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Proceedings of the March 2001 Newfoundland Region Salmonid Stock Assessment Meeting

March 2001
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TABLE OF CONTENTS

ABSTRACT

The eight annual Salmonid Stock Assessment Meeting for the Newfoundland Region was held in St. John's, Newfoundland, March 5 - 8, 2001. The general status of salmon stocks, based on data compiled during 2000, was reviewed along with detailed assessments on 22 individual rivers. Oceanographic conditions in the northwest Atlantic were also summarized. An overview of commercial landings, biological characteristics, tag recovery and ocean migrations of northern Labrador Arctic charr were presented. A summary of the current information on rainbow trout occurrences in Newfoundland rivers was also tabled. This report summarizes each of the various working papers presented and provides an account of the general status of stocks. Summary sheets for various salmon stocks assessed are appended.

RÉSUMÉ

La huitième Réunion annuelle d'évaluation des stocks de salmonidés de la Région de Terre-Neuve s'est déroulée du 5 au 8 mars 2001 à St. John's (Terre-Neuve). Les participants ont passé en revue la situation générale des stocks de saumon à partir de données réunies en 2000, et ont examiné les évaluations détaillées de 22 rivières. Les conditions océanographiques de l'Atlantique nord-ouest ont aussi été résumées. On a également présenté un survol des débarquements commerciaux, des caractères biologiques, de la récupération des étiquettes et des migrations océaniques de l'omble chevalier du nord du Labrador. On a enfin déposé un sommaire des informations à jour sur la présence de la truite arc-en-ciel dans les rivières de Terre-Neuve. Le présent rapport contient un résumé de chacun des documents de travail présentés et fait un compte rendu de la situation générale des stocks. On trouvera aussi en annexe des résumés de la situation des divers stocks de saumons qui ont fait l'objet d'évaluations.

INTRODUCTION

The eighth annual Newfoundland Region Salmonid Stock Assessment meeting was held in St. John's, Newfoundland, March 5 – 8, 2001, to review the status of Atlantic salmon and north Labrador Arctic charr stocks. In addition to Department of Fisheries and Oceans (DFO) Scientific staff, the meeting also included representatives from: Fisheries Management Branch, Parks Canada, Memorial University of Newfoundland, Labrador Inuit Association, Gander River Management Association, Salmonid Association of Eastern Newfoundland, Freshwater-Alexander Bay Ecosystem Corporation, Salmonid Council of Newfoundland & Labrador, and the Atlantic Salmon Federation.

This report contains a synopsis of the status of stocks in Newfoundland and Labrador salmon stocks, along with summaries of each of the working papers presented at the March 2001 assessment meeting. Summary sheets for various salmon stocks assessed are appended.

Complete details of the data and methodologies used in the assessments are published in the Department of Fisheries and Oceans Canadian Stock Assessment Secretariat Research Document series, while the overall report on the status of stocks is contained in Stock Status Report D2-01 (2001), Newfoundland & Labrador Atlantic Salmon Stock Status for 2000.

A copy of the agenda for the March 2001 meeting is provided in Appendix 1. Participants attending the assessment sessions, in whole or in part, are listed in Appendix 2, while working papers presented at the meeting are listed in Appendix 3. Individual stock status summary sheets are provided in Appendix 4.

SUMMARY OF SALMON STOCK STATUS

- Limited information from **Labrador** (SFA 1) indicated that returns of small salmon increased while large salmon runs declined relative to 1999. Overall, salmon runs appear to be low, as evidenced by returns to two counting facilities when compared with rivers assessed in insular Newfoundland.

- In **insular Newfoundland**, 20 rivers were assessed relative to conservation. Of these, 12 stocks met or exceeded their requirements, three rivers were between 63 and 95% of conservation, while five rivers achieved less than 40% of their spawning requirements. Of the latter rivers, two were located in Bay St. George (SFA 13) (Highlands River and Harry's River), while three others were enhanced stocks that have been, or are undergoing colonization programs.

- In **insular Newfoundland**, smolt production in 2000 decreased from 5 to 25% at four of the six monitored stocks compared with 1999. Smolt production has with declined consistently each year since 1997 on these rivers, which may be indicative of other rivers in Newfoundland. Where smolt production has fallen, returns of small salmon are

expected to decline from 2000 levels unless there are corresponding increases in marine survival to compensate for the reduction in smolt numbers.

- In **Northeast and eastern Newfoundland** (SFAs 4 - 5), total returns of small (<63 cm) salmon declined from 11% (Middle Brook) to 58% (Exploits River) relative to 1999, with all five stocks having returns lower than the 1992-1999 average. Returns of large (≥63 cm) salmon were mixed: three stocks declined by more than 50% from previous year while returns increased at two other rivers. Two of the five stocks assessed met their conservation requirements in 2000. Marine survival of smolts to returns of small salmon at Campbellton River decreased from 6.1% in 1999 to 3.8% in 2000, and was well below the average of 6.5% for the previous six years.

- In **Southern Newfoundland** (SFAs 9 - 11), total returns of small salmon in 2000 increased substantially in two rivers relative to 1999 but declined in two other stocks. Returns of large salmon varied with increases at Northeast River (Placentia) and Rocky River but decreases at Northeast Brook (Trepassey) and Conne River. At all monitored rivers, returns of large salmon in 2000 were higher than the 1992-1999 means. With the exception of Rocky River, the three other monitored stocks met or exceed their conservation spawning requirements. Marine survival at Conne River increased to the second highest value recorded (8.1%), while showing small increases at Northeast Brook (Trepassey), and Rocky River. However, marine survival is still anomalously low given the reductions in directed marine fisheries for salmon during the past decade. Smolt production decreased in two of the monitored rivers in 2000.

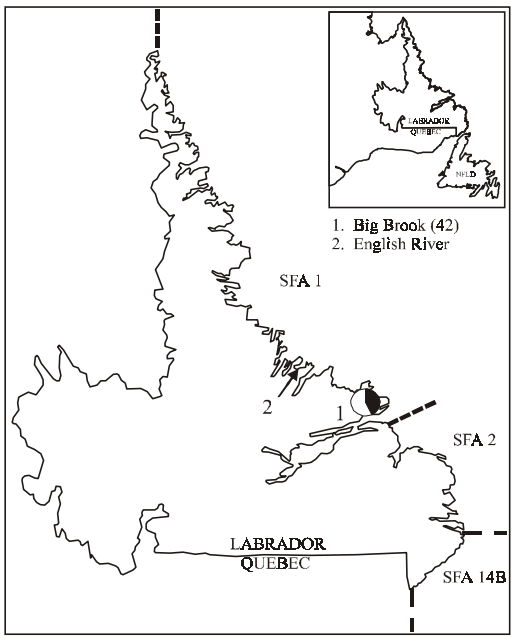
- In **Southwest Newfoundland** (SFAs 12 - 13), total returns of small salmon showed marked improvements over 1999 at three rivers (Crabbes, Middle Barachois, and Fischells), were similar to the previous year at Robinsons and Flat Bay, but declined substantially at Highlands River and Harry's River, with Highlands having the lowest return on record. Relative to 1999, total returns of large salmon decreased at Crabbes, Harry's and Highlands rivers, but increased in the other assessed stocks. Conservation spawning requirements were attained in three of the seven stocks assessed. Marine survival of smolts to small salmon returns at Highlands River decreased from 2.5% in 1999 to 0.6% in 2000, the lowest value recorded. Survival to 2SW salmon increased from 0.5% in 1999 to 0.7%.

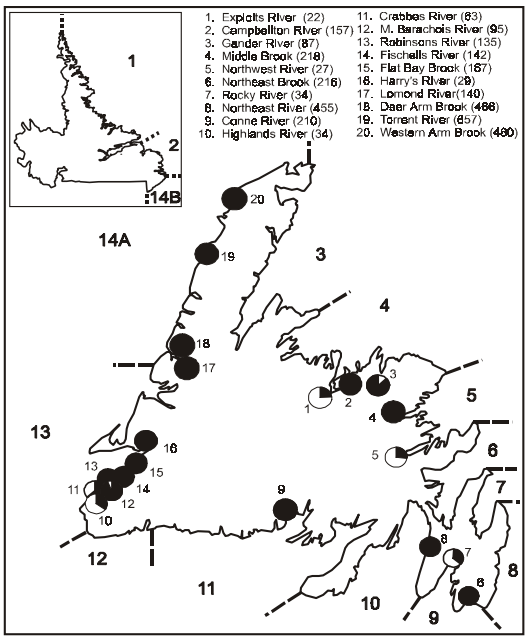
- In **Northwest Newfoundland** (SFA 14A), total returns of small salmon varied, with higher returns at Western Arm Brook compared with 1999, but lower returns at Torrent River and Lomond River. In contrast, returns of large salmon declined only at Lomond River while showing substantive increases at Torrent River and Western Arm Brook. Conservation spawning requirements were exceeded at each of these rivers, continuing the trend that began with the commercial salmon fishery moratorium in 1992. Marine survival of smolts to small salmon returns at Western Arm Brook increased from 6.1% in 1999 to 11.0% in 2000, the highest value recorded in over 20 years.

SUMMARY OF PRESENTATIONS

A total of 19 working papers was presented: 14 specific to the assessment of individual Atlantic salmon stocks; one each on Arctic charr, rainbow trout, and the impact of catch and release angling on survival of salmon; one paper was related to environmental conditions in the northwest Atlantic; and one paper examined the harvest of salmon and environmental conditions in Labrador. Twenty (20) salmon stocks were assessed relative to conservation requirements in insular Newfoundland (plus three sections for Exploits River), but only one Labrador river (Big Brook) was assessed relative to conservation. It is noted that conservation requirements for Labrador rivers may not be appropriate, and are currently used as a reference level. English River (SFA 1) was reviewed, but not in relation to conservation requirements. Results for individual rivers are provided in the Summary Sheets (Appendix 4) but note that summary sheets were not prepared for all rivers. The paper on Arctic charr presented information on commercial fishery landings for 2000 as well as historical catches and an update of tag recovery and ocean migration information compiled over the past 25 years.

The following maps illustrate the Salmon Fishing Areas of the Newfoundland Region, the individual rivers assessed, and percent of conservation egg requirements achieved in 2000.





SUMMARIES OF PAPERS PRESENTED

Status of the Exploits River stock of Atlantic salmon (*Salmo salar* L.) in 2000

***Authors*:** C. E. Bourgeois, J. Murray, and V. Mercer

***Summary*:** The status of Atlantic salmon in the Exploits River in 2000 was derived from three fishway counts, recreational fishery data, fecundity data and biological characteristic data for the Exploits stock. The 2000 run timing was similar to the mean run timing for the 1992 – 1999 time period. River escapement of 12,385, composed of 11,817 small and 683 large salmon is the lowest of the moratorium period of 1992-2000. The watershed received 22% of the required conservation egg deposition with the lower, middle and upper sections of the watershed receiving 64%, 16% and 2% respectively. Since 1996 the portion of the river escapement migrating upstream of Grand Falls has been increasing suggesting previous enhancement efforts are proving worthwhile. The 2000 recreational catch was 1,859 salmon (1,101 retained and 758 released) is also the lowest of the moratorium period. The management target of 13,000 spawners was not achieved in 2000.

***Comments*:**

Concern was expressed over the low level of returns to the upper section (area upstream of Red Indian Lake) of the watershed.

***Recommendations*:**

- Increase the management target on the Exploits River from 13,000 to 18,000 spawners.
- Conduct an angling creel on the area below Bishop Falls similar to that conducted in 1999.

Status of the Rocky River stock of Atlantic salmon (*Salmo salar* L.) in 2000

***Authors*:** C. E. Bourgeois, J. Murray, and V. Mercer

***Summary*:** The stock status was determined for the Rocky River (SFA 9) utilizing complete counts of large and small salmon at a fishway and a complete count of smolt at a smolt counting fence. Rocky River received 34% of its conservation egg deposition. The Rocky River is closed to recreational fishing. Smolt-to-1SW survival for Rocky River increased to 3% for the 1999 smolt class. Data are presented on smolt condition and the relationships between smolt condition and 1SW returns and egg-to-smolt survival versus egg deposition

Physical oceanographic conditions on the Newfoundland and Labrador Shelves during 2000

Authors: E. Colbourne

Summary: Annual air temperatures throughout much of the Newfoundland and Labrador Region were above normal during 2000. Annual mean air temperatures at Cartwright for example, on the southern Labrador Shelf, cooled slightly from the record high set in 1999, but were still above their long-term means by over 1°C. Air temperatures at Goose Bay were above normal for 10 out of 12 months and at St. John's they were above normal for 11 out of 12 months. The North Atlantic Oscillation (NAO) index value for 2000 was similar to 1999, which was well above normal, reversing the trend of below and near normal values of the previous three years. The index during 1999 and 2000 was similar to levels obtained during the cold early 1990s; however the colder-than-normal environmental conditions usually associated with a high NAO index did not influence the northwestern side of the Atlantic during the past two years. This was due to an eastward shift in the anomalous air pressure fields resulting in milder-than-normal conditions in the region.

Sea ice on the southern Labrador and Newfoundland shelves generally appeared on schedule during 2000 but left early, resulting in a shorter duration of ice than usual. The total ice coverage in these areas during 2000 was lower than average but increased slightly over conditions in 1999 during both winter and spring.

The annual water column integrated temperature at Station 27 for 2000 cooled slightly compared to 1999 but remained above the long-term mean. Surface temperatures were above normal for 9 out of 12 months with anomalies reaching a maximum of near 1.5°C during August. The June, July and December values were about normal. Bottom temperatures at Station 27 were above normal (by >0.5°C) during the first 6 months of the year and about normal during the remainder.

Salinities at Station 27 were below normal during the winter months and near normal during the rest of the year. The vertically integrated salinity for the summer months was about normal. Similar trends in temperatures and salinity were observed on the Flemish Cap and on Hamilton Bank during 2000. Temperatures at 10-m depth in the inshore regions along the east coast of Newfoundland during 2000 were above normal by up to 3°C during the summer months.

In general, the below normal trends in temperature and salinity, established in the late 1980s reached a peak in 1991. This cold trend continued into 1993 but started to moderate during 1994 and 1995. During 1996, temperature conditions were above normal over most regions; however, summer salinity values continue to be slightly below the long-term normal. During 1997 – 1999, ocean temperatures continued above normal over most areas, with 1999 being one of the warmest years in the past couple of decades. In general, during 2000 ocean temperatures were cooler than 1999 values, but remained above normal over most areas continuing the trend established in 1996. Salinities during 2000 were similar to 1999 values, generally fresher than

normal throughout most regions, which is a continuation of the trend observed during most of the 1990s.

Status of Atlantic salmon at Highlands River, Bay St. George, SFA 13, Newfoundland, 2000

***Authors*:** J. B. Dempson and G. Clarke

Summary: The status of Atlantic salmon in Highlands River, 2000, was determined from the number of salmon returning to a fish counting fence located on the main stem of the river just above head of tide. Biological characteristics were collected from kelt and updated summaries for past years are provided. Adult returns in 2000 were 58 small salmon and 67 large salmon. This was the lowest number of small salmon recorded at Highlands River and returns of large salmon were the lowest since monitoring resumed in 1993. Marine survival fell to the lowest value recorded for small salmon (0.6%) while survival to large salmon was only 1.1%. Marine survival is still anomalously low given the substantial reductions in directed sea fisheries for Atlantic salmon since 1992. The proportion of the conservation requirement achieved for Highlands River in 2000 was 34.0% with the 5th and 95th percentiles of 26.6 to 41.9%. On average, for the period 1993-2000, Highlands River has achieved 64.5% of its conservation requirement.

***Comments*:**

Questions were raised as to why attention was placed on Highlands River, which, by comparison with many other rivers, has few adult salmon returning, has been closed to angling since 1978, and likely will remain so, while assessments on rivers such as Humber were not continued in 2000. Other questions related to whether it was possible to differentiate a 2SW from a 1SW smolt, and if forestry practises in the Bay St. George area could have changed flow patterns of rivers to such an extent that river habitat could be somewhat unstable.

Status of north Labrador anadromous Arctic charr stocks, 2000

Authors: J. B. Dempson and M. Shears

Summary: Catch and effort statistics for the northern Labrador Arctic charr fishery in 2000 are summarized and information on catch-at-age and weight-at-age updated. Landings of 46.8 tonnes were about 16% higher than the previous year and were the highest recorded since 1992. Overall, effort in recent years is still low, relative to the 1980's, and interpretation of current commercial catch rates as an index of stock abundance, could be problematic. Landings of anadromous Arctic charr from the Nain Fishing Region over the past 27 years (1974 - 2000) totalled 2676 tonnes, or 5.9 million pounds. Of this amount, 77% (2054 tonnes)

has been harvested from the three primary stock complexes (Voisey, Nain, Okak) and illustrates the overall capacity of the north coast area to produce fish. We note that the amount of charr harvested for food is unknown, but could be substantive.

Comments:

It was acknowledged that more than 26,000 charr were caught in the commercial-communal charr fishery in 2000 alone, more than the number of salmon retained in angling fisheries in the insular portion of the province. Yet, not a single abundance project exists from which to provide advice on north Labrador charr stocks.

Recommendation:

- Fish counting facilities are required in order to obtain actual abundance information on north Labrador charr stocks.

Assessment of the status of the Atlantic salmon stock of Conne River, SFA 11, Newfoundland, 2000

Authors: J. B. Dempson, G. Furey, and M. Bloom

Summary: Results obtained from a fish counting fence provided the basis for the assessment of the Conne River Atlantic salmon stock in 2000. Total returns to home waters (river and estuary) were 5177 salmon < 63 cm in length and 216 salmon ≥ 63 cm in size. This represented an increase of 120% for small salmon by comparison with 1999 and the highest return since 1990. Returns of large salmon declined by 10% from the previous year. Sea survival to 1SW salmon increased to 7.8%, the second highest value recorded and well above the mean survival of 3.6% for the 1991 to 1999 adult salmon return years. Both the management target (117%; 89-147%) and conservation spawning (egg) requirement (210%; 160-264%) were attained. A mark-recapture study estimated a smolt run in 2000 of 60,777, about 40% less than the peak run in 1997 and approximately 14% below the long term average production (70,890) from 1987 – 1999.

Comments:

Explore whether a linear, or other, model could be used to test fully perceived density-dependent observations of egg-to-smolt survival. Questions were raised as to whether acidification of the watershed could have impacted salmon production in Conne River. It was noted that at a public meeting held at Bay d'Espoir in late February, local residents clearly indicated they did not want catch and release on the Conne River salmon stock. Comments on the proposed management plan for Conne River raised at the assessment meeting yielded various opinions including the point that prohibiting catch and release excludes fishers who

wish to do not want to retain salmon and seems contrary to the Department's position on promoting conservation. It was noted that Conne River should not be "micro-managed".

Impact of catch and release angling on survival of Conne River Atlantic salmon

Authors: J. B. Dempson, G. Furey, and M. Bloom

Summary: The effects of catch and release angling on survival of Atlantic salmon at Conne River, Newfoundland, were investigated by retaining angled (N = 49; experimental group) and trap-caught (N = 20; control group) fish in holding cages for up to 40 days. Samples were obtained from June 8 to July 4, 2000, and partitioned among four water temperature strata. Apart from not being angled, control fish were handled, tagged, and transferred to holding cages in a manner similar to angled salmon. Water temperatures and discharge were monitored throughout the duration of the study. Overall, 8.2% of salmon caught and released died, but 12% died among salmon angled in water temperatures ≥ 17.9 °C. No control fish died. There were no significant differences in times associated with: angling, exposure to air, tagging, transfer to holding cages, nor total handling times between salmon that survived versus those that died.

Comments:

Questions raised included who did the 'unhooking' during the catch and releases experiment, and whether there were any perceived differences in survival between repeat spawners and virgin grilse. Also, whether stream velocity could impact on recovery of salmon that were caught and released, and how much could one generalize about results obtained from this study.

Status of Atlantic salmon (Salmo salar L.) in Campbellton River, Notre Dame Bay (SFA 4), Newfoundland in 2000

Authors: P. R. Downton, D. G. Reddin, and R. w. Johnson

Summary: The status of Atlantic salmon in Campbellton River in 2000 was determined from the number of salmon counted through a portable fish counting weir (fence) located on the main stem just above head of the tide. As well, biological data was collected from salmon sampled at the fence site and from catches in the recreational fishery. The assessment was conducted in response to major management changes that were introduced in 1992 and continued into 2000. Specifically, there was a moratorium on the commercial Atlantic salmon fishery in insular Newfoundland and restrictions were placed on recreational fishing in each Salmon Fishing Area. One aspect of stock status is defined in comparison of the actual egg deposition to conservation requirements. In 2000, adult returns were 1,789 small and 208 large salmon, which is lower when compared to the average of 3,061 small and 333 large

salmon from 1993-1999. Historical records indicate that, circa. 1800, adult returns to a harvesting weir were about 12,000 salmon annually. Freshwater survival from egg to smolt for the 1993 to 1995 year classes were 0.69%, 0.71% and 0.51%, respectively and the mean smolt to grilse survival for the years 1993 to 1999 was 4.95%. The percent of the conservation requirement achieved for Campbellton River in 2000 was 157%. On average, for the period of 1993-1999, Campbellton River achieved 283% of its conservation requirement. However, based on historical runs, Campbellton River is only seeing just less than 30% of these past adult salmon migrations. The numbers of trout counted at the fence have declined substantially. It was concluded that the major decline in the return rate and number of kelts returning to the river in 2000 was probably caused by seal predation.

Comments:

1. Smolt and adult counts were complete in 2000.

2. The small postsmolt salmon (less than 40 cm) should be removed from the determination of egg deposition until such time as their reproductive status is determined. This was done and changes are reflected in percent conservation requirements achieved.

The predation by all sources including man on salmon from Campbellton River should be studied and quantified.

Status of the Atlantic salmon (*Salmo salar* L.) stock of Harrys River/Pinchgut Brook, Newfoundland, 2000

Authors: C. C. Mullins, D. Caines and S. L. Lowe

Summary: The number of small and large salmon at the counting fence on the Pinchgut Brook tributary of Harry's River in 2000 was 28% and 76%, respectively, lower than in 1999. The proportion of small salmon was 6% higher than in 1999, whereas, the proportion of large salmon was 65% lower than in 1999. The salmon stock on Harry's River achieved only 29% of its conservation requirement in 2000, the second lowest since 1992. This is alarming considering the recreational salmon fishery has been restricted to catch and release angling since 1996 and that the commercial salmon fishery has been closed since 1992. Uncertainties associated with the methodology used to estimate the spawning escapement and potential egg deposition on Harry's River were analysed using a probability density function. The results indicated that there was a greater than 100% probability that the conservation requirement was not achieved on the Harry's River in 2000. Increased juvenile densities in recent years indicate a positive outlook for this stock. However, extremely low water levels and high water temperatures in the river and past evidence of illegal removals continue to raise serious concerns. It is believed that the slow recovery of this stock following the commercial salmon moratorium is not due to over exploitation by the recreational fishery. Therefore, it is

recommended that all possible management options including increased enforcement be reviewed in order to maximise the spawning population on this important river.

Comments:

There is a great deal of concern about the status of the Harry's River salmon stock. The river once produced the highest recreational fishery catches of all rivers in the Bay St. George area of SFA 13. The current technique of using the spawning on Pinchgut Brook to estimate the total spawning escapement on Harrys River is a reasonable and inexpensive method of assessing the status of this stock. Based on three spawning surveys conducted in 1995-97, there appears to be little variation in the distribution of spawning within the on Harry's River system. However, the low water levels experienced in 1999 could cause some redistribution of spawning salmon. At this point, the spawning survey needs to be completed every year to account for possible redistribution and to identify all possible spawning areas.

Previous attempts at using a counting fence to assess the entire run to Harry's River were largely unsuccessful due to extreme fluctuations in water level. However, new counting fence techniques combined with the low water levels experienced in recent years suggest that such an initiative would now have a greater chance of success.

Recommendations:

- It is recommended that all management options be reviewed including increased enforcement in order to maximise the spawning stock.

- Salmon returns to the Pinchgut Brook tributary relative to Harry's River, as a whole, can only be fully understood through knowledge of the total number of salmon entering the system. This could be achieved by installing a counting fence near the mouth of the river supplemented by mark-recapture tagging. The tagging would provide a means of verifying the proportion of salmon spawning on Pinchgut Brook, thus eliminating some of the uncertainty.

Status of Atlantic salmon (*Salmo salar* L.) stocks of Lomond River, Torrent River and Western Arm Brook, Newfoundland, 2000

Author: C. C. Mullins, D. Caines and S. L. Lowe

Summary: Returns of small salmon to Lomond River were 21% less than in 1999 and 10% less than the 1992-99 mean. Returns of large salmon were 33% less than the 1999. Returns of small salmon to Torrent River were 10% less than in 1999 and 14% lower than the 1992-99 mean. Returns of large salmon in 2000 were 43% higher than in 1999 and 28% higher than the 1992-99 mean. Returns of small salmon to Western Arm Brook were 43% and 55% higher than in 1999 and the 1992-99 mean, respectively. Returns of large salmon was the second

highest since 1992 and were well above the returns in 1999 and the 1992-99 mean. Returns of both small and large salmon to all three rivers were higher than the 1984-91 means indicating improvements in the stocks since the commercial salmon fishery moratorium. The proportion of large salmon was higher than the 1984-91 mean on all three rivers. It is highly unlikely that the conservation requirement was not achieved on any of the three rivers in 2000. On the basis of the smolt production at Western Arm Brook in 2000 returns of 1SW salmon in 2001 are expected to be lower than in 2000 but higher than the 1992-99 mean provided marine survival remains the same. Marine survival of smolts to returning 1SW salmon at Western Arm Brook was 11.0% in 2000. If marine survival is actually closer to the 1992-99 (7.0%) returns of small salmon in 2001 will be about 40% lower than in 2000. Spawning escapements are expected to exceed conservation requirements on all three rivers in 2001 assuming marine survival remains the same as in 2000. A decline in marine survival similar to that, which occurred in 1997, would mean that conservation requirements would likely not be achieved on Western Arm Brook in 2001. Due to overall improvements in stocks and the added control afforded by the river classification system, there may be opportunities on these rivers for increased harvests below counting facilities. However, given the uncertainty in annual marine survival observed for Western Arm Brook it is cautioned that harvests on this river should not be permitted until the conservation requirement (300 salmon) has been achieved. Expansion of fisheries above counting facilities on all three selected rivers is not recommended unless angling catches can be an accurately determined.

Comments:

Owing to overall improvements in these stocks and the added control afforded by the river classification system, there may be opportunities on these rivers for increased harvests below counting facilities. However, given the uncertainty in annual marine survival observed for Western Arm Brook it is cautioned that harvests on this river in particular should not be permitted until the conservation requirement (300 salmon) has been achieved.

There has been a significant increase in the total population size of small salmon on Torrent River. This is attributed to the enhancement program carried out in the early 1970s that involved transfers of adult salmon from Western Arm Brook.

Recommendations:

- Expansion of fisheries above counting facilities on all three selected rivers is not recommended unless angling catches can be an accurately determined in order to maintain scientific integrity of long time series of adult return and spawning escapement data.

- Habitat estimates for Torrent River should be verified from digitised 1:50,000 scale topographic maps and from in-stream measurements. In comparison to the available habitat on Lomond River, the available habitat on Torrent River seems quite small given the larger drainage basin area.

Status of Atlantic Salmon (*Salmo salar* L.) in Gander River, Notre Dame Bay (SFA 4), Newfoundland, 2000

Authors: M. F. O'Connell, A. Walsh, and N. M. Cochrane

Summary: For the first time since the inception of the Gander River project in 1989, the counting fence did not operate in 2000. As an alternative to using absolute counts obtained from the counting fence for determining status of stock, estimates of total returns were based on relationships between counts at the fishway in Salmon Brook tributary and total returns to the counting fence during 1989-1999. Estimates were provided by means of a regression method and a simulation method using a nonparametric bootstrap re-sampling technique. Estimates from both methods were more or less similar. Total returns of small salmon in 2000 were the second lowest (lowest was in 1997) of the moratorium years (25% and 24% below 1999 for the regression and simulation methods; 29% and 28% below the 1992-1999 mean); estimated returns of large salmon were well below the record high for 1999 (62% and 58%) and below the mean for 1992-1999 (27% and 19%). The regression estimate for percentage of conservation egg requirement achieved was 83 compared to 87 for simulation, the second lowest of the moratorium years. There was a high degree of uncertainty around estimates for both methods. The percentage of conservation egg requirement achieved in Salmon Brook tributary in 2000 (86%) was also the second lowest of the moratorium years. The potential impacts of the retention of large salmon in the recreational fishery, on stock composition and egg deposition, are discussed.

Comments:

There was considerable uncertainty around estimates of total returns to Gander River in 2000 for both the regression and simulation methods. This certainly underscores the fact that there is no substitute for absolute counts such as provided by the counting fence.

Status of Atlantic Salmon (*Salmo salar* L.) in Middle Brook (SFA 5), Northeast Brook, Trepassey (SFA 9), and Northeast River, Placentia (SFA 10), Newfoundland, in 2000

Authors: M. F. O'Connell, A. Walsh, and N. M. Cochrane

Summary: The status of Atlantic salmon stocks in 2000 was determined for Middle Brook in Salmon Fishing Area (SFA 5), Northeast Brook, Trepassey in SFA 9, and Northeast River, Placentia in SFA 10. Total returns of small salmon to Middle Brook in 2000 decreased from 1999 (11%), remained above the 1984-1989 (39%) and 1992-1996 (63%) means, but decreased slightly from the 1992-1999 mean (7%). Total returns of large salmon increased over 1999 and the means (45, 651, 1106, and 33%, respectively). Total returns of small salmon to Northeast Brook, Trepassey in 2000 decreased from 1999 and the 1984-1989 and 1986-1991 means (13, 20, and 14%, respectively) but increased over the 1992-1999 mean

(8%). Total returns of large salmon followed a similar pattern but differed in magnitude (-22, -51, -29, and 5%, respectively). Total returns of small salmon to Northeast River, Placentia in 2000 increased over 1999 (57%) but decreased from the means (6, 8, and 33%, respectively); total returns of large salmon increased over 1999 and the means (54, 1138, 1258, and 103%, respectively). Conservation requirements in terms of both eggs and small salmon were achieved in all rivers in 2000. Smolt-to-adult survival for small salmon (repeat spawners included) for Northeast Brook, Trepassey in 2000 (adult year) was 5.8%, a slight improvement over the 5.5% observed in 1999, and low compared with the record high of 9.2% in 1996. Survival in terms of virgin grilse in 2000 was 5.4%. Egg-to-smolt survival for the 1995 spawning year-class was 0.47 (preliminary), an increase over the value of 0.43 for observed 1992. The 1995 year-class value however remained substantially below the high recorded for the 1992 year-class (1.09%) and was more in line with values observed prior to 1992.

Comments:

For the first time in nearly three decades, there was no count at the lower Terra Nova River fishway in 2000, the result of funding restraints.

Monitoring and recapture of escaped rainbow trout (*Oncorhynchus mykiss*) in Bay d'Espoir, Newfoundland 1999 and 2000

Authors: G. N. Perry and T. H. Brown

Summary: Results from a 1999 and 2000 monitoring program to collect information on the distribution of escaped farm origin salmonids in Bay d'Espoir Newfoundland are reported. In 1999 approximately 7,000 farmed Atlantic salmon smolt and 8,000 triploid rainbow trout were reported lost in marine cage aquaculture operations. In 2000, approximately 40,000 all-female, diploid and triploid rainbow trout escaped as a consequence of hurricane induced cage damage. Distribution, movements within Bay d'Espoir, biological characteristics, feeding, recreational fishery catches, and recapture of escaped fish are described. This information is used to qualitatively evaluate the effectiveness of measures adopted in a Code of Containment intended to reduce the frequency and severity of escapement incidents in order to reduce the risks that farm-origin salmonids may pose to indigenous fish populations.

Status of Atlantic Salmon (*Salmo salar* L.) Populations in Crabbes and Robinsons Rivers, and Middle Barachois, Fischells and Flat Bay Brooks, Newfoundland, 2000

Author: T. R. Porter

Summary: Adult Atlantic salmon were counted visually in Middle Barachois Brook 1-3 August, and Crabbes River, Robinsons River, Fischells Brook, and Flat Bay Brook, 14-23

August 2000. The surveys were conducted by crews of 2 to 13 snorkellers floating down the main stem of each river. Salmon were predominately concentrated in pools with water depths less than 1m. An adjustment factor, ranging from 1.0 to 2.0 was applied to the counts in each river section to account for fish not observed. There were no known removals after the survey, therefore the adjusted count is considered to be the spawning escapement for the river. The retained salmon and 10% of the hooked-and-released salmon were added to the adjusted spawner counts to approximate the total returns to each river. The estimated total numbers of salmon that returned to each river are: Crabbes River, 1026 small and 155 large salmon; Middle Barachois Brook, 1142 small and 155 large salmon; Robinsons River, 1425 small and 322 large salmon; Fischells Brook, 1800 small and 276 large salmon: and, Flat Bay Brook, 2308 small and 477 large salmon. The percentage of the egg deposition conservation requirements achieved were 63% for Crabbes River, 95% for Middle Barachois Brook, 135% for Robinsons River, 142% for Fischells Brook, and 167% for Flat Bay Brook. The egg deposition is higher in 2000 than in 1999 for all rivers except Crabbes River. The information available did not lend itself to forecasting the abundance. of salmon in 2001. Two rainbow trout were observed in Crabbes River. Their origin is unknown

Comments:

1. Some fish enter the rivers after the snorkelling survey; therefore the population estimates are considered to as minimum number.

2. A survey should be conducted above Robinsons River to confirm that the falls is a complete obstruction to migrating salmon.

3. Concern was expressed that the angling data are under-estimates of actual catches.

4. Snorkelling surveys are viewed positively by anglers

Recommendations:

- Next year risk analysis (vary certain parameters) should be built into the assessment.

- Biological characteristic data should be collected for Crabbes, Robinsons, Fischells and Flat Bay brooks.

- Further evaluation needs to be conducted upstream from the falls on Middle Barachois to determine the extent used by salmon.

The stock status of Atlantic salmon (*Salmo salar* L.) in Big Brook (Michaels River), Labrador, 2000

Authors: D. G. Reddin, P. B. Short and R. W. Johnson

Summary: The status of the Atlantic salmon (*Salmo salar* L.) stock in Big Brook (also known as Michaels River), Labrador in 2000 was determined using counting fence data, samples collected in the angling fishery, and records of angling mortalities. The stock assessment was conducted in relation to the closure of the Atlantic salmon commercial fishery in Labrador in 1998. In 2000, total returns to Big Brook, adjusted for a non-operational period of counting fence, were 982 small and 151 large salmon. Small and large salmon made up 87% and 13%, respectively of returns to the river. The number of spawners adjusted for angling mortalities were 880 small and 140 large salmon. The egg deposition required for conservation for Big Brook used only as a reference level in Labrador is 5.294 x 10^3 eggs using information from a river survey conducted by Murphy (1973) and the salmon conservation requirement of 240 eggs per m^2. In 2000, the proportion achieved of the conservation egg requirements was 42% (95^{th} confidence intervals 34 to 61%). Although the percent of conservation requirements met has increased over values in 1997 and 1999, the percent of conservation requirements met remains low.

Comments:

1. Even though the counts were adjusted, there is a major problem with the counts when counting fence was not in place for entire run. It was noted that salmon were available in food fishery nets in Rigolet area almost 4 weeks before the counting fence was in place. Additional funds required for this project.

2. Conservation requirements for Labrador rivers needs to be established which take into account presence of sea trout and charr.

3. Managers should use a precautionary approach to managing Labrador rivers given there unknown status.

Harvests of salmon and environmental conditions in Labrador, 2000

Authors: D. G. Reddin, J. Dwyer, M. Andersen, and G. Andrew

Summary: Information is presented on catch statistics for Labrador in angling fisheries and aboriginal food fisheries in 2000 along with environmental data collected at gauging stations on selected rivers. Total return information is summarised from counting facilities. Total landings of 7,386 salmon and 17,720 kg were recorded for the food fisheries in Labrador.

Landings recorded by the angling fishery were 2,251 small salmon retained, 6,086 small salmon released, 412 large salmon retained and 1,126 large salmon released. Labrador rivers were high in the spring and low throughout most

Comments:

1. Accurate statistics for all fisheries are essential to good management.

2. Reports to members of the Salmon Association of Eastern Newfoundland suggested that catches were much higher.

3. Season should be adjusted for trout fishery to avoid bycatch of salmon as much as possible.

The stock status of Atlantic salmon (*Salmo salar* L.) in English River, Labrador, 2000

Authors: D. G. Reddin, P. B. Short, G. Sheppard and R. W. Johnson

Summary: The status of the Atlantic salmon (*Salmo salar* L.) stock in English River, Labrador in 2000 was determined using counting fence data, samples collected in the angling fishery, and records of angling mortalities. The stock assessment was conducted in relation to a commercial salmon fishery buyout in Labrador in 1998 and restrictions to the angling fishery. This is the second assessment for the English River, Labrador salmon stock. In 2000, total returns to the English River counting fence were 367 small and 15 large salmon. The number of spawners adjusted for angling mortalities were 359 small and 15 large salmon. Also, 1005 small and 449 large charr and 613 brook trout were counted at the fence. Since this is the beginning of this project, there is a lack of information with which to derive conservation requirements. Counts of all fish species in 2000 increased over counts in 1999.

Comments:

1. Tagging studies should be expanded to determine exploitation rates in the food fishery. Salmon should not be tagged due to low numbers and possible mortalities from tagging.

2. Conservation requirements for Labrador rivers needs to be established which take into account presence of sea trout and charr.

3. Data on parr rearing in English River Pond suggests that salmon parr do not utilize lake habitat in English River.

Seal/Salmon Interactions

Presenter: B. Sjare

Summary: The brief presentation on seal/salmon fisheries interactions included: 1) an overview of existing seal diet data for Newfoundland and Labrador; 2) a report on some of the preliminary results of the River Observation Programs; 3) a summary of the 1997 interviews of commercial salmon fisherman along the coast of Labrador re: seal issues; 4) a brief update on seal sighting for various salmon rivers; and 5) a discussion on future research directions. The summary of Newfoundland and Labrador seal diet data presented at the assessment was based on work previously summarized by DFO as part of the Sydney, N.S. workshop on Atlantic salmon.

River Observation Programs were initiated two years ago on rivers that have counting facilities on them. Department personnel at these facilities were requested to document the time, date, location and sighting effort of all potential salmon predators in view of the facility during the smolt and/or adult run of salmon. There are two years of preliminary data available for the Northeast Trepassey River in Newfoundland and the English River in Labrador. There is also a year of observations for the Indian Bay, Bishops Falls, Northeast Placentia rivers in Newfoundland and the Paradise River in Labrador. These logbook programs provide current, and in some cases, the only information on the relative abundance and seasonal distributions of predators in the vicinity of rivers and estuaries along the coast.

Interviews with commercial salmon fishermen were conducted in 1997 to document their comments and thoughts on the significance of salmon mortality due to predation. Seals were considered to be the most significant problem by 73% of fishermen while sea gulls were considered the second most common predator. Approximately 60% of fishermen felt that harp seals and grey seals caused the greatest damage, however, this varied depending on whether fishing locations were along the coast or inside the islands and bays.

During the last year the Department has made an effort to follow-up on as many seal/salmon sighting incidents as possible and is currently trying compile a more complete sighting database. The Marine Mammal and Salmonid Sections are presently applying for funds to develop a more comprehensive seal/salmon research program.

ACKNOWLEDGEMENTS

Thanks are extended to all those who participated at the March meeting, particularly those from outside DFO who gave up their own time to attend and contribute to the sessions. Dale Parmiter kindly assisted with co-ordinating the assessment meetings, contended with various

formatting problems associated with the Salmon Stock Status Report (SSR), and overall contributed to having the SSR out in a timely fashion. Finally, special thanks are extended to Gerry Ennis, Chair of the Shellfish assessment meetings that were held next door to the Salmonid sessions at the Airport Plaza Hotel. In the spirit of co-operation and cross-species interaction, all Salmonid participants were greatly appreciative of the bountiful arrangement of various pastries, juices, sandwiches, and occasional soups that were provided for the Shellfish meeting participants, obviously reflective of the lucrative shellfish industry these days. We truly hope we can schedule our Salmonid meetings at the same time and place as Shellfish next year!!

Appendix 1

Newfoundland Region
Salmonid Stock Assessment Meeting - 2001

Date: March 5 - 8, 2001
Location: Airport Inn, Salon 'B'
Time: 0900 – 1630 hrs

AGENDA

1 - Call to order

2 - Finalization of agenda

3 - Review of Newfoundland Region stock assessment documentation process with emphasis on the Stock Status Report

4 - Summary of atmospheric, marine and freshwater environmental conditions in 2000

5 - Atlantic salmon river-specific stock assessments

5.1 Labrador (SFAs 1 – 2, 14B)

5.11 Big Brook (Michael's River)
5.12 English River
5.13 Harvest and environmental conditions

5.2 Northeast and east coast Newfoundland (SFAs 3 – 8)

5.21 Exploits River
5.22 Gander River
5.23 Campbellton River
5.24 Middle Brook
5.25 Northwest River, Terra Nova National Park

5.3 South coast Newfoundland (SFAs 9 – 11)

5.31 Rocky River

5.32 Northeast Brook, Trepassey
5.33 Northeast River, Placentia
5.34 Conne River

5.4 Southwest Newfoundland (SFAs 12 – 13)

5.41 Highlands River
5.42 Crabbes, M. Barachois, Robinsons, Fischells, & Flat Bay
5.43 Harry's / Pinchgut

5.5 Northern Peninsula west (SFA 14A)

5.51 Lomond River
5.52 Torrent River
5.53 Western Arm Brook
5.54 Deer Arm Brook

6 - Arctic charr

6.1 Review of Voisey, Nain and Okak stock complexes

7 - Other salmonid issues

7.1 Effects of catch and release angling on salmon – Conne River study
7.2 Observations on seals & other predators
7.3 Discussion on by-catch
7.4 Review of conservation egg deposition requirements for systems containing landlocked Atlantic salmon (ouananiche)
7.5 Implications for allowing retention of large salmon in recreational fisheries
7.6 Results of the 2000 rainbow trout survey
7.7 Rainbow trout – Bay d'Espoir catch records & recapture initiative results

8 - Stock Status Report

9 - Other business

Appendix 2

List of individuals who participated, in whole or in part, at the March 2001 salmonid stock assessment meetings

Name	Affiliation / Address	Phone	E-mail
Andersen, M.	Labrador Inuit Association, Goose Bay, Labrador	(709) 896-8582	
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Dempson, B. (Chair)	DFO Science, St. John's, NF	(709) 772-4475	dempsonb@dfo-mpo.gc.ca
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White, L.	Salmonid Council of Newfoundland & Labrador	(709) 753-4034	lwhite@engr.mun.ca

Appendix 3

List of working papers and discussion topics

1. Bourgeois, C. E., J. Murray and V. Mercer. 2001. Status of the Exploits River stock of Atlantic salmon (*Salmo salar* L.) in 2000.

2. Bourgeois, C. E. J. Murray and V. Mercer. 2001. Status of Rocky River stock of Atlantic salmon (*Salmo salar* L.) in 2000.

3. Colbourne, E. 2001. Physical oceanographic conditions on the Newfoundland and Labrador Shelves during 2000.

4. Dempson, J. B. and G. Clarke. 2001. Status of Atlantic salmon at Highlands River, Bay St. George, SFA 13, Newfoundland, 2000.

5. Dempson, J. B. and M. Shears. 2001. Status of north Labrador anadromous Arctic charr stocks, 2000.

6. Dempson, J. B.,G. Furey and M. Bloom. 2001. Assessment of the status of the Atlantic salmon stock of Conne River, SFA 11, Newfoundland, 2000.

7. Dempson, J. B., G. Furey, and M. Bloom. 2001. Impact of catch and release angling on survival of Conne River Atlantic salmon (*Salmo salar*).

8. Downton, P. R., D. G. Reddin and R. W. Johnson. 2001. Status of Atlantic salmon (*Salmo salar* L.) in Campbellton River, Notre Dame Bay (SFA 4), Newfoundland in 2000.

9. Knight, T. W. 2001. A preliminary assessment of the Atlantic salmon (*Salmo salar* L.) stocks in Deer Arm Brook, Newfoundland, Newfoundland, 2000. Mullins, C. C. and D. Caines. 2001.

10. Mullins, C.C., D. Cains, and S.L. Lowe. 2001. Status of the Atlantic salmon (*Salmo salar* L.) stock of Harry's River/Pinchgut Brook, Newfoundland, 1999.

11. Mullins, C.C., and D. Caines. 2001. Status of the Atlantic salmon (*Salmo salar*) stocks of Lomond River, Torrent River, and Western Arm Brook, Newfoundland, 1999.

12. O'Connell, M. F., A. Walsh and N. M. Cochrane. 2001. Status of Atlantic salmon (*Salmo salar* L.) in Gander River, Notre Dame Bay (SFA 4), Newfoundland, 2000.

13. O'Connell, M.F., A. Walsh and N. M. Cochrane. 2001. Status of Atlantic salmon (*Salmo salar* L.) in Middle Brook and Terra Nova River (SFA 5), Northeast Brook, Trepassey (SFA 9), and Northeast River, Placentia (SFA 10), Newfoundland, in 2000.

14. Perry, G. N., and T. H. Brown. 2001. Monitoring and recapture of escaped rainbow trout (*Oncorhynchus mykiss*) in Bay d'Espoir, Newfoundland 1999 and 2000.

15. Porter. T. R. 2001. Status of Atlantic salmon (*Salmo salar* L.) populations in Crabbes and Robinsons Rivers, and Middle Barachois, Fischells and Flat Bay Brooks, Newfoundland, 1999.

16. Reddin, D. G. and P. B. Short. 2001. The stock status of Atlantic salmon (*Salmo salar* L.) in Big Brook (Michaels River), Labrador, 2000.

17. Reddin, D. G., J. Dwyer, M. Andersen, and G. Andrew. 2001. Harvests of salmon and environmental conditions in Labrador, 2000.

18. Reddin, D. G., P. B. Short, G. Sheppard and S. Lowe. 2001. The stock status of Atlantic salmon (*Salmo salar* L.) in English River, Labrador, 2000.

19. Simpson, M. and C. E. Bourgeois. 2001. The Status of the Atlantic salmon stock of the Northwest River, Bonavista Bay (SFA 5), Newfoundland, 2000.

Brief presentations were also made on the following topics;

- Observations on seals and other predators
- Review of conservation egg deposition requirements for systems with newly opened habitat containing landlocked salmon
- Results of the 2000 rainbow trout survey
- Bait net bycatch
- Implications for allowing retention of large salmon in the recreational fisheries for grilse stocks (incorporated into individual stock assessment summaries)

Appendix 4

Summary Sheets

STOCK: **Big Brook (SFA 1)** **Drainage area:** 793 km² (accessible)

CONSERVATION REQUIREMENT: x million eggs (~ x small salmon) calculated as fluvial area x 2.4 eggs/m²

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	-	-	530	-	790	982	530	982
Large	-	-	104	-	194	151	104	194
Recreational harvest (small salmon)								
Retained	92	36	73	54	49	90	0	412
Released	21	12	32	24	41	123	0	123
Recreational harvest (large salmon)								
Retained	5	5	2	4	13	11	0	172
Released	0	0	1	2	9	3	0	9
Spawners								
Small	-	-	454	-	737	880	454	880
Large	-	-	102	-	180	140	102	180
Egg conservation requirement								
% met	-	-	24	-	41	42	24	42

[1] Min and max for recreational harvest are for the period of record since 1974. River returns are for 1997,1999 and 2000.

[2] Preliminary

Data and methodology: A complete count of the adult salmon migration was obtained from a portable fish counting fence in 1997, 1999 and 2000. A hook-and-release mortality rate of 10% was used in the calculation of spawning escapement. Recreational data comes from DFO angling statistics collected from the outfitting camp on the river and are preliminary for 2000. Egg requirements for fluvial habitat were calculated similar to other rivers in Eastern Canada, however, due to a lack of information on lacustrine rearing in Labrador, lacustrine habitat was not included in the calculation.

State of the stock: The percentage of conservation requirements achieved remains low. However, there is some doubt as to the applicability of the Eastern Canada conservation requirement of 240 eggs per m2 in Labrador. Risk analysis indicated that 95th confidence intervals for conservation requirements were 35 to 58%.

Forecast: No forecast is available.

STOCK: **Exploits River (SFA 4)** **Drainage area:** 11,272 km²

CONSERVATION REQUIREMENT: 95.9 million eggs (equivalent to 56,670 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	16226	30425	15263	27093	28802	12152	4740	30425
Large	945	2057	881	1959	2236	683	343	2236
Recreational harvest (small salmon)								
Retained	1336	1915	2996	2019	2985	1101	577	3072
Released	1531	3202	2169	3168	2354	666	1145	3202
Recreational harvest (large salmon)								
Retained	-	-	-	-	-		0	83
Released	72	111	0	243	274	92	0	243
Broodstock removal	0	0	0	0	0	0	31	5111
Spawners [3]	15613	30192	12859	26647	27672	11618	2326	30192
Small		28147	11978	24717	25468	10948		28146
Large		2045	881	1930	2204	670		2204
Fry Stocked	0	0	0	0	0	0	212610	6410426
Egg conservation requirement								
% met	39	69	24	49	47	22	6	69
Lower	121	210	72	146	134	64	34	210
Middle	24	43	15	35	35	16	8	43
Upper	12	26	10	6	7	2	0	119

[1] Min and max are for the period of record since 1974.
[2] Preliminary
[3] No's of large and small salmon are unavailable prior to 1996

Data and methodology: There are 35 million m2 units of fluvial habitat and 34,000 ha of lacustrine habitat. Conservation egg requirements are to come from small salmon. Previous fry releases are backcalculated to eggs for % of conservation egg deposition achieved in areas stocked. Total returns to the river are based on the count at Bishop Falls fishway plus angling below the fishway.

Broodstock requirements: None at present.

Recreational catches: The 1998 - 2000 recreational fishery data on the Exploits River, is derived from the license stub return data.

State of the stock: Overall returns to the Exploits River, have improved during the moratorium years; however returns to the upper section of the watershed are extremely low and all efforts should be made to increase escapement to this section of the watershed.

Forecast: No quantitative forecast available

STOCK: **Campbellton River (SFA 4)** **Drainage area:** 296 km² (accessible)

CONSERVATION REQUIREMENT: 2.916 million eggs (~ 1,480 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	3035	3208	1975	3275	3076	1798	1975	4001
Large	218	560	321	402	493	208	145	560
Recreational harvest (small salmon)								
Retained	393	463	254	375	288	183	23	1547
Released	47	93	67	281	126	48	4	281
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	0	63
Released	1	31	9	8	22	5	0	31
Precocious post smolts	13	49	69	51	83	208	13	208
Spawners								
Small	2624	2687	1645	2821	2692	1402	1645	3675
Large	218	557	320	401	491	208	145	557
Egg conservation requirement								
% met	277	329	187	311	326	157	157	329
Smolt count	39715	58369	62050	50441	47256	35596	31577	62050
% Sea survival (corrected)								
(Adult return year)	6.09	7.15	2.25	4.88	5.03	3.66	2.25	7.23

[1] Min and max are for the period of record since 1974.
[2] Preliminary

Data and methodology: Smolts were enumerated at a counting fence. Returning adult salmon are enumerated at a fish counting fence with a video camera system. A hook-and-release mortality rate of 10% was used in the calculation of spawning escapements for the years 1993-00. Recreational data for 1997-00 were from the License Stub Return System and are preliminary. Sea survival is corrected to exclude previous spawners in the upstream migration. Previous spawners were estimated in 1999 from survival patterns in previous years. Egg conservation requirement met for 1996, 1997,1998 and 2000 was calculated using average percent female and average whole weight, 1993-2000 due to the low number of samples obtained from the angling fishery.

State of the stock: Conservation requirements were met from 1993 to 2000.

Forecast: No forecast available.

STOCK: **Gander River (SFA 4)** **Drainage area:** 6,398 km²

CONSERVATION REQUIREMENT: 46.211 million eggs (21,828 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 ²	MIN ¹	MAX ¹
Total returns to river								
Small	22266	23946	10599	18805	18491	14041	6745	26205
Large	1121	1753	1883	3649	4822	2034	473	4822
Recreational harvest (small salmon)								
Retained	2598	2974	1061	2543	2609	1291	1061	4578
Released	612	1153	1007	2179	1061	650	448	2179
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	13	927
Released	74	73	189	298	268	96	39	298
Spawners								
Small	19606	20822	9437	16044	15776	12685	5565	24739
Large	1114	1746	1864	3619	4795	2024	473	4800
Egg conservation requirement								
% met	95	124	62	110	119	87	36	128

¹ Min and max are for the period of record since 1974.

² Preliminary

Note: Any changes from previous years are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The number of small salmon retained in 2000 was 1291 (a decrease of 51% from 1999) and the number released was 650 compared to 1061 in 1999.

Data and methodology: Complete counts of salmon were obtained at a fish counting fence during 1989-99, and have historically been counted at a fishway located on a tributary, Salmon Brook. Returns to the entire Gander River in 2000 were estimated from relationships between counts at the Salmon Brook fishway and total returns to the counting fence for the period 1989-1999. Recreational fishery data for 1997-2000 are from the License Stub Return System; data for 2000 are preliminary. Data for large salmon for 1997 are incomplete. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2000.

State of the stock: Conservation requirement was not achieved in 2000. Conservation egg requirement was achieved in five of the nine moratorium years. Conservation requirement in terms of small salmon was met only in 1993. Using Salmon Brook as an indicator of returns to the entire river, it is likely that returns of small salmon of a magnitude similar to or greater than those in 1992-2000 occurred in pre-moratorium years.

Forecast: No forecast available.

STOCK: **Middle Brook (SFA 5)** **Drainage area:** 276 km²

CONSERVATION REQUIREME 2.3 million eggs (~ 1,012 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	1448	2112	1287	2549	1950	1738	626	2549
Large	168	161	262	196	130	189	13	262
Recreational harvest (small salmon)								
Retained	402	476	77	188	183	98	28	789
Released	82	153	10	154	57	32	10	387
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	0	20
Released	0	0	1	17	16	7	0	37
Spawners								
Small	1037	1605	1209	2345	1762	1637	461	2345
Large	168	161	262	195	129	189	13	262
Egg conservation requirement								
% met	114	250	196	301	222	218	49	301

[1] Min and max are for the period of record since 1974.

[2] Preliminary

Note: Any changes from previous years are due to the updating of preliminary data and biological characteristics information.

Recreational catches: A total of 98 small salmon was retained in 2000 and 32 were released.

Data and methodology: Complete counts are available from a fishway located on the lower river. Recreational fishery data for 1997 were obtained from a creel survey and 1998-2000 are from the License Stub Return System; data for 2000 are preliminary. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2000.

State of the stock: Conservation requirement in terms of eggs and small salmon was exceeded in the moratorium years 1992-2000. Egg deposition was below conservation requirement for pre-salmon moratorium years 1985-1991. Counts of small salmon similar to or higher than those observed during the moratorium years occurred in pre-salmon moratorium years.

Forecast: No forecast available.

STOCK: **Northeast Brook, Trepassey (SFA 9)** **Drainage area:** 21 km²

CONSERVATION REQUIREMENT: 0.14 million eggs (~ 51 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	80	73	50	91	95	83	49	158
Large	12	15	9	11	18	14	9	41
Recreational harvest (small salmon)								
Retained								
Released								
Recreational harvest (large salmon)								
Retained								
Released								
Spawners								
Small	80	73	50	91	95	83	49	158
Large	12	15	9	11	18	14	9	41
Egg conservation requirement								
% met	194	196	135	256	248	216	126	368
Smolt count	792	1749	1829	1727	1419	1740	792	1911
% Sea survival								
(Adult return year)	8.5	9.2	2.9	5.0	5.5	5.8	2.6	9.2

[1] Min and max are for the period of record since 1984.
[2] Preliminary

Data and methodology: Counts of adults and smolts have been available from a counting fence since 1984 and 1986. Up until a few years ago, this small system was part of a group of experimental rivers involved in research on stock-recruitment relationships and definition of smolt production in terms of various habitat types. The system has become an important indicator of smolt (year i) to (small salmon year i + 1) survival (repeat spawners included).

State of the stock: Conservation egg requirment has been met every year in the time series, but the lowest level achieved occurred in 1997. In terms of small salmon, the second lowest percentage of conservation requirement achieved also occurred in 1997. The maximum number of smolts counted was 1,911 in 1991 while the lowest was 792 in 1995. Highest sea survival prior to the commercial salmon-fishing moratorium (8.1%) was recorded in 1987. Lowest survival (2.6%) occurred in 1992. Since the start of the moratorium in 1992, sea survival rose to a peak of 9.2% in 1996 only to plummet to 2.9% in 1997; an improvement over this low was noted for 1998 and continued in 1999 and 2000.

Forecast: No forecast available.

STOCK: **Rocky River (SFA 9)** **Drainage area:** 296 km²

CONSERVATION REQUIREMENT: 3.4 million eggs (~ 881 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	385	356	435	423	327	277	80	435
Large	39	45	89	130	77	104	1	89
Recreational harvest (small salmon)								
Retained								
Released								
Recreational harvest (large salmon)								
Retained								
Released								
Broodstock removal	76	0	0	0	0	0	0	76
Spawners								
Small	309	355	435	423	327	277	158	435
Large	39	45	89	130	77	104	1	89
Fry stocked	81983	162231	0	0	0	0	81983	434500
Egg conservation requirement								
% met	56	34	56	54	39	34	17	56
Smolt count	7577	14261	16900	12163	8625	7616	5115	16900
% Sea survival								
(Adult return year)	3.4	4.2	2.8	2.2	1.8	2.9	1.8	4.2

[1] Min and max are for the period of record since 1987.
[2] Preliminary

Background: Rocky River was stocked with salmon fry from 1983 to 1987 with the first returns to the reconstructed fishway realized in 1987. Also in 1987 140 adult salmon were transferred into Rocky River from Little Salmonier River.

Data and Methodology: Fluvial habitat consists of 1.08 million m2 and lacustrine habitat includes 2200 ha. Biological characteristics used in calculations are those for Rocky River stock. Previous fry releases are backcalculated to eggs for % of target egg achieved in areas stocked. Complete adult counts are available from a trap installed in the fishway. Smolts have been enumerated annually since 1990. Sea survival is smolt to 1SW salmon returns to the fishway.

Recreational fisheries: The recreational fishery is closed on this river.

State of the stock: Stock is still in the development phase.

Forecast: There is no forecast for 2001.

STOCK: **Northeast River - Placentia (SFA 10)** **Drainage area:** 94 km²

CONSERVATION REQUIREME 0.72 million eggs (~ 224 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	774	1420	723	885	363	571	350	1420
Large	74	123	185	287	167	258	0	287
Recreational harvest (small salmon)								
Retained	127	268	95	201	67	60	19	349
Released	8	7	45	102	26	18	5	189
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	0	6
Released	0	0	33	23	8	7	0	33
Broodstock removal [3]								
Small	-	-	31	51	43	31	31	51
Large	-	-	-	-	7	10	0	7
Spawners								
Small	646	1102	592	622	250	478	317	1102
Large	74	123	182	285	159	247	0	285
Egg conservation requirement								
% met	422	736	486	484	260	455	152	736

[1] Min and max are for the period of record since 1974.

[2] Preliminary

[3] In 1997-2000 small salmon (numbering 31, 51, 43 and 31 respectively) were removed as broodstock for enhancement projects in Rennie River and Waterford River, St. John's, and for research pruposes at the Ocean Sciences Centre.

Note: Any changes from previous years are due to the updating of preliminary data and biological characteristics information.

Recreational catches: In 2000, a total of 60 small salmon was retained and 18 were released.

Data and methodology: Counts are available from a fishway on the lower river. Recreational fishery data for 1997-2000 are from the License Stub Return System; data for 2000 are preliminary. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2000.

State of the stock: Conservation requirement has been exceeded every year since 1984. The return of small salmon in 2000 was the second lowest of the moratorium years.

Forecast: No forecast available.

STOCK: **Conne River (SFA 11)** **Drainage area:** 602 km²

MANAGEMENT TARGET: 7.8 million eggs (~ 4,000 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to home waters								
Small	3502	4440	3200	2931	2358	5177	1533	10155
Large	110	179	185	295	241	216	89	516
First Peoples' harvest								
Small	0	0	514	0	0	0	0	948
Large	0	0	1	0	0	0	0	11
Recreational harvest (small salmon)								
Retained	-	-	197	-	-	730	108	3302
Released	-	-	80	-	-	-	0	80
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	0	27
Released	-	-	0	-	-	-	0	0
Broodstock removal								
Small	117	25	0	0	0	0	25	245
Large	0	0	0	0	0	0	0	1
Spawners								
Small	3376	4402	2558	2926	2349	4431	1435	7823
Large	108	179	182	294	240	216	87	488
Management Target								
% met	82	114	70	84	68	117	40	214
Smolt estimate	62749	94088	100983	69841	63658	60777	55765	100983
% Sea survival (Adult return year)	5.8	7.2	3.4	2.9	3.4	8.1	2.7	10.2

[1] Min and max are for the period of record since 1974. First Peoples' harvest in salt water includes some salmon from other rivers. First Peoples' fishery quota of 1200 fish has been in effect since 1986, but was reduced to 500 fish for 1993. First Peoples' fishery and recreational fishery were closed again in 1998 and 1999.

[2] Preliminary

Data and methodology: Smolt estimates are derived from mark-recapture surveys. Returning adult salmon are enumerated at a fish counting fence. Angling harvets for Conne River are from DFO statistics. A video camera system was introduced in 1993.

State of the stock: The Management Target, which is higher than the conservation egg requirement, was met from 1986 to 1990 and again in 1996. Only 40-61% of the target was achieved from 1991-1994, but was 117% in 2000. Sea survival to small salmon increased from 3.4% to 8.1%, the highest in more than a decade. In contrast with the Mangement Target, the Conservation egg requirement was met or exceeded from 1986-1990, in 1993, and again from 1995 - 2000.

Forecast: Based upon the point estimate of the number of smolts that migrated in 2000, a marine survival rate of 4.1% would be required in order for the conservation requirement to be attained in 2001, while a survival of 6.6% would be needed to meet the Management Target. Based upon the sea survival rates that have resulted over the past 13 years, and without any consideration of the trend for lower survivals during the 1990's, the probability of achieving the above returns are 57% and 38%, for the conservation and management targets, respectively.

STOCK: **Highlands River (SFA 13)** **Drainage area:** 183 km²

CONSERVATION REQUIREMENT: 1.5 million eggs calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to home waters								
Small	172	199	398	96	146	58	58	398
Large	120	142	157	117	82	67	29	157
Recreational harvest (small salmon)								
Retained								
Released								
Recreational harvest (large salmon)								
Retained								
Released								
Spawners								
Small	172	199	398	96	146	58	58	398
Large	120	142	157	117	82	67	29	157
Conservation requirement								
% met	67	79	105	59	49	34	28	105
Smolt count	12160	12383	6776	5922	9634	13120	5922	15839
% Sea survival								
Small	1.6	1.6	3.2	1.4	2.5	0.6	0.6	3.2
Large	1.2	1.4	1.3	0.9	1.2	1.1	0.4	1.4
(Adult return year)								

[1] Min and max are for the period of record since 1974.

[2] Preliminary

Data and methodology: Counts of smolt and adult salmon were obtained with a fish counting fence in 1980 - 82 and in 1993 - 2000. Sea survival is calculated for small salmon returning in year i + 1 and for large salmon returning in year i + 2, by dividing the number of returning adults by the number of smolts in year i.

State of the stock: The number of large salmon returning has increased since the closure of the commercial salmon fishery in 1992, but has fallen in each of the past three years since the peak in 1997. Small salmon returns are variable with returns in 2000 the lowest recorded. The conservation spawning requirement was achieved in only one year (1997) and fell to The conservation spawning requirement was achieved in only one year (1997) and fell to 34% of the requirement in 2000.

Forecast: The conservation spawning requirement will likely not be met in 2001 unless there is a substantial increase in marine survival rates. Based upon the average egg deposition contribution from small and large salmon, respectively, over the past 8 years (1993 - 2000), marine survival rates approximating 1.91% for small salmon returns from the 2000 smolt class and 1.86% survival for large salmon returns from the 1999 smolt class would be required. To date, the highest survival to large salmon has been only 1.35%.

STOCK: **Crabbes River (SFA 13)** **Drainage area:** 551 km²

CONSERVATION REQUIREMENT: 4.6 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	N/A	866	1152	491	712	1026	111	1916
Large	N/A	249	358	240	264	155	15	397
Recreational harvest (small salmon)								
Retained	26	-	3	-			26	561
Released	5	221	278	91	59	23	0	278
Recreational harvest (large salmon)								
Retained		-	-	-	-		14	127
Released	32	96	119	55	18	25	0	119
Spawners								
Small	N/A	844	1121	482	709	1024	64	1355
Large	N/A	239	346	234	263	152	15	346
Egg conservation requirement								
% met	N/A	68	95	53	66	63	3	95

[1] Min and max are for the period of record since 1974.

[2] Preliminary

Data and methodology: Visual counts of salmon were made by snorkellers in late August, 1996 to 2000. An adjustment factor was applied to the visual counts to give an estimate of the total number of salmon in the river. Angling data in 1995 were collected by River Guardians. In 1996-00 angling catches are from the License Stub Return System. A 10% hook-and-release mortality was assumed.

State of the stock: In 2000, Crabbes River achieved 63% of its egg deposition required for conservation. The estimate is slightly slightly lower than the egg deposition level (65%) achieved in 1999 and lower than the average level (68%) 1996-99. The numbers of small salmon is 28% higher than the average returns 1996-99. However, the large salmon returns declined by 40%.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2001.

STOCK: **Middle Barachois Brook (SFA 13)** **Drainage area:** 241 km²

CONSERVATION REQUIREMENT: 2.1 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	N/A	825	1060	N/A	563	1142	134	1619
Large	N/A	40	190	N/A	62	155	0	1159
Recreational harvest (small salmon)								
Retained	53	-	-	-	-	-	51	534
Released	2	195	158	6	14	2	0	195
Recreational harvest (large salmon)								
Retained -		-	-	-	-	-	0	117
Released	24	35	81	23	2	-	0	81
Spawners								
Small	N/A	805	1044	N/A	560	1142	83	1329
Large	N/A	36	182	N/A	61	155	0	1057
Egg conservation requirement								
% met	N/A	52	95	N/A	43	95	9	254

[1] Min and max are for the period of record since 1974.

[2] Preliminary

Data and methodology: Visual counts of salmon were made by snorkellers in August 1996, 1997, 1999 & 2000. Adjustment factors were applied to visual counts to give estimates of the total numbers of salmon in the river. Angling in 1995 were collected by River Guardians. In 1996-00 angling catches are from the License Stub Return System. A 10% hook-and-release mortality was assumed.

State of the stock: In 2000, Middle Barachois Brook achieved 95% of its egg deposition required for conservation. The estimate is 116 % higher than the egg deposition in 1999, but the same as that estimated in 1997. Both the abundance of small and large salmon increased in 2000.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2001.

STOCK: **Robinsons River (SFA 13)** **Drainage area:** 439 km²

CONSERVATION REQUIREMENT: 3.3 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999 [2]	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	N/A	866	1077	N/A	1431	1425	274	3186
Large	N/A	137	190	N/A	204	322	21	733
Recreational harvest (small salmon)								
Retained	73	5	3	4	2	98	3	905
Released	38	926	571	468	434	341	0	926
Recreational harvest (large salmon)								
Retained		-	-	-	-	-	0	210
Released	23	168	184	114	41	55	7	184
Spawners								
Small	N/A	768	1017	N/A	1399	1293	158	2281
Large	N/A	120	172	N/A	200	316	21	604
Egg conservation requirement								
% met	N/A	67	91	N/A	118	135	9	174

[1] Min and max are for the period of record since 1974.
[2] Preliminary

Data and methodology: Visual counts of salmon were made by snorkellers in August 1996, 1997, 1999 & 2000. Adjustment factors were applied to visual counts to give estimates of the total numbers of salmon in the river. Angling data in 1995 were collected by River Guardians. In 1996-00 angling catches are from the License Stub Return System. A 10% hook-and-release mortality was assumed.

State of the stock: In 2000, Robinsons River achieved 135 % of its egg deposition required for conservation. The estimate is the highest estimated to have occurred since 1981. There has been an increasing trend in population size since 1993. In 2000 the egg deposition is 47% higher than the average egg deposition 1996-99

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2001.

STOCK: **Fischells Brook (SFA 13)** **Drainage area:** 360 km²

CONSERVATION REQUIREMENT: 3.6 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 ²	MIN ¹	MAX ¹
Total returns to river								
Small	N/A	N/A	797	215	1264	1800	42	1800
Large	N/A	N/A	86	72	246	276	0	455
Recreational harvest (small salmon)								
Retained	80	315	182	17	-	-	17	374
Released	112	232	162	36	-	-	0	162
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	0	66
Released	43	150	127	4	-	-	0	150
Spawners								
Small	N/A	N/A	599	194	1264	1800	25	1800
Large	N/A	N/A	73	72	246	276	0	415
Egg conservation requirement								
% met	N/A	N/A	44	23	110	142	1	142

¹ Min and max are for the period of record since 1974.
² Preliminary

Data and methodology: Visual counts of salmon were made by snorkellers in late August each year 1997 to 2000. Adjustment factors were applied to visual counts to give estimates of the total numbers of salmon in the river. Angling data in 1995 were collected by River Guardians. In 1996-98 angling catches are from the License Stub Return System. The River was closed to angling in 1999 and 2000. A 10% hook-and-release mortality was assumed.

State of the stock: In 2000, Fischells Brook achieved 142% of its egg deposition required for conservation. The estimate is the highest recorded. There was a considerable increase in abundance from that observed in 1997 and 1998.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2001.

STOCK: **Flat Bay Brook (SFA 13)** **Drainage area:** 635 km²

CONSERVATION REQUIREMENT: 3.8 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	650	1233	1307	N/A	2263	2308	179	2308
Large	48	132	173	N/A	235	477	5	477
Recreational harvest (small salmon)								
Retained	-	-	-	-	-	130	0	609
Released	-	-	253	131	264	442	0	442
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	0	59
Released	-	-	57	89	37	112	0	112
Spawners								
Small	567	1051	1282	N/A	2237	2134	107	2237
Large	44	112	167	N/A	231	466	1	466
Fry stocked	56059	127200	149555	0	0	0	56059	149555
Egg conservation requirement								
% met	45	85	89	N/A	149	167	4	167

[1] Min and max are for the period of record since 1974.
[2] Preliminary

Data and methodology: Visual counts of salmon were made by snorkellers in August each year 1996 to 2000. Adjustment factors were applied to visual counts to give estimates of the total numbers of salmon in the river. In 1995, the assessment was based on the count of salmon at a fish counting fence and angling data Angling in 1995 were collected by River Guardians. In 1996-00 angling catches are from the License Stub Return System. A 10% hook-and-release mortality was assumed.

State of the stock: In 2000, Flat Bay Brook achieved 167% of its egg deposition required for conservation. The estimate is the highest for period of record (1962-00). There appears to have been an increasing trend in abundance since 1994. The total river escapement of small salmon in 2000 is similar to the estimated escapement in 1999. The river escapement of large salmon is twice as high as the estimate for 1999.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2001.

STOCK: **Harry's River (SFA 13)** **Drainage area:** 816 km²

CONSERVATION REQUIREMENT: 7.8 million eggs calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [2]	MIN [1]	MAX [1]
Total returns to river								
Small	1982	1974	1718	1625	1672	1198	864	1982
Large	72	137	198	187	176	43	15	198
Recreational harvest (small salmon)								
Retained	149	34	2	-	-	-	2	1008
Released	60	1196	591	288	286	71	23	1196
Recreational harvest (large salmon)								
Retained		-	-	-	-	-	1	68
Released	44	206	139	95	53	23	0	206
Spawners								
Small	1827	1820	1657	1596	1643	1191	518	1827
Large	68	116	184	177	171	41	12	184
Egg conservation requirement								
% met	48	52	50	49	49	29	12	52
Spawners on Pinchgut Brook tributary								
Small	749	601	613	593	608	441	212	749
Large	28	38	68	63	63	15	5	68

[1] Min and max are for the period of record since 1974.

[2] Preliminary

Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The fishery has been limited to catch and release angling since 1996. The number small andl large salmon released in 2000 was 75% and 57% lower, respectievely, than in 1999 but this may have been due to inseason closures due to low water levels.

Data and methodology: Counts of small and large salmon were obtained at a fish counting fence operated on Pinchgut Brook tributary in 1992-2000. Spawners on Harrys River were derived from spawning escapements above the counting fence adjusted for the percentage of the total spawning activity observed on Pinchgut Brook tributary during surveys conducted in the fall of 1995-97. Recreational fishery data for 1996-2000 are from the License Stub Return System; data for 2000 are preliminary. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2000.

State of the stock: Conservation requirement was not achieved in 2000, and was 41% lower than in 1999. The stock has shown some signs of improvement since 1992 with increased juvenile densities and proportion of large salmon but it has been at most 52% of the conservation requirement. The low water levels experienced in recent years, incidence of poaching and the unknown effects of forest spraying and other human activity in the area create continued uncertainty for the stock in the short-

Forecast: No forecast available.

STOCK: **Lomond River (SFA 14A)** **Drainage area:** 470 km²

CONSERVATION REQUIREMENT: 1.1 million eggs (~ 658 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [3]	MIN [1]	MAX [1]
Total returns to river [2]								
Small	1365	982	1300	766	1179	927	259	1365
Large	101	98	77	128	123	82	3	128
Recreational harvest (small salmon)								
Retained	343	371	490	201	335	263	158	650
Released	190	99	273	226	148	64	24	273
Recreational harvest (large salmon)								
Retained	-	-	-	-	-		2	34
Released	62	49	52	23	97	11	2	97
Known removals above fishway								
Small	20	0	0	1	10	3	0	22
Large	0	0	0	1	3	0	0	3
Spawners								
Small	983	601	783	541	819	655	1	983
Large	95	93	72	125	110	81	0	125
Egg conservation requirement								
% met	187	143	161	151	181	140	31	187

[1] Min and max are for the period of record since 1974.

[2] Total returns are approximate because of spawning below the fishway.

[3] Preliminary.

Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The river quota that was in place since 1986 was dropped in 1999. Overall, the recreational catch in 2000 was lower than in 1999. The number of small salmon retained and released in 2000 was 22% and 57% lower than in 1999, respectively. The number of large salmon released in 2000 89% lower than 1999.

Data and methodology: Returns to the river above the fishway are determined from counts at the fishway and recreational catch data below the fishway. With the exception of 1968-70 and 1989-91 the fishway has been monitored since 1961. Recreational fishery data for 1997-2000 are from the License Stub Return System; data for 2000 are preliminary. A hook-and-release mortality of 10% was used in the calculation of spawning escapements for the years 1985-2000.

State of the stock: The conservation requirement above the fishway was achieved in 2000, but was 23% lower than 1999, and the third lowest since 1992. Returns of small salmon in 2000 were 21% lower than in 1999. Returns of large salmon in 2000 were 33% lower than in 1999. The area above the fishway represents about 40% of the total river area. Using the area above the fishway as an indicator, this river has achieved the conservation requirement every year since the commercial salmon fishery moratorium.

Forecast: No forecast available.

STOCK: **Torrent River (SFA 14A)** **Drainage area:** 619 km²

CONSERVATION REQUIREMENT: 1.5 million eggs (~ 656 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [3]	MIN [1]	MAX [1]
Total returns to river [2]								
Small	6168	7371	4033	5329	4545	4105	96	7371
Large	615	509	674	766	416	593	7	766
Recreational harvest (small salmon)								
Retained	331	421	327	275	477	309	31	477
Released	369	270	469	552	603	332	75	603
Recreational harvest (large salmon)								
Retained	-	-	-	-	-		2	34
Released	36	20	79	89	174	55	0	174
Spawners								
Small	5800	6923	3659	4999	4008	3762	121	6923
Large	611	507	666	757	399	587	3	757
Egg conservation requirement								
% met	1033	1279	797	924	680	657	161	1279

[1] Min and max are for the period of record since 1974.

[2] Total returns are approximate because of spawning below the fishway.

[3] Preliminary.

Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The restriction of hook-and-release angling only until a minmum spawning escapement of 750 salmon had passed through the fishway was dropped in 1999. Catches and have increased over time with the highest values occurring since 1992. The number of small salmon retained and released in 2000 was 35% and 45% lower, respectively, than in 1999. The number of large salmon released in 2000 was 68% lower than in 1999.

Data and methodology: Returns to the river above the fishway are determined from counts at the fishway and recreational catch data below the fishway. The fishway has been monitored since 1966. Recreational fishery data for 1997-2000 are from the License Stub Return System; data for 2000 are preliminary. A hook-and-release mortality of 10% was used in the calculation of spawning escapements for the years 1985-2000.

State of the stock: The conservation requirement was achieved above the fishway in 2000, but was slightly lower than the percentage achieved in 1999. Returns of small salmon in 2000 were 10% lower than in 1999, but returns of large salmon were 46% higher than in 1999. Returns to Torrent River have shown an increasing trend since the late 1970s with the highest returns occurring since 1992. It is estimated that the Torrent River stock has achieved conservation requirement every year since 1978. This is due to the successful enhancement program carried out in 1972-76 when adult salmon were used to colonize above the fishway.

Forecast: No forecast available.

STOCK: **Western Arm Brook (SFA 14A)** **Drainage area:** 149 km²

CONSERVATION REQUIREMENT: 0.91 million eggs (~ 292 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 105 eggs/ha

Year	1995	1996	1997	1998	1999	2000 [3]	MIN [1]	MAX [1]
Total returns to home waters								
Small	823	1230	509	1718	1046	1492	233	1718
Large	33	50	55	128	22	120	0	128
Recreational harvest (small salmon)[4]								
Retained	-	-	-	-	-	21	0	171
Released	-	-	-	-	-	0	-	-
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	0	0	2
Released	-	-	-	-	-	0	0	2
Known removals above counting fence								
Small	27	41	1	68	1	3	0	223
Large	3	2	0	0	0	0	0	3
Spawners								
Small	796	1189	508	1650	1045	1468	117	1650
Large	30	48	55	128	22	120	0	128
Egg conservation requirement								
% met	286	415	200	625	370	480	30	625
Smolt count	15144	14502	23845	17139	13500	12706	5735	23845
% Sea survival [2]								
(Adult return year)	8.9	8.1	3.0	6.6	6.1	11.0	2.1	12.0

[1] Min and max are for the period of record since 1974.

[2] Sea survival is from smolt to 1SW salmon returns in year of adult return.

[3] Preliminary

[4] Biological sampling by angling

Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The river has been closed to angling since 1989. The angling that took place in 2000 from the mouth of the river to 0.5km upstream was part of a biological sampling experiment. The purpose of this experiment was to collect biological information from up to 100 small salmon.

Data and methodology: Counts of smolts and adult salmon were obtained at a fish counting fence located at the mouth of the river in 1971-2000. A hook-and-release mortality of 10% was used in the calculation of spawning escapements for the years 1985-89 when there was a recreational fishery.

State of the stock: The conservation requirement was achieved on the river in 2000. The percentage achieved was 30% higher than in 1999 and the second highest since 1984. Returns of small salmon in 2000 were 43% higher than in 1999 and the second highest since 1992. Returns of large salmon were up considerably from 1999, second highest since 1992. In spite of continued high egg depositions since the commercial fishery moratorium, smolt production has not increased in recent years.

Forecast: The smolt production in 2000 was 6% less than in 1999. Hence, assuming that sea survival remains constant, returns of small salmon in 2001 are expected to be lower than in 2000 but should be sufficient to achieve the conservation requirement based on the mean sea survival in recent years. Given the extreme variability in smolt sea survival in recent years, there is some uncertainty in this expectation.