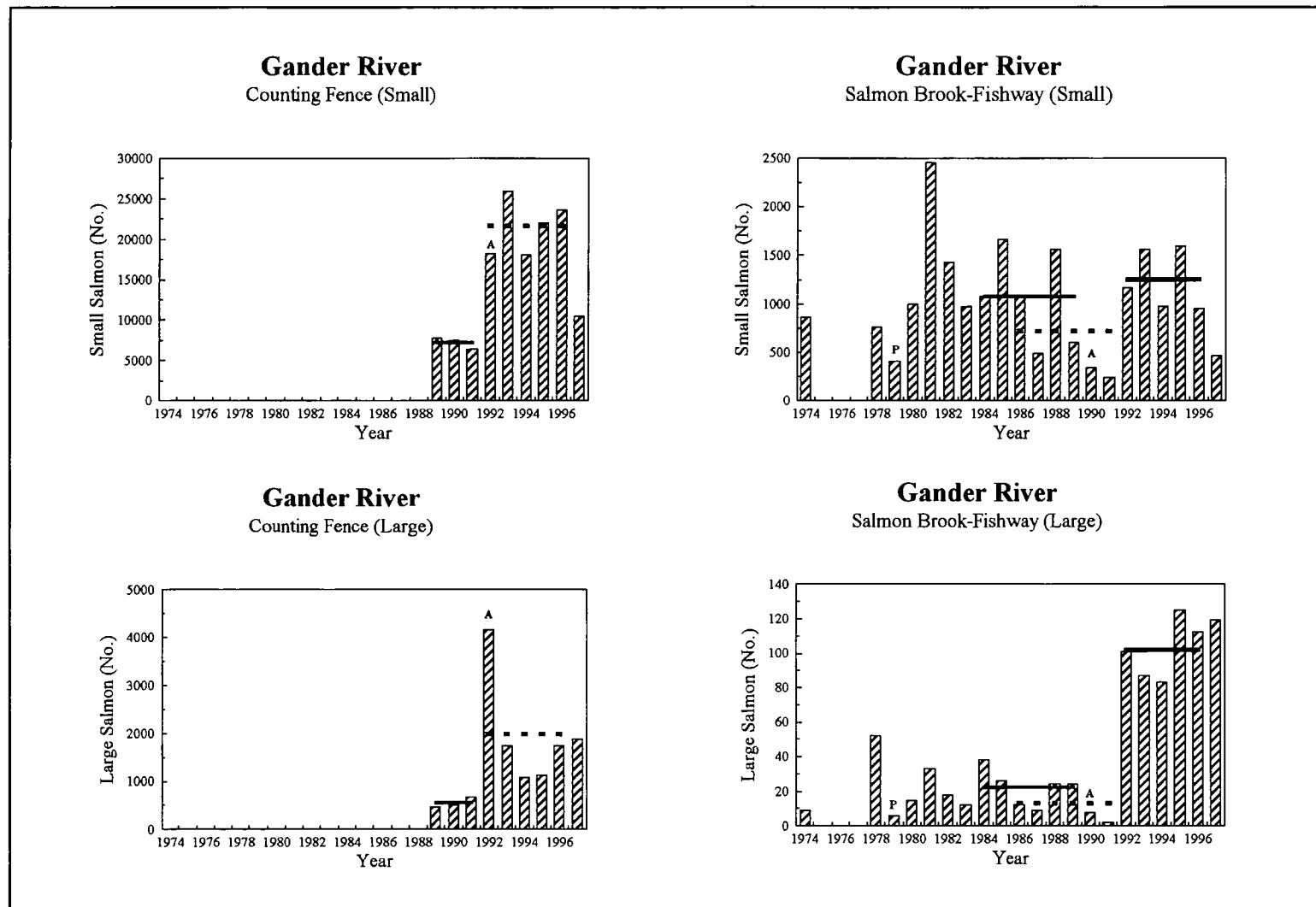


Fig. 2. Counts of small and large salmon at the Gander River counting fence and at the fishway located on the Salmon Brook tributary, 1974-97. The thin horizontal line represents the 1984-89 mean, the broken line the 1986-91 mean, and the thick solid line the 1992-96 mean. A = adjusted count; P = partial count, not included in the means.

## Gander River Counting Fence

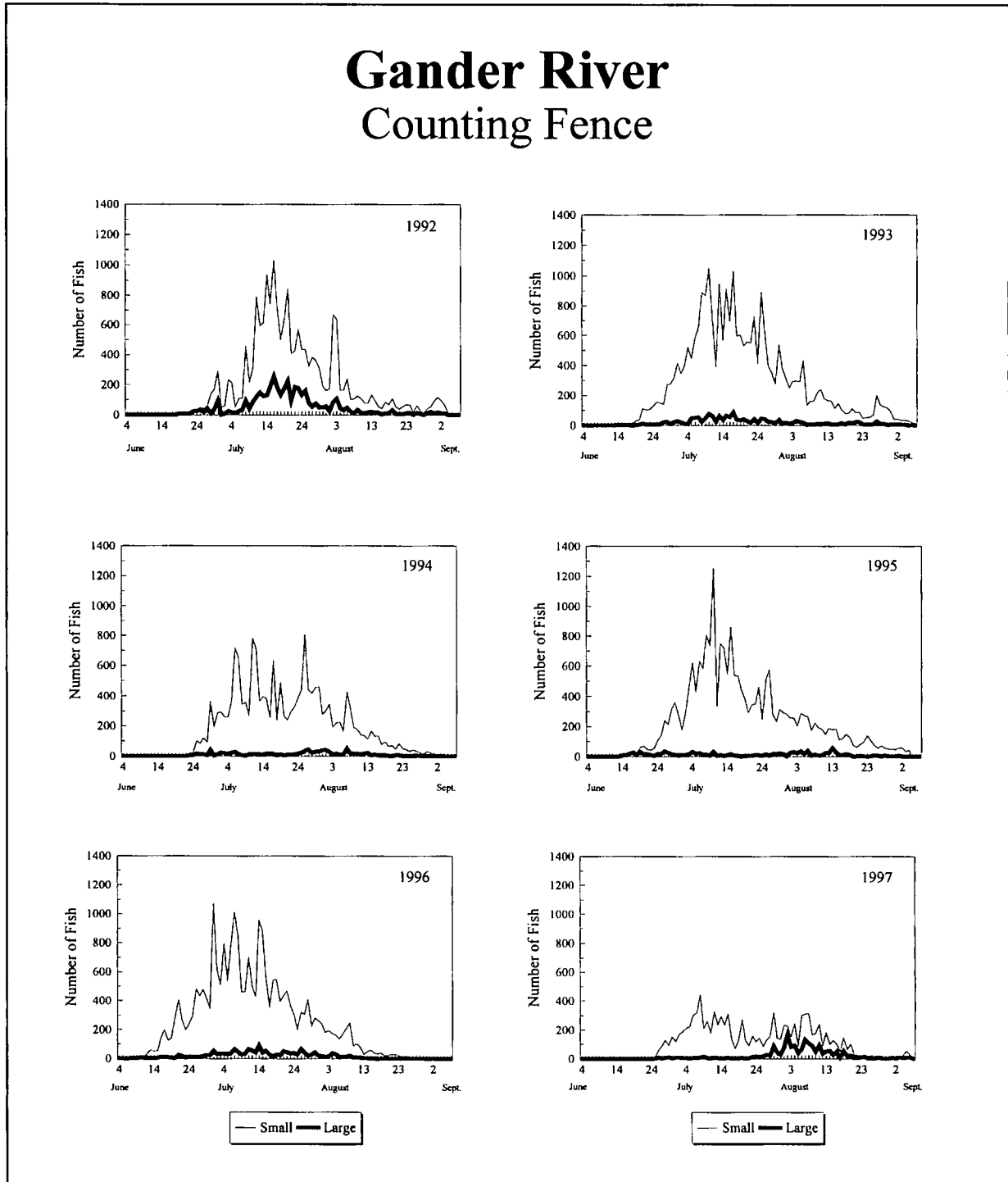


Fig. 3. Daily counts of small and large salmon at the Gander River counting fence, during the moratorium years, 1992-97.

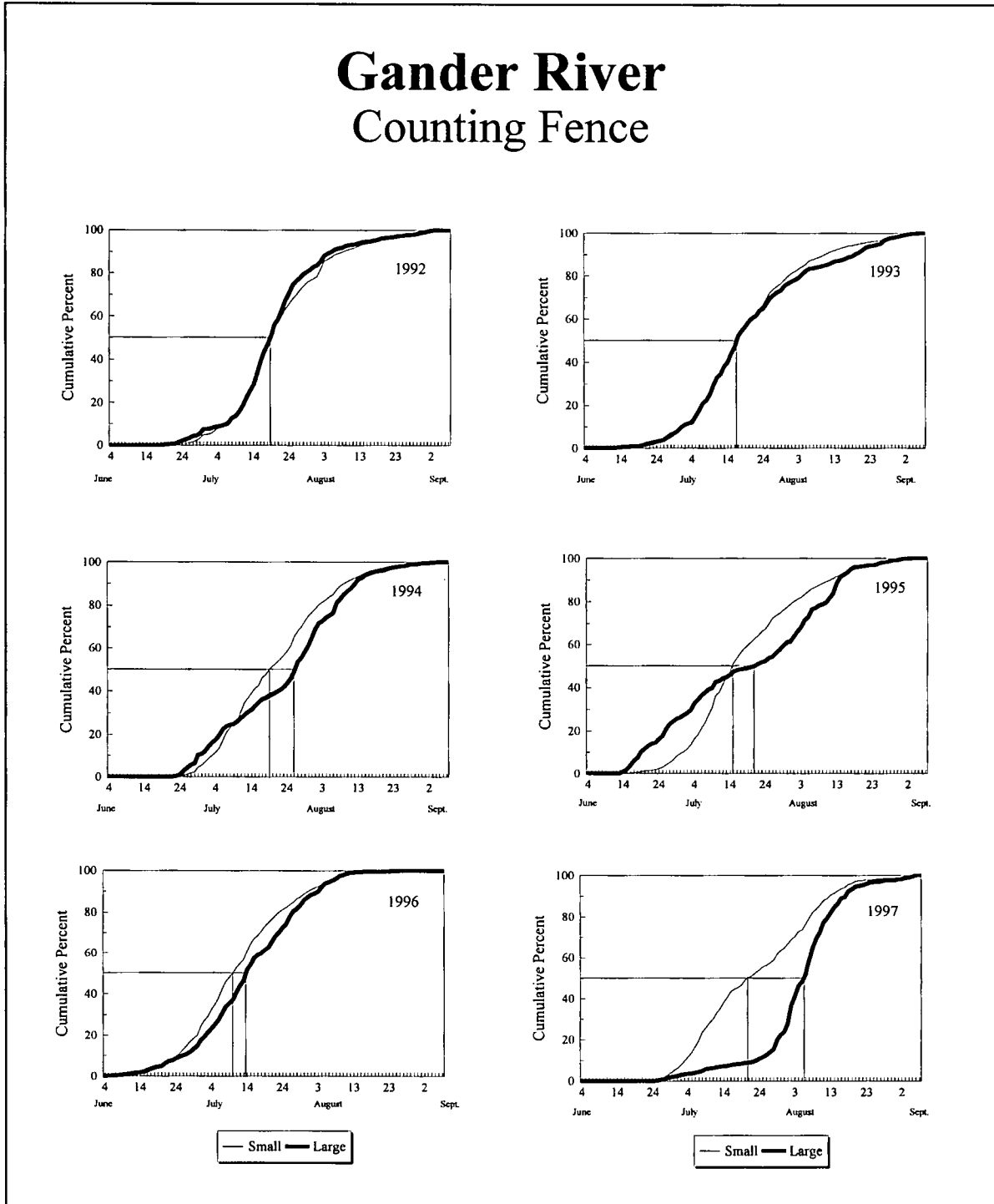


Fig. 4. Daily cumulative percent of small and large salmon at the Gander River counting fence, during the moratorium years, 1992-97. Dates of median counts are also shown.

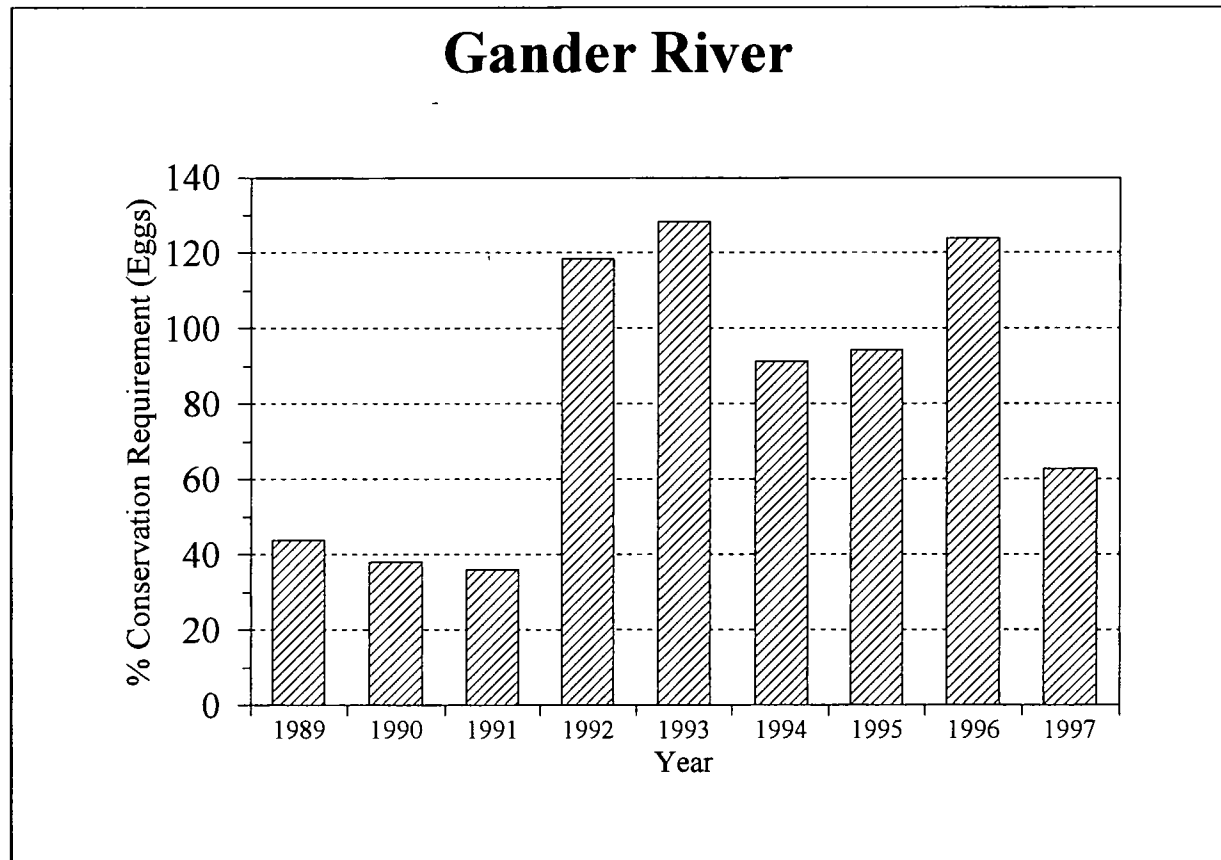


Fig. 5. Percentage conservation egg requirement achieved for Gander River, 1989-97.

Appendix I. Atlantic salmon recreational fishery catch and effort data for Gander River, Notre Dame Bay (SFA 4), 1974-97. Ret. = retained fish; Rel. = released fish. The 1997 data, obtained from the license stub return, are preliminary.

Year	Effort Rod Days	Small (<63 cm)			Large (>=63 cm)			Total (Small + Large)			CPUE
		Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	Ret.	Rel.	Tot.	
1974	5153	2270	.	2270	19	.	19	2289	.	2289	0.44
1975	6670	2976	.	2976	38	.	38	3014	.	3014	0.45
1976	6633	2374	.	2374	132	.	132	2506	.	2506	0.38
1977	6939	2269	.	2269	927	.	927	3196	.	3196	0.46
1978	8322	3332	.	3332	389	.	389	3721	.	3721	0.45
1979	7217	4199	.	4199	318	.	318	4517	.	4517	0.63
1980	6384	2664	.	2664	268	.	268	2932	.	2932	0.46
1981	10643	4578	.	4578	249	.	249	4827	.	4827	0.45
1982	8026	2176	.	2176	205	.	205	2381	.	2381	0.30
1983	6934	2033	.	2033	239	.	239	2272	.	2272	0.33
1984	7590	2028	.	2028	13	.	13	2041	.	2041	0.27
1985	10207	3358	.	3358	*	.	0	3358	.	3358	0.33
1986	9740	2361	.	2361	*	.	0	2361	.	2361	0.24
1987	6384	1444	.	1444	*	.	0	1444	.	1444	0.23
1988	7943	2686	.	2686	*	.	0	2686	.	2686	0.34
1989	6290	1173	.	1173	*	.	0	1173	.	1173	0.19
1990	7118	1155	.	1155	*	.	0	1155	.	1155	0.16
1991	5853	1180	.	1180	*	.	0	1180	.	1180	0.20
1992	6273	1268	525	1793	*	3	3	1268	528	1796	0.29
1993	9073	1271	1950	3221	*	92	92	1271	2042	3313	0.37
1994	11287	2122	448	2570	*	39	39	2122	487	2609	0.23
1995	12215	2598	612	3210	*	74	74	2598	686	3284	0.27
1996	12347	2974	1153	4127	*	73	73	2974	1226	4200	0.34
1997**		990	821	1811	*	152***	0	990	821	1811	
84-89 $\bar{X}$	8354.0	2321.2	.	2321.2	.	.	.	2323.8	.	2323.8	0.28
95% CL	1998.7	1003.6	.	1003.6	.	.	.	1002.1	.	1002.1	0.07
N	5	5	0	5	0	0	0	5	0	5	5
86-91 $\bar{X}$	7388.8	1711.0	.	1711.0	.	.	.	1711.0	.	1711.0	0.23
95% CL	1910.7	931.9	.	931.9	.	.	.	931.9	.	931.9	0.09
N	5	5	0	5	0	0	0	5	0	5	5
92-96 $\bar{X}$	10239.0	2046.6	937.6	2984.2	.	56.2	56.2	2046.6	993.8	3040.4	0.30
95% CL	3197.5	957.1	782.1	1075.8	.	43.9	43.9	957.1	814.4	1112.6	0.07
N	5	5	5	5	0	5	5	5	5	5	5

1987 DATA NOT INCLUDED IN MEAN.

IN THE ABOVE TABLE A PERIOD INDICATES NO DATA FOR THAT YEAR.

CPUE IS BASED ON RETAINED + RELEASED FISH FOR 1992 - 1997 AND ON RETAINED FISH ONLY PRIOR TO 1992.

\* NOT ALLOWED TO RETAIN LARGE SALMON IN INSULAR NEWFOUNDLAND.

\*\*DATA FOR 1997 WERE OBTAINED FROM THE LICENSE STUB RETURN AND ARE PRELIMINARY.

\*\*\*PARTIAL