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## Status of Atlantic Salmon Stocks in Statistical Areas K and L, Western Newfoundland, 1984.

by

J.L. Peppar and C.C. Mullins Department of Fisheries and Oceans Fisheries Research Branch, Gulf Region P.O. Box 2009<br>Corner Brook, Newfound1and A2H 6Z6

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## ABSTRACT

Despite more restrictive management actions in Statistical Areas $J 2, K$ and $L$ in 1984, as applied to both commercial and recreational fisheries, increased harvests were recorded in these fisheries in 1984. With the exception of the recreational fishery in Area $L$, harvests in the commercial and other recreational fisheries were up over 1983 and mean harvests 1978-83. Increased catches in 1984, despite reduced effort, indicate a greater total return of salmon, except in Area L. Calculations of the potential spawning escapements to Areas $K$ and $L$ in 1984 indicate some strong improvements to most rivers in Area $K$, but the same or poorer escapements to rivers in Area L, from those indicated for 1982 and 1983. Target spawning escapements were likely met on many rivers in Area $K$, but are still not being met on the rivers in Area $L$.

## be Sus

En dépit des mesures administratives de restriction appliquées dans les zones statistiques J 2 , K et L , en 1984 , à la pêche tant commerciale que récréative, le nombre de captures en 1984 a augmenté. Les prises tant commerciales que récréatives, sauf les prises récréatives dans la Zone $L$, ont dépassé celles de 1983 et les moyennes de 1978 à 1983. L'augmentation des prises en 1984, en dépit de l'effort réduit, indique une plus grande nombre de saumon retournant, sauf pour la Zone L. Le calcul des echappements potentiels pour la reproduction vers les Zones $K$ et $L$ en 1984 , indique une amelioration marquée dans la plupart des rivières de la Zone K , mais des échappements identiques ou plus faibles dans la Zone L par rapport à ceux de 1982 et 1983. Les nombres cibles d'échappements pour la reproduction ont été probablement atteints dans la plupart des rivières de la Zone $K$, mais ne le sont pas encore dans les rivières de la Zone $L$.

## INTRODUCTION

The purpose of this paper is to evaluate, with previous years catch and effort statistics from the commercial and recreational fisheries, Atlantic salmon stocks in Fisheries Statistical Areas K and L of Western Newfoundland (Figure 1) in 1984; and evaluate the status of stocks in light of management strategies implemented.

Management actions affecting effort and harvest in the fisheries in Areas $K$ and $L$ in 1984 included:

- a small reduction in the commercial salmon fishing season for Areas $K$ and $L$ (season was open 5 June - 10 July, as opposed to 1 June - 10 July, 1978-83);
- a complete closure of the commercial salmon fishery in Area J2 (previously open 20 May - 10 July, 1978-83);
- restricting the recreational fisheries for salmon to the retention of grilse (salmon $<63 \mathrm{~cm}$ ) only, though the legislation prohibiting anglers from landing salmon $>63 \mathrm{~cm}$ was not gazetted and officially law until late in the season (August 8);
- angling seasons on the Grand Codroy River and Robinsons River were shortened to those previously allowed 1978-82, i.e., 20 June - 31 August, as opposed to 10 June 31 August, allowed in 1983;
- an attempt was made to decrease the harvest on Serpentine River (closed to trout angling only).

Details of season changes in the commercial and recreational fisheries are presented (Tables 1 and 2).

The impact of the 1984 management action on Areas $K$ and $L$ was assessed by comparing potential spawning escapements in 1984 to target spawning requirements and by examining trends in commercial and recreational fisheries.

## METHODS

Values for commercial landings (by weight) of Atlantic salmon in Areas $K$ and $L$ for the 1984 season were obtained from Economic Services Branch, Moncton. Numbers of fish landed were calculated using mean weights from the statistics recorded 1978-83, for $15 W$ and MSW salmon, respectively. The 1984 data were updated with the historical landings for these areas as presented by Peppar (1984).

Harvests of Atlantic salmon in the recreational fisheries are recorded by field personnel of the Protection and Regulations Branch. Salmon angling reports are completed in the field on a weekly basis and then submitted to Economic Services Branch,

Corner Brook, who in turn, provide copies of each report to our Branch. The 1984 harvests were compiled and verified and values forwarded at the end of the season to DFO, St. John's (Research Branch) for subsequent key-punching and inclusion with the other harvest statistics for the Province. The 1984 catches have been added to the tables of historical catches as part of the "stream catalogue" prepared by Research Branch, St. John's (Peppar 1984).

Target spawning escapements for the river systems were provided by Porter and Chadwick (1983). These requirements were calculated using an egg deposition of 240 eggs/100 $\mathrm{m}^{2}$ of parr rearing area and an estimate of the number of eggs deposited per spawner (Table 3).

To derive potential spawning escapements to the rivers of Areas $K$ and $L$ in 1984, the following assumptions were applied: harvests in the recreational fisheries in 1984 (with the large salmon harvests adjusted) were proportional to spawning escapements, and additional spawners would be available to the rivers in 1984 because of reduced commercial fishing seasons (in Areas $J_{2}, K$ and $L$ ) and changes in the angling fishery regulations (pertaining to large salmon). In 1984, additional spawners to Areas $K$ and $L$ were assumed available from commercial fishing season reductions in Areas $K$ and $L$, and the closure of the fishing in Area J2. These are additional spawners to those already identified from the commercial fishing season changes over the period 1978-82. Additional spawners to Areas $K$ and $L$ from the recreational fisheries in $K$ and $L$ were calculated assuming all large salmon caught after August 8 were released.

In Areas $K$ and $L$, an estimate of the additional fish released from the reduced commercial season was determined by calculating the average weekly commercial harvests for the period 1980-83 (catch statistics from Moores et al. 1984; E. Ash, personal communication) and adjusting the seasons to reflect the average catch for the period 1 June to 4 June (i.e., the difference between harvests in reduced and full seasons) (Table 4). The same procedure was applied to Area $J_{2}$, except that the additional fish released were calculated for the period 20 May to 4 June. These additional fish were considered not to have been affected by any fishery and, thus, were apportioned (along with those identified earlier, i.e., over the period 1978-82) to the river spawning escapements in Areas $K$ and $L$ based on the mean recreational harvest percentages (Porter and Chadwick 1983) (Table 5). Interception of mainland stocks in Area $\mathrm{J}_{2}$ was assumed to be $65 \%$.

In Areas $K$ and $L$, an estimate of the additional fish released from the angling regulation change (release of large salmon) was determined by adjusting the 1984 angling harvests to reflect the large salmon released after August 8 . It was assumed that catches of large salmon, had large salmon been retained over the entire season, would have approximated the mean catches 1978-82. For each river, the angling catch of large salmon, if less than the
mean recorded 1978-82, was adjusted up to the mean catch. The differences in catches (recorded and mean) were assumed to reflect the additional fish released to the spawning escapements as a result of the regulation change in 1984 (Table 6).

The adjusted 1984 angling harvests were used to derive the river escapements, using angling exploitation rates of $20 \%$ and 40\%, as known rates were not available for stocks in Areas $K$ and L; these values are considered the minimum and maximum observed values for rivers in insular Newfoundland. (Chadwick 1982).

## RESULTS

## HARVEST STATISTICS

## Area K

Total commercial landings of Atlantic salmon in 1984 were $25 t$, up 25\% over the amount landed in 1983 (20t), and equal to the mean 1978-83 (25t) (Table 7). Based on the calculated mean weights of 1.80 kg and 4.52 kg for 1 SW and MSW salmon, respectively, the landings for 1984 were composed of 7,727 grilse and 2,367 large salmon (Table 7). Numbers of grilse in the landings were up $25 \%$ over 1983 ( 6,178 ), but down $13 \%$ from those in the mean landings 1978-83 (8,884). Numbers of large salmon in the landings in 1984 were up $13 \%$ over 1983 (2,094) and up $21 \%$ over those in the mean landings 1978-83 (1,953).

Total recreational catch and effort in 1984 were 5,109 fish and 14,783 rod days (CPUE 0.35 ), up $41 \%$ over the catch recorded in 1983 ( 3,629 ) and down $10 \%$ from the total effort recorded in 1983 (16,480). The 1984 CPUE was up 59\% over 1983 (0.22) (Table 8).

Compared to the mean recreational catch 1978-83 (4,171), the 1984 catch was up 23\%; mean effort 1978-83 (12,893), the 1984 effort was up 15\%; and mean CPUE 1978-83 (0.33), the 1984 CPUE was up 6\%.

The 1984 recreational catch was comprised of 4,847 grilse and 262 large salmon. This grilse catch was up $58 \%$ over that recorded in 1983 ( 3,075 ) and $31 \%$ over the mean in the period 1978-83 (3,691). Large salmon catch was down $53 \%$ from that recorded in 1983 (554) and 45\% from the mean of 1978-83 (480).

## Area L

Total commercial landings of Atlantic salmon in 1984 were 18t, up 39\% over the amount landed in 1983 ( 13 t ), and up $29 \%$ over the mean 1978-83 (14t) (Table 9). Based on the calculated mean weights of 1.90 kg and 4.72 kg for 15 W and MSW salmon,
respectively, the landings for 1984 were composed of 6,609 grilse and 1,177 large salmon (Table 9). Numbers of grilse in the landings were up $41 \%$ over 1983 (4,701) and up $32 \%$ over those in the mean landings 1978-83 (5,009). Numbers of large salmon in the landings were up $43 \%$ over 1983 ( 821 ) and up $33 \%$ over those in the mean landings 1978-83 (882).

Total recreational catch and effort in 1984 were 2,971 fish and 7,369 rod days (CPUE 0.40 ), down $11 \%$ from the catch recorded in 1983 ( 3,318 ) and down $18 \%$ from the total effort recorded in 1983 ( 8,993 ). The 1984 CPUE was up $8 \%$ over that recorded in 1983 (0.37) (Table 10).

Compared to the mean recreational catch 1978-83 (3,871), the 1984 catch was down 23\%; mean effort 1978-83 (9,097), the 1984 effort was down 19\%; and mean CPUE 1978-83 (0.33), the 1984 CPUE was down 5\%.

The 1984 recreational catch was comprised of 2,924 grilse and 47 large salmon. This grilse catch was down $10 \%$ and $21 \%$ from that recorded in $1983(3,262)$ and the mean 1978-83 (3,712), respectively. Large salmon catch was down 16\% and 70\% from that recorded in 1983 (56) and the mean 1978-83 (159), respectively.

## SPAWNING ESCAPEMENTS

## Area K

Both maximum and minimum estimates of spawning escapement for Area $K$ in 1984 indicate surpluses of 20,023 fish and 6,678 fish, respectively, over the target number of 25,059 spawners (Table 11). Increased escapements in 1984 were indicated for all rivers in Area $K$ over those calculated for 1982 (Porter and Chadwick 1983) and 1983 (Peppar 1984).

Greatly improved escapements were indicated for the Grand Codroy and Robinsons rivers, both of which had angling seasons as those previously allowed 1978-82, i.e., the season extensions of 1983 rolled back. Highly improved escapements were also indicated for Crabbes and Little Barachois brooks, both of which had indicated deficit minimum estimates of spawning escapements in 1983. Fischells Brook, Flat Bay Brook and Harry's River continued to indicate deficit spawning escapements; however, the magnitudes of these deficits were reduced from those indicated in 1982 and 1983.

Area L
Both maximum and minimum estimates of spawning escapements for Area $L$ in 1984 indicate deficits of 7,121 fish and 14,886 fish, respectively, from the target number of 24,682 spawners (Table 11). Decreased (or similar) escapements in 1984 were indicated for all rivers in Area $L$ from those calculated for 1982 (Porter and Chadwick 1983) and 1983 (Peppar 1984).

The deficits indicated for fox Island and Serpentive rivers were in the same magnitude as indicated in 1982 and 1983. However, the deficits indicated for the Humber River have increased over those indicated for the past two years.

## DISCUSSION

Despite more restrictive management actions in Statistical Areas J2, K and $L$ of insular Newfoundland in 1984, as applied to both commercial and recreational fisheries, increased harvests were recorded in these fisheries in 1984. With the exception of the recreational fishery in Area L, harvests in the commercial and other recreational fisheries were up over 1983 and mean harvests 1978-83. Increased catches in 1984, despite reduced effort, indicate a greater total return of salmon, except in Area L.

In Area K, grilse landings in the commercial fishery were up over 1983, but down from the mean landings 1978-83. Large salmon landings in the commercial fishery of Area $K$ were up over 1983 and mean landings 1978-83. In Area L, grilse and large salmon landings in the commercial fishery were up over 1983 and the mean landings 1978-83.

In the recreational fishery of Area $K$, grilse harvests were up over 1983 and up, as well, over mean harvests 1978-83. In Area L, grilse harvests were down from 1983 and the mean harvests 1978-83. Large salmon harvests in the recreational fisheries were down in both Areas, as was to be expected from the angling regulations change imposed later in the season.

Calculations of the potential spawning escapements to Areas $K$ and $L$ in 1984 indicate some strong improvements to most rivers in Area $K$, but the same or poorer escapements to rivers in Area $L$ from those indicated for 1982 and 1983. Target spawning escapements were likely met on many rivers in Area $K$ but are still not being met on the rivers in Area L. The latter rivers still require substantial increases in spawners to meet these requirements.

## REFERENCES

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Peppar, J.L. 1984. Assessment of Atlantic salmon stocks in Statistical Areas $K$ and $L$, Western Newfoundland, 1983. CAFSAC Res. Doc. $\# 84 / 19$.

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Tahle 1. Summary of season changes in commercial and recreational fisheries of Areas K and L.

|  | $\begin{aligned} & \text { Old } \\ & \text { (Before 1978) } \end{aligned}$ | $\begin{gathered} \text { New } \\ (1978-1982) \end{gathered}$ | 1983 | 1984 |
| :---: | :---: | :---: | :---: | :---: |
| Commeccial |  |  |  |  |
| Area $\mathrm{J}_{2}$ | $15 \mathrm{May}-31$ Dec. | $20 \mathrm{May-10}$ July | $20 \mathrm{May-10}$ July | Closed |
| Area K | 15 May 31 Dec . | 1 June-10 July | 1 June-10 July | 5 June-10 July |
| Area L | 15 May -31 Dec. | 1 June-10 July | 1 June-10 July | 5 June-10 July |
| Pecreational |  |  |  |  |
| Lt. Codroy | 24 Mey-15 Sept. | 1 July-15 Aug. | 1 July-15 Aug. | 1 July-15 Aug. |
| Gd. Codroy |  | 20 June-31 Aug. | . 10 June-31 Alg. | . 20 June-31 Aug. |
| Higulands | " " | No Season | Closed | Closed |
| Crabbes | " " | 203 ln -31 Aug. | 18 June-31 Aug. | 20 June-31 Aug. |
| Barachois | " " | 20 June-31 Aug. | 18 June-31 Aug. | . " " |
| Robinsons | " " | $20 \mathrm{Jrne-31}$ Aug. | 10 Jrne-31 Aug. | " " |
| Fischells | " " | 20 June-31 Aug. | 18 June-31 Aug. | .. " |
| Flat Bay | " " | \#20 June-20 July | 18 June-31 Aug. | " " |
| Lt. Barachois | " " | 1 July-15 Aug. | 1 July-15 Aug. | 1 July-15 Aug. |
| Southwest. | " " | *20 June-31 July | 18 June-31 Aug. | 20 June-31 Aug. |
| Harry's | " " | 1 July-15 Aug. | 1 July-15 Aug. | 1 July-15 Aug. |
| Fox Island | " " | ** July-17 July | 1 July-16 July | 1 July-15 July |
| Serpentine | " " | 1 July-31 Aug. | 1 July-31 Aug. | *Closed* |
| Cooks | " " | No Season | Closed | Closed |
| Hunber | " " | \#\#20 June-31 Aug. | \#\#10 June-31 Aug. | 10 June-31 Aug. |
| Hughes | " " | No Seasan | Closed | Closed |

\# 20 June-20 July 1976-80; 20 June-31 Aug. 1981-82.

* 15 June-31 Aug. in 1979.
** Nb Season 1976-80.
排 10 Jure-31 Aug. 1981-82 for Lpper Huber; 20 Jure-7 Sept. 1980 for Lower Hubber; Closed July 7-18, 1983.
. Closed July 7-12, 1983; 26 June-1 July and Aug. 11-20, 1984.
. . Closed Aug. 8-20, 1983.
*Closed* $=$ Non-enforceable closure; River "Closed" to angling for salmon only, trout angling allowed.

Table 2. A sumary of sections closed to fishing in rivers of Newfoundland.

| River name | Section closed |
| :---: | :---: |
| Grand Codroy River to South Branch | Trans Canada Higwway to source |
| Crabbes River | Twelve mile pool to source |
| Barachois Brook | Mine pool (Mile 14) to source |
| Robinsons River | Chatter pool (Mile 16) to 25 yds. above falls at Mile 19 |
| Fischells Brook | Big Steady (Mile 10) to 25 yds. above falls at Mile 18 |
| Little Barachois Brook | Old Logger's School (Mile 19) to source |
| Southwest Brook (St. George's Bay) | Mouth of Jatn's Brook to source |
| Harry's River | Mouth of Harry's River to below Sandmank Pool |
| Spruce Brook | Mouth of Spruce Brook to source |
| Pinch Ot Lake | All tributaries of Pinch Qut Lake |
| Serpentine River | All tributaries of Serpentine Lake including Serpentine River upstream from Serpentine Lake |
| Humber River | From a line drawn from Lundrigan's Wharf to Wild Cove Point upstream to Ballams Bridge |
| Adies Lake | All tributaries of Adies Lake |
| Portland Creek (Southwest Feeder) | From falls upstream from Fisheries Cabin to source |
| Little Brook Pands (Northern Peninsula) | Mouth to first pond |
| West River (St. Barbe) | Counting fence to 25 yds. above falls |
| Exploits River (Great Rattling Brook) | From fistway at Mile 3.0 to source |
| Belleve River | Cabot Highway to Trans Canada Higway |
| Northwest River (Trepassey) | Five yds. below the falls called Ladder Falls to 25 yds. above |
| Branch River (St. Mary's Bay) | The Flats (begiming inside the gut and extending upstrean $\frac{1}{2}$ mile) |

Table 3. Sumary of rearing areas and biological characteristics used to calculate spaning requirements for rivers in Areas K and L. Optimal egg deposition wes assmed to be 240 eggs per rearing unit ( $100 \mathrm{~m}^{2}$ ). Fecundity wes assumed to be 1,540 eggs per kg. (Purter and Chadick 1983).

|  | Rearing area <br> ( 100 m ) | Grilse |  | Mean weight (kg) | Large salmon |  | Mean weight (kg) | Required spanners |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | \% grils | $\%$ female |  | \% salmen | $\%$ female |  |  |
| Lt. Codroy | 3,890 | 66 | 14 | 1.6 | 34 | 67 | 5.1 | 463 |
| C.t. Coctroy | 25,963 | 86 | 57 | 1.4 | 14 | + | + | 3,511 |
| Higllands | 4,980 | 66 | 14* | 1.4 | 34 | 67* | 5.1* | 601 |
| Crabbes | 18,429 | 76 | 40 | 1.4 | 24 | $+$ | + | 2,345 |
| Barachois | 8,395 | 86 | 45 | 1.3 | 14 | $+$ | + | 1,350 |
| Robinsons | 13,491 | 87 | 63 | 1.4 | 13 | + | + | 1,752 |
| Fischells | 13,661 | 84 | $46+$ | 1.2 | 16 | + | + | 2,137 |
| Flat Bay | 16,012 | 92 | $46+$ | 1.4 | 8 | + | + | 2,904 |
| Lt. Barachois | 7,104 | 88 | 86 | 1.4 | 12 | + | + | 759 |
| Southwest | 18,970 | 82 | 43 | 1.3 | 18 | + | + | 2,795 |
| Harry's | 26,394 | 93 | 50 | 1.3 | 7 | + | + | 4,911 |
| Other | 10,016 |  |  |  |  |  |  | 1,530 |
| Area K | 167,305 | 86 | 46 | 1.4 | 14 | 90 | 3.7 | 25,059 |
| Fox Island | 6,558 | 58 | $46+$ | 1.44 | 42 | + | + | 577 |
| Serpentine | 17,799 | 85 | 22 | 1.9 | 15 | + | + | 2,233 |
| Cooks | 1,474 | 100 | 46+ | $1.4+$ | 0 | + | + | 357 |
| Hunber | 115,307 | 97 | 53 | 1.7 | 3 | + | + | 18,452 |
| Hughes | 1,221 | 91 | $46+$ | $1.4+$ | 9 | + | + | 215 |
| Other | 13,241 |  |  |  |  |  |  | 2,848 |
| Area L | 155,600 | 97 | $46+$ | 1.4 | 3 | 90 | 3.7 | 24,682 |

[^0]Table 4. Adjusted mean commercial catches in Areas $J_{2}, K$ and $L$ to detemuine additianal fish released to Areas $K$ and $L$ from Areas $J_{2}$, $K$ and $L$ de to further redictions (from 1978-82) in the commercial fishing seascrs in 1984; catches adjusted to mean weekly catches 1990-83.

| Adjusted season | Adjusted Mean Catch $\mathrm{J}_{2}$ <br> 15W <br> MSN |  | Adjusted Mean Catch K |  | Adjusted Mean Catch L |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 15W | MSW | 15W | MSW |
| 15-21 May | 6 | 435 |  |  |  |  |
| 22-28 | 44 | 2,446 |  |  |  |  |
| 29-04 June | 139 | 3,636 | 199 | 331 | 56 | 77 |
| 05-11 | 337 | 4,499 | 848 | 466 | 161 | 314 |
| 12-18 | 964 | 2,765 | 1,169 | 416 | 610 | 780 |
| 19-25 | 1,171 | 997 | 1,895 | 360 | 1,285 | 247 |
| 26-02 July | 708 | 226 | 2,837 | 240 | 1,717 | 493 |
| 03-09 | 439 | 74 | 1,571 | 121 | 1,096 | 82 |
| 10-16 | 82 | 15 | 411 | 58 | 304 | 70 |
| 17-23 |  |  | 118 | 108 | 75 | 23 |
| 24-30 |  |  | 178 | 69 | 26 | 26 |
| 31-06 |  |  | 48 | 18 | 10 | 6 |

Table 5. Estimates of fish released to rivers in Areas $K$ and $L$ frum recreational fisheries in $K$ and $L$ and connercial fisheries in $J_{2}, K$ and $L$.

| River | Angling catch as \% of area |  | Additional fish released to Areas K and L |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{gathered} \text { From } \\ \text { cormercial } \end{gathered}$ | Fram angling | Additional* | Total |
| Little Codroy | 1 | 4 | 233 | 10 | 488 | 731 |
| Grand Codroy | 19 | 19 | 1,144 | 0 | 2,964 | 4,108 |
| Crabbes | 5 | 12 | 704 | 70 | 1,642 | 2,416 |
| Barachais | 9 | 9 | 542 | 26 | 1,829 | 2,397 |
| pabinsons | 11 | 8 | 490 | 52 | 1,546 | 2,088 |
| Fischells | 5 | 5 | 302 | 10 | 937 | 1,249 |
| Flat Bay | 9 | 6 | 369 | 16 | 1,329 | 1,714 |
| Little Barachois | 5 | 4 | 244 | 5 | 588 | 837 |
| Southwest + Bottan | 15 | 21 | 1,249 | 15 | 3,473 | 4,737 |
| Harry's | 20 | 9 | 572 | 25 | 2,856 | 3,453 |
| Others** | 1 | 3 |  |  |  |  |
| Area K |  |  | 5,849 | 229 | 17,652 | 23,730 |
| Fox Island | 1 | 7 | 84 | 4 | 118 | 206 |
| Serpentine | 2 | 11 | 133 | 18 | 271 | 422 |
| Hunber | 95 | 79 | 1,092 | 113 | 3,034 | 4,239 |
| Others** | 2 | 3 |  |  |  |  |
| Area L |  |  | 1,309 | 135 | 3,423 | 4,867 |

* From Porter and Ohadwick (1983).
** Includes rivers closed in 1984.

Table 6. Recorded and adjusted recreational catches for Areas K and $L$ in 1984; 1984 adjusted catch = 1984 recorded 1 SW catch plus 1984 recorded MSN catch adjusted (increased) to mean catch 1978-82.

| River | 1984 recorded angling catch |  | $\begin{aligned} & 1984 \\ & \text { Total } \end{aligned}$ | Mean angling catch 1978-82 |  | Mean total catch | 1984 adjusted angling catch |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 15W | MSW |  | 15W | MSW |  | 15W | MSW | Catch |
| Little Codroy | 78 | 4 | 82 | 55 | 14 | 70 | 78 | 14 | 92 |
| Grand Codroy | 1,686 | 179 | 1,865 | 987 | 152 | 1,140 | 1,686 | 179 | 1,865 |
| Crabbes | 394 | 14 | 408 | 336 | 84 | 420 | 394 | 84 | 478 |
| Barachois | 158 | 0 | 158 | 162 | 26 | 189 | 158 | 26 | 184 |
| Robinsons | 502 | 23 | 525 | 636 | 75 | 711 | 502 | 75 | 577 |
| Fischells | 214 | 8 | 222 | 215 | 18 | 233 | 214 | 18 | 232 |
| Flat Bay | 325 | 7 | 332 | 308 | 23 | 331 | 325 | 23 | 348 |
| Little Barachois | 101 | 2 | 103 | 123 | 7 | 129 | 101 | 7 | 108 |
| Southwest + Bottom | 633 | 14 | 647 | 456 | 29 | 485 | 633 | 29 | 662 |
| Harry's | 720 | 11 | 731 | 522 | 36 | 558 | 720 | 36 | 756 |
| Area K * | 4,847 | 262 | 5,109 | 3,814 | 465 | 4,278 | 4,847 | 491 | 5,338 |
| Fox Island | 18 |  | 19 | 53 | 5 | 58 | 18 | 5 | 23 |
| Serpentine | 34 | 6 | 40 | 165 | 24 | 189 | 34 | 24 | 58 |
| Hunber | 2,872 | 40 | 2,912 | 3,599 | 153 | 3,752 | 2,872 | 153 | 3,025 |
| Area L* | 2,924 | 47 | 2,971 | 3,802 | 179 | 3,981 | 2,924 | 182 | 3,106 |

*Area totals may include data from a few other rivers; these rivers have been closed to angling since 1978.

Table 7. Conmercial landings of Atlantic salnan and licenced fishing gear in Statistical Area $K, 1969$ to 1984. Weight in metric torres.

| STATISTICAL AREA: K |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Effort gear units | Grilse |  | Salmon |  | Total |  | are | $\stackrel{\text { \% }}{\stackrel{\%}{i}}$ <br> (W) | $\stackrel{\stackrel{\circ}{\%}}{\text { Grilse }}$ <br> (N) |
|  |  | weight | number | weight | number | weight | number |  |  |  |
| 1969 | 218 | 22 | 11,990 | 13 | 2,709 | 35 | 14,699 | 0.16 | 62.86 | 81.57 |
| 1970 | 226 | 11 | 5,865 | 49 | 9,738 | 60 | 15,603 | 0.27 | 18.33 | 37.59 |
| 1971 | 337 | 7 | 3,756 | 21 | 4,185 | 28 | 7,941 | 0.08 | 25.00 | 47.30 |
| 1972 | 260 | 15 | 8,202 | 18 | 3,615 | 33 | 11,817 | 0.13 | 45.45 | 69.41 |
| 1973 | 369 | 33 | 18,137 | 12 | 2,366 | 45 | 20,503 | 0.12 | 73.33 | 88.46 |
| 1974 | 389 | 17 | 9,934 | 15 | 3,263 | 32 | 13,197 | 0.08 | 53.13 | 75.27 |
| 1975 | 614 | 12 | 6,529 | 7 | 1,400 | 19 | 7,929 | 0.03 | 63.16 | 82.34 |
| 1976 | 509 | 21 | 10,474 | 16 | 3,680 | 37 | 14,154 | 0.07 | 56.76 | 74.00 |
| 1977 | 467 | 15 | 8,530 | 26 | 5,534 | 41 | 14,064 | 0.09 | 36.59 | 60.65 |
| 1978 | 456 | 10 | 6,495 | 13 | 2,894 | 23 | 9,389 | 0.05 | 43.48 | 69.18 |
| 1979 | 455 | 19 | 10,242 | 4 | 868 | 23 | 11,110 | 0.05 | 82.61 | 92.19 |
| 1980 | 426 | 24 | 11,387 | 16 | 3,439 | 40 | 14,826 | 0.09 | 60.00 | 76.80 |
| 1981 | 403 | 19 | 11,097 |  | 1,573 | 26 | 12,670 | 0.06 | 73.08 | 87.58 |
| 1982 | 364 | 13 | 7,902 | 4 | 851 | 17 | 8,753 | 0.04 | 76.47 | 90.28 |
| 1983 | 418 | 11 | 6,178 | 9 | 2,094 | 20 | 8,272 | 0.05 | 55.00 | 74.69 |
| 1984* | - | 14 | 7,727 | 11 | 2,367 | 25 | 10,094 | - | 56.00 | 76.55 |

Mears and Standard Deviations:
1969-83:

| Mean | 394.07 | 16.60 | $9,114.53$ | 15.33 | $3,213.93$ | 31.93 | $12,328.47$ | 0.09 | 55.02 | 73.82 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| S.D. | 106.29 | 6.66 | $3,450.12$ | 11.17 | $2,215.54$ | 11.60 | $3,534.01$ | 0.06 | 18.62 | 15.55 |
| N | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

1978-83:

| Mean | 420.33 | 16.00 | $8,883.50$ | 8.83 | $1,953.17$ | 24.83 | $10,836.67$ | 0.06 | 65.11 | 81.79 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| S.D. | 34.60 | 5.51 | $2,323.82$ | 4.88 | $1,062.98$ | 8.04 | $2,544.23$ | 0.02 | 14.80 | 9.47 |
| N | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |

[^1]Table 8. Sparts harvest of Atlantic salmon in Area K, 1953-1984.

| STATISTICAL AREA: K |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | $\begin{aligned} & \text { Effort } \\ & \text { rod days } \end{aligned}$ | $\begin{array}{r} \text { Grilse } \\ <2.7 \mathrm{~kg} \end{array}$ | $\begin{aligned} & \text { Salmon } \\ > & 2.7 \mathrm{~kg} \end{aligned}$ | Total catch | Cue | $\%$ Grilse |
| 1953 | 8,040 | 3,118 | 1,066 | 4,184 | 0.52 | - |
| 1954 | 3,994 | 1,578 | 670 | 2,248 | 0.56 | 82 |
| 1955 | 5,696 | 2,126 | 617 | 2,743 | 0.48 | 72 |
| 1956 | 8,213 | 3,187 | 1,166 | 4,353 | 0.53 | 65 |
| 1957 | 8,720 | 4,580 | 1,621 | 6,201 | 0.71 | 66 |
| 1958 | 7,699 | 3,172 | 1,551 | 4,723 | 0.61 | 75 |
| 1959 | 8,824 | 2,664 | 928 | 3,592 | 0.41 | 7 |
| 1960 | 8,054 | 3,935 | 603 | 4,538 | 0.56 | 82 |
| 1961 | 10,244 | 3,930 | 967 | 4,897 | 0.48 | 80 |
| 1962 | 12,834 | 6,485 | 1,133 | 7,618 | 0.59 | 78 |
| 1963 | 15,743 | 8,420 | 2,240 | 10,660 | 0.68 | 74 |
| 1964 | 16,849 | 8,956 | 1,878 | 10,834 | 0.64 | 82 |
| 1965 | 14,721 | 6,127 | 1,544 | 7,61 | 0.52 | 85 |
| 1966 | 11,977 | 3,648 | 1,450 | 5,098 | 0.43 | 81 |
| 1967 | 15,534 | 5,608 | 1,571 | 7,185 | 0.46 | 70 |
| 1968 | 15,114 | 5,615 | 987 | 6,602 | 0.44 | 85 |
| 1969 | 16,025 | 6,987 | 1,082 | 8,069 | 0.50 | 84 |
| 1970 | 19,612 | 6,153 | 1,049 | 7,202 | 0.37 | 87 |
| 1971 | 18,103 | 5,339 | 660 | 5,999 | 0.33 | 90 |
| 1972 | 15,803 | 4,218 | 871. | 5,089 | 0.32 | 86 |
| 1973 | 19,017 | 6,430 | 1,020 | 7,450 | 0.39 | 81 |
| 1974 | 18,946 | 4,322 | 744 | 5,066 | 0.27 | 90 |
| 1975 | 21,678 | 5,711 | 756 | 6,527 | 0.30 | 85 |
| 1976 | 20,964 | 5,121 | 554 | 5,675 | 0.27 | 91 |
| 1977 | 17,209 | 4,355 | 994 | 5,349 | 0.31 | 84 |
| 1978 | 11,084 | 2,327 | 597 | 2,924 | 0.26 | 88 |
| 1979 | 7,751 | 2,572 | 84 | 2,656 | 0.34 | 97 |
| 1980 | 12,316 | 4,213 | 673 | 4,886 | 0.40 | 79 |
| 1981 | 14,311 | 4,911 | 500 | 5,411 | 0.38 | 89 |
| 1982 | 15,417 | 5,045 | 469 | 5,514 | 0.36 | 91 |
| 1983 | 16,480 | 3,075 | 554 | 3,629 | 0.22 | 90 |
| 1984 | 14,783 | 4,847 | 262 | 5,109 | 0.35 | 92 |
| Means Standard Deviations N's: |  |  |  |  |  |  |
| 69-73 | 17,712.0 | 5,825.4 | 936.3 | 6,761.8 | 0.38 | 86 |
| S.D. | 1,728.9 | 1,077.3 | 174.3 | 1,199.6 | 0.03 | 2 |
| N | 5 | 5 | 5 | 5 | 5 | 5 |
| 74-78 | 17,976.2 | 4,379.2 | 729.0 | 5,108.2 | 0.28 | 88 |
| S.D. | 4,232.7 | 1,294.5 | 172.6 | 1,338.4 | 0.01 | 1 |
| N | 5 | 5 | 5 | 5 | 5 | 5 |
| 79-83 | 13,255.0 | 3,963.2 | 456.0 | 4,419.2 | 0.33 | 89 |
| S.D. | 3,441.1 | 1,101.7 | 222.0 | 1,238.3 | 0.04 | 2 |
| N | 5 | 5 | 5 | 5 | 5 | 5 |
| 69-83 | 16,314.4 | 4,722.6 | 707.1 | 5,429.7 | 0.33 | 87 |
| S.D. | 2,792.5 | 1,356.3 | 269.7 | 1,548.0 | 0.02 | 1 |
| N | 15 | 15 | 15 | 15 | 15 | 15 |

Percent grilse is calculated by year class;
In the above table a period indicates no data for that year.

Table 9. Conhercial landings of Atlantic salman and licenced fishing gear in Statistical Area L, 1969 to 1984. Weight in metric tornes.

| STATISTICAL AREA: L |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Effort gear units | Grilse |  | Salmon |  | Total |  | Que | $\stackrel{\text { \% }}{\text { \% }}$ <br> (W) | $\%$ Grilse ( N ) |
|  |  | weight | number | weight | number | weight | number |  |  |  |
| 1969 | 221 | 9 | 4,944 | 5 | 945 | 14 | 5,889 | 0.06 | 64.29 | 83.95 |
| 1970 | 153 | 13 | 7,022 | 3 | 676 | 16 | 7,698 | 0.10 | 81.25 | 91.22 |
| 1971 | 248 | 2 | 1,259 | 1 | 116 | 3 | 1,375 | 0.01 | 66.67 | 91.56 |
| 1972 | 258 | 10 | 5,272 | 3 | 532 | 13 | 5,804 | 0.05 | 76.92 | 90.83 |
| 1973 | 271 | 9 | 4,875 | 3 | 560 | 12 | 5,435 | 0.04 | 75.00 | 89.70 |
| 1974 | 198 | 8 | 4,137 | 3 | 554 | 11 | 4,691 | 0.06 | 72.73 | 88.19 |
| 1975 | 366 | 6 | 2,882 | 3 | 694 | 9 | 3,576 | 0.02 | 66.67 | 80.59 |
| 1976 | 327 | 6 | 2,909 | 2 | 397 | 8 | 3,306 | 0.02 | 75.00 | 87.99 |
| 1977 | 270 | 5 | 2,377 | 7 | 1,421 | 12 | 3,798 | 0.04 | 41.67 | 62.59 |
| 1978 | 264 | 6 | 3,557 | 4 | 891 | 10 | 4,448 | 0.04 | 60.00 | 79.97 |
| 1979 | 250 | 8 | 3,987 | 1 | 288 | 9 | 4,275 | 0.04 | 88.89 | 93.26 |
| 1980 | 255 | 16 | 8,113 | 9 | 1,818 | 25 | 9,931 | 0.10 | 64.00 | 81.69 |
| 1981 | 253 | 8 | 4,230 | 3 | 687 | 11 | 4,917 | 0.04 | 72.73 | 86.03 |
| 1982 | 214 | 10 | 5,467 | 4 | 789 | 14 | 6,255 | 0.07 | 71.43 | 87.40 |
| 1983 | 259 | 9 | 4,701 | 4 | 821 | 13 | 5,522 | 0.05 | 69.23 | 85.13 |
| 1984* | - | 13 | 6,609 | 5 | 1,177 | 18 | 7,786 | - | 72.22 | 84.88 |

Means and Standard Deviations:
1969-83:

| Mean | 254.20 | 8.33 | $4,382.13$ | 3.67 | 745.93 | 12.00 | $5,128.00$ | 0.05 | 69.71 | 85.34 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| S.D. | 49.91 | 3.33 | $1,745.05$ | 2.09 | 425.08 | 4.75 | $1,986.33$ | 0.03 | 10.66 | 7.51 |
| N | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

1978-83:

| Mean | 249.17 | 9.50 | $5,009.17$ | 4.17 | 882.33 | 13.67 | $5,891.33$ | 0.06 | 71.05 | 85.58 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| S.D. | 17.90 | 3.45 | $1,655.24$ | 2.64 | 505.85 | 5.85 | $2,108.68$ | 0.02 | 9.96 | 4.68 |
| N | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |

[^2]Table 10. Sports harvest of Atlatic salmen in Area L, 1953-1984.

| STAIISTICAL AREA: L |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Effort rod days | $\begin{array}{r} \text { Grilse } \\ <2.7 \mathrm{~kg} \end{array}$ | $\begin{aligned} & \text { Salmon } \\ > & 2.7 \mathrm{~kg} \end{aligned}$ | Total catch | Cue | $\begin{gathered} \% \\ \text { Grilse } \end{gathered}$ |
| 1953 | 4,075 | 1,389 | 230 | 1,619 | 0.40 | - |
| 1954 | 4,595 | 994 | 196 | 1,190 | 0.26 | 88 |
| 1955 | 2,557 | 1,534 | 193 | 1,727 | 0.68 | 84 |
| 1956 | 7,917 | 1,419 | 283 | 1,702 | 0.21 | 84 |
| 1957 | 3,524 | 2,201 | 293 | 2,494 | 0.71 | 83 |
| 1958 | 4,066 | 1,919 | 410 | 2,329 | 0.57 | 84 |
| 1959 | 4,481 | 2,207 | 379 | 2,586 | 0.58 | 84 |
| 1960 | 4,385 | 2,159 | 324 | 2,483 | 0.57 | 87 |
| 1961 | 4,541 | 2,047 | 260 | 2,307 | 0.51 | 89 |
| 1962 | 5,393 | 2,939 | 336 | 3,275 | 0.61 | 86 |
| 1963 | 6,518 | 4,240 | 299 | 4,539 | 0.70 | 91 |
| 1964 | 9,798 | 5,390 | 650 | 6,040 | 0.62 | 87 |
| 1965 | 8,193 | 4,388 | 385 | 4,713 | 0.58 | 93 |
| 1966 | 9,992 | 4,428 | 433 | 4,861 | 0.49 | 91 |
| 1967 | 6,685 | 2,501 | 267 | 2,768 | 0.41 | 94 |
| 1968 | 7,207 | 2,750 | 162 | 2,912 | 0.40 | 94 |
| 1969 | 12,805 | 5,160 | 542 | 5,720 | 0.45 | 84 |
| 1970 | 14,848 | 3,586 | 594 | 4,180 | 0.28 | 90 |
| 1971 | 10,925 | 4,183 | 385 | 4,568 | 0.42 | 90 |
| 1972 | 11,811 | 4,183 | 232 | 4,415 | 0.37 | 95 |
| 1973 | 11,938 | 3,838 | 372 | 4,210 | 0.35 | 92 |
| 1974 | 10,367 | 2,867 | 172 | 3,039 | 0.29 | 96 |
| 1975 | 10,575 | 6,232 | 130 | 6,362 | 0.60 | 96 |
| 1976 | 11,958 | 5,262 | 72 | 5,334 | 0.45 | 99 |
| 1977 | 7,265 | 2,357 | 55 | 2,412 | 0.33 | 99 |
| 1978 | 8,602 | 2,962 | 258 | 3,200 | 0.37 | 90 |
| 1979 | 8,632 | 3,437 | 29 | 3,466 | 0.40 | 99 |
| 1980 | 8,997 | 3,700 | 320 | 4,020 | 0.45 | 91 |
| 1981 | 9,528 | 4,389 | 163 | 4,552 | 0.48 | 96 |
| 1982 | 9,829 | 4,521 | 126 | 4,647 | 0.47 | 97 |
| 1983 | 8,993 | 3,262 | 56 | 3,318 | 0.37 | 99 |
| 1984 | 7,369 | 2,924 | 47 | 2,971 | 0.40 | 99 |
| Means Standard Deviations N's: |  |  |  |  |  |  |
| 69-73 | 12,465.4 | 4,190.0 | 425.0 | 4,615.0 | 0.37 | 90 |
| S.D. | 1,489.2 | 597.9 | 144.8 | 627.9 | 0.03 | 2 |
| N | 5 | 5 | 5 | 5 | 5 | 5 |
| 74-78 | 9,753.4 | 3,936.0 | 137.4 | 4,073.4 | 0.42 | 97 |
| S.D. | 1,832.3 | 1,704.0 | 81.9 | 1,687.1 | 0.06 | 1 |
| N | 5 | 5 | 5 | 5 | 5 | 5 |
| 79-83 | 9,195.8 | 3,861.8 | 138.8 | 4,000.6 | 0.44 | 96 |
| S.D. | 476.9 | 565.4 | 114.6 | 607.0 | 0.02 | 1 |
| N | 5 | 5 | 5 | 5 | 5 | 5 |
| 69-83 | 10,471.5 | 3,995.9 | 233.7 | 4,229.7 | 0.40 | 94 |
| S.D. | 1,960.4 | 1,021.9 | 176.8 | 1,054.4 | 0.02 | 1 |
| N | 15 | 15 | 15 | 15 | 15 | 15 |

Percent grilse is calculated by year class;
In the above table a period indicates no data for that year.

Table 11. Spewing escapements 1994 for rivers Areas $K$ and $L$ using tho angling explaitation rates to derive river escapenents; these are cunpared to the aponing requirenents.

| River | Exploitation rate |  | Additional fish released | Required spanners | Surplus to requirements |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $20 \%$ | $40 \%$ |  |  | Meximm | Minimum |
| Little Codroy | 368 | 138 | 731 | 463 | 638 | 406 |
| Grand Coctroy | 7,460 | 2,798 | 4,108 | 3,511 | 8,057 | 3,85 |
| Crabbes | 1,912 | 717 | 2,416 | 2,345 | 1,993 | 788 |
| Barachais | 736 | 276 | 2,977 | 1,350 | 1,783 | 1,323 |
| Robinsons | 2,308 | 866 | 2,088 | 1,752 | 2,644 | 1,202 |
| Fischells | 928 | 348 | 1,249 | 2,157 | 40 | -520 |
| Flat Bay | 1,392 | 522 | 1,714 | 2,904 | 200 | -636 |
| Little Barachois | 432 | 162 | 837 | 759 | 510 | 240 |
| Southnest + Bottan | 2,648 | 993 | 4,737 | 2,795 | 4,590 | 2,935 |
| Herry's | 3,024 | 1,134 | 3,453 | 4,911 | 1,566 | -274 |
| Area K* | 21,352 | 8,007 | 23,730 | 25,059 | 20,003 | 6,678 |
| Fox Island | 92 | 35 | 206 | 577 | -271 | -328 |
| Serpentine | 232 | 87 | 422 | 2,233 | -1,543 | -1,689 |
| Hunber | 12,100 | 4,538 | 4,239 | 18,452 | -1,887 | -9,449 |
| Area L* | 12,424 | 4,659 | 4,867 | 24,682 | -7,121 | -14,886 |

* Area totals may include data from a few other rivers; these rivers have been closed to angling sirce 1978.


Fig. 1. Boundaries of Statistical Section (numerically indicated) and Statistical Areas (alphabetical) in insular Newfoundland. Major river systems in Areas $K$ and $L$ are also shown.


[^0]:    * Values from Lt. Coctroy were used.
    + Mean values from Area $K$.

[^1]:    * Numbers of grilse and large salmon calculated from mean weights (1978-83) of 1.80 kg and 4.52 kg respectively.

[^2]:    * Numbers of grilse and large salmon calculated from mean weights (1978-83) of 1.90 kg and 4.72 kg respectively.

