

# Batten Kill News



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**HAPPY NEW YEAR**

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*The MISSION of the Vermont Department of Fish & Wildlife is the conservation of fish, wildlife, and plants and their habitats for the people of Vermont. In order to accomplish this mission, the integrity, diversity, and vitality of all natural systems must be protected.*

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## Brown Trout Movements and Habitat Use in the Batten Kill under Study

Where do adult Batten Kill trout spawn? How far and frequently do they change locations? Do they have home ranges? What habitats do they prefer? Where do they winter? A new study being conducted now on the river by the Vermont Fish & Wildlife Department will provide some insight into these and other questions pertaining to the behavior of wild brown trout. The study relies on the field technique of radio tracking, a.k.a. telemetry. Fish are fitted with small radio transmitters which send out signals allowing Department personnel to identify individual fish and monitor their location and movements within the river. The study was kicked off this past August and will continue well into next spring.



Field investigations began with the tagging and release of 12 wild adult brown trout. The lengths of these fish ranged 16 to 20" (average 18"). All fish were captured from sections of the river situated between the upper end of the Dugway and the Route 313 bridge. Each fish had a radio tag, measuring about 3" long by 1/2" diameter, surgically implanted in the body cavity. Once the fish revived from anesthesia, they were

released back to the river usually at locations different from where they were originally taken. Release sites were scattered along the length of river between the 313 bridge and the West Arlington covered bridge. Monitoring the movements and habitat use of the fish began the following day, and since then the whereabouts of the fish have been tracked several days per week.

Each contact with individual fish is identified by a discrete code number, and other information about the encounter is recorded by the field investigator, including date and

time, location within the river or stream, habitat being used, water temperature, and weather. If any river use is taking place in the vicinity of the fish, such as angling, canoeing, or swimming, this is also noted. Field data is regularly entered into a computerized database which is linked to GIS (geographic information system) and allows mapping the movements of the fish within the Batten Kill drainage. Tracking and data management is being done by Sean Sheldon, an Environmental Assistant hired specifically for the study.

*(Continued on page 6)*

## Highlights of the 2003 Spring-Fall Season

This past field season continued to be a very busy one for all investigators involved in conducting studies designed to increase our understanding of current and past changes which affect the Batten Kill and its trout populations.

One such study involved a fluvial geomorphic assessment of the mainstem and tributaries. This included geomorphic characterization of the river and surrounding land forms based on map and orthophoto interpretation and field surveys. The first phase of the study assessed individual mainstem and tributary reaches based on the potential for changes to runoff patterns, channel geometry, and floodplain function, which in turn were used to assign an impact rating to each river segment. This was followed up with a Phase 2 field assessment of representative segments on the mainstem and tributaries to verify channel and floodplain encroachments, soils and erosion, riparian, corridor condition, channel geometry, sediment regime, and stream stability. Preliminary findings conclude “the Battenkill and major tributaries are undergoing channel adjustments and flood plain development in response to historic watershed land use changes and channel management activities.” The current fluvial geomorphic condition of the Batten Kill watershed appears to have been influenced by numerous human-related factors extending back to the 19<sup>th</sup> century, including “deforestation, settlement patterns, road and rail developments, food control hydropower, and agricultural practices.” Data collection and analysis have been completed and a final report is in preparation. This study was conducted by Shane Jaquith and Mike Kline, Vermont Department of Environmental Conservation, River Management Program; and Jim Henderson, Bennington County Regional Planning Commission. Funding was provided through a U.S. Forest Service grant.

The Vermont Fish and Wildlife Department continues annual monitoring of the river’s trout population. Late

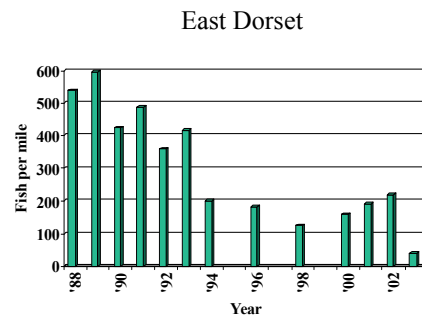
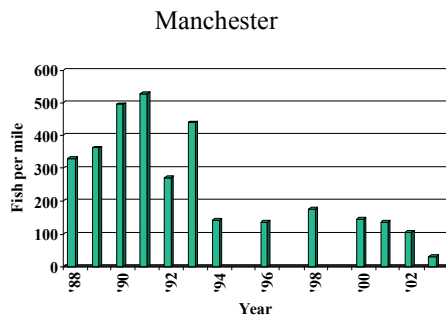
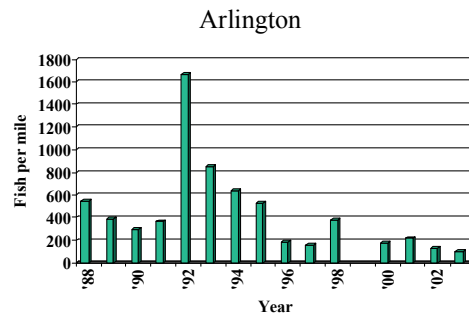
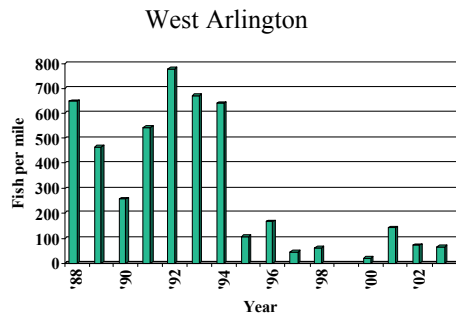
summer estimates (see table below) show the catchable-size ( $\geq 6$  inches) brown trout population to be down from 2002 and generally continues to remain at a low but relatively stable level compared to years prior to the significant decline that took place during the early 1990s. From 1988-1994 (see graphs on page 3), average abundance of catchable-size browns at the four long-term monitoring sites was in the range of 367 (Manchester site) to 678 (West Mountain site) fish per mile. Since 1994, means range from 85 (West Arlington site) to 233 (West Mountain site) fish per mile. On a more positive note, large browns continue to be seen in good numbers in the river in contrast to observations made before 2000. Although the index sites do not appear to be areas particularly frequented by large trout,

### Brown trout abundance (fish/mile) by size class in the Batten Kill, late Summer 2003.

Sampling location	Year	YOY	Size classes, inches			
			<6	6-9.9	10-11.9	$\geq 12$
West Arlington	2003	273	7	36	7	22
	2002	568	0	43	22	7
	2001	245	14	129	7	7
	2000	723	0	14	0	7
	1998	113	8	30	8	23
Arlington	2003	339	8	81	8	8
	2002	580	8	56	32	40
	2001	468	8	193	0	24
	2000	463	8	138	8	32
	1998	106	0	287	0	91
Manchester	2003	1073	42	21	0	10
	2002	281	62	52	10	42
	2001	969	124	62	21	52
	2000	360	95	63	21	63
	1998	209	55	88	66	22
East Dorset	2003	563	57	29	0	10
	2002	344	105	153	29	38
	2001	334	420	105	38	48
	2000	130	50	80	60	20
	1998	67	96	96	0	29

(Continued on page 3)

## Highlights of the 2003 Spring-Fall Season *(cont. from page 2)*



**Catchable-size ( $\geq 6$  inches) brown trout abundance in the Batten Kill, 1988-2003.**  
*Trout populations were not sampled in 1999 or at the Manchester and East Dorset sites in 1995 and 1997.*

they are present in adjacent stretches of the river, where refuge habitat may be more conducive to holding quality size fish. Based on single pass electrofishing sections located between the upper Dugway and the 313 bridge this past summer and fall, the population of trout, 15-20 inches in length, is estimated to be at least 22 fish per mile. As for young-of-the-year browns, densities appear to have recovered from the low numbers estimated during the latter half of the 1990s and to be more on par with numbers observed prior to 1995.

Progress continues to be made on evaluating changes that have occurred with the Batten Kill mainstem brown trout population through computer modeling. This work is being done by Drs. Kristian Omland and Donna Parrish of the Vermont Cooperative Fish and Wildlife

Research Unit at the University of Vermont, with field assistance provided by the Vermont Fish & Wildlife Department. The goal of the field work conducted in 2003 was to obtain an estimate of brown trout survival from pit tagging yearling and larger fish and subsequent recaptures over the period of late June-early October. Survival estimates then could be used to fine tune the population model and possibly provide better insight into one suspected cause for the population



*Kristian Omland*

*(Continued on page 4)*

## Highlights of the 2003 Spring-Fall Season *(cont. from page 3)*

decline, i.e. declining survival of mid-size trout. Unfortunately, the low numbers of trout of this size group and the difficulty experienced in recapturing marked fish resulted in samples too small to be reliably used with even the simplest models. Nonetheless, the recapture of 334 tagged trout did yield information about fish growth in the Batten Kill. Analysis of the data indicates brown trout growth rate is a declining function of fish size at time of first capture, and browns in the lower river grow at a faster rate than those in the upper river. Observed changes in the size distribution of trout populations over the summer-fall period is due to two factors: fish growth and mortality. Increasing our understanding of fish growth and its influence on the size distribution offers an indirect approach to estimate trout survival. This study was also funded by a Forest Service grant.

The survey of trout habitat on the Batten Kill mainstem was completed this summer. The Vermont Fish & Wildlife Department kicked off the survey in 2003 and since then has assessed nearly 22 miles of river from just downstream of the New York state line up to the base of Dufresne Pond dam. Collected data included, for example, identification and measurement of habitat types (pools, riffles, side channels), water depths, substrate composition, riparian cover types, erosion, and pool rating for trout cover value. Survey data are being analyzed. An extension of the habitat survey is a trout cover survey launched in 2001. It focuses on quantifying the trout cover present in randomly-selected samples of pools and riffles identified by the habitat survey. Field data collection is being done by a Forests Service crew and will be completed in 2004.

Lastly, the Vermont Department of Environmental Conservation's Biomonitoring and Aquatic Studies Section has completed analysis of water chemistry and benthic macroinvertebrate populations for sites

sampled in 2002 on the Batten Kill and four reference trout streams (Mettawee, Poultney, Castleton, and Dog rivers). The report presents findings from data collected in 2001 and 2002. The study concludes: (1) no obvious chemical or biological factors were identified which might account for differences in trout production between the five rivers, and (2) elevated levels of phosphorus and nitrogen measured in the Batten Kill below the Manchester Waste Water Treatment Facility and the observed responses in the macroinvertebrate community would more likely enhance rather than degrade trout abundance. The 2002 study was funded by the Forest Service.

Additional studies are planned for the 2004 field season. The Batten Kill Study Team will be reviewing project proposals this winter and high priority studies will be selected. Much of the work being done on the Batten Kill has been supported by funds secured by U.S. Senator Jeffords. The FY 2004 federal budget includes a provision for \$250,000 in funds to support efforts to improve the water quality and fisheries in the Batten Kill. Since 2001, this brings to total amount of funding supported by Jeffords for the Batten Kill to \$900,000. Funds are administered by the U.S. Forest Service.



Donna Parrish



## Black Spot on Brook Trout

This past summer, a higher than usual number of inquiries from anglers was received by the Springfield Regional Office of the Vermont Fish & Wildlife Department regarding the presence of numerous pinhead size black bumps on brook trout captured in the Batten Kill. Typical questions accompanying these reports include: *What are they? Is this some kind of new disease? Does it negatively affect the health of the fish?*

Actually the bumps are the encysted dormant larval stage of a flatworm parasite, scientifically referred to as digenetic trematodes. These appear black, because the host fish in response to the parasite produces a dark pigment (melanin) which is deposited in the tissue surrounding the cyst. These characteristic black bumps give rise to the more generally used names for the parasite: *black spot* or *black grub*. The parasite is neither new or uncommon in Vermont. It can be found on a range of fish species as well as trout, including yellow perch, bass, sunfish, minnows, and dace and can be caused by one of several species of digenetic trematodes.

Parasitic trematodes have a complex life cycle involving two or three hosts. Typically the hosts include a fish-eating bird, an aquatic snail and, of course, a fish. The life cycle begins in the bird, such as a kingfisher, where the adult stage of the parasite resides in the mouth. Eggs produced by the trematode travel down through the bird's gut and leave the bird via its feces and into the water. There the eggs hatch into the first larval stage (*miracidia*) which seek out and penetrate the first intermediate host, a snail. While in the snail, the parasite reproduces asexually and eventually transforms to the second larval stage (*cercariae*). The cercariae leave the snail and swim about in search of a suitable fish, the second intermediate host. Finding a



fish, the cercariae penetrate the skin and form cysts to assume the third larval stage (*metacercariae*). Should the fish be eaten by a bird, the metacercariae emerge from the cyst, attain maturity, and thus completes the life cycle.

Usually the incidence of black spot on fish is not great enough to be harmful to the host. Overall effects on fish reproduction, growth, and survival are minimal. On the other hand, extremely heavy infestations may affect fish health particularly if vital organs are involved. There is no evidence that the levels of black spot infestation observed on trout inhabiting the Batten Kill should give any reason for concern.

But what about humans? Can the parasite infect people either by contact with the water or through the consumption of fish? No, species of trematode occurring in Vermont waters do not seek out humans as a host organism, although related parasites have been found in birds and some mammals. The consumption of fish infected with black spot does not present a health risk as long as the fish are fully cooked. At this time, there is no practical treatment or control of this parasite.

## Brown Trout Movements and Habitat Use in the Batten Kill Under Study *(cont. from page 1)*

Study results have already revealed some interesting information about the movements of adult browns in the Batten Kill. While most of the fish have stayed in Vermont, three are known to be currently in New York. One of these (#9) was found near Battenville about 19 miles from the original release site, and another (#12) is in Shushan. Fish #8 moved downstream into New York, entered Camden Creek, swam 5 miles upstream re-entering Vermont, and was located in a small tributary of the creek. Since then, #8 has dropped back down and is holding out in lower Camden Creek. In addition, six fish have been found in other Vermont tributaries at one time or another. A total of three fish have been tracked in the Green River with one (#7) migrating upstream eight miles. Two fish (#2 and 5) have been located in the Roaring Branch. The remaining four tagged fish have confined their movements to the mainstem; and only one trout (#6) has evaded detection altogether since early September. The disappearance of #6 may be the result of tag failure or possibly that the fish is no longer in the river.

Even though spawning by radio-tagged browns was not actually observed, study results strongly suggest certain tributaries are used for this purpose by mainstem inhabiting fish and that spawning primarily occurs in November after most brook trout have spawned. More recently, most of the fish that were in the tributaries have returned to the main river with many of these fish returning to locations in close proximity to where they were originally captured.

Radio tracking will continue through the winter and into next spring when the battery life of the tags is expected to be exhausted. Plans are in the works to continue the study over the summer and fall months providing a year-round view into the lives of adult browns in the Batten Kill.

The cost of the current study is \$31,000 and is being funded by the U.S. Forest Service-Green Mountain National Forest and the Vermont Fish & Wildlife Department. The Forest Service share originates from an appropriation dedicated to the Batten Kill through legislation authored by U.S. Senator Jim Jeffords.

## Working for Wildlife Day, 2003

Last April 26, sixteen hardy souls volunteered Saturday to plant trees on the banks of the Batten Kill in Sunderland. Despite the cool, wet weather, the spirits and enthusiasm of the participants held firm. Over 200 small trees were hand planted along 2,000 feet of the river bank adjacent to the former Hill Farm. In total, the Vermont Fish & Wildlife Department owns about two miles of river bank between the Hill Farm bridge and the Arlington-Sunderland town line. The property was purchased in 1966 from Earl and Lois Hill for the purposes of ensuring public access to the river and to help conserve water quality, fish populations, and riparian wildlife habitat. This year's *Working for Wildlife Day* represents another installment in the continued efforts to restore the riverbanks to a natural condition. The event wrapped up with refreshments provided by the Clearwater Chapter (NY) of Trout Unlimited and, for some, an afternoon of fishing on the Kill.

The Department wants to thank the following people for their participation: Cynthia Browning, Greg Cuda, Gene Davis, Valerie dePeyster, Henry Hall, Elinor Hanrahan, Jim Henderson, Roy Lamberton, Doug Lyons (and dog Molly), Jim Miranda, Joe Philips, Shelly Stiles, Bob Thomas, Robert Van Onselder, Cliff Ward, and Gene Webster.



## Preferred Newsletter Format and Change of Address Response Form

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Please fill out the form or e-mail [melissa.currier@anr.state.vt.us](mailto:melissa.currier@anr.state.vt.us) with the following information:

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**VT Dept. of Fish & Wildlife, 100 Mineral Street, Suite 302, Springfield, VT 05156-3168**

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*“We know little, and we understand only part of what we know.”*

— Aldo Leopold, Father of Modern Conservation, 1887-1949.

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## Check Out These Web Sites

### VT Agency of Natural Resources

<http://www.anr.state.vt.us>

### VT Dept. of Fish & Wildlife

<http://www.vtfishandwildlife.com/>

### U.S. Forest Service

<http://www.fs.fed.us>

### U.S. Fish & Wildlife Service

<http://www.fws.gov/>

### The Whirling Disease Foundation

<http://www.whirling-disease.org>

### Battenkill Conservancy-New York

[http://www.battenkillconservancy\\_ny.org/](http://www.battenkillconservancy_ny.org/)



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## BATTEN KILL NEWS

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