

**Progress Report on  
River Basin Water Quality Management Planning  
During 2009**

**A Report for:  
House and Senate Committees on Agriculture and Natural  
Resources and Energy**

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## **Table of Contents**

Introduction	3
Basin 1 - Batten Kill, Walloomsac, Hoosic	7
Basin 2 - Poultney, Mettowee	10
Basin 3 - Otter Creek, Little Otter, Lewis Creek	14
Basin 4 - Direct drainages to Lower (southern) Lake Champlain	19
Basin 5 - Direct drainages to Upper (northern) Lake Champlain	22
Basin 6 - Missisquoi	24
Basin 7 - Lamoille	26
Basin 8 - Winooski	29
Basin 9 - White	31
Basin 10 - Ottauquechee, Black	33
Basin 11 - West, Williams, Saxtons	36
Basin 12 - Deerfield	38
Basin 13 - Direct drainages to Lower Connecticut River	39
Basin 14 - Waits, Wells, Ompompanoosuc, Stevens	41
Basin 17 - Lake Memphremagog, Coaticook, Tomifobia	43

## Introduction

In 2009, the Vermont Agency of Natural Resources, Department of Environmental Conservation (DEC) and its federal, state, municipal, regional and local watershed partners continued to be engaged in the basin planning process in thirteen of Vermont's seventeen river drainage basins.

The overall goal of each river basin water quality management plan is to establish and carry out strategies that will:

- maintain, improve or restore the surface waters of the basin,
- ensure full support of uses of the waters, and
- engage the many diverse parties in a watershed that are needed to reduce or eliminate pollution and protect high quality waters.

During the 2009 reporting period, the five DEC Watershed Coordinators (sometimes also known as Basin Planners) engaged members of the public, non-profit organizations, landowners, farmers, foresters, loggers, local officials, government agencies and others in the basin planning/watershed initiative process. The five DEC Watershed Coordinators are physically located in: Barre, Essex Junction, St. Johnsbury, Springfield and Rutland.<sup>1</sup>

Basin plans and the basin planning process are required by Vermont Statute 10 V.S.A. Section 1253(d), Section 1-02D of the Vermont Water Quality Standards, and the U.S. EPA 40 Code of Federal Regulations Part 130, Section 130.6 – Water Quality Management Plans. DEC has prepared a document entitled "*Vermont Watershed Initiative - Guidelines for Watershed Planning*" (2007) as a way to help planning participants become aware of these requirements and to understand the planning process.

## The Challenge

DEC Watershed Coordinators lead the development of individual river basin water quality management plans based on a visible and inclusive public involvement process. They serve as a vital communication link between the various state and federal agencies and local organizations that are directly or indirectly contributing to water quality improvement efforts. The Watershed Coordinators help educate and persuade individual landowners and business owners to prevent or abate what is essentially considered to be nonpoint source pollution from their property. The DEC Watershed Coordinators facilitate the completion of projects, large and small, that correct locally identified problems and restore water quality. Watershed Coordinators, situated in the areas they are, are needed as a long-term local presence to ensure successful follow-through and implementation of such measures as the Lake Champlain Phosphorus Total Maximum Daily Load (TMDL), hydrology-based TMDLs concerning certain stormwater impaired waters, projects arising from water quality monitoring and from other water quality plans throughout the state.

The Lake Champlain Phosphorus TMDL, for example, established phosphorus load allocations for each major lake watershed and included an implementation plan describing the major, basin-wide program efforts that will be needed to achieve these allocations. Through the DEC watershed planning initiative, strategies are developed by a public process to achieve goals and objectives identified for each of the major river basins statewide.

Translating TMDL load allocations and river basin plans into real, "on-the-ground" actions requires a locally coordinated implementation process. DEC Watershed Coordinators help to play a critical role in turning these plans into reality. Their job in a watershed is not finished until the goals derived through the public consensus process are implemented and water quality is improved.

The planning process and associated watershed projects are in varying stages in the different river basins. One completed and ANR-adopted basin plan (White River; ANR adopted in 2002) is in an implementation and restoration phase. Work began in 2009 to update the information contained in the plan document. As authorized by the 2009

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<sup>1</sup> In June 2009, the Watershed Coordinator located in Bennington was laid off as part of the Reduction in Force initiative and the Watershed Coordinator located in Waterbury was re-assigned a new set of duties resulting in the consolidation of basin planning duties to one person for the Winooski River basin.

Vermont Legislature, the local regional planning commission (Two Rivers Ottauquechee RPC) began work to develop water management typing recommendations. A second completed and ANR-adopted basin plan (Poultney-Mettowee; ANR adopted in 2005) is also in an implementation and restoration phase. While this plan contained recommendations for water management typing for all waters therein, no additional work on proposing typing and classification petitions has been done for surface waters in this drainage since 2007.

In June 2008, two other river basin water quality management plans (basin #11 - West/Williams/Saxtons and basin #14 - Waits/Wells/Ompompanossuc/Stevens) were finalized and adopted by the ANR Secretary. These two plans, now also in an implementation and restoration phase, were authorized by the 2007 General Assembly to proceed for ANR adoption without containing recommendations for classification and water management typing. The 2009 Vermont Legislature authorized a local regional planning commission in the basin #11 area (Windham RPC) to prepare water management typing recommendations.

A fifth and sixth river basin plan (basin #5 - Northern Lake Champlain direct watersheds and basin #7 - Lamoille), were released to the public for comment in late 2008 and, after incorporating public comment, were then presented to the DEC Commissioner and ANR Secretary for signature as draft plans in February 2009. Neither of these plans contained any recommendations concerning water management typing. Signature by DEC and ANR on both documents, representing draft plan approval (versus "adoption"), occurred in October 2009.

Four other river basin plans are under development with the respective councils and Watershed Coordinators holding meetings and prioritizing issues. These include the Otter Creek (basin #3), Winooski River (basin #8), Ottauquechee/Black drainage (basin #10) and the Barton/Black/Clyde drainage (basin #17). It is probable that a finalized draft water quality management plan without typing recommendations will be produced for the Otter Creek during 2010. The basin planning process was initiated for two plans (basin #1 - Batten Kill/Walloomsac/Hoosic and basin #6 - Missisquoi/Rock/Pike) but, due to the loss of planning personnel, those two water quality management planning documents remain incomplete. The sole water quality management planning document for the area drained by the Missisquoi, Rock and Pike rivers will be the Clean and Clear Action Plan. Importantly, remedial projects are being planned and implemented in each of the above noted river basins.

DEC's Watershed Initiative involves two parallel tracks of work, based on the above referenced DEC document. The first is the planning process track. Watershed planning activities use the grass roots approach and include: holding public forums to identify issues and concerns; forming a Watershed Council and facilitating Council meetings; ranking issues in order of priority; holding panel discussions on watershed topics of interest; formulating strategies to address the issues with the public and the council; developing surface water management goals; and with the public, collaboratively writing the watershed plan. The process also lays the groundwork for implementing projects by: raising public awareness of issues and solutions so that people are engaged and willing to act; bringing potential project partners together; identifying projects; determining funding sources; and coordinating the implementation. Although time-consuming, the planning track is essential to effective project implementation in the second track.

The second track involves on-the-ground watershed assessment, protection, and restoration projects to improve water quality. In addition to traditional biological, chemical and physical water quality monitoring efforts, examples of other assessment-type projects include Phase I and II stream geomorphic assessments that identify physical conditions and health in rivers and streams; bridge and culvert inventories that review the adequacy of these structures for road and stream protection and fish passage; and dam inventories. Protection and restoration projects can include: riparian buffer re-establishment, stream channel restoration and habitat improvement; trash/debris removal; selective dam removal; stormwater and agricultural best management practice implementation; securing easements; educating landowners; and working with municipalities on local protection strategies.

#### Difficulties Encountered

The Watershed Initiative has been part of notable improvements to the water quality of rivers, their tributaries and lakes since the initial years when there were only three Watershed Coordinators. As of December 1, 2009, DEC has a total of 5 Watershed Coordinator positions who continue to be able to accelerate the initiative and put more remedial and protective projects in place. An appreciable amount of federal and state dollars over the past several years have been directly leveraged by grant writing and by the rationale and momentum of the planning process.

Two noteworthy problems continue to affect the river basin and watershed water quality management planning process (these problems were similarly reported in last year's report).

#### Issue #1.

A large challenge encountered in the watershed planning process is that it takes more time than initially anticipated to carry out an inclusive, action-oriented process involving the many stakeholders in a watershed resulting in a watershed water quality management plan that the public will identify with and implement. This truly grassroots effort in some river basins has started from square one as no watershed organization existed. The DEC Watershed Coordinators form a diverse and inclusive watershed council, conduct many public forums and numerous panel discussions to provide the watershed council and other interested persons with the technical information necessary to formulate water quality remediation strategies, the "typing and classification" process, and the information needed for drafting of the management plan.

Although this takes a far greater amount of time than originally scheduled, it is absolutely essential, given the nature of the pollution sources, to have the participation of all stakeholders and landowners who are all responsible for reaching solutions that contribute to the larger goal to restore Vermont's waters. The January 2006 deadline originally required by statute to complete all 17 river basin plans for the entire state has not been met. At current staffing levels, DEC is not able to provide an estimate for when all 17 statutorily mandated river basin water quality management plans will be completed.

#### Issue #2.

The other significant challenge in the watershed planning process is associated with the still-to-be-resolved issue of water management typing.

In response to Act 43 of the 2007 legislative session, ANR provided to the Vermont General Assembly in January 2008 a report entitled "Alternatives to Water Management Typing" and a draft Anti-Degradation Implementation Rule. The report provided some important history and background related to water management typing and included reference to the Anti-Degradation Policy found within the Vermont Water Quality Standards. The report also offered several alternative approaches to typing that rely on the expansion of existing authority (under Anti-Degradation) and the creation of new authority via statute and new classes of waters. These approaches were presented to serve in place of water management typing. As of the date of this report, an agreed upon alternative to or modification of water management typing has not been achieved.

Since the Act 43 Report, ANR has revised the draft Anti-Degradation Implementation Rule and is preparing to go out to various stakeholder groups for comment concerning the draft rule. As noted earlier, the 2009 legislature authorized water management typing work that is underway by two regional planning commissions (Two Rivers Ottauquechee Commission for waters in the White River basin and the Windham Regional Commission for waters drained by the West/Williams/Saxtons rivers. The typing work being done by the two RPCs is scheduled for completion by March 31, 2010. In addition, ANR is currently considering alternatives to typing in conjunction with Vermont Water Resources Panel's Science and Policy Advisory Committee.

#### Details of each River Basin Water Quality Management Planning Process

The table appearing on the following page shows the major components of the basin planning process and their current status by river basin as of October 2009. Following this summary table are the various planning progress reports, one for each basin. Each basin report concludes with a summary of planned actions known or contemplated for 2010.

Table goes here.

## ***Batten Kill, Walloomsac & Hoosic Rivers – Basin 1***

The DEC Watershed Coordinator position that was responsible for river basin planning and certain water quality projects in this drainage area, was laid off in June 2009 as part of the Reduction in Force.

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### **Introduction**

The DEC Watershed Coordinator for the Batten Kill, Walloomsac and Hoosic River was hired in the November 2006. The basin planning process started shortly thereafter. In an effort to solicit community participation the coordinator organized and facilitated 14 initial informal public forums over several months. These public forums provided a platform for identifying community water quality concerns and interests in the waters throughout the basin. More importantly these forums gave community members an introduction to the basin planning program and information on ways for them to actively engage in the basin planning process. Local watershed organizations, community groups and town officials were provided the opportunity to participate in the planning process and individual meetings were scheduled with groups interested in learning more.

At the completion of the public forums, two watershed councils were formed to help guide the basin planning process. These councils continue to act as the lead groups representing the two distinct watersheds present in Basin 1; the Batten Kill and Hoosic River. The Watershed Coordinator designed educational topics for each monthly meeting. During these meetings, council members learned about watershed concerns, scientific studies, programs available for addressing concerns and potential funding sources. The council used this information to draft action orientated recommendations to pro-actively address the water quality concern.

In spring 2008, the DEC Watershed Coordinator organized a panel discussion by ANR personnel. The panel discussion gave the council and community members a chance to meet agency personnel and discuss various program goals. ANR personnel on the panel also reviewed draft recommendations and provided feedback to the council. The meeting created an opportunity to learn from the experts and gather feedback on various draft recommendations. The Watershed Council used previously completed basin plans to identify programs, restoration options and funding sources. Completed basin plans provided guidance to the new council and a mechanism for addressing local concerns.

Numerous projects had been completed throughout the basin 1 area prior to June 2009. A representative sampling of projects include;

Batten Kill Watershed Alliance Twin River Habitat Restoration project implementation.

Phase 3 of the project was implemented with funding from the Clean and Clear program, the Orvis Company and the National Fish and Wildlife Foundation. These funds will be matched with funds from the Green Mountain National Forest to be used on this project and similar habitat restoration operations. The Vermont Fish & Wildlife Department, the Bennington County Conservation District, and the Natural Resources Conservation Service are also project partners.

Battenkill Conservancy and Hoosic River Watershed Association Unassessed Waters Monitoring program was successfully implemented. The organizations partnered to sample waters throughout Basin 1 waters that had not been monitored. The groups gathered macroinvertebrate and chemistry samples from 12 unassessed waters. These samples provided additional information on the condition of waters in the river basin.

The identification of the invasive non-native algae *Didymosphenia geminata*, an invasive freshwater diatom species (microscopic algae) in July 2007 prompted immediate response from ANR. Signs were posted at all the access points throughout the Batten Kill and information for disinfection was provided to local outfitters. Local interest groups worked with the ANR Didymo Task Force to design a sampling and spread prevention program for the Batten Kill watershed. The towns of Arlington and Manchester jointly applied and received DEC aquatic invasive species Grant-in-Aid funding for the implementation of the program. Approximately 20 samples were gathered throughout the Batten Kill watershed. These samples provided information on the distribution of *Didymo* (aka “rock snot”) in the Batten Kill watershed.

### Watershed Initiatives (prior to June 2009)

Activity	Status	Comments/Information
Public forums held	C	14 public forums were held in 2007.
Watershed Council formed	C	Watershed Councils were formed in 2007.
Local water quality (WQ) issues identified	I/O	Local water quality issues started to be identified throughout the basin.
Panel discussions on WQ issues held	C	In May 2008 a panel of ANR employees provided an overview of their programs and answered question from watershed council members
Strategies for WQ issues formulated	I/O	Strategies for major water quality issues will be formulated by the watershed councils.
Review of town plans and zoning	I/O	Town plan and zoning regulations will continue to be reviewed. BCRC is working with the Coordinator to review and prepare a presentation to the council about the current status of the water resource sections of the town plans. This process will allow for BCRC and the Coordinator to make recommendations for future plan revisions to enhance the protection of water resources.
Develop water management type (WMT) classification proposal		.
Meetings with individual towns on the WMT classification proposal		
Draft basin plan	I/O	Draft Basin Plan continues to be developed with the input of council members, agency experts and community officials.
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	I/O	Working with local High School Teachers on a water quality monitoring program and service learning projects.
Basin Assessment Report	C	Report completed in August 2002.
Phase I Stream Geomorphic Assessments	O/C/I	Completed in the Batten Kill in 2004. Walloomsac River completed in 2006. Phase I in the Hoosic completed in 2009.
Phase II Stream Geomorphic Assessments	O/C	Completed for the Batten Kill in 2005. Completed in the Walloomsac River in 2007.
Bridge and Culvert Inventory	O/C	
Dam Inventory		
Biological Monitoring	C	Completed Fall 2008.
Restoration/Protection Projects Underway	O	See table below.

Key: I = initiated, O = ongoing, C = completed

### River & Stream Restoration Projects (prior to June 2009)

Waterway	Water Quality Concern	Current Actions
Twin Rivers Habitat Restoration Project	Habitat Alteration throughout the watershed. Goal of the project is to increase cover and shelter.	The Batten Kill Watershed Alliance, Trout Unlimited, USFS & the DEC partnered to implement the 3rd phase of the habitat restoration.

Batten Kill “Buffers on the Batten Kill Campaign”	Buffers are a key component to maintaining and preserving water quality.	The Southwestern Chapter of Trout Unlimited and Batten Kill Watershed Alliance partnered to develop a list of willing landowners and hold several buffer planting days. Batten Kill Watershed Alliance will implement buffers on various areas.
Didymo Task Force	Invasive freshwater diatom species (microscopic algae) identified in the Batten Kill.	The Batten Kill Watershed Alliance took 20 samples throughout the Batten Kill Watershed Alliance. These samples will provide a detailed understanding of the algae’s distribution in the watershed.

## Conclusion & Plans for 2010

The basin planning process had been launched and was underway in Basin 1. Prior to June 2009, the two watershed councils for the basin 1 area had worked hard to develop draft action orientated recommendation for addressing water quality concerns. The two councils showed progress in developing the strategies for addressing concerns. These strategic recommendations, along with a goal for the management of the waters, will ultimately be included in the draft basin plan.

With the DEC Watershed Coordinator position now terminated, the effort to develop the river basin water quality management plan for Basin 1 waters has been curtailed for an indefinite period.

## **Poultney & Mettowee Rivers – Basin 2**

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### **Introduction**

The Poultney-Mettowee Basin Plan was adopted by the ANR Secretary in February 2005 in accordance with 10 V.S.A. Section 1253(d), the Vermont Water Quality Standards, the Federal Clean Water Act and 40 CFR 130.6. Final printing of the adopted plan has allowed for distribution of the final plan to partners and residents throughout the Poultney-Mettowee Basin. The plan has served as a roadmap to guide projects within the watershed, and it will help to leverage funds to accomplish the goals it sets forth. Approximately two-thirds of the strategies identified in the basin plan have either already been implemented or are in the process of being implemented. The remaining third have not yet been implemented due to the lack of funding and/or other technical resources. Some of these strategies are moving targets and may have changed in their nature or priority.

### **Watershed Initiatives**

Activity	Status	Comments/Information
Public forums held	C	Public forums were held in 2001 and 2002 to identify water quality issues and concerns and also actions in which the participants were most interested
Watershed Council formed	C	Poultney Mettowee Watershed Partnership was expanded to serve the role of watershed council.
Local water quality (WQ) issues identified	C	Public forums, focus group discussions, public attitudes surveys, and other media outreach completed.
Panel discussions on WQ issues held	C	Many formats were used to explore water quality issues, including focus groups, public forums, surveys, and panel discussions.
Strategies for WQ issues formulated	C	Strategies were formulated with extensive public input and are in the Poultney Mettowee Basin Plan.
Draft white papers for WQ issues	C	White papers on specific water quality issues were reviewed during the basin planning process.
Review of town plans and zoning	C	Rutland Regional Planning Commission reviewed town plans and zoning regulations in the Poultney Mettowee Basin as part of an EPA 604b pass-through grant. VLCT did an additional assessment of town plans and zoning regulations in Fall 2006 to update municipal information as part of the 10 VSA 1253 review for water management typing.
Develop water management type (WMT) classification proposal	On-hold	A water management typing and classification proposal for the basin is included in the final plan. A subsequent analysis of potential water management types was conducted as per guidance issued by the Water Resources Panel to ensure a transparent and defensible protocol is used for future typing efforts. However, Panel's guidance proven impractical.
Meetings with individual towns on the WMT classification proposal	C	The watershed coordinator, with assistance from the Poultney Mettowee NRCD and the Watershed Partnership met with representatives from each town in the basin (planning commissions, conservation commissions, and select boards). A subsequent effort to revisit the proposed water management types may need to be undertaken as per additional WMT B1 designations as per WRP guidance.
Draft basin plan	C	Draft released on July 12 <sup>th</sup> for 80-day comment period.
Public hearings on draft plan	C	3 public hearings were held on the draft plan – Aug. 5, Aug. 10, and Sept. 13, 2004

Final basin plan	C	Adopted in February 2005 by Secretary of ANR
Outreach to area schools and local groups	O	Partners engage in continued outreach and involvement with schools and colleges in the basin (Fair Haven Elementary, Poultney Elementary, Mettowee Community School, Castleton State College, and Green Mountain College – Watershed Planning and Bioregionalism classes).
Basin Assessment Report	C	Last assessment report completed in 1999.
Phase I Stream Geomorphic Assessments done	C	ANR Phase 1 geomorphic assessments completed for Poultney, Mettowee, Hubbardton, and Castleton Rivers. Additional Phase 1 SGA is underway for select tributaries to these larger rivers.
Phase II Stream Geomorphic Assessments done	C	Mettowee River phase 2 assessment completed 2007. Phase 2 now completed for Poultney (and select tributaries), Mettowee, and Hubbardton Rivers.
Bridge and Culvert Inventory	C	Culvert assessment in-progress or completed for each town in the Poultney Mettowee basin. Castleton assessment completed via ANR protocols 2005.
Dam Inventory and Assessment	O	Associated with Phase 2 and 3 stream geomorphic assessments in progress to complete dam assessment where appropriate.
Biological Monitoring	O	There are approximately 60 biomonitoring sites that are sampled on a rotational basis throughout the basin.
Restoration/Protection Projects Underway	O/C	Most are agriculturally related streambank restoration sites on farms in the Mettowee and Poultney River basins.

Key: I = initiated, O = ongoing, C= completed

## River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Lake Saint Catherine Little Lake	Thermal modification, sedimentation, nutrient enrichment,	Shoreland outreach and education - BMPs, lake resident outreach and riparian planting project (LEAP), water quality monitoring program, watershed surveying and planning, better backroads projects identified.
Poultney River	Sedimentation, nutrient enrichment, geomorphic instability, elevated levels of pathogenic bacteria	River corridor planning and assessment, riparian buffer planting and livestock exclusion, ongoing water quality monitoring. Municipal stormwater mitigation (2009 - 2010) and LID outreach .
Hubbardton River	Sedimentation, nutrient enrichment, geomorphic instability	Riparian corridor restoration through buffer planting, livestock exclusion, conservation easements, and bio-engineered streambank restoration project.
Castleton River	Ongoing concerns over flooding, stormwater runoff, nutrient enrichment, and sedimentation.	River corridor planning and assessment, draft FEH overlay under consideration for Castleton. River conservation easements and passive river (confluence) restoration project planned.

### Several highlights for 2009 include these ongoing projects throughout the basin:

#### **Mettowee Water Quality Monitoring Program - Microbial Source Tracking project**

Vermont DEC and the US Geological Survey are conducting a cooperative research project aimed at developing methods for addressing the problem of fecal contamination in Vermont waters. In 2007, DEC requested and was granted \$80,000 from the EPA to conduct a study to develop TMDL capacity for bacteria impaired waters, including exploring the use of microbial source tracking. To leverage that grant and to take full advantage of the USGS microbiology lab in Ohio, which has developed advanced technology using genetic markers, DEC entered a partnership agreement with USGS in the spring 2008. Objectives of the original DEC grant with EPA are to:

- Evaluate current methods for microbial source tracking,
- Select and apply one or more of these methods to watersheds with contrasting land uses
- Develop a generic TMDL template for Vermont waters based on the results of these investigations.

The project includes additional *E. coli* sampling under wet and dry conditions, and evaluation of new technologies that may provide evidence for the presence or absence of sources of contamination. During 2009, the focus has been on 2

watersheds: the Poultney-Mettowee Rivers and the Huntington River. These rivers have recurring high levels of *E. coli* bacteria and some concerned local residents are eager to return these rivers to reliably safe multi-use waterways.

Based on 4-5 years of *E. coli* data collected by volunteers in the watersheds, project researchers determined that there are several stations in the Poultney and Mettowee River watersheds that were good candidates for producing positive results (i.e. likely identification of source). These rivers both have more riparian agricultural land and thus would provide a good contrasting land use to the Huntington River (a Winooski River tributary), which is more forested.

### **Lake Saint Catherine – Long Term Assessment and Management Project (Better backroads surveying – in-lake monitoring – LEAP)**

During summer 2009, a water quality committee (sub-committee of the Lake Saint Catherine Association) formed to assist with a Better Backroads survey grant project that was awarded to the town of Wells. These grants offer towns and organizations a proactive approach to addressing road-related erosion problems through planning. These grants require that an area (town, watershed, etc.) first be inventoried for road-related erosion problems (inadequate or damaged culverts, eroding road shoulders, culverts in need of a header, etc.). Once inventoried, erosion problems will be assessed for cost effectiveness and prioritized. This priority list may then be incorporated into a capital budget plan so that each problem area can be systematically corrected over a number of years. The Lake Saint Catherine watershed that lies within the town of Wells has been identified as the highest priority for surveying given concerns over sedimentation and nutrient runoff into the Lake Saint Catherine system.

Additional projects underway to address land run-off issues include the ongoing Lake Education and Action Project (LEAP). LEAP is a project sponsored by UVM Sea Grant, a marine and great lakes initiative funded through NOAA (National Oceanic and Atmospheric Administration). As part of the LEAP project in the Poultney Mettowee Basin, the Lake Champlain Sea Grant youth education and service project is active on Lake St. Catherine, in the Lake Champlain watershed, and involves 6-12 high school age youth and an intern leader. The intern leader program is now a permanent position supported by the Poultney Mettowee Watershed Partnership, Green Mountain College and Lake Champlain Sea Grant. The intern leader coordinates a summer program training youth teams to identify pollution sources, implement remediation measures, run public awareness activities and work with local officials to reduce nonpoint source pollution.

In addition, members of the Lake Saint Catherine Association organized a meeting between USACE representative Jason Shea (Project Manager with the Lake Champlain Basin Study), representatives from Vermont's congressional delegation, to survey current conditions in the Lake Saint Catherine system and discuss programs, funding, research and management alternatives. All attendees were in general agreement that developing a long-term management approach to identify future expectations, goals, and objectives would be a beneficial and necessary step to initiate additional assistance from the Corps.

### **Lake Saint Catherine - Wells Stormwater Tradeshow & Seminar – March 28<sup>th</sup>**

Maintaining the health and well-being of the area's lakes and general water quality was the subject of a workshop and tradeshow held in Wells, Vermont on Saturday, March 28. The event was held at the Wells Village School, and included workshops, displays, trade show vendors, and plenty of take home information about lake water quality and how we can help improve it. The workshops covered on-site septic rules, stormwater (construction site maintenance and LID concepts), wetland – uses/ values and regulations, lakeshore and watershed management best management practices, and water quality topics. This tradeshow targeted contractors (builders) and excavators.

## **Conclusion & Plans for 2010**

Overall, partners in the basin planning process have indicated that collective efforts have been successful in implementing high priority projects that have leveraged technical and financial resources from various partners. Many of the goals and corresponding strategies identified in the plan have been, or currently are being implemented in the areas of nutrient management, water quality monitoring and education, and streambank assessment and restoration. Resources have been allocated to provide additional nutrient management education and outreach services to farmers including education about new technologies and practices, and individual assistance for record keeping and nutrient management plan implementation.

For 2010, the partners involved in the basin planning process are committed to the ongoing implementation of strategies identified in the basin plan. There will be expanded river corridor planning and associated project activities, including additional geomorphic assessment of the tributaries throughout the watershed. Agricultural cooperators will receive increased nutrient management technical assistance, resources, and funding through the Southern Vermont Nutrient Management Program. Coupled with this will be the continued implementation of a pilot program to look at performance based measures and incentives for nutrient management. On-going restoration projects and public education activities are a high priority as well.

Finally, the basin planning process allowed partners to prioritize and implement several restoration projects throughout the basin this year. We have many other potential projects in the works for future restoration efforts. All of these will improve the water quality locally and reduce the phosphorus that reaches Lake Champlain.

## **Otter Creek Basin Progress Report – Basin 3**

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### **Introduction**

During 2009, the DEC Watershed Coordinator continued a project with the **Addison County River Watch Collaborative (ACRWC)** to develop and implement an outreach project based on the long-term water quality data collected by the collaborative since 1992. The ACRWC Education and Outreach Project, funded through a Clean and Clear Watershed Planning Assistance grant, includes a comprehensive assessment of Otter Creek (including the New Haven and Middlebury Rivers, tributaries to the Otter Creek), Little Otter Creek and Lewis Creek water quality conditions to provide greater citizen and community understanding of these conditions that includes watershed specific educational materials to inform protection and improvement activities, and a model for other watershed stewardship groups to follow. The education and outreach component of this project is underway to focus on how municipalities may be able to understand and utilize the data and reports. The DEC Watershed Coordinator has been assisting the ACRWC with project development, funding and implementation.

### **Addison County River Watch Collaborative (ACRWC) Municipal Outreach meetings**

As part of the ACRWC municipal outreach project, ACRWC water quality data was compiled, analyzed and synthesized resulting in the development of outreach materials that have been sent to Addison County towns where many waterbodies have been monitored since 1992. Specific topics of discussion include stormwater runoff issues, high levels of pathogenic bacteria and stream geomorphic assessment information including consideration for fluvial erosion hazard assessment and guidance. ACRWC has been monitoring streams to identify “in stream” problems and areas in need of improvement.

### **ACRPC – Lewis Creek Conservation Planning Presentation**

Partners in the Lewis Creek Conservation Planning Project (in collaboration with local, regional and state partners) presented to the full Addison County RPC for one of their regular monthly meetings in the summer of 2009. Discussion ensued regarding mutual objectives to identify and prioritize conservation lands at a watershed scale that integrate local and state goals and policies. The planning approach developed is friendly to lay people and landowners and may be shared with other Vermont towns. This was an interesting discussion to many town representatives regarding conservation planning in Addison County.

In the **Upper Otter Creek watershed**, the Rutland Natural Resources Conservation District (RNRCD) and ANR continued to sponsor the meetings and activities of the Upper Otter Creek Watershed Council (UOCWC) from the headwaters downstream to the vicinity of the Neshobe River in Brandon. The Council continues to identify the existing and potential causes and sources of pollution that can influence surface waters of the Otter Creek basin. During the 2009 calendar year, the UOCWC organized a meeting with representative organizations throughout the Basin to solicit input and feedback on the draft Otter Creek Basin workplan. A public process followed whereby goals, objectives, and strategies were identified and ranked based on stakeholder concerns as well as ANR monitoring and assessment work.

### **Several highlights for 2009 include these ongoing projects throughout the basin:**

**Moon Brook Corridor Low Impact Development Education & Improvement Project** – The purpose of this project (funded by Vermont Conservation License Plate) is to initiate an education and outreach campaign/program targeted at the Moon Brook watershed residents in Rutland City. Using information from the River Corridor Plan (Nealon and Sullivan 2008) and the Moon Brook Total Maximum Daily Load to address biological impairment in Moon Brook, educational materials will be developed and watershed restoration projects promoted. Simple

stormwater reduction and watershed restoration projects will be demonstrated throughout the watershed to give residents a better understanding of how these practices can be applied on their property. These demonstration/ educational projects include rain garden installations, rain barrel construction, a riparian buffer planting and a scoop the poop campaign. Educational information will be created and distributed through mail stuffers in city wide water/ tax bills to landowners in the Moon Brook watershed in an effort to educate residents on and encourage the use of these water quality improvement practices. Projects are modeled after similar successful projects completed in other states (i.e. “scoop the poop” campaigns). This education and outreach campaign is supported both by in-kind services and monetary support from Rutland City and by technical support from state and regional agencies as well as from the Upper Otter Creek Watershed Council.

**The Goshen “Safe Roads and Clean Water” Project** is a municipal project to decrease maintenance of roads and improve water quality and trout habitat. The Neshobe River located in the towns of Goshen (headwaters) and Brandon is a tributary to the Otter Creek. This project (funded under the Section 319 nonpoint source pollution program) provided culvert replacement, the stone lining of ditches, installation of rock aprons, plunge pools, and culvert headwalls which will decrease sedimentation, salinity, and nutrient enrichment by decreasing particulate matter in runoff that enters the stream. This, in turn, will improve water quality and aquatic habitat for trout which should enhance fish populations in all affected waters downstream. The improvements will also decrease the cost of maintaining this portion of road in the future. The overall goal of the project is safe roads and clean water in Goshen.

**Otter Creek River Front Committee & Middlebury Stormwater Mitigation Project** - The Marbleworks facility and surrounding development represents a significant impervious area that is currently draining unabated via stormwater infrastructure into the Otter Creek in downtown Middlebury. Through the installation of low-tech and lay friendly bio-infiltration/ retention practices such as rain gardens, project partners anticipate diverting existing stormwater surface runoff and partially treating this runoff before it flows into the Otter Creek. By correcting drainage problems and properly retaining the surface runoff, the objective is to mitigate the excessive hydro-modification that occurs due to stormwater runoff. These BMP practices (constructed wetland, large rain garden, and other bio-retention practices) will decrease sedimentation, nutrient enrichment, and pathogenic bacteria by decreasing particulate matter in runoff that enters the Creek. This, in turn, will improve water quality and aquatic habitat for trout which should enhance fish populations in all affected waters downstream. The overall goal of the project is project to decrease stormwater runoff to improve water quality, trout habitat, and enhance public access to the Middlebury Falls on the Otter Creek and promote the use of low-tech stormwater BMPs for residential development.

In addition, this project will have significant educational and demonstration value given the high degree of visibility at this area, including a large picnic area and prominent foot bridge that crosses the Otter Creek at the proposed site. Appropriate signage is proposed to draw attention to the stormwater and the simple practices that homeowners can undertake to mitigate stormwater runoff migrating off of individual properties. Finally, we have envisioned the potential research potential at this location to try and quantify the amounts and constituents of stormwater runoff that could potentially be mitigated from the installation of the proposed bio-retention practices. In order to accomplish this, comprehensive surveys and a detailed elevation analysis will need to be conducted to identify drainage patterns.

**Otter Creek Hydroelectric Project – Relicensing by the Federal Energy Regulatory Commission (FERC)** - FERC is conducting National Environmental Policy Act (NEPA) scoping on the anticipated license application for the Otter Creek Hydroelectric Project located on the Otter Creek mainstem in Addison and Rutland Counties. The Watershed Coordinator reviewed the Otter Creek Wasteload Allocation Study (1979), the most recent 401 certifications for the project and assisted DEC/FED-Dams Safety and Hydrology Section in providing preliminary water quality monitoring plans for sampling this summer prior to water quality studies and assessments.

**ACRWC – Presentation of Long-Term Analysis of Water Quality Monitoring** - The final analysis of long-term, water quality monitoring data was presented at a recent meeting of the Addison County River Watch Collaborative for the 6 sub-basins where ACRWC volunteers have been monitoring since 1992. In providing these assessments for the 6 watersheds and understanding the differences and relationships that can be made, we will soon embark on a series of public presentations and meetings with municipal officials regarding steps that can be taken to lessen and/ or eliminate the impacts and stressors affecting these systems. The analysis and subsequent outreach materials that have been subsequently developed were funded through a Watershed Planning Assistance grant that was coordinated between the Collaborative (and their consultant) and DEC.

**Draft Basin Plan Development & Planning Process** - The *draft* Otter Creek Basin Plan is anticipated to be available for review by January 2010. Independent sections of the plan have been developed and reviewed as issue papers with partner collaboration and input. Once the initial draft has been reviewed internally within ANR, the document will be released to all partners for review in order to initiate the public process leading towards plan approval.

A comprehensive list of Existing Uses for swimming, fishing, and water supply surface waters for the draft Otter Creek Basin Plan has also been drafted and reviewed for inclusion in the draft basin plan. The Agricultural section of the draft plan has been reviewed by the Agency of Agriculture and will be incorporated into the draft plan. The draft basin plan is anticipated to be released for public review in late autumn or early winter.

In general, the Watershed Coordinator will continue to participate in the meetings and activities of many organizations in the Basin as a way to support this existing stewardship and to incorporate strategies related to these efforts into the Otter Creek Basin Plan.

## Watershed Initiatives

Activity	Status	Comments/Information
Public forums held	C	A series of public forums were held in Rutland County in the winter of 2003 and in Addison County during the spring of 2004.
Watershed Council formed	C	Upper Otter Creek Watershed Council was formed in the spring 2003. Existing watershed groups are established in the Addison County portion of the basin. Basinwide agricultural work group meets quarterly.
Local water quality issues identified	C	Major WQ issues have been identified through public forums. Recently, a public attitudes survey was developed and will be implemented in Addison County.
Panel discussions on water quality issues held	C	Several panel discussions were held throughout the basin in 2004, 2005, and 2006.
Strategies for water quality issues formulated	C	UOCWC, basin-wide advisory committee, agricultural work group, and various stakeholders continue to develop & review draft strategies to address WQ issues.
Draft white papers for water quality issues	C	Issue papers for priority WQ concerns identified thus far are currently being drafted and reviewed.
Review of town plans and zoning	C	Completed for Rutland County. Completed as a 2006 604b grant project for Addison County RPC.
Develop water management type (WMT) classification proposal	On-Hold	To be determined.
Meetings with towns on the WMT classification proposal	On-Hold	The Addison and Rutland RPC's had been assisting in this effort. However, the status of WMT has yet to be determined.
Draft basin plan	O	A rough draft plan has been developed with anticipated review and revisions to occur in 2009.
Public hearings on draft plan	I	Anticipated in early 2010.
Final basin plan		
Outreach to area schools and local groups	O	Partners engage in outreach and education with schools and colleges in the basin (Smokey House Center, Currier School, Success School, Rutland High School, Stafford Tech Center, North Branch School, Middlebury High School, Middlebury College, Mount Abraham Union HS, Champlain Valley Union HS, The Watershed Center, UVM, CCV, and Patricia A. Hannaford Career Center).
Basin Assessment Report	C	The last assessment report was completed in 1998. An updated assessment report is anticipated.
Phase I and II Stream Geomorphic Assessments	O/C	Phase 2 underway or completed on the mainstem of the Otter Creek (select reaches), Cold River, East Creek, Leicester River, Lemon Fair River, Lewis Creek, Little Otter Creek, Mill River, Moon Brook, Neshobe River, New Haven River, and the Middlebury River.
Bridge and Culvert Inventory	O/C	AOT culvert assessments have been completed for most towns in the Rutland County portion of the Otter Creek basin and about half the towns in Addison County.
Dam Inventory	O	Some dam assessment as part of Phase 2 SGA
Biological Monitoring	O	There are approximately 100 biomonitoring sites that are sampled on a rotational

		basis throughout the basin.
Restoration/Protection Projects Underway	I/O/C	See table below.

Key: I = initiated, O = ongoing, C = completed

## River and Stream Restoration Projects

The DEC watershed coordinator has collaborated on multiple projects and/or grants leading to projects, often for multiple years and funding cycles with partners in the basin since 2001. These grant types include EPA pass-through grants (319 and 604b), competitive watershed grants (Lake Champlain Basin Program, UVM-Sea Grant), foundations (Vermont Community Foundation, Musser, NFWF), and state grant programs (conservation license plate, LaRosa Laboratory Grants for Analytical Services, and the River Management Program – River Corridor Grants through Clean and Clear). Examples include:

- Upper Otter Creek geomorphic assessment on Cold and Mill Rivers (underway)
- River Corridor Planning underway for the Moon Brook and Mill River
- Assessment of biological, chemical, and physical condition of waters (ongoing)
- Mussey Brook Alternatives Analysis (completed) – Project development underway
- Outreach and enrollment of riparian landowners in USDA-NRCS cost share programs, especially where CREP can be combined with CRP (underway)
- WHIP projects – developed collaboratively with USDA-NRCS and RNRCD
- Lewis Creek Stark Valley Corridor Planning Project (underway)
- New Haven River Corridor Management Planning and FEH development (completed)
- Tenney Brook Restoration Project (initiated – on-hold)
- Otter Creek Wetlands Restoration (Pittsford – completed)

**Upper Otter Creek – Phase 2 Stream Geomorphic Assessment Results** - The Stream Geomorphic Assessment (Phase 2) of the Upper Otter Creek (and significant tributaries) was presented to the Wallingford Conservation Commission and members of the public. Round River Design found that the main stem of the Upper Otter Creek has been significantly impacted by historic channel straightening and floodplain encroachment by railroad tracks, roads, and commercial and residential development. In response to these and other watershed stressors, the Upper Otter Creek is undergoing varying degrees of channel adjustment, predominately planform (or lateral migration), widening, and aggradation. In short, the Danby, Wallingford, Rutland City, Rutland Town, Proctor, and Pittsford communities have the opportunity to provide long-term protection to the river corridor and encourage the reestablishment of functioning floodplain and healthy in-stream habitat through river corridor management, protection, and restoration.

**Middlebury River Corridor planning meeting** - The Middlebury River Corridor planning group has been meeting during 2009 to discuss and review project packets for each of the top 10 projects and for prioritization. The projects are intended to address erosion hazards and potential conflicts on the Main Stem and Middle Branch of the Middlebury River. High priority areas of concern include the development of the alluvial fan area in East Middlebury, development at the confluence of the Middle and South branches in Ripton, and roads, particularly Route 125, adjacent to the river. This conservation plan recommends focusing restoration resources in these areas as a priority for minimizing erosion hazards in the long term. Minimizing conflicts along the mainstem in Ripton and identifying attenuation assets upstream of Ripton village were identified as the highest priority projects. The town of Ripton just recently adopted a Fluvial Erosion Hazard overlay district as a stand alone ordinance to guide future development in sensitive riparian areas as well as to avoid areas susceptible to fluvial erosion. The Corridor planning committee consists of WQD staff, Addison County RPC staff, landowners, and municipal officials from Ripton and Middlebury.

### Ongoing, long-term river restoration projects include:

Waterway	Water Quality Concern	Current Actions
Otter Creek mainstem	Sedimentation, nutrient enrichment, high levels of pathogenic bacteria. Diminished flows through bypass reaches of hydro facilities.	Numerous agriculturally-related streambank and buffer restoration projects on farms in the watershed. Stormwater runoff remediation projects implemented in Middlebury and Rutland.

Moon and Mussey Brooks East Creek (Rutland)	High levels of pathogenic bacteria, sedimentation, nutrient enrichment, urban (stormwater) impairment due to runoff, thermal modification, and low dissolved oxygen levels resulting from impoundments and hydro operations (East Creek)	Watershed improvement projects underway with Rutland City – river corridor planning and project identification (underway). Public outreach and awareness underway for residents of the Moon/Mussey watershed. Stormwater runoff remediation project implemented in Rutland.
Middlebury River	High levels of pathogenic bacteria, sedimentation, nutrient enrichment, impairment due to agricultural runoff	River corridor planning process underway. Riparian corridor restoration through buffer planting, livestock exclusion, AG land taken out of production along riparian corridor. Passive river restoration (conservation) project planned in east Middlebury.
New Haven River	Geomorphic instability, flooding, historic channel modification threatens transportation infrastructure	New Haven River Corridor Plan completed, floodway determination, bridge and culvert assessment associated with transportation upgrades. FEH development completed for Lincoln town. River corridor planning underway for town of Bristol.
Lewis Creek	Nutrient enrichment, sedimentation, geomorphic instability, historic channel modifications	Lewis Creek corridor planning underway, water quality monitoring, riparian corridor planning/ protection project, outreach with towns in the watershed, CREP. River Corridor Plan completed for Stark Valley – associated projects in planning and implementation phase.
Little Otter Creek	High levels of pathogenic bacteria, nutrient enrichment, historic channel modification	Outreach to agricultural cooperators for buffer planting, livestock exclusion, NRCS cost-share programs, water quality monitoring ongoing.

## Conclusion & Plans for 2010

Overall, the planning process has provided many opportunities for collaborative problem solving among stakeholders. Collaboration will be essential for future, successful restoration efforts throughout the Otter Creek Basin.

For 2010, stakeholders and water quality issue groups will review the Otter Creek Basin Plan and begin to plan for strategy implementation and other project and assessment activities that have been incorporated into the Otter Creek Basin Plan to address major issues and opportunities. Major topics that are being addressed by working groups will include agriculture, transportation infrastructure (bridge and culvert effects on streams and gravel road erosion), riparian corridor protection, and suburban and urban runoff (stormwater). The Upper Otter Creek Watershed Council as well as existing watershed groups in Addison County will pursue ongoing watershed improvement projects, water quality monitoring, geomorphic assessment, municipal planning opportunities, and public outreach, education, and awareness. Based on assessment, monitoring, and public participation, the highest-ranking projects and activities will be pursued for funding and implementation.

## **Lower Champlain Direct Progress Report – Basin 4**

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### **Introduction - The South Lake Group**

Partners in the Poultney and Mettowee River Basins as well as the Lower Champlain Direct drainage have been meeting regularly as the “South Lake Group,” (a subset of the Lake Champlain Citizens Advisory Committee) to discuss issues and develop strategies for issues ranging from aquatic invasive species to phosphorus load reductions. Several resolutions regarding the South Lake initiative have been submitted to the Lake Champlain Citizens Advisory Committee for consideration. The group has expanded to include the entire South Lake (South Lake “A” and “B”) and has included partners on the New York side of the Lake as well.

A series of meetings were convened to present an overview of several ANR and AAFM programs and activities that have been implemented in the greater South Lake area in order to inform South Lake Group members of existing resources and assistance. In anticipation of the development of a workplan, meetings provided information on agricultural resource programs, river basin planning, stormwater management, river corridor planning and management, wetlands protection, and better backroads management.

An anticipated inventory of assessment information for the southern Lake Champlain river basins should serve as the foundation for continued development of a workplan and water quality management plan for the South Lake. The research assessment will provide greater the South Lake Group greater focus and direction on priority issues affecting the South Lake.

Other participants in the “South Lake Group” include representatives from The Nature Conservancy (Southern Lake Champlain Valley Chapter), Lake Champlain Committee, Lake Champlain Restoration Association, Lake Bomoseen Association, the Champlain Watershed Improvement Coalition of New York, the Poultney Mettowee NRC, and DEC Water Quality Division.

### **Watershed Initiatives**

Activity	Status	Comments/Information
Public forums held	I	Initial public forums are anticipated to be held during the winter and spring of 2008 - 2009
Watershed Council formed	I	The South Lake Group was expanded to serve the role of watershed council.
Local water quality (WQ) issues identified	I	Through public meetings and stakeholder groups.
Panel discussions on WQ issues held	O	Several presentations and programmatic overviews were used to explore water quality issues
Strategies for WQ issues formulated		Initial stages
Draft white papers for WQ issues		Initial stages
Review of town plans and zoning	C	The Rutland Regional Planning Commission reviewed town plans and zoning regulations in the Poultney Mettowee Basin as part of an EPA 604b pass-through grant. VLCT did an additional assessment of town plans and zoning regulations in the Fall 2006 to update municipal information as part of the 10 VSA 1253 review for water management typing. The Addison County Regional Planning Commission also conducted a review of town plans in Addison County.

Develop water management type (WMT) classification proposal		
Meetings with individual towns on the WMT classification proposal		
Draft basin plan	O	South Lake Workgroup has undertaken development of South Lake Work Plan. (Note: work plan lacks required content elements so is not a river basin water quality management plan).
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	O	Partners engage in continued outreach and involvement with schools and colleges in the basin (Fair Haven High School), Castleton State College, and Green Mountain College – Watershed Planning and Bioregionalism classes).
Basin Assessment Report	I	
Phase I Stream Geomorphic Assessments done	C	ANR Phase 1 geomorphic assessments completed for Poultney, Mettowee, Hubbardton, and Castleton Rivers. Additional Phase 1 SGA is underway for select tributaries to these larger rivers. Phase 1 SGA initiated for larger tributaries in the Lower Champlain Direct.
Phase II Stream Geomorphic Assessments done	C	Mettowee River phase 2 assessment completed 2007. Phase 2 now completed for Poultney (and select tributaries), Mettowee, and Hubbardton Rivers.
Bridge and Culvert Inventory	C	Culvert assessment in-progress or completed for each town in the Poultney Mettowee basin. Castleton assessment completed via ANR protocols 2005.
Dam Inventory and Assessment	O	Associated with Phase 2 and 3 stream geomorphic assessments in progress to complete dam assessment where appropriate.
Biological Monitoring	O	There are approximately 60 biomonitoring sites that are sampled on a rotational basis throughout the basin.
Restoration/Protection Projects Underway	O/C	Most are agriculturally related streambank restoration sites on farms in the Hubbardton, Mettowee and Poultney River basins.

Key: I = initiated, O = ongoing, C = completed

### **Other watershed initiatives include:**

**EPSCoR – Private Sector Proposal** - Partners in the South Lake planning process developed a proposal for the EPSCoR Private Sector RFP to conduct a “South Lake Champlain Basin Water Monitoring and Stream Geomorphic Assessment Project.” The overall objective of this project is to determine if rapid geomorphic assessment (RGA) scores are linked to phosphorus concentrations and loads during typical storm events using water total phosphorus concentrations in the South Lake Champlain Basin. The secondary objective is an analysis of whether watershed land use or near stream land use has a greater impact on phosphorus loads and if soil test phosphorus (STP) appears to influence this relationship. The study (if funded) will also be used to look for locations and conditions in the watershed where conservation practice implementation or stream restoration would likely have the greatest impact in reducing phosphorus loads in South Lake, an impaired lake segment identified in the Lake Champlain Phosphorus TMDL as a high priority for restoration. By collecting data at the sub-watershed and whole watershed scale, we hope to explore the effects of land use alteration and geomorphic condition on the overall sediment and phosphorus load. Partners include the Poultney Mettowee NRC, Round River Design, USDA-NRCS, and ANR.

### **Conclusion & Plans for 2010**

Overall, the planning process has provided many opportunities for collaborative problem solving among stakeholders. Collaboration among stakeholders is viewed as essential for future, successful restoration efforts throughout the Southern Lake Champlain Basin.

For 2010, stakeholders and water quality issue groups will refine the South Lake workplan and submit this for consideration as a component of the revised Lake Champlain TMDL Implementation Plan. Following a broader vetting via the Lake Champlain Citizens Advisory Committee, the 2010 Vermont Legislative session, and a comprehensive public process, South Lake workgroup partners will begin to plan for strategy implementation and other project and assessment activities that have been incorporated into the South Lake workplan to address major issues and

opportunities. Major topics that are being addressed by working groups will include agriculture, transportation infrastructure (bridge and culvert effects on streams and gravel road erosion), riparian corridor protection, and suburban and urban runoff (stormwater). The various partners in Addison and Rutland Counties will pursue ongoing watershed improvement projects, water quality monitoring, geomorphic assessment, municipal planning opportunities, and public outreach, education, and awareness. Based on assessment, monitoring, and public participation, the highest-ranking projects and activities will be pursued for funding and implementation.

## Northern Lake Champlain Basin - Basin 5

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### Introduction

A watershed council for this drainage area met for the first time on April 29, 2003. The DEC Watershed Coordinator and the watershed council committed themselves to developing the watershed plan and assisting in the implementation of watershed restoration projects. The council supported the Coordinator's proposal to hold three public meetings to identify the most prominent concerns of the affected communities. The council also agreed that local groups would develop the first draft of strategies for each of the community's concerns.

The watershed council agreed to the Agency's proposal that the watersheds of the Rock and Pike Rivers would be included in the Missisquoi River Basin planning process and not in that of the Northern Lake Champlain Basin. The Franklin County Natural Resource Conservation District also met with the Missisquoi River Basin Association to discuss this option and the group agreed with this approach. The Rock and Pike Rivers' communities are closely tied with the communities of the Missisquoi River watershed and landscape.

The Watershed Coordinator began working with local groups to develop strategies for restoring and protecting water quality along tributaries to Lake Champlain in 2004. An interim plan was completed in 2008 without a chapter on establishing water management goals, including the typing and classification proposal. The final draft plan was signed by the ANR Secretary in October. ANR is waiting for the Vermont Water Resources Panel to develop new guidelines for typing and classifying waterbodies.

The Agency and watershed partners have been involved in strategy implementation since 2005. In addition, the Agency's Clean and Clear Center has initiated and implemented projects in Basin 5. The 2008 Clean and Clear Work Plan, which guides the Center's work, includes strategies developed during the Basin 5 planning process.

### Watershed Initiatives

Activity	Status	Comments/Information
Public forums held	C	Forums were held in Shelburne, Colchester, North Hero, and St. Albans
Watershed Council formed	C	A diverse task force was formed and is assisting in the development of a draft watershed plan
Local water quality issues were identified	C	Top issues in the basin include: nuisance aquatic species, urban/suburban runoff, drinking water supply quality, farming issues, streams, causeways
Discussions on water quality issues held	C	Presentations and roundtable discussions were held in different parts of the basin in the spring and summer of 2003
Strategies for water quality issues were formulated	C	Strategies were developed with local groups and then reviewed and revised by the watershed council. Strategy development took place during 13 meetings.
Review of town plans and zoning	C	Town plans were completely reviewed for Chittenden and Franklin counties
Develop water management typing (WMT) and classification proposal		To be determined once a proposed process is finalized.
Meetings with individual towns on the WMT classification proposal		

Draft basin plan	C	The draft basin plan has been completed. Signed as approved by DEC and ANR in October 2009.
Public hearings on draft plan	C	Public hearings were held in South Hero, Hinesburg on and South Burlington.
Final basin plan		To be determined.
Outreach to area schools and local groups	O	Groups with which we are working include La Platte River Partnership and St. Albans Area Watershed Association. Letters have been sent to all town officials in the basin. Articles have appeared in local newspapers.
Basin Assessment Report	C	Basin assessment report completed in December 2003.
Phase 1 and 2 Stream Geomorphic Assessments	I/C	Geomorphic assessments have begun or been completed on 15 streams. See Stream Geomorphic data base for complete list: <a href="https://anrnode.anr.state.vt.us/ssl/sga/security/frmlogin.cfm">https://anrnode.anr.state.vt.us/ssl/sga/security/frmlogin.cfm</a>
Bridge and Culvert Inventory	O	Inventories have begun.
Dam Inventory	C	
Biological Monitoring	C	Additional waters have been identified & macroinvertebrates sampled to determine long-term water quality trends of specific waters.
Restoration/Protection Projects Underway	I	Numerous protection and restoration projects are underway throughout the watershed (see below).

Key: I = initiated, O = ongoing, C= completed

## 2009 River & Stream Restoration Projects <sup>2</sup>

Waterway	Water Quality Concern	Current Actions
Northern Lake Champlain Basin	Nutrients, sediment, hydrology	Provided education on lake-friendly lawn care including distribution of "Don't P on your lawn and other lake-friendly lawn care practices" brochure with partners, coordinated display at garden show.
St. Albans Bay via Stevens Brook	Nutrients	Assisted watershed group with a phosphorus-free fertilizer rebate program and lawn sign educational program.
Northern Lake Champlain Basin	Nutrients sediment hydrology	Provided LID stormwater treatment education including funding rain garden contest, and gravel wetland restoration project, wrote newspaper article on rain barrels; organized and gave three stormwater education/ rain barrel workshops (45 barrels sold) and assisted with artistic rain barrel display
Potash Brook	Nutrients sediment hydrology	Assisted with developing city disconnect program and residential stormwater education including encouraging the use of rain barrel, rain gardens.
LaPlatte River	Nutrients sediment, hydrology	Assisted with neighborhood education project and planning of stream stabilization project
Lake Iroquois	Nutrients sediment	Assisted lake assoc. with planning and project development
Thorp Brook	Nutrients, sediment	Continued assist and fund watershed group monitor WQ project.

## Conclusion & Plans for 2010

In 2010, the focus will be on continuing project development and completion, including securing grants; continuing collaboration with all partners on priority issues; and conducting ongoing education and outreach with residents of the watershed.

<sup>2</sup> Projects assisted by the watershed coordinator between 2004 and 2007 can be found in previous basin planning reports to the legislature

## **Missisquoi Bay - Basin 6**

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### For more information:

Refer to Clean and Clear Action Plan (May 2008).

Refer also to Clean and Clear web site (<http://www.anr.state.vt.us/cleanandclear/>).

## **Introduction**

Public concern over water quality in Missisquoi Bay remains high. The general public, as well as local, state, and federal agency representatives, actively participated in the basin planning process that occurred for much of 2008. The Missisquoi Bay Watershed Council had worked to finalize a list of water quality strategies for inclusion in the river basin water quality management plan. The offices of the Secretary of the Agency of Natural Resources and the Deputy Secretary of the Agency of Agriculture participated in the Council's deliberations.

In addition to basin planning meetings and projects, the DEC Watershed Coordinator worked on implementing water quality improvement projects in the watershed, including a stream and wetland restoration project on the main tributary to Lake Carmi. The Watershed Coordinator provided technical support for local watershed groups as they prepared priority action lists, carried out water quality monitoring, and implemented various projects. The Coordinator continued regular contact with local media regarding meeting schedules, implementation activities, and particular issues of interest. The Coordinator supported visits to the drainage area by the Center for Clean and Clear (CCC) Director and also helped with revisions to the CCC work/action plan.

The CCC was established in May 2007 to enhance Vermont's commitment to improve water quality in Lake Champlain by placing resources dedicated to improving water quality in the lake - resources that were spread through many state programs - under a single director. The CCC has established both a functional structure and a physical location that has resulted in strong lines of communication across programs, departments, agencies and organizations. The lead agencies within the CCC - those of Natural Resources and Agriculture, Food and Markets - have formed a core group to ensure a coordinated, collaborative approach, calling on our partners and reaching out to broad public and private constituencies. The CCC is continuing to work cooperatively to tackle the enormous challenges of nonpoint source pollution in order to improve water quality, ensure economically and environmentally sustainable agriculture and enhance recreational opportunities.

In establishing the CCC, ANR and AAF&M also recognized that in order for there to be meaningful progress, a concerted effort had to be applied in the watersheds most acutely affected by nutrient overloading. Nowhere are the problems associated with nonpoint source phosphorus pollution more acute than in the northern-most portions of Lake Champlain. In its May 2008 work plan, the CCC laid out its approach for addressing phosphorus pollution in the northern watersheds draining to the lake - including lands emptying to Missisquoi Bay, St. Albans Bay, the Northeast Arm and the Champlain Islands (ie Grand Isle County). This work plan drew from a list of priority watershed actions developed by the Missisquoi Watershed Council and met with the Council to solicit further input as the work plan was developed.

Lastly and before leaving his position in August 2008, the DEC Watershed Coordinator supported the Missisquoi River Basin Association's work to designate parts of the Missisquoi River and some of its tributaries under the National Park Service's Wild and Scenic river system. The Vermont Congressional delegation introduced legislation in both the US Senate and House to initiate an eligibility study, which would be the next step in the wild and scenic

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<sup>3</sup> The DEC Watershed Coordinator position became vacant in August 2008. The vacant position was eliminated in 2009.

process. The legislation was authorized by Congress in 2009. Local representatives are to participate in a steering committee overseeing the study. If the study supports designation of some or all proposed river reaches, the affected towns will have the opportunity to vote on any proposed designation before Congress completes the process.

## Watershed Initiatives

Activity	Status	Comments/Information
Public forums held	C	Six forums held in January & February 2005.
Watershed Council formed	C	First meeting in April 2005. Membership formalized in October 2006. Watershed council idle since August 2008.
Local water quality (WQ) issues identified	C/O	Identified at public forums. Discussion ongoing by CCC.
Panel discussions on WQ issues held	C	Panel discussions held on phosphorus, septic systems, education, agricultural issues, fish and wildlife, and river corridor management.
Strategies for WQ issues formed	O	Draft strategies developed with watershed council.
Review of town plans and zoning	O	With assistance from the Northwest RPC.
Develop water management type (WMT) classification proposal		On hold due to deliberations of the Water Resources Panel.
Meetings with individual towns on the WMT classification proposal		
Draft basin plan	I	Sections had been development prior to 8/08.
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	O	CCC is working with existing organizations.
Basin Assessment Report	C	Basin assessment report completed November 2004.
Phase I Stream Geomorphic Assessments	C/O	Completed in all of Franklin and Orleans Counties.
Phase II Stream Geomorphic Assessments	O	Underway in select rivers and streams, with guidance from Watershed Coordinator.
Bridge and Culvert Inventory	C/O	Completed on some reaches in Franklin & Orleans Counties.
Dam Inventory		
Biological Monitoring	O	Included in 2004 rotational program.
Restoration/Protection Projects Underway	C/O	

Key: I = initiated, O = ongoing, C= completed

## **Lamoille River – Basin 7**

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### **Introduction**

DEC's Watershed Coordinator and watershed partners have developed a draft water quality improvement plan for the Lamoille River watershed. A series of public meetings were held in fall of 2008 to solicit public input to the plan. The draft plan outlines the top water quality priorities for the watershed, the sources of pollution, and the specific actions to address these issues including planning, monitoring and assessment, protection, and restoration strategies. More than half of the actions items identified in the draft Plan have been initiated or completed.

### Assessment & Monitoring

Additional physical, chemical, and biological monitoring and assessment activities in the Lamoille's lakes, ponds, and streams occurred because of the watershed initiative. Phase 1 and 2 geomorphic assessments were completed or are underway in the following sub-watersheds: Browns River, Gihon River, Centerville Brook, North Branch, Elmore Branch, Wild Branch, and entire Lamoille main stem. Geomorphic assessment work has been administered by the Lamoille Regional Planning Commission and Caledonia NRCDC, subcontracted out to private consultants and managed by the DEC River Management Program. Macroinvertebrate sampling has been completed for the Lamoille River, Gihon River, Unnamed tributary to the Brewster River, Rodman Brook, and the Wild Branch. In 2008, Johnson State College initiated phosphorus sampling and E. coli source tracking at over 20 sites in major sub-watersheds with the EPSCoR program. This program has continued in 2009.

### Urban-related Runoff Restoration & Outreach

Numerous watershed restoration projects were identified and implemented during the 2009 field season. The Watershed Coordinator assisted the Town of Walden in the remediation of 2 road-related erosion projects with Better Backroads grant funding. The Coordinator is working with the Lamoille River Anglers Association, the Vermont River Conservancy, DEC River Management Program, and a salvage yard owner to remove junk cars from the Lamoille River streambank and establish a riparian buffer there. The Coordinator is also working closely with US F&W, Lamoille NRCDC, and UVM Sea Grant program to install rain gardens, check dams, and stone lined ditching to address runoff and erosion entering a pond on the Lamoille Union High School campus.

### Agriculture & Logging-related Restoration & Outreach

The Watershed Coordinator assisted the Caledonia, Winooski, and Lamoille NRCDCs in the establishment of riparian buffers at several sites along the Lamoille River and Browns River. (Also see Impaired Waters Remediation) The Coordinator, Lamoille NRCDC, and VT DFPR launched a new innovative initiative called the Portable Skidder Bridge Project that makes available 4 portable skidder bridges to watershed loggers and foresters, reducing erosion at logging stream crossing sites. The portable skidder bridges continue to be rented out year round.

### Impaired Waters Remediation

The DEC Watershed Coordinator and watershed partners have initiated watershed restoration and inventory activities in the impaired Browns River watershed. Working closely with the DEC River Management Program, the Winooski NRCDC, and watershed landowners, the Coordinator began the work of identifying watershed restoration and protection projects prioritized in the recently completed Browns River Corridor Management Plan. Partners are currently working with landowners and submitting funding proposals for fish passage improvement projects for stream crossings, expanding riparian forest buffers and filter strips along agricultural lands, reducing erosion from municipal roads, restoring wetlands, and excluding livestock from waterways. An Agriculture and Water Quality workshop and field trip for small farmers was held in October 2009. DEC has also submitted funding proposals to prepare a River Corridor Management Plan for the impaired Mill Brook watershed.

## Lakes & Ponds

The DEC Watershed Coordinator provided technical assistance to the Friends of Zack Woods and Morrisville Water and Light Department in securing funding and implementing erosion control measures that reduced erosion entering these otherwise pristine waters. Coordinator also applied for a Forest Legacy grant to acquire and protect hundreds of acres of land and 7 ponds adjacent to Green River Reservoir.

## **Watershed Initiatives**

Activity	Status	Comments/Information
Public forums held	C	Eight public forums were held at the onset of basin planning. Three additional forums were held for the release of the draft basin plan
Watershed Council formed	C	A diverse task force was formed and assisted DEC in the development of a draft watershed plan
Local water quality (WQ) issues identified	C	Top local water quality issues include stormwater, streambank erosion and flooding, agricultural runoff, loss of working farm and forestland, lake and pond issues, and dam-related issues
Panel discussions on WQ issues held	C	A series of panel discussions was held for each of the top water quality issues
Strategies for WQ issues formed	C	The strategies are written.
Review of town plans and zoning	C	Completed
Develop water management type (WMT) classification proposal	C	A WMT proposal was developed based on existing, reasonably attainable, and desired water quality.
Meetings with individual towns on the WMT classification proposal	C	The watershed coordinator conducted over 40 meetings with select boards, planning commissions, and conservation commissions.
Draft basin plan	C	A draft basin plan has been developed. Draft plan approved by DEC and ANR in October 2009
Public hearings on draft plan	C	Completed in 2008
Final basin plan		
Outreach to area schools and local groups	O	Educational programs presented to loggers and foresters in the Portable Skidder Bridge project, Better Backroads Roads and Rivers Workshop, Laraway School students, Lamoille Valley Farm and Forest Initiative Workshop, YCC crew members, landowners, and municipalities.
Basin Assessment Report	C	Completed February 2001.
Phase 1 Stream Geomorphic Assessments	C/O	Phase 1 geomorphic assessments completed in the upper Lamoille, the entire Lamoille mainstem, the Wild Branch, Elmore Branch, Gihon River, Browns River, North Branch, lower Lamoille, and many smaller tributaries.
Phase 2 Stream Geomorphic Assessments	C/O	Phase 2 geomorphic assessments have been completed in the upper Lamoille, Browns River, Gihon, Centerville Brook, Lamoille River, Elmore Branch, and Wild Branch sub-watersheds.
Bridge and Culvert Inventory	C	Bridge and culvert surveys have been completed in the entire upper Lamoille watershed except for some smaller tributaries.
Dam Inventory	C	A dam inventory has been completed for the entire Lamoille watershed.
Biological and Chemical Monitoring	C/O	The Lamoille Water Quality Monitoring and Exchange Program was launched in 2008 with the Lamoille NRCD, Johnson State College, and the EPSCoR program. Major sub watersheds were sampled for Phosphorus, E. coli and macroinvertebrates
Restoration/Protection Projects Underway	C/O	Numerous projects are underway watershed wide (see below).

Key: I = initiated, O = ongoing, C = completed

## **Watershed Restoration Projects**

Waterway	Water Quality Concern	Current Actions
Browns River, Chittenden County	The Brown River is adversely impacted by severe streambank	A river corridor management plan was prepared for the towns of Essex, Jericho, Underhill, and Westford. A wetlands inventory mapping project has been completed. Coordinator, WQD-RMP and Winooski NRCD have

	instability and erosion	prepared numerous grant proposals to remove flood plain encroachments, upgrade bridges and culverts for fish passage, plant riparian buffers, and secure river corridor easements in the sub-watershed.
Browns River watershed, Westford	Road-related erosion to waters	Coordinator identified several road erosion sites within town and provided technical assistance to remediate these problems.
Riparian Buffer Establishment, watershed wide	Lack of riparian buffer	Watershed Coordinator is working closely with NRCDs providing technical assistance in site identification based upon geomorphic compatibility
Upper and mid Lamoille	Logging-related erosion at stream crossings	Continued the successful Lamoille Portable Skidder Bridge Rental Project with Lamoille NRCD to reduce erosion at stream crossings
Roads in Walden	Erosion and sedimentation from town gravel roads	DEC Coordinator provided technical assistance in the implementation of 2 projects to address erosion related to municipal road systems.
Zack Woods Pond & Mud Pond, Hyde Park	Erosion and sedimentation from town road	Coordinator provided technical assistance to the Friends of Zack Woods and Morrisville Water and Light Dept in securing funding and implementing erosion control measures that reduced erosion entering these otherwise pristine waters. Applied for a Forest Legacy grant to acquire and protect hundreds of acres of land and 7 ponds adjacent to Green River Reservoir.

## Plans for 2010

Plans for 2010 include identifying water quality concerns, initiating watershed improvement projects, and protecting high quality sites with help from our watershed partners. Watershed restoration projects are planned to:

- Continue to implement river corridor restoration and protection measures in the Browns River watershed as recommended in River Corridor Management Plan. Examples of projects include flood plain encroachment removals, buffer plantings, securing river corridor easements, livestock exclusion from waterways, and upgrading culverts for fish passage and sediment transport.
- Implement the junk yard remediation project along the Lamoille River in Wolcott (removing junk cars and planting trees within the riparian corridor).
- Undertake Phase 2 Geomorphic Assessment and River Corridor Management Plan for the Mill Brook watershed (impaired waterway).
- Initiate a pilot buffer planting project in the Mill Brook watershed.
- Prioritize & submit funding proposals for upgrades of stream crossings in the upper & mid-Lamoille basin.
- Prepare a wetland inventory map of high priority wetlands for restoration within the mid Lamoille watershed.
- Address gully erosion in the impaired Deer Brook watershed.
- Implementation of stormwater best management practices in the Deer Brook watershed.
- Inventory, restore and protect wetlands in the lower Lamoille watershed.
- Development of a fluvial erosion hazard map for the towns of Underhill and Jericho.
- Continue establishment of riparian buffers along lakes & streams throughout the watershed with NRCDs.
- Assist additional towns in securing funds for road runoff issues.
- Integrate completed chemical, physical, and biological assessment & monitoring results to identify priority watershed restoration and protection projects.

## Winooski River Basin - Basin 8

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### Introduction

Prior to July 2009, two DEC Watershed Coordinators divided the basin into upper and lower at Bolton Falls and worked with separate watershed councils to develop the river basin water quality management plan and implement projects. The two Coordinators partnered with Friends of the Winooski, Winooski NRCD, VYCC, UVM Sea Grant Program, area schools, watershed residents, municipalities and corporate sponsors. These partnerships have helped address a wide array of water quality, aquatic habitat, and watershed outreach needs. During July, the duties of one DEC Watershed Coordinator position were redefined, requiring the remaining Coordinator to take responsibility for both upper basin and lower basin planning processes.

### Watershed Initiatives

Activity	Status	Comments/Information
Public forums held	C	A series of public forums held at the onset of basin planning in the lower and upper watershed.
Watershed Council formed		A lower and an upper council were formed and have met monthly since the late winter of 2008 to assist DEC in developing a draft watershed plan.
Local water quality (WQ) issues identified	C	Top local water quality issues were identified in both the lower and upper watershed.
Discussions on WQ issues held	O	In addition to the public forums, 12 watershed council meetings have been held to develop strategies.
Strategies for WQ issues formed	O	In draft.
Review of town plans and zoning	I	In early stages.
Develop water management type (WMT) classification proposal		
Meetings with individual towns on the WMT classification proposal		
Draft basin plan	I	
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	O	Educational programs presented at Winooski Valley Park District, Winooski Sojourn, VYCC crew members, landowners, school children and municipalities.
Basin Assessment Report	C	Completed in 2008.
Phase 1 and 2 Stream Geomorphic Assessments	C/O	Geomorphic assessments begun and/or completed for 26 streams. See Stream Geomorphic data base for complete list: <a href="https://anrnode.anr.state.vt.us/ssl/sga/security/frmlogin.cfm">https://anrnode.anr.state.vt.us/ssl/sga/security/frmlogin.cfm</a>
Bridge and Culvert Inventory	C	Completed in the much of the upper and mid watershed except for some smaller tributaries.
Dam Inventory	I/O	Inventory process started.
Biological Monitoring	O	Additional waters have been identified and macroinvertebrates sampled to determine long-term water quality trends of specific waters.
Restoration/Protection Projects Underway	C/O	Numerous projects are underway watershed wide (see below).

Key: I = initiated, O = ongoing, C= completed

## 2009 River & Stream Restoration Projects

Waterway and location	Water Quality Concern	Current Actions
Winooski River	Need for on-river watershed education	Assisted in coordination of a multi-day paddle of the Winooski River from headwaters to mouth featuring educational events & stop-overs along the way.
Lower Winooski wastewater treatment facilities	Lack of data regarding pharmaceutical residuals from WWTFs	Analyzed the pharmaceutical and personal care product sampling conducted at several wastewater treatment facilities.
Winooski River, Marshfield, Plainfield, Worcester	Lack of riparian buffer	Riparian buffers established along several thousand feet
Mad River	Trash in river	Assisted in coordination of trash clean up of basin
West Branch	Phosphorus	Gave lake friendly lawn care workshop
Lower Winooski	Invasive Species	Provided comments on invasive species eradication plan for Richmond flood plain forest and assisted in implementation
Huntington River	Sediment	Assisted in development of Better Backroads Grant application
Allen Brook	Sediment	Funded stream buffer & fish habitat restoration project
Alder Brook	Nutrients	Assisted in developing and giving small farm workshop
Centennial Brook	Nutrients Sediment hydrology	Residential stormwater education including incentives for incorporating rain barrel, rain gardens.
Head waters	Sediment	Three log skidder bridges constructed during educational workshop to teach loggers how to build and install bridges. Completed bridges now available for rental.

### Plans for 2010

The DEC Watershed Coordinator will continue to work closely with watershed partners in the Winooski watershed. The three partnership efforts will focus on:

- Basin plan development,
- Basin plan strategy implementation,
- Watershed resident outreach,
- Riparian buffer establishment,
- River corridor protection and easements,
- Reducing urban runoff,
- Remediation work in the impaired waters,
- Volunteer water quality monitoring efforts.

The Coordinator will continue to provide technical assistance to municipalities to reduce river-road related conflicts and erosion hazards and implement additional road best management practices to reduce road-related erosion.

In 2010 the watershed planning efforts will include beginning to draft a Basin 8 water quality management plan and defining objectives, tasks, responsible parties, schedules and potential funding sources.

## White River Basin - Basin 9

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### Introduction

The Agency of Natural Resources adopted the plan in November 2002 and the Vermont Water Resources Board (Board) held public hearings in February 2005 and subsequently approved the Agency's water management typing and classification petition for surface waters in the basin. The Legislative Committee on Administrative Rules (LCAR) reviewed the Board's proposed water management typing rule, but ultimately, did not approve the rule. At LCAR's request, parties opposing the proposal, the Agency and the Board are all in discussions to develop a revised proposal, including a process for developing future typing and classification proposals. In 2009, the Vermont Legislature authorized a local regional planning commission to develop water management typing recommendations.

The White River Partnership (WRP) was formed in 1995 as a group of local citizens interested in preserving the quality of life in the White River Basin. It has become a forum for bringing together the community, local, state, and federal government agencies, and their resources to protect common interests. The WRP has since taken the lead in implementing watershed restoration, protection, and outreach efforts with assistance from DEC and other state and federal partner organizations.

### DEC 2009 Efforts

After a brief absence, DEC has re-established its watershed planning initiative in the White River basin during 2009. The DEC Watershed Coordinator and watershed forester co-developed the Class 4 Road Erosion Inventory Project with the WRP and the Two Rivers Regional Planning Commission. High priority eroded sites were identified. Partners have developed grant proposals to implement restoration efforts at numerous high priority sites. Additionally, a multi-organization collaborative effort was initiated to identify high priority stream crossings for upgrades to improve fish and aquatic organism passage.

### Watershed Initiatives

Activity	Status 2002/2009	Comments/Information
Public forums held	C - NCI	Four public forums - held in 2000.
Watershed Council formed	C	White River Partnership (WRP) and others served this function. DEC will rely on WRP in future.
Local water quality issues identified	C - NCI	Top local water quality issues included stream channel instability and streambank erosion, lack of awareness of water quality problems, public access, impacts to fisheries
Panel discussions on water quality issues were held	C - NCI	Technical staff participated in development of strategies, gave presentations during public hearings.
Strategies for water quality issues formed	C - NCI	Strategies were developed to resolve each priority water quality issue.
White papers on WQ issues	C - NCI	8 water quality issue fact sheets were developed for 2002 process.
Review of town plans and zoning	C - NCI	All town plans and regulations were reviewed.
Develop water management type (WMT) classification proposal	C - I	A water management typing proposal was developed based on existing, reasonably attainable and desired water quality for the 2002 plan. RPC doing WMT in 2009 as per legislature. Completion in 3/2010.

Meetings with individual towns on the WMT classification proposal	C	Information about the WMT proposal went to all watershed towns in 2001. DEC met with 17 select boards and planning commissions, 1 conservation commission. DEC is unsure of current RPC process.
Draft basin plan	C - NCI	Working Draft Fall 2001.
Public hearings on draft plan	C - NCI	September 2002.
Final basin plan	C - NCI	Signed & published November 2002.
Outreach to area schools and local groups	C/I	DEC did outreach throughout planning process. Ongoing outreach by the White River Partnership.
Basin Assessment Report	C	An updated report was done in November 2002.
Phase I Stream Geomorphic Assessments	C	Completed on upper White, First, Second, Third Branches and numerous tributaries.
Phase II Stream Geomorphic Assessments	C	Completed on many of the rivers and streams for which Phase I was done (see above).
Bridge and Culvert Inventory		
Dam Inventory	C	Field inventory done.
Biological Monitoring	C	Additional waters sampled (biological monitoring) to bracket possible sources of pollution and determine long-term water quality trends.
Restoration/Protection Projects Underway	O/I	Numerous watershed and restoration projects are underway watershed wide (see below)

Key: I = initiated, O = ongoing, C = completed, NCI = not currently initiated

## River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Watershed-wide	Erosion from Class 4 town roads	Watershed partners have identified and prioritized roads with significant erosion and sedimentation entering waterways. Partners have prepared several funding proposals to address these sites
Watershed-wide	Fish and aquatic passage at stream crossings	Watershed partners have identified several stream crossings for replacement or retrofitting to better accommodate fish and aquatic passage.

## Plans for 2010

The DEC Watershed Coordinator will continue to pro-actively initiate watershed improvement projects, and protect high quality sites with watershed partners, state and federal government agencies, landowners, and municipalities in accordance with the adopted White River Basin plan. Examples of projects include:

- Fish and aquatic passage upgrades at several stream crossings.
- Erosion remediation and outreach associated with town-owned Class 4 Roads.
- Increasing riparian buffer establishment especially in the 2<sup>nd</sup> and 3<sup>rd</sup> Branches and Ayers Brook.
- Increasing land protected with River Corridor Easements in Ayers Brook watershed.
- Targeting watershed restoration projects by bracketing water quality monitoring results.
- The initiation of basin planning and outreach in efforts to update the White River Basin Water Quality Management Plan.
- Monitoring the process and outcome of water management typing, mandated by the Vermont Legislature, being conducted by Two Rivers Ottauquechee RPC.

## Ottauquechee & Black Rivers – Basin 10

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### Introduction

Watershed Council meetings are on-going and taking place throughout the basin 10 area covering the following topics:

Uses & values of surface waters	Fisheries	Dams
Roads	Buffers	Agriculture
Town planning & zoning	Wildlife & travel corridors	Floods & flood hazards
Recreation	Lakes & ponds	Invasive species

Recommendations from these meeting are being incorporated into the draft plan which is in the process of being prepared. Topics to be addressed include the current water quality conditions, stormwater and low impact development and groundwater source protection. Public participation in Watershed Council meetings has been strong with a varied set of stakeholders attending including representation from watershed groups, local and regional agencies, town commissions, business, resort recreation, outdoor pursuits, farmers, and landowners.

The schedule of meetings and minutes on the planning process and progress have been posted on a basin 10 website found on the Water Quality Divisions’ Planning Section page. A number of the maps required for the plan have been completed through a grant to the Two-Rivers Ottauquechee RPC.

On-the-ground work projects accomplished in 2008 included the installation of 800 feet of buffer along the Ottauquechee River in Woodstock where 1,150 willow stakes have been pounded into the eroding bank and 350 trees and shrubs planted. Stock have been added to the buffer plant nursery for future plantings and a workshop on the control of the invasive plant Japanese knotweed was attended by over 40 landowners.

The Phase 1 and 2 Stream Geomorphic Assessment of the Black River mainstem and significant tributaries has resulted in a Corridor Conservation Plan identifying projects for future implementation. A special study is underway focusing on Round Pond tributaries, located at the north end of Lake Rescue.

A meeting, held with Springfield and Weathersfield, concerning a town owned dam in poor condition resulted in the development of an Emergency Action Plan to ensure proper action and coordination in the event evacuation is necessary. Discussions have been initiated on the future of the dam and reservoir.

Total funding coordinated in basin 10 to date is about \$186,178.

### Watershed Initiative Status

Activity	Done	Comments/Information
Public forums held	C	Four introductory forums held
Watershed Council formed	O	In Progress, 12 meetings held
Local WQ concerns identified	O	Local watershed groups and watershed residents are expressing concerns for particular waterbodies and issues
Panel discussions on WQ issues held	O	Topics covered to date: fisheries, buffers, dams, roads, agriculture

Strategies for WQ issues formulated	O	Council discussions have so far resulted in over 150 preliminary recommendations
Draft white papers for WQ issues		
Review of town plans and zoning	O	Working with RPC on town plan reviews
Develop water management type classification proposal		
Meetings with individual towns on WMT classification proposal		
Watershed plan draft	I,O	Preliminary drafting of sections begun
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	O	Meetings with town committees, local groups, college classes are continuing
Basin Assessment Report completed	O	Basin in current rotation for new assessment report, field work completed 2008
Stream Geomorphic Assessments		Phase 1 & 2 SGA completed on the Black River mainstem and significant tributaries, Round Pond study initiated
Bridge and Culvert Inventory (B&C)	O	Completed as part of P2 SGA on Black, underway on Ottauquechee by RPC
Dam Inventory		
Biological Monitoring	O	BASS monitored in 2007 for assessment rotation
Restoration/Protection Projects Underway or Completed in 2008-9	I,O	Projects are underway, see narrative above and chart below.

\* I = initiated, O = ongoing, C= completed

## River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Black River	Litter, pollutants	Black River RiverSweep Clean-Up day organized by BRAT in cooperation with the Connecticut River Watershed Council (C, annually)
	Japanese knotweed	Landowner workshop on ID and control (C)
	Buffers	
Lake Rescue (Round Pond)	Sedimentation	Working with Lake Rescue Assoc., Lakes & Ponds Div., & Better Backroads Program to identify sources of sediment and address road erosion issues (O)
	Stormwater runoff	Working with local group to develop and install demonstration raingarden Developed a brochure on LID for homeowners and developers (O)
	Watershed Education	Outreach activities at public events, education in schools and college classes (O)
	Forest Mgmt Practices	Educational workshop on forests and WQ for landowners (O)
Ottauquechee	Lack of Buffers	800' buffer planting completed (C)
	Litter	River clean-up in Quechee by ORG (C)
Basin 10	Road runoff	Working with Better Backroads Program in Ludlow (O)
	Lack of water quality protection in town plans and zoning	Working with RPC to incorporate language into town plans and ordinances (O)

## Plans for 2010

Continue Watershed Council meetings & form focus groups on topics of particular interest to members.

Begin review by watershed council of draft plan chapters.

Work with partners to implement projects being developed in Council meetings.

Continue work with Lake Rescue Association to study sediment sources to Round Pond & develop correction strategy.

Expand the plantings in the nursery & begin offering these for buffer installations.  
Begin stream geomorphic assessment on Ottauquechee River.  
Bring Vermont Local Roads workshop to interested person in Basin 10.  
Hold farmer input meetings with VACD ARS/Basin planner.

## West, Williams & Saxtons Rivers – Basin 11

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### Introduction

The ANR-adopted Basin 11 Water Quality Management Plan (June 2008) is being implemented by the DEC Watershed Coordinator in cooperation with many watershed partners.

Plan strategies being implemented by DEC and local partners include invasive species education and training on management and control, invasive species surveying and removal work on the West River and Basin lakes; launch of a skidder bridge program for area loggers; work with Windham Regional Commission developing a graphic depiction of bridge and culvert environmental and structural conditions for replacement planning by towns; backroads erosion control work and assistance with planning development projects along the West River.

Stream geomorphic assessments and corridor planning are continuing in the Basin with development of a corridor plan for the Rock River following completion of the Phase 1 & 2 reports. Ball Mountain Brook assessments are complete and prioritized projects from the corridor plan are being implemented. Phase 1 and 2 assessments on the Saxtons River are being completed.

Total funding coordinated in basin 11 to date is about \$359,328.

### Watershed Initiatives

Activity	Done	Comments/Information
Public forums held	C	Over 240 public forums, Council meetings and partner meetings have taken place over the life of the planning process.
Watershed Council formed	C	First meeting held 4/1/04. Council members have been and continue to be part of all public forums.
Local WQ concerns identified	C	5 top WQ concerns identified by the watershed council are thermal modification, sedimentation, habitat alteration, flow alteration, pathogens.
Panel discussions on WQ issues held	C	Special topic focus groups presented reports to the Watershed Council who examined issues and proposed solutions. The public was invited to attend and participate in all meetings.
Strategies for WQ issues formulated	C	63 strategies and over 150 actions steps have been written to address identified WQ concerns
Draft white papers for WQ issues	C	Focus group recommendations have been integrated into the basin plan.
Review of town plans and zoning	C	A table listing all towns and pertinent laws and regulations is included in the appendix to the plan
Develop water management type (WMT) classification proposal	C/I	As part of ANR's plan development process, WMT was completed for all waters in Basin 11. Protocol of typing process & recommendations documented separate from plan. In 2009, legislature authorized local RPC to develop WMT recommendations. Completion in 3/2010.
Meetings with individual towns on WMT classification proposal	C	As part of ANR's 2008 plan, 10 of 29 basin towns had WMT presentations and discussions.
Watershed plan draft	C	Draft plan was completed & public meetings held in January 2008.
Public hearings on draft plan	C	Completed May 2008.

Final basin plan	C	Adopted by DEC and ANR in June 2008.
Outreach to area schools and local groups	C, O	Major partners in basin planning are doing outreach work to towns and local groups offering workshops in WQ related land management topics. Watershed coordinator offers presentations to towns, groups, schools, others.
Basin Assessment Report completed	C	Information incorporated and referred to in the Basin 11 draft plan.
Stream Geomorphic Assessments done	C, O	West River, Phase 1 & 2 completed. Rock River Phase 1 & 2 reports complete, Corridor Plan underway. Ball Mountain Brook Phase 1 & 2 & Corridor Plan complete, projects are being developed for implementation. Saxtons River Phase 1 & 2 assessments completed.
Bridge and Culvert Inventory (B&C)	C, O	Completed where Phase 2 assessments exist. The Nature Conservancy completed a B&C assessment of ~ 400 structures on the West River.
Dam Inventory	I	State inventory provides information for larger impoundments. Dam Focus group has recommended survey of small dams in Basin 11.
Biological Monitoring	O	State biological monitoring is on-going in areas of Basin 11 – as described in the Basin 11 Watershed Assessment 2001.
Restoration/Protection Projects Underway or Completed in 2008	I, O, C	Projects are being carried out throughout the basin, see narrative above and chart below.

\* I = initiated, O = ongoing, C= completed

## River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
West River	Agricultural runoff	Trees for Streams program by NRCD – buffer planting on ag lands
West River	Aquatic Nuisance Species	Retreat Meadows aquatic invasive species control project, river and lake VIP surveys, public education & VIP trainings offered
West River	Development encroachment	Working with town committee to prevent/minimize impact of recreational area development on riverbank and floodplain
West River	Flow impact on river ecology	TNC, working with USACE, is studying the impact of dam operations on flora/fauna/floodplains to potentially alter future operational procedures
Rock River	Assessment	Corridor Conservation Plan completed; priority projects identified
Ball Mountain Brook	Road runoff erosion and sedimentation	VYCC crew built culvert headwalls, lined ditches, sediment basins along Dalewood Road
Kidder Brook	Development impact on Class A water	Working with ANR to develop and promote changes to wastewater rules to prevent wastewater contamination in Class A watersheds
Basin-wide	Bridge & Culvert replacement	Methodology created to determine environmental and structural condition of B&C for evaluation by towns and replacement planning
Basin-wide	Skidder bridge program	Bridge construction workshop completed with 52 attendees and bridge rental program initiated

## Plans for 2010

Continue seeking funding to implement actions and recommendations in the 2008 Basin Plan.  
Fund consultant to work on implementing corridor plan projects on the Rock River and Ball Mountain Brook.  
Work with NRCS on buffers in the Saxtons River watershed.  
Work with the towns of Jamaica and Dover on backroad erosion problems.  
Work with WRWA to re-establish water quality monitoring program.  
Work with WRWA, TPL, USFWS and CRWC on fish passage projects.  
Monitor the process and outcome of water management typing, mandated by the Vermont Legislature, being conducted by WRC.

## Deerfield River - Basin 12

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The basin planning process, to be overseen by a DEC Watershed Coordinator, has not started in the Deerfield River basin area. DEC's Watershed Coordinator for the area was hired in November 2006. The Coordinator position, however, was eliminated in June 2009 as part of the state's Reduction in Force. DEC had planned to develop the basin 12 plan document after completion of the basin 1 plan.

Although there has been no formal planning process within the basin, the DEC Watershed Coordinator had, over the course of 2.5 years, worked to make contacts with local officials, community organization, the Regional Planning Commission and Natural Resource Conservation District. Through this outreach, the community partners continue to identify, develop, and scope potential water quality projects throughout the basin. These partnerships will continue in 2009. The basin planning process will benefit from the work that gets done prior to initiation of the basin planning process and create a smoother transition to the official plan development.

### Watershed Initiatives (prior to June 2009)

Activity	Status	Comments/Information
Public forums held	O	
Watershed Council formed	I	
Local water quality (WQ) issues identified	O	
Panel discussions on WQ issues held	I	
Strategies for WQ issues formulated		
Review of town plans and zoning		
Develop water management type (WMT) classification proposal		
Meetings with individual towns on the WMT classification proposal		
Draft basin plan		
Public hearings on draft plan		
Final basin plan		
Outreach to area schools & local groups		
Basin Assessment Report	C	Completed - March 2003.
Phase I Stream Geomorphic Assessments	C/O	The Phase I SGA work was completed on the North Branch of the Deerfield River in 2006.
Phase II Stream Geomorphic Assessments	C/O	The Phase II work on the North Branch of the Deerfield River was completed in 2006.
Bridge & Culvert Inventory	I/O	
Dam Inventory		
Biological Monitoring	O	BASS Lab monitoring programs.
Restoration/Protection Projects		

### Conclusion & Plans for 2010

The basin planning process for this river basin has been suspended by DEC for an indefinite period.

## **Various drainages emptying into Lower Connecticut River – Basin 13**

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### **Introduction**

Although basin planning in the Lower Connecticut River basin has not officially begun, the DEC Watershed Coordinator for this area is working on a number of important projects in the Basin to address water quality issues.

Stream geomorphic assessments, completed on the Whetstone and Crosby Brooks in Brattleboro, have resulted in Corridor Plans prioritizing projects needed. Several of these are underway now. Projects have been implemented or are underway in Brattleboro, West Brattleboro, and Windsor.

Crosby Brook, a stream listed for 303d purposes as impaired, is the focus of much of the project work. A massive eroded gully has been stabilized by VT AOT through the basin planning program. The gully was contributing about 25% of the total annual sediment load to the stream which is impaired for sediment. More work with stormwater mapping is beginning in the Crosby Brook watershed as well as in the Whetstone Brook watershed.

Extensive assistance was provided to the Town of Brattleboro to aid them in developing and implementing zoning ordinances that reduce the threat of hazards due to flooding events along Whetstone Brook. The town has enacted interim zoning dealing with inundation flooding and fluvial erosion hazards from flooding. Both these ordinances are being prepared for permanent adoption.

The lead project along the Whetstone is the planned purchase of one of the last remaining lots of open floodplain land in an area under significant development pressure. The effort to preserve the Locke Field is being lead by the DEC Watershed Coordinator and the Clean and Clear program is providing major funding. The community is working to secure the remaining funds through a public campaign. The lot, once purchased, will be restored to increase flood holding capacity and improve wildlife habitat. Another priority project on land used by the Farmer's Market is being done involving invasive plant control and buffer planting. Work continues in Windsor to remove Eurasian watermilfoil from Mill Pond and to stop the destruction of a Class 2 wetland by illegal ATV use.

Total funding coordinated in basin 13 to date is about \$299,177.

### **Watershed Initiative Status**

Activity	Done	Comments/Information
Public forums held	O	As related to specific stream projects
Watershed Council formed		
Local WQ concerns identified	I,O	Local watershed group and watershed residents are expressing concerns for particular waterbodies and issues.
Panel discussions on WQ issues held	I,O	Meetings are being held to address specific WQ concerns on Crosby, Whetstone and Hubbard brooks and Mill Pond.
Strategies for WQ issues formulated	I,O	Strategies are being developed and projects implemented
Draft white papers for WQ issues	O	As related to specific stream projects
Review of town plans and zoning	I	
Develop water management		

type classification proposal		
Meetings with individual towns on WMT classification proposal		
Watershed plan draft		
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	I,O	Outreach being done by DEC, WCNRCD, WRC, WRWA.
Basin Assessment Report completed	O	Report done. Sampling completed in 2008 season.
Stream Geomorphic Assessments	O, C	Assessments and Corridor Planning being carried out on several streams.
Bridge and Culvert Inventory (B&C)	O	As part of Phase 2 assessments.
Dam Inventory		
Biological Monitoring		Sampling completed in 2008
Restoration/Protection Projects Underway or Completed in 2009	I,C	Projects are being carried out throughout the basin, see narrative above and chart below.

\* I = initiated, O = ongoing, C= completed

## River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Crosby Brook	Road runoff – erosion	Black Mountain Road maintenance and repair Head-cut gully repaired
	Excess runoff – flow	Stormwater system survey completed and funding applied for
Whetstone Brook	Flooding	Interim zoning banning development in floodplain Floodplain model developed for outreach program Fundraising campaign for Locke Field purchase underway
	Erosion, sedimentation	Better Backroads project completed on All Souls Church 1/4 mi. driveway
Hubbard Brook	Sedimentation, flooding	SGA Phase 1 completed
Mill Pond	Invasives, wetland damage	Milfoil control underway, work with landowners on access control, wetland restoration planned and funding sought
Basin	Habitat degradation Buffer loss	Shrubland bird habitat workshop completed with DF&W, NRCS Important Bird Area coalition and meeting on CT River floodplain and buffer habitat
	Erosion, sedimentation	Presentation of river Flume at Herrick's Cove Wildlife Festival attended by over 1300 people

## Plans for 2010

Continue responding to local requests for assistance with water quality concerns.

Continue coordination of projects and meetings on Crosby Brook improvements.

Continue working with the Town of Brattleboro on final zoning ordinances for FEH, SFHA and impervious surfaces.

Continue coordination of projects & meetings on Whetstone Brook improvements & finalize purchase of Locke Field.

Fund consultant to work on implementing corridor plan projects on the Whetstone and Crosby Brooks.

Work with Paradise Park Commission on sediment control strategies for Hubbard Brook.

## **Wells, Waits, Stevens and Ompompanoosuc River Basin – Basin 14**

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### **Introduction**

In 2009, watershed councils for the Wells River, the Waits River and Ompompanoosuc River watersheds met to continue efforts to implement strategies in the Basin 14 Water Quality Management Plan that was ANR-adopted in 2008. Out of a total of 117 strategies in the plan, 37 have been initiated or completed as of September 2009. Projects in the basin during the year include a Phase 1 and 2 geomorphic assessment of the Wells River, a Phase 2 geomorphic assessment of the Waits River and a Phase 1 assessment of the Ompompanoosuc River. In addition, a project identification grant for the lower Wells River is in progress. The Ticklenaked Pond TMDL has been released for public comment and a small ecosystem restoration grant has been secured to complete a number of projects in the TMDL implementation plan to reduce phosphorus levels in this waterbody in 2010.

### **Watershed Initiatives**

Activity	Status	Comments/Information
Public forums held	C	Five public forums were held in 2004.
Watershed Council formed	C	Watershed councils were formed in 2004 in each of the four watersheds.
Local water quality (WQ) issues identified	C	Local WQ issues have been identified in each of the four watersheds
Panel discussions on WQ issues held	C	Panel discussions were held in 2004 and 2005
Strategies for WQ issues formulated	C	Strategies for all major WQ issues have been formulated
Review of town plans and zoning	C	Town plan and zoning regulations have been reviewed
Develop water management type (WMT) classification proposal	O	Initiated but on hold until the process for WMT is resolved.
Meetings with individual towns on the WMT classification proposal		On hold until the process for WMT is resolved.
Draft basin plan	C	Completed
Public hearings on draft plan	C	Completed 2008
Final basin plan	C	Signed in June 2008
Outreach to area schools and local groups	O	Participation in the Blue Camp which focuses on the Wells River watersheds and a watershed model presentation to 5 classes as part of the Marion Cross School river day.
Basin Assessment Report	C	The basin assessment report was completed in April 1999.
Phase I Stream Geomorphic Assessments	C	Phase 1 assessments have been completed on all basin watersheds. Stevens River assessment will be getting updated in 2010.
Phase II Stream Geomorphic Assessments	O/C	Phase 2 assessments have been completed for all basin waters except for the East Branch of the Ompompanoosuc & upper Wells River.
Bridge and Culvert Inventory	O/C	Bridge and culvert surveys were completed in the Stevens River watershed in 2004 and in the Ompompanoosuc River watershed and a portion of the Wells River watershed in 2006. In addition a road inventory was completed for the Town of Peacham in 2006.
Dam Inventory		
Biological Monitoring		Completed 2007/2008
Restoration/Protection Projects Underway	O	See below.

Key: I = initiated, O = ongoing, C = completed

## River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Ticklenaked Pond Watershed	Phosphorus impairment	Applied for and received a grant to complete a driveway retrofit demonstration project as well as rain garden and buffer projects.

## Conclusion & Plans for 2010

Efforts to improve water quality in this basin continued in 2009 through a number of projects and assessments. In 2010, more projects are expected to occur in the basin arising from the Ticklenaked Pond Ecosystem Restoration Grant. Projects have already been initiated in the Waits River and Wells River watersheds. Watershed councils will continue to meet on an annual basis or more frequently as needed to continue the work in this basin.

## **Lake Memphremagog, Tomifobia & Coaticook Watershed – Basin 17**

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### **Introduction**

The DEC Watershed Coordinator has worked closely with members of the community to host a series of panel discussions on the top priority water quality issues including nutrient enrichment, invasive species and aquatic habitat. Specific topics for meetings included discussion of the issues and development of strategies to address: stormwater runoff, river corridor management, aquatic invasive species and lakeshore development in addition to a meeting on high quality waters in the basin and strategies to protect these waters. The Coordinator worked with Orleans County Conservation District to hold an agricultural task force meeting to discuss cover cropping. The Conservation District received an Aerway machine in 2009 which will support the use of no-till practices discussed at the meeting.

The Watershed Coordinator has also been working closely with the Memphremagog Watershed Association (MWA), a local watershed group that the coordinator helped to get off the ground two years ago. The Coordinator assisted the MWA in organizing a buffer planting of 1700 plants along the shores of the Clyde River and Lake Memphremagog funded through a Ecosystem Restoration grant. In addition, the Coordinator helped the association host meetings on the water quality sampling results from 2008 and water quality concerns associated with the Waste USA landfill along the Black River in Coventry.

The Watershed Coordinator assisted with a number of assessments completed in the basin in 2009. These include: water quality sampling on the small tributaries to Lake Memphremagog and in the Johns River watershed, water quality sampling on small tributaries to Lake Seymour, the development of an assessment protocol for blue green algae blooms in Lake Memphremagog, and the geomorphic assessment of the Black River. The Coordinator also assisted in a phosphorus modeling effort for the Lake Memphremagog watershed coordinated by regional partners in Quebec. In addition to this, the Coordinator worked closely with the MWA, the Orleans County Conservation District, the Vermont Agency of Agriculture and Geological Survey, and EPA to identify the source of elevated levels of nitrogen in the Johns River and nearby tributaries and to define the relationship between surface water and ground water in this area.

Additional projects completed in the basin include the continuation of a clean and clear project that funded a volunteer buffer planting on the lower Barton River. The Coordinator assisted with an Ecosystem Restoration grant to address eroding gullies that flow into Seymour Lake and a Better Back Roads grant in the same area to add cross culverts and rock line a ditch along Wayesses Road that was contributing sediment to Seymour Lake.

The DEC Watershed Coordinator is working with other ANR staff to review the management of three dams in the Coaticook River watershed to minimize impacts to lakes and streams and to address concerns raised by local residents in a public forum in Norton.

### **Watershed Initiatives**

Activity	Status	Comments/Information
Public forums held	C	Five public forums were held in 2006 with over 90 individuals participating.
Watershed Council formed	C	A watershed council has been formed covering a broad cross section of interests in the watershed.
Local water quality (WQ) issues	C	In 2008, the watershed council prioritized the issues of nutrient

identified		enrichment, invasive species, aquatic habitat, and surface water contamination. The Quebec/VT Steering Committee on Lake Memphremagog meets twice a year and is working on updating recommendations from a 1993 joint report "On Managing Lake Memphremagog and its Environment." Basin planning is expected to dovetail with this existing effort.
Panel discussions on WQ issues held	I	Eleven panel discussions were held in 2008 and 2009 and more are planned for the fall of 2009.
Strategies for WQ issues formulated	I	Draft strategies to address roads, river corridor management, lakeshore management, stormwater runoff and aquatic nuisance species have been developed.
Review of town plans and zoning	I	Town plans were reviewed in preparation for a MWA meeting on town zoning options to protect water quality.
Develop water management type (WMT) classification proposal		
Meetings with individual towns on the WMT classification proposal		
Draft basin plan	I	The development of a draft plan has been initiated.
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	O	The watershed coordinator participated in a camp to discuss watershed issues.
Basin Assessment Report	C	The basin assessment report was completed in 2006.
Phase I Stream Geomorphic Assessments	I/C	Phase 1 assessments were completed on the Clyde River, Barton River, Willoughby River and Johns rivers by 2009. An assessment of the Black River was initiated in 2009.
Phase II Stream Geomorphic Assessments	I/C	Phase 2 assessments were completed on the Clyde River, Barton River, Willoughby River and Johns rivers by 2009. A Phase 2 assessment of the Black River was initiated in 2009.
Bridge and Culvert Inventory	I/C	VDF&W has completed bridge and culvert surveys on portions of the Clyde and Barton Rivers, and NVDA completed an assessment of bridges and culverts in the watershed in 2008.
Dam Inventory		
Biological Monitoring		Planned for fall 2009.
Restoration/Protection Projects Underway	O/C	See below.

Key: I = initiated, O = ongoing, C = completed

## River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Clyde River & Lake Memphremagog	Nutrients and Aquatic Habitat	DEC Watershed Coordinator worked with the MWA to plant 1700 trees & shrubs along the noted waterways.
Lower Barton River	Nutrients and Aquatic Habitat	DEC Coordinator helped to organize tree planting effort on the Lower Barton River that included planting 4,000 feet of streambank. The project was a collaborative effort of the DFW, DFPR, DEC, local volunteers with funding from a Clean and Clear grant.
Seymour Lake	Phosphorus increases in recent years	DEC Coordinator helped to coordinate a project to address eroding gullies bringing sediment into the lake.
Seymour Lake	Phosphorus increases in recent years	DEC Coordinator worked with partners to complete a better back roads project to reduce sedimentation into lake.
Lake Memphremagog	Cyanobacteria	DEC Coordinator worked with others in WQD & VDOH to develop a Cyanobacteria monitoring protocol for the MWA.
Echo Lake & Clyde River	Nutrient enrichment	DEC Watershed Coordinator assisted the Echo Lake Association & Town of Charleston complete a road inventory.

## **Conclusion & Plans for 2010**

There is a great deal of energy and excitement associated with the basin planning process in the Lake Memphremagog, Tomifobia, and Coaticook rivers basin. The creation of the local watershed association as an offshoot of the planning process has greatly increased the discussion of water quality issues and threats in the basin and ideas for projects to address these. In 2010, the watershed council will hold a number of panel discussions to develop draft strategies to address the last of the priority issues in the basin that have yet to be discussed. The strategies developed during these meetings will be compiled into a draft plan for the Basin in 2010. The basin planning effort will be coordinated with partners in Quebec through the Quebec/Vermont Steering Committee on Lake Memphremagog and will be tied into an effort to update the actions that were listed in 1993 joint report "On Managing Lake Memphremagog and its Environment."

Geomorphic assessment projects will be completed covering the Black River watershed. The results of these assessments will be presented publicly in addition to being used to develop projects in these watersheds. The phosphorus modeling project for Lake Memphremagog will be completed, and the watershed coordinator and other water quality division staff will be reviewing this study to see how it can be used for the development of a TMDL in Vermont.

There are a number of potential projects in the works for next year that the watershed coordinator will be assisting with if they are funded, including an additional shoreline planting project on the Clyde River, continued shoreline planting work on the Barton River, additional gully restoration efforts on small tributaries to Lake Seymour as well as a number of better back road projects in the basin.