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MAGALLOWAY RIVER FISHERY MANAGEMENT

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Magalloway River Fishery Management
Interim Summary Report No. 6 (2008-2010)

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 2010 survey is the subject of this report. Results of the previous surveys are included here for comparison.

- About 2,900 fishing trips were made in 2010, which exceeded all other estimates made since 1998. Fishing effort continued to be concentrated in the uppermost 4.7 miles below Aziscohos Dam.

- The clerk survey showed fishing quality for legal-size brook trout (6 to 12 inches) in 2010 was slightly above estimates from previous years, while fishing quality for legal salmon (14 inches and larger) was within the range observed since 1998. 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 in the catch exceeding 12 inches increased slightly from 1998 to 2003, declined in 2004, and then improved slightly in 2007 and 2010. Catch rates, a better indicator of the abundance of these larger trout, were relatively stable from 1998 to 2010. The availability of these larger trout appeared 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 from 2008-2010, when volunteers caught proportionately more sublegal salmon. Smelts, the principal forage for salmon, commonly drop into the river from Aziscohos Lake where their population abundance declined in recent years. Higher ratios of sublegal salmon possibly reflected low smelt abundance and declining salmon growth rates.

- Magalloway River anglers continued to release a high proportion of their legal catch. About 2,500 legal brook trout and 600 legal salmon were caught during the 2010 fishing season, but none were reported harvested.

- Anglers continued to catch small numbers of smallmouth bass. Their abundance has remained low because habitat is poor for bass 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 seemed more influenced by natural variability in annual spawning and recruitment success than by angler catch and 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.

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. Objectives of the 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*) in 1996. The 2010 survey is the subject of this report. Results of earlier surveys were reported by Boucher (1999a, 1999b, 2003, 2005, and 2007), 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 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 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 (*Catastomus 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 to12 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, and the open fishing season extends from April 1 to September 30. All brook trout and salmon must 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 May 2 to September 30, 2010 (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 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 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

Fishing effort in 2010 continued to be concentrated in the uppermost 4.7 miles below Aziscohos Dam. Angler use in this reach was estimated at 2,870±514 trips in 2010, the highest observed since surveys began in 1998 (Figure 2). Anglers were not observed in the lower section, including in the special "Kid's Fishing" area adjacent to Bennett's Covered Bridge. Youth fishing events are known to occur here during the mid-summer months, but none coincided with a scheduled survey day.

Fishing quality in 2010 was higher for brook trout than that observed during most previous clerk creel surveys (Table 2). The catch rate for legal-sized trout (those between 6 inches and 12 inches) was 0.86 fish/trip, 0.32 fish/trip for trout over 12 inches, and 1.40 fish/trip for trout of all sizes. Legal-sized salmon (those 14 inches and larger) were caught at a rate of 0.21 fish/trip. Catch rates for legal fish of both species varied during the entire 1998-2010 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 indicated 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 and 2010 (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 were highly variable from 2004 to 2010, showing no obvious trends (Table 3). This suggested that the special harvest slot did not result in improved recruitment of older-age trout.

Magalloway River anglers continued to release a high proportion of their legal catch. An estimated 2,500 legal brook trout and 600 legal salmon were caught during the 2010 fishing season, but none were reported 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

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. Increasing angler use since 2007 (Figure 2), and the higher total catch of brook trout associated with it (Table 2), also seemed to have little influence on this population's size structure. High release rates practiced by anglers, which predated both the regulation changes and higher effort, suggest that fishing mortality was not a significant factor 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 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. 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.

From 2007 to 2010, 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). Smelt abundance in Aziscohos declined during this same period (ME Dept. Inland Fisheries and Wildlife, unpublished data), so it's possible that growth rates of Magalloway River fish declined concurrently. 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 2013.

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

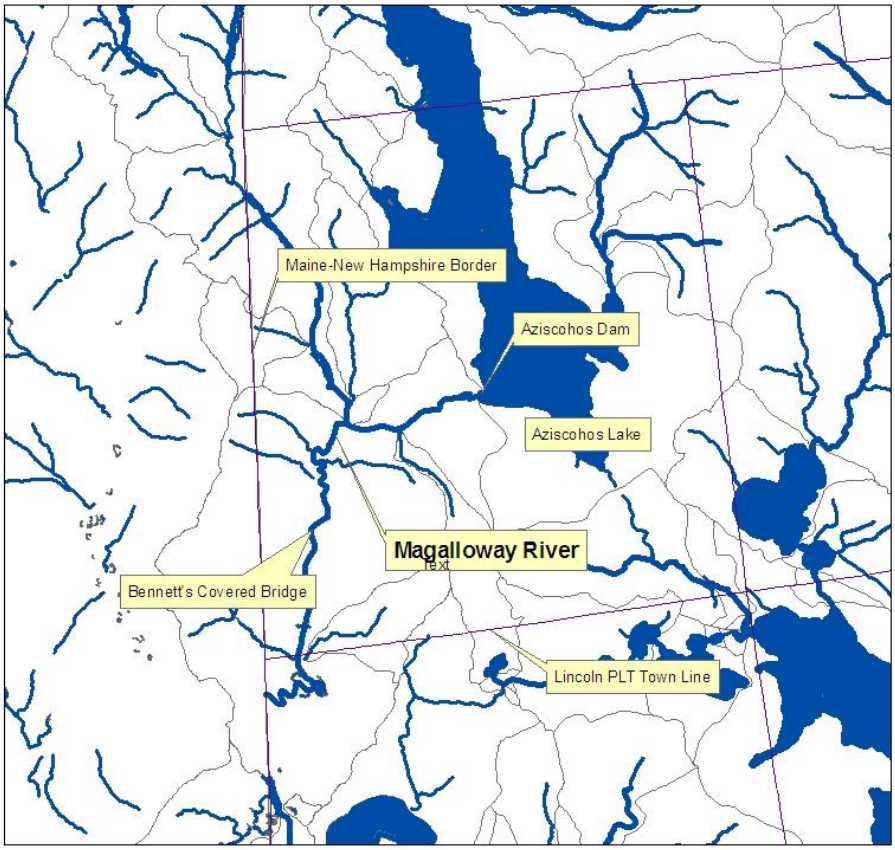

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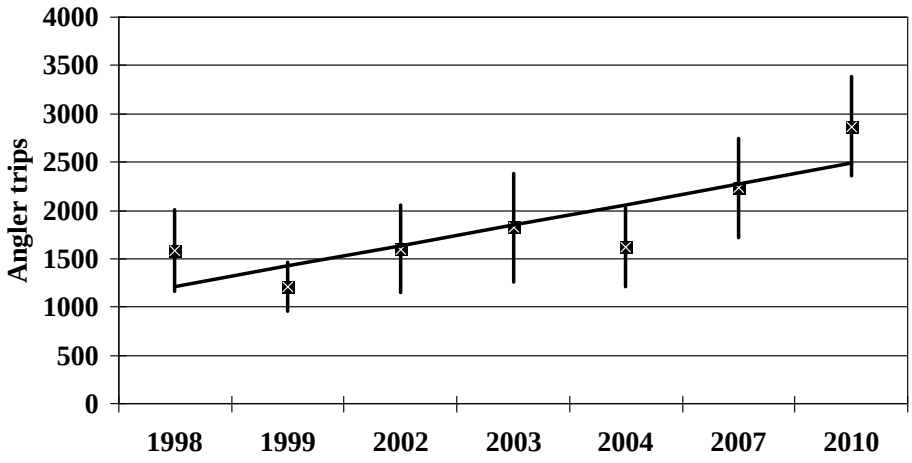
Table 1. Description of Magalloway River clerk creel surveys.

Year	Date	No. days surveyed	No. days in season
2010	May 2 to September 30	50	183
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

Figure 2. Magalloway River angler use trends, 1998-2010. (Below Aziscohos Dam to Lincoln PLT town line)



Vertical bars represent 95% confidence limits.

Table 2. Summary statistics for Magalloway River clerk creel surveys, 2002-2010. Upper reach only[1]. Confidence limits (±) were computed at the 0.05 probability level.

Parameter	Species and year of survey									
	Brook trout					Salmon				
	2002	2003	2004	2007	2010	2002	2003	2004	2007	2010
No. anglers surveyed:	197	237	134	307	550	197	237	134	307	550
No. angler hours surveyed:	447	593	432	826	1,611	447	593	432	826	1,611
No. (%) successful anglers:	50 (25)	32 (14)	51 (38)	106 (35)	251 (46)	16 (8)	25 (11)	24 (18)	50 (16)	89 (16)
No. legals caught: **(legal trout are 6-12 inches)[2]**	81	25	67	212	473	22	32	31	66	115
No. (%) legals released:	79 (98)	25 (100)	67 (100)	212 (100)	473 (100)	22 (100)	29 (91)	31 (100)	66 (100)	115 (100)
No. (%) brook trout > 12 inches:	27 (21)	30 (35)	14 (11)	73 (18)	173 (22)	*	*	*	*	
No. (%) sublegals released:	20 (16)	30 (35)	46 (36)	111 (28)	126 (16)	65 (75)	37 (54)	34 (52)	123 (66)	185 (62)
No. legals caught/angler-trip:	0.41	0.11	0.50	0.69	0.86	0.11	0.14	0.23	0.22	0.21
No. legals kept/angler-trip:	0.01	0	0	0	0	0	0.01	0	0	0
Hours/legal caught:	5.5	23.7	6.5	3.9	3.4	20.3	18.5	13.9	12.5	14.0
No. brook trout >12 in caught/trip:	0.14	0.13	0.11	0.24	0.32	*	*	*	*	
All sizes caught/angler-trip:	0.65	0.36	0.95	1.29	1.40	0.44	0.29	0.75	0.62	0.55
Estimated total catch of legals±CI:	656±187	200±62	811±205	1,539±358	2,468±442	179±51	255±79	373±94	494±113	600±107
Estimated total harvest of legals±CI:	16±5	0	0	0	0	0	23±7	0	0	0
Estimated total angler days±CI:	1,601±456	1,819±561	1,622±409	2,230±519	2,870±514					
Percent of total effort in upper reach:	98	100	100	99	100					
No. angler days/river-mile:	340	387	345	475	611					
Number of smallmouth bass reported:	11	9	15	1	9					

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

[2] Legal trout were 8-12 inches prior to 2006.

Table 3. Summary statistics for Magalloway River voluntary angler surveys, 2004-2010. Upper reach only[3].

		Year of survey						
Parameter	**Species**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
No. anglers surveyed:		81	70	67	40	22	28	25
No. angler hours surveyed:		316	277	237	207	77	117	114
No. legals caught:	BKT	29	20	48	39	29	35	27
(legal trout are 6-12 inches)[4]	LLS	86	38	62	29	1	11	5
No. (%) legals released:	BKT	29 (100)	20 (100)	48 (100)	39 (100)	29 (100)	35 (100)	27 (100)
	LLS	86 (100)	38 (100)	62 (100)	29 (100)	1 (100)	11 (100)	5 (100)
No. (%) brook trout > 12 inches:	BKT	29 (48)	64 (60)	57 (44)	21 (31)	9 (24)	43 (55)	12 (31)
No. (%) sublegals released:	BKT	3 (5)	23 (21)	25 (19)	7 (10)	0	0 (0)	0 (0)
	LLS	43 (33)	20 (34)	16 (21)	24 (45)	18 (95)	10 (48)	9 (64)
No. legals caught/angler-trip:	BKT	0.36	0.29	0.72	0.98	1.32	1.25	1.08
	LLS	1.06	0.54	0.93	0.73	0.05	0.39	0.20
No. legals kept/angler-trip:	BKT	0	0	0	0	0	0	0
	LLS	0	0	0	0	0	0	0
Hours/legal caught:	BKT	10.9	13.9	4.9	5.3	2.7	3.3	4.2
	LLS	3.7	7.3	3.8	7.1	77.0	10.6	5.0
No. brook trout >12 in caught/trip:	BKT	0.36	0.91	0.85	0.53	0.41	1.54	0.48
All sizes caught/angler-trip:	BKT	0.75	1.53	1.94	1.68	1.73	2.79	1.56
	LLS	1.59	0.83	1.16	1.33	0.86	0.75	0.56
Mean length (in) of fish reported:	BKT	12.9 (57)	15.3 (83)	13.1 (97)	12.1 (59)	11.2 (38)	11.9 (55)	11.1 (39)
(no. fish reported)	LLS	16.0 (86)	16.9 (37)	17.3 (55)	16.8 (28)	17.0 (1)	14.8 (11)	15.6 (5)
Number of smallmouth bass reported:	SMB	2	1	2	0	0	0	0

[3] Upper reach extends from Aziscohos Lake dam to ¼ mile upstream of Bennett's Covered Bridge (4.7 miles).
[4] Legal trout were 8-12 inches prior to 2006.