Vermont Department of Fish & Wildlife

Batten Kill News

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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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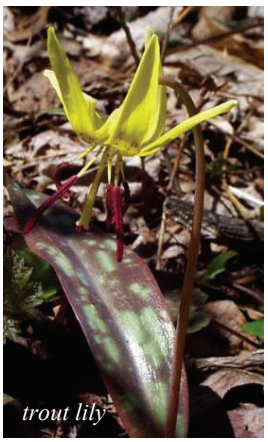
Less Than One More Month to Go and Counting!

The 2002 Trout Fishing Season opens Saturday, April 13, so there is precious little time remaining to get your gear and tackle in good operating order and to replenish your inventory of home-tied flies. It is always risky to prognosticate how the upcoming trout season will be taking into account the uncertainty of weather and other environmental factors. However, with that said, the trout populations appear to have fared well after having gone through last summer's near record drought, and this winter's mild conditions probably have been beneficial too. With so little snow pack and barring the occurrence of any record breaking heavy late winter-early spring snow storms, spring melt and high river flows should be brief setting the stage for favorable early fishing conditions. Of course there may be a price to pay later in the season, if we don't get some significant soaking spring rains. Time will tell.


trout lily

This will be the third season that the Batten Kill, from the Dufresne Pond dam downstream to the New York state line, will be under the no-harvest regulation. Even though all trout caught must be returned immediately to the water, there are no special restrictions on gear and terminal tackle other than as allowed by Vermont's general fishing regulations for rivers and streams *(see Section F3.0 and Table 1 of the 2002 Vermont Digest of Hunting, Fishing and Trapping Laws)*. Anglers are encouraged to use fishing methods and handling techniques which increase the chances of released fish to survive, to be caught again and continue to contribute to the population. A brochure recommending these techniques can be sent to you free of charge by calling Melissa Currier at the Springfield District Environmental Office at *(802) 885-8845*.


spring beauty

Highlights of 2001 Projects

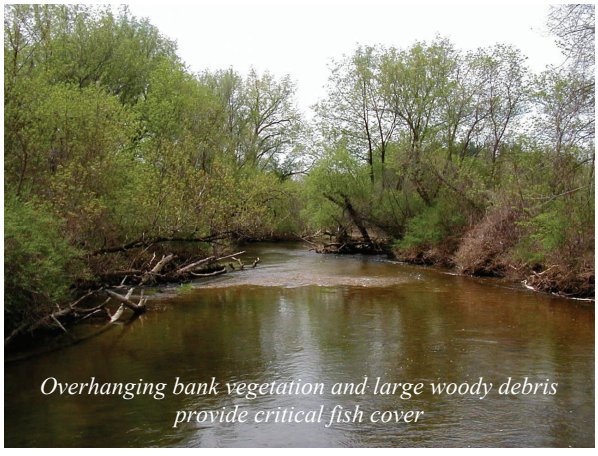
Year 2001 saw a considerable amount of work done in the Batten Kill drainage directed principally on two fronts: resource assessment and habitat improvement. Assessment activities have been focusing on inventorying current habitat conditions in the Batten Kill main stem, including channel and riparian conditions, water chemistry and temperature, river hydrology, and trout cover. Additionally, trout populations are continuing to be monitored by annual electrofishing surveys. Habitat improvements were completed at two sites: the Shepard property, where 170 feet of eroding stream bank was stabilized using bioengineering methods; and the West Arlington Grange river bank, where timber cribbing was used to correct a longstanding erosion problem and improve access to the river.

Data from several assessment projects completed last season have been analyzed and reports are now in preparation. Highlights of some of these investigations are presented below. The 2002 season also looks to be a very busy one including additional work on projects in progress and possibly the addition of several new initiatives.

Habitat Survey

Another 6.5 miles of the Batten Kill main stem was surveyed during Summer 2001 as part of a multi-year effort involving the Vermont Fish & Wildlife Department and U.S. Forest Service/Green Mountain National Forest. The survey picked up where the Summer 2000 assessment ended (mouth of Benedict Hollow Brook) and concluded at the Sunderland Hill bridge. This segment of the main stem includes three defined river reaches for a total of four reaches identified and surveyed. Reach 4 has yet to be completed, therefore the following provisional results are for Reaches 2 and 3 only. Results for Reach 1 were previously reported in *Batten Kill News (Vol. 2, Issue 2).*

Reach 2 measures 1.7 miles in length. Within the reach, a total of 21 habitat units were identified of which 67% are pools and 33% are riffles. In terms of proportion of reach length, pools compromise 1.4 miles (85%) and total riffle habitat is 0.3 miles (15%). The pool to riffle ratio is 5.5:1. Average wetted channel width is 72.3 feet. The total wetted area of Reach 2 measures nearly 15 acres (77% pool habitat and 23% riffle habitat). The average distance between adjacent pools is 103.5 feet.



Overhanging bank vegetation and large woody debris provide critical fish cover

Reach 3 is 1.5 miles long and contains a total of 28 habitat units (54% pools; 46% riffles). The total combined length of pools within the reach is 0.7 miles (48%) and riffles is 0.8 miles (52%). The pool:riffle ratio is 0.9:1. Average wetted channel width is 67.6 feet. Reach 3 has a total wetted area of nearly 13 acres (46% pool habitat and 54% riffle habitat). Average distance between adjacent pools is 290.1 feet.

Pool depths average 4.2 feet (range 2.2-6.5 feet) in Reach 2 and 4.4 feet (range 2.5-7.0 feet) in Reach 3. The average residual pool depth for both reaches is 2.8 feet. Reach 2 values ranged from 0.8 to 4.9 feet, and in Reach 3 from 0.9 to 5.4 feet. Average riffle depth for each reach was 1.1 feet.

Bank instability as evidenced by significant erosion is estimated to be 1.0% in Reach 2 and 1.2% in Reach 3. Last year, the length of eroded bank in Reach 1 was estimated at 1.3%.

Analysis of 2000 and 2001 survey data continues, and field survey activities will resume this summer. Collection of field data remains on schedule and is to be completed during Summer 2003 or sooner.

Trout Cover Assessment

A random sample of pool and riffle habitat units in Reach 1, identified during the 2000 survey, were revisited this past summer and evaluated for available trout cover. Cover is any habitat feature which provides trout with a place to rest or seek refuge from predators, such as deep water, overhanging structures (banks, logs, vegetation), and coarse substrate (boulders, cobbles). Criteria were developed prior to the field season to assist the survey crew with the identification and measurement of various kinds of cover. Cover is measured in square feet of habitat that yearling and older fish can effectively occupy and is expressed as a percentage of each habitat unit's total area.

Seven pools and five riffles in Reach 1 were evaluated. Available cover is estimated to be in the range of 0.37-10.06% (average 3.60%). Only two of the 12 habitat units have cover exceeding 6% of their total area. About 90% of the fish cover is associated with the shorelines, where the dominant structure is

(Continued on page 3)

Highlights of 2001 Projects *(Continued from page 2)*

overhanging bank vegetation. When water depths two feet or greater are not factored in, overhanging vegetation provides on average about 76% of the trout cover. As might be expected, pool habitat units contain the greatest amount of cover, particularly when deep water is also taken into account. Nearly three-quarters of the pools evaluated have sufficient depth (two feet or greater) to serve as trout cover. Other types of cover identified within Reach 1 are woody debris (e.g., logs and root wads, wood aggregates); boulders; bank revetments and undercuts; and pocket water.

Water Temperature Monitoring

Summer (June-August) 2001 was the fifth driest in terms of precipitation recorded for Vermont over the past 107 years. One might conclude river flows likewise were low, which was the case, and water temperatures were high. However, last summer ranked the 66th warmest summer since 1895 and was only 0.4°F warmer than the average for the period of record. Water temperature monitoring conducted by the Vermont Fish & Wildlife Department and U.S. Forest Service showed that water temperatures in the Batten Kill remained within the suitable limits for trout. Temperature loggers were placed in the river main stem at four locations corresponding to the Fish & Wildlife Department's population monitoring index sites. They were put in the river in late May and were not retrieved until late September. During that time the loggers recorded the water temperature hourly, 24 hours a day.

As an example of the data output, the graph below shows water temperatures measured below the West Arlington Covered Bridge which is the most downstream monitoring site and theoretically should represent worse case conditions. Trout tolerance to high water temperatures is dependent on several factors, including trout species, fish life stage, maximum temperature, and duration of exposure. Also, two temperature regimes are generally recognized: an optimum range which promotes good growth and survival, and an overall tolerance range at which temperatures do not result in widespread fish mortality. The upper limit within the tolerance range for brown trout is 27°C (81°F) and brook trout is 24°C (75°F). At no time during Summer 2001 did the Batten Kill water temperature exceed the upper thermal limit for brown trout. On five days (July 24-25; August 7-9) mid-late afternoon temperatures either closely approached or exceeded the upper thermal limit for brook trout. However, these occurrences in themselves do not necessarily mean that brook trout experienced unusually high mortality due to thermal stress. Providing the fish have access to cool water refuge areas, such as ground water seeps and springs, or maximum temperatures cool off over night and fall within the tolerance range, large scale fish losses can be avoided. Both situations probably played a significant role in minimizing any loss of fish in the Batten Kill due to temperature during the past summer.

Geomorphological Study of Channel Stability

A study involving an analysis of aerial photographs of the Batten Kill, spanning 1942-2000, was conducted by Professor John Field of Green Mountain College in Poultney, Vermont. The study was funded by a grant from the U.S. Forest Service/Green Mountain National Forest. One objective of the study was to identify the location, timing, and rate of channel

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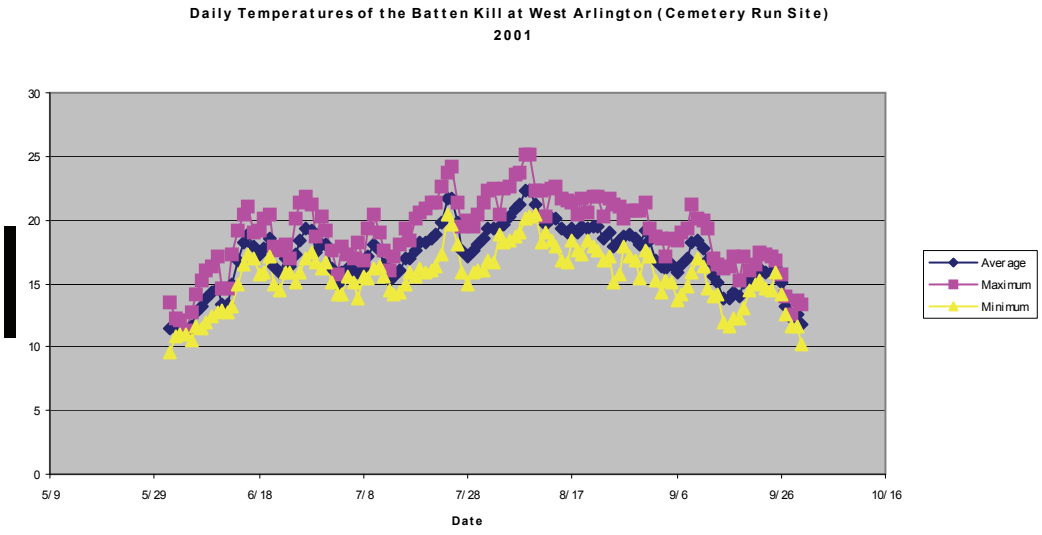

The Science of Fluvial Geomorphology

Editor's note: *In the last issue of Batten Kill News (Vol. 2, Issue 2), some preliminary results of the 2000 Habitat Survey were reported. The data introduced some terminology which is not in common usage, but lays out a more advanced way of looking at stream channels and evaluating their relationship to the watershed and the changes that may occur over time. The following recently appeared in the Vermont Agency of Natural Resources Environment 2002 report and is printed in part here.*

Stream bank erosion, common in Vermont, is a natural process. Through the science of fluvial geomorphology – the study of landscapes formed by water processes – we've learned that many streams in Vermont have lateral instability, meaning they move back and forth across their valleys at more rapid rates than stable streams. This lateral instability is primarily due to a lack of deep-rooted, dense vegetation on the stream banks.

Naturally stable streams in broad valleys or otherwise unconfined settings have access to their floodplains. Energy from the stream can then be dissipated as the water flows over the banks and into the floodplain – a process that allows the water to spread out and slow down, thereby reducing the downward erosion on the stream bed during floods. However, even these types of streams benefit from the existence of woody vegetation on their banks and in their floodplains. Such vegetation further dissipates the energy associated with flowing water. Streams that are unstable and lack access to their floodplains, then, experience more downward erosion of their stream bed. Riparian vegetation helps these streams by binding the stream banks with roots to protect against the strong force of water.

Some unstable streams have eroded down their channel beds, or have become incised, meaning they cannot access their original floodplains. This may be caused by human efforts to straighten the channel, gravel extraction, or floodplain encroachments (fill placed in the active floodplain). As a result, their stream banks bear considerable stress during high water. Due to this increased stress on the stream banks, the channel begins to erode outward, or laterally. The channel over-widens considerably, and eventually fills with sediment. Over time a new narrow channel forms again in this wide channel bed and new floodplains develop to either side of the new channel at a lower elevation. The cumulative effects of stream bank and bed erosion and the resulting channel adjustments cause loss of property, loss of aquatic and wildlife habitat, decreased water quality, and greater risk of flood-related damage.

Streamsides often represent high-risk areas for development even if located above flood elevation. Public and private investments, including culverts and bridges, are at risk when stream dynamics are not considered. Riparian buffers are cost-effective protection against flooding, shoreline erosion, and the lateral movement of channels.

Fortunately, restoration of a riparian buffer is a fairly simple process. The easiest, but slowest, method of restoration is simply moving the impact (possibly a tilled field or trail) away from the stream and allowing the area to naturally revegetate. Over several years, a mix of grasses, trees, and shrubs will establish themselves. A more effective restoration process involves the active planting of native riparian species, such as red-osier dogwood, willow, fern, maple, and birch.

Batten Kill utilizing its flood plain

Errata

In the printed version of the last issue of this newsletter, a couple errors were belatedly noted under the ***FYI*** section. The definition included for *Residual Pool Depth* actually defines *Streamflow*. *Residual Pool Depth* is the depth of a pool that would occur under extreme low flow or drought conditions as controlled by the lowest streambed elevation point at the pool tail crest.

Highlights of 2001 Projects *(Continued from page 3)*

change along that portion of the river between the New York state line and Dufresne Pond dam. It was concluded that the river has changed very little at the resolution of the eight aerial photographs analyzed. Several exceptions were identified, however. A meander on the main stem in Arlington upstream of the confluence of Benedict Hollow Brook was cut off between 1942 and 1962, and another meander cutoff occurred between 1968 and 1977 upstream of the Route 7A bridge near the Arlington-Sunderland town line. Meander growth was noted at three locations in Sunderland and Manchester. Overall, these channel changes affected less than one percent of the total section of river evaluated and indicate the river channel has experienced a slow rate of change over the past 60 years. The report states several factors may be responsible for the apparent lack of significant changes in channel position: natural and artificial constraints on lateral channel migration, the lack of significant flood events over the past 60 years, and the ability of the river to transport sediment inputs preventing the accumulation of channel features (e.g., gravel bars) which promote lateral channel migration.

"When we try to pick anything out by itself we find it hitched to everything else in the universe."

— John Muir, Scottish-born American Naturalist, 1838-1914

Preferred Newsletter Format and Change of Address

We are pleased to announce that the ***Batten Kill News*** is now on the Department of Fish & Wildlife homepage (www.vtfishandwildlife.com). Advantages of the on-line version include improved image quality/color and direct access to links. In the interest of saving paper and postage, readers are encouraged to use the Internet to access the newsletter. Readers indicating a preference for the internet option will be notified via e-mail when the latest version has been posted on the F&W home page.

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

Name: _____

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My preference is:

☐ will read newsletter on F&W homepage e-mail address: _____

☐ continue to receive printed copy through the mail *(provide mailing address below if different from that given above)*

Name: _____

Street Address: _____

City/Town: _____ State: ____ Zip: _____

Please return form to: **VT Dept. of Fish & Wildlife, 100 Mineral St., Suite 302, Springfield, VT 05156-3168**

Check Out These Web Sites

VT Agency of Natural Resources
www.anr.state.vt.us

Trout Unlimited
www.tu.org

Battenkill Conservancy-NY
www.crisny.org/not-for-profit/bcny/

River Watch Network
www.riverwatch.org

U.S. Forest Service
www.fs.fed.us

U.S. Fish and Wildlife Service
www.fws.gov

Aldo Leopold
www.aldoleopold.org
www.naturenet.com/alnc

Buffer Strips: Common Sense Conservation
www.nhq.nrcs.usda.gov/CCS/Buffers.html

Buffer Strips for Riparian Zones
www.forestry.iastate.edu/ext/buffstrips.html

Introduction to Stream Geomorphology
cayuganet.org/owla/riparian/fluvial15.html

Natural Stream Processes
www5.bae.ncsu.edu/bae/programs/extension/wqg/sri/rv-crs-1.pdf

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