

Brokaw (1988)

ACADIA NATIONAL PARK
RESOURCE MANAGEMENT DIVISION

JOB NO. F-104
LONG POND SALMON MANAGEMENT
PROGRESS REPORT NO. 1 (1987)

ABSTRACT

Long Pond was creel-surveyed during the 1987 ice fishing season to collect data on the salmon fishery. This pond provides one of the most consistent salmon fisheries in Region C. During the season, an estimated 627 ± 255 anglers caught an estimated 231 ± 116 legal salmon of which approximately 169 ± 68 were harvested. Salmon fishing was "good", as the average catch rate of 0.35 legal salmon/angler easily exceeded the statewide average of 0.22. Of the 42 salmon observed in the sample, 3 (7%) were native fish, 32 (76%) were age III hatchery fish, 4 (10%) were age II hatchery fish, two (5%) were age IV hatchery fish, and one (2%) was an age V hatchery fish. Salmon averaged 436 ± 6 mm (17.2 in) in length and 715 ± 31 g (1 lb, 9 oz) in weight with a mean "K" of 0.85 ± 0.02 . Salmon stocked in 1985 produced an estimated return to anglers of 21.4% as age III fish, which is considered very good.

As would be expected in an oligotrophic lake, pickerel fishing was "poor". Fishermen caught only 0.06 pickerel/angler which averaged 453 ± 21 mm (17.8 in) in length and 595 ± 83 g (1 lb, 5 oz) in weight. Because suitable habitat is scarce, pickerel are not abundant and do not significantly influence survival of stocked salmon.

It is recommended that one more sport fishery survey be conducted during the 1989 ice fishing season to collect additional information on the characteristics of the salmon fishery in this popular water which receives moderate to heavy angling pressure during both the ice fishing and open water seasons.

INTRODUCTION

Long Pond is a 363-ha (897-acre), clear-water, oligotrophic pond located in the townships of Mount Desert and Southwest Harbor in Hancock County. Maximum and mean depths are 37m (120 ft) and 12m (39 ft), respectively. Species present include:

<u>Common Name</u>	<u>Scientific Name</u>
Landlocked salmon	<u>Salmo salar</u>
Brook trout	<u>Salvelinus fontinalis</u>
Smallmouth bass	<u>Micropterus dolomieu</u>
Chain pickerel	<u>Esox niger</u>
Rainbow smelt	<u>Osmerus mordax</u>
Alewife	<u>Alosa pseudoharengus</u>
American eel	<u>Anguilla rostrata</u>
White sucker	<u>Catostomus commersoni</u>
Golden shiner	<u>Notemigonus crysoleucas</u>
Redbelly dace	<u>Phoxinus eos</u>
Banded killifish	<u>Fundulus diaphanus</u>
Threespine stickleback	<u>Gasterosteus aculeatus</u>

The pond is heavily utilized in the summer by people who enjoy boating, canoeing, sailboating, swimming, and water skiing. A degree of competition/conflict exists between fishermen and these other recreationists. Approximately 60% of the shoreline lies within Acadia National Park, and the remainder is moderately to heavily developed with camps and year-round residences.

Because native salmon produced in the outlet typically account for only 5-9% of the catch, the fishery is maintained largely through annual stockings of fin-clipped hatchery-reared salmon planted at rates of 0.67-0.84 spring yearlings per acre. Smelt and juvenile anadromous alewives provide the principal forage species for salmon. Long Pond was the site of an important long-term intensive study conducted from the mid 1950's through the early 1970's by fishery biologist Keith Havey (retired). Havey's work, which focused on the quality of the fisheries produced by different salmon stocking densities, had important statewide implications for management of landlocked salmon. The results of this study are presented in the report "Stocking Density in Relation to Growth and Yield of Atlantic Salmon (Salmo salar) at Long Pond, Maine" published in 1978. One of Havey's key findings was that salmon stocking rates should not exceed 0.40/ha (1 per acre) for optimum growth and yield.

Long Pond is not noted for either its smallmouth bass or pickerel fisheries. The pond contains several areas of

good habitat for both juvenile and adult bass. While it produces a few larger bass in the 900-1350g (2-3 pound) range, the bulk of the fishery is for 200-250mm (8-10 in) fish, with relatively few fish exceeding 280mm (11 in) in length. The scarcity of good quality pickerel habitat limits abundance of this species, but the pond occasionally produces some large pickerel which weigh from 1575-2025g (3 1/2-4 1/2 lbs). There are no minimum length or daily bag limits on bass and pickerel.

MATERIALS AND METHODS

An intensive sport fishery creel survey was conducted during the 1987 ice fishing season to collect data on the characteristics of the salmon fishery. The pond was checked by a fishery biologist on 11 weekend days and 12 weekdays. Most of the lake could be safely fished throughout the entire season from January 1 - March 31. Postcards were routinely distributed to parties to increase the percentage of completed-trip data in the survey sample. This random stratified survey was sufficiently intensive to permit the calculation of seasonal estimates of total angling pressure and catch in accordance with the standard techniques described by K. A. Havey (1984).

RESULTS

A total of 181 anglers (78 angler parties) was interviewed during the season. Good cooperation from anglers in returning postcards helped achieve completed-trip data from 40 (51%) of the parties.

The salmon fishery was "good" as anglers caught salmon at the rate of 0.35 legal fish/angler, which exceeds the average statewide winter catch rate of 0.22 (DeSandre 1986). Because anglers released a surprisingly high 24% of the legal fish they caught, the harvest rate was 0.27 legal salmon/angler. About 27% of fishermen were successful in catching a legal salmon which averaged 436 ± 6 mm (17.2 in) in length and 715 ± 31 g (1 lb, 9 oz) in weight (Table 2). On the average, the salmon creeled by anglers were somewhat longer than the statewide average of 427mm (16.8 in), but somewhat lighter than the statewide average of 772g (1 lb, 11oz). Anglers had to fish for 16.4 hours to catch a legal salmon, most of which were in satisfactory condition as indicated by their mean "K" of $0.85 \pm .02$.

Of the 42 salmon observed in the survey, 32 (76%) were age III hatchery fish, 4 (10%) were age II hatchery fish, 3 (7%) were native fish, 2 (5%) were age IV hatchery fish, and one (2%) was an age V hatchery fish. Age III ("Ad" fin clip) hatchery-reared salmon, which routinely account for

the bulk of the winter catch in Region C salmon fisheries, averaged 432 ± 3 mm (17.0 in) in length and 686 ± 19 g (1 lb, 8 oz) in weight with a mean "K" of 0.85 ± 0.01 . Age II ("LV" fin clip) hatchery-reared salmon averaged 375 ± 3 mm (14.8 in) in length and 410 ± 11 g (14 oz) in weight. Sub-legal salmon comprised approximately 17% of the reported catch. The largest salmon recorded in the survey sample weighed 1,220 g (2 lbs, 11 oz).

Anglers caught pickerel at the rate of 0.06 fish/angler which is typical for an oligotrophic water where a salmonid is the principal sportfish and a warmwater species is of secondary importance. Only 4% of anglers were successful in catching a pickerel which averaged 453 ± 21 mm (17.8 in) in length and 595 ± 83 g (1 lb, 5 oz) in weight. The largest pickerel recorded in the survey weighed 1,000 g (2 lbs, 3 oz).

DISCUSSION

Long Pond was selected for a winter sport fishery creel survey for two primary reasons: 1) angler reports indicated that the pond had provided "good" salmon fishing in 1985-86, and we wished to quantify fishing quality, and 2) a survey would allow us to compare current fishing quality with that which existed in the late 1960's-early 1970's as documented by K. A. Havey and C. Leslie Smith. Because the chance to compare reliable data collected "today" vs that obtained 15-20 years ago on the same pond is all too infrequent, we took advantage of this opportunity to do so.

As is the case with many Maine salmon waters, age II and III hatchery-reared salmon provided the bulk of the fishery, comprising 86% of the harvest of salmon. Fishing pressure, categorized as moderate to heavy in both the ice fishing and open water season, is sufficiently high to harvest most salmon prior to age IV. An interesting (and highly atypical) finding was that anglers released 24% of the legal salmon they caught. This release rate is the highest, by far, documented to date in Region C winter creel surveys. Most of the legal salmon released were fast-growing 355 - 380 mm (14-15 in) age II fish.

Age III hatchery-reared salmon yielded very good returns to fishermen during the season. Of the 600 spring yearling (SY) salmon stocked on May 14, 1985, ice fishermen harvested an estimated 128 which represents a return of 21.4%. This return rate for age III salmon is one of the best documented in Region C. Likewise, the mean length (432 ± 3 mm) (17.0 in) attained by these fish compares favorably to mean lengths recorded for same-age salmon on other regional waters.

We annually receive a good quantity of voluntary data from Long Pond fishermen. By using Havey's model for predicting open water catch from the observed winter catch at Long Pond, coupled with the 1987 voluntary open water data, an approximation of the summer catch of age III+ salmon can be obtained. This calculation indicates that approximately 25-35 age III+ salmon were harvested during the open water season. By combining the estimated winter harvest of 128 with the approximate open water harvest of 30, we arrive at an estimated total harvest of 158 age III salmon, which is equivalent to a 26% return. Furthermore, our voluntary records reveal that substantial numbers of this cohort were harvested as age II+ fish during the 1986 open water season, especially in August and September. With the "meaningful" harvest at age II+, the substantial harvest at age III-III+, and the additional small harvest at ages IV-V, it is likely that the total return to anglers from the 600 salmon stocked in May, 1985 will approximate 40-48%. Returns of this magnitude are considered to be very satisfactory.

Mean condition factor ($0.85 \pm .01$) of age III salmon is at the lower end of the "satisfactory" range. Indications are that the 1985 stocking rate (0.67 SY's/acre) was an appropriate one in that it produced a salmon population which was "barely" in balance with available forage supply. The data suggest that if a higher (in excess of 600 SY's) stocking rate had been used in 1985, it likely would have produced relatively thin salmon in unsatisfactory condition during the season.

It is instructive to compare some of the 1987 survey results with those of the late 1960's-early 1970's. One of the comparisons clearly substantiates the Fishery Division's findings that salmon stocked in the 1980's display considerably higher survival rates than their counterparts of 15-20 years ago. The estimated return of age III salmon to ice fishermen in 1987 easily exceeded returns of same-age fish for the 1967-71 period (Table 3). The relatively superior return exhibited by the salmon stocked in 1985 is probably even more pronounced in that the 1987 estimated return likely understates the actual return, because the clerk did not spend most of the day at the pond as was routinely the case for the earlier survey period. For the ice fishing and open water seasons combined, age III salmon caught in 1987 provided an estimated return second only to the salmon caught in 1967 (Table 3).

Major factors contributing to the enhanced survival of the present-day, hatchery-reared salmon (vis a vis its counterparts of 15-20 years ago) is the increased size and healthy condition at time of stocking. The cohort stocked

in 1985 had, on average, at least a 20mm (0.8 in) advantage in length when planted compared with the cohorts stocked from 1965-69 (Table 3).

The 1987 survey provided us with a rare opportunity to compare current salmon fishing quality with that existing 15-20 years ago. Key parameters of the 1967-71 and 1987 winter fisheries are listed in Table 4. Indications are that the current level of ice fishing pressure is approximately 2 1/2 times that of the earlier period. The ice fishing season presently extends for 3 months vs 2 months during the 1967-71 period.

The 1967-69 fisheries were provided largely from stockings of $\pm 1,000$ FY's while the 1970-71 fisheries resulted principally from stockings of $\pm 1,500$ FY's. The 1987 fishery was provided largely through a stocking of 600 SY's. The 1987 salmon catch rate was very similar to the 1968-70 rates, but was substantially lower than both the 1967 and 1971 rates when salmon fishing was very good (Table 4). The 5-year mean catch rate for the 1967-71 period was 0.45 salmon/angler; thus, indications are that the current salmon catch rate has declined approximately $\pm 25\%$. While such a decrease is indeed "quite substantial", the magnitude of the decline is not nearly as serious as perceived by some who refer to the "much better" salmon fishing of the late 1960's and early 1970's.

The other major component of fishing quality, average size of fish harvested, was examined for the early period and 1987. Mean length ($436 \pm 6\text{mm}$) (17.2 in) of salmon harvested in 1987 exceeded those recorded for 3 of the 5 earlier years. The 5-year mean length of salmon for the 1967-71 period was $429 \pm 9\text{mm}$, (16.9 in), so the average salmon harvested in 1987 was approximately 7mm (1/4 in) longer than the typical salmon harvested 15-20 years ago. Mean weight ($715 \pm 31\text{g}$) of salmon harvested in 1987 exceeded the mean for 2 of the 5 earlier years. The 5-year mean weight of salmon harvested from 1967-71 was $762 \pm 48\text{g}$, (1 lb, 11oz), so the average salmon harvested in 1987 was approximately 47g (2oz) lighter. Accordingly, the salmon caught in the 1967-71 period were generally in better condition than the salmon caught in 1987. The difference between the salmon fisheries of the 1967-71 period and the 1987 salmon fishery can be broadly summarized as follows: In 1987, ice fishermen caught salmon which were comparable in size to those caught in 1967-71, but their catch rate (success) was approximately 25% lower. With regard to the different stocking densities, it can be said that a stocking of 600 SY salmon in 1985 produced a fishery with similar-size salmon but a reduced catch rate ($\pm 25\%$ lower) compared with the fisheries produced from stockings of 1,000-1,500 FY salmon in 1965-69. Such a

decline in fishing quality is not considered to be "too serious" in view of the fact that fishing pressure in 1987 was approximately 2 1/2 times higher than that documented in the earlier period.

In recent years, anglers have sent in several petitions to the Department requesting an introductory togue stocking program at Long Pond. The petitioners believe that the pond contains several areas of good quality togue spawning habitat which provide the potential to establish a self-sustaining togue population at some future date. SCUBA diving/snorkeling conducted by biologists confirmed the presence of some potentially suitable togue spawning habitat. Despite this, we have strongly recommended against an introduction of togue believing that such an initiative would seriously jeopardize the noteworthy stability of the salmon fishery by placing additional pressure on the pond's critically important smelt population. The 1987 survey data support the legitimacy of this concern. The data revealed that annual plantings of 600-750 SY salmon in recent years impacted smelt/alewife populations to the extent that forage levels were barely adequate to produce salmon in satisfactory condition (K of 0.85). It is reasonably certain that if togue had been introduced into Long Pond, these additional efficient smelt predators would have undoubtedly reduced supplies of available forage for salmon with the concomitant effect of reducing salmon condition. The data indicate that there would be a high risk level inherent with an introduction of togue. In the case of Long Pond, which supports a good salmon fishery in most years, it simply is not worth the risk, especially in view of the fact that two other waters (Eagle Lake and Jordan Pond) on Mount Desert Island provide anglers with the opportunity to fish for togue.

RECOMMENDATIONS

1. Results from the 1987 survey suggest that an annual stocking rate of approximately 600-750 SY salmon is most appropriate. When smelts are especially abundant, from 900-1,000 SY's may be stocked, and conversely, when smelts are relatively scarce, approximately 400-450 SY's may be stocked.
2. One more intensive winter sport fishery creel survey should be conducted in 1989 to collect data on the characteristics of the salmon fishery provided by stockings of 750 SY's. Additionally, a second year of data would be most helpful in assessing the relative quality of the present-day salmon fishery vs that of the 1967-71 period.

3. No togue (or any other salmonid such as brown trout, rainbow trout, or splake) should be introduced because of the undesirable additional pressure on the forage base which would inevitably result.

ACKNOWLEDGEMENTS

The author wishes to thank Conservation Aide Gregory Burr who conducted the sport fishery creel survey in a very capable and conscientious manner. Sincere gratitude is also extended to those cooperating anglers who kept valuable records of their fishing trips on Long Pond in recent years.

Prepared by: Ronald Brokaw, March, 1988

REFERENCES

- DeSandre, R. A. 1986. Landlocked Salmon Management Plan.
IN Planning for Maine's Inland Fish and Wildlife.
Vol. II. Inland Fisheries. Part I. Species Assessments
and Strategic Plans. 445 pp.
- Havey, K. A. 1978. Stocking Density in Relation to Growth
and Yield of Atlantic Salmon (Salmon salar) at Long Pond,
Maine. 30pp.

CREEL CENSUS DESCRIPTION

Table: 1Season: Ice FishingWater censused: Long Pond Acres: 897 Miles: Water type: Oligotrophic Town: Mt.Desert, SW County: Hancock
HarborPrincipal Fisheries: Salmon, pickerel

Year	Date	No. days censused	No. days in season	Clerk	Vol.	Other
1987	Jan. 1 - March 29	23	90	X		
19						
19						
19						
19						
19						
	Stocking History		Mark or Clip	Regulation History		
1986	Salmon 750 SY		LV	General Law		
1985	Salmon 600 SY		Ad	" "		
1984	Salmon 540 SY		RV	" "		
1983	Salmon 600 SY		BV	" "		
19						
19						
REMARKS:						

CREEL CENSUS SUMMARY

10.

Table: 2

Season: Ice Fishing

Water: Long Pond

Acres: 897

Miles:

Town: Mt.Desert, SW Harbor

County: Hancock

Region: C

Principal Fisheries: Landlocked salmon, pickerel

Census Method: Clerk, stratified random

CENSUS YEAR

Statistics	Species	1987	19	19	19	19
No. anglers censused		181				
No. angler hours censused		1,030.75				
No. anglers (and %) successful in catching a legal fish	Salmon	49 (27)				
	Pickerel	7 (4)				
No. legal fish kept	Salmon	48				
	Pickerel	11				
No. legal fish released	Salmon	15				
	Pickerel	0				
No. (and %) "short" fish released	Salmon	13 (17)				
	Pickerel	-				
No. legal fish per angler (only those kept)	Salmon	0.27				
	Pickerel	0.06				

(OVER)

Table 3. Returns of Age III salmon to anglers at Long Pond, 1967-71, 1987.

<u>Survey year</u>	<u>No. of salmon stocked and (year)</u>	<u>Mark</u>	<u>Mean Length (mm) of salmon when stocked</u>	<u>Estimated return (%) in ice fishing season</u>	<u>Estimated return (%) for both ice fishing & open water season</u>
1967	1,010 - (1965)	Ad & LV	178	12.6	32.1
1968	1,015 - (1966)	BV	157	6.8	16.8
1969	1,007 - (1967)	Ad & RV	140	1.7	4.2
1970	1,529 - (1968)	Dorsal	175	4.0	11.3
1971	1,500 - (1969)	RP	170	4.4	11.0
1987	600 - (1985)	Ad	198	21.4	26.2 ^a ✓

Remarks: It should be emphasized that the 1987 estimate represents a minimum one in that the survey clerk did not spend most of the day at the pond as was routinely done in the 1967-71 period.

✓^aNo clerk survey in 1987 open water season - estimate derived from model and voluntary survey data -
See "Discussion" section.

Table 4. Various parameters of the winter salmon fisheries at Long Pond; 1967-71, 1987

Year	Estimated no. of angler days	Estimated catch	Legal salmon per angler	Mean length of angled salmon(mm)	Mean weight of angled salmon(g)
1967	238 $\pm$ 32	127 $\pm$ 14	0.53	432 $\pm$ 5	728 $\pm$ 28
1968	275 $\pm$ 42	109 $\pm$ 7	0.40	447 $\pm$ 8	957 $\pm$ 56
1969	167 $\pm$ 45	51 $\pm$ 15	0.31	465 $\pm$ 13	997 $\pm$ 84
1970	254 $\pm$ 48	83 $\pm$ 16	0.32	414 $\pm$ 10	709 $\pm$ 56
1971	299 $\pm$ 62	179 $\pm$ 44	0.60	406 $\pm$ 5	625 $\pm$ 28
5-year mean	247	110	0.45	429	762
1987	627 $\pm$ 255	219 $\pm$ 110	0.35	436 $\pm$ 6	715 $\pm$ 31

Note: 2-month season in 1967-71 and 3-month season in 1987

COOPERATIVE STATE/FEDERAL PROJECT

This report has been funded in part by the Federal Aid in Sport Fish Restoration Program. This is a cooperative effort involving federal and state government agencies. The program is designed to increase sport fishing and boating opportunities through the wise investment of anglers' and boaters' tax dollars in state sport fishery projects. This program which was founded in 1950 was named the Dingell-Johnson Act in recognition of the congressmen who spearheaded this effort. In 1984 this Act was amended thru the Wallop-Breaux Amendment (also named for the congressional sponsors) and provided a threefold increase in Federal monies for sportfish restoration, aquatic education and motorboat access.

The Program is an outstanding example of a "user pays - user benefits", or "user fee" program. In this case, anglers and boaters are the users. Briefly, anglers and boaters are responsible for payment of fishing tackle excise taxes, motorboat fuel taxes, and import duties on tackle and boats. These monies are collected by the sport fishing industry, deposited in the Department of Treasury, and are allocated the year following collection to state fishery agencies for sport fisheries and boating access projects. Generally, each project must be evaluated and approved by the U.S. Fish and Wildlife Service (USFWS). The benefits provided by these projects to users complete the cycle between "user pays - user benefits".