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Rainbow Trout Experimental Stocking Program: Rainbow Trout and Brown Trout Field Comparisons

By

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SUMMARY

- This study evaluated the relative field performance of Eagle Lake strain rainbow trout and New Gloucester strain brown trout as part of a larger project to examine the feasibility and value of initiating a rainbow trout stocking program in Maine. Study objectives were: (1) to examine and compare catch rates, returns of stocked trout, growth, and carry-over potential of rainbow and brown trout; and (2) to evaluate whether rainbow trout may be more catchable than brown trout during mid-day hours, and thus more available to the majority of anglers.

- Catch rates were significantly better for rainbow trout than brown trout in lakes and ponds. On average across all study lakes, it took winter anglers 450 hours to catch a legal brown trout versus 74.4 hours to catch a legal rainbow trout, a 6.0-fold difference. Similarly, open water anglers had to fish for 104.3 hours to catch a legal brown trout versus 22.1 hours to catch a legal rainbow trout, a 4.7-fold difference.

- Although rainbow trout exhibited better catch rates than brown trout on rivers, the differences (1.5-1.9 fold) between the two species were much closer than those observed on lakes.

- Seasonal catch rate patterns were similar for both species. Lakes and the Kennebec River showed similar patterns with a spring/early summer peak, followed by a decline during the hotter summer months and an increase as fall approached. The Little Androscoggin River showed a similar pattern, except no increase in catch rates occurred during the fall.

- The total numbers of stocked trout returned to the angler were significantly higher for rainbow trout. Winter returns averaged 23.1% and 6.24% across all lakes for rainbow and brown trout, respectively. Open water returns averaged across all lakes were 79.5% for rainbows and 17.7% for browns. Average full season returns across all study lakes were 101.4 % and 21.8% for rainbow and brown trout, respectively. Kennebec River had returns of 81.1% for all rainbows caught versus 50.0% for all browns, a 1.6-fold difference. Although the Little Androscoggin River exhibited a similar difference in returns (1.5-fold) between the two species, the actual percent returns were substantially lower than those observed on the Kennebec River.

- For lakes, the cost/legal brown trout returned to the angler ranged from $8.71-$42.73 more than a rainbow trout, and averaged $26.55 higher.

- The cost/legal brown trout returned to the angler was a $1.87 and $5.47 more than a rainbow trout for the Kennebec and Little Androscoggin Rivers, respectively.

- The mean incremental growth rate across all age classes was 0.34 and 0.25 inches/month for rainbow and brown trout, respectively. Initial rainbow growth is strong and drops off dramatically, whereas browns show higher and more steady rates of growth starting at approximately age III. The mean growth rate for age II/II+ fish was 0.43 inches/month for rainbows and 0.25 for browns. The mean growth rates from age III on were 0.24 inches/month for browns and 0.19 for rainbows.

- Two and three year-old rainbows constituted 49.1 and 35.7% (84.7%) of all rainbow trout sampled across the five study lakes in 2005. Despite their high catch rates, rainbow trout demonstrated an ability to survive up to age IV+ in four of the five study lakes, and up to age V+ in two of the five waters. The Kennebec River sample was comprised of rainbows up to III+ years of age with the following age –class distribution: 20.7 % I+, 65.5% II+, and 13.8% III+. No holdover rainbows were sampled on the Little Androscoggin River; however, we did obtain evidence of several II+ year-old trout being caught by anglers.

- Although a high percentage of anglers, 48.5-78.4%, fish entirely or partially during mid-day hours, there were no statistically significant differences in the percentage of rainbows versus browns caught during mid-day hours. As anticipated, higher percentages of both trout species were caught during the morning/evening time period.

KEY WORDS: RBT, BNT, ANGLER SURVEY, AGE & GROWTH, CPUE, RETURNS, SIZE AT AGE, TIME OF DAY

INTRODUCTION

Although the original distribution of the rainbow trout (*Oncorhynchus mykiss*) was largely limited to the Northwestern United States and Canada, they have been widely introduced throughout North America and in various countries around the world (Scott and Crossman 1973). Their excellent sporting qualities have certainly made them one of the most popular trout species in the United States. This popularity among anglers, the relative ease of culture in a hatchery environment, and the availability of various strains for different fishery management programs have all contributed to their widespread use in state and federal stocking programs. Eicher (1946), Swink (1983), and Hartzler (1988) all reported rainbow trout comprise a significant component of many state salmonid stocking programs. A more recent survey revealed 36 out of 37 responding states had rainbow trout stocking programs, and every state in the Northeast, other than Maine, had a stocking program for rainbow trout (Pellerin 2000).

Anglers have often queried the Maine Department of Inland Fisheries and Wildlife (MDIFW) about initiating a rainbow trout stocking program. Rainbows were historically stocked in Maine until the early 1940s by the Federal Hatchery system, and an experimental stocking program was conducted by MDIFW from 1968 to 1973. This experimental stocking project compared rainbow trout and brook trout (*Salvelinus fontinalis*) performance, and the project leader recommended continuing a limited stocking program for management and future evaluations (DeSandre 1974). The Department discontinued the rainbow project in 1979 for several reasons including: (1) difficulties associated with acquiring disease-free egg sources; (2) the danger of accidental mixing of rainbow trout with other coldwater species in the hatchery system leading to an introduction in drainages where they might compete with native salmonids; and (3) they did not strongly meet some expectations (i.e. establishment of self-sustaining populations, low returns).

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 and Department heads concluded to move forward with a limited, experimental program to evaluate the relative performance of rainbow trout against brown trout (*Salmo trutta*) and brook trout. A new evaluation was deemed necessary for several reasons including: evaluation against a different species (brown trout), changes in expectations, and to address problems associated with earlier rainbow trout studies. Our intentions were to determine if rainbow trout could provide fishery managers with an additional tool to improve fishing opportunities for Maine anglers. The study was conducted over a 5-year period in a variety of Maine waters and included three parts: (1) field performance comparisons of browns and rainbows, (2) field performance comparisons of brookies and rainbows, and (3) hatchery performance comparisons among all three species.

In the remainder of this paper the author discusses field performance comparisons of brown trout and rainbow trout. Although many studies have compared the field performance of these two species (Shetter and Hazard 1940; Tremblay 1943; Shetter 1944; Shetter 1962; Cooper 1952; Elliot 1975; Kalishek and Winn 1996; Kirn 1999; Lemon and Elliot 1999; Baird et al. 2006;), none of these studies have necessarily compared the same two strains or their performance in Maine waters. The latter tend to be of lower productivity and more acidic than those in other states. Study objectives were to: (1) examine and compare catch rates, returns, growth, and

carry-over potential of rainbow and brown trout; and (2) evaluate whether rainbows may be more catchable than browns during mid-day hours, and thus more available to the "average" angler.

STUDY AREAS

Brown trout and rainbow trout comparisons were initially conducted on 5 lakes, and 4 river segments located in Maine Fishery Management Regions A, B, and D. Two of the original four river segments, both located in Region D, were eventually dropped from these formal evaluations due to water specific complications (i.e. low use) that yielded limited data in regards to angler catch rates and returns. The remaining waters in the study represent a range of characteristics in terms of size, morphometry, habitat types, water quality, and fish communities. A description of each study water is presented below.

Crystal Lake

Crystal Lake is located in the town of Gray in Cumberland County, Maine. The surface area is 185 acres. Mean and maximum depths are 59 and 25 feet, respectively. This water thermally stratifies and an oxygen deficiency develops below 25 feet; however, a band of cool, oxygenated water exists that is suitable for trout management. The majority of the pond has sand, gravel, or mud substrates and lacks structure such as weed beds, submerged wood, and rock piles. Existing coldwater fisheries management focuses on brook trout and brown trout. Crystal Lake has one small tributary that does not provide sufficient spawning and nursery habitat for trout; consequently annual stockings are required to maintain these fisheries. This water is typically scheduled to receive 250 spring yearling brook trout, 125 fall yearling brook trout, and 250 spring yearling brown trout; however, additional stockings of unscheduled trout are common. Brook trout provide a put-and-take fishery with no evidence of carry-over; browns do carry-over and produce quality-sized fish, but catch rates are low. Other fish species present include[1]: LMB, PKL, GLS, PKS, YLP, EEL, SLT, and LLA. LLA provide a good forage base, whereas SLT are not abundant. Abundance and size of warmwater fish predators are limited by a lack of habitat.

Crystal Lake is open under general law regulations during the open water season with two special regulations S2 and S3 (lake and tributaries closed to the taking of smelt, smelt may be taken by hook-and-line in the lake). Winter fishing is open under general law.

Middle Range Pond

Middle Range Pond is located in the town of Poland in Androscoggin County, Maine. The surface area is 382 acres. Maximum and mean depths are 66 and 29 feet, respectively. Although an oxygen deficiency develops below 46 feet, summer water quality is quite good for salmonids. Middle Range has predominantly sand, gravel, or mud substrates. Other than the thoroughfare, the main lake lacks any significant amount of weedy areas. Existing coldwater fisheries management focuses on brook trout and brown trout. The pond has two perennial and several intermittent tributaries; however, spawning and nursery habitat are limited and annual stockings are required to maintain these fisheries. This water typically receives 750 spring yearling brook trout, 75 fall yearling brook trout, and 300 fall yearling brown trout; however, additional

[1] 3-letter species codes are defined in Appendix A.

stockings of unscheduled trout are common. Brook trout provide a put-and-take fishery with no evidence of carry-over; brown trout do carry-over and produce quality-sized fish, but catch rates are low. Other fish species include: LKT, SMB, LMB, WHP, YLP, PKL, GLS, WHS, BUL, PKS, RBS, SCL, EEL, SLT, and LLA. LLA and SLT provide forage for piscivorous fish species.

Middle Range Pond is open under general law regulations during the open water season with two special regulations; S2 and S3 (lake and tributaries closed to the taking of smelt, smelt may be taken by hook-and-line in the lake). Winter fishing is open under general law.

Upper Range Pond

Upper Range Pond is located in the town of Poland in Androscoggin County, Maine. The surface area is 357 acres. Maximum and mean depths are 38 and 20 feet, respectively. During summer stratification an oxygen deficiency develops below 26 feet, but a suitable band of cool, oxygenated water exists for salmonid management. Upper Range is connected to Middle Range via a small thoroughfare, but habitat and substrates are quite different. Upper Range Pond has a broader range of habitats that vary from rocky shorelines to weedy/mucky coves. Existing coldwater fisheries management focuses on brook trout and brown trout. This water has two perennial inlets and several intermittent streams. Limited natural reproduction of brown trout and brook trout has been documented in one of the streams, but spawning and nursery habitats are inadequate and annual stockings are required to maintain these fisheries. This water typically receives 300 fall yearling brown trout; however, additional stockings of unscheduled brook trout are not uncommon. Brook trout provide a put-and-take fishery with no evidence of carry-over; brown trout carry-over and produce quality-sized fish, but catch rates are low. Other fish species include: SMB, LMB, WHP, YLP, PKL, GLS, WHS, BUL, PKS, RBS, SCL, EEL, SLT, and LLA. LLA and SLT provide forage for piscivorous fish species.

Upper Range Pond is open under general law regulations during the open water and winter fishing seasons.

Lake George

Lake George is located in the town of Canaan in Somerset County, Maine. This 318-acre lake has a maximum and mean depth of 68 and 24 feet, respectively. It thermally stratifies during the summer and typically experiences an oxygen deficiency below 49 feet. This water has predominantly rocky shoreline habitat with few shallow, weedy areas. Two perennial inlets enter the lake and the outlet flows into Oaks Pond, which is located in the Kennebec River drainage. Lake George was historically stocked with brown trout. An experimental stocking program for anadromous alewives was undertaken in 1988 to measure the affects on freshwater ecosystems. Salmonid stockings throughout the 9-year alewive study and in the years following were variable. In more recent years, Lake George has been stocked with brown trout and splake. Other species present include: SPK, SMB, WHP, YLP, PKL, BUL, SLT, EEL, WHS, GLS, FLF, RBS, and PKS. Smelts are relatively abundant and provide an excellent forage base for piscivorous fish species.

Lake George is open under general law regulations during the open water season with three special regulations; S3, S18, and S23 (tributaries closed to the taking of smelt, 2 BKT-minimum

length 8 inches, open in October ALO & catch-and-release). Winter fishing is open under general law with the following special regulation; S-19 (2 trout bag limit).

Megunticook Lake

Megunticook Lake is located in the town of Camden in Knox County, Maine. The surface area is 1,328 acres. Maximum and mean depths are 64 and 23 feet, respectively. Megunticook Lake thermally stratifies in the summer, and an oxygen deficiency typically develops below 26 feet. This water has a convoluted rocky shoreline with many islands and is characterized by a variety of littoral habitat types, as well as several large basins. Ten inlets enter the lake including one that is a short connection to Norton Pond, and the outlet flows directly to the ocean. Spawning and nursery habitats are limited and salmonid stocking is required to maintain a viable sport fishery. Megunticook Lake was historically stocked with landlocked salmon (*Salmo salar*), but the fishery was inconsistent due to smelt fluctuations and water quality constraints. Rainbow trout were stocked experimentally in the 1970s; however, they were replaced with a brown trout stocking program when the rainbow study was terminated. Brown trout have provided a reasonably successful fishery, but catch rates and returns are relatively low. In the 1990s, the lake association petitioned MDIFW to allow rainbow stocking from a private hatchery source, which has occurred since 1995. Brown trout and rainbow trout have been stocked at the rate of approximately one fall yearling per surface acre and rainbows at 0.5 spring yearling per surface acre, respectively. Other species present include: BKT, SMB, LMB, WHP, YLP, PKL, BUL, SLT, EEL, WHS, GLS, FLF, BKF, and PKS.

Megunticook Lake is open under general law regulations during the open water season with the exception of two special regulations: S2 and S3 (lake and tributaries closed to the taking of smelt, smelt may be taken by hook-and-line in the lake). The winter season is open under general law regulations.

Kennebec River

The Kennebec River originates as the outlet of Moosehead Lake and flows into the Atlantic Ocean near the towns of Phippsburg and Georgetown, Maine. The study reach includes the river below Shawmut Dam in the town of Benton downstream to the Fairfield boat landing. This reach is approximately 3.3 miles in length with a width that varies between 200 and 2000 feet. Depths of up to 20 feet exist, but most of the water is less than 10 feet deep. The section consists of primarily deep runs with shallower runs throughout, and some shallow to deep riffles depending on flows. The river substrate is primarily gravel, rubble, and boulders with scattered outcrops of ledge, but areas of lower flow are generally characterized by sand and silt substrates. Temperature monitoring of the upper reach indicates that temperatures commonly exceed 20ºC from mid June to mid September. Coldwater fisheries are maintained entirely by stocking, because natural reproduction is negligible. This section of the river has been stocked with 2,000 spring yearling brown trout annually since 1985. In addition, the study reach has been stocked with equal numbers of rainbow trout by private sources from 1992 to 2000. Areas above and/or below the Shawmut section are routinely stocked with browns and landlocked salmon. Other species present include: LLS, BNT, LMB, SMB, WHP, YLP, PKL, PIK, WHS, LNS, BUL, PKS, BLC, CMS, GLS, CCB, BND, NSK, MIN, EEL.

This section of the Kennebec River has the following regulations: open year round; ALO; 16-inch minimum length limit; and a daily bag limit of one salmonid.

Little Androscoggin River (Lower)

The study area on the Little Androscoggin River extends from the Welchville Dam in the Town of Oxford downstream to the tail waters of Upper Barker's Dam in the Town of Auburn, Maine. This 20-mile long section of the river can generally be characterized as a meandering channel with sand/mud substrate, slow flowing water, and relatively deep runs and/or pools. Most of the accessible and suitable trout habitat in this section of the river is limited to smaller areas of broken water consisting of primarily cobble, boulder, and ledge substrates. These areas consist of either natural riffle-pool type habitat or bypass-tailwater sections below the several dams present within the reach. These broken water habitat segments comprise approximately 1.3 miles of the 20-mile reach, and were the focus of this study. The width of the river varies widely, but is generally between 100 to 200 feet across. Summer temperatures typically range from about 18-24ºC, but may exceed 27ºC on occasion. Although a few wild brook trout are caught during the early and later part of the fishing season, supplemental stocking is required to produce a viable sport fishery. Prior to the rainbow study, this reach of the river was stocked with approximately 1,600 spring yearling brook trout and 4,000 spring yearling brown trout annually. Brook trout provided popular early to mid season angling with no evidence of carry-over, while browns were available throughout the entire season and afforded limited carry-over. Brautigam (2000) conducted a detailed assessment of prior trout stocking programs in this section of the Little Androscoggin River. Other fish species present include: LMB, SMB, YLP, PKL, WHS, BUL, PKS, CMS, GLS, CCB, BND, FLF, MIN, and EEL.

General law fishing regulations apply to this reach with the following exceptions: April 1st-August 15th S-19 (2 trout bag limit); August 16th to October 31st S-6, S-8 (ALO, 1 trout bag limit).

METHODS

Eagle Lake Strain rainbow trout obtained from the Erwin National Fish Hatchery and New Gloucester strain brown trout were propagated at the Casco and New Gloucester State Fish Hatcheries as regular production lots. Hatchery staff were instructed to alter feeding regimens as needed to maintain similar mean sizes between the two species at the time of stocking to reduce size dependent differences in field performance. Beginning in 2001, all of the study waters were stocked annually with paired stockings of rainbow trout and brown trout. Both species were stocked at the same location(s) and on the same day, and all trout were fin clipped according to MDIFW's standard four-year rotational marking schedule. Rivers were stocked with spring yearling trout in either April and/or May, except in 2005 when unusually high flows resulted in a May and June stocking on the two rivers. All lakes were stocked with fall yearling trout in October or November. Prior to stocking, hatchery staff obtained total lengths (mm) and weights (g) for 30 individual trout of each species. Summaries of trout stockings and size data are presented in Appendices B and C.

Standard roving ice and open water clerk creel surveys were conducted on all of the study waters for a period of four years, 2002-2005. Winter season surveys occurred on all study lakes and typically covered the period from January 1-March 31; however, a few seasons experienced

slightly shorter surveys due to deteriorating and unsafe ice conditions. Open water creel surveys occurred on all study waters, except Crystal Lake; and generally ran from April 1st to October 31st. In some instances, open water surveys may have started later and/or ended earlier than anticipated due to high spring flows and/or staff limitations. Each survey was of a stratified random design, with one weekend day/holiday and one weekday sampled each week. Initially survey days were divided into 2 or 3 discrete sampling time blocks (Table 1) with approximately equal coverage given to each period throughout the survey. This design was used to address the study objective of mid-day catchability; however, after the first season it was determined that this sampling regimen was limiting the number of clerk-angler contacts. This reduced data availability for higher priority study objectives, i.e. examining catch rates and returns of stocked trout. Consequently, sampling periods were adjusted beginning the second year to capture periods of peak angling activity. This change resulted in most ice surveys being conducted between the hours of 10 AM and 2 PM, while most open water surveys were sampled in 3-4 hour time blocks that alternated between morning and evening hours. The only exception to this pattern was the Kennebec River, which was sampled almost exclusively during the evening. During each sampling event, clerks made instantaneous angler counts on each water surveyed. Angler counts were then expanded using angler activity curves to estimate total fishing effort by water, season, and year.

Table 1. Sample time periods for creel surveys by Season.

ICE SEASON				
Months	**AM**		**PM**	
Jan-March	0830 - 1230		1230-1630	
OPEN WATER SEASON				
Months	**Morning**	**Afternoon**	**Evening**	**Day Length**
Apr-Aug	0600-1000	1100-1500	1600-2000	14 hours
Sep-Oct	0700-1030	1130-1500	1600-1930	12 Hours

Voluntary creel data were also collected, and included the use of voluntary record-keepers and voluntary creel boxes. Creel boxes were only utilized during the summer season and placed at all convenient access sites. All creel boxes contained signage for species identification with text/color photos and an explanation of the project (Appendix D). Use of voluntary data was limited due to its inherent biases; however, it was used to investigate the mid-day catchability objective and to supplement findings observed in the clerk data.

Even when pooled over the entire four-year study period, creel census information provided limited age and growth data on both species due to low catch and/or harvest rates. All study lakes were sampled with various gear types during the final year of the study to collect additional fish data for age and growth analyses, with the goal of collecting 30 trout of the predominant age class for each species. Sampling techniques included electrofishing, trapnetting, and/or gillnetting. We failed to reach our sample size goals for most waters; consequently all trout data were typically pooled across years and/or lakes for analysis purposes. Experimental angling was used to collect additional age and growth data for the Kennebec River. No additional data collections were conducted on the Little Androscoggin River due to a lack of carry-over.

Brown trout were stocked in all study waters prior to the initiation of this project, which complicated the direct comparison of the two species. All brown trout data are presented in appendices E and F; however, data presented in the results has been adjusted to account for only

browns that originated from stockings conducted during the study period. "Non-study" brown trout for all lake surveys were identified by marks and/or fish size, and removed from analyses. When size was used as the only criteria and there was any doubt as to a brown trout's origin it was deemed a study brown. Kennebec River data had to be adjusted for both pre-study stockings and migrants from outside of the study reach. This was done using percentages of marked versus unmarked trout from voluntary book data supplied by Scott Davis, an MDIFW employee who keeps personal fishing data on the Kennebec fishery. No adjustments were needed for the Little Androscoggin since dropdowns and holdovers were negligible. Also, no corrections were applied to voluntary data due to a lack of accurate mark and size information.

Data were managed and analyzed with a variety of computer software including SAS (SAS Institute, Inc. 1985), MS Access (Microsoft Corporation 2000), MS Excel (Microsoft Corporation 2000), and Statistix 7 (Analytical Software 2000). Standard statistical procedures were used for interspecies comparisons where appropriate at the statistical significance level of $p \leq 0.05$.

RESULTS

A summary of general clerk creel census statistics for the entire study period is provided by water, season, and year (Appendix E). A similar summary of open water voluntary data is located in Appendix E, except it is pooled for the entire study period and presented by water. Creel census and other data in the remainder of this section are presented in context of the specific study objectives identified for the project.

Catch Rates

An examination of winter catch rates (hours/legal) for rainbow trout and brown trout indicates catch rates were quite variable among lakes, and even among years for the same water. However, catch rates were consistently better for rainbow trout throughout the study period (Table 2). During the study period, the hours required to catch a legal rainbow trout in the winter were significantly less (Wilcoxon Rank Sum Test, 1-tailed, $p < 0.05$) than brown trout for all waters.

Table 2. Mean catch rate (hours/legal) during the ice fishing season by species, lake, and year.

Water	Species	Year				
		2002	2003	2004	2005	All
Crystal L	RBT	37.0	29.4	76.9	50.0	43.5
	BNT	333.3	35.7	142.8	71.4	83.3
Middle Range P	RBT	200.0	83.3	100.0	71.4	100.0
	BNT	>825.8	1000.0	200.0	500.0	500.0
Upper Range P	RBT	200.0	47.6	58.8	83.0	66.7
	BNT	>629.6	250.0	200.0	333.3	333.3
Lake George	RBT	333.3	166.6	76.9	83.3	125.0
	BNT	>2503.0	1000.0	1000.0	1000.00	1000.0
Megunticook L	RBT	83.3	30.3	43.5	27.0	37.0
	BNT	>741.0	200.0	1000.0	142.9	333.3

A graphic representation of the pooled results by lake clearly demonstrates the higher effort required to catch a legal brown trout (Figure 1). Depending on the water, it took anglers anywhere from 1.9 to 9.0 times longer to catch a legal brown during the winter season. The mean of means for all lakes combined equates to 450 hours to catch a legal brown trout versus 74.4 hours to catch a legal rainbow trout, a 6.0-fold difference.

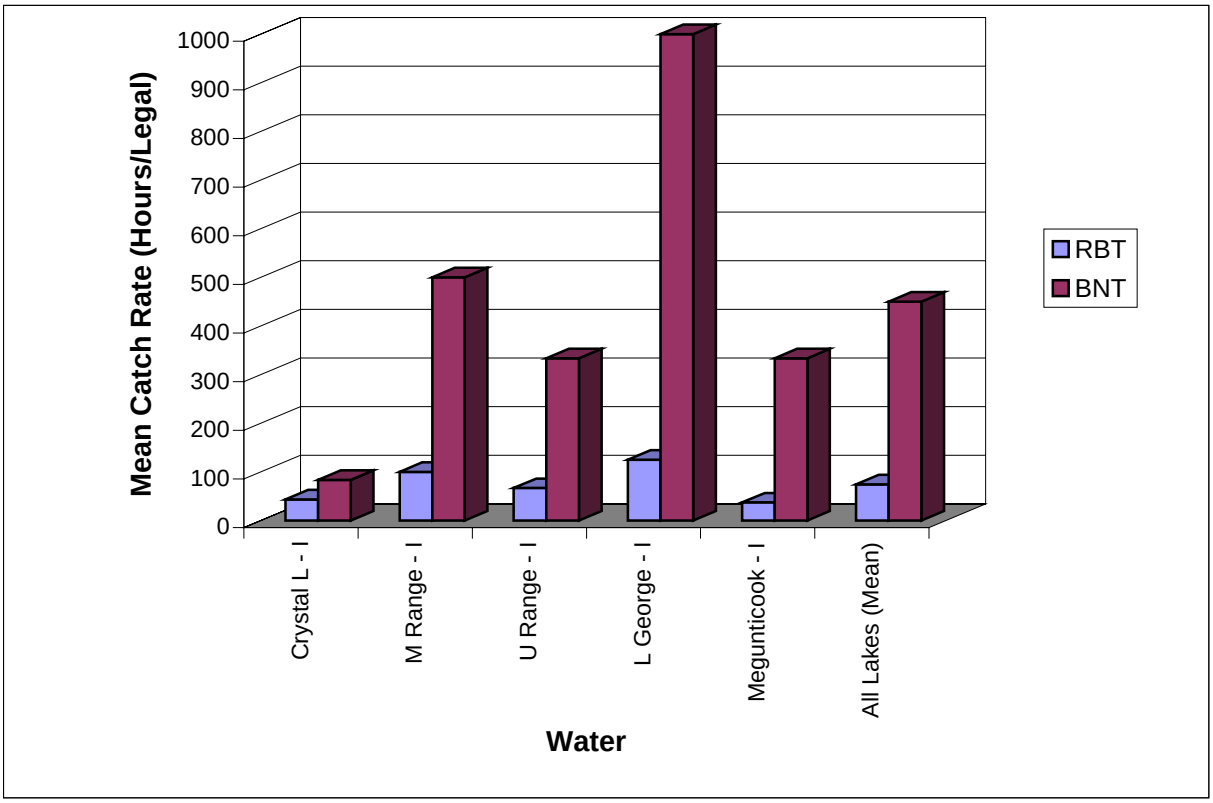

Figure 1. Mean catch rate (hours/legal) during the ice fishing season by species and water, 2002-2005.

The same analyses and procedures show similar results for the open water season (Table 3). Rainbow trout catch rates were significantly better than brown trout for all study lakes (Wilcoxon Rank Sum Test, 1-tailed, $p < 0.05$). Interestingly, open water catch rates (hours/legal) on lakes were consistently better than winter rates for both species. During the study period (2002-2005), it took winter anglers between 2.2 and 9.5 times longer to catch a legal trout than during the open water season. On average winter anglers spent 4.9 more hours to catch a legal trout.

River catch rates were also typically worse for brown trout (Table 3). In only one instance, the Kennebec River in 2002, were the hours required to catch a legal brown trout less than that necessary to catch a rainbow trout. This occurrence was the result of the high legal length limit (16-inches) and the lack of larger, holdover rainbows present in the system during the first years of the project. Due to the high minimum length limit on the Kennebec River and the stocking of catchable-sized trout in other study waters, using hours/trout for the Kennebec provides a more meaningful comparison among waters. No statistical analyses were conducted on the Kennebec River due to the methods employed for controlling known variability in the data (i.e. catch rate adjustments for study trout). Once again, rainbow trout catch rates on the Little Androscoggin

River were statistically better than brown trout for the study period (Wilcoxon Rank Sum Test, 1-tailed, $p < 0.05$).

Table 3. Mean catch rate (hours/legal) during the open water fishing season by species, lake, and year.

Lakes						
		Year				
Water	**Species**	**2002**	**2003**	**2004**	**2005**	**All**
Middle Range P	**RBT**	15.9	23.3	13.0	4.5	10.5
	BNT	35.7	250.0	30.0	83.3	62.5
Upper Range P	**RBT**	71.4	16.4	27.0	38.5	27.7
	BNT	142.9	166.6	27.8	250.0	76.9
Lake George	**RBT**	76.9	23.8	40.0	23.3	33.3
	BNT	142.6	71.4	200.0	>336.3	166.7
Megunticook L	**RBT**	25.0	25.6	13.2	18.5	16.7
	BNT	142.9	58.8	142.9	125.0	111.1
Rivers[1]						
Water	**Species**	**Year**				
		2002	**2003**	**2004**	**2005**	**All**
Kennebec R (hours/legal)	**RBT**	>575.3	20.4	15.4	40.0	22.1
	BNT	111.1	142.9	142.9	166.7	131.6
Kennebec R (hours/trout)	**RBT**	37.0	6.3	3.4	3.2	4.7
	BNT	40.0	24.4	5.1	4.2	8.9
L Androscoggin R	**RBT**	5.2	6.7	4.7	3.9	5.1
	BNT	10.5	23.3	3.9	6.0	7.5

[1] No statistical analyses were conducted on the Kennebec River figures.

A graphic representation of the pooled results by water clearly demonstrates the higher effort required to catch a legal brown trout during the open water season on both lakes and rivers (Figure 2). Depending on the lake, it took anglers anywhere from 2.8 to 6.7 times longer to catch a legal brown during the open water season. The mean for all lakes during the study period equals 104.3 hours to catch a legal brown trout versus 22.1 hours to catch a legal rainbow trout, a 4.7-fold difference. Although rainbows still exhibited better catch rates than browns on rivers, the differences (1.5-1.9 fold) between the two species were much closer than those observed on lakes.

Open water voluntary census data for the study period are presented in Appendix F. These data generally parallel clerk survey results. Crystal Lake was an anomaly with a mean catch rate for browns that appears to be superior to the catch rate for rainbows; however, a Wilcoxon Rank Sum Test reveals that the brown trout catch rate was not significantly better ($p \leq 0.05$). Unfortunately, no open water clerk data was available for this lake to further investigate this apparent discrepancy.

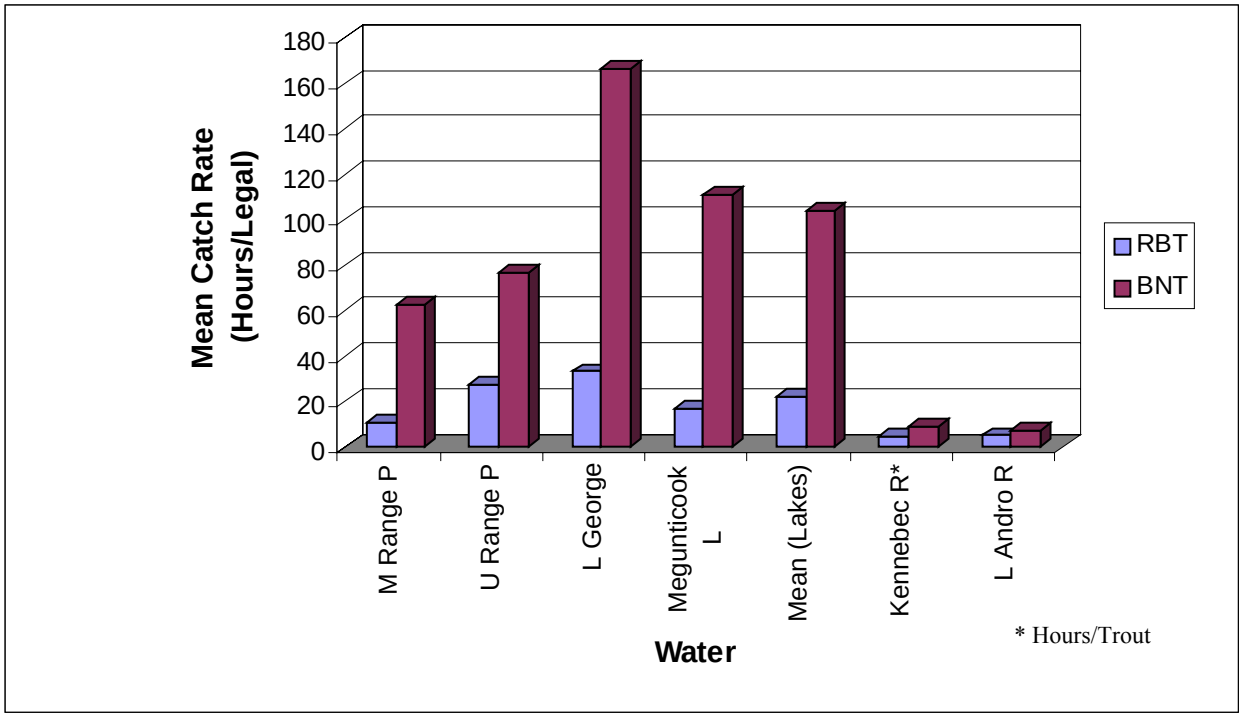

Figure 2. Mean catch rate (hours/legal) during the open water season by species and water, 2002-2005.

A comparison of catch rates for rainbow and brown trout by month showed almost identical seasonal patterns between the two species for both lakes and river systems (Figures 3-5). However, the pattern for lakes is different from that of the two rivers, and the rivers themselves exhibit different seasonal patterns. The pattern on lakes clearly showed lower catch rates (legals/hour) for both species during the winter season. A peak occurred from April-June, which is followed by a decline in catch rates during the summer season, and then another increase as fall approaches. In general, the Kennebec River shows a similar trend, except the spring peak is shorter and occurs primarily in the month of June. The pattern on the Little Androscoggin River is different from lakes and the Kennebec in that it shows a more pronounced peak in the spring and no improvement in fall catch rates after the summer period.

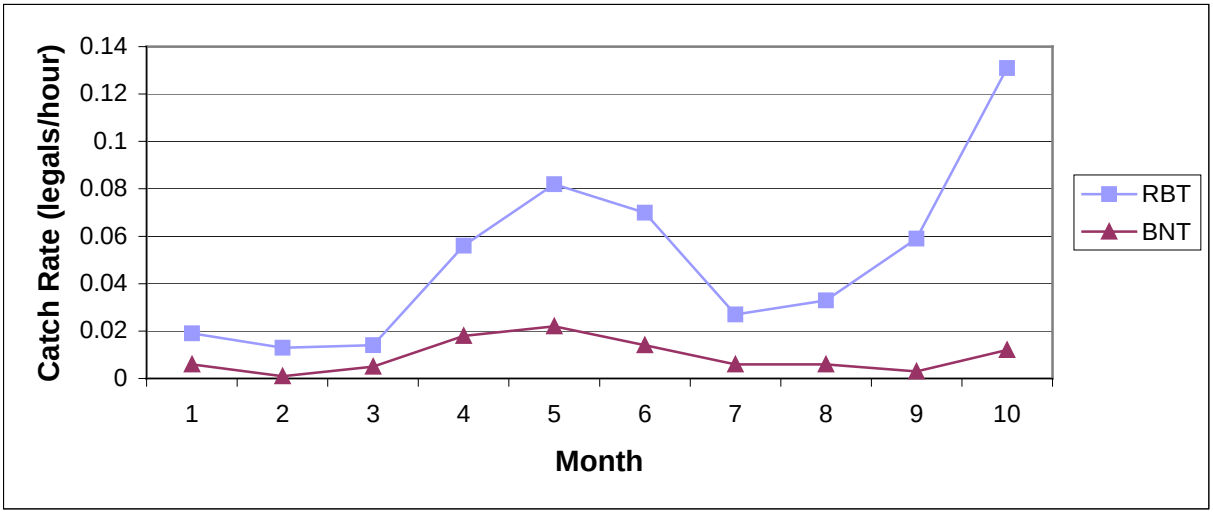

Figure 3. Clerk Survey catch rate (legals/hour) data by month for all lakes, 2002-2005.

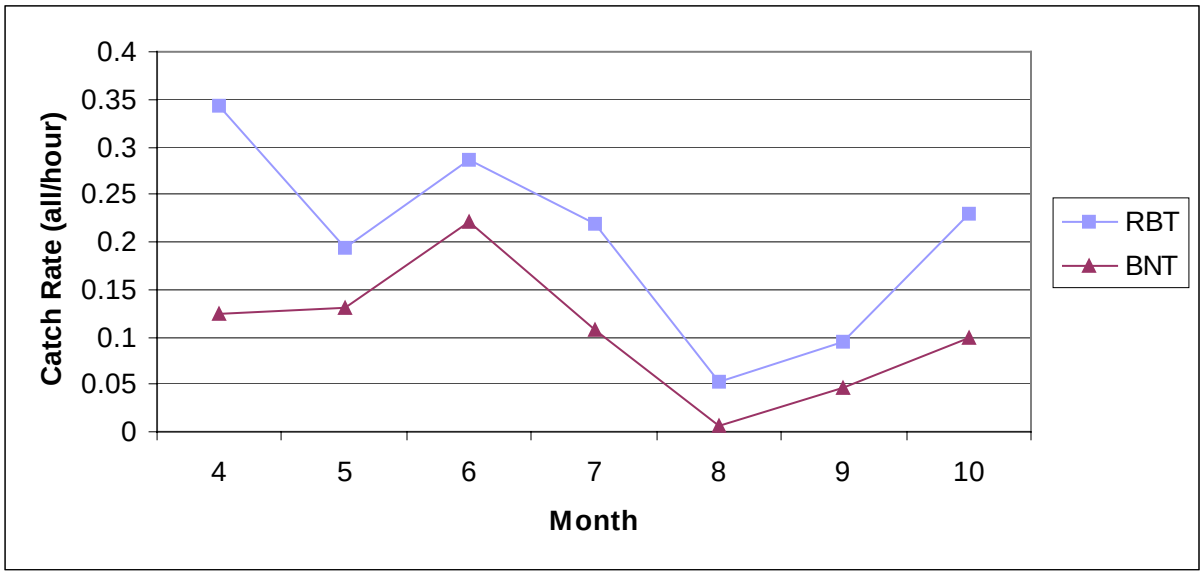

Figure 4. Clerk survey catch rate (all/hour) data by month for the Kennebec River, 2002-2005.

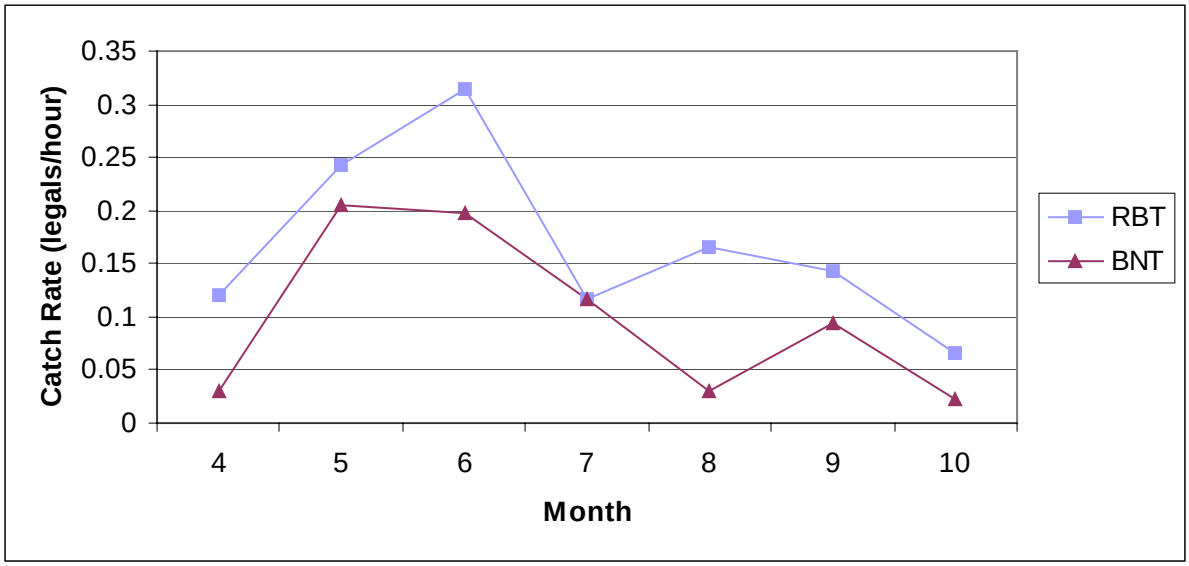

Figure 5. Clerk survey catch rate (legals/hour) data by month for the Little Androscoggin River, 2002-2005.

Returns

Table 4 illustrates total trout returns for the 2001 age class throughout the entire study period, 2002-2005. The 2001 age class is the most appropriate for examination, because (1) both species of trout exhibited holdover up to five years of age, and (2) few trout contribute to the fishery beyond age V+. Return data presented were computed by dividing the total number of trout caught (kept and released) by anglers into the total number of trout stocked in the fall of 2001. Rainbow trout returns on lakes ranged from 40.9% to 128.7%, and averaged 85.0% across the four lakes with both winter and open water data. Trout returns exceeding 100% are largely attributed to fish recycling from catch-and-release practices, and will be discussed in more detail

later in this report. Other than Crystal Lake, brown trout returns for a single cohort could not be examined due to the low numbers of brown trout observed each year. Kennebec River trout returns were not analyzed by age class for similar reasons, and holdover was negligible on the Little Androscoggin River. Consequently, trout return data by age class provides limited opportunity to compare the performance of the two trout species.

Table 4. Estimated number of legals caught and percent returns () for the 2001 age class by water, species, and year.

Water	Species	# Stocked	2002	2003	2004	2005	Total
Crystal L[1]	RBT	300	97 (32.3)	22 (7.3)	3 (1.0)	3 (1.0)	125 (41.7)
	BNT	300	11 (3.7)	46 (15.3)	6 (2.0)	0	63 (21.0)
M Range P	RBT	325	81 (24.9)	43 (13.2)	0	9 (2.8)	133 (40.9)
	BNT	325	ISD	ISD	ISD	ISD	ISD
U Range P	RBT	150	70 (46.7)	91 (60.7)	32 (21.3)	0	193 (128.7)
	BNT	150	ISD	ISD	ISD	ISD	ISD
L George	RBT	200	71 (35.5)	52 (26.0)	4 (2.0)	0	127 (63.5)
	BNT	200	ISD	ISD	ISD	ISD	ISD
Megunticook L	RBT	600	524 (87.3)	97 (16.2)	21 (3.5)	0 (0.0)	642 (107.0)
	BNT	600	ISD	ISD	ISD	ISD	ISD

[1]Data only available for Winter Season ISD – Insufficient data for analysis

In order to compare the two trout species, return data presented and discussed in the remainder of this paper were computed by dividing the total number of trout caught (kept and released) by anglers into the total number of trout stocked for the specified time period. Two problems associated with this type of return computation include: (1) a potential to underestimate the actual return rate, because the full contribution of younger age classes in later years has not been realized, or (2) a potential to overestimate the actual return rate when multiple year classes of trout contribute to a single season and/or year's return rate. Although not a "true" return rate, fisheries scientist commonly express trout returns in this manner when cohort data is insufficient, and these return values are certainly appropriate for the species comparisons being discussed.

A complete summary of trout return data is presented in Appendix G. The percentage of legal trout returned was highly variable among waters, and even among years for the same water. Table 5 summarizes the percentage of stocked trout caught as legal-sized fish by water, species, and season for the entire study period, 2002-2005. Percent returns of stocked rainbow trout were significantly higher (χ^2, d.f. 1, $p < 0.0001$) than brown trout during the study period for all waters and all seasons. Winter returns averaged 23.1% and 6.24% across all lakes for rainbow and brown trout, respectively. Open water returns averaged across all lakes were 79.5% for rainbows and 17.7% for browns. Statistical analyses of the pooled data with a more robust test, reveals stocked rainbows still returned in significantly higher numbers during both the winter and open water seasons (Wilcoxon Signed Rank Test, 1- tailed, $p=0.0043^{winter}$ and $p=0.0000^{open\ water}$). Similar to catch rates, returns of stocked trout of both species were consistently higher during the open water season.

For lakes, full season (winter and open water combined) percent returns for rainbow trout varied from 3.4 to 6.9 times higher than brown trout (Figure 6). Average full season returns across all study lakes were 101.4 % and 21.8% for rainbow and brown trout, respectively. The difference was determined to be highly significant (Wilcoxon Signed Rank Test, 1-tailed, p=0.0000).

The Kennebec River had returns of 81.1% for all rainbows caught versus 50.0 % for all browns, a 1.6-fold difference. Although the Little Androscoggin River exhibited a similar difference in returns (1.5) between rainbows and browns, the actual percent returns for the two species were substantially lower than the Kennebec River.

Table 5. Percent legals caught and harvested by water, species, and season, 2002-2005.

Water	Season	% Caught Returns (legals)		% Harvest Returns	
		RBT	BNT	RBT	BNT
Crystal L	Ice	27.9	15.1	27.0	9.5
M Range P	Ice	8.4	1.5	5.9	0.2
	Open	64.7	12.8	14.3	0.2
	Full	73.1	14.3	20.2	0.4
U Range P	Ice	46.5	11.2	39.8	3.7
	Open	102.2	32.5	16.3	2.0
	Full	148.7	43.7	56.2	5.3
L George	Ice	18.1	1.6	16.5	1.6
	Open	57.0	9.1	44.1	3.0
	Full	75.1	10.8	60.6	4.6
Megunticook L	Ice	14.6	1.8	8.5	0.3
	Open	93.9	16.5	10.7	1.3
	Full	108.5	18.3	19.2	1.7
Kennebec R	Open	15.9	3.1	0.6	0.0
Kennebec R (All Trout)	Open	81.1	50.0	NA	NA
L Andro R	Open	22.6	15.0	2.7	1.8

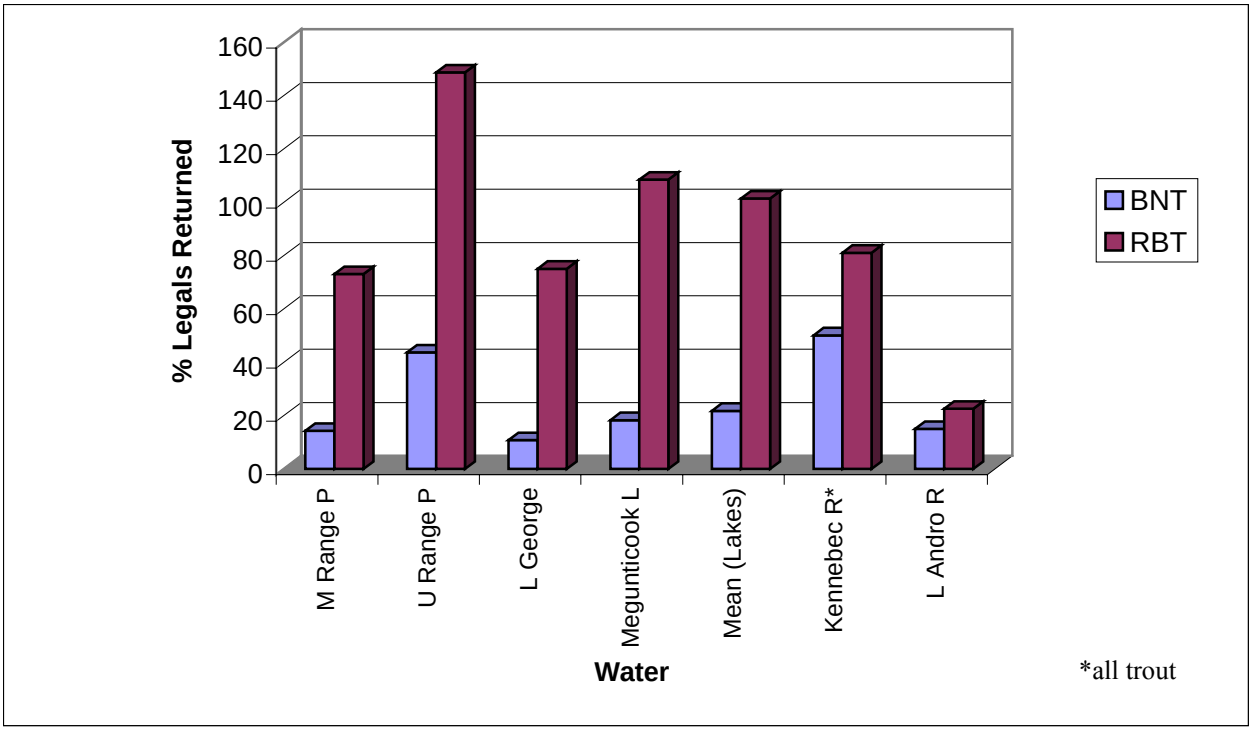

Figure 6. Full season percent returns by water and species, 2002-2005.

Percent harvest returns on lakes were also consistently higher for rainbows than browns (Table 4), which would be expected given the higher catch rates for rainbow trout. However, percent harvest returns were disproportionately higher than the catch rates observed for the two species. For example, the average percent harvest return across all lakes was 13.0 times higher for rainbows than browns versus only a 4.7 times higher catch rate for rainbow trout. This data suggests rainbows were being harvested at higher rate for reasons other than differences in catch rate alone.

Based on estimates from 2000, the total cost to propagate and stock spring yearling and fall yearling brown trout were $2.44 and $5.39 per trout, respectively (Wilson 2006). The estimated cost per legal trout returned to the angler was consistently higher for brown trout than rainbow trout (Table 6). For lakes, the cost/legal brown trout returned ranged from $8.71-$42.73 more than a rainbow trout, and averaged $26.55 higher. As expected, the cost/legal returned for both species was extraordinarily high on the Kennebec due to the high minimum length limit. In general, the cost difference between the two species (per trout returned) is substantially closer for rivers than lakes.

Table 6. Estimated full season cost/legal trout returned to the angler by water, and species.

Water	RBT[1]	BNT	Cost Difference
Lakes			
M Range P	$7.37	$37.69	$30.32
U Range P	$3.62	$12.33	$8.71
L George	$7.18	$49.91	$42.73
Megunticook L	$4.97	$29.45	$24.48
Mean (Lakes)	$5.79	$32.34	$26.55
Rivers			
Kennebec R	$33.90	$173.87	$139.97
Kennebec R (All Trout)	$3.01	$4.88	$1.87
L Andro R	$10.80	$16.27	$5.47

[1] Assumes rainbow trout and brown trout of similar size cost the same to produce.

Age & Growth

A complete summary of pooled age and growth data by age class is presented in Appendix H; however, for purposes of comparing the two species the remainder of this discussion will focus on trout known to have originated from the paired study stockings and only includes trout of known age. Pooled data refers to fish collected from all sampling events including: creel survey data, gillnetting, trapnetting, and electrofishing.

Mean lengths of rainbow trout ranged from 11.9 inches to 17.7 inches depending on the water, whereas brown trout varied from 11.0 to 16.7 inches (Table 7). Other than Crystal Lake, the mean length of rainbow trout was consistently higher than brown trout on all waters. Mean weights were less consistent; brown trout equaled or exceeded rainbow trout in 4 of the 7 study waters. Mean weights varied from 0.6 to 2.0 pounds and 0.5 to 2.0 pounds for rainbow trout and brown trout, respectively. On the other hand, mean K-factors were consistently higher for brown trout. Brown trout sample sizes were too small for most individual waters to compare the results statistically.

Pooling data across all lakes yields a mean of 16.8 and 16.2 inches for rainbow trout and brown trout, respectively. Although relatively close, the mean length of rainbow trout was significantly larger than brown trout (2 sample t-test, 1-tailed, p=0.0122). Mean weight across all lakes was 1.75 pounds for rainbows and 1.83 pounds for browns, and the difference was not significant (2 sample t-test, 2-tailed, p=0.5053). On the other hand, the mean condition factor of 1.06 for brown trout was significantly larger than 0.98 for rainbow trout (2 sample t-test, 1-tailed, p=0.0000). River data was not statistically analyzed due to the small sample sizes even when pooled and the dissimilarity between the two waters. Information presented thus far indicates both species are providing similar fisheries in terms of size quality.

Table 7. Summary of rainbow and brown trout size and condition, 2002-2005.

Water	Statistic	Length (in)		Weight (lbs)		K-factor	
		RBT	BNT	RBT	BNT	RBT	BNT
Crystal L	N	93	42	83	39	83	39
	MEAN	15.7	16.3	1.3	1.9	0.93	1.05
	SD	1.5	3.0	0.44	1.2	0.10	0.13
M Range P	N	132	14	130	13	130	13
	MEAN	17.7	16.7	2.0	2.0	0.99	1.02
	SD	2.0	3.4	0.7	1.4	0.11	0.13
U Range P	N	109	18	105	17	105	17
	MEAN	17.0	16.3	1.8	1.8	0.97	1.05
	SD	1.7	2.5	0.6	0.9	0.10	0.14
L George	N	93	11	83	11	83	11
	MEAN	16.8	14.6	1.8	1.4	1.01	1.11
	SD	1.9	2.4	0.7	0.9	0.14	0.15
Megunticook L	N	106	13	84	9	84	9
	MEAN	16.7	16.3	1.6	1.9	0.97	1.04
	SD	1.3	1.8	0.4	0.8	0.10	0.15
All Lakes	N	533	98	485	89	485	89
	MEAN	16.8	16.2	1.8	1.8	0.98	1.06
	SD	1.8	2.8	0.6	1.1	0.11	0.13
Kennebec R	N	27	3	22	2	22	2
	MEAN	15.8	14.7	1.5	1.1	1.04	1.08
	SD	1.2	0.9	0.3	0.0	0.13	0.02
L Andro R	N	44	6	44	6	44	6
	MEAN	11.9	11.0	0.6	0.5	0.98	1.05
	SD	1.2	0.7	0.2	0.11	0.11	0.07

Field observations and a closer examination of the data in Appendix H suggests rainbow trout growth rates might be better initially, whereas brown trout appear to surpass rainbow trout in size sometime between ages III and IV+, depending on the lake. Pooling the data by lake and examining linear regressions of length and weight by age produces some interesting results (Figures 7 and 8). Length and weight data were transformed (*ln*) to normalize the data for statistical comparisons between the two species. The elevations of the regression lines were significantly different for both length (p=0.0000) and weight (p=0.0000), and the higher starting elevations suggest rainbows may have had an initial length and weight advantage at stocking and/or exhibited better initial growth early post-stocking. Despite efforts by hatchery staff to keep the two species in the same size range, a review of pre-stocking growth data (Appendix C) clearly demonstrates rainbow trout were consistently stocked at a larger size than brown trout, with only one exception (Little Androscoggin River in 2001). At the time of stocking, spring

yearling rainbows ranged from -0.3 to 2.0 inches smaller or larger than browns with a mean of 1.2 inches. Fall yearling rainbow trout ranged from 0.7-2.7 inches larger than brown trout with a mean of 1.4 inches. Excluding the Little Androscoggin in 2001, a comparison of the mean lengths by water and year showed rainbows were always significantly larger in length than browns at the time of stocking (paired t-test, one tailed, $p \leq 0.05$). At this point, it is still unclear if the larger sizes of rainbow trout earlier on can be completely attributed to size at stocking or if they simply experienced better growth initially. The slopes of the regression lines were also significantly different for both length (p=0.0002) and weight (p=0.0000), and certainly more dramatic by weight. Interestingly, the converging or crossing slopes of the regression lines between the species implies growth rates may be better for browns than rainbows even though the latter were larger at stocking than were brown trout.

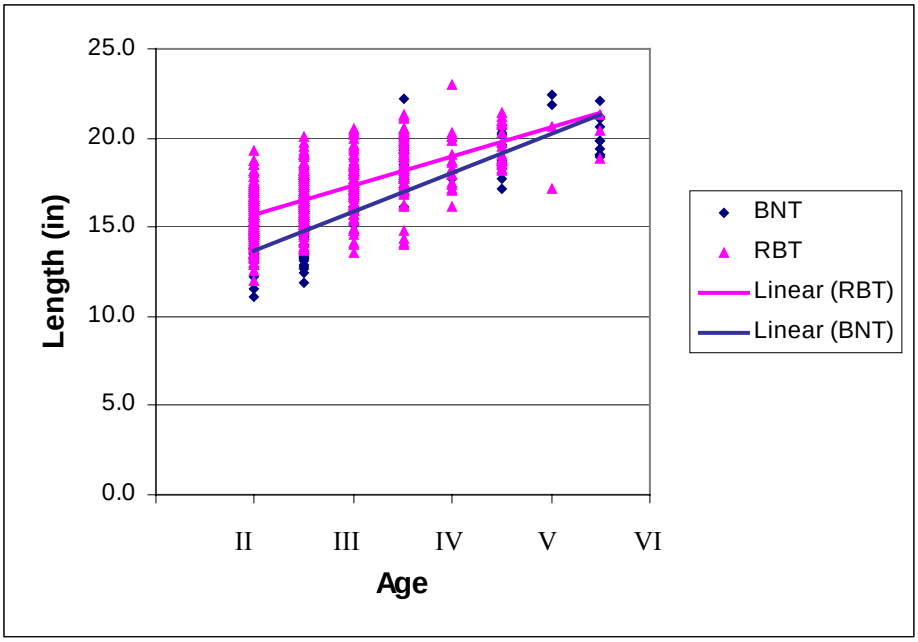

Figure 7. Scatter plot and regression lines of length at age by species for all lakes, 2002-2005.

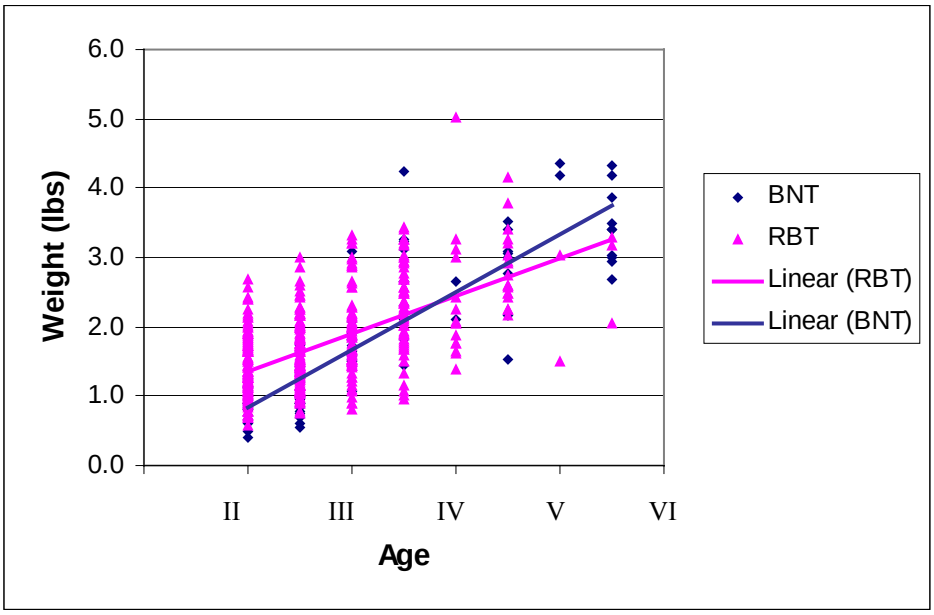

Figure 8. Scatter plot and regression lines of weight at age by species for all lakes, 2002-2005.

Although rainbows were stocked slightly larger than browns, field observations still suggest initial rainbow growth was better than browns, and that rainbow trout growth slowed dramatically after reaching approximately 16-17 inches in size. The same data were utilized to compare incremental growth from the mean size at stocking by species, which removes the initial size advantage from the data. In addition, incremental growth data was modified to a monthly growth rate, which incorporates the number of days at large since stocking to address the fact that trout were caught at different dates over a several month period when viewed by age class (Figures 9 and 10).

The mean incremental growth rate across all age classes was 0.34 and 0.25 inches/month for rainbow and brown trout, respectively. The overall growth rate for length was significantly higher for rainbows (two sample t-test, 198 DF, p=0.0000); however, the graph also proves our field observations were correct. Although rainbow growth is initially strong, it drops off dramatically, whereas browns show higher and more steady rates of growth starting at approximately age III. The mean growth rate for age II/II+ trout was 0.43 inches/month for rainbows and 0.25 for browns, which was significantly greater (two sample t-test, 69.2 DF, p=0.0000). Mean growth rates for age III and older trout were 0.24 inches/month for browns and 0.19 for rainbows, this difference was significant (two sample t-test, 89.7 DF, p=0.0002). The crossover in growth rates occurs between ages II and III, when the mean lengths for brown trout and rainbow trout are approximately 15.1 and 16.9 inches, respectively.

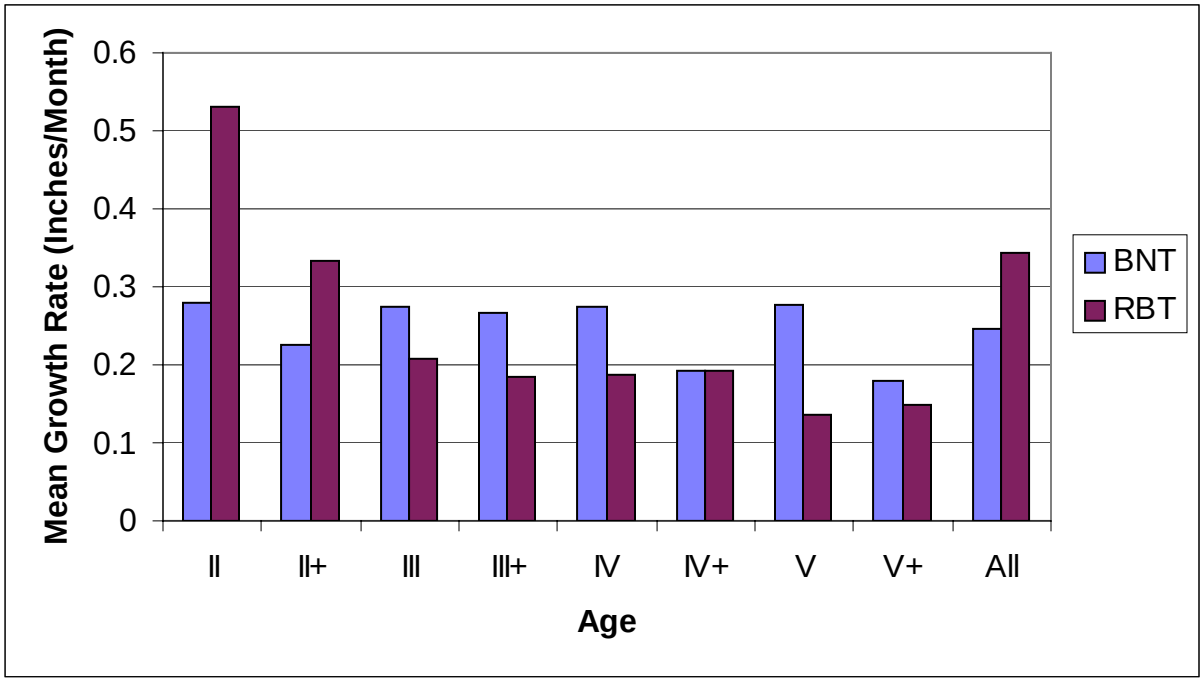

Figure 9. Mean incremental growth rate (inches/month) from size at stocking for all lakes by age class, 2002-2005.

Similar growth patterns were observed for weight (Figure 10). The overall mean monthly growth rate for weight across all age classes was 0.06 pounds for rainbow trout and 0.04 for brown trout, and the difference was significant (two sample t-test, 182.2 DF, p=0.0473). Age II/II+ rainbows exhibited a weight gain of 0.06 pounds/month versus 0.02 for browns, which was significantly higher for rainbows (two sample t-test, 79.1 DF, p=0.0000). At age three and

beyond brown trout growth rates by weight dominated with a mean of 0.07 pounds/month compared to 0.04 for rainbow trout. Brown trout growth rate by weight was significantly higher than rainbow trout for these older aged fish (two sample t-test, 88.1 DF, p=0.0000).

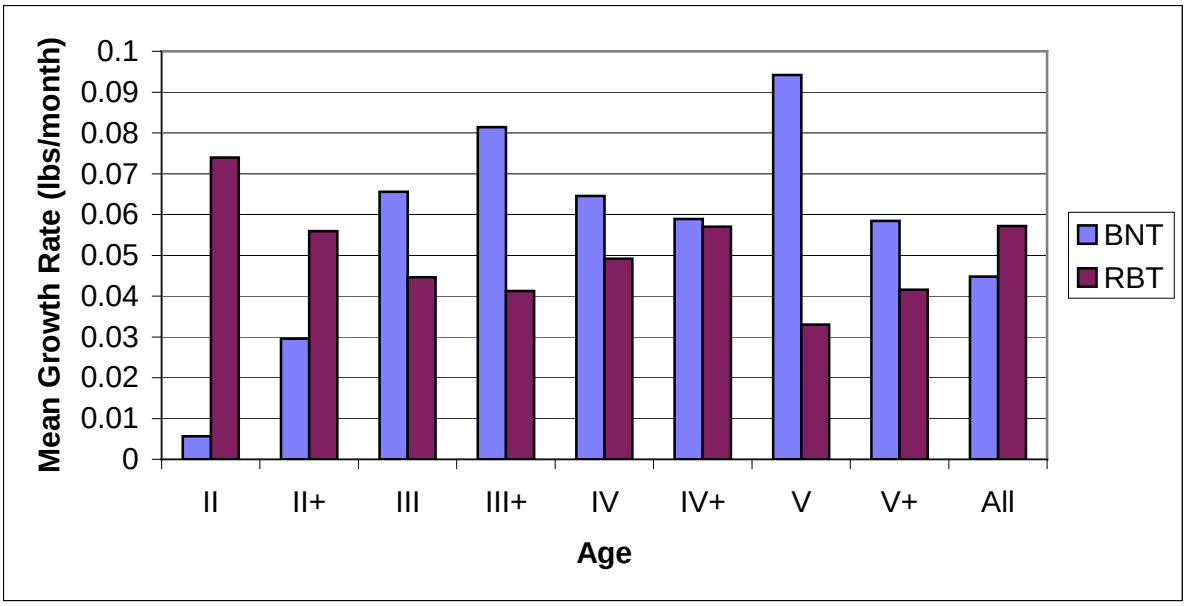

Figure 10. Mean incremental growth rate (pounds/month) from size at stocking for all lakes by age class, 2002-2005.

A review of the numbers and percent of trout by age class for all 2005 sampling illustrates the age composition of the fisheries for all of the study waters, and demonstrates the holdover potential of the two species (Table 8). Sample sizes were generally very small for brown trout, which makes it difficult to draw meaningful conclusions. Although it is interesting to note the lack of younger age classes represented in the brown trout data, which employed several sampling techniques including creel survey, gillnetting, trapnetting, experimental angling, and even electrofishing of spawning tributaries on a couple of the study waters. Three out of the five lakes produced brown trout up to V+ years of age; older aged brown trout do occur in Maine lakes, but did not show up due to the time limits of the study period. The Kennebec River data was too limited to formulate any conclusions; however, browns up to III+ years of age are not unusual, and even older aged trout show up in the fishery (Davis 2006). No holdover browns were observed on the Little Androscoggin River, although anecdotal reports suggest a small number of holdovers occur.

Sample sizes for rainbows were better, and as expected younger fish between 2-3 years of age dominated the lake fisheries. Two and three year-old rainbows constituted 49.1% and 35.7% (a total of 84.8%) of all the rainbow trout sampled across the five study lakes in 2005. Despite their high catch rates, rainbow trout demonstrated an ability to survive up to age IV+ in four of the five study lakes, and up to age V+ in two of the five lakes. The Kennebec River sample was comprised of rainbows up to III+ years of age. No holdover rainbows were sampled on the Little Androscoggin River; however, we did obtain photos and anecdotal angler reports of several II+ year-old trout being caught by anglers.

Table 8. Age composition of trout observed in 2005 samples by water, species, and age class.

Water	Species	Numbers and (Percent) by Age					
		I+	II-II+	III-III+	IV-IV+	V-V+	Total
Crystal L	BNT	NA	3 (15.8)	5 (26.3)	3 (15.8)	8 (42.1)	19 (100.0)
	RBT	NA	22 (68.8)	7 (21.9)	2 (6.3)	1 (3.1)	32 (100.0)
M Range P	BNT	NA	3 (33.3)	2 (22.2)	2 (22.2)	2 (22.2)	9 (100.0)
	RBT	NA	31 (36.0)	36 (41.9)	15 (17.4)	4 (4.7)	86 (100.0)
U Range P	BNT	NA	3 (37.5)	3 (37.5)	2 (25.0)	0 (0.0)	8 (100.0)
	RBT	NA	14 (29.2)	25 (52.0)	9 (18.8)	0 (0.0)	48 (100.0)
L George	BNT	NA	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
	RBT	NA	27 (84.4)	5 (15.6)	0 (0.0)	0 (0.0)	32 (100.0)
Megunticook L	BNT	NA	6 (54.5)	3 (27.3)	0 (0.0)	2 (18.1)	11 (100.0)
	RBT	NA	16 (61.5)	7 (26.9)	3 (11.5)	0 (0.0)	26 (100.0)
Kennebec R	BNT	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)
	RBT	6 (20.7)	19 (65.5)	4 (13.8)	0	0	29 (100.0)

A length frequency distribution of the 2005 sample data shows that, depending on the lake, the majority of browns and rainbows were typically in the 16.0-17.9 or 18.0-19.9 2-inch size classes (Table 9). Across all lakes, 66.7% of the browns and 75.0% of the rainbows were 16 inches or larger in size. Although the percentage of trout over 16 inches was fairly similar between the two species, rainbow trout 16 inches or larger constituted 61.8% of all trout sampled (rainbows and browns) versus 11.8% for brown trout. The majority of the trout from the Kennebec River were in the 14-15.9 inch size range. Few holdovers were observed on the Little Androscoggin and growth appears negligible; size class of that fishery is predominantly a function of size at stocking.

Table 9. Size composition of trout observed in 2005 samples by water, species, and 2-size class.

Water	Species	Numbers and (Percent) by Size Class					
		12-13.9”	14-15.9”	16-17.9”	18-19.9”	20+”	Total
Crystal L	BNT	1 (5.3)	2 (10.5)	3 (15.8)	8 (42.1)	5 (26.3)	19 (100.0)
	RBT	0 (0.0)	15 (46.9)	12 (37.5)	4 (12.5)	1 (3.1)	32 (100.0)
M Range P	BNT	1 (11.1)	2 (22.2)	1 (11.1)	2 (22.2)	3 (33.3)	9 (100.0)
	RBT	1 (1.2)	11 (12.8)	23 (26.7)	31 (36.0)	20 (23.3)	86 (100.0)
U Range P	BNT	2 (25.0)	1 (12.5)	2 (25.0)	1 (12.5)	2 (25.0)	8 (100.0)
	RBT	0 (0.0)	9 (18.8)	14 (29.2)	22 (45.8)	3 (6.3)	48 (100.0)
L George	BNT	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
	RBT	1 (3.1)	10 (31.3)	14 (43.8)	6 (18.8)	1 (3.1)	32 (100.0)
Megunticook L	BNT	0 (0.0)	6 (54.5)	2 (18.1)	3 (27.3)	0 (0.0)	11 (100.0)
	RBT	0 (0.0)	9 (34.6)	12 (46.2)	3 (11.5)	2 (7.7)	26 (100.0)
Kennebec R	BNT	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)
	RBT	1 (3.4)	14 (48.3)	10 (34.5)	0 (0.0)	0 (0.0)	29 (100.0)

Mid-day Catchability

Mid-day clerk and voluntary catch data were examined by water type (lotic/lentic) and season, except each river was analyzed independently due to their different water-specific characteristics. All catch data were pooled across waters and/or years, and the mid-day time period was

arbitrarily chosen, between 10:00-13:59 and 10:00-16:59 for the ice and open water seasons, respectively.

A summary of the mid-day catch data and analyses are presented in Table 10. The table clearly confirms that a high percentage of anglers, 48.5-78.4%, do in fact fish entirely or partially during mid-day hours. However, the percentage of rainbows versus browns caught during mid-day was not significant (χ^2, d.f. 1, $p \leq 0.05$) under any of the scenarios examined. As anticipated, higher percentages of both trout species were caught during the morning/evening time period, where the percentage of trout caught ranged from 55.8% to 90.9%.

Table 10. Mid-day catch data for rainbow and brown trout by water(s) and season.

Water	Season	Year(s)	Mid-Day Time Period	% of Anglers Fishing Mid-day Hours	% of All RBT caught Mid-day	% of All BNT caught Mid-day	p value (χ^2)
All Lakes (5)	Ice	2002	10:00-13:59	66.3	34.5	44.2	p=0.32
All Lakes (4) [2]	Open	2002-2005	10:00-16:59	78.4	10.8	9.1	p=0.55
Kennebec R.	Open	2002-2005	10:00-16:59	48.5	34.6	33.2	p=0.70
L Andro R	Open	2002-2005	10:00-16:59	60.2	40.4	41.9	p=0.39

[1] Clerk data used for Ice and voluntary data used for open water season.
[2] Crystal L data was omitted due to unexplained discrepancies with the voluntary data.

DISCUSSION

Catch Rates and Returns

Although year-round creel survey data was limited for brown trout prior to this study, MDIFW biologists believed stocked brown trout provided extraordinarily low catch rates and returns for Maine anglers. One of the primary objectives of this project was to examine whether or not rainbow trout would provide better catch rates and returns than brown trout. In this study, Eagle Lake strain rainbow trout consistently demonstrated significantly higher catch rates and angler returns than New Gloucester strain brown trout in five lakes and two rivers. Other comparisons on the performance of these two strains and species in Maine waters are nonexistent; however, several researchers have demonstrated similar results between these two species on rivers and lakes in other states (Shetter and Hazard 1940; Tremblay 1943; Shetter 1944; Cooper 1952; Shetter 1962; Elliot 1975; Kalishek and Winn 1996; Kirn 1999; Lemon and Elliot 1999; Baird et al. 2006).

As stated earlier, rainbow trout were stocked at a consistently larger size than brown trout, which possibly contributed to the increased catch and return rates for the species. Stockings of larger trout typically yield better returns than smaller sized fish (Butler and Borgeson 1965; Hansen and Stauffer 1971; Elliot 1975; Cunningham and Anderson 1992; Walters et al 1997; Baird et al. 2006). Many researchers have attributed these higher returns with increased survival due to lower predation on larger sized trout. The mean differences in total length at stocking for the two species in this study were relatively small, 1.2 inches for spring yearlings and 1.4 inches for fall yearlings. Differences in catch rates and returns documented in this report are likely largely related to performance differences (i.e. survival, catchability) between the two species; however, influences associated with size at stocking cannot be ruled out as a contributing factor.

On lakes, catch rates and returns for both species were consistently higher during the open water season than during the ice fishing season. This is likely the result of (1) greater feeding activity related to higher metabolic rates during the warmer open water season; (2) greater angler mobility during the open water season, which allows anglers to be more effective; and/or (3) the longer season length. Even though winter catch rates for rainbows on lakes appeared to be relatively low compared to other salmonids (i.e. brook trout or landlocked salmon), the average percent returns of stocked rainbow trout (23.1%) were better than those reported by Kirn (1999) for Vermont lakes (2%). On the other hand, winter harvest returns of rainbows were reported to be as high as 74.6% on a heavily fished lake in Iowa (Kalishek and Winn 1996). Angler inexperience with the species and the use of traditional Maine winter angling methods (tip-up style traps and live fish as bait) possibly contributed to the low winter catch rates. Anecdotal information and field observations suggests worms or salmon eggs were more effective for rainbows than were live fish, the traditional bait of Maine ice fishermen. Furthermore, jigging was more effective for catching rainbows than were traps, the most common approach to ice fishing in Maine.

Catch rates and returns on rivers were substantially closer between the two species than results observed for lake systems. While this may simply be a function of habitat differences and/or angler skill levels, there are some other potential explanations. Greater movement of stocked rainbows out of the study reaches may have contributed to the results. Although the literature reports are conflicting, several studies have demonstrated greater movement of rainbow trout than brown trout in river systems (Trembley 1943; Shetter 1944; Cooper 1952; Baird et al. 2006). Interestingly, rainbows showed stronger stream performance in terms of catch rates and returns during low water years (2002-2003) than in high water years (2004-2005), suggesting high flows and/or cooler water temperatures associated with snowmelt may have affected performance. Moring (1982) found downstream movement of two rainbow strains earlier in the fishing season, and no downstream movement of either strain in June when stream flows were lower. Cooper (1952) demonstrated higher movement of stocked rainbow trout than brown trout at temperatures below 50°F. In addition, Eagle Lake strain rainbow trout may simply not be as well suited for riverine type environments and may have a tendency to move in search of more preferable lotic type habitats. Fisheries staff in California, Wyoming, and Michigan all reported Eagle Lake strain rainbows exhibited poorer stream performance than other rainbow strains (Calkins 1998; Belford 1999; Dexter 1999).

A comparison of seasonal catch rates revealed similar patterns between the two species in lakes and rivers. Seasonal catch rates in the lakes and Kennebec River were very similar with a peak in the spring, followed by a slowdown during the summer, and increased catch rates starting in early fall. The Little Androsoggin showed a similar spring/summer pattern to that of the Kennebec River, but lacked the return to higher catch rates in the fall. Although the patterns are similar, underlying causes behind the patterns may differ. The spring/early summer peak in all three systems likely results from: higher fish metabolism, higher activity of trout anglers, and a higher percentage of trout available due to late fall and spring stockings. On the other hand, the summer drop in catch rates on the two rivers is more likely related to temperatures becoming unfavorable for trout. McMichael and Kaya (1991), found rainbow and brown trout exhibited lower catch rates in the Madison River, Montana when stream temperatures were 19°C or higher. The lower catch rates could be the result of several factors including reduced activity, changes in trout distribution, and seasonal use of refugia that were unknown to anglers, unfishable, or out of

the study reach. On lake systems, trout still have suitable habitat at deeper depths and are likely to be even more concentrated than during the spring or fall; however, there is a marked shift from coldwater anglers to warmwater anglers during the summer months, which likely shifts the mean catch rate of salmonids lower than during other times of the year. In the fall, temperatures become favorable again for trout and their activity increases, they redistribute, and trout angler activity picks up. Lake systems may have experienced an additional catch rate boost during the fall due to late season stockings. However, fall stocking typically occurs during the later part of the open water season (mid-October to early November), and provides only a limited opportunity for exploitation. The Little Androscoggin River showed no increase in the fall, suggesting many trout had not survived the summer season or had left the area, and may have been unable to redistribute if they had dropped below one or more of the dams.

Anglers tended to harvest rainbow trout at a disproportionately higher rate than brown trout on all study waters, irrespective of catch rate differences. Two logical explanations for the higher harvest include: (1) younger trout, two to three years of age comprised the bulk of the fishery and rainbows tended to be larger than browns at these ages, and (2) rainbows are not commonly caught in Maine, and the novelty of the species may have contributed to the higher harvest.

In this study, full season returns on lakes averaged 101.4% and 21.8% for rainbows and browns, respectively. Rainbow trout returns on lakes occasionally exceeded 100%, which may be considered unusual. This is the result of two factors including: (1) holdover trout contributed to returns beyond the year they were stocked, and (2) the "recycling" of individual trout due to relatively high angler release rates. In addition, exceptionally high returns on the Range Ponds in specific years may be the result of trout emigrations from one pond to the other via the thoroughfare that connects the two waters. Historically, percent returns were typically reported as the number and/or weight of trout harvested, but with the high catch-and-release rates observed today, total catch is more meaningful when examining recreational trout fisheries. Lake returns in this study were substantially higher than those reported by Kirn (1999) for Vermont lakes of similar management type, where the average return for rainbows was 38% and 3% for browns. It is uncertain how comparable the two estimates are due to a variety of potential differences in the two studies including: lake habitats and communities, stocking rates, size at stocking, strains, study methods, and other factors. In any case, it is clear rainbows generally provide better angling opportunities in terms of catch rates and returns than browns. Although Maine's brown trout stocking programs in lakes consistently produce quality and trophy-sized trout, poor returns in recent years have prompted the Department to investigate the performance of some new brown trout strains.

The Kennebec River returned high numbers of stocked trout for both species with 81.1% and 50.0% returns of stocked rainbows and browns, respectively. On the other hand, the Little Androscoggin River yielded low returns of both species, 22.6 % for rainbows and 15.0% for browns. These returns are substantially lower than the 50% return rate used by many agencies to justify the expense associated with catchable trout stocking programs (Butler and Borgeson 1965; Hartzler 1988; Wiley et al 1993). Returns on the Little Androscoggin River were partially reduced by the influence of sites with limited angler use, but the lack of accessible and/or fishable trout habitat, ½-mile for the 21-mile reach, presumably played a larger role in the low returns observed on the river.

Age & Growth

Despite considerable efforts to collect adequate samples from each water, brown trout samples tended to be too small for meaningful statistical analyses. While this was a limitation of the study, growth comparisons were still possible by pooling lake data across years and waters.

Overall mean lengths for lakes were 16.7 and 16.3 inches for rainbows and browns, respectively. A poll conducted in New Hampshire reported that the majority of anglers (29%) considered a good or quality-sized rainbow trout to be at least 15 or more inches in length (Sprankle 1997). It appears both species are capable of providing a quality-sized trout fishery in lakes and larger river systems. However, our data also suggests Eagle Lake rainbows will rarely produce trout 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 will be discussed in more detail below.

Over the study period, an initial review of mean lengths and weights suggests the two species produce similar fisheries in terms of size-quality. Although significantly larger, the mean length of rainbows for all lakes combined was only 0.4 inches longer than the mean length observed for brown trout. There were no statistically significant differences in weight. On the other hand, observation of the slopes of the two regression lines for length and weight by age class suggested brown trout growth might be better than rainbow trout.

A refinement of the analyses clearly indicates overall and initial rainbow growth rates on lakes were significantly better than brown trout, but between ages II+ to III, brown trout growth begins to exceed rainbows. Pooled lake data suggest the crossover in growth rates occurs between ages II+ and III; however, in general brown trout do not gain size superiority in the fishery until they are between III to III+ years of age (Appendix H). Elliot (1975) reported very similar results on studies conducted on six ponds in New York; rainbows were larger than browns during their first and second years, but were surpassed by brown trout in their third year. Both species exhibited declining growth rates with age, but brown trout did so to a lesser degree than rainbow trout. Trembley (1944) showed similar results for these two species, whereby growth rates decreased as fish size increased.

These growth rate observations are presumably related to dietary preferences of the two species. Limited field observations of stomachs suggest fall yearling brown trout become at least partially piscivorous almost immediately, whereas Eagle Lake strain rainbows appear reluctant to switch to piscsivory. Younger, smaller rainbows ($\leq$ 16-17") exhibit excellent growth rates while feeding on zooplankton, aquatic invertebrates, and mollusks. However, as they increase in size its possible that small prey items are no longer able to keep up with their energetic and metabolic demands, which results in a decline in growth rates after age III. In contrast, brown trout at least partially feed on forage fish from the onset, and they eventually surpass rainbows in both length and weight between ages II+ and IV depending on the water, and exhibit higher growth rates than rainbows at older ages.

The above rationale for explaining the different growth rate observations for the two trout species appears to be supported in the literature. Moyle (1976 as cited by Raleigh et al. 1986) indicated brown trout begin to exhibit piscivory at approximately 10 inches in size; and McAfee (1966a) states that while large rainbows may feed extensively on forage-sized fish if they are abundant, rainbows are typically not as pisivorous as similar sized browns. Several studies

indicate forage fish may (Leonard and Leonard 1946; Alexander and Gowing 1976) or may not be an important part of the rainbow trout diet (Hubert and Gipson 1994; Hadix and Buddy 2005), which suggests strain and/or lake-specific influences could play an important role in dietary preferences for this species. Although McAfee (1966b) reported Eagle Lake strain rainbows feed extensively on Tui Chub (*Siphateles bicolor*) in Eagle Lake, California, several other researchers describe the strain as not very piscivorous (Hubert and Gipson 1994; Belford 1999; Dexter 1999). Dexter (1999) reported the strain to be largely planktivorous up to 15 inches in size, but also suggested they became more piscivorous once they attained lengths in excess of 18 inches. With the exception of Lake George, Eagle Lake strain rainbow trout appeared to rarely utilize forage fish in Maine waters. During the study period Lake George supported an abundance of juvenile smelt, and rainbows exhibited phenomenal growth by utilizing them in their diet (Bolduc 2003). Abundance and availability of smaller sized forage fish may be key factors in triggering the switch to piscivory for this strain.

Crystal Lake growth data adds some supporting evidence for the lack of piscivorous feeding behavior in this strain. Crystal Lake exhibited the poorest growth for rainbows. This lake is characterized by sand/gravel substrates with very limited littoral area, which limits the production of aquatic invertebrates available for rainbow trout. In addition, an abundance of juvenile yellow perch and landlocked alewives competed with rainbows for both zooplankton and aquatic invertebrates, but were not extensively utilized as forage themselves. The data suggest lakes exhibiting this morphometry and habitat may not be well suited for Eagle Lake strain rainbows, in terms of maximizing growth potential.

In lake environments, both species demonstrated an ability to produce holdover trout up to V+ years of age, which was the oldest possible age class given the time constraints of the study. Browns are known to survive beyond age V+ in Maine lakes (Davis 2006), but maximum life expectancy for rainbow trout remains to be determined. As anticipated, II and III+ year-old rainbows were the largest age classes present in the lake fisheries, and abundance tended to decrease with increasing age. On the other hand, brown trout did not exhibit this typical age distribution. No study browns showed up in 4 out of 5 lakes during their first winter season at large in 2002, and II year-old BNT were often absent, or present in very low numbers during subsequent years. Although their numbers were still generally low, II+ year-old browns made more of an appearance during their first summer at large. Other than Crystal Lake, younger aged brown trout are typically absent from the fishery and the overall abundance of brown trout appears to be relatively low, which may suggest high mortality shortly after stocking. MDIFW staff has often observed large numbers of fall yearling stocked brown trout spawning in lake tributaries. Many of these trout show significant wounds and abrasions from spawning activity and attempted predation, and it has been suspected that this behavior may be a source of post-stocking mortality. Investigation of this issue is beyond the scope of this study, but should be examined in more detail.

The stocking of spring yearling rainbows and browns produced holdover trout up to III+ years of age on the Kennebec River versus little holdover for either species on the Little Androscoggin River. Other researchers have also confirmed poor holdover and over winter survival of catchable trout stocked in river systems (Shetter and Hazard 1940; Wiley et al. 1993; Kirn 1999; Lemon and Elliot 1999). This data and data from other rivers in New England suggest larger river systems are more likely to yield limited holdover from catchable stockings of brown and rainbow trout (VDFW 1990s; Boucher 2005).

Mid-day Catchability

The final objective of this study was to determine if rainbows would be more catchable than brown trout during mid-day hours. A survey of state fish and wildlife agencies (Pellerin 2000), anecdotal reports, and personal fishing experiences of Maine's biological staff all implied that rainbows might be more catchable during mid-day hours than brown trout. Based on this study, anglers spend considerable time fishing entirely or partially during mid-day hours, and a more catchable trout during these time periods could improve angling success, particularly for less avid anglers that are not as willing to fish at dawn, dusk, or night.

Surprisingly, there was no statistical difference in mid-day catchability between the two trout species. These results were considered highly possible on lakes where the effects of daylight could be compensated for by changing feeding depths, as well as the influence of ice and snow cover during the winter season. Although Bachman (1984) reported time of day had little effect on daily feeding rates for browns in a Pennsylvania stream, a difference was expected on rivers for two reasons: (1) shallower water depths equate to less light attenuation, and (2) rainbows have demonstrated less use of shade associated with overhead cover than other trout species including browns (Butler and Hawthorne 1968). Interestingly, both rainbows and browns have been shown to actively feed during the night in stream environments (Jenkins 1969) and nocturnal fishing accounted for most of the rainbow trout harvested from a lake in Kentucky (Jones 1982).

On the other hand, data from this study confirms popular fishing knowledge; higher percentages of both species were caught during the morning/evening time period when trout tend to be more active. Differences reported are even more pronounced than they appear from the actual percentages, because there was considerably less effort expended during morning and evening hours than mid-day. Swift (1962 and 1964 as cited by Raleigh et al. 1985) showed browns in lakes were more active during the day than at night, particularly around dawn. Although Bachman (1984) showed time of day had little effect on brown trout feeding activity in a Pennsylvania stream, he reported short peaks at dusk during late spring and early summer.

Additional Notes of Interest

- Although this strain was originally a spring-spawner (McAfee 1966b), Eagle Lake Strain rainbow trout from the Erwin National Fish Hatchery are produced as a late fall spawning strain. A fall spawning strain was preferred due to MDIFW hatchery logistics. Based on spring and fall electrofishing surveys, the majority of the trout reverted to spring spawning by their first spawning cycle. While reversion is not all that uncommon in fish that have spawning regimens altered by artificial manipulation (i.e. altered photoperiods), Jack Jones (2006) indicated Eagle Lake Strain rainbow trout at federal hatcheries in Montana and Tennessee are not artificially manipulated.

- Spawning activity was observed between mid-April and early May, which has several implications including: (1) spent rainbows returning to the lake may be thinner and some may exhibit wounds associated with spawning, (2) mature trout in the streams are vulnerable to anglers, poachers, and predators, (3) spring spawning behavior may require different sampling techniques/timing than our typical fall spawning salmonids, and (4) spawning trout

may not be as available in the lake for anglers to catch during what is typically a peak fishing period. This last appears to have little to no affect on the fishery, since seasonal catch rates actually peaked around this time (Fig. 3-5).

- The majority of males matured by age II-III, whereas females were typically at least age III, which is similar to that reported by McAfee (1966b) for this strain.

- Rainbows were observed using an intermittent tributary for spawning. Other researchers have documented the same behavior and indicate intermittent tributaries can be significant contributors to rainbow reproduction (Erman and Hawthorne 1976).

- Spawning activity was observed in several Region A lake tributaries, but few juvenile rainbow trout were observed during follow-up stream sampling events with an electrofishing unit.

- Observations of coloration and spot patterns were highly variable for this strain, which could be related to reports that the strain might be a rainbow/cutthroat hybrid (McAfee 1966b). Color variations and late maturation may also have contributed to difficulties in external/internal sexing of mature fish.

- Rainbow trout appeared to perform equal to or better than browns, even on waters with seasonally marginal water quality (i.e. Kennebec R and Megunticook L). Habitat Suitability Index Models for rainbow trout and brown trout indicate both species tolerate and prefer similar temperature and dissolved oxygen regimes. Optimum temperatures are reportedly 12-19°C for brown trout and 12-18°C for rainbow trout, whereas the incipient lethal dissolved oxygen level is 3mg/l or less for both species (Raleigh et al. 1986 and Raleigh et al. 1984). Interestingly, Barwick et al. (2004) found that rainbows in Jocassee Reservoir, South Carolina generally selected colder water, lower dissolved oxygen (as low as 2.9 mg/l), and deeper depths than brown trout in late summer.

- While not examined as part of this study, biologists in Wyoming and Michigan have stated Eagle Lake strain rainbows seem to provide good opportunities for shore anglers. Dexter (1999) reported Eagle Lake strain to be more shore/shoal oriented than other rainbow strains, Belford (1999) reported shore anglers in one study caught Eagle Lake strain rainbows at the rate of 0.15-0.20 trout/hr versus boat anglers at 0.05 to 0.10 trout/hr.

MANAGEMENT IMPLICATIONS

Our initial and most important reason for investigating rainbow trout performance was to explore their potential for improving angling opportunities. The differences in catch rates and returns between the two species were not only significant, but also substantial. On certain waters currently managed for brown trout, the addition of rainbow trout stockings or replacement of brown trout stocking programs with rainbow trout may improve angling success for coldwater sport fish in Maine. In addition, the cost per trout returned suggests rainbows will provide more value for the angling public's dollar. While costs are not the only criteria for judging the success of a fishery management program, it is an important consideration in this era of ever tightening budgets for state fish and wildlife agencies.

In southern Maine, brown trout catchables are often used in conjunction with brook trout on small to medium sized streams with the expectation that brook trout provide good catch rates, while browns provide better extended season angling opportunities. Based on these study results, rainbows could provide similar seasonal benefits, while providing better catch rates and returns. Additionally, DeSandre (1974) documented rainbows provided better season-long fishery opportunities than brook trout on the Carrabassett River, Maine.

As anticipated, growth was similar between the two species and both have the potential of producing quality trout fisheries in Maine waters. However, brown trout are more likely to produce trophy-sized fish due to their better growth at older ages and lower catchability. Combination stockings of both species would provide the best angling opportunities; rainbows would provide better action and browns would yield a limited number of trophy fish each season.

Throughout the study, I considered whether or not the use of higher minimum length limits (i.e. 16 inches) on lakes would improve the size quality of rainbow trout fisheries. The large size at stocking (fall yearlings), low winter catch rates, age ands size composition of the fishery, fast initial growth and slower growth at larger sizes suggest higher length limit may not be not warranted or necessary when fall yearlings are utilized. However, size restrictions may benefit fisheries stocked with spring yearling or younger age classes, where the habitat has the potential to support holdover.

Although the lack of piscivorous behavior observed for this strain of rainbow trout and its associated growth implications could be viewed negatively, there are several potential benefits. Many lakes in Maine currently lack abundant forage populations, particularly rainbow smelt (Pellerin 2001). Eagle Lake rainbows do not appear to be dependant upon smelt or any other forage fish to produce a quality salmonid fishery. As such, they may produce less of an impact on forage fish populations experiencing low abundance, and they are less likely to compete with other piscivorous species. For example, New Hampshire Department of Fish and Game successfully utilizes rainbow trout and landlocked salmon on the same waters, and indicate rainbows continue to perform well even when smelt populations experience temporary declines in abundance (Miller 2000). In lake systems, this rainbow trout strain appears to utilize lower trophic levels of the food chain, where food resources would tend to be less limiting. As a result, rainbow trout could possibly be stocked at higher rates than other sport fish that rely more heavily on forage fish. Higher stocking rates should provide better angling opportunities in terms of catch rates and the number of successful angler trips, but the use of higher rates will need to be studied in further detail to determine what levels are appropriate for Maine waters.

Before the Department adopts a rainbow trout stocking program, all of the associated hatchery and management implications of such a program need to be considered. For example, if a broodstock were developed, additional equipment would be required to manipulate rainbow trout spawning times if a fall spawning strain is preferred. Fishery managers may need to protect spring spawning rainbows due to their vulnerability to anglers and poachers. If rainbows do not replace existing programs, then the largest obstacle to overcome will probably be associated with space constraints of our existing hatchery system.

Perhaps, the most important consequence of initiating a rainbow trout program is their potential to impact native salmonids like brook trout and Atlantic salmon. Evidence suggests rainbow

trout can have negative interactions with both species (Hearn and Kynard 1986; Fausch 1988). Presumably, rainbow trout will only have the potential to 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 evidence suggests Maine waters may not be well suited for the establishment of self-sustaining rainbow trout populations, it has occurred on a few larger river systems. Of 82 waters historically stocked in Maine, rainbows have only established long-term, self-sustaining populations in two systems. Both are upper reaches of larger river systems and their tributaries. In addition, self-sustaining rainbow populations have developed in similar habitats of other New England States.

Despite their potential benefits and limited risks, it would be irresponsible of the Department to not seriously consider the risks involved with introducing a non-native trout species into Maine waters. Do the benefits of the species outweigh their risks? Ultimately, the Department and the public will need to answer this question and determine the future of the rainbow program in Maine. If a rainbow trout-stocking program is initiated, the Department should take precautions to minimize rainbow trout interactions with wild salmonids and to reduce potential for the establishment of self-sustaining populations. The first step in this process will be to develop a sound stocking policy for rainbow trout.

RECOMMENDATIONS

A rainbow trout stocking program would improve angling success for Maine anglers, particularly on marginal waters where native salmonid species are unable to provide satisfactory angling, and where nonnative salmonids (i.e. brown trout) provide low returns. The following recommendations should be considered with any future rainbow trout stockings in Maine.

(1) Stocking policies or guidelines need to be developed as to when and where such stockings are appropriate. For example, guidelines may include some of the following:

- Rainbow trout should not be used to replace or augment native salmonids (i.e. brook trout, landlocked salmon) that are producing successful fisheries.

- Future stockings should largely be restricted to drainages in Regions A and B where native trout populations have already been impacted or influenced by invasive fish, development, and/or historical stockings. Within these regions, rainbows should be used cautiously, and certain drainages would be precluded from stocking. For example, Sebago Lake and its tributaries, as well as waters within the Crooked River drainage would be prohibited from stockings to protect an indigenous population of landlocked salmon.

- Stockings could occur in Region D drainages that currently support wild rainbow populations (i.e. the Upper Androscoggin River and the Kennebec River below Wyman Lake), and in lakes without any outlets that do not currently support native salmonids. The Dead River drainage should be excluded for now, because it is uncertain if the rainbow trout population would persist if the private hatchery closed.

- Stockings in all other regions should be severely restricted to minimize impacts on native salmonids. In these other management regions, rainbows should only be stocked in lakes without outlets and in waters that do not currently support native salmonids. Stockings on small coastal drainages could also be considered on a case-by-case basis.

- Rainbow trout could not be stocked in any of the listed Atlantic salmon drainages.

- New rainbow trout stockings would be subject to current internal and public review processes.

(2) Investigate and consider sterilization of stocked rainbow trout to further minimize potential risks associated with establishing self-sustaining populations. Rainbow trout eggs could be heat shocked with relative ease and low expense to create predominantly sterile fish. Historically, the use of sterile salmonids (polyploids) was largely investigated as a potential method to increase growth and survival for commercial and fishery management operations (Thorgaarg and Jazwin 1981; Galbreath and Samples 2000). Today, salmonid triploids are commonly used as a tool for meeting public demands for improved angling opportunities, while minimizing risks to native salmonids.

(3) The Eagle Lake strain performed reasonably well in lakes and larger rivers; however, other strains may exhibit better lake growth and river performance. Several researchers have documented significant performance differences among different rainbow trout strains (USFWS 1979; Brauhn and Kincaid 1982; Moring 1982; Dwyer and Piper 1984; Fay and Pardue 1986; Babby and Berry 1989). We should consider conducting investigations of additional rainbow trout strains, particularly if piscivory and improved stream performance are of importance.

(4) Evaluate rainbow trout stocking rates, and the potential use of higher rates to improve angling success in Maine waters. Develop standardized stocking rate guidelines based on these additional field evaluations.

(5) Consider acquiring our own rainbow brood stock(s) to ensure long-term success of our stocking programs. Relying on out-sourced hatchery products has created problems with some past experimental programs, and would be even more of an issue with an established program that anglers expect from year to year. Control of our own brood stock would also eliminate the risks of pathogen introductions associated with annual importations from out-of-state sources.

(6) The Department should conduct an informational effort directed at winter fishing techniques for rainbows to improve and maximize returns.

(7) This recommendation is not associated with the rainbow trout program, but with our current brown trout stocking program. Although browns from our existing stocking program continually produce quality and even trophy-sized fish, returns are so low that the Department needs to seriously consider a new direction for this program. Now that the rainbow trout project has come to a conclusion, the proposed brown trout strain evaluations should be "fast-tracked." Small brown trout sample sizes will be an issue

that needs to be addressed with any future brown trout evaluations where statistical analyses are being considered.

(8) Lastly, future evaluations of this magnitude should be directed by the research division to ensure proper oversight and regional cooperation.

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LITERATURE CITED

Alexander Gaylord R., and Howard Gowing. 1976. Relationships between diet and growth in rainbow trout (*Salmo gairdneri*), brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). Michigan Department of Natural Resources, Fisheries Division. Fisheries Research Report No. 1841. 41 pp.

Analytical Software. 2000. Statistix 7 user's manual. Tallahassee, FL. 359 pp.

Bachman, Robert A. 1984. Foraging behavior of free-ranging wild and hatchery brown trout in a stream. Trans. Amer. Fish. Soc. 113:1-32.

Baird, Owen E., Charles C. Krueger, and Daniel C. Johnson. Growth, movement, and catch of brook, rainbow, and brown trout after stocking into a large, marginally suitable Adirondack river. North Amer. Jour. Fish. Mngmt. 26:180-189.

Barwick, D.H., J.W. Foltz, and D.M. Rankin. 2004. Summer habitat use by rainbow trout and brown trout in Jocassee Reservoir. North Amer. Jour, Fish Mngmt. 24:735-740.

Belford, Dave. 1999. Personal communications with Dave Boucher. Wyoming Department of Game and Fish. Cheyenne, Wyoming.

Bolduc, Dennis. 2003. Personal communications. Maine.

Boucher, David. 2005. Personal communications. Maine Department of Inland Fisheries and Wildlife. Strong, ME.

Butler, Robert L. and David P. Borgeson. 1965. California catcahable trout fisheries. The Resources Agency of California, Department of Fish and Game Fish Bulletin 127. Sacramento, CA. 47 pp.

Butler, Robert L. and Vernon M. Hawthorne. 1968. The reactions of dominant trout to changes in overhead artificial cover. Trans. Amer. Fish. Soc. 97(1):37-41.

Brautigam, F.B. 2000. An assessment of recreational fisheries in the lower Little Androscoggin River (Mechanic Falls to Auburn). Fishery Interim Summary Report Series No. 00-1. Maine Department of Inland Fisheries and Wildlife. Augusta, Maine. 20 pp.

Calkins, Russ. 1998. Personal communications. Crystal Lake Hatchery Manager. California Department of Fish and Game. Sacramento, CA.

Copper, Edwin L. 1952. Returns from plantings of legal-sized brook, brown, and rainbow trout in the Pigeon River, Otsego County, Michigan. Trans. Amer. Fish. Soc. 82 (1):265-280.

Cunningham, Paul K. and Charles S. Anderson. 1992. Effect of size at stocking on harvest of rainbow trout in Bad Medicine Lake. Minnesota Department of Natural Resources Investigation Report 421. St Paul, MN. 17 pp.

Davis, Scott. 2006. Personal communications. Maine Department of Inland Fisheries and Wildlife. Sidney, ME.

DeSandre, R. 1974. Rainbow trout project. Maine Department of Inland Fisheries and Wildlife. Augusta, Maine. 21 pp.

Dexter, J. 1999. Personal communications with Dave Boucher. Michigan Department of Natural Resources, Fisheries Division. Lansing, MI.

Eicher, Jr., George J. 1946. Current trends in state fishery programs. Trans. Amer. Fish. Soc. 76: 13-22.

Elliot, Wayne P. 1975. Returns of stocked yearling brook, brown, and rainbow trout from six two story ponds, 1971-1974. New York State Department of Environmental Conservation. New Paltz, New York. 23 pp.

Erman, Don C. and Vernon M. Hawthorne. 1976. The quantitative importance of an intermittent stream in the spawning of rainbow trout. Trans. Amer. Fish. Soc. 105(6): 675-681.

Fausch, Kurt D. 1988. Tests of competition between native and introduced salmonids in streams: what have we learned? Can. J. Aquat. Sci. 45:2238-2246.

Haddix, Tyler, and Phaedra Budy. 2005. Factors that limit growth and abundance of rainbow trout across ecologically distinct areas of Flaming Gorge Reservoir, Utah-Wyoming. North Amer. Jour. Fish. Mngmt. 25:1082-1094.

Galbraith, Peter F. and Barbara L. Samples. 2000. Optimization of thermal shock protocols for induction of triploidy in brook trout. North Amer. Journ. Fish. Mngmt. 62:249-259.

Hansen, Martin J. and Thomas M. Stauffer. 1971. Comparative recovery to the creel, movement and growth of rainbow trout stocked in the Great Lakes. Trans. Amer. Fish. Soc. 2:336-349.

Hartzler, J. R. 1988. Catchable trout fisheries: the need for assessment. Fisheries; 13:2-8.

Hearn, William E. and Boyd E. Kynard. 1986. Habitat utilization and behavioral interaction of juvenile atlantic salmon (*Salmo salar*) and rainbow trout (*S. gairdneri*) in tributaries of the White River of Vermont. Can. J. Aquat. Sci. 43:1988-1998.

Hubert, Wayne A. and Robert D. Gipson. Diet of Eagle Lake rainbow trout in Lake Desmet, Wyoming. North Amer. Jour. Fish. Mngmt. 14:457-459.

Jenkins, Thomas M. Jr. 1969. Night feeding of brown and rainbow trout in an experimental stream channel. J. Fish Res. Board Can. 26(12):3275-3278.

Johnson, Ken and Steve Kahl. 2005. A systematic survey of water chemistry for downeast area rivers. ASC pH Survey. Final Report. 19 pp.

Jones, Albert R. 1982. The "two-story" rainbow trout fishery at Laurel River Lake, Kentucky. North Amer. Journ. Fish Mgmnt. 2:132-137.

Jones, Jack. 2006. Personal communications. Erwin National Fish Hatchery. USFWS. Erwin. Tennessee.

Kalishek, Bill and Mark Winn. 1996. North Prairie Lake winter trout creel survey. Pages 70-75 in 1996 Fish Mgmt. Investigations. Iowa Dept. of Nat. Res. Des Moines, Iowa.

Kirn, Rich. 1999. Evaluation of the use of cultured trout in Vermont. Vermont Department of Fish and Wildlife. Federal Aid in Fish and Wildlife Restoration Report, F-12-R-32. Waterbury, VT. 13 pp.

Lemon, David K. and Wayne Elliot. 1999. Relative angler harvest of three species of tagged hatchery trout from eight southeastern New York trout streams. New York State Department of Environmental Conservation. Cortland, New York. 29 pp.

Leonard, J.W. and F.A. Leonard. 1946. An analysis of the feeding habits of rainbow trout and lake trout in Birch Lake, Cass County, Michigan. Trans. Amer. Fish. Soc. 76:301-314.

McAfee, W.R. 1966a. Rainbow trout. Pages 192-215 in A. Calhoun, editor. Inland fisheries management. California Department of Fish and Game. Sacramento, CA.

McAfee, W.R. 1966b. Eagle Lake rainbow trout. Pages 221-225 in A. Calhoun, editor. Inland fisheries management. California Department of Fish and Game. Sacramento, CA.

McMichael, G.A., and C. M. Kaya. 1991. Relations among streams temperature, angling success for rainbow trout and brown trout, and fisherman satisfaction. North Amer. Journ. Fish. Mgmt. 11:190-199.

Microsoft Corporation. 2000. Microsoft Office 2000. Redmond, Washington.

Miller, Don. 2000. Personal communications. New Hampshire Fish and Game Department. New Hampton, NH.

Moring, John R. 1982. An efficient hatchery strain of rainbow trout for stocking Oregon streams. North Amer. J. Fish Mgmt. 2(3): 209-215.

Moyle, P.B. 1976. Inland fishes of California. University of California Press, Berkley. 546 pp.

Pellerin, J.C. 2000. Rainbow trout study plan (draft). Maine Department of Inland Fisheries and Wildlife. Augusta, Maine. 24 pp.

Pellerin, J.C. 2001. Smelt assessment. Maine Department of Inland Fisheries and Wildlife. Augusta, Maine. 24 pp.

Perry, Steve. 2006. Personal communications. New Hampshire Fish and Game Department. Concord, NH.

Pierce, Urban Jr. 2005. Personal communications. Shy Beaver Trout Hatchery. Hollis, Maine.

Raleigh, Robert F., Laurence D. Zuckerman, and Patrick C. Nelson, 1986. Habitat suitability index models and instream flow suitability curves: brown trout, revised. U.S. Fish Wildl. Serv. Biol. Rep. 82(10.124). 65 pp.

Raleigh, Robert F., T. Hickman, R.C. Solomon, and P.C. Nelson. 1984. Habitat suitability information: rainbow trout. U.S. Fish Wildl. Serv. Biol. Rep. 82(10.60). 64 pp.

SAS Institute, Inc. 1985. SAS User's Guide: Basics. Version 5 Edition. Cary, North Carolina. 1290 pp.

Scott, W.B. and E.J. Crossman. 1973. Freshwater fishes of Canada. Bulletin 184. Fisheries Research Board of Canada. Ottawa, Canada. 966 pp.

Shetter, David S. 1944. Further results from spring and fall plantings of legal-sized, hatchery-reared trout in streams and lakes of Michigan. Trans. Amer. Fish. Soc. 74(1):35-58.

Shetter, David S. 1962. Recoveries by anglers of legal-sized trout stocked during different seasons of the year in Michigan streams. Trans. Amer. Fish. Soc. 91(2):145-150.

Shetter, David S. and Albert S. Hazzard. 1940. Recoveries by anglers of legal-sized trout stocked during different seasons of the year in Michigan streams. Trans. Amer. Fish. Soc. 70(1):446-468.

Swift, D.R. 1962. Activity cycles in the brown trout (*Salmo trutta* Linn.). I. Fish feeding naturally. Fish feeding naturally. Hydrobiologia. 20(3):241-247.

Swift, D.R. 1964. Activity cycles in the brown trout (*Salmo trutta* L.). I. Fish artificially fed. J. Fish. Res. Board Can. 21 (1):133-138.

Swink, W.D. 1983. Nonmigratory salmonids and tailwaters – a survey of stocking practices in the United States. Fisheries; 8:5-9.

Thorgaard, Gary H. and Mary Ellen Jazwin (1981). Polyploidy induced by heat shock un rainbow trout. North Amer. Journ. Fish. Mngmt. 110:546-550.

Trembley, Gordon L. 1943. Results from plantings of tagged trout in Spring Creek, Pennsylvania. Trans. Amer. Fish. Soc. 73(1):158-172.

VDFW. 1990s. Vermont brook, brown, and rainbow trout age and growth summary - Appendix III C. Vermont Department of Fish and Wildlife. Montpelier, VT. 12 pp.

Walters, Jody P., Tom D. Fresques, and Scott D. Bryan. 1997. Comparison of creel returns from rainbow trout stocked at two sizes. North Amer. Jour. Fish. Mngmt. 17:474-476.

Weiner, Gary S., Carl B. Shreck, and Hiram W. Li. 1986. Effects of low pH on reproduction of rainbow trout. Trans. Amer. Fish. Soc. 115:75-82.

Wiley, Robert W., Roy A. Whaley, Joe B. Satake, and Mark Fowden. 1993. North Amer. Jour. Fish. Mngmt. 13:160-170.

Wislon, Steve. 2006. Personal communications. Maine Department of Inland Fisheries and Wildlife. Augusta, Maine.

Appendix A. Alphabetical list of 3-letter species codes.

Species Code	Common Name	Scientific Name
BKT	Brook Trout	*Salvelinus fontinalis*
BLC	Black Crappie	*Pomoxis nigromaculatus*
BND	Blacknose Dace	*Rhinichthys atratulus*
BNS	Brown Trout (Study Fish)	*Salmo trutta*
BNT	Brown Trout	*Salmo trutta*
BUL	Brown Bullhead	*Ameirus nebulosus*
CCB	Creek Chub	*Semotilus atromaculatus*
CMS	Common Shiner	*Notrpois cornutus*
EEL	American Eel	*Anguilla rostrata*
FLF	Fallfish	*Semotilus corporalis*
GLS	Golden Shiner	*Notemigonus crysoleucus*
LLA	Landlocked Alewive	*Alosa pseudoharengus*
LLS	Landlocked Salmon	*Salmo salar*
LMB	Largemouth Bass	*Micropterus salmoides*
LNS	Longnose Sucker	*Catostomus catostomus*
MIN	Minnow Species	----
NSK	Nine-spine Stickleback	*Pungitius pungitius*
PIK	Northern Pike	*Esox lucius*
PKL	Chain Pickerel	*Esox niger*
PKS	Pumpkinseed Sunfish	*Lepomis gibbosus*
RBS	Redbreast Sunfish	*Lepomis auritus*
RBT	Rainbow Trout	*Oncorhynchus mykiss*
SCL	Slimy Sculpin	*Cottus cognatus*
SLT	Rainbow Smelt	*Osmerus mordax*
SMB	Smallmouth Bass	*Micropterus dolomieu*
SPK	Splake	*Salvelinus namaycush x Salvelinus fontinalis*
WHP	White Perch	*Morone americana*
WHS	White Sucker	*Catostomus commersoni*
YLP	Yellow Perch	*Perca flavescens*

Appendix B. Project stocking summary by water.

Water Name	Annual Stocking Pre-Study Period	Annual Stocking Study Period	Time of Stocking	Comments
Crystal Lake	250 SY BKT 250 SY BNT 125 FY BKT	300 FY BNT 300 FY RBT	Fall	None
Middle Range Pond	750 SY BKT 75 FY BKT 300 FY BNT	325 FY BNT 325 FY RBT	Fall	None
Upper Range Pond	300 FY BNT	150 FY RBT 150 FY BNT	Fall	None
Lake George	Unscheduled Misc. # & species	200 FY BNT 200 FY RBT	Fall	None
Megunticook Lake	600 FY BNT 600 FY RBT	600 FY BNT 600 FY RBT	Fall	None
Kennebec River	2,000 BNT 2,000 RBT	2,000 BNT 2,000 RBT	Spring	None
Little Androscoggin River	4,000 BNT 1,600 BKT	2,850 BNT 2,850 RBT	Spring	2 Stocking Events Multiple Sites

Appendix C. Summary of mean length, weight, and condition of trout at time of stocking, 2001-2005.

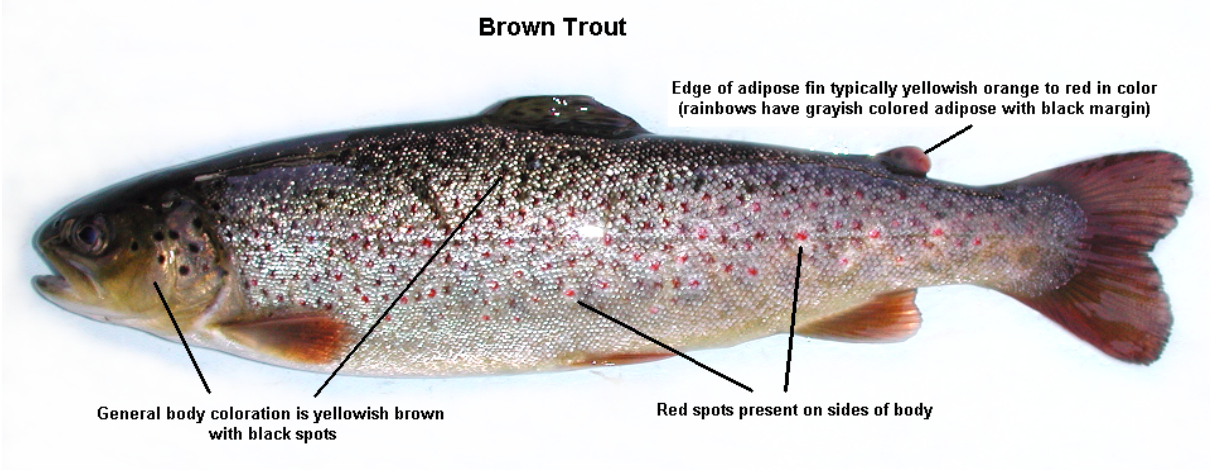
WATER	MEAN (SD)	YEAR									
		2001		2002		2003		2004		2005	
		BNT	RBT	BNT	RBT	BNT	RBT	BNT	RBT	BNT	RBT
CRYSTAL L	Length (in)	11.4 (1.3)	13.6 (1.4)	12.7 (1.3)	13.3 (1.3)	13.1 (1.2)	15.1 (1.2)	12.5 (1.2)	13.5 (1.3)	13.1 (1.4)	14.1 (1.5)
	Weight (lbs)	0.6 (0.3)	1.0 (0.3)	0.8 (0.3)	1.0 (0.3)	1.0 (0.3)	1.6 (0.5)	0.9 (0.3)	1.0 (0.3)	1.0 (0.3)	1.2 (0.5)
	K-factor	1.13 (0.14)	1.06 (0.09)	1.04 (0.12)	1.13 (0.15)	1.15 (0.12)	1.22 (0.17)	1.19 (0.14)	1.13 (0.14)	1.15 (0.11)	1.26 (0.14)
	N	29	30	30	30	30	30	30	30	30	29
KENNEBEC R	Length (in)	10.0 (0.4) [1]	9.7 (1.3)	9.1 (1.3)	10.4 (1.7)	9.2 (0.8)	11.2 (1.4)	9.3 (0.8)	11.2 (1.4)	9.6 (1.4)	10.7 (1.8)
	Weight (lbs)	0.4 (0.0) [1]	0.3 (0.2)	0.4 (0.2)	0.5 (0.3)	0.4 (0.1)	0.7 (0.2)	0.4 (0.1)	0.6 (0.2)	0.4 (0.2)	0.5 (0.3)
	K-factor	1.01 (0.12)[1]	0.98 (0.09)	1.25 (0.16)	1.08 (0.22)	1.27 (0.16)	1.24 (0.19)	1.21 (0.12)	1.14 (0.10)	1.21 (0.17)	1.10 (0.16)
	N	30	30	29	30	30	30	30	30	30	30
L GEORGE	Length (in)	11.4 (1.3)	13.7 (1.5)	12.5 (1.1)	14.3 (1.7)	13.1 (1.2)	15.1 (1.2)	12.5 (1.2)	13.5 (1.3)	13.3 (1.6)	15.4 (1.1)
	Weight (lbs)	0.6 (0.3)	1.0 (0.4)	0.9 (0.3)	1.3 (0.4)	1.0 (0.3)	1.6 (0.5)	0.9 (0.3)	1.0 (0.3)	1.0 (0.4)	1.8 (0.5)
	K-factor	1.13 (0.14)	1.03 (0.13)	1.19 (0.10)	1.15 (0.11)	1.15 (0.12)	1.22 (0.17)	1.19 (0.14)	1.13 (0.14)	1.16 (0.10)	1.31 (0.13)
	N	29	30	32	32	30	30	30	30	30	30
LANDRO R	Length (in)	10.1 (0.7) [1]	10.2 (1.2)	9.0 (1.2)	10.2 (1.8)	9.4 (0.9)	11.0 (1.5)	9.2 (0.9)	10.9 (1.2)	9.7 (1.0)	11.3 (1.4)
	Weight (lbs)	0.4 (0.1) [1]	0.4 (0.2)	0.4 (0.1)	0.5 (0.3)	0.4 (0.1)	0.6 (0.3)	0.4 (0.1)	0.6 (0.2)	0.4 (0.1)	0.6 (0.2)
	K-factor	1.15 (0.22)[1]	0.99 (0.12)	1.28 (0.15)	1.15 (0.19)	1.18 (0.17)	1.06 (0.16)	1.24 (0.11)	1.20 (0.18)	1.23 (0.11)	1.10 (0.13)
	N	59	60	59	60	60	59	60	60	60	60
M RANGE P	Length (in)	11.4 (1.3)	13.5 (1.4)	12.7 (1.3)	13.3 (1.3)	13.1 (1.2)	15.1 (1.2)	12.5 (1.2)	13.5 (1.3)	13.1 (1.4)	15.1 (1.3)
	Weight (lbs)	0.6 (0.3)	1.0 (0.3)	0.8 (0.3)	1.0 (0.3)	1.0 (0.3)	1.6 (0.5)	0.9 (0.3)	1.0 (0.3)	1.0 (0.3)	1.6 (0.5)
	K-factor	1.13 (0.14)	1.10 (0.13)	1.04 (0.12)	1.13 (0.15)	1.15 (0.12)	1.22 (0.17)	1.19 (0.14)	1.13 (0.14)	1.15 (0.11)	1.26 (0.14)
	N	29	30	30	30	30	30	30	30	30	29
MEGUNTICOOK L	Length (in)	11.4 (1.3)	14.1 (1.1)	12.7 (1.3)	13.3 (1.3)	13.1 (1.2)	15.1 (1.2)	12.5 (1.2)	13.5 (1.3)	13.3 (1.6)	15.4 (1.1)
	Weight (lbs)	0.6 (0.3)	1.1 (0.3)	0.8 (0.3)	1.0 (0.3)	1.0 (0.3)	1.6 (0.5)	0.9 (0.3)	1.0 (0.3)	1.0 (0.4)	1.8 (0.5)
	K-factor	1.13 (0.14)	1.05 (0.09)	1.04 (0.12)	1.13 (0.15)	1.15 (0.12)	1.22 (0.17)	1.19 (0.14)	1.13 (0.14)	1.16 (0.10)	1.31 (0.13)
	N	29	30	30	30	30	30	30	30	30	30
U RANGE P	Length (in)	11.4 (1.3)	13.6 (1.0)	12.7 (1.3)	13.3 (1.3)	13.1 (1.2)	15.1 (1.2)	12.5 (1.2)	13.5 (1.3)	13.1 (1.4)	15.1 (1.3)
	Weight (lbs)	0.6 (0.3)	1.0 (0.3)	0.8 (0.3)	1.0 (0.3)	1.0 (0.3)	1.6 (0.5)	0.9 (0.3)	1.0 (0.3)	1.0 (0.3)	1.6 (0.5)
	K-factor	1.13 (0.14)	1.06 (0.09)	1.04 (0.12)	1.13 (0.15)	1.15 (0.12)	1.22 (0.17)	1.19 (0.14)	1.13 (0.14)	1.15 (0.11)	1.26 (0.14)
	N	29	30	30	30	30	30	30	30	30	29

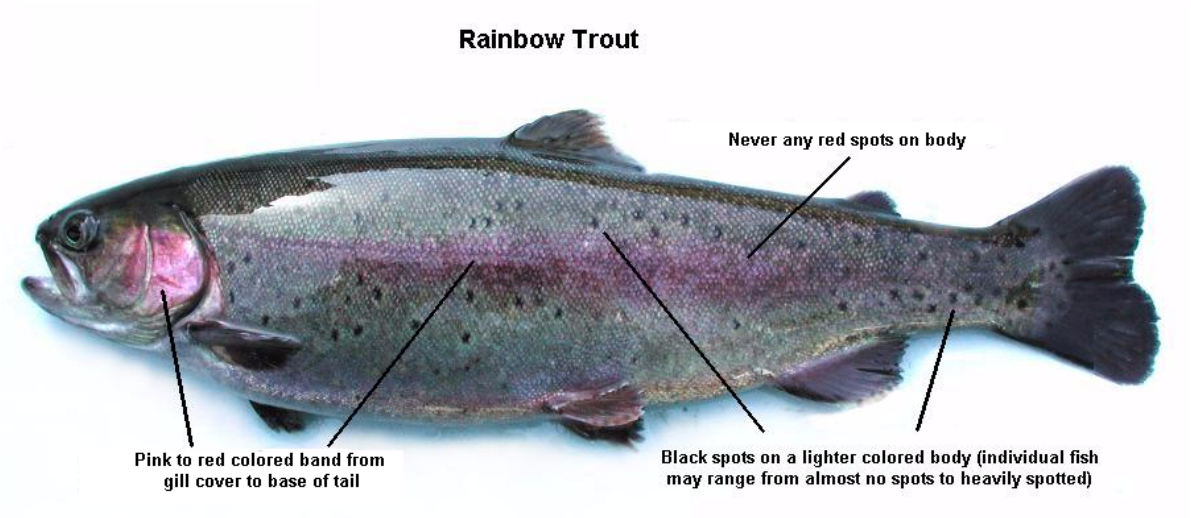
[1]Weight and K-factor data collected for Kennebec R and 1st L Andro R stocking in 2001 was based on pooled data for 30 trout rather than 30 individuals.

Appendix D. Voluntary box informational sign.

Maine Department of Inland Fisheries and Wildlife
Attention Anglers - Study Water

The Maine Department of Inland Fisheries and Wildlife is conducting an experimental stocking program with rainbow trout to evaluate their relative performance against brown trout and brook trout. This particular water is being stocked with brown trout and rainbow trout, and your cooperation is required for successful evaluation. Please completely fill out a blank voluntary census card located under the lid and place into compartment. It is important to accurately identify the two different trout species and the photographs below are available for reference. Also, be on the look out for any missing fins on your fish (all stocked trout for this study have been marked). If you fish this water frequently, you may be interested in keeping a voluntary record book instead of filling out the individual cards. If so, please contact your regional fisheries office. Thanks for your time and cooperation.





Appendix E. Summary statistics for clerk creel surveys by water, season, and year.
Water: Crystal L (3708) Town: Gray County: Cumberland
Region: A Acres: 185 Principle Fisheries: BNT/RBT/LMB
Season: Ice Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		282	229	300	198
No. angler hours		1120.9	859.2	1185.6	742.0
Mean Party Size		2.0	2.4	2.4	2.0
Mean Trip Length		4.5	4.2	4.4	4.3
No. (%) successful anglers	BNT	6 (2.1)	18 (7.8)	17 (5.6)	8 (4.0)
	RBT	23 (8.2)	23 (10.0)	20 (6.6)	14 (7.1)
	BNS	5 (1.8)	16 (7.0)	12 (4.0)	7 (3.5)
No. legals kept	BNT	4	15	9	5
	RBT	23	23	19	14
	BNS	2	13	7	4
No. (%) legals released	BNT	3 (42.9)	4 (21.1)	8 (47.1)	3 (37.5)
	RBT	1 (4.2)	1 (4.2)	3 (13.6)	9 (39.1)
	BNS	3 (60.0)	4 (23.5)	5 (41.6)	3 (42.8)
No. (%) sublegals released	BNT	4 (36.4)	3 (13.6)	0	0
	RBT	1 (4.0)	1 (4.0)	0	0
	BNS	4 (44.4)	3 (15.0)	0	0
No. legals/angler	BNT	0.019	0.107	0.050	0.061
	RBT	0.105	0.132	0.068	0.107
	BNS	0.014	0.097	0.035	0.051
Hours/legal caught	BNT	250.0	32.3	90.9	62.5
	RBT	37.0	29.4	76.9	50.0
	BNS	333.3	35.7	142.8	71.4
Legals/Hour (SE)	BNT	0.004 (0.003)	0.031 (0.009)	0.011 (0.003)	0.016 (0.007)
	RBT	0.027 (0.007)	0.034 (0.009)	0.013 (0.005)	0.020 (0.009)
	BNS	0.003 (0.002)	0.028 (0.009)	0.007 (0.002)	0.014 (0.006)
Estimated angler days + 95%CI		798 + 134	781 + 338	1147 + 240	725 + 274
Estimated angler days/acre		4.3	4.2	6.2	3.9
Estimated catch of legals ± 95 %CI	BNT	14 ± 3	101 ± 44	55 ± 12	50 ± 19
	RBT	97 ± 16	111 ± 48	65 ± 14	62 ± 24
	BNS	11 ± 2	91 ± 40	35 ± 7	44 ± 16
Estimated fish harvested ± 95%CI	BNT	7 ± 1	69 ± 29	25 ± 5	37 ± 14
	RBT	97 ± 16	105 ± 45	60 ± 13	62 ± 24
	BNS	4 ± 0	62 ± 27	20 ± 4	28 ± 11

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Middle Range P (3762) Town: Poland County: Androscoggin
Region: A Acres: 382 Principle Fisheries: BNT/RBT/LKT/SMB
Season: Ice Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		236	162	176	378
No. angler hours		825.8	664.7	615.0	2012.0
Mean Party Size		2.2	2.1	2.2	2.5
Mean Trip Length		4.3	3.1	3.6	3.9
No. (%) successful anglers	BNT	4 (1.7)	1 (0.62)	2 (1.1)	9 (2.4)
	RBT	2 (0.85)	6 (3.7)	4 (2.3)	18 (4.8)
	BNS	0	0	2 (1.1)	5 (1.3)
No. legals kept	BNT	4	1	0	8
	RBT	2	6	1	17
	BNS	0	0	0	4
No. (%) legals released	BNT	0	0	2 (100.0)	1 (11.0)
	RBT	0	1 (14.3)	4 (80.0)	1 (5.6)
	BNS	0	0	2 (100.0)	0
No. (%) sublegals released	BNT	0	0	0	0
	RBT	0	0	0	0
	BNS	0	0	0	0
No. legals/angler	BNT	0.012	0.003	0.019	0.020
	RBT	0.013	0.057	0.042	0.056
	BNS	0	0.003	0.019	0.009
Hours/legal caught	BNT	500.0	1000.0	200.0	333.0
	RBT	200.0	83.3	100.0	71.4
	BNS	>825.8	1000.0	200.0	500.0
Legals/Hour (SE)	BNT	0.003 (0.001)	0.001 (0.001)	0.005 (0.003)	0.003 (0.002)
	RBT	0.005 (0.004)	0.012 (0.006)	0.010 (0.006)	0.014 (0.004)
	BNS	ND	0.001 (0.001)	0.005 (0.003)	0.002 (0.001)
Estimated angler days + 95%CI		700 + 116	635 + 159	667 + 188	839 + 288
Estimated angler days/acre		1.8	1.7	1.7	2.2
Estimated catch of legals ± 95 %CI	BNT	9 ± 2	2 ± 1	12 ± 3	10 ± 3
	RBT	15 ± 3	24 ± 6	24 ± 7	46 ± 16
	BNS	ND	ND	12 ± 3	7 ± 2
Estimated fish harvested ± 95%CI	BNT	9 ± 2	2 ± 1	0	10 ± 3
	RBT	15 ± 3	20 ± 5	2 ± 1	40 ± 13
	BNS	ND	ND	0	3 ± 1

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Middle Range P (3762) Town: Poland County: Androscoggin
Region: A Acres: 382 Principle Fisheries: BNT/RBT/LKT/SMB
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		245	246	201	112
No. angler hours		458.3	505.8	467.0	298.0
Mean Party Size		1.5	1.8	1.6	1.4
Mean Trip Length		1.7	2.2	1.9	1.3
No. (%) successful anglers	BNT	16 (6.5)	3 (1.2)	6 (3.0)	4 (3.6)
	RBT	15 (6.1)	16 (6.5)	20 (10.0)	21 (18.8)
	BNS	5 (2.0)	2 (0.81)	0	4 (3.6)
No. legals kept	BNT	9	1	2	0
	RBT	7	11	6	5
	BNS	1	0	0	0
No. (%) legals released	BNT	8 (47.1)	2 (66.7)	4 (66.7)	4 (100.0)
	RBT	14 (66.7)	7 (38.9)	17 (73.9)	24 (82.8)
	BNS	4 (80.0)	2 (100.0)	2 (100.0)	4 (100.0)
No. (%) sublegals released	BNT	1 (5.6)	0	1 (14.3)	0
	RBT	0	0	0	0
	BNS	1 (16.7)	0	0	0
No. legals/angler	BNT	0.074	0.018	0.035	0.022
	RBT	0.102	0.087	0.140	0.217
	BNS	0.028	0.015	0.012	0.022
Hours/legal caught	BNT	29.4	200.0	26.3	83.3
	RBT	15.9	23.2	13.0	4.5
	BNS	35.7	250.0	30.3	83.3
Legals/Hour (SE)	BNT	0.034 (0.010)	0.005 (0.003)	0.038 (0.031)	0.012 (0.007)
	RBT	0.063 (0.024)	0.043 (0.017)	0.077 (0.022)	0.224 (0.059)
	BNS	0.014 (0.007)	0.004 (0.003)	0.033 (0.031)	0.012 (0.007)
Estimated angler days + 95%CI		617 + 87	2176 + 490	1863 + 250	1017 + 138
Estimated angler days/acre		1.6	5.7	4.9	2.7
Estimated catch of legals ± 95 %CI	BNT	36 ± 5	24 ± 5	135 ± 18	16 ± 2
	RBT	66 ± 9	206 ± 46	273 ± 36	296 ± 40
	BNS	15 ± 2	19 ± 4	117 ± 18	16 ± 2
Estimated fish harvested ± 95%CI	BNT	18 ± 2	5 ± 1	7 ±1	0
	RBT	21 ± 3	105 ± 24	39 ± 5	21 ± 3
	BNS	2 ± 1	0	0	0

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Upper Range P (3688) Town: Poland County: Androscoggin
Region: A Acres: 357 Principal Fisheries: BNT/RBT/SMB/LMB
Season: Ice Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		166	244	150	348
No. angler hours		629.6	940.4	1333.3	1697.0
Mean Party Size		2.2	2.4	2.3	2.4
Mean Trip Length		4.7	4.2	5.1	5.7
No. (%) successful anglers	BNT	5 (3.0)	10 (4.1)	7 (2)	8 (2.3)
	RBT	3 (1.8)	15 (6.1)	19 (5.5)	17 (4.9)
	BNS	0 (0.0)	4 (1.6)	5 (1.4)	5 (1.4)
No. legals kept	BNT	4	9	3	6
	RBT	3	15	15	17
	BNS	0	3	1	3
No. (%) legals released	BNT	1 (20.0)	1 (10.0)	4 (57.1)	2 (25.0)
	RBT	0 (0.0)	0 (0.0)	4 (21.1	1 (5.6)
	BNS	0	1 (25.0)	4 (80.0)	2 (40.0)
No. (%) sublegals released	BNT	0 (0)	0 (0)	0 (0)	0 (0)
	RBT	0 (0)	0 (0)	0 (0)	0 (0)
	BNS	0 (0)	0 (0)	0 (0)	0 (0)
No. legals/angler	BNT	0.049	0.044	0.025	0.021
	RBT	0.023	0.056	0.060	0.054
	BNS	0.000	0.019	0.017	0.014
Hours/legal caught	BNT	83.3	100.0	166.7	250.0
	RBT	200.0	47.6	58.8	83.0
	BNS	>629.6	250.0	200.0	333.3
Legals/Hour (SE)	BNT	0.012 (0.006)	0.010 (0.004)	0.006 (0.003)	0.004 (0.002)
	RBT	0.005 (0.003)	0.021 (0.008)	0.017 (0.005)	0.012 (0.005)
	BNS	0.000 (0.000)	0.004 (0.002)	0.005 (0.003)	0.003 (0.002)
Estimated angler days ± 95%CI		605 ± 130	926 ± 249	1295 ± 283	1039 ± 315
Estimated angler days/acre		1.7	2.6	3.6	2.9
Estimated catch of legals ± 95 %CI	BNT	34 ± 7	39 ± 10	40 ± 8	24 ± 7
	RBT	14 ± 3	82 ± 22	112 ± 25	71 ± 22
	BNS	0	16 ± 4	33 ± 7	18 ± 5
Estimated fish harvested ± 95%CI	BNT	26 ± 5	39 ± 10	13 ± 3	18 ± 5
	RBT	14 + 3	81 ± 22	79 ± 18	65 ± 20
	BNS	0	16 ± 4	0	6 ± 2

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Upper Range P (3688) Town: Poland County: Androscoggin
Region: A Acres: 357 Principal Fisheries: BNT/RBT/SMB/LMB
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		335	365	288	97
No. angler hours		531.8	686.3	681.0	431.0
Mean Party Size		1.6	1.7	1.8	1.7
Mean Trip Length		1.6	2.2	2.6	2.4
No. (%) successful anglers	BNT	7 (2.1)	9 (2.5)	5 (1.7)	3 (3.1)
	RBT	6 (1.8)	20(5.5)	19 (6.6)	7 (7.2)
	BNS	1 (0.3)	2 (0.5)	5 (1.7)	2 (2.1)
No. legals kept	BNT	0	4	1	2
	RBT	3	8	5	3
	BNS	0	0	1	1
No. (%) legals released	BNT	8 (100.0)	7 (63.6)	7 (87.5)	1 (33.3)
	RBT	4 (57.1)	23 (74.2)	15 (75.0)	4 (57.1)
	BNS	1 (100.0)	2 (100.0)	6 (85.7)	1 (50.0)
No. (%) sublegals released	BNT	0 (0)	0 (0)	0	0
	RBT	0 (0)	0 (0)	0	0
	BNS	0 (0)	0 (0)	0	0
No. legals/angler	BNT	0.034	0.046	0.047	0.026
	RBT	0.024	0.127	0.093	0.055
	BNS	0.005	0.007	0.041	0.015
Hours/legal caught	BNT	31.3	21.7	23.8	142.9
	RBT	71.4	16.3	27.0	38.5
	BNS	142.9	166.6	27.8	250.0
Legals/Hour (SE)	BNT	0.032 (0.014)	0.046 (0.018)	0.042 (0.024)	0.007 (0.004)
	RBT	0.014 (0.008)	0.061 (0.016)	0.037 (0.011)	0.026 (0.014)
	BNS	0.007 (0.007)	0.006 (0.005)	0.036 (0.021)	0.004 (0.003)
Estimated angler days ± 95%CI		2475 ± 311	2778 ± 388	1295 ± 283	940 ± 172
Estimated angler days/acre		6.9	7.8	3.6	2.6
Estimated catch of legals ± 95 %CI	BNT	129 ± 16	281 ± 39	141 ± 31	16 ± 3
	RBT	56 ± 7	373 ± 52	125 ± 27	59 ± 10
	BNS	28 ± 4	37 ± 5	121 ± 27	9 ± 2
Estimated fish harvested ± 95%CI	BNT	0	49 ± 7	7 ± 1	11 ± 2
	RBT	8 ± 1	55 ± 8	17 ± 4	18 ± 3
	BNS	0	0	7 ± 1	5 ± 1

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Lake George (2608) Town: Canaan County: Somerset
Region: B Acres: 318 Principle Fisheries: BNT/RBT/SLT/SMB/PKL/WHP
Season: Ice Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		520	430	383	487
No. angler hours		2503.0	1910.0	1563.0	2359.0
Mean Party Size		2.5	2.9	2.2	2.9
Mean Trip Length		4.7	3.9	3.5	4.7
No. (%) successful anglers	BNT	0	2 (0.47)	3 (0.78)	1 (0.21)
	RBT	4 (0.77)	12 (2.8)	25 (6.5)	1 (0.21)
	BNS	0	2 (0.47)	3 (0.78)	21 (4.3)
No. legals kept	BNT	0	2	2	1
	RBT	4	11	27	21
	BNS	0	2	2	1
No. (%) legals released	BNT	0	0	1 (33.3)	0
	RBT	1 (20.0)	3 (21.4)	0	0
	BNS	0	0	1 (33.3)	0
No. (%) sublegals released	BNT	1 (100)	0	0	0
	RBT	0	0	0	0
	BNS	1 (100)	0	0	0
No. legals/angler	BNT	0	0.004	0.007	0.003
	RBT	0.019	0.033	0.066	0.050
	BNS	0	0.004	0.007	0.003
Hours/legal caught	BNT	>2503.0	1000.0	1000.0	1000.0
	RBT	333.3	166.6	76.9	83.3
	BNS	>2503.0	1000.0	1000.0	1000.0
Legals/Hour (SE)	BNT	0	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
	RBT	0.003 (0.002)	0.006 (0.003)	0.013 (0.004)	0.012 (0.004)
	BNS	0	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Estimated angler days ± 95%CI		1459 ± 720	1452 ± 746	1130 ± 486	682 ± 180
Estimated angler days/acre		4.5	4.6	3.6	2.1
Estimated catch of legals ± 95 %CI	BNT	ND	6 ± 3	4 ± 2	3 ± 1
	RBT	21 ± 10	34 ± 17	51 ± 23	39 ± 10
	BNS	ND	6 ± 3	4 ± 2	3 ± 1
Estimated fish harvested ± 95%CI	BNT	ND	6 ± 3	4 ± 2	3 ± 1
	RBT	14 ± 7	28 ± 15	51 ± 23	39 ± 10
	BNS	ND	6 ± 3	4 ± 2	3 ± 1

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Lake George (2608) Town: Canaan County: Somerset
Region: B Acres: 318 Principle Fisheries: BNT/RBT/SLT/SMB/PKL/WHP
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		151	96	165	130
No. angler hours		378.0	340.8	461.8	336.3
Mean Party Size		2.3	3.5	2.9	1.9
Mean Trip Length		2.5	1.6	1.7	2.6
No. (%) successful anglers	BNT	2 (1.3)	2 (2.1)	2 (1.2)	0
	RBT	5 (3.3)	2 (2.1)	15 (9.1)	12 (9.2)
	BNS	2 (1.3)	11 (11.5)	2 (1.2)	0
No. legals kept	BNT	1	1	2	0
	RBT	4	9	9	13
	BNS	1	1	2	0
No. (%) legals released	BNT	1 (50.0)	3 (75.0)	0	0
	RBT	1 (20.0)	6 40.0)	6 (40.0)	2 (13.3)
	BNS	1 (50.0)	3 (75.0)	0	0
No. (%) sublegals released	BNT	0	0	0	0
	RBT	0	0	0	1 (6.3)
	BNS	0	0	0	0
No. legals/angler	BNT	0.022	0.058	0.010	0
	RBT	0.034	0.217	0.112	0.148
	BNS	0.022	0.058	0.010	0
Hours/legal caught	BNT	142.6	71.4	200.0	>336.3
	RBT	76.9	23.8	40.0	23.3
	BNS	142.6	71.4	200.0	>336.3
Legals/Hour (SE)	BNT	0.007 (0.006)	0.014 (0.013)	0.005 (0.004)	0
	RBT	0.013 (0.006)	0.042 (0.014)	0.025 (0.007)	0.043 (0.016)
	BNS	0.007 (0.006)	0.014 (0.013)	0.005 (0.004)	0
Estimated angler days ± 95%CI		1522 ± 584	1413 ± 448	1671 ± 530	2148 ± 802
Estimated angler days/acre		4.8	4.4	5.3	6.8
Estimated catch of legals ± 95 %CI	BNT	27 ± 10	32 ± 10	14 ± 5	0
	RBT	50 ± 18	95 ± 30	71 ± 23	240 ± 90
	BNS	27 ± 10	32 ± 10	14 ± 5	0
Estimated fish harvested ± 95%CI	BNT	8 ± 3	2 ± 1	14 ± 5	0
	RBT	38 ± 15	63 ± 20	40 ± 12	212 ± 80
	BNS	8 ± 3	2 ± 1	14 ± 5	0

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Megunticook L (4852) Town: Camden County: Knox
Region: B Acres: 1328 Principle Fisheries: BNT/RBT/SMB/WHP/PKL
Season: Ice Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		174	183	298	247
No. angler hours		741.0	724.0	1204.0	967.0
Mean Party Size		2.3	2.4	1.7	1.9
Mean Trip Length		4.1	4.9	4.3	4.1
No. (%) successful anglers	BNT	23 (13.2)	9 (4.9)	3 (1.0)	5 (2.0)
	RBT	5 (2.9)	20 (10.9)	26 (8.7)	28 (11.3)
	BNS	0	5 (2.7)	1 (0.34)	5 (2.0)
No. legals kept	BNT	11	6	2	3
	RBT	3	14	26	17
	BNS	0	1	0	3
No. (%) legals released	BNT	17 (60.7)	5 (45.4)	1 (33.3)	10 (76.9)
	RBT	4 (57.1)	11 (44.0)	4 (13.3)	14 (45.2)
	BNS	0	4 (80.0)	1 (100)	9 (75.0)
No. (%) sublegals released	BNT	0	0	0	0
	RBT	0	0	0	0
	BNS	0	0	0	0
No. legals/angler	BNT	0.211	0.092	0.013	0.053
	RBT	0.071	0.171	0.109	0.170
	BNS	0	0.031	0.006	0.049
Hours/legal caught	BNT	25	62.5	333.3	125.0
	RBT	83.3	30.3	43.5	27.0
	BNS	>741.0	200.0	1000.0	142.9
Legals/Hour (SE)	BNT	0.040 (0.010)	0.016 (0.007)	0.003 (0.002)	0.008 (0.005)
	RBT	0.012 (0.007)	0.033 (0.013)	0.023 (0.006)	0.037 (0.008)
	BNS	0	0.005 (0.003)	0.001 (0.001)	0.007 (0.004)
Estimated angler days ± 95%CI		446 ± 163	765 ± 296	966 ± 286	717 ± 286
Estimated angler days/acre		0.3	0.6	0.7	0.5
Estimated catch of legals ± 95 %CI	BNT	73 ± 27	60 ± 23	12 ± 4	24 ± 9
	RBT	22 ± 8	124 ± 48	96 ± 28	109 ± 43
	BNS	ND	19 ± 7	4 ± 1	21 ± 8
Estimated fish harvested ± 95%CI	BNT	24 ± 9	38 ± 14	8 ± 3	3 ± 1
	RBT	6 ± 2	53 ± 20	83 ± 25	62 ± 24
	BNS	ND	4 ± 1	ND	3 ± 1

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Megunticook L (4852) Town: Camden County: Knox
Region: B Acres: 1328 Principle Fisheries: BNT/RBT/SMB/WHP/PKL
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		122	190	491	241
No. angler hours		472.3	514.3	1295.8	753.5
Mean Party Size		1.9	1.6	1.7	1.9
Mean Trip Length		3.8	3.0	3.0	3.3
No. (%) successful anglers	BNT	3 (2.5)	5 (2.6)	12 (2.4)	7 (2.9)
	RBT	11 (9.0)	12 (6.3)	44 (9.0)	19 (7.9)
	BNS	2 (1.6)	4 (2.1)	8 (1.6)	6 (2.5)
No. legals kept	BNT	1	0	2	2
	RBT	3	4	11	6
	BNS	0	0	2	1
No. (%) legals released	BNT	2 (66.6)	6 (100.0)	10 (83.3)	5 (71.4)
	RBT	11 (78.6)	11 (73.3)	56 (83.6)	22 (78.6)
	BNS	2 (100.0)	5 (100.0)	6 (75.0)	5 (83.3)
No. (%) sublegals released	BNT	0	0	0	0
	RBT	0	0	0	1 (3.5)
	BNS	0	0	0	0
No. legals/angler	BNT	0.028	0.037	0.031	0.013
	RBT	0.138	0.095	0.193	0.158
	BNS	0.023	0.029	0.020	0.028
Hours/legal caught	BNT	125.0	43.5	76.9	111.1
	RBT	25.0	25.6	13.2	18.5
	BNS	142.9	58.8	142.9	125.0
Legals/Hour (SE)	BNT	0.008 (0.006)	0.023 (0.015)	0.013 (0.005)	0.009 (0.004)
	RBT	0.040 (0.015)	0.039 (0.014)	0.076 (0.015)	0.054 (0.016)
	BNS	0.007 (0.006)	0.017 (0.013)	0.007 (0.003)	0.008 (0.003)
Estimated angler days ± 95%CI		3305 ± 879	2913 ± 751	3907 ± 700	2911 ± 927
Estimated angler days/acre		2.5	2.2	2.9	2.2
Estimated catch of legals ± 95 %CI	BNT	100 ± 27	201 ± 52	152 ± 28	87 ± 27
	RBT	502 ± 134	341 ± 88	891 ± 159	519 ± 165
	BNS	88 ± 111	149 ± 38	82 ± 15	77 ± 24
Estimated fish harvested ± 95%CI	BNT	13 ± 3	0	12 ± 2	29 ± 9
	RBT	75 ± 20	35 ± 9	70 ± 13	77 ± 24
	BNS	0	0	12 ± 2	19 ± 6

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Kennebec R (093) Town: Benton/Fairfield County: Kennebec
Region: B Miles: 3.3 Principal Fisheries: BNT/RBT/SMB
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		220	166	508	69
No. angler hours		575.3	411.6	1358.1	187.3
Mean Party Size		1.4	1.3	1.3	1.4
Mean Trip Length		2.3	2.5	2.7	2.8
No. (%) successful anglers	BNT	5 (2.3)	7 (4.2)	8 (1.4)	3 (4.3)
	RBT	2 (0.9)	1 (0.6)	67 (13.2)	5 (7.2)
	BNS	2 (0.9)	2 (1.2)	5 (1.0)	1 (0.0)
No. legals kept	BNT	0	0	0	0
	RBT	0	1	1	1
	BNS	0	0	0	0
No. (%) legals released	BNT	6 (100.0)	9 (100.0)	8 (100.0)	3 (100.0)
	RBT	2 (100.0)	18 (94.7)	68 (98.6)	4 (80.0)
	BNS	3 (100.0)	3 (100.0)	5 (100.0)	1 (100.0)
No. (%) sublegals released	BNT	19 (76.0)	45 (83.3)	346 (97.7)	58 (95.1)
	RBT	10 (83.3)	39 (67.2)	279 (80.2)	40 (88.9)
	BNS	8 (72.7)	14 (73.7)	216 (97.7)	27 (96.4)
No. legals/angler	BNT	0.032	0.069	0.018	0.049
	RBT	0.002	0.123	0.156	0.094
	BNS	0.014	0.020	0.012	0.023
Hours/legal caught	BNT	45.5	43.5	100.0	71.4
	RBT	>575.3	20.4	15.4	40.0
	BNS	111.1	142.9	142.9	166.7
Legals/Hour (SE)	BNT	0.022 (0.012)	0.023 (0.010)	0.010 (0.004)	0.014 (0.009)
	RBT	0	0.049 (0.014)	0.065 (0.011)	0.025 (0.011)
	BNS	0.009	0.007	0.007	0.006
All/Hour (SE)	BNT	0.057 (0.018)	0.146 0.030)	0.285 (0.030)	0.513 (0.165)
	RBT	0.027 (0.017)	0.159 (0.033)	0.290 (0.031)	0.317 (0.078)
	BNS	0.025	0.041	0.195	0.237
Estimated angler days ± 95%CI		3709 ± 1246	3205 ± 1078	4526 ± 890	1624 ± 1186
Estimated catch of legals ± 95 %CI	BNT	187 ± 64	184 ± 62	122 ± 24	64 ± 46
	RBT	0	393 ± 132	794 ± 156	114 ± 83
	BNS	77 ± 25	56 ± 19	86 ± 17	27 ± 20.0
Estimated catch of all fish ± 95 %CI	BNT	486 ± 163	1170 ± 393	3483 ± 685	2333 ± 1704
	RBT	230± 77	1274 ± 429	3544 ± 697	1442 ± 1053
	BNS	213 ± 72	329 ± 110	2383 ± 469	1078 ± 787
Estimated fish harvested ± 95%CI	BNT	0	0	0	0
	RBT	0	16 ± 5	12 ± 3	18 ± 14
	BNS	0	0	0	0

Appendix E (con.). Summary statistics for clerk creel surveys by water, season, and year.
Water: Little Andro. R (086023) Town: Oxford-Auburn County: Oxford & Andro.
Region: A Miles: 0.5 Principal Fisheries: BNT/RBT/BKT
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEAR			
Year		**2002**	**2003**	**2004**	**2005**
No. anglers surveyed		350	250	252	95
No. angler hours		255.7	265.8	315.4	141.1
Mean Party Size		1.6	1.5	1.6	1.6
Mean Trip Length		0.7	1.5	1.1	1.3
No. (%) successful anglers	BNT	20 (5.7)	10 (4.0)	24 (9.5)	16 (16.8)
	RBT	30 (8.6)	31 (12.4)	36 (14.3)	27 (28.4)
No. legals kept	BNT	3	2	4	0
	RBT	11	5	12	3
No. (%) legals released	BNT	25 (89.0)	8 (80.0)	31 (88.6)	24 (100.0)
	RBT	35 (76.1)	34 (87.2)	35 (74.5)	33 (91.7)
No. (%) sublegals released	BNT	0	0	0	0
	RBT	0	0	0	0
No. legals/angler	BNT	0.100	0.036	0.185	0.184
	RBT	0.162	0.170	0.201	0.237
Hours/legal caught	BNT	10.5	23.3	3.9	6.0
	RBT	5.2	6.7	4.7	3.9
Legals/Hour (SE)	BNT	0.095 (0.025)	0.043 (0.017)	0.258 (0.097)	0.167 (0.059)
	RBT	0.192 (0.056)	0.150 (0.034)	0.214 (0.045)	0.258 (0.064)
Estimated angler days ± 95%CI		3412 ± 635	3375 ± 797	2923 ± 618	1996 ± 534
Estimated catch of legals ± 95 %CI	BNT	227 ± 42	218 ± 51	830 ± 175	433 ± 116
	RBT	459 ± 85	759 ± 180	688 ± 146	670 ± 179
Estimated fish harvested ± 95%CI	BNT	19 ± 4	76 ± 18	109 ± 23	0
	RBT	45 ± 9	76 ± 18	145 ± 30	42 ± 11

Appendix E (con.). Summary statistics for Little Androscoggin River clerk creel surveys by site.

Water: Little Andro. R (086023) Town: Oxford-Auburn County: Oxford & Andro.
Region: A Miles: 0.5 Principal Fisheries: BNT/RBT/BKT
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEAR 2002-2005					
Year		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
No. anglers surveyed		178	234	244	203	116	28
No. angler hours		184.7	210.6	230.3	222.17	104.9	24.1
Mean Party Size		1.7	1.6	1.7	1.5	1.4	1.2
Mean Trip Length		0.9	0.9	0.8	1.6	0.9	0.8
No. (%) successful anglers	BNT	12	14	14	11	17	2
	RBT	14	25	19	25	34	6
No. legals kept	BNT	2	1	3	2	1	0
	RBT	6	4	5	5	11	0
No. (%) legals released	BNT	13	14	19	21	19	2
	RBT	9	35	24	26	35	7
No. (%) sublegals released	BNT	0	0	0	0	0	0
	RBT	0	0	0	0	0	0
No. legals/angler	BNT	0.117	0.080	0.121	0.132	0.165	0.065
	RBT	0.097	0.193	0.155	0.159	0.341	0.261
Hours/legal caught	BNT	7.2	10.2	9.9	5.0	6.4	23.8
	RBT	8.0	6.7	5.6	6.1	2.5	2.8
Legals/Hour (SE)	BNT	0.138 (0.044)	0.098 (0.030)	0.101 (0.039)	0.199 (0.108)	0.156 (0.045)	0.042 (0.030)
	RBT	0.125 (0.038)	0.150 (0.041)	0.180 (0.077)	0.163 (0.042)	0.407 (0.085)	0.306 (0.147)
Estimated angler days ± 95%CI		1990 ± 803	2638 ± 1012	2897 ± 1091	2497 ± 1018	1370 ± 674	266 ± 225
Estimated catch of legals ± 95 %CI	BNT	247 ± 100	233 ± 89	234 ± 88	795 ± 324	192 ±	9 ± 7
	RBT	224 ± 90	356 ± 137	469 ± 105	651± 266	502 ±	65 ± 55

Appendix F. Summary statistics for open water voluntary data, 2002-2005.

Water: Crystal L (3708) Town: Gray County: Cumberland
Region: A Acres: 185 Principle Fisheries: BNT/RBT/LMB
Season: Open water Survey Method: Volbook & Volbox

STATISTICS		SURVEY YEARS 2002-2005
No. anglers surveyed		403.0
No. angler hours		1534.8
Mean Party Size		1.8
Mean Trip Length		3.6
No. (%) successful anglers	BNT	162.0 (40.2)
	RBT	148.0 (36.7)
No. legals kept	BNT	126.0
	RBT	113.0
No. (%) legals released	BNT	141.0 (52.8)
	RBT	78.0 (40.8)
No. (%) sublegals released	BNT	5.0 (1.8)
	RBT	0
No. legals/angler	BNT	0.780
	RBT	0.534
Hours/legal caught	BNT	4.7
	RBT	5.7
Legals/Hour (SE)	BNT	0.212 (0.022)
	RBT	0.176 (0.021)
Mean Length (N)	BNT	389.0 (258)
	RBT	410.0 (218)

Appendix F (con.). Summary statistics for open water voluntary data, 2002-2005.

Water: Middle Range P (3762) Town: Poland County: Androscoggin
Region: A Acres: 382 Principle Fisheries: BNT/RBT/LKT/SMB
Season: Open water Survey Method: Volbook/Volbox

STATISTICS		SURVEY YEARS 2002-2005
No. anglers surveyed		190.0
No. angler hours		669.3
Mean Party Size		1.8
Mean Trip Length		3.5
No. (%) successful anglers	BNT	32.0 (16.8)
	RBT	62.0 (32.3)
No. legals kept	BNT	14.0
	RBT	31.0
No. (%) legals released	BNT	22.0 (61.1)
	RBT	59.0 (65.6)
No. (%) sublegals released	BNT	2.0 (5.3)
	RBT	1.0 (1.1)
No. legals/angler	BNT	0.202
	RBT	0.591
Hours/legal caught	BNT	5.0
	RBT	5.8
Legals/Hour (SE)	BNT	0.064 (0.015)
	RBT	0.173 (0.028)
Mean Length (N)	BNT	468.0 (39)
	RBT	454.0 (91)

Appendix F (con.). Summary statistics for open water voluntary data, 2002-2005.

Water: Upper Range P (3688) Town: Poland County: Androscoggin
Region: A Acres: 357 Principal Fisheries: BNT/RBT/SMB/LMB
Season: Open water Survey Method: Volbook/Volbox

STATISTICS		SURVEY YEARS 2002-2005
No. anglers surveyed		255.0
No. angler hours		1011.0
Mean Party Size		2.0
Mean Trip Length		3.7
No. (%) successful anglers	BNT	39.0 (15.3)
	RBT	53.0 (20.8)
No. legals kept	BNT	18.0
	RBT	38.0
No. (%) legals released	BNT	26.0 (59.1)
	RBT	28.0 (42.4)
No. (%) sublegals released	BNT	1.0 (2.2)
	RBT	0
No. legals/angler	BNT	0.184
	RBT	0.313
Hours/legal caught	BNT	22.7
	RBT	10.5
Legals/Hour (SE)	BNT	0.044 (0.009)
	RBT	0.095 (0.017)
Mean Length (N)	BNT	434.0 (40)
	RBT	421.0 (80)

Appendix F (con.). Summary statistics for open water voluntary data, 2002-2005.

Water: Lake George (2608) Town: Canaan County: Somerset
Region: B Acres: 318 Principle Fisheries: BNT/RBT/SLT/SMB/PKL/WHP
Season: Open water Survey Method: Volbook/Volbox

STATISTICS		SURVEY YEARS 2002-2005
No. anglers surveyed		344.0
No. angler hours		1263.9
Mean Party Size		1.7
Mean Trip Length		3.7
No. (%) successful anglers	BNT	11.0 (3.2)
	RBT	84.0 (24.4)
No. legals kept	BNT	5.0
	RBT	59.0
No. (%) legals released	BNT	6.0 (54.5)
	RBT	54.0 (47.8)
No. (%) sublegals released	BNT	1.0 (8.3)
	RBT	0
No. legals/angler	BNT	0.036
	RBT	0.399
Hours/legal caught	BNT	125.0
	RBT	10.5
Legals/Hour (SE)	BNT	0.008 (0.003)
	RBT	0.095 (0.014)
Mean Length (N)	BNT	447.0 (13)
	RBT	458.0 (95)

Appendix F (con.). Summary statistics for open water voluntary data, 2002-2005.

Water: Megunticook L (4852) Town: Camden County: Knox
Region: B Acres: 1328 Principle Fisheries: BNT/RBT/SMB/WHP/PKL
Season: Open water Survey Method: Clerk

STATISTICS		SURVEY YEARS 2002-2005
No. anglers surveyed		256.0
No. angler hours		891.4
Mean Party Size		1.6
Mean Trip Length		3.5
No. (%) successful anglers	BNT	38.0 (14.8)
	RBT	87.0 (34.0)
No. legals kept	BNT	15.0
	RBT	41.0
No. (%) legals released	BNT	32.0 (68.1)
	RBT	113.0 (73.4)
No. (%) sublegals released	BNT	1.0 (2.1)
	RBT	0
No. legals/angler	BNT	0.194
	RBT	0.784
Hours/legal caught	BNT	14.1
	RBT	4.5
Legals/Hour (SE)	BNT	0.071 (0.018)
	RBT	0.224 (0.029)
Mean Length (N)	BNT	425.0 (30)
	RBT	424.0 (121)

Appendix F (con.). Summary statistics for open water voluntary data, 2002-2005.

Water: Kennebec R (093) Town: Benton/Fairfield County: Kennebec
Region: A Miles: 3.3 Principal Fisheries: BNT/RBT/SMB
Season: Open water Survey Method: Volbook/Volbox

STATISTICS		SURVEY YEARS 2002-2005
No. anglers surveyed		2045.0
No. angler hours		6358.8
Mean Party Size		1.4
Mean Trip Length		2.9
No. (%) successful anglers	BNT	122.0 (6.0)
	RBT	180.0 (8.8)
No. legals kept	BNT	11.0
	RBT	6.0
No. (%) legals released	BNT	127.0 (92.0)
	RBT	231.0 (97.5)
No. (%) sublegals released	BNT	647.0 (82.4)
	RBT	857.0 (78.3)
No. legals/angler	BNT	0.077
	RBT	0.136
Hours/legal caught	BNT	32.3
	RBT	17.9
Legals/Hour (SE)	BNT	0.031 (0.003)
	RBT	0.056 (0.006)
Mean Length (N)	BNT	320.0 (741)
	RBT	351.0 (1062)

Appendix F (con.). Summary statistics for open water voluntary data, 2002-2005.

Water: Little Andro. R (086023) Town: Oxford-Auburn County: Oxford & Andro.
Region: A Miles: 0.5 Principal Fisheries: BNT/RBT/BKT
Season: Open water Survey Method: Volbook/Volbox

STATISTICS		SURVEY YEARS 2002-2005
No. anglers surveyed		1431.0
No. angler hours		2535.9
Mean Party Size		1.4
Mean Trip Length		1.7
No. (%) successful anglers	BNT	391.0 (27.3)
	RBT	627.0 (43.8)
No. legals kept	BNT	101.0
	RBT	280.0
No. (%) legals released	BNT	653.0 (86.6)
	RBT	791.0 (26.1)
No. (%) sublegals released	BNT	0
	RBT	4.0 (0.37)
No. legals/angler	BNT	0.624
	RBT	0.877
Hours/legal caught	BNT	2.3
	RBT	1.6
Legals/Hour (SE)	BNT	0.444 (0.041)
	RBT	0.623 (0.032)
Mean Length (N)	BNT	270.0 (624)
	RBT	303.0 (999)

Appendix G. Returns for Crystal Lake by species, year, and season.

Species	Year	Season	# Stocked	Est. Legals (Kept & Released)	% Legals Returned	Est. Legals (Harvested)	% Harvest Return
RBT	2002	Ice	300	97	32.3	97	32.3
	2003	Ice	300	111	37.0	105	35.0
	2004	Ice	300	65	21.7	60	20.0
	2005	Ice	300	62	20.7	62	20.7
Total	2002-2005	Ice	1200	335	27.9	324	27.0
BNT	2002	Ice	300	11	3.7	4	1.3
	2003	Ice	300	91	30.3	62	20.7
	2004	Ice	300	35	11.7	20	6.7
	2005	Ice	300	44	14.7	28	9.3
Total	2002-2005	Ice	1200	181	15.1	114	9.5

Appendix G (con.). Returns for Middle Range Pond by species, year, and season.

Species	Year	Season	# Stocked	Est. Legals (Kept & Released)	% Legals Returned	Est. Legals (Harvested)	% Harvest Return
RBT	2002	Ice	325	15	4.6	15	4.6
		Open	325	66	20.3	21	6.5
		Full	325	81	24.9	36	11.1
	2003	Ice	325	24	7.4	20	6.2
		Open	325	206	63.4	105	32.3
		Full	325	230	70.8	125	38.5
	2004	Ice	325	24	7.4	2	0.6
		Open	325	273	84.0	39	12.0
		Full	325	297	91.4	41	12.6
	2005	Ice	325	46	14.2	40	12.3
		Open	325	296	91.1	21	6.5
		Full	325	342	105.2	61	18.8
Total	2002-2005	Ice	1300	109	8.4	77	5.9
		Open	1300	841	64.7	186	14.3
		Full	1300	950	73.1	263	20.2
BNT	2002	Ice	325	0	0.0	0	0.0
		Open	325	15	4.6	2	0.6
		Full	325	15	4.6	2	0.6
	2003	Ice	325	0	0.0	0	0.0
		Open	325	19	5.8	0	0.0
		Full	325	19	5.8	0	0.0
	2004	Ice	325	12	3.7	0	0.0
		Open	325	117	36.0	0	0.0
		Full	325	129	39.7	0	0.0
	2005	Ice	325	7	2.2	3	0.9
		Open	325	16	4.9	0	0.0
		Full	325	23	7.1	3	0.9
Total	2002-2005	Ice	1300	19	1.5	3	0.2
		Open	1300	167	12.8	2	0.2
		Full	1300	186	14.3	5	0.4

Appendix G (con.). Returns for Upper Range Pond by species, year, and season.

Species	Year	Season	# Stocked	Est. Legals (Kept & Released)	% Legals Returned	Est. Legals (Harvested)	% Harvest Return
RBT	2002	Ice	150	14	9.3	14	9.3
		Open	150	56	37.3	8	5.3
		Full	150	70	46.7	22	14.7
	2003	Ice	150	82	54.7	81	54.0
		Open	150	373	248.7	55	36.7
		Full	150	455	303.3	136	90.7
	2004	Ice	150	112	74.7	79	52.7
		Open	150	125	83.3	17	11.3
		Full	150	237	158.0	96	64.0
	2005	Ice	150	71	47.3	65	43.3
		Open	150	59	39.3	18	12.0
		Full	150	130	86.7	83	55.3
Total	2002-2005	Ice	600	279	46.5	239	39.8
		Open	600	613	102.2	98	16.3
		Full	600	892	148.7	337	56.2
BNT	2002	Ice	150	0	0.0	0	0.0
		Open	150	28	18.7	0	0.0
		Full	150	28	18.7	0	0.0
	2003	Ice	150	16	10.7	16	10.7
		Open	150	37	24.7	0	0.0
		Full	150	53	35.3	16	10.7
	2004	Ice	150	33	22.0	0	0.0
		Open	150	121	80.7	7	4.7
		Full	150	154	102.7	7	4.7
	2005	Ice	150	18	12.0	6	4.0
		Open	150	9	6.0	5	3.3
		Full	150	27	18.0	11	7.3
Total	2002-2005	Ice	600	67	11.2	22	3.7
		Open	600	195	32.5	12	2.0
		Full	600	262	43.7	32	5.3

Appendix G (con.). Returns for Lake George by species, year, and season.

Species	Year	Season	# Stocked	Est. Legals (Kept & Released)	% Legals Returned	Est. Legals (Harvested)	% Harvest Return
RBT	2002	Ice	200	21	10.5	14	7.0
		Open	200	50	25.0	38	19.0
		Full	200	71	35.5	52	26.0
	2003	Ice	200	34	17.0	28	14.0
		Open	200	95	47.5	63	31.5
		Full	200	129	64.5	91	45.5
	2004	Ice	200	51	25.5	51	25.5
		Open	200	71	35.5	40	20.0
		Full	200	122	61.0	91	45.5
	2005	Ice	200	39	19.5	39	19.5
		Open	200	240	120.0	212	106.0
		Full	200	279	139.5	251	125.5
Total	2002-2005	Ice	800	145	18.1	132	16.5
		Open	800	456	57.0	353	44.1
		Full	800	601	75.1	485	60.6
BNT	2002	Ice	200	0	0.0	0	0.0
		Open	200	27	13.5	8	4.0
		Full	200	27	13.5	8	4.0
	2003	Ice	200	6	3.0	6	3.0
		Open	200	32	16.0	2	1.0
		Full	200	38	19.0	8	4.0
	2004	Ice	200	4	2.0	4	2.0
		Open	200	14	7.0	14	7.0
		Full	200	18	9.0	28	14.0
	2005	Ice	200	3	1.5	3	1.5
		Open	200	0	0.0	0	0.0
		Full	200	3	1.5	3	1.5
Total	2002-2005	Ice	800	13	1.6	13	1.6
		Open	800	73	9.1	24	3.0
		Full	800	86	10.8	37	4.6

Appendix G (con.). Returns for Megunticook Lake by species, year, and season.

Species	Year	Season	# Stocked	Est. Legals (Kept & Released)	% Legals Returned	Est. Legals (Harvested)	% Harvest Return
RBT	2002	Ice	600	22	3.7	6	1.0
		Open	600	502	83.7	75	12.5
		Full	600	524	87.3	81	13.5
	2003	Ice	600	124	20.7	53	8.8
		Open	600	341	56.8	35	5.8
		Full	600	465	77.5	88	14.7
	2004	Ice	600	96	16.0	83	13.8
		Open	600	891	148.5	70	11.7
		Full	600	987	164.5	153	25.5
	2005	Ice	600	109	18.2	62	10.3
		Open	600	519	86.5	77	12.8
		Full	600	628	104.7	139	23.2
Total	2002-2005	Ice	2400	351	14.6	204	8.5
		Open	2400	2253	93.9	257	10.7
		Full	2400	2604	108.5	461	19.2
BNT	2002	Ice	600	0	0.0	0	0.0
		Open	600	88	14.7	0	0.0
		Full	600	88	14.7	0	0.0
	2003	Ice	600	19	3.2	4	0.7
		Open	600	149	24.8	0	0.0
		Full	600	168	28.0	4	0.7
	2004	Ice	600	4	0.7	0	0.0
		Open	600	82	13.7	12	2.0
		Full	600	86	14.3	12	2.0
	2005	Ice	600	21	3.5	3	0.5
		Open	600	77	12.8	19	3.2
		Full	600	98	16.3	21	3.5
Total	2002-2005	Ice	2400	44	1.8	7	0.3
		Open	2400	396	16.5	31	1.3
		Full	2400	440	18.3	40	1.7

Appendix G (con.). Returns for Kennebec River by species, year, and season.

Species	Year	Season	# Stocked	Est. Legals (Kept & Released)	% Legals Returned	Est. Legals (Harvested)	% Harvest Return
RBT	2002	Open	2000	0	0.0	0	0.0
	2003	Open	2000	393	19.7	16	0.8
	2004	Open	2000	794	39.7	12	0.6
	2005	Open	2000	114	5.7	18	0.9
Total	2002-2005	Open	8000	1270	15.9	46	0.6
BNT	2002	Open	2000	77	3.9	0	0.0
	2003	Open	2000	56	2.8	0	0.0
	2004	Open	2000	86	4.3	0	0.0
	2005	Open	2000	27	1.4	0	0.0
Total	2002-2005	Open	8000	246	3.1	0	0.0
Species	**Year**	**Season**	**# Stocked**	**Est. All Trout (Legals & Sublegals)**	**% Legals Returned**	**Est. Legals (Harvested)**	**% Harvest Return**
RBT	2002	Open	2000	230	11.5	NA	NA
	2003	Open	2000	1274	63.7	NA	NA
	2004	Open	2000	3544	177.2	NA	NA
	2005	Open	2000	1442	72.1	NA	NA
Total	2002-2005	Open	8000	6490	81.1	NA	NA
BNT	2002	Open	2000	213	10.7	NA	NA
	2003	Open	2000	329	16.5	NA	NA
	2004	Open	2000	2383	119.2	NA	NA
	2005	Open	2000	1078	53.9	NA	NA
Total	2002-2005	Open	8000	4003	50.0	NA	NA

Appendix G (con.). Returns for Little Androscoggin River by species, year, and season.

Species	Year	Season	# Stocked	Est. Legals (Kept & Released)	% Legals Returned	Est. Legals (Harvested)	% Harvest Return
RBT	2002	Open	2850	459	16.1	45	1.6
	2003	Open	2850	759	26.6	76	2.7
	2004	Open	2850	688	24.1	145	5.1
	2005	Open	2850	670	23.5	42	1.5
Total	2002-2005	Open	11400	2576	22.6	308	2.7
BNT	2002	Open	2850	227	8.0	19	0.7
	2003	Open	2850	218	7.6	76	2.7
	2004	Open	2850	830	29.1	109	3.8
	2005	Open	2850	433	15.2	0	0.0
Total	2002-2005	Open	11400	1708	15.0	204	1.8

Appendix G (con.). Returns for Little Androscoggin River by site, 2002-2005.

	Percent Legals Returned by Site, 2002-2005					
Species	**1**	**2**	**3**	**4**	**5**	**6**
BNT	15.4	9.7	9.8	44.2	12.0	0.6
RBT	14.0	14.8	19.5	36.2	31.4	4.1

Appendix H. Summary of age and growth data for Crystal Lake, 2002-2005.

Species	Data – Mean (SD)	Age									
		Unknown	II	II+	III	III+	IV	IV+	V	V+	Grand Total
BNT	Mean Length (in)	20.2 (3.05)	13.2 (0.99)	15.2 (1.11)	16.2 (0.88)	20.3 (2.64)	17.7 ()	18.9 (0.67)		20.4 (1.03)	17.0 (3.35)
	N (Length)	9	15	2	11	2	1	3		8	51
	Mean Weight (lbs)	2.9 (0.99)	0.8 (0.20)	1.4 (0.47)	1.7 (0.29)	3.4 (1.11)	2.1 ()	2.9 (0.16)		3.6 (0.49)	2.1 (1.19)
	N (Weight & K)	9	14	2	10	2	1	2		8	48
	Mean K-factor	0.94 (0.16)	0.94 (0.08)	1.10 (0.13)	1.05 (0.10)	1.12 (0.07)	1.04 ()	1.26 (0.01)		1.17 (0.11)	1.03 (0.14)
RBT	Mean Length (in)	17.1 ()	15.1 (1.38)	16.1 (1.07)	16.2 (1.43)	17.8 (2.47)	17.1 (0.03)	18.7 ()	17.1 ()		15.7 (1.55)
	N (Length)	1	57	15	13	4	2	1	1		94
	Mean Weight (lbs)	1.7 ()	1.2 (0.39)	1.3 (0.26)	1.5 (0.39)	2.0 (0.75)	1.7 (0.09)	2.6 ()	1.5 ()		1.3 (0.44)
	N (Weight & K)	1	49	15	11	4	2	1	1		84
	Mean K-factor	0.95 ()	0.96 (0.09)	0.83 (0.05)	0.92 (0.12)	0.94 (0.05)	0.94 (0.06)	1.08 ()	0.83 ()		0.93 (0.10)

Appendix H (con.) Summary of age and growth data for Middle Range P, 2002-2005.

Species	Data – Mean (SD)	Age									
		Unknown	II	II+	III	III+	IV	IV+	V	V+	Grand Total
BNT	Mean Length (in)	19.5 (2.97)	14.2 ()	13.2 (0.90)	16.8 ()	17.5 (0.89)		19.1 (1.26)	22.1 (0.42)		18.5 (3.41)
	N (Length)	23	1	5	1	2		3	2		37
	Mean Weight (lbs)	3.2 (1.27)	1.1 ()	0.8 (0.18)		2.0 (0.20)		2.9 (0.65)	4.3 (0.12)		2.8 (3.41)
	N (Weight & K)	22	1	5		2		3	2		35
	Mean K-factor	1.10 (0.13)	1.09 ()	0.94 0.18)		1.02 (0.05)		1.12 (0.05)	1.09 (0.03)		1.07 (0.13)
RBT	Mean Length (in)	17.7 ()	15.4 (1.21)	16.6 (1.4)	17.5 (1.48)	19.2 (1.16)	19.6 (0.81)	19.6 (1.18)	20.7 ()	20.2 (1.25)	17.7 (1.96)
	N (Length)	1	11	60	9	33	3	12	1	3	133
	Mean Weight (lbs)	2.3 ()	1.4 (0.27)	1.6 (0.44)	2.0 (0.49)	2.5 (0.51)	2.9 (0.45)	2.8 (0.37)	3.0 ()	2.8 (0.69)	2.0 (0.68)
	N (Weight & K)	1	9	60	9	33	3	12	1	3	131
	Mean K-factor	1.16 ()	1.07 (0.14)	0.97 (0.10)	1.02 (0.14)	0.97 (0.09)	1.07 (0.04)	1.04 (0.11)	0.95 ()	0.94 (0.10)	0.99 (0.11)

Appendix H (con.). Summary of age and growth data for Upper Range P, 2002-2005.

Species	Data – Mean (SD)	Age							
		Unknown	II	II+	III	III+	IV	IV+	Grand Total
BNT	Mean Length (in)	21.1 (3.55)	13.8 (0.69)	14.1 (0.67)	16.2 (0.54)	18.2 (1.80)	19.9 ()	19.3 (1.87)	19.5 (3.95)
	N (Length)	38	3	5	3	3	1	3	56
	Mean Weight (lbs)	3.9 (1.69)	0.9 (0.05)	1.1 (0.21)	1.7 (0.11)	2.6 (1.04)	2.6 ()	2.7 (1.04)	3.2 (1.77)
	N (Weight & K)	36	2	5	3	3	1	3	53
	Mean K-factor	1.03 (0.11)	0.99 (0.03)	1.05 (0.18)	1.09 (0.07)	1.16 (0.17)	0.93 ()	1.00 (0.16)	1.04 (0.12)
RBT	Mean Length (in)	18.3 ()	15.7 (1.37)	16.4 (1.17)	17.8 (1.16)	17.5 (1.85)	18.2 (1.19)	19.9 (1.20)	17.0 (1.68)
	N (Length)	1	21	38	20	18	7	5	110
	Mean Weight (lbs)	2.1 ()	1.4 (0.43)	1.6 (0.37)	2.0 (0.53)	1.9 (0.58)	2.1 (0.56)	3.0 (0.93)	1.8 (0.60)
	N (Weight & K)	1	19	37	20	18	6	5	106
	Mean K-factor	0.95 ()	1.00 (0.08)	0.96 (0.11)	0.98 (0.12)	0.97 (0.08)	0.91 (0.10)	1.02 (0.15)	0.97 (0.10)

Appendix H (con.). Summary of age and growth data for Lake George, 2002-2005.

Species	Data – Mean (SD)	Age						
		Unknown	II	II+	III	III+	IV	Grand Total
BNT	Mean Length (in)	16.1 (2.48)		13.4 (1.05)	17.0 (1.59)	19.6 ()		15.0 (2.45)
	N (Length)	4		8	2	1		15
	Mean Weight (lbs)	1.5 (1.02)		1.0 (0.34)	2.3 (1.12)	3.1 ()		1.4 (0.89)
	N (Weight & K)	3		8	2	1		14
	Mean K-factor	1.09 (0.32)		1.09 (0.12)	1.24 (0.28)	1.14 ()		1.11 (0.18)
RBT	Mean Length (in)	17.2 (0.95)	15.7 (1.41)	16.9 (1.65)	17.9 (1.48)	19.1 (1.31)	23.0 ()	16.8 (1.88)
	N (Length)	3	38	25	24	5	1	96
	Mean Weight (lbs)	2.4 ()	1.5 (0.46)	1.7 (0.61)	2.2 (0.70)	2.7 (0.57)	5.0 ()	1.8 (0.74)
	N (Weight & K)	1	32	25	21	4	1	84
	Mean K-factor	1.10 ()	1.07 (0.12)	0.92 (0.13)	1.03 (0.13)	1.01 (0.04)	1.14 ()	1.02 (0.14)

Appendix H (con.). Summary of age and growth data for Megunticook Lake, 2002-2005.

Species	Data – Mean (SD)	Age								
		Unknown	II	II+	III	III+	IV	IV+	V+	Grand Total
BNT	Mean Length (in)	17.5 (2.30)	15.2 (1.29)	15.2 (0.80)	15.2 ()	18.3 (1.17)			19.0 (0.08)	17.2 (2.24)
	N (Length)	38	3	5	1	2			2	51
	Mean Weight (lbs)	2.1 (1.01)	1.1 ()	1.3 (0.28)		2.5 (0.23)			2.8 (0.19)	2.0 (0.96)
	N (Weight & K)	36	1	4		2			2	45
	Mean K-factor	1.00 (0.13)	1.05 ()	0.94 (0.17)		1.12 (0.11)			1.15 (0.06)	1.01 (0.13)
RBT	Mean Length (in)	16.2 (1.13)	16.2 (1.31)	16.6 (1.09)	16.7 (1.42)	18.1 (1.11)	17.8 (0.66)	18.7 ()		16.7 (1.33)
	N (Length)	7	37	36	19	10	3	1		113
	Mean Weight (lbs)	1.5 (0.26)	1.6 (0.43)	1.4 (0.27)	1.6 (0.47)	2.2 (0.53)	1.9 (0.16)			1.6 (0.42)
	N (Weight & K)	5	36	23	17	5	3			89
	Mean K-factor	0.95 (0.15)	1.01 (0.09)	0.92 (0.08)	0.96 (0.14)	0.95 (0.06)	0.93 (0.04)			0.97 (0.10)

Appendix H (con.). Summary of age and growth data for the Kennebec River, 2002-2005.

Species	Data – Mean (SD)	Age				
		Unknown	I+	II+	III+	Grand Total
BNT	Mean Length (in)	15.5 (2.57)		14.7 (0.95)		15.3 (2.12)
	N (Length)	6		3		9
	Mean Weight (lbs)	1.6 (0.70)		1.1 (0.00)		1.5 (0.62)
	N (Weight & K)	6		2		8
	Mean K-factor	1.12 (0.12)		1.09 (0.02)		1.11 (0.10)
RBT	Mean Length (in)	14.8 (3.41)	14.6 (1.04)	15.6 (0.88)	17.6 (0.38)	15.7 (1.56)
	N (Length)	4	3	20	4	31
	Mean Weight (lbs)	1.7 (0.36)	1.3 (0.19)	1.5 (0.23)	1.8 (0.06)	1.5 (0.25)
	N (Weight & K)	2	3	16	3	24
	Mean K-factor	1.05 (0.04)	1.18 (0.09)	1.03 (0.13)	0.94 (0.05)	1.04 (0.13)

Appendix H (con.). Summary of age and growth data for the Little Androscoggin River, 2002-2005.

Species	Data - Mean (SD)	Age		
		Unknown	I+	Grand Total
BNT	Mean Length (in)	9.9 (0.64)	11.0 (0.71)	10.6 (0.87)
	N	4	6	10
	Mean Weight (lbs)	0.4 (0.07)	0.5 (0.13)	0.5 (0.13)
	N	4	6	10
	Mean K-factor	1.07 (0.09)	1.05 (0.07)	1.06 (0.07)
RBT	Mean Length (in)		11.9 (1.23)	11.9 (1.23)
	N		44	44
	Mean Weight (lbs)		0.6 (0.23)	0.6 (0.23)
	N		44	44
	Mean K-factor		0.98 (0.11)	0.98 (0.11)