Fishery Region A

Rainbow Trout Project

In the fall of 1997, the Fishery Division established a committee comprised of biologists and hatchery staff to revisit the prospect of a rainbow trout stocking program. After deliberation of the pros and cons, the committee concluded to move forward with a limited, experimental program to evaluate the relative performance of rainbow trout against that of brown trout and brook trout. Our intentions were to determine if rainbows could provide fishery managers with an additional tool to improve fishing opportunities for Maine anglers. The study was conducted over a 5-6 year period in a variety of Maine waters and included three parts: (1) hatchery performance comparisons among all three species, (2) field performance comparisons of browns and rainbows, and (3) field performance comparisons of brookies and rainbows. A federal hatchery in Tennessee provided Eagle Lake Strain rainbow eggs used during the study. Following is a partial summary of our findings and conclusions; complete technical reports are available from the Department.

Hatchery Comparisons

All three trout species exhibited similar performance in the hatchery system for most parameters including mortality, food conversion, disease resistance, and tolerance to various stressors. Hatchery growth was excellent for browns and brookies, but phenomenal for Eagle Lake strain rainbows. For example, spring yearling rainbows averaged 11.3 inches, over an inch longer than browns (10.2 in) and brookies (9.8 in) of the same age. Remarkable rainbow growth may help satisfy the public's desire for larger trout. In addition, this project demonstrated that our facilities and staff could successfully raise rainbows, and meet the potential challenges of a new stocking program.

Field Performance Comparisons – Brown and Rainbow Trout

Beginning in 2001, five lakes and two rivers were stocked annually with equal numbers of rainbow trout and brown trout. Our objectives were: (1) to examine and compare catch rates, returns, growth, and carry-over potential of rainbow and brown trout; and (2) to evaluate whether rainbows may be more catchable than browns during mid-day hours, and thus more available to the majority of anglers. A few highlights from the study include:

- **Catch rates.** On average, it took winter lake anglers 6 times longer to catch a legal brown trout than a legal rainbow trout. Similarly, open water anglers fished 4.7 times longer to catch a legal brown trout than a legal rainbow trout. The bottom line, lake anglers caught approximately 5 rainbow trout to every brown trout! River anglers caught 1.5-1.9 rainbows to every brown trout.


4+lb Upper Range Pond Rainbow

- **Returns.** On average, lake anglers caught 101.4% of the stocked rainbows and 21.8% of the stocked browns during a full fishing season (summer and winter). Amazingly, anglers managed to catch over 100% of all the 'bows stocked due to recycling from catch and release! The Kennebec River had return rates of 81.1% for rainbows versus 50.0% for browns. Although the Little Androscoggin River exhibited a similar difference in returns between the two species, the actual percent returns were substantially lower than those observed on the Kennebec River.

- **Age and Growth.** Both rainbows and browns are capable of providing a quality-sized trout fishery in lakes and larger river systems (Table 1). Overall, rainbows grew at a better rate (0.34 inches/month) than brown trout (0.24 inches/month) in lakes. The data also suggests Eagle Lake rainbows will generally produce few fish in excess of 4 pounds in Maine waters. This is due to higher catch and harvest rates on rainbows, as well as feeding behaviors that target smaller sized prey.

  As expected, younger aged rainbows (2-3 years old) dominated the lake fisheries with few surviving to age 4 and fewer still to age 4. The dominance of younger rainbows was even more pronounced in river fisheries where no rainbows over age 3 were reported.

Water(s)	Species	Length (in)	Weight (lbs)
All Lakes	RBT	16.7	1.8
	BNT	16.3	1.9
Kennebec River	RBT	15.8	1.5
	BNT	14.7	1.1
L. Andro River	RBT	11.9	0.6
	BNT	11.0	0.5

- **Mid-day Catchability.** Although a high percentage of anglers fish entirely or partially during mid-day hours, there was no statistically significant difference in the percentage of rainbows versus browns caught during mid-day hours. On the other hand, data from this study confirms popular fishing knowledge, that is, a higher percentage of both species were caught during the morning and evening time periods when trout tend to be more active.

Field Performance Comparisons – Brook and Rainbow Trout

This portion of the study evaluated the relative field performance of Eagle Lake strain rainbow trout and Maine Hatchery strain brook trout in four small, trout ponds including: Jaybird P (Hiram), Lily P (New Gloucester), Long P (Denmark) and Overset P (Greenwood). Study objectives were: (1) to compare angler catch/harvest rates and examine whether the two trout species differ in their seasonal availability to the angler; (2) to evaluate relative size quality and growth, (3) to assess survival and carry-over potential; (4) to compare their utilization of the food chain, and (5) to examine trout performance in waters with marginal summer water quality under different levels of competition/predation. A few highlights from the study include:

- **Catch and Harvest Rates.** Across all waters, legal-sized rainbow trout were caught and harvested at rates 2.5 and 3.8 times greater than brook trout, respectively. These results are not all that surprising, since rainbows were slightly larger than brookies at the time of stocking. However when catch rates are computed on the basis of all sizes (legal + sublegal) of trout, the overall difference in catch/hr across all four study waters was relatively small (1.2 times higher). This data suggest that full season catch rates are fairly similar between the two species.

  On the other hand, a review of catch rates by early, mid, and late season shows that brook trout typically provided slightly better early season angling opportunities, whereas rainbow trout yielded about 2 ½ times higher catch rates during mid and late season periods (Figure 1).

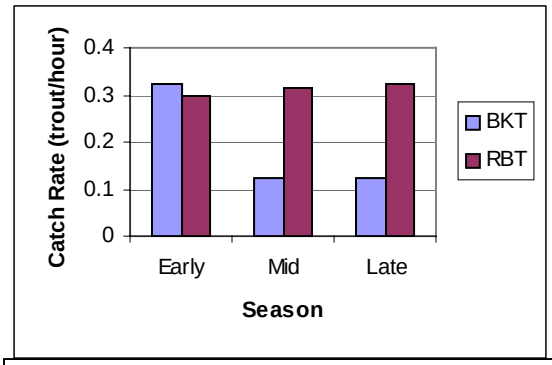


Figure 1. Catch Rate by Species and Season

- **Size Quality and Growth.** Brook trout produced fisheries of lower size quality than rainbow trout. Brook trout averaged 11.2 inches long and weighed 0.62 pounds, where as rainbows averaged 14.6 inches long and weighed 1.1 pounds across all study waters. Furthermore, monthly growth rates for rainbows were approximately 50% greater than brook trout for both length and weight.

- **Holdover and Survival.** Rainbow trout survival (holdover potential) exceeded brook trout on three out of the four study ponds. The annual survival estimate for rainbow trout was 2.7 times greater than brook trout (14 and 38%). Across all waters, brook trout older than I+ comprised only 10.0% of our sample compared to 55.1% for rainbow trout. These results indicate rainbow trout are more likely to provide quality and trophy sized trout fishing opportunities than brook trout.

- **Diets.** Fall diets of brook trout and rainbow trout were very similar, and surprisingly Eagle Lake strain rainbow trout did not appear to utilize larger, non-insect type food items (i.e. fish, mollusks, crayfish) anymore than brook trout. On the other hand, rainbow trout exhibited fewer empty stomachs and a higher volume of food/kilogram of trout. This may suggest that rainbow trout are more aggressive feeders, which could account for the higher growth rate observations.

Conclusions

Study results are encouraging and support the potential continuation of rainbow trout stocking in select Maine waters, particularly in marginal waters where native salmonid species are unable to provide satisfactory angling, and where nonnative salmonids (i.e. brown trout) provide low returns. About 10,000 rainbows are stocked annually in support of this study. Current plans are to continue stocking rainbows in most of these waters. Furthermore, an initial modest stocking increase is planned for southern and central Maine, including some waters that were historically stocked with rainbows, as well as some new proposed stockings. All “new” stocking proposals will undergo an internal and public review process

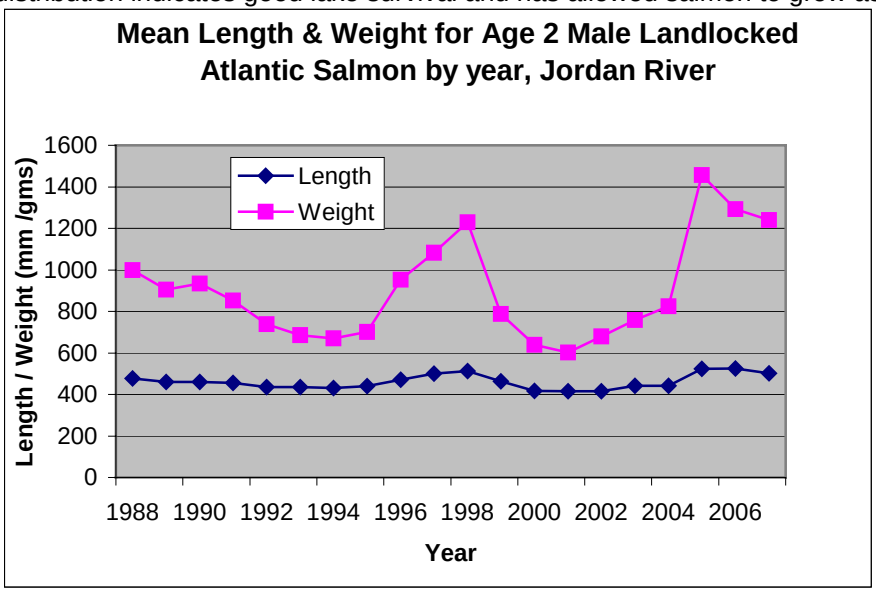
before any management and stocking changes are authorized. This review process ensures adherence to established Department policies and ensures proposals are biologically sound.

Scott and Crossman (Fishes of Canada) state, "The rainbow has been one of the more successful, more appreciated, and less potentially dangerous of the many attempts to introduce a fish to areas beyond its natural range." Despite the proven benefits of rainbows, the Department needs to consider the risks and implications involved with introducing a non-native trout species into Maine waters. Particularly, when evidence suggests rainbow trout likely have negative interactions with native salmonids like brook trout and Atlantic salmon. Rainbow trout will presumably only create significant, long-term impacts to native species if they establish self-sustaining populations, or if they are continually stocked on top of existing wild salmonid populations. Although historical stockings in Maine suggest establishment is unlikely on most waters, it has occurred on a few of our larger river systems. The Department will take precautions to minimize risks of rainbow interactions with wild salmonids and to reduce potential for the establishment of self-sustaining populations.

Sebago Lake Fishing update

According to Carroll Cutting, proprietor of Jordan's Store in Sebago, ex-MDIFW advisory council member, long time angler, and a most genuine person, the salmon fishing in 2007 on Sebago was some of the best he has ever seen on the lake - that's over 3 to 4 decades. Certainly a testament to the improving fishery. Salmon in the 3 to 7 pound size range were the norm, particularly during the annual spring flurry that coincides with the smelt spawning run. Catches of 6 to 12 salmon per trip were reported from experienced anglers through the month of July. For management purposes we refer to the 1988 fishery as a historical "bench mark" of what anglers would like to see reestablished in the lake. The salmon fishing this past season appears to have exceeded the 1988 level, at least in terms of size quality. An active creel survey was not conducted in 2007 so no assessment of angler catch rate was undertaken in '07. These overall positive changes in the salmon fishery, as well as reported improvements in lake trout size quality have been well received by lake fishermen.

The Jordan River fish trap captured 161 adult stocked salmon, which is up considerably from recent previous years. Three age classes (2, 3, 4) were well represented, as well as a small number of 5 year olds. This relatively broad age class distribution indicates good lake survival and has allowed salmon to grow as large as 8 pounds. Age 3 stocked salmon were as large as 6 to 7 pounds, although some that didn't grow and/or were injured were as small as 2 pounds.



Age 2 and 3 male salmon collected at the Jordan River Fish trap are monitored annually to assess trends in mean growth and size. As for the Age 2 salmon, this past fall and the prior 2 years have produced salmon that exceeded size "standards" observed in 1988, with a slight reduction in mean size in 2007 from that observed in '06 and '05 (see table). The age 3 salmon have exceeded 1988 size quality standards for the past 4 years, although this age group is slightly smaller on average than the previous 2 years.

A mechanical problem with the hydroaccoustic boat prevented the completion of a smelt survey in 2007 to quantify smelt abundance. However, a robust spring spawning run in the Songo and Crooked rivers, and anecdotal reports from lake anglers suggest good numbers of smelt are now present in the lake. Prior to 2007, the smelt population has been steadily and rapidly increasing since 2001.

In response to the designation of Sebago Lake as Classic Salmon water, we have developed a written fisheries management plan for Sebago. And without question, salmon are the focus under the draft plan being developed with input from the angling community. In fact, other fisheries are not addressed in the plan, with the exception of those species (i.e., togue, smelt, invasive species) that strongly influence salmon management. Since the initial draft plan was developed we have invited and received input from various area fishing groups, including Sebago Lake Anglers Association, Windham/Gorham Rod & Gun Club, Sebago Chapter of Trout Unlimited, as well as the Sportsmen's Alliance of Maine. At the time of this writing we are also anticipating comments from Pine Tree Fish & Game Club. Once formal comments have been submitted from the organized area-fishing clubs, comments will be discussed (at a public meeting) and where appropriate incorporated in the plan. Comments have been largely positive to date. Once this task is complete a copy of the plan will be added to the Department's website for public review and comment.

Based on the draft plan several regulation proposals have already been proposed by Sebago Lake Anglers Association, and in concept embraced by us. The final language is still being developed, but in essence the proposals would:

- Allow open water anglers to fish for and keep togue from April 1 through December 30.

- Establish a no size or bag limit on togue, except that there would be a restriction on the harvest of larger togue, which could take the form of a higher "only 1 over provision", or a protective slot on larger togue that would only allow only a single trophy to be harvested.

The proposed fall fishing initiative would increase togue harvest opportunity, which is a stated objective in the fisheries plan. Restricting the harvest of larger, older togue is an effort to establish a "biological control" in the population that is believed to be important in limiting togue abundance. Removal of larger individuals from long standing Lake trout populations in Idaho is believed to have caused togue population explosions and associated management problems for other coexisting sportfish. The harvest of younger individuals in Sebago, while enhancing the older age structure in the population should negatively influence total reproduction, fecundity, and overall population size, which will reduce total predation pressures on the smelt population, so critically important to salmon. If successful, togue anglers will have fewer lake trout to catch, but they will be of much larger size quality. In addition, the salmon fishery will be enhanced by a greater abundance of smelt and associated improvements in salmon abundance and size quality.

At this time it is unlikely either proposed regulations could be promulgated to appear in the 2008 open water fishing law book, however, we plan to advance the fall fishing provision for the 2008 open water fishing season, but it will not appear in the open water fishing law book. We will conduct public outreach to get the word out if the new regulation is adopted. The regulation dealing with togue lengths and bag limits will not be advanced for the 2008 open water fishing season and still needs more public discussion. If approved, new size and bag regulations for togue regulation could become established in the 2009 open water fishing law book.

By Francis Brautigam