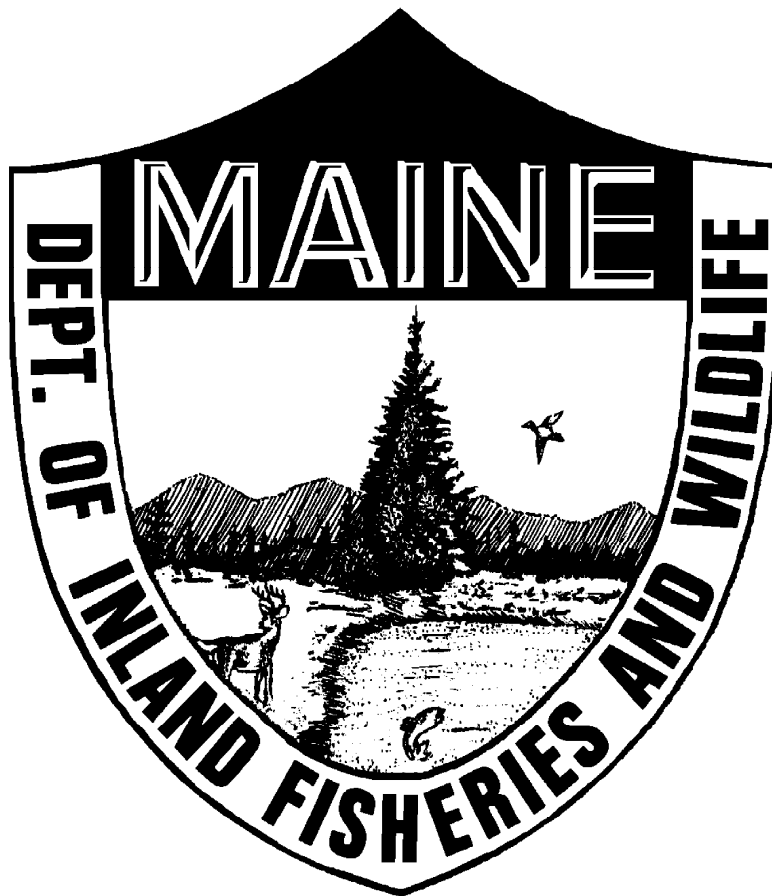


Fishery Interim Summary Report Series No. 17-3

Magalloway River Fishery Management

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Maine Department of
Inland Fisheries & Wildlife
Fisheries and Hatcheries Division

**Magalloway River Fishery Management
Interim Summary Report No. 8 (2016)**

SUMMARY

- The Magalloway River from Aziscohos Dam at the outlet of Aziscohos Lake to the Maine-New Hampshire border is 8.3 miles long. Season-long clerk creel surveys have been conducted periodically since 1998 on the upper 6.8 miles of this reach. Objectives of the surveys were to document existing levels of angler use, catch, and harvest prior to scheduled changes in flow regimes, and to evaluate a special harvest slot limit imposed on brook trout. The 2016 survey is the subject of this report, but only the upper 4.7 miles of the previously surveyed reach was surveyed, due to a lack of angler activity observed in the lower section in earlier surveys. Results of the previous surveys are included here for comparison.
- Approximately 4,690 fishing trips were made to this stretch of the Magalloway River in 2016, which was up from all estimates of previously survey years. Angler effort may have been higher during this year's survey due to the dam reconstruction project that was occurring at nearby Upper Dam Pool and consequently detracting from the overall angling experience.
- The clerk survey showed fishing quality for brook trout in 2016 was within the range observed since 1998. However, the catch rate for landlocked salmon dropped to about half the previous range of 0.21 fish/angler. Annual variations in catch rates for all fish sizes of both species, including the ratio of sublegal fish, were indicative of variable recruitment.
- Clerk survey data showed that the ratio of brook trout exceeding 12 inches increased slightly from 1998 to 2003, declined in 2004, and then improved steadily in 2007, 2010, and 2013. Trout catch rates in 2016 were in the range of the previous two survey years. The availability of brook trout appears to be strongly associated with weak and strong year-classes.
- Fishing quality data provided by volunteers were consistent with general trends observed in the clerk surveys except volunteers reported catching more salmon. Smelts, the principal forage for salmon, commonly drop into the river from Aziscohos Lake where their population abundance fluctuates regularly. A higher ratio of salmon in the catch could predict future lower smelt abundance and declining salmon growth rates within the river.
- Magalloway River anglers released just over 4,500 brook trout over 12 inches in length and almost 450 legal (>14 inches) salmon during the 2016 fishing season. Only one 18-inch salmon was reported to be harvested throughout the survey.

- Anglers continued to catch relatively small numbers of smallmouth bass. Despite over a 200% increase in the average annual bass catch (7 fish/survey year), the 17 taken in 2016 is still a relatively small number. Bass abundance has remained low in this reach of the Magalloway River because ideal habitat for bass is lacking.
- Special fishing regulations applied to brook trout in 1998, and altered slightly in 2006, did not dramatically enhance the availability of larger, older-age fish. The availability of these larger trout seemed more influenced by natural variability in annual spawning and recruitment success than by angler catch and harvest rates. Nonetheless, in 2013 we recommended a catch-and-release regulation, combined with a barbed hooked prohibition, to provide maximum protection to brook trout in this heavily utilized and increasingly popular river segment. These rules became effective on April 1, 2014.

KEY WORDS: BKT, LLS, ANGLER SURVEY, INTRODUCTION, REGULATIONS

INTRODUCTION AND STUDY AREA

The Magalloway River originates near the Canadian border in western Maine and eastern New Hampshire and is a major tributary to the upper Androscoggin River. A portion of the Magalloway River is impounded by Aziscohos Dam, located 17.7 miles above its confluence with Umbagog Lake and the Androscoggin River.

The Magalloway River from Aziscohos Dam to the Maine-New Hampshire border is 8.3 miles long (Figure 1). Season-long angler surveys have been conducted periodically on the upper 6.8 miles of this reach since 1998. In 2016, only the upper 4.7 miles were surveyed due to a lack of angler activity observed in the lower section in earlier surveys. Objectives of the previous surveys were to monitor levels of angler use, catch, and harvest in conjunction with scheduled changes in flow regimes, and to evaluate a special harvest slot limit imposed on brook trout (*Salvelinus fontinalis*) from 1996 to 2013. The 2016 survey is the subject of this report and will begin to compare the brook trout fishery of previous years with the current fishery under a catch-and release regulation. Results of earlier surveys were reported by Boucher (1999a, 1999b, 2003, 2005, 2007, 2010, and 2013), and some are included here for comparison.

The Magalloway River provides suitable habitat for all life stages of brook trout and landlocked salmon (*Salmo salar*), which provide the principal sport fisheries. Brook trout are native to this drainage but salmon were introduced late in the 19th century. Populations of both species are sustained entirely by natural reproduction.

Rainbow smelt (*Osmerus mordax*) occur in the river, having passed over or through the dam on Aziscohos Lake, which controls flows and temperatures in this reach of the Magalloway River. When present, they provide valuable forage for adult salmon and brook trout.

The presence of smallmouth bass (*Micropterus dolomieu*) in the Magalloway River below Aziscohos Lake was confirmed in 1999. This species was illegally introduced in Umbagog Lake, into which the Magalloway River flows, around 1986.

Other fish known to be present include chain pickerel (*Esox niger*), yellow perch (*Perca flavescens*), brown bullhead (*Ameiurus nebulosus*), slimy sculpin (*Cottus cognatus*), white sucker (*Catostomus commersoni*), fallfish (*Semotilus corporalis*), golden shiner (*Notemigonus crysoleucas*), common shiner (*Luxilus cornutus*), and lake chub (*Couesius plumbeus*).

The brook trout fishery is regulated with a catch-and-release and barbless hooks only rules below the Aziscohos Lake Dam. Landlocked salmon have a 14-inch minimum length limit and one fish per day bag limit, and unlimited harvest of smallmouth bass is permitted. Fishing is restricted to fly fishing, and the open fishing season extends from April 1 to September 30. All salmon must also be released alive after August 15. A special regulation on the section from Bennett's Covered Bridge upstream for about 1,300 feet allows persons under 16 to fish from June 1st to August 15th under the S-4 regulation (the use of live fish as bait is prohibited), but only from shore with barbless hooks. The Magalloway River below Aziscohos Lake can be accessed from several road crossings, roadside turnouts, and foot paths (Figure 1).

METHODS

A creel survey was conducted from April 22 to September 30, 2016 (Table 1) on the 4.7 mile river section from Aziscohos Dam downstream to Bennett's Covered Bridge (Figure 1). The survey was of a stratified random design with one weekend day and two weekdays sampled each week. Each survey day was divided into three time periods of equal length (8AM-12PM; 12PM-4PM; and 4PM-8PM). Time periods were preselected randomly with approximately equal coverage given to each period throughout the survey. One time period was sampled each survey day. During each sampling event, clerks made instantaneous counts of anglers fishing the section from road, bridge, and footpath vantages. Standard clerk interviews were conducted to collect catch and harvest data. Total fishing effort was estimated from formulae described by Pollack et al. (1994) for a roving survey.

SUMMARY OF FINDINGS

Angler use in this reach was estimated at $4,687 \pm 577$ trips in 2016 (Table 2). Fishing quality was within the normal range for brook trout compared to previous clerk creel surveys (Table 2). The catch rate for brook trout greater than 12 inches was 0.96 fish/trip and 1.62 fish/trip for trout of all sizes. Legal-sized salmon (14 inches and larger) were caught at a rate of 0.10 fish/trip, which is approximately half the rate of previous surveys. Catch rates for both species varied during the entire 2004-2016 period, suggesting that conditions for successful recruitment of these wild fish varied considerably. Large annual variations in the ratio of sublegal fish, as well as annual differences in catch rates for all fish sizes combined are also indicative of variable recruitment. Data provided by volunteers (Table 3) were largely consistent with the clerk data in this regard.

The ratio of brook trout in the catch exceeding 12 inches increased steadily from 1998 to 2003, declined in 2004, then improved steadily in 2007, 2010, 2013, and 2016 (Table 2). Catch rates, a better indicator of the abundance of these larger trout, were relatively stable throughout much of the period (Table 2). Catch rates for larger trout reported by volunteers were highly variable from 2004 to 2014, showing no obvious trends (Table 3)

An estimated 4,522 legal brook trout and 448 legal salmon were caught and released during the 2016 fishing season with only one salmon being harvested.

Both clerk and voluntary surveys showed that smallmouth bass were present but their numbers have not increased dramatically (Tables 2 and 3), probably because habitat for this species is poor in this reach of the Magalloway River.

DISCUSSION AND RECOMMENDATIONS

There has been an increase in angler use since 2003 (Figure 2), but the availability of all trout sizes, including those exceeding 12 inches have improved, particularly since 2007 (Table 2). Restrictive regulations may now be having some influence on this population's size structure, though this remains uncertain because this riverine population appears to be heavily influenced by natural variability in annual spawning and recruitment success, rather than by angler harvest rates. Recruitment levels for riverine brook trout are often linked with stream flows and summer

water temperatures that prevail during early life stages. This clearly occurs in the lower Magalloway River, despite highly regulated flows and suitable temperatures from Aziscohos Dam.

The high volume of $4,687 \pm 577$ anglers estimated to have fished this stretch of the Magalloway River during this survey could be explained by the dam reconstruction project that was occurring at Upper Dam concurrently. The two fisheries are similar and anglers may have chosen to avoid the less pleasant conditions presented at the Upper Dam site. An estimate of 2,071 anglers fished the pool in 2016, which is 30% lower than the average of four surveys conducted from 2003 to 2010.

A radio telemetry study conducted in 2007 determined that a significant portion of Magalloway River brook trout utilize Abbott Brook, a tributary to the Magalloway, for spawning and nursery habitat (Boucher and Timmins 2008). Abbott Brook is a small, unregulated stream subject to extremes in flows and temperatures, which likely influences recruitment and fishing success in the Magalloway. Nonetheless, in 2013, a season-long catch-and-release rule was recommended for the river, combined with a barbed hooked prohibition, to provide maximum protection to brook trout in this heavily utilized and increasingly popular river segment. These rules became effective on April 1, 2014.

From 2007 to 2016, the average size of salmon reported by volunteers declined slightly, and the ratio of sublegal salmon increased (Table 3). Rainbow smelts, present as dropdowns from Aziscohos Lake, are known to be an important food item for Magalloway River salmonids (Boucher and Timmins 2008). However, growth rate changes cannot be confirmed because long-term, age-specific size data are not available for Magalloway River salmon.

The Magalloway River below Aziscohos Dam continues to provide attractive, heavily utilized sport fisheries for native brook trout and wild landlocked salmon. The river's sport fisheries will be monitored annually by voluntary record-keepers and with a season-long creel survey and angler counts in 2019.

ACKNOWLEDGEMENTS

Brookfield Renewable Energy Partners provided staff and funding for the creel surveys and angler counts as a condition of their licenses to operate Upper and Middle Dams from the Federal Energy Regulatory Commission. Jeff Smith conducted the creel survey in 2016. Fishery Biologist Elizabeth Thorndike assisted heavily in the survey coordination and data entry/analysis. Fishery Biologists Brian Lewis, Kevin Gallant, Robert Van Riper, and Elizabeth Thorndike reviewed this report and offered several helpful suggestions. The following anglers provided excellent records of their fishing trips from 2007 to 2014: Mike Anctil, Bob Bourassa, Bob Erickson, Ralph Johnson, Wayne MacDougall, Peter Mills, Patrick O'Shea, Don Palmer, and Greg Swenson.

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Figure 1. Site location map for Magalloway River creel surveys.

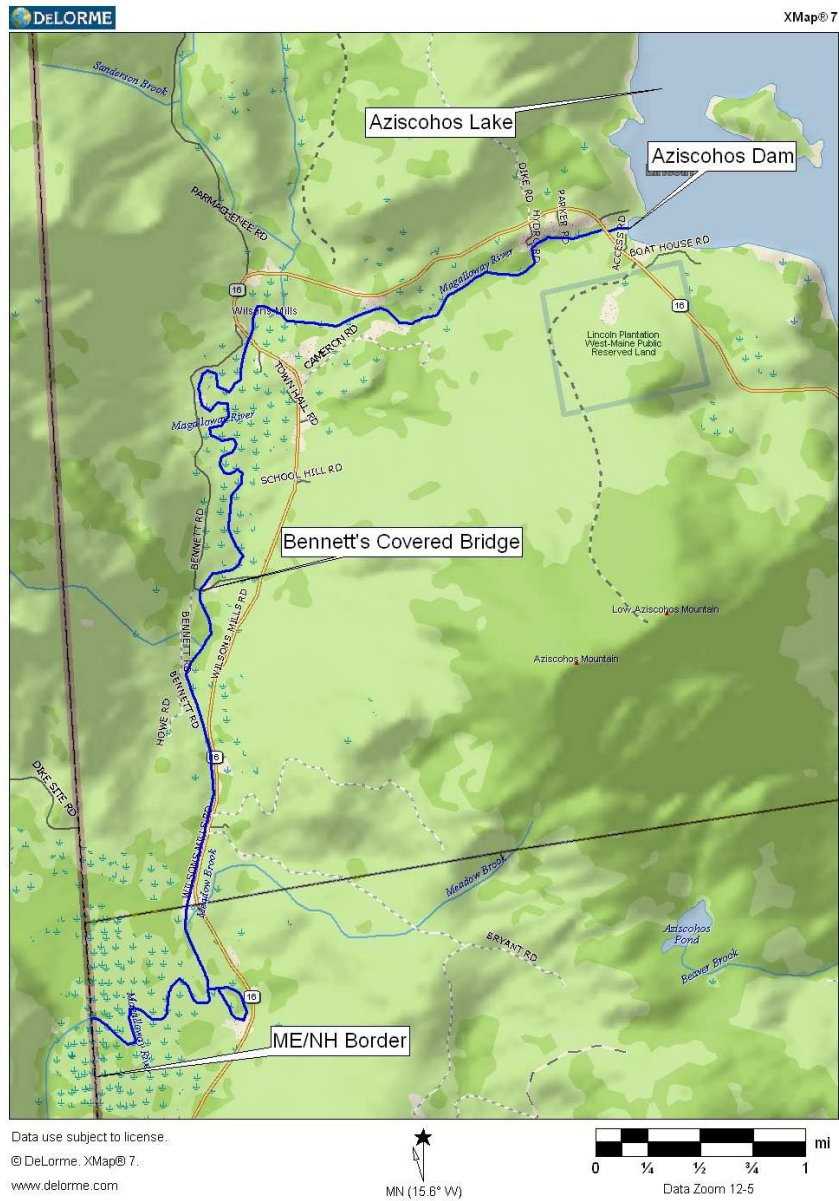
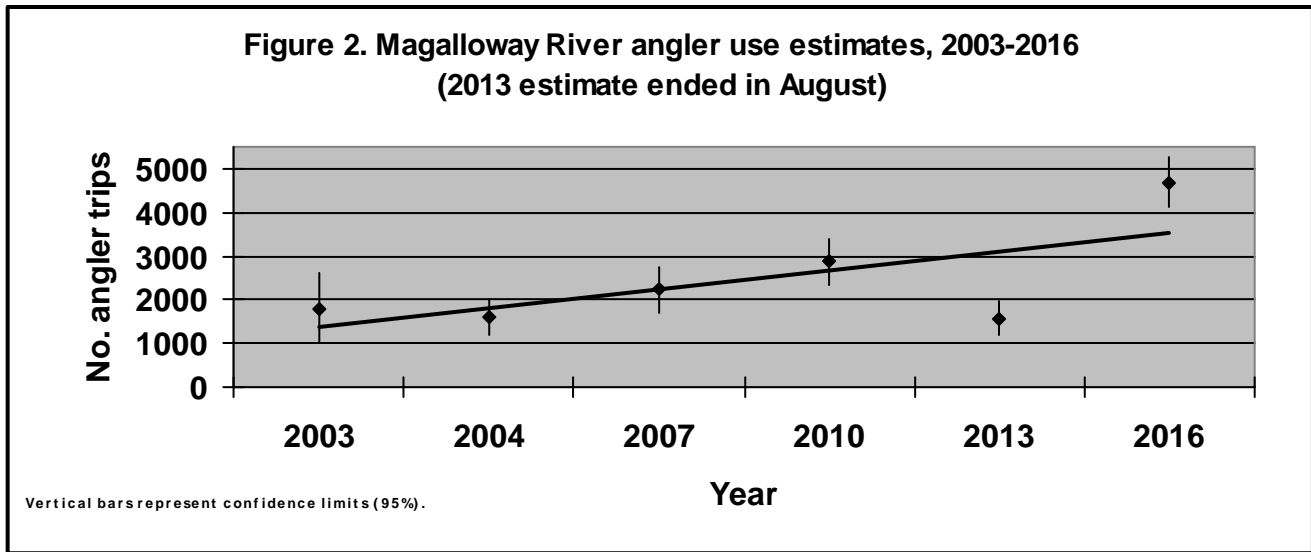


Table 1. Description of Magalloway River clerk creel surveys.

Year	Date	No. days surveyed	No. days in season	Percent of season
2016	April 22 to September 30	66	194	34
2013*	May 10 to August 31	45	153	29
2010	May 2 to September 30	50	183	27
2007	May 12 to September 30	44	183	24
2004	May 22 to September 30	40	183	22
2003	May 3 to September 30	46	183	25
2002	May 7 to September 30	40	183	22

* 2013 survey cut short due to staffing issues. Season numbers for that year do not include September.



**Table 2. Summary statistics for Magalloway River clerk creel surveys, 2004-2016. Upper reach only¹.
Confidence limits (\pm) were computed at the 0.05 probability level.**

Parameter	Species and Year of Survey									
	Brook Trout					Landlocked Salmon				
	2004	2007	2010	2013 ³	2016	2004	2007	2010	2013 ³	2016
No. anglers surveyed:	134	307	550	414	596	134	307	550	414	596
No. angler hours surveyed:	432	826	1,611	1,256	2,291	432	826	1,611	1,256	2,291
No. (%) successful anglers:	51 (38)	106 (35)	251 (46)	165 (40)	233 (39)	24 (18)	50 (16)	89 (16)	54 (13)	47 (8)
No. legals ² caught:	67	212	473	252	575	31	66	115	82	57
No. (%) legals released:	67 (100)	212 (100)	473 (100)	252 (100)	-	31 (100)	66 (100)	115 (100)	82 (100)	56 (98)
No. (%) brook trout > 12" released:	14 (11)	73 (18)	173 (22)	196 (44)	575 (100)	-	-	-	-	-
No. (%) sublegals released:	46 (36)	111 (28)	126 (16)	24 (5)	389 (40)	34 (52)	123 (66)	185 (62)	152 (65)	124 (69)
No. legals ² caught/angler-trip:	0.50	0.69	0.86	1.08	0.96	0.23	0.22	0.21	0.20	0.10
No. legals ² kept/angler-trip:	0	0	0	0	-	0	0	0	0	> 0.01
Hours/legal ² caught:	6.5	3.9	3.4	2.8	-	13.9	12.5	14.0	15.3	40.2
No. brook trout >12" caught/trip:	0.11	0.24	0.32	0.47	0.96	-	-	-	-	-
All sizes caught/angler-trip:	0.95	1.29	1.40	1.40	1.62	0.75	0.62	0.55	0.57	0.30
Estimated total catch of legals ² \pm CI:	811 \pm 205	1,539 \pm 358	2,468 \pm 442	1,707 \pm 424	4,522 \pm 557	373 \pm 94	494 \pm 113	600 \pm 107	316 \pm 79	448 \pm 55
Estimated. total harvest of legals ² \pm CI:	0	0	0	0	-	0	0	0	0	8 \pm 1
Estimated total angler days \pm CI:	1,622 \pm 409	2,230 \pm 519	2,870 \pm 514	1,581 \pm 393	4,687 \pm 577					
Percent of total effort in upper reach:	100	99	100	100	100					
No. angler days/river-mile:	345	475	611	363	997					
Number of smallmouth bass reported:	15	1	9	3	17					

¹ Upper reach extends from Aziscohos Lake dam to ¼ mile upstream of Bennett's Covered Bridge (4.7 miles).

² Legal brook trout: 8"-12" prior to 2006; 6"-12" 2007 to 2013; 12" for the purposes of this survey - 2014 to present.

³ May – August only

Table 3. Summary statistics for Magalloway River voluntary creel surveys, 2009-2015. Upper reach only¹.

Parameter	Species	2009	2010	2011	2012	2013	2014	2015
No. anglers surveyed:		28	25	13	6	9	8	4
No. angler hours surveyed:		117	114	50	24	37	31	14
No. legal ² caught:	BKT	35	27	12	8	13	5	5
	LLS	11	5	3	1	9	9	1
No. (%) legal ² released:	BKT	35 (100)	27 (100)	12 (100)	8 (100)	13 (100)	-	-
	LLS	11 (100)	5 (100)	3 (100)	1 (100)	9 (100)	9 (100)	1 (100)
No. (%) brook trout > 12”:	BKT	19 (55)	12 (31)	4 (25)	1 (11)	9 (59)	5 (38)	3 (60)
No. (%) sublegals released:	BKT	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	8 (62)	0 (0)
	LLS	10 (48)	9 (64)	8 (73)	2 (67)	2 (18)	3 (33)	2 (67)
No. legal ² caught/angler-trip:	BKT	1.25	1.08	0.92	1.33	1.44	0.63	1.25
	LLS	0.39	0.20	0.23	0.17	1.00	1.13	0.25
No. legal ² kept/angler-trip:	BKT	0	0	0	0	0	-	-
	LLS	0	0	0	0	0	0	0
Hours/legal ² caught:	BKT	3.3	4.2	3.1	3.0	2.8	6.1	2.7
	LLS	10.6	5.0	16.7	24.0	4.1	3.4	13.5
No. brook trout >12” caught/trip:	BKT	1.54	0.48	0.31	0.17	2.11	0.63	0.50
All sizes caught/angler-trip:	BKT	2.79	1.56	1.23	1.50	3.56	1.63	1.25
	LLS	0.75	0.56	0.85	0.50	1.22	2.00	0.75
Mean length (inches) of fish reported: (no. fish reported)	BKT	11.9 (55)	11.1 (39)	11.7 (20)	10.8 (8)	13.8 (32)	11.9 (13)	10.8 (5)
	LLS	14.8 (11)	15.6 (5)	16.7 (3)	16.0 (1)	15.0 (9)	14.4 (9)	13.3 (3)
Number of smallmouth bass reported:	SMB	0	0	0	0	0	0	0

¹ Upper reach extends from Aziscohos Lake dam to ¼ mile upstream of Bennett’s Covered Bridge (4.7 miles).

² Legal brook trout: 8”-12” prior to 2006; 6”-12” 2007 to 2013; 12” for the purpose of this survey – 2014 to present.

COOPERATIVE

STATE



FEDERAL

PROJECT

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

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



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