LAKE CHAMPLAIN FISH AND WILDLIFE MANAGEMENT COOPERATIVE

FISHERIES TECHNICAL COMMITTEE
ANNUAL REPORT
2008

Management of the fishery resources of Lake Champlain requires cooperation with several organizations. The activities of those organizations are coordinated via the Lake Champlain Fisheries Technical Committee which is part of the Lake Champlain Fish and Wildlife Management Cooperative. The Fisheries Technical Committee includes the US Fish and Wildlife Service (USFWS), the Vermont Department of Fish and Wildlife (VTDFW), the New York State Department of Environmental Conservation (NYSDEC), the University of Vermont, and the Vermont Cooperative Fish and Wildlife Research Unit. In addition, representatives from the Province of Quebec, Sea Grant, and other universities are frequently involved in Technical Committee activities.

In this annual report the activities discussed are not specific to a single agency; some aspects were conducted jointly with, or in some instances, independently by member agencies of the Technical Committee. Last names of authors are listed after section headings. Their contact information can be found on the Fisheries Technical Committee Membership List at the end of this document.

Administrative Accomplishments

In addition to the regular and recurring field activities reported in this document, there were three noteworthy accomplishments in 2008.

1) Procedural changes were developed with the Vermont Department of Environmental Conservation that led to more open and effective communication on lampricide permitting. The efficiency of the process was greatly improved and welcomed by all involved.

2) A federal Environmental Assessment (EA) was completed and approved that granted the expansion of the sea lamprey control program into 3 new rivers. Mill Brook was immediately treated in Port Henry, NY while preparation for the treatment of the Lamoille River in Milton, VT is underway. Pond Brook in Colchester, VT will continue to be monitored and trapped when needed.

3) A strategic plan for the management of Lake Champlain's fisheries was completed and reviewed by the public. The document will be formalized in 2009 and serve as a guide for fisheries management during the next 10 years.

SEA LAMPREY

Objective: To achieve and maintain lamprey wounding rates at or below 25 (ideally 10) wounds per 100 lake trout, 15 (ideally 5) wounds per 100 landlocked Atlantic salmon, and two (ideally less than one) wounds per 100 walleye.

Control

***Lampricides* (Durfey, Chipman, Smith,)**

Lampricide treatments were successfully completed on three streams (Mount Hope Brook, Mill Brook and the Great Chazy River) and two deltas (Saranac River and Mill Brook) in New York and two rivers (Winooski and Missisquoi) in Vermont during 2008 (Table 1). A treatment schedule is presented in Appendix 1.

Table 1: Summary of lampricide applications in tributaries and deltas of Lake Champlain during 2008.

Stream or delta	Date treated	Flow (CFS)	TFM (lbs active ingredient)	Miles treated	Bayluscide (lbs active ingredient)	Acres treated
Saranac River delta	Sept 3	-	-	-	576	115.4
Mount Hope Brook	Sept 17	8	92.7	1.5	-	-
Mill Brook	Oct 14	10	165	0.5	-	-
Mill Brook delta	Oct 15	-	-	-	46.4	9.3
Great Chazy River	Oct 21-24	72-179	1167.9	14.5	-	-
Winooski River	Oct 7	400-800	3,376	10.5	-	-
Missisquoi River	Nov 7	1180	4,192	7.8	-	-
		Totals:	**8,993.6**	**34.8**	**622.4**	**124.7**

***Post-treatment larval assessment* (Bouffard)**

Post-treatment surveys to assess the TFM treatments were conducted on three streams to determine treatment effectiveness (Table 2). The Poultney River and the Hubbardton River were surveyed to assess the treatment conducted in the fall of 2007. Surveys were also conducted on Mt. Hope Brook following the fall 2008 treatment.

Surveys to assess the 2008 treatments of the Great Chazy River, Mill Brook, Winooski River, and Missisquoi River will be conducted during 2009.

Table 2. Pre-treatment and post-treatment population estimates, numbers of lamprey collected, and percent reduction in ammocoetes levels for streams where post-treatment assessments were conducted during 2008.

	Pre-treatment		Post-treatment		
River/Reach	**Pop est.**	**n**	**Pop est.**	**n**	**% reduction**
Poultney R1	53,681	57	2,027	2	96.22%
Poultney R2	97,802	202	4,849	13	95.04%
Hubbardton	8,850	96	4,611	38	47.90%
Hubbardton	11,824 [a]	95	4,611	38	61.00%
Mt Hope	15,849	29	2,412	3	84.78%
Mt Hope	15,849	29	5,426 [b]	8	65.76%

[a] uses reduced a pre-treatment population estimate for the length of river from the mouth to the 2007 treatment Application Point. This standardizes surveyed area between pre- and post-treatment estimates.
[b] assumes 5 yoy captured in post-treatment survey were sea lamprey

Trapping and Barriers **(Bouffard)**

Traps and pots were used to collect migratory-phase sea lamprey in eight streams during the spring of 2008 (Table 3). A hardened trap site and seasonal weir was operated for the first time during 2008 on Beaver Brook, in Westport, NY. Fewer lamprey were captured there this year than the previous year which is likely indicative of a smaller number of lamprey attempting to migrate up the brook. The weir appeared to successfully block lamprey from passing under all conditions encountered. There were non-target mortalities from fish being impinged, both inside the trap and on the upstream side of the weir. Some minor erosion was evident immediately downstream of the weir on both banks and in the streambed.

Table 3. Number of migratory-phase sea lamprey captured during 2008 in Lake Champlain tributaries where traps were deployed and the relative differential compared to 2007 catches.

Stream	**Gear used**	**Trap Set Date**	**Last Checked**	**# Lamprey 2008**	**# Lamprey 2007**	**% change from 07**
Beaver Brook	Weir	9-Apr	9-Jun	26	230	-88.70%
Trout Brook	PAT[a]	17-Apr	16-Jun	33	37	-10.81%
Stonebridge Brook	PAT	17-Apr	16-Jun	73	128	-42.97%
Malletts Creek	PAT	22-Apr	16-Jun	159	237	-32.91%
Boquet River Pool	Pot[b]	21-Apr	4-Jun	4		
Boquet River Fishway	PAT	24-Apr	4-Jun	0	0	0
Great Chazy River	Dam[c]	30-Apr	10-Jun	217	383	-43.34%
Total				**513**	1015	-49.46%

[a] PAT = Portable Assessment Trap, integrated into plastic mesh fencing to block and trap migrating adults.
[b] Pot = 8" PVC pipe with funneled end, used passively to capture adults in areas where they seek refuge.
[c] Dam = low-head, concrete barrier dam with integrated lamprey trap.

Pots were deployed in two locations below the Boquet River dam in Willsboro, NY in a continued effort to assess the ability of migrating sea lamprey to successfully negotiate the cascades below the dam. Portable assessment traps were also set in the fishway for the third consecutive year. Four lamprey were captured in the pot at the fisherman's access in the lower pool and no lamprey were captured at the pot in the middle pool or the traps in the fishway.

Pike River Seasonal Barrier **(Young)**

The U.S. Fish and Wildlife Service continues to work with all levels of government in Quebec to implement the proposed lamprey barrier. An environmental consultant from Milieu Inc. has submitted permits and received engineering blueprints for the design on behalf of the Cooperative. Problems with local land owners and international law agreements prevented construction in 2008. Solutions are still being worked on with summer/fall 2009 now being the proposed time for construction. Under this scenario, Morpion Stream will continue to produce parasitic phase sea lamprey through 2013 due to the sea lamprey life cycle.

Assessment

Ammocoetes and transformers in tributaries **(Bouffard)**

The larval sea lamprey population of the Lamoille River was surveyed during the summer of 2008 in preparation for a lampricide treatment scheduled for the fall of 2009. This survey estimated the sea lamprey population to be approximately 6,700 larvae. No transformers were captured during sampling. A QAS survey was also initiated on the LaPlatte River upstream of the falls in Shelburne to quantify the population in that reach, however weather conditions prevented that survey's completion.

Ammocoetes in deltas **(Smith)**

Deepwater assessment is another critical piece of our larval sampling program. Larval populations are known to exist on the deltas of up to nine NY tributaries and possibly some in VT. Assessing the presence and abundance of these deepwater populations guides our decisions of where to control these deepwater populations in the face of a limited supply of Bayluscide.

Larval sea lamprey surveys were conducted on the Saranac River and Mill Brook deltas during the summer of 2008 in preparation for Bayluscide treatments scheduled for the fall. Surveys were used to ensure that distribution of larvae had not changed significantly since the original survey was conducted in 2007.

Evaluation of treatment effectiveness is a critical component of a successful lamprey control program. In 2008, a post-treatment deepwater electrofishing survey was conducted on portions of the Ausable River delta which were treated with Bayluscide in 2007 to determine treatment effectiveness. This was the first time a post-Bayluscide treatment electrofishing survey was conducted on a Lake Champlain delta. The post treatment survey resulted in the collection of 27 larvae in the areas that were treated in 2007. At first this was troubling; however, the size structure of the collected animals

suggests that these larvae are one-year old larvae which would have been young-of-year in 2007. This year class likely emigrated or was flushed from the river out onto the delta following the Ausable Delta treatment of 2007.

Detection sampling **(Bouffard)**

The USFWS annually investigates "negative streams" where sea lamprey populations are not known to exist, but where there may be suitable habitat. The lake basin is divided into quadrants which are rotated annually so that every stream in the basin, regardless of size or past lamprey infestation history, is surveyed on a four-year cycle. In 2008, presence/absence surveys were conducted in the southern Vermont quadrant and Pond, Indian, and Sunderland Brooks in VT. Sea lamprey were collected from Pond Brook and Sunderland Brook. No sea lamprey were collected from Indian Brook or any "negative stream" in the southern Vermont quadrant during the surveys.

FORAGE FISH (Pientka, Staats)

Catch-Per-Unit-of-Effort

A total of 21 midwater trawls for rainbow smelt were conducted between July 21 and August 12, 2008 (Table 4). Calculated mean CPUE in 2008 were nearly the same at the main lake stations and decreased in the Malletts Bay and Northeast Arm stations (Figure 1, Table 4). It is of particular concern in the Northeast Arm where less than 100 fish per net were collected and age analysis revealed no one-year-old smelt in the sample. Similarly, one-year-olds were very rare in the Malletts Bay sample.

The decrease in catch and loss of young smelt could be associated with the increase in alewife abundance.

Hydroacoustics

A hydroacoustics assessment of the Northeast Arm, Malletts Bay, and the Main Lake was conducted between July 29 and August 22, 2008 following the same procedures as prior years. The assessment transects generally cover around 30 nautical miles in the Northeast Arm, 15 nautical miles in Malletts Bay and just over 100 nautical miles in the Main Lake. Along with the acoustic transects targeted, trawls were performed to confirm species compositions. In 2008, 20 tucker and 16 midwater trawls were performed. Processing of the acoustic data is currently ongoing.

Table 4. Mean catch per 55 minute trawl (CPUE with 95% confidence interval) of rainbow smelt in 2008 and comparison to long-term mean and median CPUE.

Station	Number of trawls	CPUE	Historical		
			Mean CPUE	Median CPUE	N years
Main Lake					
Barber Point	4	209 ± 97	255	202	15
Juniper Island	4	67 ± 15	160	83	19
Valcour Island	4	64 ± 30	270	121	9
Malletts Bay					
Malletts Bay	4	252 ± 279	1097	654	19
Inland Sea					
Northeast Arm	5	59 ± 27	1161	977	19

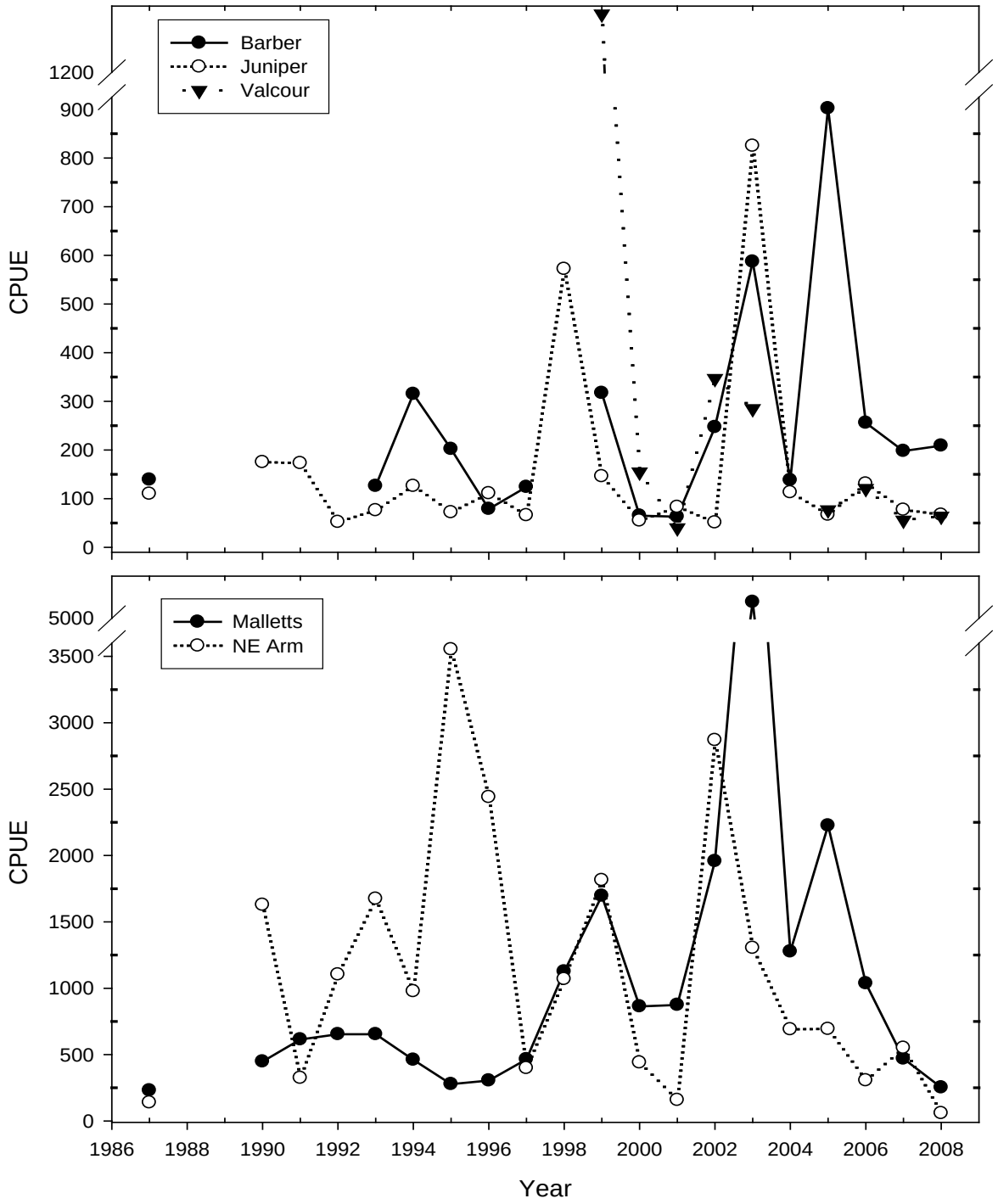


Figure 1. Mean CPUE of smelt for Lake Champlain at the five annually assessed stations.

SALMONIDS

Stocking Summary (Durfey, Chipman)

Salmonid stockings in Lake Champlain during 2008 included about: 252,000 landlocked Atlantic salmon (smolt equivalents); 22,000 steelhead (smolt equivalents); 86,000 lake trout; and 32,000 brown trout (Table 5). The list includes landlocked Atlantic salmon and steelhead that were stocked in the tributaries to the lake. Also listed in Table 5 are the stocking targets for each species. The stocking numbers are presented as "stocking equivalents". Salmonids are stocked at varying sizes, from recently hatched fry that spend two years in the tributaries before emigrating to the lake, to smolts and yearlings that are ready to begin life in the lake at the time of stocking. The numbers stocked are adjusted to stocking (smolt/yearling) equivalents to better represent the effective numbers stocked.

Table 5. Numbers (in stocking equivalents[a]) of salmonids stocked in Lake Champlain during 2008, and stocking targets for the lake.

Species	Main Lake		Malletts Bay/Inland Sea		Total number stocked in 2008
	Target	2008	Target	2008	
Landlocked salmon	207,000	251,737	60,000	67,678	319,415
Lake trout	82,000	85,625	0		85,625
Steelhead	73,000	21,661	12,000		21,661
Brown trout	38,000	32,285	40,000	43,988	76,273
Total	400,000	391,308	112,000	111,666	502,974

[a] Salmonids are stocked in a range of sizes which exhibit very different survival rates. The numbers stocked are converted to stocking equivalents based on expected survival rates.

Stocking Evaluation (Staats)

A landlocked salmon fry stocking evaluation continued in the Winooski River drainage. Of the salmon stocked as smolts in 2008, 59,991 were put into the lower Winooski River. In addition to the smolt stocking, sections of the Winooski downstream of the Bolton Falls dam and its tributary, the Huntington River, were stocked with approximately 210,000 salmon fry in May, 2008.

Age 0+ salmon parr (surviving fry) were found in 7 of the 8 Winooski River tributaries sampled in the early fall of 2008 at densities ranging from 0.2 to 13 fish per salmon unit. Extreme high flow events in spring resulted in first summer survival of less than 25 percent. Parr survival estimates in previous years have generally been in the range of 35-50 percent.

A rotary screw trap was fished in the Huntington River from April into June, 2008 to capture out-migrating salmon smolts which were stocked as fry. A total of 426 smolts were captured resulting in an estimate of 2,247 salmon smolts passing the trapping site.

Sea Lamprey Attack Rates (Chipman, Smith)

Wounding rates on lake trout and salmon were still above objectives during 2008, though there was a substantial drop in wounding from 2007. (Table 6 and Figure 2).

Table 6. Wounding rates on Lake Champlain lake trout and salmon during 2008.

Species	Number of lamprey wounds per 100 fish			
	Objective	Pre-control	Eight-year control	**Year 2008**
Lake trout[a]	25	55	38	**31**
Landlocked salmon[b]	15	51	22	**35**

[a] Lake trout in the 533-633 mm (21.0-24.9 inches) length interval. For lake trout, pre-control included 1982 - 92, while eight-year control includes 1993 - 97.

[b] Salmon in the 432-533 mm (17.0-21.0 inches) length interval. For salmon, pre-control included 1985 - 92, while eight-year control includes 1993 - 98.

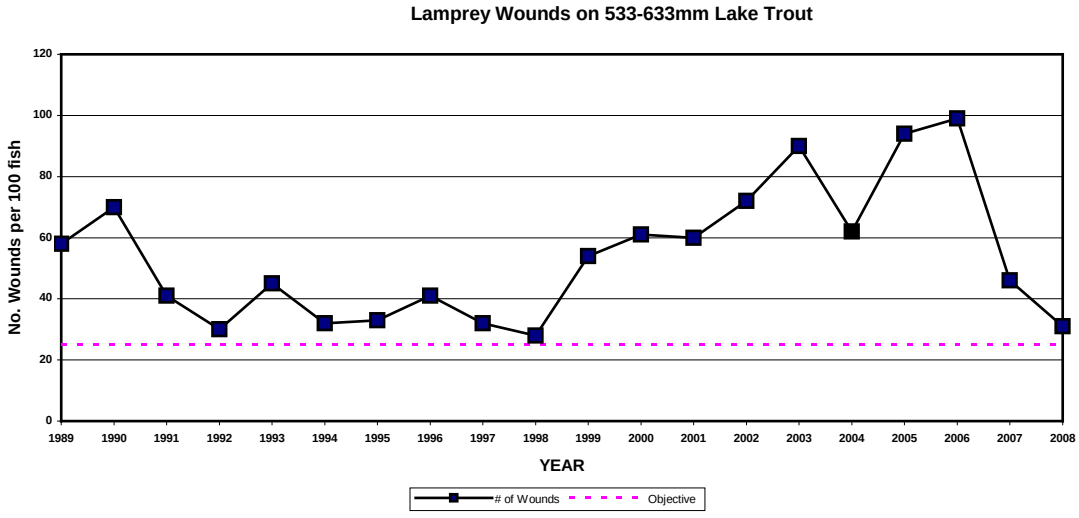


Figure 2. Sea lamprey wounds (fresh and healing) per 100 lake trout (533-633 millimeters total length) sampled in the main lake by fall electrofishing, 1989-2007. For reference, the target wounding rate of 25 wounds per 100 fish is also presented (dashed line).

Fish Passage (Staats, Smith)

Six adult landlocked Atlantic salmon were collected in the Willsboro Fishway during 2008. These fish were collected during five weeks of trapping from mid-August to mid-September. The fishway was left open for fish passage for the remainder of the fall; however, trapping operations stopped in mid-September due to budget cuts by New York Department of Environmental Conservation.

The Winooski One fish passage facility operated for 52 days in the spring and 60 days in the fall, 2008. Twenty-six landlocked Atlantic salmon were lifted, tagged and released downstream during the fall and six steelhead and one salmon were processed in the spring**.** The threat of viral hemorrhagic septicemia has curtailed the movement of fish upstream at this time.

Spring and Fall Nearshore and Tributary Assessments (Chipman, Smith)

Spring and fall boat electrofishing surveys for salmonids are conducted annually. This sampling allows for the collection of biological data including length, sex and age information as well as lamprey wounding data. The data are utilized in hatchery product/strain evaluations and to monitor sea lamprey control progress through time.

Near-shore salmon catches continue to be dominated by small, young salmon, indicating sea lamprey predation is preventing the recruitment of salmon older than one lake-year. However, the data from sampling in 2008 show an increase in the number of larger, older fish. Over 20% of the 2008 salmon sample was greater than 540 mm (~21 in.) This is the first time since 1999 that 20% of the sample was greater than 540 mm.

In fall 2008, 207 adult Sebago-strain salmon collected from the Lamoille River, Sandbar Causeway, and Hatchery Brook (Ed Weed Fish Culture Station discharge stream) were sent to the hatchery for use as broodstock.

Sebago-strain salmon were more prevalent in both spring and fall sampling relative to the Memphremagog and Little Clear strains.

Angler Diary Program (Durfey)

During the 2008 open-water fishing season, 24 cooperators returned diaries of their 2008 fishing season. They recorded information from 424 fishing trips, down slightly from 2007's total of 450.

In the main lake, catch rates for legal-sized lake trout ($\geq$ 15") increased slightly in 2008; however, catch rates for landlocked Atlantic salmon decreased slightly from 2007 (Figure 3).

Cooperators reported only 44 lake-caught brown trout and 6 steelhead, and no lake trips solely targeting either of these two species were made during 2008. Cooperators reported catching just 3 brown trout and 0 steelhead during fishing trips on tributaries.

Tributary fishing for landlocked salmon continued to improve this year (Figure 4). In 2008, it took 6.7 hours to catch a legal-sized landlocked salmon in tributaries to Lake Champlain. Cooperators reported catching 54 landlocked salmon from tributaries.

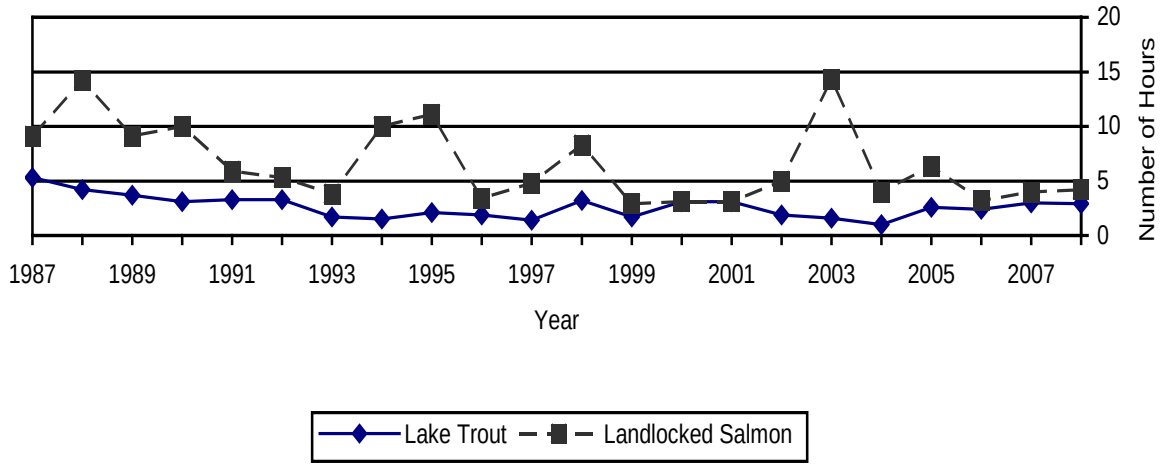


Figure 3. Main lake catch rates (hours of fishing per fish) for legal-sized lake trout and landlocked salmon, 1987 – 2008 (from Angler Cooperative Diary Program).

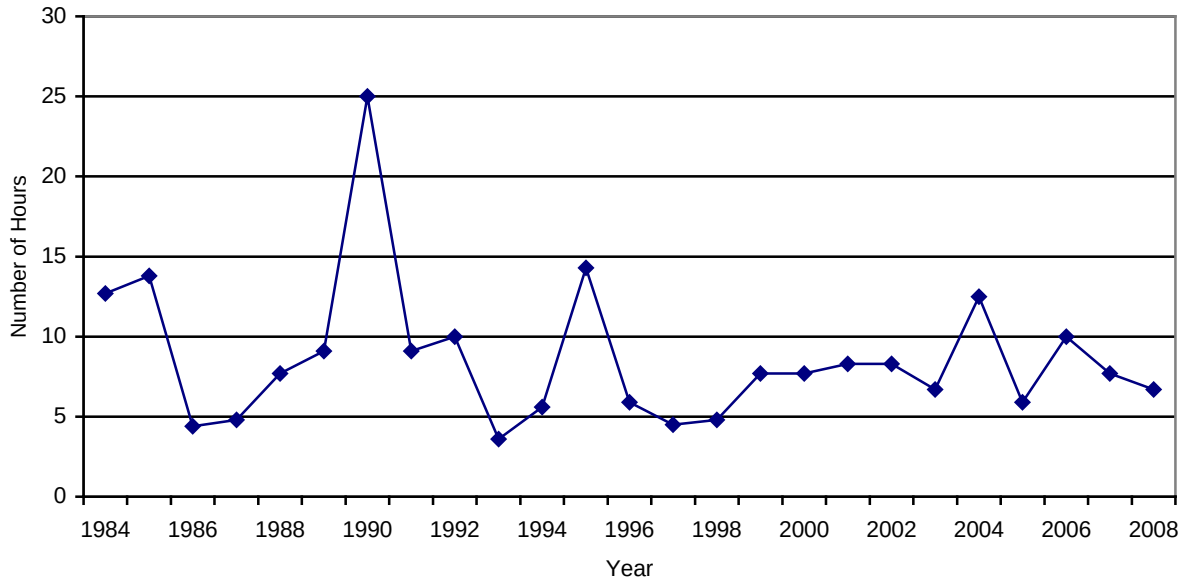


Figure 4. Tributary catch rates (hours of fishing per fish) for legal-sized landlocked salmon for the years 1984 through 2008. These include trips where salmon alone or in combination with another salmonid were listed as the angler's target (from Angler Cooperative Diary Program).

STURGEON (MacKenzie)

Lake Champlain once supported a small commercial fishery for lake sturgeon that harvested from 50 to 200 fish annually in the late 1800's and early 1900's. Annual harvest declined rapidly in the late 1940's, and the fishery was closed in 1967. Lake sturgeon are currently listed as endangered by the states of New York and Vermont.

Recent sampling efforts have been focused near historic spawning sites found in the Lamoille, Winooski, and Missisquoi rivers and Otter Creek. Sampling with gillnets for spawning lake sturgeon near historic spawning sites in the Lamoille and Winooski Rivers occurred from 1998 thru 2002. Gillnets were also set in the Missisquoi River in 2001 and 2003. Trotlines were also set for lake sturgeon in the Winooski and Lamoille rivers in 2002. Sampling for sturgeon eggs in spawning tributaries began in 2003 and continued thru 2008. Limited sampling for drifting sturgeon larvae in the Winooski and Lamoille rivers occurred in 2004 and 2005 and in the Missisquoi River in 2008.

Sturgeon eggs were sampled with egg mats set in the Missisquoi River below the dam in Swanton, Vermont in 2008. Egg mats were set on April 29, 2008 and fished until May 29. Fourteen sturgeon eggs were collected on May 15 on four separate mats.

Drift nets were set to capture drifting lake sturgeon larvae in Missisquoi River on May 27, 29, June 2, 5, and 10th. Nets were 3 meters long constructed of 1/16" knotless nylon netting and had 1-meter diameter openings. Nets were set in the evening and processed at midnight. No larval sturgeon were collected. Heavy rains provided less than optimal sampling conditions – high flows, and dirty, debris-laden waters.

Although recent surveys indicate that the numbers of adult sturgeon spawning in tributaries are low, sturgeon are still spawning successfully in 3 of the 4 tributaries used historically.

WALLEYE (MacKenzie, Zollweg, Smith)

Walleye management activities on Lake Champlain included monitoring adult walleye during the spawning runs in the Missisquoi and Poultney rivers, collection of brood stock from the Poultney River for the fish culture and stocking program, evaluation of OTC marking, evaluation of the contribution of stocked walleye to spawning populations and continuation of the angler diary program.

In 2008, 3.2 million eggs were collected from 24 pairs of walleye collected from the Poultney River. The egg collection goal was significantly reduced in 2008 because all adults used for spawning are now sacrificed for disease testing because of concerns over Viral Hemorrhagic Septicemia.

Eggs were hatched at both the Grand Isle and Bald Hill Fish Culture stations in Vermont. Fingerlings were reared at the Bald Hill FCS and in rearing ponds managed by the Lake Champlain Walleye Association in Swanton, Vermont. There were 62,000 fry and 130,000 fingerlings stocked into southern portions of Lake Champlain. All fry were marked with OTC and all fingerlings received a second OTC mark before being stocked.

An additional 770,000 eggs were collected from 27 of the 69 walleye caught from the South Bay, New York spawning stock and reared in a portable hatchery managed by the Lake Champlain Walleye Association in Whitehall, New York. An estimated 458,000 unmarked fry were stocked back into South Bay.

Of the 69 walleye caught by USFWS and NYSDEC in South Bay in 2008, 13 were less than 500 mm. Of those 13 fish, one was estimated to be three years old (354 mm), the rest were ages 6, 7, and 8 (and over 440 mm). Only 8 fish out of 300 collected from 2003-2007 in South Bay were less than 500 mm in length. Possible sources of these smaller fish include natural reproduction, fry-stocking in South Bay or the Poultney River, fingerling stocking from the Poultney River or immigrants from other areas of Lake Champlain.

Samples of age 3 year walleye were collected for OTC analysis from the Poultney (n = 27) and Missisquoi rivers (n = 35) because both river systems were stocked with OTC-marked fingerlings and fry in 2005. Preliminary results indicate that 69% of the age 3 walleye collected from the 2008 Poultney River spawning run were stocked: 4% (1 of 26) were stocked as fry and 65% (17 0f 26) were stocked as fingerlings. Otoliths from the Missisquoi River sample have not been aged or examined for OTC marks at this time.

Sea lamprey wounding rates on walleye collected in 2008 were 4 per 100 fish sampled in the length slot. This remains higher than the Cooperative's lamprey wounding objective of 2 wounds per 100 walleye.

Fishing regulations for walleye and sauger were changed in 2008 by both New York and Vermont. See details in the *Regulations* section: Page 15.

ESOCIDS (Good)

Northern Pike

In 2008, the Vermont Fish & Wildlife Department began a project to collect age and growth information for Lake Champlain's northern pike population. Department fisheries biologists began sampling northern pike in northern Lake Champlain in the spring of 2008, and in the winter an angler-based data collection project was initiated for the entire lake. Because the preferred aging structure of northern pike is the pectoral girdle, or "cleithrum", removing this structure requires sacrificing the fish. Anglers who harvest northern pike offer an untapped resource of biological samples and information. Collecting data from angler-harvested fish allows the fish to be used for both consumption and for data collection. To solicit angler-derived data and cooperation, Vermont developed a website with instructions on how to remove the cleithrum and record and submit biological data http://www.vtfishandwildlife.com/pike.cfm. Data derived from this project will be used in conjunction with creel and other data to help direct future northern pike management decisions.

Muskellunge

Parts of central and northern Lake Champlain and its lower tributaries historically supported a self-sustaining muskellunge population. For unknown reasons, this native population disappeared by the late 1970's. In recent years, incidental angler catches of this species in Missisquoi Bay and lower Missisquoi River indicated that a remnant population might still exist. The Vermont Fish & Wildlife Department's Muskellunge Team collected tissue samples from six angler-caught and two Department-surveyed muskellunge from 2003-2006, in an effort to compare the DNA of these fish with the DNA from potential source populations stocked into the upper Great Chazy River on the New York side, and upper Otter Creek on the Vermont side. If the DNA from muskellunge caught at-large in Lake Champlain did not match either stocked source population, it could be assumed that the genetics of the fish in question was representative of the original Lake Champlain muskellunge population. Genetic analyses indicated that the wild-caught muskellunge were derived from sources used in previous stocking events (Chautauqua Lake muskellunge stocked into upper Great Chazy River, NY and Pymatuning Reservoir muskellunge stocked in upper Otter Creek, VT). Although the genetic analyses provided no evidence of survival of the historic Lake Champlain muskellunge strain, angler catches and Department surveys demonstrated that the lake can and does support and grow large muskellunge specimens. Vermont's Muskellunge Team concluded that a program to restore a self-sustaining muskellunge population and develop a fishery could be initiated by stocking Chautauqua Lake strain muskellunge from New York. In 2008, Vermont worked with New York to obtain a small number (~250 individuals) of Chautauqua-strain muskellunge fingerlings, which were stocked into lower Missisquoi River. With New York DEC's cooperation, this stocking program should continue for the next few years, but with increased numbers of fish (~1,000 per year). Vermont's Muskellunge Team plans to investigate opportunities to obtain St. Lawrence River strain muskellunge for future stocking programs, since the native Lake Champlain muskellunge strain was likely most closely related to the St. Lawrence River muskellunge based on lake drainage and biogeography.

CENTRARCHIDS (Good, Pientka)

Largemouth and Smallmouth Bass

Angling for largemouth and smallmouth bass in Lake Champlain continues to increase in popularity. The lake is frequently named as one of the Top 5 bass fishing destinations in the United States by numerous popular national fishing magazines. It not only attracts and supports a high level of recreational fishing pressure, but multiple professional bass fishing tournament trails have added Lake Champlain as an annual stop. As a result, the popularity of and pressure on the lake's bass fisheries have increased a great deal in recent years. Currently, Vermont and New York conduct very little management or research on Lake Champlain's bass populations; however, this has been identified as an area that may require increased management attention in the future. High quality professional tournament catches in recent years seem to indicate that for at least the time being, bass populations and the fishery remain healthy.

RULES, REGULATIONS, and POLICY SHIFTS (Good, Schoch)

Joint-State

Sauger have become very scarce in Lake Champlain. Therefore, both New York and Vermont combined walleye and sauger into a single regulation that covers both species - a regulation that effectively precludes harvest of sauger. Previously, the regulations allowed harvest of sauger year round, with no daily bag limit and no minimum length limit. Harvest of walleye was limited to the first Saturday in May through March 15, with a daily bag limit of 5 fish and a minimum length limit of 18-inches. The newly adopted walleye/sauger regulation allows for a combined 3 fish daily bag limit and an 18-inch minimum length limit. The season for both species is the same as the previous walleye season. Sauger seldom exceed 18 inches in length, so the 18 inch minimum length, as had applied to walleye, effectively protects the sauger population from legal harvest.

Vermont

A number of Vermont fishing regulation changes were made in 2008 that pertain to Lake Champlain fisheries. Vermont regulations governing muskellunge fishing in Lake Champlain were changed in 2008 as part of a muskellunge restoration program. The pre-existing Vermont regulation allowed anglers to target muskellunge year round, and harvest one fish per day with a minimum length limit of 30-inches. Because of the desire to restore a fishable population of muskellunge to the Vermont side of Lake Champlain, a new regulation was adopted that allows anglers to target muskellunge year round, but all fish must be immediately released. Additionally, anglers may only target muskellunge using artificial lures and flies only; no live bait is allowed. This regulation change brings Vermont out-of-step with New York's muskellunge regulation for Lake Champlain, which is identical to Vermont's previous regulation. Vermont's new "catch-and-release

only" muskellunge regulation may be amended at some point in the future to allow for limited harvest of this species, if and when restoration is found to be working.

In response to the threat of Viral Hemorrhagic Septicemia (VHS), Vermont passed new baitfish regulations. The movement and use of live fish as bait has been identified as one of the primary vectors of spread of this fish disease to new waters. Lake Champlain has been identified as being at high risk for VHS infection by the United States Department of Agriculture's Animal and Plant Health Inspection Service. Vermont's new baitfish rules are designed to reduce the risk of the VHS virus from spreading from lake to lake within Vermont were it to become established in Lake Champlain or any other Vermont waterbody. Primary changes under the new rule include: anglers may only harvest and use approved baitfish species on the same waterbody where they were captured. Anglers may not transport baitfish away from any waterbody; this includes baitfish harvested on that waterbody as well as baitfish purchased at a baitshop. Commercial baitshops that wish to sell baitfish for statewide use are required to sell only certified disease-free hatchery-reared baitfish. Commercial baitshops may sell wild-harvested baitfish, provided they are sold to anglers for use only on the waters from which they were harvested, and the baitshop does not sell baitfish for statewide use. The rule also gives the Vermont Fish & Wildlife Department authority to prohibit baitfish harvest on any waterbody the Department lists as "closed to baitfish" harvest. A lake may be listed as "closed to baitfish harvest", for example, if VHS were to be detected in it.

New York

New York modified regulations concerning the use of baitfish, to reduce the potential to spread non-native fishes via the bait bucket. The major change in 2008 was to enact a "green list;" that is, a relatively limited list of fish species that can be sold as bait. To help explain the green list, and other changes in the regulations concerning the use of fish as bait, a leaflet is now available on the web at:

http://www.dec.ny.gov/docs/fish_marine_pdf/baitfishofny.pdf

RESEARCH

Lake whitefish project (Marsden)

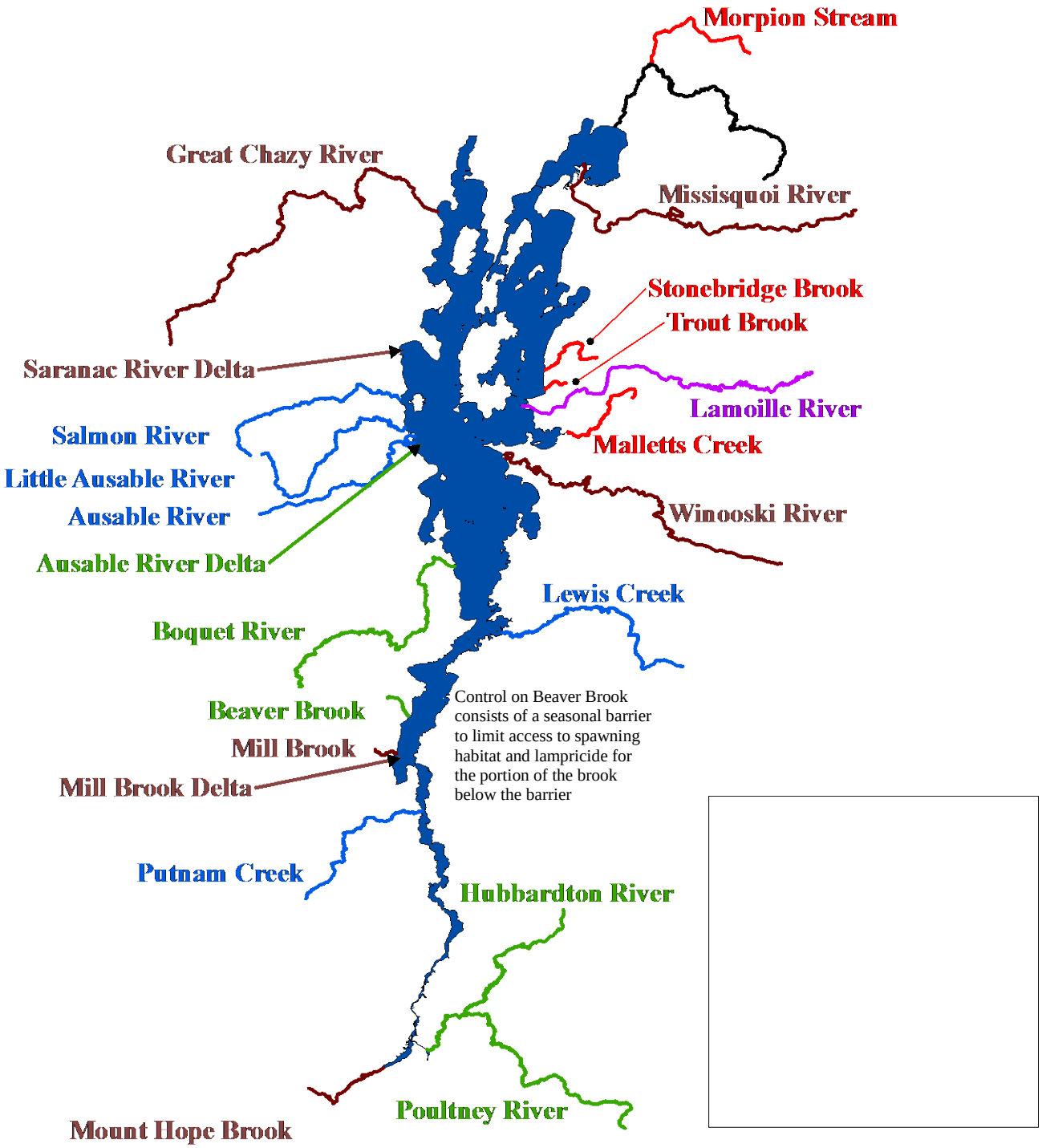
The objectives of the lake whitefish project, funded by NOAA, are to determine the historical trends and current status of the lake whitefish populations in the lake. A particular interest of the study is on the south end of the lake and Missisquoi Bay, where commercial fishing was focused. A review of the commercial fishery landings in Quebec suggests the northern fishery declined steadily since the 1960s and ended in 2005. Larval sampling located abundant larvae at multiple sites throughout the main lake, but no larvae in southern Missisquoi Bay or at Larabee's Point in the south lake. Diet studies are being conducted to determine whether, as in the Great Lakes, the addition of zebra mussels to the lake has altered diet availability, selection, condition factor, or fecundity of adult lake whitefish.

Alewife thiaminase project (Marsden)

The objectives of this project, also funded by NOAA, are to evaluate changes in alewife thiaminase levels during the initial phases of the alewife invasion, and examine effects of alewife consumption and alewife thiaminase expression upon lake trout reproduction in Lake Champlain. Alewife samples were collected in 2006, 2007, and 2008; thiaminase levels in 2006 (5.51 μmol/g) were slightly higher than in 2007 (4.96 μmol/g); 2008 samples have not yet been analyzed. Samples of lake trout and Atlantic salmon eggs were collected in 2008 and will be analyzed for thiamine content and compared with data from 2004 and 2007. In 2004 and 2007, thiamine levels were sufficiently high that symptoms of early mortality syndrome (EMS) would not be expected.

Rainbow smelt-alewife project (Parrish)

This study, funded by Lake Champlain Sea Grant, extends and complements our work from 2001 and 2002 by focusing on young-of-year (YOY) rainbow smelt and alewife. We have worked on developing the methods for quantifying YOY fish abundance through the summer, measuring the distribution of hatch dates and young fish growth rates, and modeling. In the two years of sampling, we documented schooling behavior in both species. Rainbow smelt generally hatched earlier than alewife and were distributed farther from shore and deeper than alewife. In 2009, we will focus on modeling the decline in YOY abundance over time as a function of both abundance and distribution of adult rainbow smelt and alewife as well as other predators.



APPENDIX 1. Lamprey Control Treatment and Trapping Schedule

Appendix 2: Schedule of completed Lake Champlain lamprey treatments through 2008 and projected treatments for 2009 and beyond.

1990: Salmon River
Little Ausable River
Ausable River (and Dry Mill Brook)
Boquet River
Beaver Brook
Putnam Creek
Lewis Creek

1991: Mount Hope Brook (and Greenland Br.)
Stone Bridge Brook
Ausable Delta
Saranac Delta
Little Ausable Delta
Salmon Delta
Boquet Delta

1992: Great Chazy River
Saranac River
Poultney River (and Hubbardton River)

1993: no treatments

1994: Salmon River
Little Ausable River
Ausable River (and Dry Mill Br.)
Boquet River
Putnam Creek
Lewis Creek

1995: Mount Hope Brook (and Greenland Br.)
Trout Brook
Ausable delta
Salmon delta
Boquet delta
Saranac delta

1996: Great Chazy River
Poultney River (and Hubbardton River)

1997: no treatments

1998: Little Ausable River
Salmon River
Putnam Creek
Beaver Brook

1999: Mount Hope Brook (and Greenland Br.)
Boquet River
Ausable River (and Dry Mill Brook)

2000: Great Chazy

2001: no treatments

2002: Little Ausable River
Ausable River (and Dry Mill Brook)
Salmon River
Putnam Creek
Beaver Brook - postponed
Lewis Creek

2003: Mount Hope Brook – postponed
Beaver Brook
Boquet River
Ausable delta
Salmon delta - no treatment required
Little Ausable delta - no treatment required
Winooski River - postponed

2004: Great Chazy River
Saranac delta
Boquet delta – no treatment required
Mount Hope Brook
Winooski River

2005: no treatments

2006: Little Ausable River
Ausable River (and Dry Mill Brook)
Salmon River
Putnam Creek
Lewis Creek

2007: Beaver Brook
Boquet River
Ausable delta
Little Ausable delta – no treatment required
Salmon delta – no treatment required
Poultney River (and Hubbardton River)

2008: Great Chazy River
Mount Hope Brook
Saranac delta
Boquet delta
Winooski River
Missisquoi River

2009: Lamoille River

2010: Salmon River
Little Ausable River
Ausable River
Putnam Creek
Lewis Creek

2011 and beyond: Repeat the cycle listed above for 2007 through 2010.

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