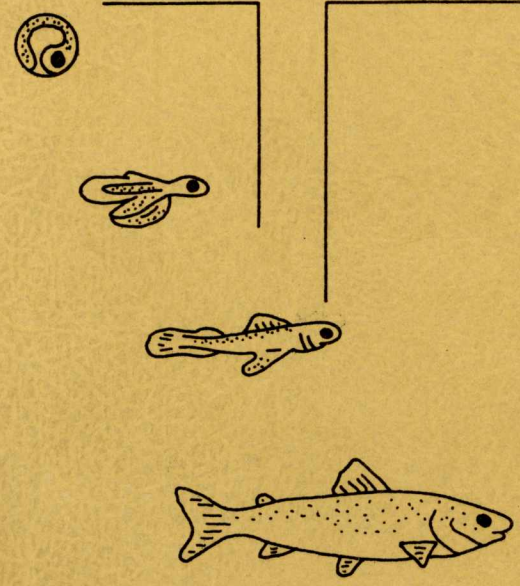
ENVIRONMENT CANADA

FISHERIES SERVICE



PROGRESS REPORT NO. 93

GANDER RIVER

— A STREAM INVENTORY —

BY

G. R. TRAVERSE

RESOURCE DEVELOPMENT BRANCH
NEWFOUNDLAND REGION
ST. JOHN'S

GANDER RIVER

- A Stream Inventory -

by

Gerald R. Traverse

Resource Development Branch
Dept. of the Environment (Fisheries Service)
St. John's, Nfld.
December, 1972

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Materials and Methods

The watershed was completely flown at altitudes of 100 - 150 feet using a Bell G4A helicopter. Periodic checks were made from the ground to help maintain accuracy. In addition, all obstructions and many gravel sections were viewed from the ground.

Prior to the survey, a map of the watershed to be surveyed was drawn. This map was used during the survey to mark the various pertinent features such as width, depth and bottom composition. All obstructions were accurately located and marked on the map. Each map was traced on plain white paper omitting all contour lines, other river systems, etc. This, it is found, enables the surveyor to follow the stream more easily at fairly high speed in helicopter especially in the headwaters area.

Bottom types were classified according to Lagler (1956). Percentage composition was not used. A new system, that of listing the bottom types in order of abundance or predominant types, was used. For example, if a section of river contained mainly rubble with some boulder, then that section was classified as rubble/boulder bottom. Any spawning gravel in the section was recorded as a percentage under spawning area. This it is felt gives a more realistic approximation of the available rearing and nursery area.

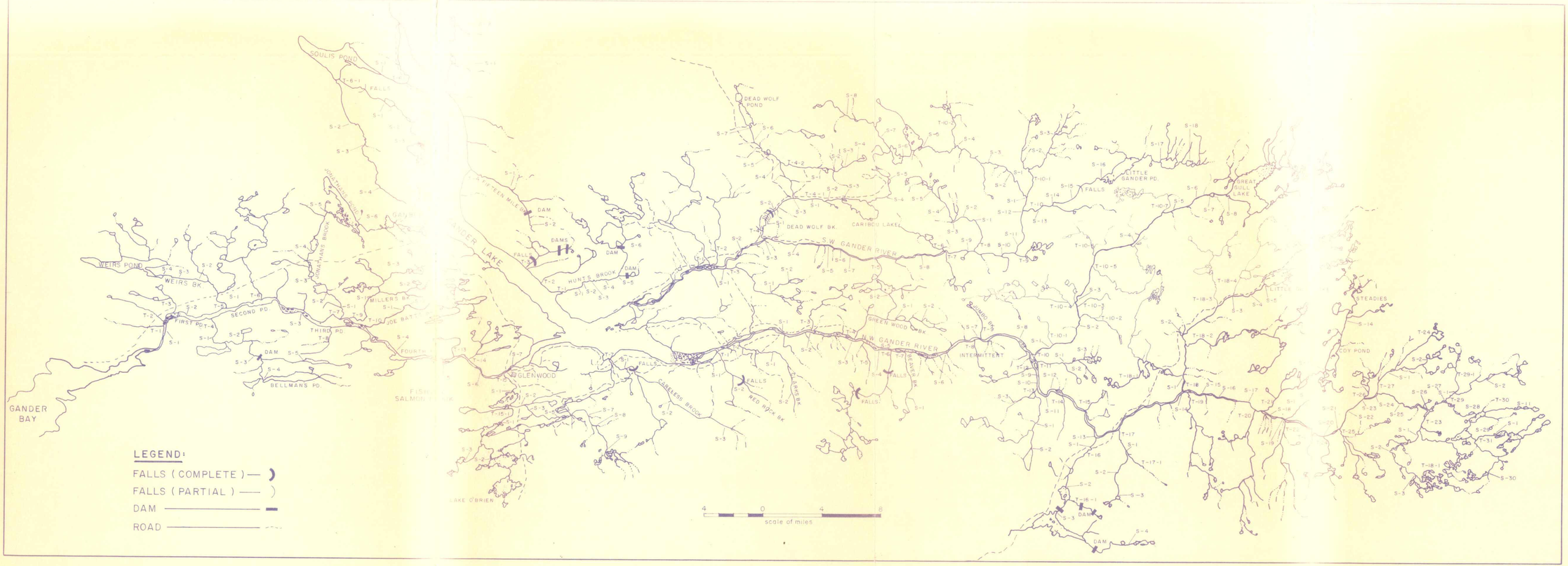


FIG. OUTLINE MAP OF GANDER RIVER, SHOWING OBSTRUCTION LOCATIONS AND SECTIONS SURVEYED.

Watershed Description

Gander River has a drainage area of 2470 miles^2 and a total axial length of 97.4 miles (fig. 1). The river has three main watercourses; The Northwest Gander (60 miles long) and the Southwest Gander (48 miles long) arise from about the center of the island and run northeastward, where they flow into the southwest corner of Gander Lake. The main Gander River leaves the Lake at its northwest corner and flows for twenty seven miles to empty into Gander Bay. For the purpose of this survey, the Gander River has been divided into four sections (1) The main river - that is, from Gander Lake to Gander Bay, (2) Northwest Gander River and tributaries (3) Southwest Gander River and tributaries, (4) other tributaries around Gander Lake.

There are no obstructions to migrating fish on any of the main streams. Great Gull River, a tributary of northwest, has several temporary holdups which can be remedied by blasting (fig. 16 to 18). Dead Wolf Brook, a tributary of Southwest, has several temporary holdups and a complete obstruction with approximately 5000 units of rearing area above it. Some of the small tributaries have major obstructions near the headwaters with insignificant quantities of rearing above them. Several old logging dams block fish passage on many of the smaller streams (Fig. 1).

The main river from Gander Bay to Gander Lake has a medium flow with an average width of approx. 1000 feet. The river consists mainly of a series of long narrow ponds connected by sections of boulder bottom type (Fig. 3). Fishing pools are contained in those sections between ponds. No spawning gravel is located in this section. Tributaries below the lake contain fair amounts of spawning gravel scattered throughout.

The northwest Gander from Gander Lake upstream for several miles has a medium to low flow with mostly gravel/rubble bottom composition littered with several islands (Fig. 8). Many areas of good sapwning gravel are located throughout this section (Table VII). As you near the middle and upper reaches the current picks up and the bottom composition becomes generally coarser. However, good gravel sections are scattered throughout this area as well (Table VII). Several tributaries of Northwest, Great Gull, Little Gull and Coy Brook contain excellent spawning and rearing areas (Table VIII).

Pulpwood harvesting is being carried out on a large scale in the lower and middle reaches. A great deal of the larger vegetation, spruce, fir etc. has been removed from many of the tributaries (Fig. 7). The upper reaches contain extensive areas of virgin spruce and fir and are not being harvested as yet.

The lower reaches of Southwest consists of mainly gravel/sand with a fairly slow current (Fig. 12). Further upstream the river narrows, the current is faster and bottom composition is mostly rubble/boulder. Good spawning areas are scattered throughout the Southwest and its tributaries. Pulpwood harvesting is being carried out in the middle reaches of this system. The upper portion is well forested and as yet, untouched (Fig. 13).

Fish Populations

Atlantic Salmon

A counting fence of netting was operated in 1951 near the mouth of the main river by the Fisheries Research Board of Canada. The fence was operated from June 7 to September 30. However, due to flood damage, it was

out of operation from August 7 to September 3, The actual count of salmon entering the river before the damage was 9700 fish (80% grilse, 20% salmon). No salmon entered after the fence was repaired. The estimate of the total run assuming that the run decreased at the same rate that it increased, was 12000 fish.

A counting trap was operated in the Salmon Brook Fishway from 1957 to 1961. (Table I). Counts were began again in 1971 and continued through 1972. The average number of salmon counted per year was 822 fish.

Table I. Fishway Count, Atlantic Salmon, Salmon Brook Fishway, Gander River

Year	Grilse	Salmon	Total
1957	642	323	965
1958	1072	502	1574
1959	591	290	881
1960	291	183	474
1961	41	15	56
1971	714	*494	1208
1972	540	54	594
Total	3891	1861	5752
Average per year	556	266	822

*Due to a misunderstanding of instructions, the attendant was calling all fish over 4 lbs. "salmon" up until July 27. For this reason the count of "salmon" is considerably higher for 1971 than it should be.

Angling reports (1952-1971) show an average angler catch of 1649 fish per year (Table II). Angling results are probably lower on the Gander system than many of the other major rivers due to inaccessibility.

The angling catch for 1951 was 1448, 598 on the lower Gander, 850 on the Upper Gander (Glenwood area). One of two prime fishing areas on the Lower Gander was situated below the fence. No records of the number of fish angled below the fence are available. Assuming 50% were taken below then the run to the river would be:

Fence count	- 9,700
Estimated	- 2,300
Angled below fence	- 300
Total run	12,300

The angling catch for 1951 based on this data was approximately 9% of the total run. The catch effort that year was 1 fish per rod day. From 1952-1971 the catch effort was .75 fish per day with the rod days increasing by approximately 50%. Based on this data, the average angling catch should be not more than 15% of the total run, giving a yearly run of approximately 11,000 fish.

Table II. Angling catch, Atlantic Salmon, Gander River - 1952-1971

	Total No.	Av. No. per year	Total Wt. (lbs)	Av. wt. (lbs)
Grilse	28,296	1414	120,208	4.2
Salmon	4,702	235	37,844	8.0
Total	32,998	1649	158,052	4.8

Bottom Composition

Some of the smaller tributaries were not surveyed due to a shortage of time. The amount of rearing area in each of these was estimated based on observations made at the intersection of each tributary with the main stem. No attempt has been made to estimate the spawning gravel on these tributaries.

The main river from Gander Lake to the mouth contains several sections of deep water with the bottom not being observable. These sections have been omitted from rearing areas.

Standing water has not been included in rearing calculations due to a lack of information available on the extent of Atlantic Salmon utilization of this type of habitat.

Table III. Bottom Composition, Gander River - Main River and tributaries from mouth to Gander Lake.

Section	Dist. (ft.)	Av. Width (ft.)	Bottom type	* Total units	Rearing %	Rearing Units	Spawning %	Spawning Units (Inc. in rearing)
1	16,000	800	deep (undetermined)	14,222	-	-	-	-
2	10,600	1000	boulder/rubble	11,777	100	11,777	-	-
3	9,700	900	boulder/rubble	9,700	100	9,700	-	-
4	16,000	1000	boulder/rubble/ gravel	17,778	100	17,778	-	-
5	4,000	1200	boulder/rubble	5,333	30	1,599	-	-
6	20,000	800	boulder/rubble	17,778	30	5,333	-	-
7	17,000	450	boulder/rubble]	8,500	100	8,500	-	-
Total	93,300			85,088	64.3	54,687	-	-

* 1 unit = 100 yds.^{2}

Table IV. Bottom composition, tributaries of main Gander River from mouth to Gander Lake

Tributary	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
Bellman's Brook									
T4-S-1	8,500	25	rubble/boulder	236	100	236	-	-	
S-2	17,000	25	steady	472	-	-	-	-	
S-3	10,600	15	rubble/boulder/ gravel	178	100	178	15	28	
S-4	13,500	25	steady	375	-	-	-	-	
S-5	15,500	25	steady	430	-	-	-	-	
Weirs Brook									
T5-S-1	6,700	40	boulder/rubble	298	100	298	5	15	
S-2	12,600	25	rubble/boulder/ gravel	350	100	350	15	53	
S-3	6,300	25	rubble/boulder	175	100	175	-	-	
S-4	5,500	25	steady	153	-	-	-	-	
Island Pond Brook									
T-6	70,000	30	rubble/boulder/ gravel	2333	90	2100	5	117	
Jonathans Brook									
T-7-S-1	4,500	30	steadies	150	-	-	-	-	
S-2	8,000	40	rubble/boulder	356	100	356	5	18	
S-3	6,500	50	steadies	361	-	-	-	-	
S-4	5,000	35	boulder/rubble	194	90	175	2	4	
S-5	15,000	30	rubble/boulder	500	90	450	1	5	
S-6	17,000	20	rubble/boulder/ steady	378	70	265	2	8	
S-7	15,000	10	steady	167	-	-	-	-	

Fig. 2. Aerial view, mouth of Gander River looking downstream.

Fig. 3. Main river 2 miles from mouth.

Fig. 4. Main river 2 miles below Gander Lake.

Fig. 5. Typical section of Salmon Brook 1/2 mile below fishway.

Table IV. Bottom composition, tributaries of main Gander River from mouth to Gander Lake (cont'd)

Tributary	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning (Inc. in rearing) Units
Millers Brook								
T-9-S-1	17,000	15	rubble/boulder/ steady	283	60	170	10	28
S-2	20,000	15	rubble/boulder	333	80	266	5	17
S-3	20,000	20	steady	444	-	-	-	-
Joe Batt's Brook								
T-10-S-1	19,000	15	rubble/boulder/ gravel	317	100	317	25	79
S-2	5,000	15	steadies	-	-	-	-	-
S-3	6,500	15	rubble/boulder	108	100	108	-	-
S-4	20,000	30	steadies	667	-	-	-	-
Salmon Brook								
T-15-S-1	9,000	60	boulder/rubble	600	100	600	-	-
S-2	4,500	40	rubble/boulder/ gravel	200	100	200	10	20
S-3	3,000	40	boulder/rubble	133	95	126	-	-
S-4	6,000	40	rubble/gravel	267	95	254	10	27
S-5	9,000	40	boulder/rubble	400	100	400	-	-
S-6	4,000	50	steadies	222	-	-	-	-
S-7	6,000	40	gravel/rubble	267	100	267	95	254
S-8	6,500	40	rubble/boulder	289	100	289	-	289
S-9	14,000	30	boulder/rubble	467	100	467	-	-
T-15-1-S-1	8,500	30	boulder/rubble	283	100	283	-	-
S-2	11,000	25	rubble/boulder	306	100	306	-	-
S-3	10,500	20	steadies	233	-	-	-	-
TOTAL				12925	66.8	8636	7.4	962

Table V. Estimated rearing capacity of small tributaries not surveyed below Gander Lake.

Tributary	Dist. (ft.)	Estimated Width (ft.)	Estimated rearing units
T-1	12000	10	134
T-2	20000	12	
T-3	18000	10	200
T-8	18000	10	200
T-11	12000	15	200
T-12	6000	8	53
T-13	15000	15	250
T-14	30000	15	500
Total estimated rearing units			1537

*Based on observations made at the intersection of each tributary with the main stream.

Table VI. Summary of bottom composition on main river and tributaries below Gander Lake

Section	Total Units	Rearing Units	Spawning Units	(Inc. in rearing)
Main river	85,088	54,687	-	
Tributaries surveyed	12,925	8,636	962	
Tributaries estimated	-	1,537	-	
TOTAL	98,013	64,860	962	

Fig. 6. Fishway, Salmon Brook, 1 mile from mouth.

Fig. 7. Headwaters of Salmon Brook, showing extensive cut over areas.

Table VII. Bottom Composition, Northwest Gander, Main Stem

Section	Dist. (ft.)	Av. Width (ft.)	Bottom Type	Total Units	Rearing %	Rearing Units	Spawning %	Spawning Units (Inc. in rearing)
1	26,000	250	gravel/rubble	7,222	80	5778	10	722
2	11,500	200	rubble/gravel/ boulder	2,555	100	2555	10	256
3	16,000	300	gravel/sand	5,333	80	4266	10	533
4	11,000	375	gravel/rubble/ boulder	4,583	100	4583	75	3437
5	5,000	200	rubble/boulder	1,111	100	1111	-	-
6	17,000	375	gravel/rubble	7,083	100	7083	90	6375
7	15,000	250	boulder/rubble	4,166	100	4166	-	-
8	15,500	250	boulder/rubble	4,305	100	4305	-	-
9	18,000	400	rubble/gravel/ boulder	8,000	100	8000	30	2400
10	3,000	200	boulder/rubble	667	100	667	-	-
11	5,000	300	gravel/rubble	1,667	100	1667	90	1500
12	2,000	250	rubble/boulder	556	100	556	-	-
13	25,000	200	boulder/rubble	5,556	100	5556	-	-
14	35,000	200	boulder/rubble	7,778	100	7778	-	-
15	5,000	125	rubble/gravel	694	100	694	40	278
16	8,000	125	rubble/gravel/ boulder	1,111	100	1111	20	222
17	12,000	125	rubble/gravel	1,667	100	1667	40	667
18	9,000	125	steady	1,250	-	-	-	-
19	6,500	125	boulder/rubble	903	100	903	-	-
20	16,000	100	rubble/gravel/ boulder	1,778	100	1778	10	179
21	4,500	100	steady	500	-	-	-	-
22	9,000	100	rubble/boulder	1,000	100	1000	-	-
23	5,000	80	rubble/boulder	444	100	444	-	-
24	8,000	90	steady	800	-	-	-	-
25	8,000	80	rubble/boulder	711	100	711	3	21
26	14,000	90	steadies	1,400	-	-	-	-
27	8,000	100	steady/boulder/ rubble	889	50	445	-	-
28	7,500	45	boulder/rubble	375	100	375	-	-
29	3,000	40	rubble/boulder	134	100	134	-	-
30	10,000	20	boulder/rubble	222	100	222	-	-
TOTAL				74,460	90.7	67,555	22.2	16,590

Fig. 8. Northwest Gander River, aerial view looking downstream 11 miles from Gander Lake.

Fig. 9. Rearing area, Northwest Gander River, 20 miles above Gander Lake.

Table VIII. Bottom Composition, Tributaries of Northwest Gander

Trib.	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
Red Rock Brook									
T-1-S-1	6000	20	gravel/rubble	133	100	133	70	93	
T-1-S-2	6000	20	boulder/rubble	133	100	133	-	-	
Clark's Brook									
T-2-S-1	22000	20	rubble/boulder	489	100	489	5	24	
S-2	9000	10	rubble/boulder	100	100	100	-	-	
Greenwood Brook									
T-4-S-1	20000	20	rubble/boulder	444	100	444	10	44	
2	13000	10	rubble/boulder	144	100	144	-	-	
3	7500	10	rubble/boulder	83	100	83	2	2	
Cooper Brook									
T-6-S-1	20000	40	boulder/rubble	889	100	889	-	-	
Beaver Brook									
T-7	15000	15	boulder/rubble	250	100	250	5	13	
Great Gull River									
T-10-S-1	4000	125	rubble/gravel	556	100	556	30	167	
S-2	18000	100	boulder/rubble	2000	100	2000	-	-	
S-3	8000	60	steady	533	-	-	-	-	
S-4	34000	75	rubble/gravel/ boulder	2833	100	2833	40	1133	
S-5	20000	75	rubble/gravel/ boulder	1667	100	1667	40	667	
S-6	10000	70	rubble/gravel/ boulder	777	100	777	20	155	
S-7	5000	60	rubble/boulder	333	100	333	5	17	
S-8	3000	100	boulder/rubble	333	100	333	-	-	

Table VIII. Bottom Composition, Tributaries of Northwest Gander (cont'd)

Trib.	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing units	Spawning %	Spawning Units	(Inc. in rearing) -
Bear Brook									
T-11-S-1	10000	20	boulder/rubble	222	100	222	2	4	
S-2	7000	10	boulder/rubble	77	100	77	-	-	
S-3	14000	10	rubble/boulder	156	100	157	-	-	
No Name									
T-12	13000	10	boulder/rubble	144	100	144	-	-	
Rolling Brook									
T-13-S-1	12500	35	rubble/boulder	486	100	486	2	10	
S-2	8000	25	boulder/rubble	222	100	222	-	-	
S-3	11000	10	boulder/rubble	122	100	122	-	-	
Miguels Brook									
T-16-S-1	2500	30	rubble/boulder	83	100	83	-	-	
S-2	22000	25	rubble/boulder/ gravel	611	100	611	5	31	
S-3	3000	30	boulder/rubble	100	100	100	-	-	
S-4	16000	15	rubble/boulder	267	100	267	5	13	
T-16-1	15000	30	boulder/rubble	500	100	500	2	10	
No Name									
T-17-S-1	9000	25	rubble/boulder	250	100	250	5	13	
S-2	9000	15	rubble/boulder	150	100	150	5	8	
S-3	10500	15	steady	175	-	-	-	-	
T-17-1	8000	10	rubble/boulder	89	100	89	5	4	

Table VIII. Bottom Composition, tributaries of Northwest Gander, cont'd)

Trib.	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning Units (Inc. in rearing)
Little Gull River								
T-18-S-1	5000	70	rubble/gravel	389	100	389	40	156
S-2	16000	70	steady	1244	-	-	-	-
S-3	26000	50	rubble/gravel/ boulder	1444	100	1444	30	433
S-4	4000	45	rubble/boulder	200	100	200	-	-
S-5	8000	75	steadies	667	-	-	-	-
T-18-1	25000	15	rubble/boulder	417	100	417	2	8
T-18-2	14000	20	boulder/rubble	311	100	311	-	-
T-18-3	13000	10	rubble/boulder	144	100	144	-	-
T-18-4	16000	45	rubble/boulder	800	100	800	-	-
Coy Brook								
T-21-S-1	9000	45	rubble/gravel	450	100	450	40	180
S-2	10000	45	boulder/rubble	500	100	500	-	-
S-3	8000	60	boulder/rubble	533	100	533	-	-
S-4	5500	45	rubble/gravel	275	100	275	40	110
Stormy Brook								
T-27-S-1	10000	50	boulder/rubble	556	100	556	-	-
S-2	11000	25	boulder/rubble	306	100	306	-	-
T-27-1	16000	25	boulder/rubble	444	100	444	-	-
No Name								
T-28-S-1	13000	70	rubble/boulder	1011	95	960	2	20
S-2	9000	100	steady	1000	-	-	-	-
S-3	10000	45	boulder/rubble	500	100	500	5	25
T-28-1	9000	30	boulder/rubble	300	100	300	-	-

Table VIII. Bottom Composition, Tributaries of Northwest Gander, cont'd.

Trib.	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
No Name									
T-29-S-1	4000	100	steady/boulder/ rubble	444	50	222	-	-	
S-2	18000	40	boulder/rubble	800	100	800	10	80	
T-29-1	8000	15	boulder/rubble	133	100	133	-	-	
No Name									
T-30-S-1	1000	15	boulder/rubble	167	100	167	-	-	
No Name									
T-31-S-1	8000	25	steadies	222	-	-	-	-	
Total				28608	85.6	24,494	12.0	3,420	

Fig. 10. Typical Spawning gravel section, Great Gull River.

Fig. 11. Typical rearing area, headwaters of Northwest Gander.

Table IX. Estimated rearing capacity of small tributaries not surveyed on Northwest Gander and Great Gull River

Tributary	Distance (ft.)	*Estimated width (ft.)	Estimated rearing units
T-3	25,000	20	556
T-9	10,000	15	67
T-10-1	10,000	15	67
T-10-2	15,000	20	333
T-10-3	10,000	15	67
T-10-4	25,000	25	694
T-10-5	25,000	25	694
T-10-6	8,000	15	133
T-10-7	15,000	20	333
T-14	15,000	10	167
T-15	8,000	10	89
T-19	50,000	10	556
T-20	20,000	10	222
T-22	20,000	15	333
T-23	3,000	10	33
T-24	10,000	10	111
T-25	20,000	10	222
T-26	6,000	10	66
TOTAL ESTIMATED REARING UNITS			4743

*Based on observations made at the intersection of each tributary with the main stream.

Table X. Summary, bottom composition, Northwest River and tributaries

	Total units	Units of rearing	Units of spawning
Main Northwest	74,460	67,555	16,590
Tributaries Surveyed	28,608 ;	24,494	3,420
Tributaries estimated	-	4,743	-
TOTAL	103,068	96,792	20,010

Table XI. Bottom Composition, Southwest Gander, Main Stem

Section	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
1	36,000	200	gravel/sand/mud	8000	50	4000	5	400	
2	10,000	150	gravel/rubble	1667	100	1667	10	167	
3	10,000	125	rubble/boulder	1389	100	1389	-	-	
4	13,000	100	boulder/rubble	1444	95	1372	-	-	
5	10,000	125	rubble/boulder	1389	100	1389	-	-	
6	4,500	125	rubble/boulder/ gravel	625	100	625	10	63	
7	6,000	125	bedrock/rubble/ boulder	833	50	417	-	-	
8	25,000	100	gravel/rubble	2778	75	2315	5	139	
9	18,000	90	gravel/sand/mud/ rubble	1800	50	900	-	-	
10	10,000	100	boulder/rubble	1111	95	1055	2	22	
11	8,500	80	boulder/rubble/ steady	756	75	567	-	-	
12	13,000	75	gravel/sand/mud	1083	50	542	10	108	
13	8,000	40	rubble/gravel/ boulder	355	100	355	20	71	
14	5,000	35	boulder/rubble	194	100	194	-	-	
15	7,000	40	boulder/rubble/ gravel	311	100	311	10	31	
16	16,000	40	boulder/rubble/ gravel	711	100	711	5	36	
17	9,000	25	boulder/rubble	250	100	250	-	-	
18	4,000	20	boulder/rubble	89	100	89	-	-	
TOTAL				24785	73.2	18148	4.2	1037	

Fig. 12. Southwest Gander River 3 miles above Gander Lake.

Fig. 13. Southwest Gander River 14 miles above Gander Lake.

Fig. 14. Typical section of headwater area of Southwest River

Table XII. Bottom composition, tributaries (accessible areas) of Southwest Gander

Trib.	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total Units	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
Winter Brook									
T-3-S-1	22,000	15	rubble/boulder	367	100	367	10	37	
S-2	8,000	10	rubble/boulder	89	100	89	-	-	
Dead Wolf Brook									
T-4-S-1	8,000	65	rubble/boulder/ gravel	578	100	578	2	12	
No Name									
T-8-S-1	10,000	20	boulder/rubble	222	100	222	5	11	
S-2	5,000	15	steady	83	-	-	-	-	
S-3	7,000	15	boulder/rubble	117	100	117	-	-	
S-4	7,000	12	steady	93	-	-	-	-	
S-5	8,000	10	boulder/rubble	89	100	89	-	-	
No Name									
T-10-S-1	5,000	50	gravel/rubble	278	100	278	60	167	
S-2	9,000	50	rubble/gravel/ boulder	500	100	500	20	100	
S-3	14,000	45	rubble/gravel/ boulder	700	100	700	5	35	
S-4	15,000	30	steady	500	-	-	-	-	
S-5	14,000	25	rubble/boulder	389	100	389	2	8	
S-6	5,000	25	boulder/rubble	139	100	139	-	-	
S-7	4,000	25	steady	111	-	-	-	-	
S-8	15,000	20	boulder/rubble	333	100	333	-	-	
T-10-1-S-1	10,000	25	rubble/gravel	278	100	278	40	124	
S-2	6,500	25	rubble/boulder	180	100	180	-	-	
S-3	11,000	20	boulder/rubble	244	100	244	-	-	
T-10-2	10,000	25	steady	278	-	-	-	-	
T-11	Unnamed								
T-11	7,000	20	steady	156	-	-	-	-	
TOTAL				5624	80.0	4503	8.8	494	

Table XIII. Estimated rearing capacity of small tributaries not surveyed on Southwest Gander River.

Tributary	Dist. (ft.)	Av. Width (ft.)	Estimated rearing units
T-1	20,000	20	444
T-2	20,000	15	333
T-5	10,000	15	167
T-6	18,000	15	300
T-7	13,000	15	217
T-9	8,000	10	89
TOTAL ESTIMATED REARING UNITS			1550

Table XIV. Summary, bottom composition, accessible areas, Southwest River and tributaries

	Total Units	Units of rearing	Units of spawning
Main Southwest	24785	18,148	1037
Tributaries surveyed	5624	4,503	494
Tributaries estimated	-	1,550	-
TOTAL	30409	24,201	1531

Table XV. Bottom composition, Dead Wolf Brook (T-4) above falls #5, estimated complete obstruction

Section	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
S-2	11,000	80	rubble/gravel/ boulder	978	100	978	20	196	
S-3	4,000	75	rubble/boulder	333	100	333	-	-	
S-4	15,000	60	steady	1000	-	-	-	-	
S-5	4,000	40	boulder/rubble	178	100	178	-	-	
S-6	5,000	40	boulder/rubble	222	100	222	-	-	
S-7	5,000	80	steady	444	-	-	-	-	
T-4-1-S-1	7,000	50	steady	389	-	-	-	-	
S-2	6,000	40	boulder/rubble	267	100	267	--	-	
S-3	5,000	50	steady	278	-	-	-	-	
S-4	3,000	15	rubble/boulder	50	100	50	3	2	
S-5	10,000	15	rubble/boulder	167	100	167	-	-	
T-4-2-S-1	15,000	35	boulder/rubble	583	100	583	2	12	
S-2	5,000	50	steady	278	-	-	-	-	
S-3	5,000	15	boulder/rubble	83	100	83	-	-	
S-4	3,000	40	steady	133	-	-	-	-	
TOTAL				5383	53.1	2861	3.9	210	

Table XVI. Bottom composition, other tributaries around Gander Lake

Trib.	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total units	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
T-1 Hunts Brook									
S-1	4,000	25	rubble/boulder	111	100	111	-	-	
S-2	2,000	25	steady	56	-	-	-	-	
S-3	2,000	25	boulder/rubble	56	100	56	-	-	
S-4	4,000	20	steady	89	-	-	-	-	
S-5	7,000	30	rubble/gravel	233	90	210	25	58	
S-6	14,000	35	rubble/boulder/ gravel	544	100	544	20	109	

Table XVI. Bottom Composition, other tributaries around Gander Lake (cont'd).

Trib.	Dist. (ft.)	Av. Width (ft.)	Bottom type	Total unit	Rearing %	Rearing Units	Spawning %	Spawning Units	(Inc. in rearing)
Unnamed									
T-2-S-1	7,000	15	rubble/gravel	117	100	117	15	18	
T-3 Falls at mouth									
Fifteen Mile Brook									
T-4-S-1	14,000	20	boulder/rubble	311	100	311	-	-	
S-2	14,000	15	rubble/boulder	233	100	233	15	35	
Joes Brook									
T-5-S-1	10,000	30	boulder/rubble/ gravel	333	100	333	5	17	
S-2	13,000	20	boulder/rubble/ steady	289	50	145	-	-	
Soulis Brook									
T-6-S-1	11,000	40	rubble/boulder	489	100	489	2	10	
S-2	15,000	15	rubble boulder	250	95	238	2	5	
S-3	10,000	20	steadies	222	-	-	-	-	
S-4	13,000	15	rubble/boulder	217	100	217	-	-	
T-6-1-S-1	20,000	15	rubble/boulder	333	100	333	2	7	
S-2	5,000	12	rubble/boulder/ steady	67	50	34	-	-	
S-3	12,000	20	steady	267	-	-	-	-	
S-4	2,500	10	rubble/boulder	28	100	28	-	-	
Careless Brook									
T-7-S-1	8,000	30	gravel	267	50	134	50	134	
S-2	25,000	30	rubble/gravel	833	100	833	30	250	
S-3	30,000	20	rubble/boulder	667	100	667	-	-	
TOTAL				6012	83.7%	5033	10.7	643	

Table XVII. Summary, bottom composition, accessible areas of the Gander River System

	Total Units	Units of rearing	Units of Spawning
Main river and tributaries below Gander Lake	98,013	64,860	962
Northwest River and tributaries	103,068	96,792	20,010
Southwest River and tributaries	30,409	24,201	1,531
Other tributaries around Gander Lake	6,012	5,033	643
TOTAL	237,502	190,886	23,146

OBSTRUCTIONS

Main River

The main river from the mouth to Gander Lake is completely free from any kind of obstruction. A falls 1 mile upstream in Salmon Brook (T-15) causes no problem since a fishway was built here in 1955 (Fig. 6). Road culverts on Nine Island Pond Brook and Weirs Brook have caused temporary holdup since installation in 1965. This problem is currently under investigation by the Engineering Section.

Northwest Gander

There are no holdups to migrating fish on the main Northwest Gander river. A small rapids at mile point 28 presents no problems at any level (Fig. 15). Several old logging dams on Miguels Brook (T-16) completely halt fish movement (Fig. 1). These dams are in extremely poor condition and have not been used for several years. A series of 3 falls approximately 100' apart in a gorge at mile point 1.5 on Great Gull River (T-10) form a temporary holdup. Falls #1 is 6' high, 15' long at 60° angle. Removal of bedrock lip by blasting is required. Falls #2 is 12' high sloping 75° on flat bedrock on left hand side. There is a bedrock ledge at the bottom. This side is not passable (Fig. 16). The right hand side consists of an 8' vertical drop. Most of the water is confined to this side. This falls is passable but difficult at medium and high water levels. Improvements should consist of deepening the pool below and removing rock outcrop from the base of the falls. Falls #3 is 7' high, 15' long at 45° approximately (Fig. 17). There is a run-around on left bank which requires rock clearing. Another falls (#4) at mile point 12 is 4' high 10' long and presents no problems at any water level (Fig. 18).

There is a 30-40' vertical falls on Red Rock Brook (T-1), a small tributary of Northwest Gander, approximately 3 miles from the mouth. However, little if any rearing area is available above. A 40' vertical falls also halts fish movement on T-6 (Coopers Brook). There is an insufficient amount of rearing area above to justify any further work here.

Fig. 15. Rapids Northwest Gander 28 miles upstream from Gander Lake.

Fig. 16. Falls #2, Great Gull River (T-10).

Fig. 17. Falls #3, Great Gull River (T-10).

Fig. 18. Falls #4, Great Gull River

Southwest Gander

There is one falls on the main Southwest Gander (Fig. 1). It is a partial obstruction located 13 miles upstream from Gander Lake. Lack of a suitable landing area for the helicopter prevented observation from the ground. The main falls appears to be approximately 10-12 feet high sloping 50-60° (Fig. 19). There is a run-around on the left bank with a drop of from 6-8 feet.

Dead Wolf Brook (T-4) has a series of 5 falls located in a gorge at mile point 2, one of which forms a complete obstruction. (Table XVIII). Another falls at mile point 3.5 is a temporary holdup at low water.

Table XVIII. Obstructions, Dead Wolf Brook (T-4 of Southwest River)

Obstruction no.	Type of Obstruction	Distance from the mouth (mi.)	Description	Degree of Obstruction	Recommendations
1	falls	2.0	9' high 15' long	Passable only at high water	Blasting to confine water and enlarge pool
2	falls	2.0	5' high 8' long at 70°	Passable all levels	Overhanging lip needs removal
3	falls	2.0	8' vertical	Passable medium and high water levels	Requires removal of overhanging lip
4	falls	2.1	5' high at 75°	Holdup low water	Blasting to confine water
5	falls	2.2	20' high, 50' long bedrock shute 50-60° slope	Complete all water levels	Requires extensive blasting or fishway. Needs Engineering survey.
6	falls	3.5	9' high in 2 drops lower 5' vertical upper 4' vertical deep pool between	Holdup at low water	Minor blasting required to improve lower drop

Fig. 19. Falls main Southwest Gander, Mile point 13.

Tributaries around Gander Lake

There is a 40' vertical falls near the mouth of T-3 (Fig. I). Insufficient rearing capacity above eliminates the need for any further work. Two old wooden dams are also located on this stream and block fish passage (Fig. I).

Hunt's Brook (T-1) has two wooden dams which completely block fish passage. These dams are very old and have not been used for several years.

Two old wooden dams are located on Fifteen Mile Brook (T-4). These completely halt fish movement. Approximately 1 mile upstream from Soulis Pond there is a 4' vertical falls on Soulis Brook (T-6)(Fig. I). This falls acts as a temporary holdup. Another falls 1 mile from the mouth of T-6-1 requires some blasting to improve fish passage at low water. A dam at the outlet of Deadwater Pond completely blocks fish passage. The dam is currently in use to raise the water level of Deadman's Pond for float plane usage. Approximately 2 miles from the mouth of Careless Brook (T-7) there is a falls 7-8' high. Blasting is required here to improve fish passage.

Potential Population Estimation

Table XIX. Estimated Atlantic salmon, smolt production and adult sea survival - accessible area of Gander River and tributaries

If smolt production per 100 yds^2 is		1	2	3
Smolts produced		190,886	381,772	572,658
Adult return if sea survival is	5%	9,544	19,089	28,633
	10%	19,089	38,177	57,266
	15%	28,633	57,266	85,899
	20%	38,177	76,354	114,532
	25%	47,722	95,443	143,165

Table XX. Estimated Atlantic Salmon smolt production and adult sea survival - Dead Wolf Brook above complete obstruction

If smolt production per 100 yds^2 is		1	2	3
Smolt produced		2861	5722	8583
Adult return if sea survival is	5%	143	281	429
	10%	286	572	858
	15%	429	858	1287
	20%	572	1144	1717
	25%	715	1430	2146

Summary

A helicopter survey of Gander River revealed approximately 191,000 rearing units presently available to Atlantic salmon. No complete obstructions were found on any of the major tributaries. Several serious falls were discovered on some of the smaller tributaries (Fig. I). However, there is insufficient area above to warrant any future work. Dead Wolf Brook (T-4 Southwest) is the only tributary with a complete obstruction where there is any amount of rearing above. There are 2860 rearing units above a falls which forms a complete obstruction on Dead Wolf Brook.

Assuming a production of 2 smolts per unit and an adult sea survival of 10%, the return to the local fishery should be roughly 38,000 fish. If 50% of these are taken commercially, then the expected run to the Gander River system would be in the order of 19,000 fish.

Recommendations

1. Stream clearance work be initiated on Great Gull River, Careless Brook and Soulis Brook.
2. An Engineering survey of the obstructions on Dead Wolf Brook.
3. Removal of the old logging dams on several of the smaller tributaries.
4. The wood harvesting operations on the Northwest and Southwest tributaries be watched closely to avoid any undue damage from silt or other debris.
5. An extensive spawning survey of the entire Gander River watershed.

REFERENCES

Anonymous 1951. Annual Report of the Newfoundland Fisheries Research Station.

Davis, H.S. 1938. Instructions for conducting stream and Lake surveys. N.S. Bur. Fish. Fish. Circ. 26, 55p.

Lagler, K.F. 1956. Freshwater fishery Biology, 2nd. ed., W.C. Brown Co., Dubuque, Iowa.

Mercer, K.M. 1970. Rearing Capacity of Exploits River for Atlantic Salmon. Resource Dev. Branch Fish. Serv., St. John's, Nfld.

Riche, L.G. 1972. An outline of methods used in stream surveys and estimation of salmon production; with a suggested value for Atlantic Salmon Sports Fish in Newfoundland. Resource Dev. Branch, Fish. Serv., St. John's, Nfld.