

# Magalloway River Fishery Management

By David P. Boucher



*Caring for Maine's Outdoor Future*



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Maine Department of Inland Fisheries  
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**FISHERY INTERIM SUMMARY REPORT SERIES NO. 08-06  
MAGALLOWAY RIVER FISHERY MANAGEMENT**

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**Magalloway River Fishery Management  
Interim Summary Report No. 5 (2007)**

**SUMMARY**

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- 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, funded and staffed by FPL Energy, 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 2007 survey is the subject of this report. Results of the previous surveys are included here for comparison.
- An estimated 2,230 fishing trips were made in 2007, which was similar to most of the earlier surveys. Fishing effort continued to be concentrated in the uppermost 4.7 miles below Aziscohos Dam (99% of the total).
- The clerk survey showed fishing quality in 2007 was within the range observed during the previous surveys. Catch rates for legal fish of both species fluctuated during the 1998-2007 period, suggesting that conditions for successful recruitment of these wild fish varied considerably. Annual variations in the ratio of sublegal fish, as well as annual differences in catch rates for all fish sizes combined, were also indicative of variable recruitment.
- Clerk survey data showed that the ratio of brook trout in the catch exceeding 12 inches increased slightly from 1999 to 2003, declined in 2004, and then improved slightly in 2007. Catch rates, a better indicator of the abundance of these larger trout, were relatively stable throughout the entire period. The availability of these larger trout appears to be strongly associated with weak and strong year-classes.
- Fish size data provided by volunteers showed the average length of brook trout and salmon has improved slightly since 1999. The improvement may be related to higher densities of rainbow smelts. Smelts commonly drop into the river from Aziscohos Lake, where their population abundance has increased in recent years.
- Magalloway River anglers continued to release a high proportion of their legal catch. An estimated 2,100 legal brook trout and 500 legal salmon were caught during the 2007 fishing season, but none was harvested.
- Both clerk and voluntary surveys showed that anglers catch smallmouth bass each year. Their abundance has remained low because habitat for this species is generally poor in this reach of the Magalloway River.
- Special fishing regulations applied to brook trout in 1998, and altered slightly in 2006, did not significantly enhance the availability of larger, older-age fish. The availability of

these larger trout seems more influenced by natural variability in annual spawning and recruitment success than by angler harvest rates. However, we recommend retention of the restrictive rule because it provides a high level of protection to the river's brood population, and it remains popular with anglers.

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



## INTRODUCTION AND STUDY AREA

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The Magalloway River is a major tributary to the upper Androscoggin River, originating near the Canadian border in western Maine and eastern New Hampshire. 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 at the outlet of Aziscohos Lake to the Maine-New Hampshire border is 8.3 miles long. Season-long clerk creel surveys were conducted on the upper 6.8 miles of this reach in 1998 and 1999, from 2002 to 2004, and in 2007. Objectives of these surveys, funded and staffed by FPL Energy, 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 (*Salvelinus fontinalis*) in 1996. The 2007 survey is the subject of this report. Results of earlier surveys were reported by Boucher (1999a, 1999b, 2003, and 2005) and 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; salmon were introduced late in the 19th century. Populations of both species are sustained by natural reproduction.

Rainbow smelt (*Osmerus mordax*) are observed in the river as dropdowns from Aziscohos Lake, having passed over or through Aziscohos Dam, 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 by creel clerks 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 6 to 12-inch harvest slot (8-12 inches from 1996 to 2005), with one trout permitted in this size range. 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 during the period from April 1 to September 30. All brook trout and salmon must be released alive after August 15.

The Magalloway River below Aziscohos Lake can be accessed from several road crossings, roadside turnouts, and foot paths (Figure 1).

## METHODS

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A creel survey and angler counts were conducted from May 12 to September 30, 2007 (Table 1). The river was divided into two sections (Figure 1): from Aziscohos Dam downstream to Bennett's Covered Bridge (4.7 miles), and from Bennett's Covered Bridge downstream to the Lincoln PLT town line (1.8 miles). The survey was of a stratified random design, with one weekend day and one weekday 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 sampled randomly within each survey day, with approximately equal coverage given to each period throughout the survey. During each sampling event, clerks made instantaneous counts of anglers fishing each section from road, bridge, and footpath vantages. Standard clerk interviews were conducted to collect catch and harvest data. Total fishing effort for each section, and the entire reach, was estimated from formulae described by Pollack et al. (1994) for a roving survey.

## SUMMARY OF FINDINGS

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Fishing effort in 2007 continued to be concentrated in the uppermost 4.7 miles below Aziscohos Dam, and much of it was focused in the uppermost 2 miles. Angler use in this reach was estimated at 2,230 trips in 2007, which was similar to estimates from earlier surveys (Table 2). Only two anglers were observed in the lower reach extending below Bennett's Covered Bridge to the Lincoln PLT town line.

Fishing quality in 2007 was within the range observed during most previous clerk creel surveys (Table 2). The catch rate for legal-sized trout (those between 6 inches and 12 inches) was 0.69 fish/trip in 2007. Legal-sized salmon ( $\geq 14$  in) were caught at a rate of 0.22 fish/trip. Catch rates for legal fish of both species varied during the entire 1998-2007 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, also indicate 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, as measured by clerk surveys, increased steadily from 1998 to 2003, declined in 2004, then improved slightly in 2007 (Table 2). Catch rates, a better indicator of the abundance of these larger trout, were relatively stable throughout the entire period (Table 2). Catch rates for larger trout reported by volunteers was highly variable from 2001 to 2007, showing no obvious trends (Table 3). This suggests that the special harvest slot did not result in improved recruitment of older-age trout.

Fish size data provided by volunteers showed the average length of brook trout and salmon has improved slightly since 1999 (Table 3).

Magalloway River anglers continued to release a high proportion of their legal catch. An estimated 2,100 legal brook trout and 500 legal salmon were caught during the 2007 fishing season, but none was 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

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Restrictive fishing regulations applied to brook trout in 1996, and altered slightly in 2006, did not appear to significantly enhance the availability of larger, older-age fish. High release rates practiced by anglers, which predated the regulation change, suggest that fishing mortality was not a significant factor in structuring this trout population. Rather, the availability of larger trout seemed more influenced by natural variability in annual spawning and recruitment success than by angler harvest rates. Recruitment levels for riverine brook trout is 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. A recent radio telemetry study 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. Nevertheless, we recommend retention of the restrictive fishing rules because it provides a high level of protection to the river's brood population, and it remains popular with anglers.

The average size of brook trout and salmon reported by volunteers showed a slight improvement from 1999 to 2007 (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). Smelt abundance in Aziscohos increased during this same period (ME Dept. Inland Fisheries and Wildlife, unpublished data), so it's possible that growth rates of Magalloway River fish increased concurrently. However, improved growth rates cannot be confirmed because long-term, age-specific size data are not available.

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 surveys and angler counts in 2010.

## ACKNOWLEDGEMENTS

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FPL Energy 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. Liz Studdert conducted the creel survey in 2007. The following anglers provided excellent records of their fishing trips from 2005 to 2007: Mike Ancil, Bob Bourassa, B. Erickson, Ralph Johnson, Don Palmer, Patty Silva, and Greg Swenson.

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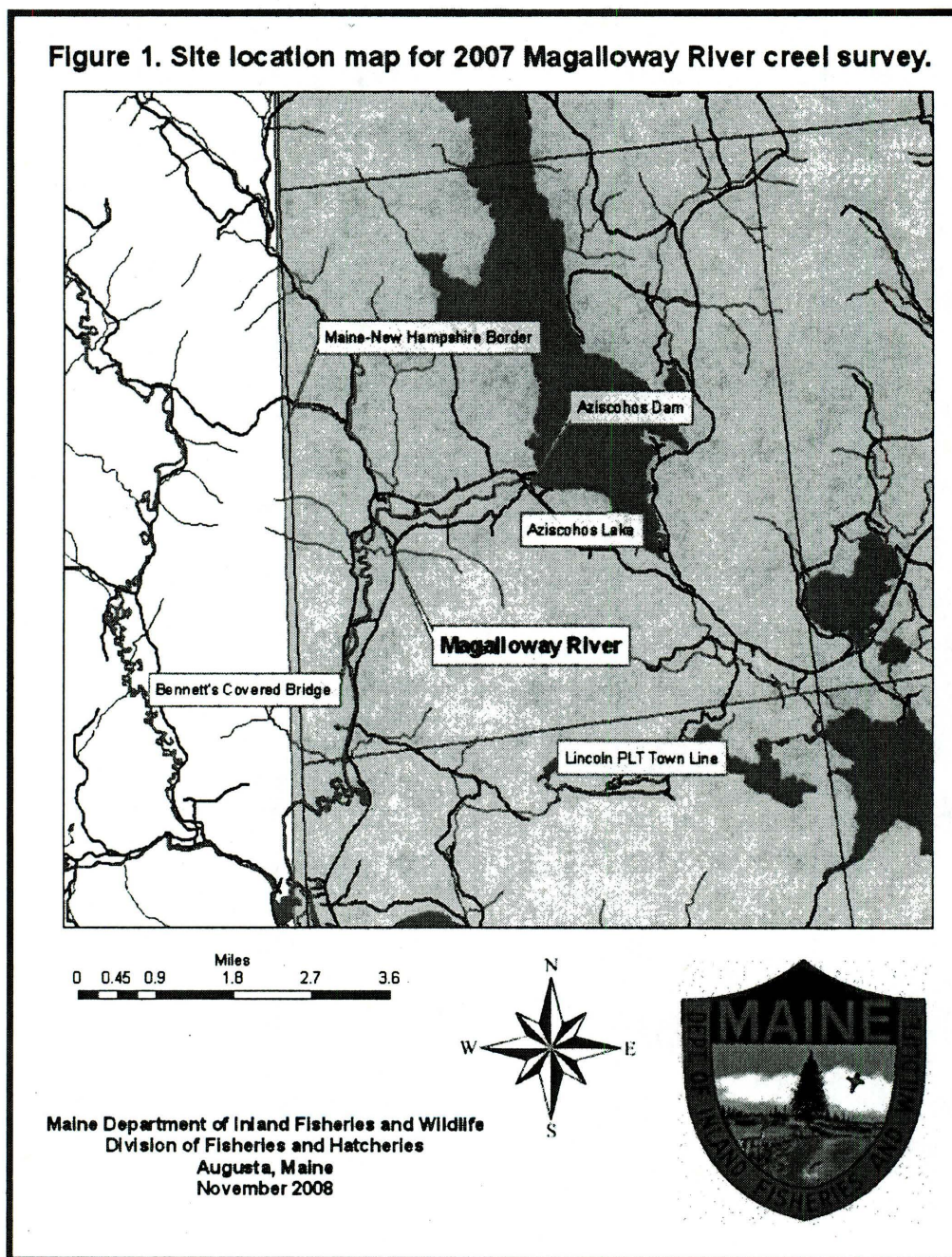
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**Figure 1. Site location map for 2007 Magalloway River creel survey.**



**Table 1. Description of Magalloway River clerk creel surveys.**

Year	Date	No. days surveyed	No. days in season
2007	May 12 to September 30	44	181
2004	May 22 to September 30	40	183
2003	May 3 to September 30	46	183
2002	May 7 to September 30	40	183
1999	May 13 to September 30	34	183



**Table 2. Summary statistics for Magalloway River clerk creel surveys, 1999-2007. Upper reach only<sup>1</sup>. Confidence limits ( $\pm$ ) were computed at the 0.05 probability level.**

Parameter	Species and year of survey									
	Brook trout					Salmon				
	1999	2002	2003	2004	2007	1999	2002	2003	2004	2007
No. anglers surveyed:	89	197	237	134	307	89	197	237	134	307
No. angler hours surveyed:	213	447	593	432	826	213	447	593	432	826
No. (%) successful anglers:	44 (49)	50 (25)	32 (14)	51 (38)	106 (35)	24 (27)	16 (8)	25 (11)	24 (18)	50 (16)
No. legals caught: (legal trout are 6-12 inches) <sup>2</sup>	150	81	25	67	212	40	22	32	31	66
No. (%) legals released:	149 (99)	79 (98)	25 (100)	67 (100)	212 (100)	40 (100)	22 (100)	29 (91)	31 (100)	66 (100)
No. (%) brook trout > 12 inches:	37 (18)	27 (21)	30 (55)	14 (17)	73 (26)	*	*	*	*	*
No. (%) sublegals released:	22 (11)	20 (16)	30 (36)	46 (36)	111 (28)	32 (44)	65 (75)	37 (54)	34 (52)	123 (66)
No. legals caught/angler-trip:	1.69	0.41	0.11	0.50	0.69	0.45	0.11	0.14	0.23	0.22
No. legals kept/angler-trip:	0.01	0.01	0	0	0	0	0	0.01	0	0
Hours/legal caught:	1.4	5.5	23.7	6.5	3.9	5.3	20.3	18.5	13.9	12.5
No. brook trout >12 in caught/trip:	0.42	0.14	0.13	0.11	0.24	*	*	*	*	*
All sizes caught/angler-trip:	2.35	0.65	0.36	0.95	1.29	0.81	0.44	0.29	0.75	0.62
Estimated total catch of legals $\pm$ CI:	2,031 $\pm$ 432	656 $\pm$ 187	200 $\pm$ 62	811 $\pm$ 205	2,086 $\pm$ 537	542 $\pm$ 115	179 $\pm$ 51	255 $\pm$ 79	373 $\pm$ 94	494 $\pm$ 113
Estimated total harvest of legals $\pm$ CI:	14 $\pm$ 3	16 $\pm$ 5	0	0	0	0	0	23 $\pm$ 7	0	0
Estimated total angler days $\pm$ CI:	1,205 $\pm$ 256	1,601 $\pm$ 456	1,819 $\pm$ 561	1,622 $\pm$ 409	2,230 $\pm$ 519					
Percent of total effort in upper reach:	98	98	100	100	99					
No. angler days/river-mile:	256	340	387	345	475					
Number of smallmouth bass reported:	1	11	9	15	1					

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

<sup>2</sup> Legal trout were 8-12 inches prior to 2006.



Table 3. Summary statistics for Magalloway River voluntary angler surveys, 2001-2007. Upper reach only<sup>3</sup>.

Parameter	Species	Year of survey						
		2001	2002	2003	2004	2005	2006	2007
No. anglers surveyed:		25	32	44	81	70	67	40
No. angler hours surveyed:		57	180	201	316	277	237	207
No. legals caught: (legal trout are 6-12 inches) <sup>4</sup>	BKT	23	13	18	29	20	48	39
	LLS	0	15	10	86	38	62	29
No. (%) legals released:	BKT	20(87)	12 (92)	18 (100)	29 (100)	20 (100)	48 (100)	39 (100)
	LLS	0 (0)	14 (93)	10 (100)	86 (100)	38 (100)	62 (100)	29 (100)
No. (%) brook trout > 12 inches:	BKT	15 (27)	6 (12)	11 (31)	29 (48)	64 (60)	57 (44)	21 (31)
No. (%) sublegals released:	BKT	18 (32)	33 (63)	7 (19)	3 (5)	23 (21)	25 (19)	7 (10)
	LLS	0 (0)	14 (48)	6 (38)	43 (33)	20 (34)	16 (21)	24 (45)
No. legals caught/angler-trip:	BKT	0.92	0.41	0.41	0.36	0.29	0.72	0.98
	LLS	0	0.47	0.23	1.06	0.54	0.93	0.73
No. legals kept/angler-trip:	BKT	0.12	0.03	0	0	0	0	0
	LLS	0	0.03	0	0	0	0	0
Hours/legal caught:	BKT	2.5	13.9	11.2	10.9	13.9	4.9	5.3
	LLS	*	12.0	20.1	3.7	7.3	3.8	7.1
No. brook trout >12 in caught/trip:	BKT	0.60	0.19	0.25	0.36	0.91	0.85	0.53
All sizes caught/angler-trip:	BKT	2.24	1.63	0.82	0.75	1.53	1.94	1.68
	LLS	0	0.91	0.37	1.59	0.83	1.16	1.33
Mean length (in) of fish reported: (no. fish reported)	BKT	10.9 (32)	11.5 (19)	14.5 (27)	12.9 (57)	15.3 (83)	13.1 (97)	12.1 (59)
	LLS	*	17.1 (15)	16.1 (10)	16.0 (86)	16.9 (37)	17.3 (55)	16.8 (28)
Number of smallmouth bass reported:	SMB	3	4	1	2	1	2	0

<sup>3</sup> Upper reach extends from Aziscohos Lake dam to ¼ mile upstream of Bennett's Covered Bridge (4.7 miles).

<sup>4</sup> Legal trout were 8-12 inches prior to 2006.

# COOPERATIVE

STATE  FEDERAL

# PROJECT

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

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



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