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U.S. SALMON RESEARCH IN THE STATE OF MAINE

by  
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Activities of the Atlantic Sea Run Salmon Commission continue to focus upon management and restoration of existing and former Atlantic salmon streams in the State of Maine. With research to guide the program, restoration of Maine's salmon resources continues. A summary of activities in several of the more important areas of study during 1967 and 1968 is outlined in the following paragraphs.

Tag Recoveries

Tag recoveries in 1967 consisted of 77 from commercial fisheries and 22 from home waters. Forty-one tagged salmon of Maine origin were recovered in subarea I. Of these, 36 were post-smolts and 5 post-kelts. Incomplete recoveries from the 1968 calendar year include 122 tag returns from waters outside United States territorial jurisdiction and 164 from home waters. Recoveries by age groups are listed in Table 1.

Table 1. 1968 Tag Recoveries of Maine Salmon by Age Group.

Age GROUP	Recoveries in home waters	Recoveries outside U.S. territorial waters	Total recoveries
Post-smolt	0	47	47
1+ sea-winter (grilse)	4	8	12
2+ sea-winter (salmon)	126	34	160
Post-kelt (repeat spawners)	34	33	67
All age groups	164	122	286

Tag recoveries by month and I.C.N.A.F. area of recovery are illustrated in Table 2. Figures are for grilse, salmon and post-kelts only, and do not reflect complete recoveries from the Twillingate fishery (Div. 3K) or the autumn West Greenland fishery (Area I).

Table 2. 1968 Tag Recoveries of Maine Salmon by Month and I.C.N.A.F. Area of Recovery.

I.C.N.A.F.

Div.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Unknown	Total
1B					1	1			2	4
1B				1						1
3K		2	2	1			6	1		12
3L	2	1	5	1					2	11
3Pa		7	5	1					3	16
3Pa		1	1							2
4X	4	14	8	2		1				29
Total	6	25	21	6	1	2	6	1	7	75

Sex and Age Composition of Spawning Runs

I.C.N.A.F. research document 67/42 reported preliminary sex and age composition data of the Narraguagus River spawning runs for the period 1962-66. Trapping of a significant portion of the spawning runs of salmon was continued in 1967 and 1968 to augment previous work. As in other years, the data is of native stock only. A summary of the age and sex composition for the seven-year period 1962-68 is presented in Tables 3 and 4. For a more detailed explanation of the 1962-66 data, see I.C.N.A.F. research document 67/42.

Table 3. Age Class Composition of Narraguagus River Spawning Runs, 1962-68.

	<u>Year</u>	<u>1967</u>	<u>1968</u>	<u>Total</u> <u>1962-68</u>	<u>Percentage of</u> <u>total 1962-68</u>
Number of fish		279	185	1559	100.0
M 1 sea-winter		4	2	19	1.2
A F					
I I 2 sea-winter		242	161	1367	87.7
D S					
E H 3 sea-winter		18	5	42	2.7
N					
% Maiden fish		94.6	90.8		91.6
					(range 86.7-94.9)
S 2nd run		14	13	114	7.3
RP					
EA 3rd run		1	3	16	1.0
PW					
EN 4th run		0	1	1	0.1
AE					
TR % Repeat spawners		5.4	9.2		8.4
S					
					(range 5.1-13.3)
S 2 year		222	155	1288	82.6
MA					
OG 3 year		57	30	271	17.4
IE					
T % 2 year		79.6	83.8		82.6
					(range 75.8-86.8)

Table 4. Composition of Narraguagus River Spawning Runs by Sex, 1962-68.

	<u>Year</u>	<u>1967</u>	<u>1968</u>	<u>Total</u> <u>1962-68</u>	<u>Mean</u> <u>1962-68</u>
Total no. of fish sexed		263	177	1341	192
					(range 137-263)
Male		124	68	553	79
Female		139	109	788	113
% Male		47.2	38.4	-	41.2
					(range 35.3-47.2)
Ratio M:F		1:1.12	1:1.60		1:1.43
					(range 1:1.12-1:1.83)

The addition of the 1967-68 data did not significantly alter the 1962-66 findings. Differences in the sex and age composition of the 1967-68 Narraguagus River spawning runs were due to normal yearly fluctuations and appear to be consistent with the long term trend. The total number of salmon ascending the river from year to year is, of course, a different matter altogether.

#### Timing of Upstream Migration of Native Stock

During the period 1962-66, a total of 756 2 sea-winter native salmon were tagged at the Cherryfield dam on the Narraguagus River. This represents approximately 84% of the total trap catch for the period. Timing of upstream migration was quite variable from year to year, although long-term trends are becoming evident. Cumulative trap catch by 5-day periods is shown in Figure 1.

An average of 67.5% of the spawning runs was completed by July 31, during the 7-year period 1962-68. Yearly figures ranged from 50.3% in 1965 to 81.4% in 1962. These are minimal estimates due to the fact that salmon may pass over the dam rather than into the fishway trap during high spring flows. Preliminary work attempting to correlate trap catch with river discharge and temperature failed to show a statistically significant correlation, although a weak relationship apparently does exist. Work in this area will continue in 1969.

#### Restoration Activities

Penobscot River. The Great Works and Milford dam fishways were completed in 1968, while construction was started at the Bangor and Veazie dams. These two fishways are scheduled for completion in 1969. Bright salmon were angled at the Bangor salmon pool for the first time since 1955. A total of 13 salmon were angled in July of 1968.

St. Croix River. In 1968, alewives (*Alosa pseudoharengus*) utilized the fishways and successfully spawned in Spednic Lake. Pollution abatement facilities are scheduled to be in operation by late 1969. Smolt stocking of this river to hasten restoration continues.

Machias River. Extensive repairs to the Whitneyville fishway were completed in 1968. All adults are tagged as they ascend the river. A creel census and biological data obtained through tagging provide information on age class composition and sex ratio of adults.

Sheepscot River. Construction of a thermo-nuclear plant on the estuary began in 1968. A two-year study prior to operation of this facility is scheduled to commence in 1969.

Narraguagus River. A water control structure was completed on the East Branch of the River in 1968. This structure is expected to provide an additional 2000 acre-feet of water to supplement flows on nursery areas. It is hoped a similar structure will be constructed on the West Branch in 1969.

#### Miscellaneous Activities

Through 1968, smolt tag recoveries from stomachs and nesting colonies of the double-crested cormorant, *Phalacrocorax a. auritus*, in the Machias Bay area total 6,081. Known tag losses from one tag series alone exceeds 10%. Chi-square analysis of smolt losses to this predator revealed that all size classes of stocked fish were preyed upon in direct proportion to their abundance.

Tagging studies are continuing; a total of 76,600 tagged smolts were stocked in the spring of 1968, with an additional 77,000 scheduled for release in the spring of 1969. Preliminary data suggests a higher survival of two-year-old hatchery-reared smolts, and that fish must exceed 18 centimeters in total length to provide optimum returns. Additional data taken in 1969 is expected to supplement these findings.

Literature Cited

Meister, A. L. and R. E. Cutting. 1967. A preliminary report of the composition of the spawning runs of Atlantic salmon (Salmo salar) in Maine rivers for period 1962-66. I.C.N.A.F. Res. Doc. 67/42.

Figure 1. Cumulative Trap Catch of Two Sea-winter, Native Salmon, Narraguagus River, 1962-1966.

