



SPRING WALLEYE ANGLER SURVEY IN THE SOUTHERN NEW HAMPSHIRE SECTION OF THE CONNECTICUT RIVER (2008 & 2009)

STATE: New Hampshire

GRANT: F-50-R-26

GRANT TITLE: Anadromous and Inland Fisheries Operational Management Investigations

JOB 15: Angler Surveys

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Introduction

The Connecticut River supports a naturally reproducing population of walleye (*Sander vitreus*) from Monroe, New Hampshire (Comerford Dam) south into the state of Connecticut. In New Hampshire, walleye provide a popular spring fishery in the river during the months of March, April and May; prior to and during the spawning season. Angling pressure for walleye is reduced in other months, although they are targeted throughout the year (Sprankle 1997). Walleye angling opportunities in New Hampshire are currently limited to the Connecticut River and Merrimack River. Accordingly, it is not surprising that only 1% of New Hampshire anglers interviewed in 2004 fished for walleye (Responsive Management 2004).

Walleye are not native to New Hampshire and were first stocked into the Connecticut River watershed in the late 1800's; Sunapee Lake in 1876 and Mascoma Lake in 1877. The NH Fish and Game Department (NHFGD) stocked the mainstem with 1 million fry in 1919 and 1.5 million fry in 1920. The state of Vermont stocked millions of walleye fry into the Connecticut River and some of its tributaries during the period of 1912 to 1932. It is assumed that these fish were of Lake Champlain/Lake Memphremagog stock. Walleye quickly became established in the river as a 1939 survey indicated they were "well known" in the river and fairly common (NHFGD 1939).

Prior to January 1, 1998 walleye regulations on the Connecticut River consisted of a daily limit of 5 fish and a minimum length limit of 457 mm (18 inches). Effective January 1, 1998, walleye regulations on the Connecticut River were modified to a daily limit of 4 fish, of which only 1 can be larger than 457 mm (18 inches) and no fish between 406 mm (16 inches) and 457 mm (18 inches) can be harvested. Neither regulation included a closed season.

Walleye monitoring efforts from 1995-1999 in the Connecticut River were fairly consistent and entailed angler and electrofishing surveys. After 1999, NHFGD staff's ability to assess the walleye population and/or the 1998 walleye regulation change was limited as monitoring efforts were seasonally sporadic and contained small sample sizes. As such, the 1998 walleye regulation change on the Connecticut River had not been fully assessed prior to 2008.

This report documents a spring angler survey conducted in the southern New Hampshire portion of the Connecticut River during 2008 and 2009. Objectives of this angler survey were to: 1) document spring walleye angler effort, catch and harvest rates in the tailrace fisheries below the Bellows Falls and Vernon Dams; 2) document total length (TL; mm) of walleye caught; 3) assess angler satisfaction with current walleye regulations for the first time since they were instated; 4) learn more about walleye anglers on the Connecticut River including opinions on walleye management and seasonal fishing efforts; 5) determine age and growth rates; 6) derive mortality estimates, and 7) compare angler survey results to one conducted in 1996, prior to current walleye regulations (Sprankle 1997).

Methods

Survey Design

A roving creel survey was performed from March 16, 2008 to May 4, 2008 and from March 28, 2009 to May 2, 2009. In order to make results comparable with a 1996 creel survey (Sprankle 1997; Appendix 1 and 2), efforts were made to conduct the 2008 and 2009 creel survey as similar as possible to the 1996 survey. Pollock et al.'s (1994) suggestion to correlate sampling effort with angling effort by strata (time and day) was followed by using results from the 1996 survey (Sprankle 1997). The 1996 survey was performed from March 18 to May 4.

Angler counts were used to calculate effort, and angler interviews were used to calculate harvest and catch rates and angler attitudes (Appendix 3 and 4). Fishing effort was not expanded for the survey period. Surveys and counts were conducted at specified times even when weather was poor and/or people were not fishing.

The survey period covered the walleye spawning run which typically occurs from the beginning of April to the first week in May, realizing environmental factors can shift spawning run begin and end dates. Similar to the 1996 survey, this survey was stratified by site (Bellows Falls tail water to the Cold River confluence / Vernon Dam tail water), day (weekend/weekday), and time (AM: 0800-1400 / PM: 1430-2030). Four days were sampled each week: two weekend days and two weekdays as Sprankle (1997) found roughly 50% of fishing effort took place on weekends. Each site was sampled on one weekday and one weekend day per week with one time stratum sampled per weekday and weekend. Days were chosen randomly. Weekday and weekend time (AM/PM) by site were chosen randomly the first week the survey was performed. The subsequent weekday and weekend day time alternated from either AM to PM or PM to AM.

The 1996 survey included angler data from the Wilder Dam tail waters as well as from Bellows Falls tail water to the Cold River confluence and Vernon Dam tail water. In order to compare 1996 survey data to the 2008-2009 survey, Wilder Dam data was removed and 1996 creel data were reanalyzed.

Time strata for 2008 and 2009 surveys were increased from those during the 1996 survey from 3 hours per site to 6 hours per site due to the low percentage of completed angler trips recorded in 1996 (Sprankle 1997). Time strata in 1996 were split between two sites per day while only one site was visited per day and time strata in 2008 and 2009. The AM strata were 0700-1330 in 1996 and 0800-1400 in 2008 and 2009. The earliest completed AM strata trip interview in 1996 was at 0757 (Sprankle 1997). The PM strata were 1331-2000 in 1996 and 1430-2030 in 2008 and 2009. A longer stay per site enabled more completed fishing trip surveys to be recorded, which reduced potential bias in angler catch, and also helped reduce staff time and mileage costs.

Angler Counts

Three angler counts were completed during each time period, using binoculars when necessary. Angler counts were performed at the beginning, middle, and end of the survey period. For AM surveys (0800-1400), angler counts were made at 0800, 1100, and 1400. For PM surveys (1430-2030), angler counts were made at 1430, 1730, and 2030. Only people that were actively fishing were counted. Counts took no longer than 15 minutes and anglers fishing from boats and on both banks were counted. For the Vernon Dam tail water site, all anglers could be viewed from one vantage point. For the Bellows Falls tail water site, all anglers could not be viewed from one vantage point and creel clerks took appropriate measures to cover all ground within the allotted time.

Angler Interviews

Anglers were interviewed when angler counts were not being performed (Appendix 3). An angler form was filled out for each angler and anglers were assigned a consecutive interview number per day starting with one. Anglers were interviewed individually and opinion questions were not asked to anglers that had been interviewed on previous survey days during 2008 or 2009. Kids (15 years old or younger) were not considered for individual angler attitudinal questions (Q7. - Q14.; Appendix 4), but were included in effort. This age cut-off was chosen because 16 is the age residents must purchase a fishing license and are able to obtain a driver's license. Attempts were made to update anglers' creel information if they were available to be interviewed later in the day.

Age and Growth

Creel survey clerks collected spines from walleye that were harvested by interviewed anglers. Spines were also collected from walleye that were released if a survey clerk was near an angler who caught a walleye with the intention of releasing it. Spines (2nd and 3rd of first dorsal) were clipped at the base using diagonal cutters and placed in a scale envelope. Survey clerks recorded TL (mm), sex of fish, date caught, and location on scale envelopes.

Concurrent to this effort, select avid walleye anglers were asked to participate in collecting walleye dorsal spines from every walleye they caught throughout the spring walleye season (March – May). Cooperating anglers were instructed on fish handling techniques, measuring TL, sex determination if fish was mature, and what spines were to be removed. Spines (2nd and 3rd of first dorsal) were clipped at the base using diagonal cutters and placed in a scale envelope. Anglers recorded walleye TL (inches), sex of fish, date caught, and location on scale envelopes that were provided to them.

Spines are still being prepared and aged. Age and growth data will be reported upon in the next project segment, F-50-R-27.

Size

A one-way ANOVA was used to compare harvested walleye TL among study years as well as to compare released and harvested walleye TL among study years. Data were collected by creel survey clerks and cooperating anglers (see below). Because sample size from the 1996 angler survey was low, these data were bolstered using TL data collected by cooperating anglers during 1995 at the Wilder Dam tail waters (see below; Sprankle 1997).

In 2008 and 2009, cooperating anglers recorded walleye TL data (released and harvested fish) at the tail waters of Bellows Falls Dam, Vernon Dam, Wilder Dam, mouth of the Mascoma River, and an unknown location on the CT River ($n = 2$). Creel survey clerks recorded TL of walleye harvested by anglers at Bellows Falls Dam and Vernon Dam tail waters. Total length was recorded for 139 walleye in 2008 and 143 in 2009 (Table 1.)

In 1995, cooperating anglers recorded walleye TL data (released and harvested fish) at the Wilder Dam tail water. In 1996, creel survey clerks recorded TL data of walleye harvested by anglers at the Bellows Falls Dam and Vernon Dam tail waters. Although Wilder Dam is located approximately 43 river miles upstream from Bellows Falls Dam, 1995 TL data from Wilder Dam was included in the analysis due to the limited sample size from the 1996 creel survey (85% of combined 1995-1996 data came from 1995). Total length was recorded for 98 walleyes in 1995-1996 (Table 1).

All reported mean values include estimated standard deviations, unless otherwise noted. The level of significance for all statistical analyses was 0.10, unless otherwise noted.

Results and Discussion

Angler Counts and Effort

A total of 28 weekday/weekend days were surveyed in 2008, while 22 weekday/weekend days were surveyed in 2009; 24 weekday/weekend days were surveyed in 1996 (Sprankle 1997). A total of 120 anglers were counted during the 2008 creel survey with an average of 4.3 anglers per day. A total of 232 anglers were counted during the 2009 creel survey with an average of 10.5 anglers per day. A total of 177 anglers were counted during the 1996 survey with an average of 7.4 anglers counted per day (Sprankle 1997).

In the 2008 survey, 71% of anglers were fishing from shore and 29% were fishing from boats. In the 2009 survey, 77% of anglers were fishing from shore and 23% were fishing from boats. In the 1996 survey, the number of boat vs. shore anglers was more similar with 45% of anglers fishing from shore and 55% fishing from boats (Sprankle 1997).

Weather conditions during 2008 and 2009 surveys were generally pleasant. In 2008, skies were clear during 41% of the counts, partly cloudy during 26% of the counts, overcast during 19% of the counts, rained during 12% of the counts, and snowed during

3% of the counts. In 2009, skies were clear during 46% of the counts, partly cloudy during 19% of the counts, overcast during 22% of the counts, and rained during 13% of the counts. Wind conditions in 2008 were calm during 81% of the counts and windy during 19% of the counts and in 2009 winds were calm during 89% of the counts and windy during 11% of the counts.

A total of 112 anglers were interviewed in 2008, 141 anglers in 2009, and 140 anglers in 1996 (Sprankle 1997). Angler effort at time of interview in 2008 was 207 hours (236 rod-hours; angler effort adjusted by number of rods used) with approximately 58% of this effort occurring on weekends. Angler effort at time of interview in 2009 was 282 hours (368 rod-hours) with approximately 64% of this effort occurring on weekends. Angler effort at time of interview in 1996 was 308 hours (382 rod-hours) with approximately 50% of this effort occurring on weekends (Sprankle 1997). Thirty percent of anglers interviewed in 2008 were interviewed more than once, 45% in 2009 (including being interviewed in 2008), and 17% in 1996 (Sprankle 1997).

Size

A total of 14 walleye were harvested by anglers during the creel survey in 2008 with a mean TL of 454 mm (± 88.3). In 2009, anglers harvested a total of 18 walleye during the creel survey with a mean TL of 441 mm (± 94.3). In 1996, anglers harvested a total of 15 walleye during the creel survey with a mean TL of 479 mm (± 23.6) (Sprankle 1997; Figure 1). Differences in harvested walleye TL among years were not significant ($P = 0.41$).

In 2008 and 2009, 53% ($n = 17$) of walleye harvested were males with a mean TL of 385 mm (± 61.6), 41% ($n = 13$) were females with a mean TL of 524 mm (± 72.9), and 6% ($n = 2$) were unidentified by gender. In 1996, 21% ($n = 3$) of walleye harvested were males with a mean TL of 480 mm (± 24.5) and 79% ($n = 11$) were females with a mean TL of 478 mm (± 24.5 ; Sprankle 1997).

Walleye TL data (collected via creel surveys and cooperating anglers; see above) were significantly different among survey years ($P = 0.006$). Post-hoc comparisons (Dunn's Method) showed that TL data for both 2008 and 2009 were greater than for 1996 (1995 data included; see above) and that TL did not differ between 2008 and 2009 ($P > 0.05$; Figure 2). Mean walleye TL in 2008 was 421 mm (± 125.1 , $n = 139$), 433 mm (± 70.5 , $n = 143$) in 2009, and 405 mm (± 63.6 ; $n = 98$) in 1996 (1995 data included; see above) (Sprankle 1997; Figure 2).

Catch and Harvest

Surveyed anglers caught 58 walleye in 2008, 38 in 2009, and 102 in 1996 (Sprankle 1997). Corresponding catch rates were 0.23 fish/hour and 0.20 fish/rod hour in 2008, 0.11 fish/hour and 0.09 fish/rod hour in 2009, and 0.32 fish/hour and 0.27 fish/rod hour in 1996 (Sprankle 1997; Table 2 and 3).

Surveyed anglers released 44 walleye in 2008, 20 in 2009, and 87 in 1996 (Sprankle 1997). Corresponding release rates were 0.19 fish/hour and 0.16 fish/rod hour in 2008, 0.06 fish/hour and 0.04 fish/rod hour in 2009, and 0.28 fish/hour and 0.23 fish/rod hour in 1996 (Sprankle 1997; Table 2 and 3).

Surveyed anglers harvested 14 walleye in 2008, 18 in 2009, and 15 in 1996 (Sprankle 1997). Corresponding harvest rates were 0.04 fish/hour and 0.04 fish/rod hour in 2008, 0.05 fish/hour and 0.05 fish/rod hour in 2009, and 0.05 fish/hour and 0.04 fish/rod hour in 1996 (Sprankle 1997; Table 2 and 3).

Surveyed anglers specifically targeting walleye caught 54 walleye in 2008, 33 in 2009, and 101 in 1996 (Sprankle 1997). Corresponding catch rates were 0.30 fish/hour and 0.26 fish/rod hour in 2008, 0.14 fish/hour and 0.13 fish/rod hour in 2009, and 0.33 fish/hour and 0.28 fish/rod hour in 1996 (Sprankle 1997; Table 4 and 5).

Surveyed anglers that were specifically targeting walleye released 40 walleye in 2008, 16 in 2009, and 86 in 1996 (Sprankle 1997). Corresponding release rates were 0.24 fish/hour and 0.21 fish/rod hour in 2008, 0.07 fish/hour and 0.05 fish/rod hour in 2009, and 0.28 fish/hour and 0.24 fish/rod hour in 1996 (Sprankle 1997; Table 4 and 5).

Surveyed anglers that were specifically targeting walleye harvested 14 walleye in 2008, 17 in 2009, and 15 in 1996 (Sprankle 1997). Corresponding harvest rates were 0.06 fish/hour and 0.06 fish/rod hour in 2008, 0.08 fish/hour and 0.08 fish/rod hour in 2009, and 0.05 fish/hour and 0.04 fish/rod hour in 1996 (Sprankle 1997; Table 4 and 5).

Anglers harvested 24.1% of walleye caught in 2008, 47.4% in 2009, and 14.7% in 1996 (Sprankle 1997). Anglers specifically targeting walleye harvested 25.9% of walleye caught in 2008, 51.5% in 2009, and 14.9% in 1996 (Sprankle 1997).

In 2008, 24% of interviewed anglers caught walleye, compared to 18% in 2009 and 29% in 1996 (Sprankle 1997). In 2008, 29% of interviewed anglers who were specifically targeting walleye caught walleye, compared to 23% in 2009 and 29% in 1996 (Sprankle 1997).

The sex ratio of harvested walleye in 2008 was slightly skewed toward males with 58% of harvested fish being male (7 out of 12). The sex ratio of harvested walleye in 2009 was similar with 56% of harvested fish being male (10 out of 18). In 1996, the sex ratio of harvested walleye was highly skewed toward females with 79% of harvested walleye being female (11 out of 14; Sprankle 1997).

Miscellaneous Information

When anglers interviewed in 2008 and 2009 were asked if they support the existing walleye regulations on the Connecticut River, 93% said “yes.” When anglers interviewed in 1996 were asked if they would support a slot limit if biologists recommended a management change, 93% said “yes” (Sprankle 1997).

Anglers interviewed in 2008 and 2009 reported they typically fished an average of 9.8 days (\pm 11.2) for walleye in spring. Anglers interviewed in the 1996 survey reported they fished an average of 11.6 days (\pm 8.5) for walleye in March and April (Sprankle 1997).

Thirty-five percent of anglers surveyed in 2008 and 2009 indicated they fished for walleye in other months of the year (summer, fall, winter) as well. Sixty-eight percent of anglers surveyed in 1996 indicated they fished for walleye in other months of the year (excluding March and April; Sprankle 1997). These differences are likely attributed to a higher percentage of anglers in 1996 that were specifically targeting walleye compared to anglers in 2008 and 2009 (see below).

In the 2008-2009 survey, 64% of anglers said they were fishing for walleye followed by 18% fishing for anything, 12% fishing for trout, 5% fishing for bass, and 1% fishing for northern pike. In the 1996 creel survey, 96.5% of anglers said they were fishing for walleye followed by 1.4% fishing for trout, 0.7% fishing for anything, 0.7% fishing for bass, and 0.7% fishing for northern pike (Sprankle 1997). The increased diversity of anglers in 2008-2009 is, in part, likely due to the fact that the Connecticut River in Walpole was only stocked with trout twice prior to 1996, but has been stocked every year with increasing numbers of trout from 1996 to present.

In the 2008-2009 survey, anglers were asked to rate their fishing success for walleye from “Excellent, Good, Average, Poor, or Terrible.” Six percent of anglers rated their success for walleye as “Excellent,” 13% rated “Good,” 27% rated “Average,” 34% rated “Poor,” and 20% rated “Terrible.”

Surveyed anglers were asked in the 2008-2009 survey what the smallest size walleye in inches they would harvest. Most anglers (77.6%) said they would harvest walleye between 10-16 inches in length, followed by walleye 18-22 inches (19.8%) and walleye > 22 inches (2.6%).

The majority of anglers surveyed in the 2008 and 2009 angler survey were from VT (64%), followed by 32.8% from NH, 1.6% from MA, 1.2% from MI, and 0.4% from CT. The average number of miles traveled by anglers was 15 miles (\pm 21; range: 0.25 – 180).

Summary

There were six main objectives of the protected slot limit that was enacted in 1998: 1) increase angler harvest rates; 2) increase protection for large females; 3) increase proportion of larger walleye in the population; 4) improve walleye condition rates; 5) reduce walleye natural mortality rates; 6) improve walleye growth rates (Sprankle 1997).

The objective to increase angler harvest rates was met. Anglers in 2008 and 2009 harvested 24.1% and 47% of walleye caught, respectively, while only 14.7% of walleye caught in 1996 were harvested (Sprankle 1997).

The objective to increase protection for large females was met. The 2008 and 2009 survey showed increased protection for large females with only 42% and 44% of harvested fish being females, respectively, compared to 79% of walleye harvested in 1996 being females (Sprankle 1997). Although TL of walleye harvested among years were not significantly different ($P = 0.41$), mean TL for 2008 and 2009 (454 mm and 441 mm, respectively) were smaller than for 1996 (479 mm). Additionally, most anglers (77.6%) fishing in 2008 and 2009 said the smallest walleye they would harvest would be between 10-16 inches in length.

The objective to increase the proportion of larger walleye in the population was met, if one assumes that angler catches are representative of the population. Angler caught walleye were significantly greater in TL during 2008 and 2009 than in 1996 (Figure 2).

In 2008 and 2009 walleye weights were not recorded and therefore condition rates could not be calculated and compared to 1996 data to determine if walleye condition rates improved. Walleye spines from 2008 and 2009 are still being prepared and aged, and therefore calculating natural mortality rates and growth rates is unfeasible at the time of this report.

Sprankle (1997) also hypothesized that with the protected slot limit enacted in 1998, angler harvest would increase and harvested fish would be of smaller size on average. The 2008 and 2009 study proved this hypothesis to be correct with an average of 33.3% of caught fish harvested by anglers compared to 14.7% in 1996 (Sprankle 1997). Additionally, walleye harvested by anglers in 2008 and 2009 were smaller on average than those harvested in 1996.

It might be assumed that higher harvest rates are indicative of higher catch rates. However, unlike walleye harvest rates, angler catch rates of walleye were lower in 2008 and 2009 than in 1996 (catch rates among years were more similar when anglers that were specifically targeting walleye were examined (Table 4)). This is likely due to more anglers in 2008 and 2009 targeting other species such as trout and bass or not targeting a specific fish species. Additionally, spring river conditions can also greatly influence angler catch rates. During high flows, walleye seek slower flows and congregate closer to shore and along major current breaks, making them more vulnerable to anglers. During low flows, walleye tend to be more dispersed, making them less vulnerable to anglers. Higher river flows in 2008 and 1996 than in 2009 was a likely reason for the higher catch rates and the higher percentage of anglers that caught walleye in 2008 and 1996 compared to 2009 (Figure 3).

The purpose of this study was to determine if objectives of the slot limit enacted in 1998 were met and to determine angler satisfaction with the current walleye fishery on the Connecticut River. The 2008 and 2009 creel survey showed all measurable objectives were met. Walleye weights were not measured during 2008 and 2009 and thus condition factor could not be determined. Natural mortality and growth rates will be reported in the next project segment (F-50-R-27) after spines have been prepared and aged. The majority

of anglers (93%) interviewed were supportive of the current walleye regulations on the Connecticut River. Another angler survey should be conducted in 10 years to assess walleye population status and angler satisfaction.

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Table 1. Walleye total length (TL) sample size and % by year and site. Data from cooperating anglers and by creel survey clerks .

Site	Year		
	1995-96	2008	2009
Bellows Falls	4 (4%)	61 (44%)	93 (65%)
Vernon	11 (11%)	73 (53%)	40 (28%)
Wilder	83 (85%)	-	8 (6%)
Mascoma	-	5 (4%)	-
Unknown	-	-	2 (1%)

Table 2. Mean walleye harvest, release, and catch rates (± 1 SD) by angler effort and year for both sites combined. All rates calculated as # fish/hour of effort. Angler effort is hours fished by angler prior to being interviewed for angler survey.

Angler effort							
Year	Total Angler Effort	# Harvested	# Released	# Caught	Harvest rate	Release rate	Catch rate
2008	207	14	44	58	0.04 (± 0.13)	0.19 (± 0.50)	0.23 (± 0.55)
2009	282	18	20	38	0.05 (± 0.17)	0.06 (± 0.20)	0.11 (± 0.26)
2008 & 2009	489	32	64	96	0.04 (± 0.15)	0.12 (± 0.37)	0.16 (± 0.42)
1996	308	15	87	102	0.05 (± 0.18)	0.28 (± 0.72)	0.32 (± 0.79)

Table 3. Mean walleye harvest, release, and catch rates (± 1 SD) by rod effort and year for both sites combined. All rates calculated as # fish/hour of effort. Rod effort is equal to angler effort multiplied by number of rods fished by the angler.

Rod effort							
Year	Total Rod Effort	# Harvested	# Released	# Caught	Harvest rate	Release rate	Catch rate
2008	236	14	44	58	0.04 (± 0.13)	0.16 (± 0.46)	0.20 (± 0.52)
2009	368	18	20	38	0.05 (± 0.17)	0.04 (± 0.13)	0.09 (± 0.22)
2008 & 2009	604	32	64	96	0.04 (± 0.15)	0.10 (± 0.33)	0.14 (± 0.39)
1996	382	15	87	102	0.04 (± 0.16)	0.23 (± 0.57)	0.27 (± 0.65)

Table 4. Mean walleye harvest, release, and catch rates (± 1 SD) by angler effort and year for both sites combined by anglers targeting walleye specifically. All rates calculated as # fish/hour of effort. Angler effort is hours fished by angler prior to being interviewed for angler survey.

Angler effort							
Year	Total Angler Effort	# Harvested	# Released	# Caught	Harvest rate	Release rate	Catch rate
2008	143	14	40	54	0.06 (± 0.15)	0.24 (± 0.58)	0.30 (± 0.64)
2009	161	17	16	33	0.08 (± 0.22)	0.07 (± 0.17)	0.14 (± 0.28)
2008 & 2009	304	31	56	87	0.07 (± 0.19)	0.15 (± 0.43)	0.22 (± 0.50)
1996	298	15	86	101	0.05 (± 0.18)	0.28 (± 0.74)	0.33 (± 0.8)

Table 5. Mean walleye harvest, release, and catch rates (± 1 SD) by rod effort and year for both sites combined by anglers targeting walleye specifically. All rates calculated as # fish/hour of effort. Rod effort is equal to angler effort multiplied by number of rods fished by the angler.

Rod effort							
Year	Total Rod Effort	# Harvested	# Released	# Caught	Harvest rate	Release rate	Catch rate
2008	162	14	40	54	0.06 (± 0.15)	0.21 (± 0.53)	0.26 (± 0.60)
2009	214	17	16	33	0.08 (± 0.22)	0.05 (± 0.15)	0.13 (± 0.27)
2008 & 2009	376	31	56	87	0.07 (± 0.19)	0.13 (± 0.40)	0.20 (± 0.47)
1996	298	15	86	101	0.04 (± 0.16)	0.24 (± 0.58)	0.28 (± 0.66)

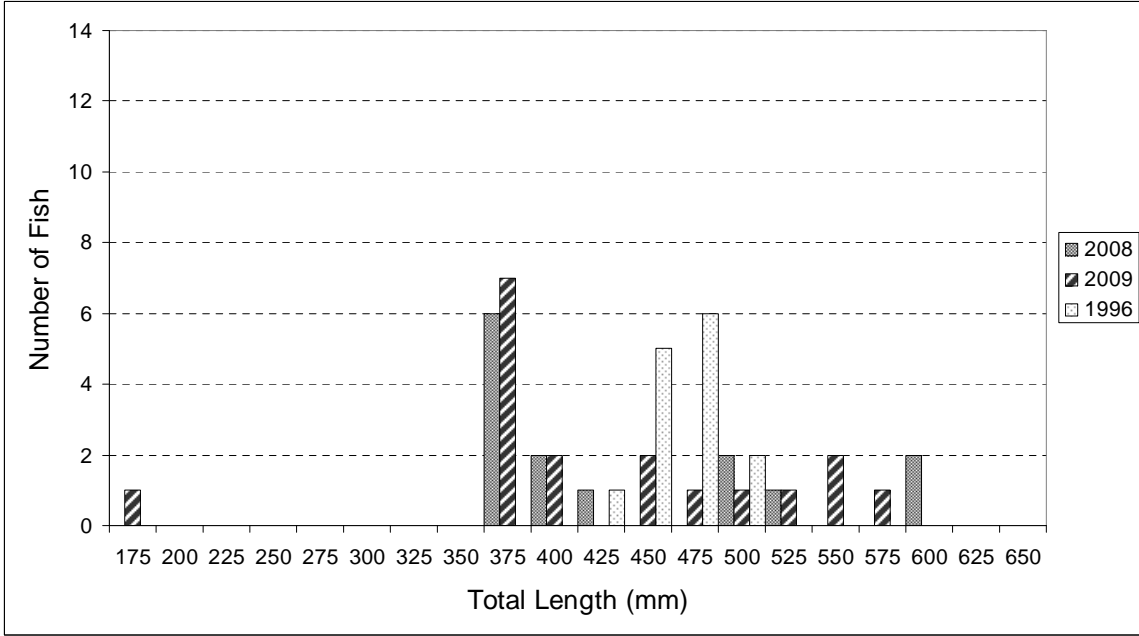


Figure 1. Length frequency distribution of harvested walleye by anglers during the 2008, 2009, and 1996 creel surveys.

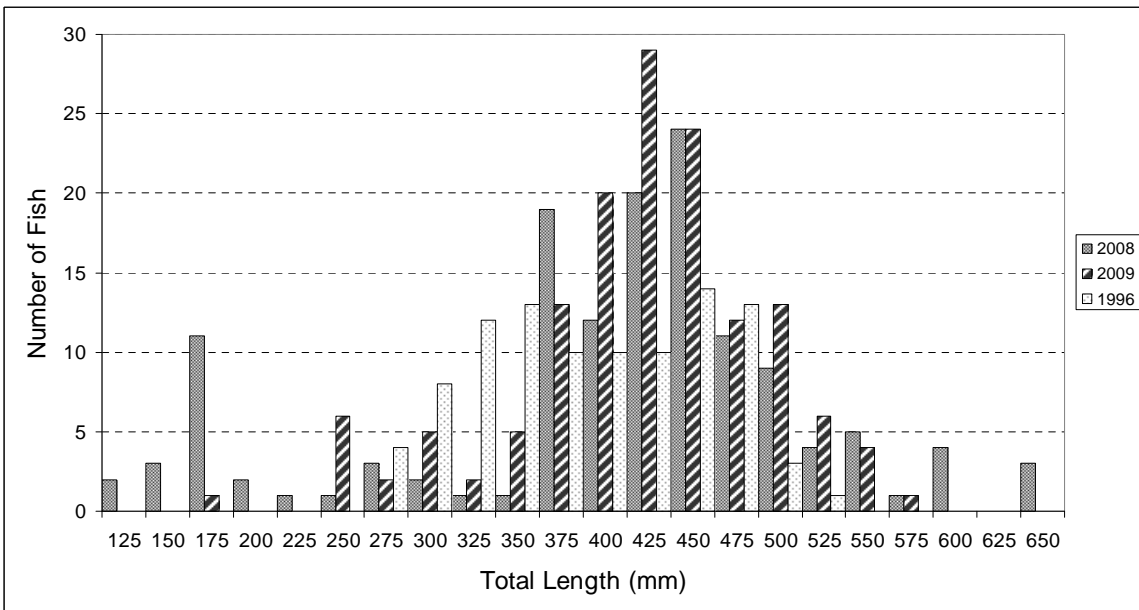


Figure 2. Length frequency distribution of walleye collected via creel surveys and cooperating anglers (released and harvested fish). The 1996 data includes data from cooperating anglers in 1995 (see Methods above).

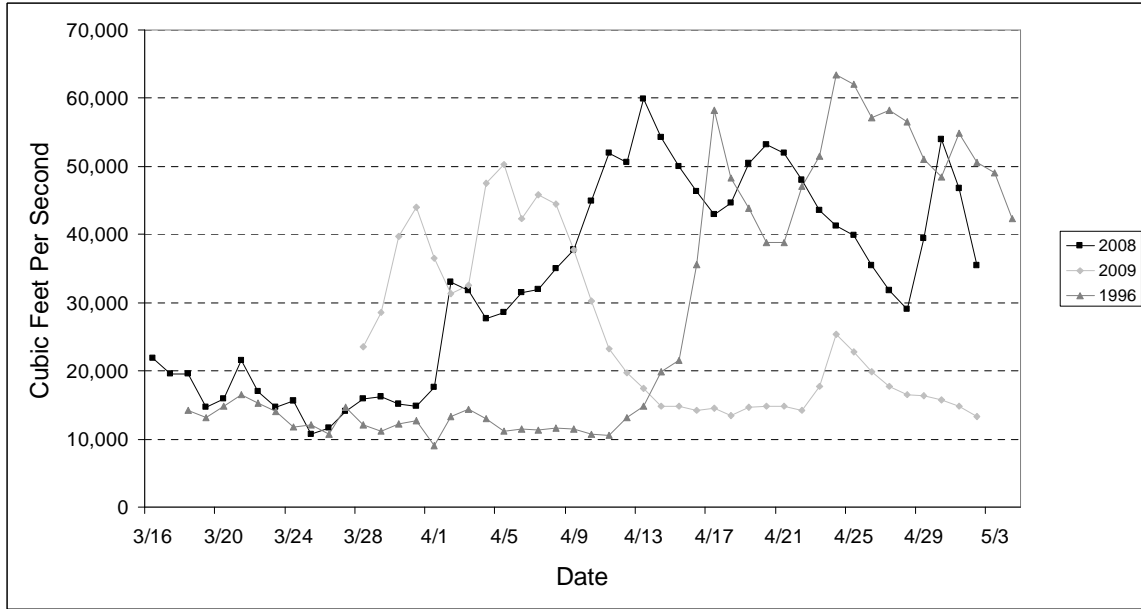


Figure 3. Stream flow data from the USGS river gauge on the Connecticut River at North Walpole, NH during creel survey dates by year.

Appendix 2.

CT RIVER WALLEYE PROJECT - 1996 CREEL SURVEY FORM

DATE:_____ **SECTION:**_____ **SAMPLE PERIOD:** 7:00am-1:30pm or
1:31pm-7:30pm

FISHING FROM (Circle one): 1)SHORE 2) BOAT **# OF RODS:** 1 or 2

METHOD: 1) Shiner 2) Lure 3) Worms 4)

TECHNIQUE: 1) Still 2) Casting 3) Trolling 4)

A. **Time of interview:**_____ **Time started fishing:**_____

B. **What are you fishing for?:**_____

C. **How would you rate your fishing success for walleye today? (Circle choice):**

1) good 2) average 3) poor

I. Would you mind if I measured your fish?:

Species	Total Length (mm)	Sex	Species	Total Length (mm)	Sex	Not Measured

* **Note** if spines were taken.

II. Did you release any fish? (Could you please specify their approximate lengths?):

Species	Length (inches)	Species	Length (inches)

Have you been interviewed before? **If yes** skip questions below.

A. Would you support a change in walleye regulations which would reduce the daily limit on larger fish (>18") from 5 fish to 3 or 2? Yes or No

B. Would you harvest smaller fish (under 17 inches) if you were allowed to creel 2 or 3?

Y or N

C. Would you support a slot limit if the biologist recommended a management change?

Y or N

D. Approximately how many days in March and April do you fish for walleye? _____

E. Do you fish for walleye in other months? Yes or No App. how many days? _____

F. What percentage of legal size or larger walleye that you catch will you bring home _____%

Comments:

Appendix 3.

CT RIVER WALLEYE PROJECT – 2008/2009 CREEL SURVEY FORM Party/Interview # _____

DATE: _____ SAMPLE PERIOD: (wkend / wkday) (AM / PM)

Your initials _____

SITE (circle): 1) Bellows 2) Vernon Time of interview: _____

FISHING FROM (circle one): 1) SHORE 2) BOAT # RODS _____

Q1. Hello, my name is _____ and I am representing the New Hampshire Fish & Game Department in a study of the walleye fishery. May I ask you some questions?

- 1 No I hope you enjoy your fishing trip? END OF INTERVIEW
- 2 Yes Thank you. CONTINUE

Q2. What time did you start fishing today? _____ Q3. Are you done fishing here today? (circle) Yes / No

Q4. What are you fishing for? _____ Q5. Are you keeping an angler diary? (circle) Yes / No

Q6. How would you rate your fishing success for walleye today? (circle) Excellent Good Average Poor Terrible

Q7. Did you catch any fish? (circle) Yes / No Q8. If so, may I measure them? (circle) Yes / No

Species	Total length (mm)	Sex	Species	Total length (mm)	Sex	Species	Total length (mm)	Sex	Species	Total length (mm)	Sex

Q9. Did you release any fish? (circle) Yes / No Could you specify their approximate lengths?

Species	Total length (mm)	Species	Total length (mm)	Species	Total length (mm)	Species	Total length (mm)

Q10. What is your state of residency? _____ Q11. How many miles did you travel to fish here today? _____

Q12. Have you been interviewed before? (circle) Yes / No

Q13. Typically, how many days do you fish for walleye in NH in the Spring _____ Summer _____ Fall _____ Winter _____?

Q14. In inches, what is the smallest length walleye you would keep? _____

Q15. Do you support the existing walleye regulation on CT R.? (circle) Yes / No If no, please explain

Q16. Do you practice catch and release while walleye fishing? (circle) Always Sometimes Never

Q17. Do you feel that walleye fishing opportunities in NH are adequate? (circle) Yes / No

Appendix 4.

CT RIVER WALLEYE PROJECT – 2008/2009 ANGLER COUNT FORM

DATE: _____ SAMPLE PERIOD: (wkend / wkday) (AM / PM)

Your initials _____

SITE: bellow Bellows Falls to Cold River confluence.

Angler counts should be done three times - upon arrival of the site, halftime point , and end of period. The count should attempt to be done in under 15 minutes at each site. For an AM survey, take angler counts at 0800, 1100, and 1400. For PM surveys, take angler counts at 1430, 1730, and at 2030. In order of priority, counts are done below Bellows Falls (NH side & VT side) and at the confluence of the Cold River.

Sub-location	Time of Count		Number of anglers actively fishing		Temp ©		Weather ^a	
	Start	End	Shore	Boat	Water	Air	Wind (Calm or Windy)	Sky
NH side								
VT side								
Cold R.								
NH side								
VT side								
Cold R.								
NH side								
VT side								
Cold R.								

a. Weather -sky categories: 1) Clear 2) Partly cloudy 3) Overcast 4) Rain 5) Snow

DATE: _____ SAMPLE PERIOD: (wkend / wkday) (AM / PM)

Your initials _____

SITE: below Vernon Dam (Vernon, Vt)

Angler counts should be done three times - upon arrival of the site, halftime point , and end of period. The count should attempt to be done in under 15 minutes at each site. For an AM survey, take angler counts at 0800, 1100, and 1400. For PM surveys, take angler counts at 1430, 1730, and at 2030.

Time of Count		Number of anglers actively fishing		Temp ©		Weather ^a	
Start	End	Shore	Boat	Water	Air	Wind (Calm or Windy)	Sky