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REPORT NO. I. Report by W. M. Chisholm

1. Eel trapping in Lower Rawdon River - 1950

As a result of poor results with a barrel type eel pot last summer a differently designed pot was made this year. This pot was rectangular (approximately 2'6" long, 6" wide, 4" high) with a piece of rubber tubing used as a funnel and the end of this, inside the pot, drawn together to form a wedge. As a trial this pot was placed in the Rawdon river above the trap on May 25th. Throughout the period 25th May to 15th June it was moved from above the trap to below the trap and to various spots as far as 50' below the river bridge. It did not take one eel.

On the 8th June the heads only of many eels were noticed sticking out from under the trap. It was decided to place a barrel type pot beside the smolt trap, one with the inlet in the form of a funnel leading to a hole approximately 2" in diameter and not in the form of a wedge. The following morning the pot contained 70 eels.

The next day another pot was placed at the mouth of the Small Rawdon. The following morning it contained one eel and during the next three days only 16 eels. Since more were being taken in the Large Rawdon it was decided to transfer this pot to that river. Unfortunately old screening was used in this pot and the eels escaped by breaking a hole in the screen. By

the 14th this pot was functioning properly and on the 15th June held 79 eels.

During the period 8th-15th June the original pot in the Large Rawdon was moved from beside and below the trap to spots above the trap, approximately 5' and 20' respectively. No one position was better than another though actually all were in close proximity to the trap.

It was soon noted that the traps took only the odd eel during the day and practically 100% of their contents at night. They were baited with dead gaspereaux.

The eels were first placed in a puncheon in relatively still water. 13 eels died with a day. A container comprised mainly of screening was then used, placed in swiftly running water and since then there have been no dead eels.

Excluding the 17 eels taken in the Small Rawdon the total trapped in the Large Rawdon for the period 8th June to 15th July was 1,671.

After the 15th of July with low water and no gaspereaux in the river there were no eels taken in the traps. Preparations were then made to carry out an eel removal program for the whole river.

To facilitate handling six traps were made of galvanized screening. They were 3' long, 14" in diameter, with a funnel approximately 1½' long and tapering to a round inlet approximately 1½" in diameter.

The river was divided into six equal sections, each 817

feet long (from the mouth of the river to the dam) and each section divided into 10 equal stations 81' apart. Beginning August 1st the traps were placed at Station No. 1 in each section and thence on succeeding Mondays, Wednesdays and Fridays the traps were moved up river to Station No. 2 and so on.

From the record of trapping it is interesting to note that on the morning of August 22nd, with a natural freshet running, the trapping did not show an increase except for one trap, this latter eel pot was at Station No. 8, Section "A", which was immediately beside and below the smolt trap. This was the same spot where many eels were taken when the eel traps were first placed in the river in June. On the morning of the 22nd this trap held 73 eels, weighing 23 lbs. in all. It is also interesting to note that the smolt trap contained 10 eels weight 26½ lbs. in all - the largest eels seen this season.

On the 23rd of August, with the natural freshet still running, the eel traps did not show a marked increase in content of eels. Since the river had been sufficiently covered to give a picture of the method being used and the results obtained it was decided to reposition the traps (to obtain a comparison in method of trapping). Two traps were placed at the mouth of the river and three traps by the smolt trap, one in front (upstream) and two beside the trap, i. e. downstream.

For the second consecutive day very large eels were taken in the Large Rawdon down smolt trap (12 weighing 23 lbs.) while the eels traps, with the exception of one large eel, again

held chiefly "strings".

On the morning of the 24th with the traps repositioned, the results were not gratifying with the exception of one trap. Again this trap was in the same place as the one which on August 22nd held 73 eels.

On the 26th August, the traps at the mouth of the river again did not hold any eels and the numbers in the eel traps beside the smolt trap showed a decrease. Trapping was discontinued on the 26th August.

IN GENERAL

(1) The eel traps made of galvanized screening were easy to handle and worked quite well.

(2) The traps should be placed in swift running water and emptied early in the morning.

(3) Large eels were trapped but were very much in the minority. Prior to the freshet the eels trapped were very small ("strings").

(4) The largest eels (3' long and weighing 3 lbs.) were seen late in August and following a natural freshet.

To obtain further facts on points brought out by this experiment it would seem worthwhile to conduct a shorter experiment using four traps. Two traps could be placed in section A and two in section C (the former where most eels taken, the latter the converse). In each of these two sections one of the two traps to be placed in swiftly running water with funnel pointing downstream. This could then be reversed in each section.

RECORDS OF NUMBERS OF BELLS AND WEIGHTS (6/16 REPRESENTS 6 BELLS WEIGHING 16 LBS.) OF BELLS TRAP-  
PED IN LOWER HUDSON RIVER FROM AUG. 4 TO AUG. 23 INCLUSIVE.

STATION	1	2	3	4	5	6	7	8	9	TOTAL NO.	TOTAL WT. (LBS.)
A	12/3½	6/1½	13/3½	6/1½	0	0	11/2	73/23	6/3½	129	40½
B	1/1	3/1½	3/½	7/3½	2/½	10/3	7/2½	3/1½	47/8	89	22
C	0	1/½	0	1/½	0	1/½	1/½	3/1	0	7	3
D	1/½	4/1½	2/1	3/½	0	6/2½	0	2/½	19/4	37	10½
E	2/1	1/½	2/½	13/2½	0	0	3/1	0	9/2	30	7
F	2/2	3/1	4/½	14/4	3/½	2/½	0	2/½	3/1	<u>33</u>	<u>10</u>
TOTALS										325	93

RECORD FOR AUG. 24 and 26

		AUG. 24	AUG. 26
trap A - immediately in front of smolt trap	A	3/1 lb.	0
" B " " beside smolt trap to right	B	2/2½ "	15/7
" C " " " " " left	C	45/12 "	8/5
traps D) and E) - at mouth of Hudson river	D	0	0
	E	<u>0</u>	<u>0</u>
TOTALS		50/15½ lb.	21/12

Rawdon River "Distance" Survey

<u>REFERENCE POINT</u>	<u>DISTANCE</u>	<u>Total distance from mouth river</u>
1. Mouth of river to lower side of Rawdon bridge	500'	
2. Bridge to trap	95'	595
3. Trap to lower edge "Cameron's fence"	468'	1063
4. Above to rock middle of R.R. embankment	490'	1553
5. Above to apex of turbulator	406'	1959
6. Above to tree at tip of "island"	444'	2403
7. Above to large rounded rock	538'	2941
8. Above to rock at base of old pine tree	543'	3484
9. Above to leaning hemlock	548'	4032
10. Above to lower edge abutment R. R. bridge	363'	4395
11. Above to lower edge dam	<u>500'</u>	4895
	4895' =	1632 yds.

Hence yds. per station (6) = 272 = 816'

<u>SECTION</u>	<u>Distance from mouth river</u>	<u>Distance from numbered ref. point above (latter point in each case)</u>
A	NIL	NIL
B	816'	221' above 2
C	1632'	79' " 4
D	2448'	45' " 6
E	3264'	323' " 7
F	4080'	48' " 9

No. of feet per station in each section = 81'.

## 2. Operation of Large Rawdon smolt trap - 1950

There were no changes in trap construction or methods of trapping this year. As an experiment the trap and main angles for the slat fence were left in position all winter and survived this period very well. Cost of trap installation this year was thusly more than halved.

The trap was in operation from May 2 to Aug. 25th. Daily records were complete and again water height in the river was maintained fairly constant due to the dam and a relatively rainy season.

A summary of fish trapped is as follows:

### SMOLT

The first smolt were taken on the 14th of May. From this date until the 24th May, when smolt counting had to be discontinued due to plugging of the trap with gaspereaux, a total of 92 smolt were trapped. 11 of these were native or wild and 81 were marked by a missing right ventral fin.

During the 25th-29th May the inlet funnel was removed from the trap to allow escape of hundreds of gaspereaux which were constantly backing into the trap in such numbers that they were killing themselves and it was feared the same would happen to the smolt if the small area was kept enclosed. However no fish were permitted to pass on through the trap and down stream so it is felt that few, if any, (i. e. smolt) descended without being counted. Also during this period permission was granted to a reliable local fisherman to dip the gaspereaux from the trap on

the condition that particular care be taken to check for smolt in each dip. Only five smolt were taken on these five days and of these 3 were marked (R.V.) and 2 were wild.

From the 50th May-10th June, 11 smolt and 2 parr were taken - none of these were marked. On the 11th June, 1 marked smolt (L.V. fin missing) was trapped. 4 native smolt and 1 parr were taken during the period 20 June - 22 July and since that date there have been none. 3 of the latter 4 smolt were trapped during the runoff period of a natural freshet.

Totals for the period 29th April- 7 Aug. are:

	<u>MARKED</u>		<u>NATIVE OR WILD</u>	
	<u>ALIVE</u>	<u>DEAD</u>	<u>ALIVE</u>	<u>DEAD</u>
PARR	-	-	3	-
SMOLT	84	1	27	1

Prior to the 5th of June all smolt were taken in the morning whereas from the 5th-11th June all the smolt were taken in the afternoon. The significance of this is not known nor is it clear why, prior to the main gasperaux run, the marked smolt outnumbered the wild by 8:1 and after the main gasperaux run the wild outnumbered the marked approximately 4:1. The one smolt with L. V. fin missing could be one of the fish planted in Grand Lake last summer or one of the fish planted last fall in the Rawdon River but a mistake made in marking.

#### SALMON

Of a total of 8 (the last of which appeared the 9th of June), 4 were tagged, 1 marked (R.V.) and three were native.

They ranged from 25-35 cm. in size.

GASPEREAUX

On the first day of trap operation one gaspereaux was taken in the down trap. The first gaspereaux taken in the up trap was on the fourth of May when a total of six were removed and placed upstream.

From the 4th to the 10th of May incl. a total of 342 gaspereaux were taken in the down trap while the number for the corresponding days taken in the up trap was only 43. The main run began the evening of the 23rd May (lasted until the 27th May) and up to this time our records show that 372 gaspereaux entered the down trap while only 46 entered the up trap.

Hence from the start of trap operation up to the time of the main run, the chief period of gaspereaux movement was between the 4th and 10th of May. During this period the ratio of fish entering the down trap, as against those entering the up trap, was 8:1. Since the number of fish below the trap was always small it is presumed that some gaspereaux had made their way up river prior to installation of the trap and that these fish had not "broken through" the fence.

On the morning of the 24th it was estimated that there were 4000-5000 gaspereaux above the fence and many of these were falling back into the trap. At the same time the up trap was plugged.

Obviously, with so many fish above the trap, many were finding their way through holes in the fence. A temporary patch-

ing job was attempted but to no avail and from the 24th-27th May countless numbers made their way through the fence and on up stream. (It was later determined that the chief reason for so many holes was a result of the stone backing behind the fence not being adequate. Hence small fill placed in front of the fence, then covered with heavy rock, was soon washed away leaving spaces through which gaspereaux could easily make their way).

The up trap was again placed in operation on the 29th May and from this date to 8th June only 32 gaspereaux were trapped. On the 9th June a small increase in ascending fish was noted and between the 9th-12th June 104 gaspereaux were removed. On the morning of the 13th there were no gaspereaux in the up trap although considerably greater numbers below the trap and making their way up river/<sup>than</sup> on previous days. From this it could be concluded that the actual number of fish taken in the up trap on any given day in no way bears any relation to the actual number of fish making their way up river (except during a heavy run). From the 14th-23rd June, 22 gaspereaux were taken, on the 30th June 14 gaspereaux and none since then.

For the down trap, great numbers of gaspereaux fell back into the trap on the 26th and 27th of May - 15 and 10 barrels respectively. On the 28th of May this fell off to 2 barrels and by the 30th only 75 fish. From the 1st-9th June the numbers falling back averaged approximately a barrel a day. Then on June 10th 19 barrels were taken and on the 11th 5 barrels. Number of fish removed for the period 24th May-June 11th = 69 barrels.

for the period 12th - 15th June = 6 barrels

" " " 16th - 20th " = 6 "

" " " 21st June - 22nd July = 9½ barrels

and from August 1st-8th 120 gasperesux. Thus a sum total of approximately 91½ barrels removed from the down trap (600 fish per barrel).

Gaspereaux fry first appeared on August 2nd following the release of a freshet on August 1st. No more fry were seen until August 23 following a natural freshet which began on August 22nd. Fry were seen each day in the trap from August 23 - August 26 (when trapping was discontinued) but not in large numbers.

OTHER FISH

There were only 2 trout this year as against 32 for 1949. Catfish as well descended in small numbers, a total of 10.

Sucker, again, were more numerous than any other fish excluding gasperesux. These fish descended chiefly in May, a total of 1345.

Lamprey eels again appeared well on in June and throughout July, a total of 45. The number (60) of common eels trapped was much lower than last year. This figure is no doubt influenced by the eel removal program though it is interesting to note that even before this program was instigated the number of eels being trapped showed a decrease over last year. Very large eels were taken in the trap following a natural freshet which began Aug. 22 (23x52½ lbs.).

There were also small numbers of white and yellow perch, dace and chub.

The up trap again showed little upstream movement, none after July 10th.

	<u>Sucker</u>	<u>Trout</u>	<u>Smolt</u>	<u>Eel</u>	<u>Lamprey</u>
May	48	-	-	5	-
June	-	11	1 (R.V.)	3	2
July	-	-	1 (R.V.)	-	-

3. Operation of small Rawdon trap

This "up" trap was placed in operation of 2 May and was the same as that operated last year. Again it was seen that this trap showed more upstream movement than the Large Rawdon up trap.

GASPEREAUX

The first gaspereaux taken in the Small Rawdon was on the 3rd of May and between this date and the 24th May only 3 were trapped. A heavy run of ascending fish began the evening of the 24th May and lasted until the night of 25-26th May. At midnight on the 25th the river was teeming with fish but at 9 a. m. the following morning there were no fish in the river. Between the 26th May and 16th June only 6 gaspereaux were taken in this trap and no fish were seen ascending the river.

OTHER FISH

	<u>SUCKER</u>	<u>TROUT</u>	<u>EEL</u>
MAY	59	1	13
JUNE	-	2	1

No fish were taken in the Small Rawdon after 13 June when the water reached a low level and the main flow from the dam was confined to the Large Rawdon.

4. Fletcher trap

The trap was not operated until June 14th (when the main runs of gaspereaux up the fishway were over) and trapping was discontinued on July 15th.

For the month of June, other than a very few gaspereaux passing up and down, only 1 sucker was taken in the up trap and 3 trout, 1 smolt (16 cm.) and 1 sucker in the down trap. In July only 1 salmon (26 cm.) and 3 trout were trapped (18-20 cm.) - these all in the down trap.

In all there was very little fish movement which corresponded with the trapping records for the other rivers.

5. Combined digging effect of freshet and turbulator in Lower Rawdon River

To add to the digging effect of the turbulator placed at the head of a large pool last summer, a short round log (2½' long, 3" in diameter) was attached to the chain at the apex of the turbulator by two pieces of aluminum wire 1' long.

After noting the dimensions of the hole at the apex of the turbulator (3' wide, 4' long, 2' deep) a freshet was released and allowed to run for 1½ hours.

DATA

- a) Water level in front of dam when freshet first released - 3.0'
- b) Water level behind dam when freshet first released - 2.6'
- c) Water level in front of dam before freshet stopped - 2.4'
- d) Water level behind dam before freshet stopped - 2.2'
- e) Average depth of water running through one gate - 2.7'
- f) Width of gate - 4.0'
- g) Number of gates - 9

Hence, VELOCITY of water throughout time of freshet =  $C \sqrt{2g} \sqrt{h} A$

where C = coefficient

g = gravity

h = difference in ht. between a) and b),  
c) and d) above

A = area of water flowing through one gate

$$V = C \sqrt{2g} \sqrt{h} A$$

$$= .9 \times 8.025 \times .548 \times 10.8$$

$$= 42.7 \text{ cfs/gate or } 384.3 \text{ cfs for nine gates.}$$

Since duration of freshet was  $1\frac{1}{2}$  hours then volume of freshet was

$$384.3 \text{ cfs} \times 5400 = 2,075,220 \text{ cu. ft.}$$

Dimensions of digging effect as turbulator following freshet,  
3.2' wide, 7' long and 2.3' deep.

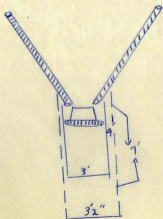
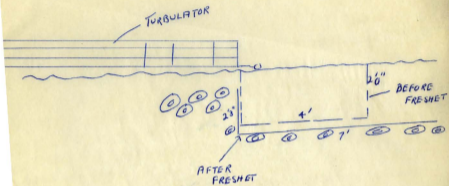
6: Smolt planting in Shubemacadie lake - 1950

To establish a suitably deep area for smolt planting soundings were made in the lake beginning in the middle of the lake off C. Mullins camp and thence proceeding north up the lake. A depth of 40 ft. was not obtained until a point reached approximately 200 yards past Cook's camp. A marker was dropped on a line between a brow above Cook's camp and Grand Lake Village, approximately 500 yards along this line from the west shore.

Three plantings were made as follows:

<u>Date</u>	<u>Time</u>	<u>Kind</u>	<u>Number</u>
June 1	11.00 a.m.	"Sebago"	3,400
" 1	3.00 p.m.	"	3,424
" 2	4.30 p.m.	"Atlantic"	2,360

Due to difficulty experienced in hauling the fish up the lake to this point, it was decided to change the site of planting to Grand Lake Station, off G. Tingley's. From Tingley's wharf five plantings were made at distances ranging from 200-250 yards from said wharf.



<u>Date</u>	<u>Time</u>	<u>Kind</u>	<u>Number</u>
June 9	8.45 a.m.	"Atlantic"	3,176
" 9	9.45 a.m.	"Sebago"	3,670
" 9	11.00 a.m.	"	3,670
" 13	9.00 a.m.	"	3,200
" 13	10.10 a.m.	"	3,200

"Sebago" were marked by removal of left ventral fin and "Atlantic" by removal of right ventral fin. "Sebago" smolts are the offspring of lake or pond-reared salmon. "Atlantic" smolts are offspring of sea salmon.

Supt. Cameron stated that approximately 20 in 1,000 had changed back from the smolt stage to the dark phase and that none were parr.

Smolts seemingly referable to this planting were captured as follows: Upper end of lake - Large Rawdon, down trap, June 11, 1 lacking left ventral; Fletcher down trap, June 15, 1 lacking left ventral; Large Rawdon, up trap, July 10, 1 lacking left ventral. Main part, where planting was made - Chisholm cove, July 13, 1 taken by angling lacking left ventral; Grand Lake Sta., July 2, 1 taken by angling lacking left ventral and 5 "marked" taken by angling. Shubenacadie river - Milford, July "marked" 1, 1/taken by angling according to Inspector Fullerton.