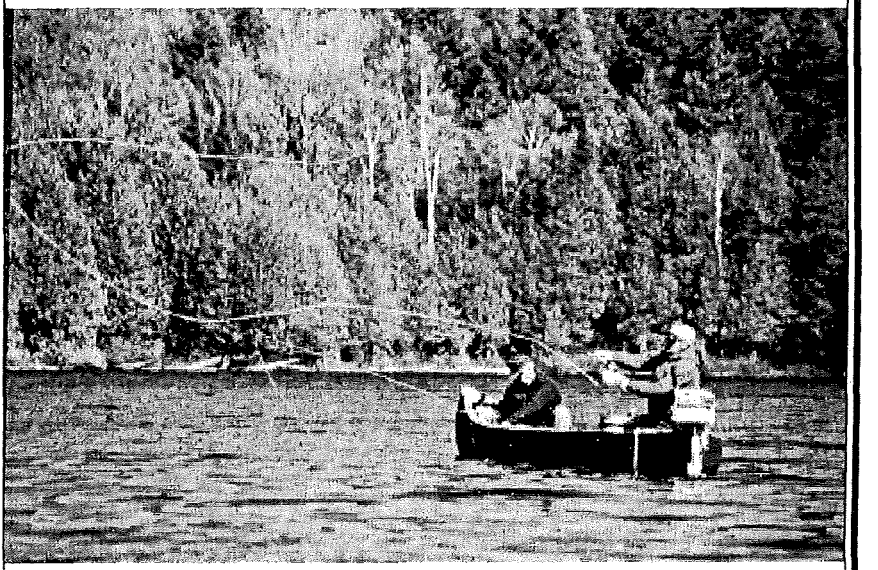
Maine Department of Inland Fisheries and Wildlife

Lee E. Perry, Commissioner

Fisheries Research & Management Report 2000



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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 opportunites through the wise investment of anglers' and boaters' tax dollars in state sport fishery projects. This program which was funded in 1950 was named the Dingell-Johnson Act in recognition of the congressmen who spearheaded this effort. In 1984 this act was amended through 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".

Introduction

This is the first in an annual series of Fisheries Research and Management reports. The report includes a summary of some of our management activities in each of our seven fishery regions. The report format was purposely left open to allow each fishery biologist the opportunity to highlight some of their work in a less technical writing style.

In addition to regional reports there are summaries of some of our more specific studies on Sebago Lake, the Rapid River & Aziscohos Lake, a Baxter Park Angler Survey, eel research and several important brook trout studies.

In the future we hope to have an even more comprehensive report including an update on our next 15-year Fisheries Plan and some important information on Maine's Fish Culture Program.

Let us know if you find the report of interest to you.

Peter Bourque, Director
Fisheries & Hatcheries Division

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Table of Contents

Printed under appropriation 010-09A-8200-012

Sebago Lake Region (A)

Public Access Public boat access has been identified as a high priority fisheries management issue in Region A, and over a dozen boat access issues were investigated in 1999. Below is a brief description of a few of these initiatives:

Square Pond (Acton): MDIFW purchased a property located off West Shore Drive on Stiles Brook to provide trailered boat access for small and medium sized boats.

Sebago Lake (Standish): The Portland Water District (PWD) submitted a bill (LD 1810) to relocate the existing Standish Town boat ramp. The basis for this legislation was the concern for potential gasoline contamination from motorized boats, but the bill was subsequently withdrawn.

Thompson Lake (Poland /Oxford): MDIFW purchased property located along the west shore of Potash Cove for the development of a public boat access. Some lake front property owners have organized to oppose our efforts with concerns, which are similar to those expressed at other launch sites developed in southern/central Maine. Additional information forums will be scheduled to encourage further dialogue between MDIFW and concerned interest groups. Facility construction is anticipated for the year 2001.

Crescent Lake (Raymond): MDIFW provided several concrete ramp panels for replacement at the existing Town-owned ramp located off Route 85.

Trickey Pond (Naples): MDIFW has been working with the Town of Naples to develop a small public boat launch on Town property located off Route 11/114. Our proposal was well received at a public informational meeting and the Town voted to support the public access project. Launch construction is scheduled to be completed by the fall of 2000.

Rachael Carson Refuge: The Rachael Carson Refuge complex encompasses coastal estuarine properties on most major rivers south of the Spurwink River. However, these public lands have not all been open to anglers under the current use management plan. The existing plan is in the process of begin revised, and MDIFW has expressed concerns over the limited angler access provisions and has requested substantial changes.

Sokokis Lake (Limerick): An undeveloped lot adjacent to Route 11 was recently purchased by MDIFW for public boat access. Except of the installation of a small ramp, few site improvements are planned.

Thomas Pond (Casco): The traditional public access site located on Route 302 was purchased by MDIFW. Minimal site improvements are planned, but low cost opportunities to enhance parking may be explored in the future.

Special Project

Region A fisheries personnel have been working on a stream inventory project of over a decade. During the summer months we sampled one to two sections of most streams within a town, and when one town is complete we proceed to another. During our investigation we collect basic water quality (i.e. ph, temp., alkalinity) and stream morphology data (i.e. substrate, stream channel description, pool depths). The fisheries of each stream are also sampled with electrofishing gear to gather information on species composition, relative abundance, and fish size. In addition, any environmental issues such as erosion, bank stability, and road crossings that impede fish passage are also noted. In 1999, we sampled approximately 100 streams and completed the inventory for all of the towns in York, Cumberland, and Androscoggin Counties. Next summer, we plan to focus our efforts on town located in Oxford County, and we expect this sampling to take at least several years to complete. Ultimately, our goal is to collect baseline date for the majority of streams throughout our region to aid us with resource management decisions. This stream inventory has already proven to be quite useful and we routinely access the data. However, the paper files limit the usability of the information and we recently developed a computerized database to allow more efficient and better utilization of our stream inventory data.

Landlocked Salmon

Thompson Lake (Poland/Oxford) The salmon fishery, which has been exceptional the last few years, began to show signs of a growth problem in the spring of 1999 and stocking rates were reduced by 1/3. Fortunately, by fall salmon condition improved, likely the result of a good smelt run this spring. New regulations will be adopted to encourage more winter use directed at increasing the harvest of wild lake trout to reduce predation pressures on the smelt population.

Kezar Lake (Lovell) Angler reports of poor salmon fishing lead us to conduct a complete winter census on Kezar. Landlocked salmon fishing was very slow, but up to a dozen salmon between 5 and 8 pounds were take from Kezar. Angler use appears to be light and not responsible for

the decline in the salmon fishery. Investigations will continue in an effort to identify the cause for the apparent reduction in salmon abundance.

Moose Pond (Bridgton) The landlocked salmon fishery at Moose Pond has been relatively poor over the past few years due to a decline in the smelt population, which began rebounding about a year ago. Winter use at Moose Pond was relatively light this year, but many anglers were surprised by the good landlocked salmon fishing. Several anglers caught fish up to 3 lb., but many of the fish were sub-legals in the 14-15 inch size range and in excellent condition.

Little Ossipee Lake (Waterboro) An excellent hook and line smelt fishery developed this past winter and a good spawning run this spring suggest the smelt population is well on its way to recovery. The development of an abundant smelt population will support our long term goal of rebuilding this salmon fishery.

Brook Trout

In the fall of 1998, we reclaimed Overset Pond (Greenwood), and over the next several years we plan to evaluate the success of our spring yearling brook trout stocking program. Initial fall sampling results are very encouraging, with trout averaging 12 to 14 inches long and over a pound in weight. We had intended to reclaim Cushman Pond (Sumner) and Spicer Pond (Shapleigh) in the fall, but were faced with some issues that caused us to cancel those plans. We are currently investigating the potential for reclaiming one or two small trout ponds in Oxford County in 2000.

Lake Trout

Kezar Lake (Lovell): Winter fishing was good for togue, and several anglers reported catches of fish between 4 and 8 lbs. Reports from local anglers and wardens, and stomach analysis indicates that Kezar's forage populations of smelt and landlocked alewives appear to be doing well.

Auburn Lake (Auburn): This metropolitan lake consistently produces excellent togue fishing. The lake is closed to winter fishing and about 40% of the lake is closed to fishing at the request of the water district. This is one of the few lakes where anglers anchor and "still fish" or "plug fish" for lake trout.

Thompson Lake (Poland/Oxford): Good catches of lake trout were caught by winter anglers, particularly those willing to work a "jig". Most togue caught were 17 to 23 inches long, but a couple of fish weighed up to 8 lbs. Summer anglers reported slow fishing for togue. New regulations were adopted in an effort to increase the harvest of togue and to improve

size quality. These regulations allow anglers to keep two togue, with a minimum length of 14 inches, but only one fish may exceed 18 inches.

Great East Lake (Acton): Good catches of healthy looking lake trout were reported this past winter. Lake trout size quality should continue to improve in the presence of a building smelt population and liberalized fishing regulations.

Brown Trout

Many small streams along southern coastal Maine produce a few sea-run-brook trout and brown trout each year, but angling opportunities for these fish are very limited. Throughout the 1970's and 1980's, we attempted to create a sea-run brown trout fisheries at the Royal River in Yarmouth and the Ogunquit River in Wells. Poor returns forced the termination of the Royal River program, but the Ogunquit River has continued to produce a fishery. In an effort to increase fishing opportunities, including late season angling, we have expanded the sea-run program by stocking larger/older brown trout, stocking in the fall, and stocking additional waters. Stocking larger fish in the fall has resulted in increased returns to the angler. This fall the following coastal waters were stocked: Ogunquit River, York River, Scarborough Marsh, Royal River, Spurwink River, Mousam River, and Androscoggin River.

The sea-run fishery is dominated by 12-15 inch trout, but fish in the 16-22 inch range have also been taken. Catches of 10-20 trout per trip are not uncommon. Spin fishermen have been successful using small lead-headed jigs and small spinners, while fly fishermen, have had success with small shrimp/nylon patterns and small streamers. Small nymphs on either a floating or sink tip fly line seem to be most effective in the spring, but anglers should watch for hatches of caddis flies. At those times, dry flies such as a small caddis (size 14-16) work very well. The best tides seem to be the last few hours of the outgoing or the first two hours of the incoming. Fishing in the tidal portions of these waters is permitted year round, but anglers should be aware that general length (12 inches) and bag (2 fish) limits still apply. There are no terminal tackle restrictions.

Splake

Splake have been stocked in a dozen Region A waters where lake trout , salmon, and brook trout have failed to provide a desirable fishery. All 12 splake waters were assessed this summer to evaluate growth, age class, distribution, and relative abundance. A more careful explanation of habitat suitability was also investigated. Existing information from past creel surveys was combined with this new data to provide a basis for the following findings and management recommendations. Most winter splake fisheries are comprised of 2 and 3 year old fish; splake older than

age 4 are uncommon; age 2 splake average 14.6 inches in length and weigh 1.2 pounds; age 3 splake average 17.3 inches in length and weigh 2 pounds. Splake performance has been good on a few waters, but has not been consistent from year to year and additional work will be needed to address this inconsistent performance. No new introductions are planned until this issue has been addressed. In addition, splake will no longer be stocked in Highland Lake (Windham) due to poor returns and unsuitable water quality. Splake stocking will also be discontinued at Trout Pond (Stoneham), because public access and existing regulations limit the splake harvest.

Rainbow Trout

In the fall of 1997, the Fisheries and Hatcheries Division formed a committee to investigate the possibility of initiating a rainbow stocking program. Committee meetings continued through 1999 when it was determined that an experimental program would be initiated on a few waters in southern and central Maine. The performance of stocked rainbows will be carefully monitored to determine if they provide any advantages over brook trout and brown trout. Rainbow trout eggs arrived from the Erwin National Fish Hatchery in Tennessee in December of 1999, and spring/fall yearling rainbows are scheduled to be stocked into study waters in 2001.

Bass

Region A continues to work with other fisheries management regions in a coordinated effort to address bass management needs in Maine. There are two ongoing statewide bass projects designed to:

(1) understand the relationship between bass size at the end of their first growing season, overwinter mortality, and year class strength; and

(2) evaluate the effectiveness of the 12-inch minimum length limit that was adopted in 1992.

Region A has also been trying to obtain a suitable electrofishing boat through submissions to the Maine Outdoor Heritage Fund to support the implementation of a statewide bass population study, but neither request received funding.

Northern Pike

An angler caught a 24-inch Northern pike this past summer in Taylor Pond (Auburn). Taylor Pond is the first water in the Sebago Lake region known to contain pike; however, they have continued to show up in many new waters in central Maine for the past several years. All of these occurrences are the result of illegal introductions.

Environmental

This past winter S.D. Warren (SAPPI) filed an application with the Federal Energy Regulatory Agency (FERC) requesting relicensing of five existing hydroelectric facilities (Dundee, Gambo, Little Falls, Mallison, and Saccarappa). To date, we have requested the applicant to conduct various studies to evaluate fishery resource issues. In addition, we have provided ongoing input throughout the process in an effort to enhance fishery resources and recreational opportunities on the river. Our efforts have primarily focused on the following concerns:

(1) establishing continuous minimum flows in the bypass channels of Dundee, Gambo, and Mallison projects to support MDIFW trout stocking programs;

(2) providing safe and permanent angler foot access to the above three bypass reaches:

(3) providing safe and permanent car-top boat access to all five impoundments;

(4) establishing stable water level within the impoundment's to protect bass and other "warm water" fish; and

(5) enhancing upstream and downstream eel passage.

We've also been actively participating in the Saco River Coordinating Committee, which is a formal work group comprised of state and federal agencies, Florida Power and Light, and other non-governmental interest groups. The work group is responsible for overseeing the implementation of fish passage and other restorative measures designed to benefit anadromous fish. This forum also provides an opportunity to address resident fishery issues like interspecific competition from stocking Atlantic salmon fry in wild trout streams and potential impacts on warmwater/ coldwater fisheries from stocking river herring into the Saco River impoundments.

Sebago Lake Fishery Management

Sebago Lake, located in Cumberland County, is one of the original waters in the world where landlocked salmon occur naturally. Sebago has always been regarded as a high quality landlocked salmon fishery. At 28,771 acres, Sebago is the state's second largest lake, and the deep, cold, oxygenated waters of the lake are highly suitable for coldwater fishery management.

In 1972, Maine fishery biologists began a lake trout stocking program to utilize the deeper waters of the lake. Biologists felt that the native salmon would occupy the upper levels of the lake and the lake trout would take advantage of the deep, cold, well-oxygenated water below. Lake trout were stocked annually until 1982. Stocking was discontinued at this time, because biologists felt the lake trout would propagate naturally. Since that time, the lake trout population has flourished and the trout are totally self-sustaining. Lake trout are very effective predators and are competing with salmon for smelt, which is the principal forage species. The lake trout population continued to expand into the 1990's and as a result of the intense competition, salmon fishing deteriorated. In response, fishery biologists developed a management plan to address the concerns related to the increasing lake trout population.

During the 1990's, fishery management focused on restoring the smelt population to levels capable of supporting a landlocked salmon and lake trout fishery. Fishery biologists, with the assistance from the Sebago Anglers Association, stocked millions of smelt eggs into Sebago between 1994 and 1997. Regulations were liberalized in 1994 and again in 1998 to allow a higher harvest of lake trout. In 1994, the salmon stocking rate was reduced from 8,000 to 4,000 fish per year due to decreasing growth rates.

The smelt population rebounded and salmon stocking rates were increased in 1998 and again in 1999 at which time 7,000 salmon were stocked. Salmon fishing improved and in 1999 Sebago Lake anglers were rewarded with perhaps the best fishing since the early 1980's. Salmon in excess of 5 pounds were common; many salmon in excess of 7 pounds were caught including one, which weighed in at 8.9 pounds. However, this exceptional salmon fishing had its downside. Many ardent lake trout anglers redirected their efforts toward salmon, which resulted in a substantial decrease in the lake trout harvest. This reduced lake trout harvest coupled with mediocre smelt runs in 1999 and 2000 is adversely affecting salmon growth. Biologists expected to stock 8,000 salmon in the spring of 2000, but reduced that number by 50% due to the sudden slowdown in growth.

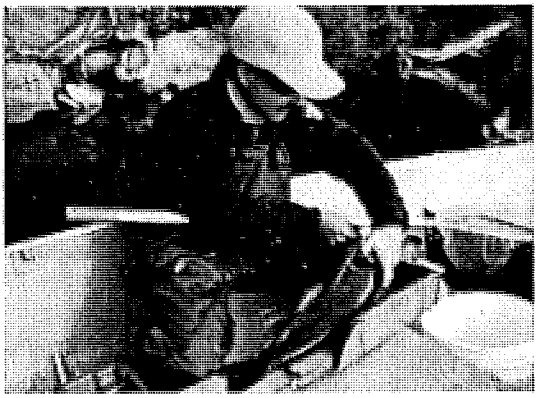
The lake trout fishing has been very impressive. Each year many fish over 15 pounds are landed, and usually one or two will top 20 pounds. A 26.8 pound laker was the largest fish landed in 1999. In addition to these trophy-size lake trout, anglers can also expect fast action when fishing at Sebago for lake trout. It's not uncommon for a party to land over 20 lake trout in a single day.

Biologists will continue to intensively monitor the Sebago Lake fishery. The growth rates of salmon and togue, and the catch rates for these species will be carefully assessed. Smelt population levels will be evaluated, and fishery biologists will be striving to revitalize the landlocked salmon fishing at Sebago Lake, while also maintaining a trophy lake trout fishery.

Belgrade Lakes Region (B)

Winter sport fishing surveys were completed on ten lakes in the region during the winter of 1999, including: Androscoggin Lake, Damariscotta Lake, East Pond, Megunticook Lake, North Pond (Smithfield), North Pond (Warren), Parker Pond, Quantabacook Lake, Sennebec Lake, and Seven Tree Pond. The level of angler use proved to be extremely low on these lakes during the winter, with the average use equal to 0.35 anglers per acre. Dangerous ice conditions for the first week of the season coupled with ice out early in March in some of the coastal lakes probably diminished overall angler effort.

Decreasing angler use has been documented on surveyed central Maine waters since 1994. Some portion of this reduced use may be due to anglers directing more fishing effort towards warmwater fish species, particularly northern pike. In fact, the one surveyed northern pike water, North Pond in Smithfield, had a higher angler use level of 0.54 anglers per acre than the surveyed brown trout water, which averaged 0.31



anglers per acre. The angler interest in winter pike fishing is confirmed by angler use estimates at Sabattus Pond in 1997-98 of 0.94 and 1.06 anglers per acre based on a principal fishery for pike. These Sabattus Pond use rates were much higher than angler use rates for lakes with cold water-based fisheries elsewhere in the region in those years.

The average winter catch rate on the surveyed brown trout water was 0.1 brown trout per angler in 1999. While this catch rate is the same as the statewide goal of 0.1 browns per angler, it was only one half of the 0.2 browns brown trout per angler reported statewide based on the 1996 update of the brown trout plan.

Two years of creel survey work on the St. George River drainage lakes, and other sources of data failed to document brown trout survival to age III and beyond. Brown trout survival may be impacted by a number of factors in these ponds, including heavy competition from warm water species and marginal water quality. Poor survival of brown trout to older ages led to suspension of stocking in Seven Tree, Sennebec, and North Ponds for several years. By suspending the stocking of brown trout, IF&W plans to allow the brown's forage base to recover in the absence of this predator. Stocking could be reinitiated at a lower stocking rate in the future. The browns may have a better chance at survival with an improved forage base.

The landlocked salmon fishery at Parker Pond was surveyed during January of 1999, the only month that Parker is open to ice fishing. Winter creel survey work was initiated after fall trap netting conducted in 1998 showed slow salmon growth at Parker. Salmon condition factors, a measure of how fat the fish are, were well below the desired level. The catch rate of salmon through the ice was fair, considering the minimum size is 16 inches. Fishing pressure in 1999 was estimated at 0.37 anglers per acre, well below the historic level of approximately one angler per acre. With several years of data indicating slow salmon growth, IF&W has suspended stocking of salmon at Parker Pond to allow the smelt population to rebound.

Smelt spawning sites and the densities of eggs deposited have been documented over the years at Parker Pond. Review of the smelt stream surveys suggests that recent smelt spawning is within the normal range of historic levels, but not equal to the highest levels observed. Regional fisheries staff have worked to increase the smelt population in Parker through transferring smelt eggs from other lake systems into tributary streams, suspending eggs in the pond away from the streams, and through moving existing eggs which would have become exposed to the

air into deeper water to assure their survival. Regional staff plans to use hydroaccoustic equipment acquired by the Fisheries Division to help in assessing the status of the smelt population at Parker.

The landlocked salmon in Long Pond in the Belgrade Lakes areas have been monitored for many years through various methods, including regular fall trap netting. The number of salmon caught by trap netting has declined somewhat over the last 5 years, while the K factor (the measure of fatness mentioned earlier) has stayed near 0.97 until the 1999 fall netting when it fell to 0.91. The current status of the salmon fishery will be investigated through a clerk creel survey during the 2000 open water fishing season. Long Pond is not open to ice fishing. With smelt spawning associated primarily with the lake shoreline and not tributary streams in this lake, apparently it is hoped that hydroaccoustics will help document the status of the lake's smelt population.

One important change at Long Pond in recent years is the addition of numerous fish species to the lake through illegal introductions. New fish species in Long Pond include: northern pike, walleye, black crappie, and landlocked alewife. The full impact of these new species is not yet known, except that impacts by pike are already being observed by fisheries personnel. The incidence of scarring on salmon caught in fall trap netting has increased markedly from 6 to 7% in 1993-94 to 37% in the 1999 fall trap net catch. It is believed that this scarring is due to attacks by northern pike preying on salmon. Smaller numbers of salmon in trap net catches in recent years may also be attributed to pike predation on salmon.

Regional fisheries staff will continue to monitor Long Pond's fisheries through the 2000 open water creel survey, trap netting and with the hydro-acoustics gear. Stocking additional salmon may have a negative impact on salmon growth. It is important to note that pike are known to feed on smelt, and may impact salmon growth. Water quality status will also be investigated to determine if it is a significant limiting factor in salmon and smelt management at Long Pond. Changes in fisheries management may be warranted depending on the information gathered.

Grand Lakes Region (C)

Anglers enjoyed an excellent year at West Grand Lake. Ice fishing was productive for all three principal species, landlocked salmon, togue, and whitefish. The lake continued its recent trend of yielding fair numbers of 17-18 inch whitefish, considerably larger than the normal (15-15.5 inches) of 20-25 years ago. Our annual spring clerk creel survey conducted for the first 1-1/2 months after ice-out yielded good results. The salmon catch rate of 0.49 legal salmon per angler attained a new 20-year high. Anglers reported releasing about 54% of their legal salmon, which marked the seventh consecutive year wherein the release rate has exceeded 50%. Average weight of harvested salmon was 1 lb. 11 oz., somewhat above the 20-year average. The togue catch rate was the fourth highest in 20 years. Thus, on average, every time three anglers went out on a day to try their luck, two of them caught either a legal salmon or togue. The "good news" continued through the fall with our annual random sample of 100 salmon lengths and weights, obtained from the trapnetted sample. These fish are utilized by hatchery personnel as a source of eggs for the state-wide salmon stocking program. Many salmon were captured, mostly 2 and 3 year old fish. Age III+ salmon are the "indicator" year class for comparative purposes. Average length (18.9 ins.) of the age III+ fish was one of the highest in 26 years. Similarly, average weight (2 lb., 8 oz.) of this age class was the second highest. Most salmon were in excellent shape, confirming that the number (10,800) of fish stocked in 1997 was in good balance with the number of available smelt.

Along with all the "positives" from West Grand, anglers who fished the outlet, Grand Lake Stream, also enjoyed an outstanding season. More than a few long-time anglers reported that it was their best (or one of their best) years ever. Fly-fishing was productive in May and June for nicely shaped 16-18 inch salmon, and was outstanding in October during most of the special catch-and-release extended season. Lots of 18-20 inch salmon were creeled, along with some unusually large 20-22 inch fish.

It's believed that the salmon in the lake preyed extensively on smelt during the summer, thereby gaining a considerable amount of weight. They were fat and sassy in late September and October when they dropped down into Grand Lake Stream in preparation for spawning.

It was also a truly outstanding year for salmon at Cathance Lake. Numerous 3-4 pound fish were netted, with reports of several over 5 pounds. The fishery was especially productive during the open water season. Salmon were in superb condition, gorging on an abundant smelt population. The salmon stocking rate had been reduced several years ago in response to a marked decline salmon growth. This management change

caused a strong resurgence in smelt abundance, a key to the fishery for large salmon. Several veteran anglers called it the best they had ever seen for large salmon. A few 17-19 inch wild brook trout were also caught.

An excellent catch of salmon was made during the fall trap-netting season at Alligator Lake. This water has very restrictive regulations wherein all salmon between 16-20 inches must be immediately released, along with a one fish daily bag limit in the aggregate of salmon and brook trout. We captured a total of 85 salmon, 56% of which were wild fish. Most of the wild fish were ages IV+ and V+, weighing from 2 lb. 6 oz. to 2 lb. 10 oz. Age distribution of the 37 stocked fish was as follows: 19 age II+, 8 age III+/ 9 age IV+, and one age VI+. Age II salmon averaged 17.9 in. and 2 lb.2 oz. in weight... not as large as last year, but still satisfactory. The biggest salmon in our catch weighed exactly 5 lbs.

At Tunk Lake, anglers continued to catch numerous 20-22 inch sub-legal togue which have stockpiled below the special restrictive 23-inch minimum length limit. Most legal togue checked during the ice fishing season were in unsatisfactory condition. Most of the togue collected at late summer netting were also on the thin side. In an effort to improve the growth rate and condition of togue, the legal minimum length returned to "general law" (ie. 18 in.) effective on January 1, 2000. Furthermore, anglers can now keep two togue per day. These changes will allow anglers to "thin out" the population, thereby fostering improved growth conditions for the fish that remain. The unanticipated substantial increase in togue abundance has resulted in a sharp decline in the smelt population. Therefore, salmon growth rate has also been adversely impacted. Tunk Lake is our other special salmon "slot" water wherein all salmon between 16-20 inches must be released. Although the lake continues to grow some 3-3 1/2 lb. salmon, such fish are scarce, and the fishery has been disappointing. An important lesson has been learned at Tunk Lake... do not attempt to manage such a deep, cold, relatively sterile water for both trophy togue and trophy salmon at the same time.

The year 1999 proved to be yet another outstanding year for Big Lake smallmouth bass anglers. The fishery at this classic Downeast bass water has really blossomed over the past several years. The lake supports an abundant crop of 10-12 inch fish, numerous 12-16 inch fish, and good numbers of 16-20 inch fish. Very few bass waters can make this claim as most are known for either lots of small fish, moderate numbers of medium sized fish, etc. The special slot limit wherein all bass between 12-16 inches must be released has been instrumental in fostering the improved fishery. Another possible factor is the alewives have not been able to access the lake for the past 3-4 years. In their absence, the smelt population has staged a sharp resurgence, and bass growth may have benefited

from the juvenile sunfish, frogs, dragonfly nymphs and adults, etc. Knowledgeable anglers who know the location of some of the off shore shoals make fine catches of bass, including some 17-20 inch fish, in the summer using live bait, often large golden shiners. This fishery attracts large numbers of non-residents each summer who appreciate both the feisty fighting abilities of smallmouth and their delicious flavor on the dinner table.

Rangeley Lakes Region (D)

Within the last few years, we have concentrated more of our management efforts on rivers and streams than in the past. This trend continued in 1999 with additional stream survey work on the Cupsuptic, Sunday, and Magalloway Rivers, all within the Androscoggin drainage. Each river requires several years of work in order to complete all aspects of a biological survey. Although the Cupsuptic River was initially surveyed in 1997, work has continued to the present. In 1999, we conducted additional brook trout population estimates by electrofishing, measured representative transects to determine stream types, and planned for habitat restoration work. Similar work was conducted at Sunday River in anticipation of a watershed survey to be conducted in 2000. An initial survey of the Magalloway River is scheduled for 2000,but we conducted to quantify fisheries habitat; determine fish species composition, abundance and population structure; to identify degraded reaches of stream; and to recommend and implement restoration procedures, if practicable.

Salmon growth rates in Rangeley Lake were exceptional in 1999, though there was concern that too many big fish were harvested when heavy rains associated with Hurricane Floyd resulted in an unusually early concentration of salmon at the outlet screens. However, we sampled nearly 200 salmon at the same site after the fishing season closed, indicating that many more large fish remain for anglers to catch in 2000. Sampling at nearby Mooselookmeguntic Lake in 1999 indicated a moderate decline in the salmon growth rates. For that reason, we recommended a change in the regulation that limits to one the number of salmon over 18 inches that may be kept. The intent of this regulation is to encourage the harvest of more of the large number of smaller (14-18 inches in length) salmon that make up the majority of the population. Because Mooselookmeguntic has a wild salmon fishery, the only way to control the large number of salmon is to encourage harvesting through regulations. This regulation change proposal went into effect in 2000, and we will monitor the fishery to determine whether it has the desired effect of reducing salmon "stockpiling". Salmon growth rates at the Richardsons have been poor for the last few years, but reduced salmon stocking rates

seem to be paying off, as the decline in growth stabilized in 1999. Aziscohos Lake, Mooselookmeguntic Lake, and the Rapid River are all producing exceptional wild fisheries for brook trout. The success of these fisheries is attributed to the regulation changes imposed in 1996.

A systematic survey of the Region's bass waters, begun in 1995, was continued in 1999 at Roxbury Pond, the Kennebec River (Madison to Solon), Parker Pond (Jay), Umbagog Lake, and North Pond (Chesterville).

The illegal introduction of fish species throughout the Region continues to be a concern. Although warmwater species such as smallmouth bass provide excellent fisheries, they tend to displace native coldwater species. In 1999, bass originally illegally stocked in Umbagog Lake were documented as far upstream as Aziscohos Dam on the Magalloway River and at Middle Dam on the Rapid River. The wild brook trout and salmon fisheries of both rivers are imperiled, and we will continue to monitor these fisheries to determine the effects of these, and other, illegal introductions.

River fishing in region D has improved markedly in recent years with the implementation of annual stocking; examples include brown trout stocking in the Kennebec, Androscoggin, and Sandy Rivers. At higher elevations, where the water temperatures are cooler, brook trout are stocked in the Dead River (North and South Branches), the Carrabassett River, and the West Branch of the Ellis River. Many of the remaining rivers - and virtually all of the streams and brooks - rely on natural reproduction for fisheries.

Region D biologists are also responsible for statewide salmon and brook trout assessments. During 1999, substantial progress was made toward updating The Landlocked Salmon of Maine. A similar document summarizing historic brook trout research has begun, including evaluation of restrictive fishing regulations and the performance of new hatchery strains.

Moosehead Lake Region (E)

The Moosehead Lake Region encompasses an area of 4,400 square miles in west central Maine. It includes 625 lakes and ponds 10 acres or larger in size, and 655 ponds less than 10 acres in size, with a combined total surface area of 238,000 acres - 24% of the total area of all lakes and ponds in Maine! Moosehead Lake (74,890 acres) is the region's (and Maine's) largest lake. Together with its associated river fisheries, it is among Maine's best known inland fisheries. In addition, approximately

4,200 miles of rivers and streams, comprising the headwaters of the Kennebec, Penobscot, and St. John Rivers, flow through the region and round out its aquatic offerings. The region offers coldwater and warmwater fisheries sought by anglers from throughout Maine and the Northeastern United States.

Three fishery biologists headquartered in Greenville plan, implement, and evaluate all aspects of the fisheries management programs for all of the waters in the region.

Of all the work performed throughout the year, lake and stream habitat assessments, fish population assessments, and sport fishery surveys provide the information necessary to produce the kind of fishing that anglers expect in the Moosehead region. In 1999, more than two-thirds of our total work time involved resource assessment activities, primarily sampling fish populations and obtaining information from anglers on regional waters. More than half of this time was spent in the field working directly with the region's aquatic habitat, its fishery resources, or its anglers.

Moosehead Lake, on the road to recovery from a recent slump in fishing, received a great deal of our management attention. Winter and summer angler surveys produced valuable information on use and catch, revealed that the fishing is once again approaching the objectives outlined in the lake's management plan. In addition to the angler surveys, we monitored the lake trout and the landlocked salmon populations to ensure that our recent efforts to restore a balance between predators and their prey remain on track. We also trapped the fishway in the East Outlet dam to determine the outlet's contribution of wild salmon to Moosehead's population.

Beyond Moosehead, we conducted winter anglers surveys on Sebec Lake, Piper Pond, Kingsbury Pond, and Big Wood Pond. During the summer and fall we evaluated 12 wild brook trout populations, 15 stocked brook trout populations, three splake populations, two smallmouth bass populations, two stocked salmon populations, one wild lake trout population, and one stocked lake trout population. We electrofished 12 streams to evaluate their brook trout and landlocked salmon production. Even with these efforts, in 1999 we were able to work on only 53 waters - that's less than 10% of the region's total. It is apparent that the extensive aquatic habitat and the diverse fisheries in Moosehead Lake Region will require more than three fishery biologists and the help they are able to enlist if current and accurate assessments necessary for appropriate management are to be maintained for at least more than half of the regions waters.

Fortunately, many anglers have volunteered to make a meaningful contribution to our work and efforts. During the winter, 25 anglers reported information from 600 days of fishing on 18 waters open to ice fishing. During the summer, 63 anglers reported information from 2,225 days of fishing on 89 lakes and ponds and 26 rivers and streams in the region. The information they provided on catch rates and fish sizes more than doubled the number of waters that we were able to assess. To these people we send our hearty thanks!!

Time in the field requires office time to summarize and analyze all of the information that has been collected. Scales and otoliths were read, fish stomachs were examined in the lab, all fishing information from both seasons was summarized and analyzed. After summary and analysis, information was filed appropriately for use in the future management programs.

The remaining time during 1999 was divided among the other jobs in the Fishery Division's current Operational Plan. Protecting water quality and aquatic habitat is essential to fishery management. Therefore LURC, DEP, and MDOT applications, notifications and permits were reviewed, and, wherever appropriate, comments were prepared on potential impacts to aquatic habitat and fisheries. FERC relicensing of power generation and storage projects at Indian Pond and on the West Branch Penobscot River required meetings and field investigations, as well as, review of and comment on specific water level management proposals. We continued working toward securing public access to our public waters, and to developing access sites at Sawyer, Prong, Lower Wilson, Branns Mill and Mountain View Ponds.

Our communication activities included attending meetings and corresponding with the public as well as with other State and private agencies. We reviewed fishery literature pertinent to the resources and our ongoing work in the region. Hatchery allocations involved preparing stocking recommendations and updating regional stocking records, marking fish at hatcheries, and assisting with the stocking of salmonids in regional waters.

Penobscot Region (F)

Region F continues an aggressive program of providing quality fishing opportunities for a wide range of angler preferences. The Region contains about 360 lakes and ponds 10 acres or larger in size which total over 191,000 acres. Salmon are found in 55 waters totaling 131,609 acres of which 24 waters (103,341 acres) were stocked with 50,000 salmon. Brook trout are present in 196 waters (40,176 acres), and 47,000 trout were stocked in 50 waters (32,400 acres). There are 20 waters with lake trout (81,000 acres) and three of these (32,000 acres) were stocked with 6,500 lake trout. These lakes are being stocked in alternate years and the total number of fish stocked in these three lakes over the 2 year period is 11,500 fish. The purpose of the low stocking rates for lake trout is to develop a fishery for fewer-but-larger fish. There are two lakes, Sebois Lake and Lower Togue Pond, being stocked with splake and one lake, Nicatous Lake, is stocked with brown trout.

Smallmouth bass are not stocked and the populations are managed through regulations to provide a fishery that is consistent with the productive capacity of each body of water. There is an active program of evaluation of bass populations and habitat. Study waters include the Penobscot River, South Branch Lake, Nicatous Lake, Pleasant Pond in Island Falls, Hot Brook Lakes, and Grand Lake Sebois, which currently is northern most range of bass in the state of Maine. Illegal introduction of bass continue to occur in the region. The most recent introductions have occurred in waters in the Patten to Matagamon Lake area and in Cold Stream Pond and Upper Cold Stream Pond in Lincoln and Enfield. These introductions jeopardize cold water fisheries and make it difficult, if not impossible, to continue brook trout management and stocking in affected waters. Largemouth bass have been recently introduced into the Cambolasse Stream drainage in Lincoln and will eventually spread into the Penobscot River.

Monitoring the recovery of the smallmouth bass population in Spednic Lake is continuing on an annual basis. Results have shown a significant increase in the population since its low point in the late 1980's, however, it still does not have a spawning population as large as the population that was present in the early 1970's. Monitoring will show when the population has increased sufficiently to support a fishery so that the lake can be reopened to the taking of bass.

Other bass studies included electrofishing to capture young-of-the-year bass to determine the average size after the first season of growth. This information is used to predict the rate of survival of this age group through

the first winter. Waters sampled were Pushaw Lake in Old Town, South Branch Lake in Seboies, and Pleasant Pond in Island Falls.

Creel surveys and trapnetting on Cold Stream Pond have confirmed that the restoration of a wild lake trout population has been successful. In the late1970's, the spawning population had fallen to only 60-70 adult fish even though there were 15,000 to 20,000 one-year- old lake trout being stocked each year. Stocking was discontinued in 1980 and natural reproduction was allowed to take over. The wild population gradually improved and in 1999 only one fish could be identified as a hatchery lake trout.

Recent introductions of splake into two regional waters, Seboeis Lake and Lower Togue Pond, were evaluated in 1999. Both of these lakes contain very good populations of splake producing very attractive fisheries. Sebois Lake also provides fisheries for salmon, bass, and white perch.

A survey of angler fishing activity and angler preferences was conducted on the trout ponds in the interior highlands of Baxter State Park. This project was conducted by a student from Unity College as an internship project under the supervision of the regional fishery biologist. The data are being compiled and analyzed and a project report should be ready soon.

A study of the interactions between Atlantic salmon and brook trout, the condition of the brook trout population, and a creel survey on the East Branch of the Penobscot River from Matagamon Lake to Whetstone Falls was begun in 1994 and continued through 1999. Results of the study were used to initiate changes in fishing regulations and in salmon and trout stocking numbers and stocking procedures in both Matagamon Lake and the East Branch. The changes appear to be working, because anglers and sporting camp owners have reported one of the best fishing seasons ever, both in the lake and the river.

Little Round Pond (Lincoln) was reclaimed in October, 1999. A barrier dam was constructed in September 1999, with considerable assistance from the Lincoln Water District. The pond was stocked with spring yearling trout in 2000, but it will be stocked with fall fingerling trout after that. Lincoln Water District had owned the water rights to the pond and used it for a water supply for many years. The town eventually drilled wells to obtain water and in 1998 they conveyed their rights on Little Round Pond to this Department.

In April 1999, Region F hosted an Aquatic Safety Training course at the YWCA pool in Bangor. The instructor was a retired U.S. Coast Guard Safety Officer, now residing in Bangor. The course was attended by most of the fishery biologists and one person from the Hatchery Division.

Fish population evaluations by gill netting and concurrent water quality analyses are a very important component of fisheries management in the region. Information obtained is used in many fisheries management processes. Age and growth information will help determine stocking rates in stocked waters and appropriate length and bag limits in non-stocked (wild) waters. Water quality analysis is used to determine the feasibility of stocking. Fishery evaluations were done in 24 regional waters in 1999.

Trapnetting is another important population sampling process. Trap nets permit the collection of data over a longer period of time and all of the fish can be released back into the body of water. Trap nets are, however, most effective during the fall season. In 1999 salmon evaluations were done in Scraggly Lake (T6 R8), and Pemadumcook Lake (T1 R9). Splake and salmon were sampled in Seboeis Lake (T5 R9, NWP), and brown trout in Nicatous Lake (T4OMD). As mentioned earlier, the status of the wild lake trout population in Cold Stream Pond (Enfield) was evaluated by trapnetting.

During the winter of 1999, aerial angler counts were conducted on coldwater management lakes in the southeastern portion of the region. These showed that a recent trend in declining winter angling activity that started in the early 1990's continued through 1999. It is difficult to determine, however, whether the trend is due to less interest in fishing, or is the result of unfavorable weather and ice conditions in recent years.

Electrofishing brook trout streams as part of a statewide monitoring of brook trout populations in streams continued in 1999. There are several streams in Region F that are included in the program, however, the streams do not have to be sampled in each year. In 1999, four streams were checked: Gott Brook in Springfield, Baxter State Park, Lowell Brook in Springfield, and Lord Brook in Grand Falls.

River survey work is in progress on the Piscataquis River to obtain habitat and fish population information. The East Branch of the Pleasant River has been surveyed to its confluence with the West Branch of the Pleasant River.

Fish River Lakes Region (G)

Regional personnel spent the months of January, February and March conducting sport fishery surveys on several important waters that are open to ice fishing. These included Long, Cross, Square, and Eagle Lakes in the Fish River Chain; Ross, Big Eagle, Churchill, Spider, and Clear Lakes in the Allagash drainage; and Squa Pan Lake in the Aroostook River drainage. Anglers were counted and interviewed to obtain catch information. Fish were measured and weighed and, if fin clipped, checked for year of stocking. Data collected is used to assist in evaluating regulation effectiveness, assess contribution of hatchery fish to the sport fishery, and condition of gamefish being caught.

Smelt egg transfers were made in May to bolster smelt populations in Eagle Lake, Squa Pan Lake, Millinocket Lake, and Millimigassat Lake. This was the second consecutive year of transfers to Eagle Lake; which, in concert with a reduced salmon length limit, is an effort to improve salmon growth.

An intensive sport fishery survey was conducted on the general law section of the Aroostook River from Oxbow to Washburn. From late April through May and June, a survey clerk canoed the river interviewing anglers and collecting data for age and growth purposes. Findings from this survey indicated that 60% of 264 angler trips were successful in

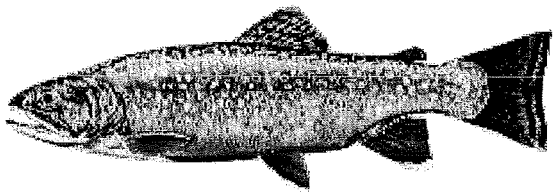
catching a legal (6 inch) brook trout; one legal trout was caught for every three hours of fishing; and the average size of trout kept was 10.7 inches. These findings compare favorably with a clerk survey conducted at the same river section in 1989 and 1990. At that time, 50% of 112 angler trips were successful in catching a legal trout; one legal trout was caught every 2.6 hours of fishing; and the average size of the trout kept was 10.0 inches. Age II+, III+, IV+ and V+ brook trout were represented in the trout harvested in 1999.

The fall of 1999 may have been our busiest time conducting field work. Silver Lake (T15 R5 WELS), Aroostook County was chemically reclaimed in October to remove all fish from the pond, most importantly the yellow perch and suckers that compete with brook trout for food and space. We received valuable volunteer assistance from members of Sportsmen Inc., a fish and game club in Stockholm. Brook trout will be stocked in the spring of 2000, and fishing will be subject to a no live bait regulation to prohibit the reintroduction of other fish species.

Eagle Lake in the Fish River Chain was trap netted in September to monitor the wild salmon population. We caught fewer salmon of all sizes and, most notably salmon 12 inches and larger in this the third year of fall trap netting Eagle Lake. We also took a significantly greater number of brook trout than in previous years. If the smelt egg introduction is successful in contributing to the forage base, the lake should soon respond to our management strategies for improving salmon fishing.

Square Lake and Long Lake were each trap netted in October to obtain data on salmon and brook trout populations. Brook trout in both lakes have responded very favorably to the 2 trout daily limit and 12 inch length limit with only 1 fish exceeding 14 inches. Salmon growth in each lake has also improved from the management strategies implemented in recent years. The average size of salmon captured in Long Lake was 18.6 inches and 2.5 pounds; whereas at Square Lake, they were 16.1 inches and 1.5 pounds.

Other lakes trap netted included Green Pond, Ferguson Pond, Moccasin Pond, and Clear Lake to obtain brook trout population estimates and Rockabema Lake and Lower Hudson Pond to update trout and salmon age and growth data for regulation evaluation.



Comparitive Performance of Two Genetic Groups of Stocked Brook Trout in Maine Lakes

The performance of two new strains of hatchery-reared brook trout was studied with Maine lakes in 1998. The new strains are being developed to replace the older domestic strains which, due to inbreeding, exhibit high mortality rates prior to hatch-out and are short-lived in the wild. Paired stockings of Kennebago and Sourdnahunk strains, identified by different fin clips, were evaluated for catch rates, growth rates, and fall abundance. Anglers fished the study ponds at an average rate of 31 angler trips/ac/season, kept 0.35 fish/angler, and caught a legal-size brook trout for every 5.8 hours of fishing. Kennebago fish comprised 45% of the estimated harvest and Sourdnahunk fish 55%. Age II+ fish accounted for 25% of the Kennnebago and 12% of the Sourdnahunk harvest. Population estimates, determined for only the three ponds with low interspecific competition, averaged 16 brook trout/ac, or 6.4 lb./ac. Age II+ fish represented 34% of the number and 45% of the weight of the population. There was no difference in overall abundance, growth rates, age-at-maturity, or incidence of hooking injuries between the Kennebago and the Sourdnahunk fish There were differences in growth rates, attributed to basic productivity and/or interspecific competition, among ponds. Age II+ fish of both groups has a higher rate of hooking injuries than age I+ fish. Fish from a pond with artificial-lures-only regulation also had significantly more hooking injuries than those from a pond with a fly-fishing only regulation. Fish with hooking injuries were less robust than those without hooking injuries. Brook trout accounted for 38% if the total weight of fish in a pond with low interspecific competition, but only 1% of the total weight in ponds with moderate interspecific competition. For ponds with similar numbers of competing fish species, age II+ fish of the Kennebago and Sourdnahunk strains represented 6.2 % of those captures, compared to only 0.3% for the domestic strains evaluated in an earlier study. To date, the new strains have higher hatching rates and better survival rates than the domestic strains.

- Forrest R. Bonney
- David Howatt

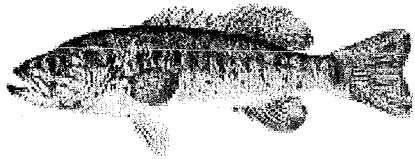
Rapid River Fishery Management*

The Rapid River is 3.2 miles long from Middle Dam at the outlet of Richardson Lake to Umbagog Lake. Pond in the River, located 0.6 miles below Middle Dam, divides the river into two reaches. Both waters support important fisheries for landlocked salmon and brook trout that are sustained primarily by natural reproduction. Smallmouth bass, which were illegally introduced into the Umbagog Lake around 1986, have recently colonized the Rapid River. Clerk creel surveys were conducted in 1994, 1998, and 1999 to document existing levels of angler use, catch, and harvest prior to scheduled changes in the river's flow regime. These surveys, supplemented with information provided by volunteers, were also intended to evaluate a catch-and-release regulation imposed on brook trout in 1996. In addition, biological information was collected from Rapid River and Pond in the River to determine the nature and extent of habitat for smallmouth bass.

Fishing pressure was stable form 1994 to 1999 at approximately 8,000 angler trips/year, but this level of angler use is believed to be significantly higher than during the previous decade. Current fishing pressure on the Rapid River is among the highest observed on Maine rivers that support salmon and trout fisheries. The proportion of brook trout in the fishery, relative to the salmon catch, increased from 1994 to 1999, as did numbers of trout over 16 inches. The percentage of salmon over 16 inches declined during the same period. These changes were attributed to the catch-and-release regulation applied to trout in 1996,the 1998 closure to ice-fishing of the portion of the Umbagog Lake where Rapid River brook trout are believed to overwinter, and reduced stocking rates of salmon in Richardson Lake after 1993.

Rapid River salmon were comprised of both hatchery-reared and wild fish. Both exhibited slow growth rates typical of river-resident salmon. Rapid River and Pond in the River brook trout were all of wild origin, and their growth rates exceeded that observed in nearby Mooselookmeguntic Lake and other western Maine lakes.

Thirteen smallmouth bass, ranging in length from 8 to 18 inches, were reportedly caught in the lower Rapid River in 1998 and 1999. Smallmouth bass had not yet colonized Pond in the River by 1998, but SCUBA surveys showed this water provides excellent habitat for this species. Bass will soon colonize Pond in the River, and if they become abundant, are expected to negatively impact the Rapid River brook trout fishery. The



Department recently promulgated a rule permitting unlimited harvest of smallmouth bass from the Rapid River and Pond in the River. However, we expect this rule to have little long term effect in controlling bass numbers because they will be continually recruited from Umbagog Lake, where they are well established, abundant, and grow to large sizes.

* Progress Report No. 1 (1998 &1999, Jobs F-104 and F-103)

- David P. Boucher

Aziscohos Lake (1994-00)*

Aziscohos Lake is a 6,700-acres water formed by the construction of a dam on the Magalloway River. The lake supports fisheries for both salmon and brook trout. All of the trout and most of the salmon are wild fish. Although salmon are stocked at relatively low rates, they provide good returns to the angler in some years.

During the summer of 1999, anglers were interviewed at Aziscohos Lake to gather biological information on the quality of the salmon and brook trout fishery. This information was compared with that collected in a similar manner in 1986, 1991, 1993 and 1996. Angler use, which varied from 3,703 days in 1999, to 6,477 in 1996, is among the lowest of the Rangeley lakes. Growth rates decreased for 1991 to 1993, but improved in 1996. The improved growth rates resulted from an increase in the number of smelt in the lake, which in turn is attributed to a 2-year salmon stocking moratorium and closure of the west-shore tributaries to smelt dipping. Growth rates declined moderately in 1999; in response, the salmon stocking rate will be reduced from 500 spring yearlings per year to 500 spring yearlings every other year.

We will continue to monitor the Aziscohos Lake fishery by conducting a creel survey and angler count every third year.

*Progress Report No. 3 (1994-00) Job F-104

- David P. Boucher

Effects of Competition Removal and Restrictive Regulations of Wild Brook Trout in Little Moxie Pond*

After just two seasons of trapnetting and removal of competing species, brook trout exhibited substantial increases in survival of age I+ fish. During the entire study period, age I+ trout averaged less than 10 inches in length and therefore were not subject to harvest although there would be some associated hooking mortality with releasing sub-legal fish. In 1994 and 1995, the mean number of age I+ trout in the pond was 306 fish. Since that time there has been a two-fold increase in the mean number of age I+ trout at the end of the season. Despite increased survival and growth rates, restrictive regulations have not been effective in maintaining the quality of the fishery. Use dramatically increased during the study period from 195 angler-days in 1995, to over 800 angler-days in 1998. Although no estimate was available, it was obvious from personal observation that use began to increase in 1996 as fish size and abundance improved. Harvest rates were at their highest in 1996 and 1997. Even with a two fish limit, anglers were removing a high percentage of age III+ and all age IV+ fish. In 1996, there were an estimated 355 age II+ trout, and 93 age III+ trout in the pond. These fish exhibited high mortality rates between the fall of 1996 and the fall of 1997. By the close of the 1997 fishing season only 30 age III+ trout were remaining in the pond, representing a total mortality rate of 92% for this age class. No age IV+ trout were taken in 1997, representing 100% mortality. In addition, 70% of the age II+ trout did not survive the open water season. Some natural over-winter/post spawning mortality occurred but probably at a low level compared to harvest. For example, in 1997, an estimated 595 age I+ fish were present in the fall. Under the new 12-inch minimum length limit all of these fish were protected for the open water season in 1998 at age II+. The 1998 estimate of age II+ trout was 563 fish. This represents about a 5% mortality form the fall of 1997 to fall 1998, some of which may be hooking related. Clearly, at Little Moxie Pond angler harvest and hooking mortality are the most important factors influencing the abundance of wild trout population.

This fishery was at its qualitative best in 1996 when few age II+ and just 37% of age III+ and 76% of age IV+ were harvested. Anglers were able to catch larger fish throughout the summer and into the fall. However, these fish were quickly removed the following spring as a result of increased fishing pressure. The more restrictive regulations adopted in 1998 have initially reduced harvest. Total mortality figures in 1998 were very similar to those observed in 1996. If these trends continue, there should be an increase in the number of age III+ and age IV+ fish in the 1999 fishery and post-season trapnetting.

After two consecutive years of trapnetting and removal of suckers and minnows, there was a substantial increase in trout biomass. Nearly 50 lb./ acre of non-trout species were removed in 1994 and 1995. The following three years total of just 3.6 lb. were caught and removed. Total estimated pounds of trout increased from a low of 89 lb. in 1994, to 470 lb. in 1996.

It is concluded that removal of competing species would have positive management implications on other similar waters by increasing brook trout survival, abundance, and growth. It is unclear how long these benefits will last once trapnetting ceases.

* Fishery Interim Summary Report Series No. 99-12

- Timothy C. Obrey

Recreational and Angling Surveys in the Wassataquoik Watershed, Baxter State Park

Within Baxter State Park, the Wassataquoik watershed offers recreational users a variety of unique opportunities. Remote hike-in access and mountainous terrain afford users one of the best wilderness experiences in New England. The user can engage in challenging hikes and mountain climbs as well as fishing on a variety of remote ponds. During the summer of 1999, a student intern from Unity College interviewed people using Baxter State Park campgrounds in the Wassataquoik watershed. In addition, survey boxes were placed at trailheads and campgrounds on ponds in the watershed to obtain angler effort and catch information. The Wassataquoik watershed is centrally located in the park and includes 17 ponds with brook trout and one with brook trout and blueback charr.

Ninety-nine park visitors ranging in age 9 to 70 years were interviewed; 68 males and 31 females. The majority (68.1 %) of visitors were residents of Maine, with most from Cumberland and Penobscot Counties. The rest of the people interviewed were from other states (27.3%), European countries (3.0%), and Australia (1.0%). Their priorities for the recreational activities within Baxter State Park were: hiking, camping, relaxing, observing nature, and fishing. Visitors thought that the wilderness experience, scenery, and opportunity to view wildlife were important aspects of their visit. Twenty eight of the 99 people interviewed planned to fish in Baxter State Park. Their primary fishing methods were fly fishing (39.3%), artificial lures (39.3%), and bait (21.4%). They fished an average of 1.6 days per year in Baxter State Park, with half of them seeking out remote angling experiences. Sixty four percent of the anglers interviewed reported practicing catch and release most of the time.

A total of 186 daily records from six waters in the Wassataquoik watershed were collected from anglers. Brook trout catch per hour ranged from 0.374 (SE 0.174) in Pogy Pond to 2.518 (SE 0.536) in Six Ponds # 4 (Figure 1). The total number of reported fish caught for all six waters was 1,773 brook trout. Two legal-size blueback trout were reported from Wassataquoik Lake. The total number of legal brook trout caught was 1,131 fish. Percent of legal brook trout kept from all six waters ranged from 17.44% in Little Wassataquoik Lake to 26.89% in Wassataquoik Lake. The reported number of sublegal brook trout was as low as 13.57% in Little Wassataquoik Lake and as high as 50.00% in Wassataquoik Lake.

- Joan G. Trial
- Jason Saucier

TABLE 6. Summary of voluntary fish survey data reported by anglers. Brook trout data taken from fish that were sampled by angling.

BKT = Brook trout **BBT** = Blueback trout
SE = Standard Error

Water	Sample Size (n)	Fish/Hour Harvested	(SE)	% of Legal Fish Kept	% Sublegal Fish in Catch	Number of Fish Caught	Number of Legal Fish Caught	Angler Count	Trip Length Party Mean	(SE)
Little Wassataquoik Lake	21									
BKT		0.433	0.165	17.44	13.57	199	172	37	2.35	0.47
Wassataquoik Lake	30									
BKT		0.287	0.095	26.89	50.00	238	119	55	2.01	0.19
BBT*		0.004	0.004	100.00	0.00	2	2			
Six Ponds # 4	36									
BKT		0.562	0.122	18.22	45.25	842	461	74	2.52	0.25
Deep Pond	29									
BKT		0.317	0.116	26.00	40.12	167	100	52	1.54	0.15
Russell Pond	50									
BKT		0.507	0.125	25.79	25.34	296	221	83	1.54	0.11
Pogy Pond	20									
BKT		0.000	0.000	0.00	9.68	31	28	31	1.63	0.27
Totals	186									
BKT						1773	1131			
BBT						2	2			

Trout Stream Monitoring Program

Since 1990, fishery biologists have been monitoring wild brook trout in streams around the state. The streams selected have brook trout populations that support a fishery, with growth rates adequate to ensure that some portion of the population exceeds the general law minimum length of 6 inches. In the late summer of 1999, staff from the seven regions and research visited 16 streams and estimated the number of brook trout and noted the occurrence of other fish species in the streams. Fish length and weight were measured for all trout and salmon and a portion of the other species caught. Although there are some differences related to stream temperature, the average size of a young-of-the-year trout is 2.6 inches. These young trout make up approximately 61% of the stream population, while trout over 6 inches are almost 6% of the population. The 6-inch fish that you catch in streams will weigh 1.1 ounce, an 8-inch fish will weigh about 2.6 ounces, and at 12 inches the fish will be just over one-half of a pound. Between one and ten other fish species are found in the brook trout streams, with blacknose dace, slimy sculpin, creek chub, and white sucker the most common. These fish can be quite numerous.

A new effort in 1999 involved classifying the stream reaches based on their geomorphology using slope, sinuosity, width/depth ratio, and entrenchment. Stream reaches that are mostly cascades and waterfalls are type A, type B reaches are relatively steep, with straight riffle reaches, and type C reaches have more gentle slopes, characterized by pools and riffles in winding channels. A type BC reach would be intermediate to a type B and type C, but more like a type B. We used this process to categorize 18 of the brook trout monitoring sites. Three of the sites were BA reaches, five were B reaches, seven were BC reaches, and three were C reaches. Type B and C stream reaches had higher populations of legal-size (>5.9 ins.; age II+ and III+) brook trout per stream mile than type BA and BC reaches. Medium-size trout populations (3.5 in.; age 0+) were highly variable, with no differences among stream types.

- Joan G. Trial

Eel Research

American eels are harvested as they immigrate into freshwater as juveniles (elvers), as they grow in freshwater (yellow eels), and as out migrating adults (silver eels). We know very little about eel densities in freshwater and the harvest efficiencies of the yellow and silver eel fisheries. To develop an understanding of the yellow eel fishery, we contracted with commercial eel fishermen to assist us in examining the population of the American eel (>270mm) in five Maine lakes and one river during 1998 and 1999. Population estimates were obtained at three locations where eels were removed (two lakes) or commercially harvested (one river section) and on one lake where the eels were marked and released back into the lake. Densities of eels ranged from 2.1 to 8.4 eels/ha (0.52 to 1.86 kg/ha) in the lakes, and was 32 eels/ha (8.9 kg/ha) in the river section. The commercial pot fisheries traced, harvested between 36% and 95% of the estimated American eel populations. Efficiencies were higher in waters with more eels. In the second year, populations were very low on lakes where removal had occurred, with catch/pot only one tenth of the previous summers catches. Based on their length most of the eels caught in pots were females (67-89%).

Silver eels are captured in weirs as they migrate to the ocean in the fall. In 1999, the people or partnerships that are licensed to operate weirs provided us with data on eel catches of all fish caught. In addition, with the cooperation of one weir operator, small-mesh fyke nets were set downstream to see how efficient his weir was at capturing eels. Total harvest of 26,285 pounds of eels was reported by 11 of the weir operators. The 1999 study confirms what we had found in 1997 and 1998, that silver eel migrations are related to rain events. Eels are probably responding to increases in stream flow following rainfall, rather than actual rain events. Moon phase and temperature did not seem to influence migration. Weirs were extremely efficient at harvesting eels during low to moderate flow, capturing 100% of the eels that were migrating. Over three successive days, a total of 54 eels were captured in the weir and no eels were captured in the fyke net set downstream. We are in the process of preparing a paper for publication including data from the 1997, 1998 and 1999 eel weir seasons. In addition, these data will be used to help model turbine mortality associated with hydroelectric projects.

- Joan G. Trial
- Lea Daniels

Hooked On Fishing Report

During the last 12 months the program has been an even greater success than the previous year. My goal for the past 12 months has been twofold. I not only wanted to show a great increase in the numbers of children who participated in program events, but also wanted to show and increase in the numbers of certified instructors and volunteers who were providing those programs to the children and families of Maine. To increase the number of children who participated was an obvious way to show success. If more children wanted to take part in our programs it meant to me that the public was viewing the events in general as a positive experience. To be able to increase the number of certified instructors and volunteers available to help carry out the events meant to me that we would be able to offer a more personalized experience to all in attendance because we would have a lower adult/child ratio at each event. Any time you can increase a child's one on one time with guidance from an adult, you are increasing the odds for success for that child.

Our first goal, to increase the numbers of children who took part in our events was not hard to meet at all. With a strong increase in numbers of school programs, a jump in the community programs, and a significant increase in the number of Fish & Wildlife employees who are providing programs of all kinds in their districts, we have been able to provide program exposure to over 11,000 children in Maine. These programs have varied from one-day events with 1.5 hours of instruction in safety and ethics to eight week long programs with a group of home schoolers. Another point of success for all of the reporting events has been that they ALL contained a fishing experience for the children involved. In a few cases it was thanks to the addition of the Backyard Bass Game and the fish being caught were plastic, but those kids had just as much fun. In fact this game is as popular with the adults as it is with the children. It provides a fun way to improve your casting accuracy, without waiting for a live fish to bite your hook.

Being able to increase the numbers of adults at our events was very important, for all the reasons I have stated here, and I thought it would be harder than it was to do. But the people of Maine have a very strong desire to keep our outdoor recreational sports a vital part of our heritage that we pass on to our children. For the most part I need only to make good use of the people who call in looking a way to help out. I very seldom need to go looking for help. The list of people throughout the state who want to be involved in what we do here at the department is constantly growing. When I go to the national conferences I hear a lot from other state and countries that have a real hard time with this aspect of

their jobs, but I feel very fortunate to be here in Maine. I cannot stress enough how important Maine's desire is to preserve and protect our natural resources for our future generations.

I cannot report without stressing the importance making sure that all outdoor recreational sports are equally important. Our beautiful state of Maine has so much to offer it's citizens, and I consider it our responsibility to provide educational experiences to the youth of Maine that will enable them to be good stewards of this resource so that it can be passed on to future generations with a quality even greater that when we took our jobs here at the Department. If we can do this, we have been successful!!!!!!

- Betty Lewis

Be a Supersport!

The extra $15 you pay supports the Maine Fish and Wildlife Department's critical landowner relations program, which insures future recreational access. Residents and nonresidents - hunters, anglers, trappers, guides - can all become Supersports. Even if you don't buy sporting licenses, you can still show your support by purchasing a Supersport certificate.

As a 2000 Maine Supersport, you have an opportunity to purchase an exclusive Supersport hat with embroidered Fish and Wildlife Department logo! in addition, several business supporters of the Supersport program are offering the following gift package valued in excess of $50 as their ways of saying "thank you"

- **Kittery Trading Post in Kittery -** $5.00 discount on purchases of $25.00 or more, or $10.00 discount on purchases of $100.00 or more.
- **North Maine Woods Association -** $4.00 gift certificate toward checkpoint fees
- **VanRaymond's Outfitters, Brewer -** 10% discount on most items (some restrictions apply)
- **Brown's Trading Post, Houlton -** 10% discount on most items (some restrictions apply)
- **Roy's Army Navy Store, Presque Isle -**10% discount on most items (some restrictions apply)
- **Indian Hill Trading Post, Greenville -** 10% discount on most items (some restrictions apply)
- **Maine's Northwoods Sporting Journal -** a one year subscription at 1/2 price.
- **Maine Department of Inland Fisheries & Wildlife -** 10% discount on all logo merchandise.

Maine residents and nonresidents can buy a Supersport license wherever licenses are sold. Nonresident hunters and anglers also may buy a Supersport license through the mail from:

Maine Department of Inland Fisheries & Wildlife
284 State Street
41 State House Station
Augusta, ME 04333-0041

Pass on a Maine tradition and a gift to last a lifetime...

Introducing the Maine Resident Lifetime License!

Your investment in a lifetime license for yourself or as a gift will allow the bearer to fish and/or hunt for their entire life, regardless of any future change in residency. The revenues generated by the sale of these licenses will be deposited in a special trust fund which will provide long-term financial support for Maine's fish and wildlife.

Cost of the lifetime license for residents:

Age Group	Fishing	Hunting	Combination Hunting/Fishing
Applicants 5 years of age and under	$150	$150	$250
Applicants 6-15 years of age	$300	$300	$500
(Lifetime license for 6-15 age group is not available until January 1, 2001)			
Applicants 65 years of age	$50	$50	$80
Applicants 66 years of age	$40	$40	$64
Applicants 67 years of age	$30	$30	$48
Applicants 68 years of age	$20	$20	$32
Applicants 69 years of age	$10	$10	$16

For more information call: 207-287-8000

MAINE
DEPT. OF INLAND FISHERIES AND WILDLIFE

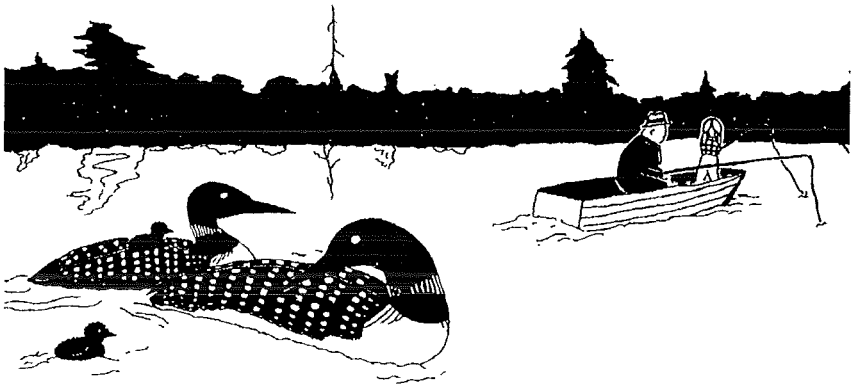
Caring for Maine's Outdoor Future

LOONS & LEAD DON'T MIX

Lead tackle is deadly to waterbirds!

Lead sinkers & jigs cause fatal lead poisoning in loons and other waterfowl.

Lead ingestion is the #1 killer of loons in Maine, but any waterbird can die from swallowing just one lead sinker or jig!



YOU CAN:

Use steel, tin, bismuth or plastic instead.
Ask local tackle shops to stock alternatives.
Properly dispose of old lead sinkers and jigs.

Maine Department of Inland Fisheries and Wildlife