

**PROGRESS REPORT ON
RIVER BASIN WATER QUALITY MANAGEMENT PLANNING
DURING 2010**

A REPORT FOR:

**HOUSE & SENATE COMMITTEE ON AGRICULTURE
HOUSE & SENATE COMMITTEE ON NATURAL RESOURCES AND ENERGY**

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Introduction

In 2010, 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 13 of Vermont's 17 planning basins. The goal of the process is to develop watershed management plans for each planning basins that are built in a two-year timeframe, and that are revisited every five years.

The overall goal for 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 2010 reporting period, the five DEC Watershed Coordinators (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.

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" as a way to help planning participants become aware of these requirements and to understand the planning process. The Guidelines have been the framework under which basin planning has evolved to date.

In the January 2010 Legislative Report on Basin Planning, DEC reported progress in the development and implementation of basin-specific management plans. DEC also described in detail two core difficulties that have limited DEC's ability to complete individual plans in the timeline envisioned by 10 V.S.A. Section 1253(d) and Section 1-02D of the Vermont Water Quality Standards. Summarized briefly, issue one involves the length of time necessary to convene a functional Watershed Council, and then educate that Council sufficiently such that the Council is equipped to develop basin strategies with only limited DEC assistance. The second issue regards the difficulties involved in accurate and acceptable Water Management Typing of individual surface waters. Typing has, over time, proven to be a process subject to widely varying degrees of understanding among stakeholders and remains saddled with considerable management complexity. To promote further evaluation of potential options for water management typing, legislative direction was provided in the 2010 budget bill to direct funding to the Two Rivers and Windham County Regional Planning Commissions to pilot a water management typing approach for basin 9 (White River) and basin 11 (West, Williams, Saxtons). The final report is due on this effort by January 31, 2011.

Despite these current challenges involved in Basin Planning, DEC remains committed to the concept, and has continued to promote and pursue basin planning. The results of those efforts are described in Part Three of this report for several planning basins. In light of ongoing lessons learned while implementing the process envisioned the "Guidelines," the Department, through the efforts of the Water Quality Division, has taken a step back to re-evaluate the basin planning process. While DEC views river basin water quality management plans as critical components to good surface water management, several years of WQD experience trying to develop meaningful and widely used plans highlight the need for a revised approach.

Therefore, during 2010, the Water Quality Division carried out an internal planning process to develop a Statewide Surface Water Management Strategy, and is presently engaged in a public stakeholder process to implement this strategy through a revised approach to basin planning, known as the Tactical Planning Process. This work has involved all Basin Planning staff and many others in DEC, and for 2010 was given priority over the publication of new Plans. Accompanying this strategic evaluation was a minor reorganization of the Water Quality Division that aligned monitoring, assessment, and watershed planning functions into a single organizational unit of service to DEC and watershed stakeholders statewide. This new unit is known as the [Monitoring, Assessment, and Planning Program](#).

This strategic planning process was first described in the [2010 Revised Lake Champlain TMDL Implementation Plan](#), then subsequently in the [2010 Statewide Biennial Water Quality Assessment](#). DEC has viewed the development of the Statewide Strategy and proposed Tactical Basin Planning Process as an investment in DEC's ability to produce individual basin plans with considerably more agility. The combined efforts to develop a Statewide Surface Water Management Strategy, propose a new Tactical Basin Planning Process, and continue basin plan development and implementation are reflected in this report in three sections.

Section 1) Statewide Surface Water Management Strategy - a Framework for Statewide Efforts to Guide Surface Water Quality Management



The Vermont Surface Water Management Strategy has been prepared to address pollutants and stressors that affect uses and values of Vermont's surface waters. The Statewide Strategy presents a coordinated statewide planning process to be implemented by the DEC, and proposes a focused, basin-specific approach to protection, maintenance, and restoration of surface waters. The Strategy reflects experience gained and lessons learned by the Water Quality Division (WQD) in working with partner programs and watershed stakeholders.

Specifically, this Strategy:

- Sets forth goals and objectives for managing Vermont's surface waters in light of the goals of the federal Clean Water Act and Vermont's state surface water quality policy;
- Describes a new approach to protecting and improving surface waters by managing stressors rather than individual pollutants;
- Evaluates program effectiveness in managing stressors, including an identification of "gaps" that impede effective stressor management;
- Describes a new focused approach to watershed management planning that will result in the development of explicit tactical basin plans that provide geographic specificity for project development necessary to implement this Strategy;
- Describes the new WQD Ambient Surface Water Monitoring and Assessment Strategy that will work hand in hand with watershed management planning at the statewide and basin-specific level to identify and prioritize waters in need of protection, restoration or management.

The full content of the plan may be found online at www.vtwaterquality.org.

Protecting & Improving Surface Waters by Managing Stressors

In the development of this Strategy, the WQD has engaged in an intensive strategic planning process aimed at identifying areas of program duplication and program gaps, as a way to ensure program efficiency in meeting the goals and objectives identified in the Strategy. A key element of this approach is the recognition that individual pollutants (often more than one) can be simultaneously mitigated by managing surface water stressors. These stressors are of interest not only to the WQD, but also to several Federal, State, and local agencies and organizations with an interest in surface water management. The WQD has identified a list of 10 major stressors with unique causes, and sometimes overlapping effects, which result in the surface water impacts documented in Vermont. By identifying stressors and approaches to their management, the Strategy sets the stage for the WQD's approach to multi-agency planning and implementation that will meet the goals of preserving, enhancing, and balancing surface water integrity, use, and health and safety.

What are the 10 Major Stressors affecting Vermont's surface waters?

Acidity



Channel Erosion



Flow Alteration



Encroachment



Invasive Species



Land Erosion



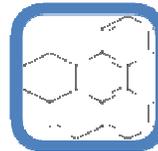
Nutrient Loading



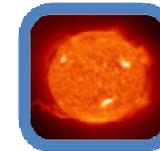
Pathogens



Toxic Substances



Thermal Stress



Using the Stressor Approach to Evaluate Program Effectiveness

As part of the development of this Strategy, the WQD has evaluated gaps in its ability to directly or indirectly protect and improve surface waters. By evaluating the extensiveness, intensity, urgency, and durability of 10 major stressors, along with WQD's overall program effectiveness with respect to each stressor, programmatic gaps and priorities for improvement to surface water management have been identified that rely on greater program integration and efficiency. The gaps and recommendations identified in Stressor Plans are integrated to develop a roadmap for the improvement of surface waters in Vermont.

Tactical Basin Planning: Managing waters along a gradient of condition

This Statewide Strategy will be used to support on-going planning in Vermont's seventeen planning basins and includes a revised watershed-specific planning process with a strong emphasis on geographically explicit implementation strategies. Through this process it is envisioned that WQD staff will develop, with significant public input, basin-specific "Tactical Basin Plans." The Tactical Plans, considered addenda to the Statewide Strategy, will become the new, streamlined basin plans. Tactical Plans will be developed using an efficient public process, and the implementation of the tactical plans will remain reliant on all watershed stakeholders. The combination of this Statewide Strategy and the tactical planning process describes the WQD's newly revised "game plan" to meaningfully promote and advance surface water protection and improvement. More information about the Tactical Planning Process is provided in Section 2 of this report.

WQD Ambient Surface Water Monitoring & Assessment Strategy

In parallel with the development of this Strategy, the WQD has also completed a comprehensive revision to its existing strategy for guiding surface water monitoring and assessment. Effective monitoring is integral to watershed management planning at the statewide and basin-specific level, to identify and prioritize waters in need of protection, restoration or management.

Public Input

As part of the implementation of this Strategy, the Water Quality Division is convening discussions among Federal, State, and local agencies and organizations, and the public to fine-tune recommendations for tactical basin planning, and develop and refresh working partnerships at the Statewide and basin-specific level on surface water management, protection, and restoration initiatives.

Section 2) Recommendations for a revised Tactical Basin Planning Process to implement the Statewide Strategy

Tactical Basin Planning: Managing Waters along a Gradient of Condition

The Tactical Basin Planning Framework is not a new program, but rather a way of coordinating existing programs and building new partnerships that will result in efficient management of land and surface water resources in Vermont. Inherent in the design of the framework is the belief that many stakeholder groups and individuals must have ongoing opportunities to participate in the process of managing those natural resources that characterize Vermont's watersheds. This chapter of The Strategy describes the process for developing individual, basin-specific and geographically explicit plans, establish priority monitoring and assessment approaches, list planning, permitting, or project-level initiatives to protect or restore surface waters, and meet the legal requirements for basin plans.

These plans will focus on the important conservation and restoration objectives to be accomplished within the any given five-year cycle. A priority list of objectives and strategies will identify conservation and restoration activities for major river basins in the state. Benefits to the people and stakeholders of Vermont include:

- Better information for decision making for major river basins
- Increased ability (by ANR and partners) to resolve complex surface water resource problems
- Improved communication and coordination among governmental agencies
- More opportunities for stakeholders to get involved
- Increased ability to demonstrate results and benefits of environmental management
- More cost-effective use of public and private funds

There are seventeen major river basins that serve as hydrologic planning units in which monitoring and management strategies will be focused. Within these major river basins, *priority sub-basins* will be identified for enhanced monitoring, assessment, and project development within the span of any given two-year rotational cycle. This rotational planning process also identifies topics or areas of special importance in the basin, available management tools to address those topics, and specific recommendations on how to address key topics, including recommendations for technical assistance, project implementation, and education and outreach. The general idea is to focus resources and attention on a more concentrated area in a more coordinated fashion with the various stakeholders so that better utilization of resources (i.e., technical assistance and funding) can be achieved.

Principles

1. Tactical basin plans will be developed according to the goals of the Vermont Surface Water Management Strategy to ensure the biological, chemical, and physical integrity, and public use and enjoyment of Vermont's water resources, and to protect public health and safety.
2. Each of the tactical basin plans will contain objectives, prioritized strategies, benchmarks and tasks in order to facilitate the implementation of the plans.
3. Priority will be given to those basins and sub-basins for planning and direct remediation actions where there are the most serious water quality problems or where surface waters in excellent condition and valuable aquatic features deserve greater protection.
4. Each plan must spell out clear, attainable goals and targeted strategies to achieve those goals. The goals must be stated for the river basin and for individual sub-basins. A final plan should contain a 'report card' by which progress can be tracked with regard to measurable indicators of each major goal and will:

- a. Address the major (highest priority) water quality stressors
- b. Identify surface waters in excellent condition (from biological, chemical, and physical assessment information)
- c. Address legal requirements for a basin plan
- d. Define clear roles for each participant
- e. Provide understandable connections between the roles of all participants and the environmental outcomes
- f. Track the outcomes and monitor the commitments of the participants

Process

Step 1 - Scoping and information gathering (monitoring and basin assessment)

For targeted basins (and sub-basins) within the rotational queue (see Figure 1. Rotational Basin Assessment Map) a compilation of existing assessment data including but not limited to stream geomorphic assessments (and corresponding river corridor plans), biological assessment data, chemical water quality monitoring data, lake assessments, rare-threatened-endangered species, natural community inventories, etc. In addition to data compilation, this may include attendant process information such as:

- Assessment protocol - including the identification of very high quality waters, existing uses, in addition to the Vermont Surface Water Assessment Methodology (2006).
- Initial prioritization process (based on review of assessment information) – For highest priority protection, restoration, and conservation actions
- Summary of assessment data and reports used in the prioritization process

Step 2 - Prioritization and Targeting of Resources (internal)

MAPP pre-Basin planning meeting within ANR programs (within DEC - Water Quality, Water Supply, and Wastewater Management Divisions, DFW – Fisheries, and DFPR – Watershed Forestry as examples) will be held to review current (and long term trends) water quality monitoring data, discuss known issues in the basin, direct additional (near term) monitoring, identify priority projects (both protection and restoration), and current levels/ areas of funding. This formula is an intra-agency tool for prioritizing (sub) basins within a major river basin for further action, based upon a ranking system that considers both ecological and human health to meet restoration and protection goals and objectives. It provides a basis for decision making and targeting of program resources.

Step 3 - Prioritization and Targeting of Resources (external)

Once current monitoring and assessment data has been compiled and reviewed, initiate external stakeholder meetings with sister agencies, technical entities, watershed and other organizations (e.g., Conservation Districts, Regional Planning Commissions, etc). Identify and coordinate shared priorities and develop “tactical” approach to planning and project implementation for the basin in queue. In addition, solicit partner programs for areas of opportunity – funding and project priorities.

Step 4 – Public Outreach and Awareness of the Basin Planning Process

Commence with public forums and targeted meetings to present data on known impairments as well as waters exhibiting very good to excellent biological or physical integrity (or other high quality characteristics) to identify and solicit public input to identify gaps and seek recommendations on priority areas (surface waters) for protection and restoration.

Step 5 - Development of Tactical Basin Plans and Attendant Strategies

Develop draft workplan that identifies priority projects and enhanced program implementation. Workplan elements will also include strategies for the protection of very high quality waters, impaired waters remediation, etc. Priorities will be identified as per concurrent management plans (e.g. river corridor management plans) and the stakeholder prioritization process. Commence with stakeholder process to review strategies and formalize as adopted workplan. Present at final round(s) of public meetings/ presentations.

Step 6 – Implementation of Tactical Basin Plans

Initiate implementation of tactical plan. Develop agreements and MOU’s between stakeholder groups as to the lead partners for project implementation and identification and procurement of project funding sources.

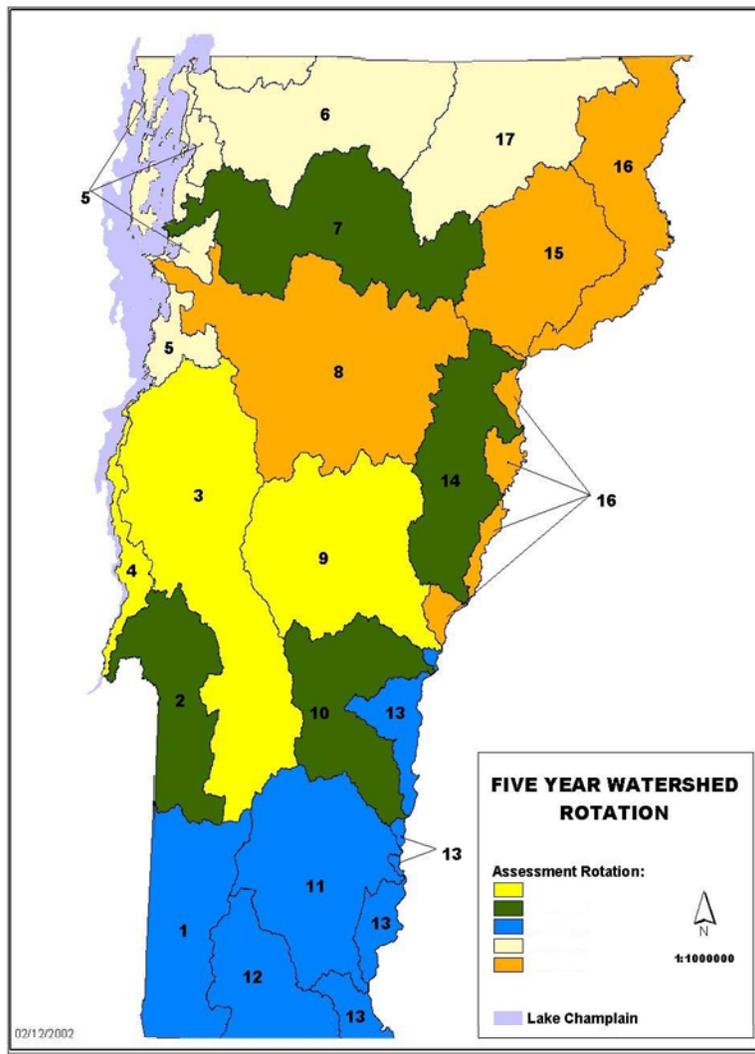


Figure 1 - Rotational Basin Assessment Map as of November 2010.

Proposed Tactical Basin Planning Timeline for a Specific Basin

Tactical Basin Planning Timeline	Month																							
Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Scoping and information gathering (monitoring and basin assessment info compiled)	█	█	█	█	█	█																		
Prioritization and Targeting of Resources (internal), Identify and Secure Sources of Funding				█	█	█	█	█	█															
Prioritization and Targeting of Resources (external), Identify and Secure Sources of Funding				█	█	█	█	█	█	█	█	█												
Public Outreach and Awareness of the Basin Planning Process, SW Strategy and draft Tactical Plan presentation									█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Development of Tactical Basin Plans and Attendant Strategies											█	█	█	█	█	█	█	█						
Implementation of Tactical Basin Plans																						█	█	█
Milestone(s)	Initial Assessment Report drafted						Final Assessment Report produced, Initial Tactical Plan drafted						Final Tactical Plan produced, Implementation Table, Report card drafted						Track implementation progress via report card, Sequence Rotational Basin Planning Process (ongoing)					

Structure of the Tactical Basin Plans

Each Tactical Basin Plan will provide an introduction about tactical planning process, a description of the basin and priority sub-basins that are areas of focus and a prioritization of primary stressors in the basin where strategies will be focused to address the activities causing the stressor(s).

In general, tactical basin plans will be developed to incorporate the following strategies:

- Strategies that address impaired or altered waters
- Strategies that address protection of Very High Quality Waters and Healthy Watersheds
- Strategies that address new threats to surface waters, stressors that affect large areas of the basin, or stressors that are top priorities for other reasons. These stressors may be targeted by:
 1. Specific sub-basins within the rotational basin planning process for focused monitoring, assessment, protection, restoration and outreach - (i.e., *targeted sub-basins*)
 2. By stream order- *in order to target priority statewide and surface water stressors and strategies for focused areas of the basin and sub-basins.*

Where problems affecting impaired waters are known and solutions are clear, the plan must contain specific remediation actions. For such waters, this would include a list of actions to be taken, who will take those actions, a timeline for completion of the actions, an estimate of the cost of the action and an indication of the most probable funding for the action. Where the problems are not fully known, or solutions are not clear, an adaptive management strategy will be adopted. Here, the plan must contain a

strategy for reasonable actions that should improve the impaired waters, as well as a process to acquire the necessary information to further define the problem and develop new solutions as soon as reasonably possible. In this regard, ongoing monitoring and assessment programs will determine whether or not we are moving towards desired water quality improvement goal(s).

Resources

Statewide Surface Water Management Framework

To support the Vermont Watershed Management Framework (and tactical basin planning process) the Vermont Surface Water Management Plan was developed to provide guidance, oversight and communication to interagency programs, organizational partners, and stakeholders at the basin level. In addition, the Statewide Plan identifies how the State manages the 10 primary “stressors” affecting surface waters in the state. The Statewide Plan was created (in part) to eliminate the redundant process of providing a comprehensive explanation of each major stressor in every basin plan. As a web-based application, the Statewide Plan will provide navigable electronic links to each of the 10 stressors, the activities that cause those stressors, the pollutants associated with those stressors, and the goals and objectives met by managing the stressors. Programs, strategies, and funding sources that address those stressors within a statewide surface water management framework are a major feature of the Plan.

MAPP Subcommittee

The MAPP Subcommittee is a body of representatives from the Water Quality Division (WQD) and partners that play a role in natural resource monitoring and assessment. These programs include monitoring and assessment, planning and technical assistance (River Management, Wetlands, Stormwater, and Lakes and Ponds) initially, broadening out to include other programs within the Department of Environmental Conservation (DEC), Agency of Natural Resources (ANR), and sister agencies (AOT and AAFM). This workgroup will meet annually to compare notes, plan and coordinate the monitoring and data gathering efforts to occur in the coming year for the purpose of stretching monitoring resources around the state. They coordinate high-level objectives and who will sample what, where and when.

Watershed Coordinators/ Basin Planners

Watershed coordinators are staff assigned to serve as liaisons in a given basin planning process among the agencies, the basin stakeholders and local concerns. Their job is to specialize in their watershed, to know what resources might be available to address the concerns and facilitate the tactical basin planning process to develop and implement plans that address high priority issues and known stressors in each basin.

River Basin Teams

River basin teams are the field-level, technical entity within the Watershed Management Framework. These teams are composed of field staff from most State and Federal Natural Resource Agencies (e.g. USDA-NRCS), Regional Planning Commissions, Natural Resource Conservation Districts, Watershed Organizations, and citizen advocates. These teams help in development of monitoring strategies, education and outreach, prioritization of issues and watersheds within the basin, planning, and networking among technical staff and local leaders to apply agency resources to implement strategies identified in tactical basin plans.

Stakeholder Process

1. Invite other technical (internal) partners to consider their role for plan coordination and implementation and how this collaboration can be mutually beneficial
2. External outreach to determine which programs would complement the effort to coordinate existing programs to protect or improve water quality. Solicit input from intra-agency programs (WQD, DEC, ANR, other technical partners) in how this can be achieved.

3. Solicit input from external programs (Examples include but not limited to: USDA-NRCS, VAAFM, VTrans, CVPS, ACOE, USFWS, VACD-NRCDs, etc).

Funding

Ultimately, it is envisioned that the Water Quality Division priorities will be explicitly identified in tactical basin plans (Divisions priorities are identified and developed via the tactical planning process). Themes central to the funding strategy include:

- ✓ Ensuring state dollars are invested in the most important water quality projects;
- ✓ Leveraging state dollars in every way possible to attract additional federal or private funds for appropriate and priority projects;
- ✓ Ensuring existing federal authorizations related to Vermont are appropriated to the maximum extent practicable; and
- ✓ Accounting for successful pollution reductions throughout all aspects of ANR work, whether from forest and recreation, fish and wildlife, or environmental conservation sectors.
- ✓ Identify and apply funding opportunities within the tactical basin planning timeline and framework to develop one set of priority funding recommendations for each basin in the tactical planning queue.

Use of the Plan

Each Tactical Basin Plan will include an Implementation Table that lays out broad objectives for this effort, and then begins to frame-out specific actions to achieve the stated objectives. It is anticipated that the list of action items will first be expanded, based on input from agency staff and watershed partners, and later prioritized and refined based on the staff and financial resources available to implement specific actions. Action items include both necessary data collection and assessment efforts, in addition to waterbody-specific implementation activities; action items should be able to be accomplished within the next two to five years. Action items address known stressors in each basin and reflect the primary goals and objectives identified in the Vermont Surface Water Management Plan.

Benefits

- ***More direct focus on the resource*** to be protected, tailored to basin-specific stressors and conditions that may be germane to that region.
- ***Coordination*** among programs and agencies that perform similar duties, thereby making technical assistance and available funding a more efficient and predictable process.
- ***Improved capabilities*** to address complex environmental issues that cross agencies' jurisdictions.
- ***Improved basis for management decisions*** as better coordination of monitoring is established and more information is gathered on a specific basin.
- ***Consistency and continuity*** is encouraged as an initial framework is prepared and applied to all basins in a systematic and sequential (rotational) fashion.
- ***Opportunities for enhanced data sharing*** as agencies and organization improve communication and coordination.
- ***Encouragement of innovative solutions*** with input from the various stakeholders and partners.

Section 3) Update on River Basin Water Quality Planning Activities during 2010

The following table provides a summary of basin planning activities across the planning basins. Following this table, a series of individualized updates are provided for each planning basin.

Watershed Initiative Status (as of December 2010)
Current Status of Major Planning Process Components by River Basin Identification Number

Components of the basin planning process	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Public forums held	I,O	C	C	I	C	C	C	I,O	C	C	C		O	C			C
Watershed council formed	C	C	C	I	C	C	C	I,O	C	O	C			C			C
Local WQ concerns identified	I,O	C	C	I	C	O,C	C	I,O	C	O	C		I,O	C			C
Panel discussions on WQ issues held	C	C	C	O	C	I,O	C	I	C	O	C		I,O	C			I
Strategies for WQ issue formulated	I,O	C	C		C	I,O	C	I	C	I	C		I,O	C			I
Review of town plans & zoning regulations	I	C	C	C	C	I	C	I	C	I,O	C		I	C			I
Develop water management type classification proposal		C					C		C/P		C/P						
Meetings with towns on classification proposal		C					C		C		C						
Watershed plan draft	I	C	O		C	I	C		C	I	C			C			
Public hearings on draft plan		C	I		C		C		C		C			C			
Final basin plan		A			*		*		A		A			A			
Outreach to schools & local groups	I,O	O	O	O	O	O	O	O	O	O	O		I,O	O			O
Basin assessment report	C	C	C	I	C	C	C	C	C	C,O	C	C	O,C	C	C		C
Phase I SGA	I,O,C	O,C	O,C	C	I,C	O,C	O,C	O,C	O,C		O,C	O,C	O	O,C			I,C
Phase II SGA	I,O,C	O,C	O,C	C	I,C	O	O,C	O,C	O,C		O,C	O,C	O	O,C			I,C
Bridge & culvert inventory	I,O,C	O,C	O,C	C	O	O,C	C	C		O	O,C	I,O	O	O,C			I,C
Dam inventory		O	O	O	C		C	I,O	C		I						
Biological monitoring	O,C	O	O	O	O,C	O	O,C	O,C	O,C	O	O	O		O			
Restoration projects	O	O,C	IOC	O,C	I	O,C	O,C	O,C	O,C	I,O	IOC		I	O			O,C

Table notes: I = initiated; O = ongoing; C = completed; P = recommendations pending by respective RPCs

WQ = water quality; SGA = stream geomorphic assessments

A = Final plan signed and “adopted” plan by ANR.

(*) Draft plan signed and “approved” by ANR. Document lacks state mandated water management typing recommendations.

Basin 1 = BattenKill/Walloomsac/Hoosic; Basin 2 = Poultney-Mettowee Rivers; Basin 3 = Otter Creek; Basin 4 = Southern Lake Champlain direct;

Basin 5 = Northern Lake Champlain; Basin 6 = Missisquoi River; Basin 7 = Lamoille River; Basin 8 = Winooski River; Basin 9 = White River;

Basin 10 = Ottauquechee/Black; Basin 11 = West/Williams/Saxtons; Basin 12 = Deerfield; Basin 13 = lower CT River direct;

Basin 14 = Waits/Wells/Ompompanoosuc/Stevens; Basin 15 = Passumpsic; Basin 16 = upper CT River direct; Basin 17 = Lake Memphremagog

Batten Kill, Walloomsac & Hoosic – Basin 1

Due to statewide Reductions in Force associated with the economic downturn, the DEC Watershed Coordinator position that was responsible for river basin planning and certain water quality projects in this drainage area left State service in June 2009.

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Introduction

The DEC Watershed Coordinator for the Batten Kill, Walloomsac and Hoosic River was hired in 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 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 and better understanding regarding mechanisms for addressing local concerns.

Numerous projects had been completed throughout the basin 1 area prior to June 2009. A representative sampling of projects were reported in the 2010 basin planning report submitted to the Legislature.

Since June 2009, DEC has been maintaining contact with members of the watershed councils. In light of the reduction in force, the supervisor for DEC watershed coordinators has accommodated certain planning activities, as time permits. Progress has occurred on refining and prioritizing draft water quality strategies for waters in the Basin 1 area. The Bennington RPC conducted an evaluation of water quality based elements

found in the town plans and town land use regulations for towns within Basin 1. The RPC also compiled a preliminary listing of Basin 1 existing uses.

Watershed Planning Initiatives (prior to June 2009 unless otherwise noted)

Activity	Status	Comments/Information
Public forums held	C	14 public forums held in 2007.
Watershed Council formed	C/O	Watershed Councils formed in 2007. DEC continued contact with councils in 2010.
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	O/C	Strategies for major water quality issues have been formulated by the watershed councils. Strategies reviewed and prioritized during 2010.
Review of town plans and zoning	O	Town plan and zoning regulations will continue to be reviewed. In November 2010, BCRC presented to the councils about the current status of the water resource sections of the town plans and town land use regulations. This will allow for BCRC and DEC 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		Targeted for 2011.
Final basin plan		Targeted for 2011.
Outreach to area schools and local groups	I/O	Coordinator worked with local High School Teachers on a water quality monitoring program and service learning projects.
Basin Assessment Report	C	Report completed August 2002.
Phase I Stream Geomorphic Assessments	O/C/I	Completed for the Batten Kill in 2004. Walloomsac River completed in 2006. Phase I for the Hoosic completed in 2009.
Phase II Stream Geomorphic Assessments	O/C	Completed for the Batten Kill in 2005. Completed for the Walloomsac River in 2007.
Bridge and Culvert Inventory	O/C	
Dam Inventory		
Biological Monitoring	C	Completed Fall 2008.
Restoration/Protection Projects Underway	O	Refer to 2010 legislative report.

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

Conclusion & Plans for 2011

The basin planning process remains underway in Basin 1 but at a reduced level compared to that found in 2006 - 2009. The two watershed councils for the Basin 1 area will continue to refine draft action orientated recommendations and strategies for addressing water quality concerns. These strategic recommendations, along with existing uses and goals for the management of the waters, will ultimately be included in the draft basin plan.

DEC will continue to coordinate with the Bennington County RPC and the Bennington County NRCD in order to produce a draft river basin water quality management plan in 2011.

Poultney-Mettowee – Basin 2

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Introduction

The Poultney-Mettowee River Basin Water Quality Management Plan was adopted 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 was distributed to partners and residents throughout the Poultney-Mettowee basin area. 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. Most of the strategies identified in the basin plan have either already been implemented or are in the process of implementation. Remaining strategies 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 Planning Initiatives

Activity	Status	Comments/Information
Public forums held	C	Public forums were held in 2001 & 2002 to identify water quality issues and concerns and also actions in which the participants were most interested
Watershed Council formed	C	The Poultney Mettowee Watershed Partnership was expanded to serve the role of watershed council.
Local water quality (WQ) issues identified	C	Through public forums, focus group discussions, public attitudes surveys, and other media outreach.
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	The Rutland Regional Planning Commission reviewed town plans and zoning regulations in the Poultney Mettowee Basin as part of an EPA 604(b) pass-through grant. VLCT did an additional assessment of town plans and zoning regulations in the Fall of 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 WMT 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 (WRP) to ensure a transparent and defensible protocol is used for future typing efforts. However, this has proven

		ineffective and inadequate.
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 th 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 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. Updated assessment information is available to watershed stakeholders from DEC on an as-needed or as requested basis.
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 bio-monitoring sites 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 watersheds.

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

Notable River & Stream Restoration Projects in 2010

Waterway	Water Quality Concern	Current Actions
Lake Saint Catherine and Little Lake	Thermal modification, sedimentation, nutrient enrichment, invasive plant species	Shoreland outreach and education - BMPs, lake resident outreach and riparian planting project (LEAP), water quality monitoring program, watershed surveying, water quality management strategic planning, and better backroads projects.
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.

Castleton River	Ongoing concerns over flooding, stormwater runoff, nutrient enrichment, and sedimentation.	River corridor planning and assessment, landowner enrollment in USDA-NRCS cost share programs, river conservation easements and passive river restoration project implementation (berm removal)
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Highlights for certain ongoing 2010 projects throughout the basin:

Lake Saint Catherine Watershed – Better Backroads Inventory & Capitol Budget

An ongoing assessment and inventory project is underway in the Lake Saint Catherine watershed that identifies road infrastructure elements that will require significant funding and resources to minimize sediment contributions. These issues were prioritized based on the potential to maximize town involvement such as road crew time availability, funding availability, threat to infrastructure, and/or erosion severity. Road projects identified through the inventory process will make the roads less susceptible to severe damage during heavy rains or flash flood events and save the town expensive repairs. In addition, having an inventory and budget plan, especially one that shows potential cost savings, can help convince voters to allocate funds to accomplish erosion control.

Poultney River Active Area Project

The Nature Conservancy (TNC) has developed the *Active River Area Project* as a river conservation planning tool, and received a private foundation grant to create a small number of ARA demonstration projects in the Eastern US. With this support, the Vermont Chapter is interested in developing demonstration projects in two Lake Champlain tributaries: Lewis Creek and Poultney River. TNC has completed their analysis and discussed the interpretation of their results in order to inform their final product for the project, a “conservation blueprint” that identifies conservation priorities based on the Active River Area conservation assessment framework.

Town of Benson Stormwater Mitigation Project

This project was implemented to correct a stormwater problem at the intersection of Stage and Lake Roads in Benson Village. Currently, stormwater collects and ponds due to runoff from over an acre of paved surface and 1500 square feet of unpaved surface. Environmental concerns addressed include: (1) elimination of stormwater runoff through the gas station island, preventing most gas spills from reaching the storm drain; (2) elimination of sediment and gravel from entering the stormwater drain by paving the 1500 square foot area adjacent to the store; (3) reduction of the amount of silt and gravel entering the storm drain at this location by the installation of the diagonal rain garden. This project was funded by the ANR Clean and Clear Program.

Gully Brook Berm Removal Project

As part of the ongoing restoration of the Gully Brook/Castleton River confluence restoration work, a lower section of the western berm along Gully Brook was removed to reconnect the historic confluence/ floodplain that will contribute to a dynamic equilibrium condition at this location in Castleton. In addition, the landowner has enrolled approximately 10 acres along the floodplain in the Conservation Reserve Enhancement Program (CREP), which should also serve to restore the riparian corridor. This project directly implements high priority strategies identified in the Castleton River Corridor Plan and was funded through the Clean and Clear Program. This project was funded by the ANR Clean and Clear Program.

Conclusion & Plans for 2011

Overall, partners in the basin planning process have indicated that collective efforts have been quite 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 are now 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 2011, the partners involved in the basin planning process are committed to the ongoing implementation of strategies identified in the 2005 basin plan. There will be expanded river corridor planning and associated project implementation throughout the watershed. Agricultural cooperators will see an increase of 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. A high priority will be ongoing restoration projects and public education activities. Also, high priority will continue to focus on outreach and education of water quality issues.

Finally, the basin planning process allowed partners to prioritize and implement several restoration projects throughout the basin this year. There are many other potential projects in the works for future restoration efforts. All of these will improve the water quality locally as well as help reduce phosphorus reaching Lake Champlain.

Otter Creek – Basin 3

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Introduction

Draft Basin Plan Development & Planning Process

The *draft* Otter Creek Basin Plan is anticipated to be available for review in 2011. 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, it will be released to all partners for review in order to initiate the public process for approving the document. The *draft* Otter Creek Basin Plan is being developed 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. The draft plan will serve as a roadmap to guide projects within the watershed and will help to leverage funds to accomplish the goals it sets forth.

A comprehensive list of existing uses for swimming, fishing, and water supply surface waters for the draft Otter Creek Basin Plan is being reviewed for inclusion in the draft basin plan. The agricultural section of the draft plan has been reviewed by the Vermont Agency of Agriculture and will be incorporated into the draft plan. The draft basin plan is anticipated to be released for public review mid- winter 2011.

In general, the DEC 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 Planning Initiatives

Activity	Status	Comments/Information
Public forums held	C	A series of public forums were held in Rutland County in the winter 2003 and in Addison County during spring 2004.
Watershed Council formed	C	The Upper Otter Creek Watershed Council was formed in spring 2003. Existing watershed groups are established in the Addison County portion of the basin. A basin wide agricultural work group has been meeting 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	The UOCWC, basin-wide advisory committee, AG work group, and various stakeholders continue to develop and review draft strategies to address water quality issues.
Draft white papers for water	C	Issue papers for priority water quality concerns identified thus far are

quality issues		currently being drafted and reviewed.
Review of town plans and zoning	C	Completed in 2006 for Rutland County. Completed as a 604b grant project for Addison County RPC.
Develop water management type (WMT) classification proposal	On-hold	
Meetings with towns on the WMT classification proposal	On-hold	The Addison and Rutland RPCs had been assisting in this effort. However, the status of WMT is TBD.
Draft basin plan	O	A rough draft plan has been developed with anticipated review and revisions to occur in 2011.
Public hearings on draft plan	I	Anticipated in early 2011.
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. Updated assessment information is available to watershed stakeholders directly from DEC on an as-needed or as requested basis.
Phase I and II Stream Geomorphic Assessments	O/C	Phase 2 and FEH 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

Several highlights for certain ongoing 2010 projects throughout the basin:

During 2010, the DEC Watershed Coordinator initiated a project with the **Addison County River Watch Collaborative (ACRWC)** to develop a flow monitoring component of this year's Addison County River Watch Collaborative water quality monitoring project via the LaRosa Analytical Partnership program. This will make possible the determination of relative importance of both dissolved and particulate phosphorus to identify 1) the relative importance of particular sub-basin contributions of nutrients, 2) Within a priority sub-basin (Little Otter Creek selected), identify areas in need of further investigation and 3) analysis of long term trends. This required the establishment of flow rating curves for the Little Otter Creek, where staff gauges were installed as a component of the flow monitoring project to better understand nutrient loading as per flow rates in the Little Otter Creek system. In addition, a corridor planning steering committee was convened with representatives from ANR (DEC), USDA-NRCS and the Addison County River Watch Collaborative.

In the **Upper Otter Creek Watershed**, the Rutland NRCD 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 2010 calendar year, the Rutland NRCDC initiated the **Rutland City - Moon Brook Watershed Low Impact Development (LID) Project**. In cooperation with the City of Rutland and ANR, project is targeting multiple businesses along urban corridors in Rutland City to implement LID practices for both demonstration and stormwater mitigation. Several businesses have signed on to do LID practices, including the removal of existing impervious and encouraging greater infiltration and/or dissipation in vegetated areas. Site plans have been developed for a few of these urban properties where landowners are agreeable to LID practices to address stormwater runoff in the City.

Combination Pond Alternatives Analysis – Moon Brook Basin

Moon Brook (from its mouth at Otter Creek upstream to Combination Pond) is included on the State's list of impaired waters due to stormwater. The brook was first listed in 2004, based on data that shows the brook is unable to fully support certain types of aquatic life. Elevated water temperature in Moon Brook is a pollutant that contributes to the stormwater impairment, specifically in the upper reaches of the watershed in the vicinity of Combination Pond. Of eleven temperature monitoring stations maintained by the City of Rutland, the outlet of Combination Pond had the highest water temperature. A maximum two day average of 79 degrees F was recorded below the outlet of the pond in August 2007. These temperatures can be lethal to brook trout.

The City of Rutland and ANR agree that the elevated temperatures of manmade Combination Pond adversely affect certain types of aquatic life in Moon Brook and the brook is seasonally too warm to support coldwater fish like brook trout. The question is how best to address that impact.

The project partners (City of Rutland and ANR) would like to study the feasibility of altering the pond to eliminate the problem. The hope is that such a change will lead to significant improvements for the viability of brook trout in Moon Brook, which DEC currently categorizes as an impaired waterway. Any change the study identifies is likely to be significant — and could even include taking the pond off-stream or removing it entirely. However, any proposed change would be subject to public input and the concerns of residents living near and adjacent to the pond will be thoughtfully considered.

Otter Creek Basin Municipal Stormwater Mapping and Illicit Discharge Detection & Elimination (IDDE) Project

The goal of this project is to develop a map of the urbanized area drainage infrastructure including catch basins, lines, outfalls and any stormwater treatment structures, if one does not exist. Once the map is completed, a survey of the outfalls is planned to make sure there are no cross-connections with the wastewater system. If a cross-connection (also called an illicit discharge) is found, cross-connections are to be isolated and addressed. A consultant will perform the testing and investigative work. This type of activity can be very cost effective in terms of reducing phosphorus and bacteria in stormwater and in the receiving waters. It is also useful to the Town for maintenance and emergency spill response purposes. This work plan is presented as a template for the 6 Otter Creek basin municipalities which will be addressed by this project. These municipalities are Vergennes, Middlebury, Pittsford, Brandon, Rutland Town, and Rutland City.

Notable River & Stream Restoration Projects in 2010

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 (sections 319 and 604b), competitive watershed grants (Lake Champlain Basin Program,

UVM-Sea Grant), foundations (Vermont Community Foundation, Musser, NFWF), and state grant programs (watershed/conservation license plate grant program, LaRosa Laboratory Grants for Analytical Services, and the River Management Program – River Corridor Grants through Clean and Clear). Examples include:

- River Corridor Planning underway in the Neshobe River Basin
- River Corridor Planning underway in the Little Otter Creek Basin
- Assessment of biological, chemical, and physical condition of waters (ongoing)
- Moon Brook (Combination Pond) Alternatives Analysis (initiated)
- Outreach and enrollment of riparian landowners in USDA-NRCS cost share programs, especially where CREP can be combined with CRP (ongoing)
- WHIP projects – developed collaboratively with USDA-NRCS and Rutland NRCD
- New Haven River Corridor Management Planning and project development (initiated)
- Otter Creek Wetlands Restoration – Wetland Reserve Program (Brandon – underway)
- Elfin Lake Rain Garden Demonstration Project – Wallingford

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 DO 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 watershed residents of Moon/Mussey brooks. Stormwater runoff remediation projects 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, agricultural land taken out of production along riparian corridor. Passive river restoration (conservation easement) project underway 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 adopted in the town of Ripton. River corridor planning (and FEH development) underway in Bristol.
Lewis Creek	Nutrient enrichment, sedimentation, geomorphic instability, historic channel modifications	Lewis Creek corridor planning, water quality monitoring, riparian corridor planning/ protection projects, outreach with towns in the watershed.
Little Otter Creek	High levels of pathogenic bacteria, nutrient enrichment, historic channel modification	River corridor planning, outreach to agricultural operators for buffer planting, livestock exclusion via NRCS cost-share programs, water quality/flow monitoring project underway.

Conclusion & Plans for 2011

Overall, the planning process has provided many opportunities for collaborative problem solving among stakeholders that will help to ensure in the future successful restoration efforts throughout the Otter Creek Basin.

For 2011, 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 (e.g., Lewis Creek Association and the Addison County River Watch Collaborative) 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 Lake Champlain Direct Drainages – Basin 4

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Introduction - The South Lake Citizens Advisory Committee

Partners in the Poultney and Mettowee River Basins as well as the Lower Champlain Direct drainage have been meeting regularly as the “South Lake Workgroup,” a subgroup of the Lake Champlain Citizens Advisory Committee to discuss issues and develop strategies 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 (ie South Lake “A” and “B” segments) and has also included partners on the New York side of the Lake.

Following a series of meetings convened to present an overview of several ANR and Vermont Agency of Agriculture programs and activities that have been operating and implementing projects in the greater South Lake area in order to inform South Lake Workgroup members of the existing resources and assistance. These meetings were offered for the purposes of informing South Lake Workgroup members for consideration in the development of the **South Lake Workplan** and partner coordination/ implementation. These meetings provided information on agricultural resource programs, river basin planning, stormwater management, river corridor planning and management, wetlands protection, and better backroads management.

An inventory of assessment information for these Southern Lake Champlain river basins serves as the foundation to continue the implementation of the Workplan (i.e., the water quality management plan for the South Lake). The South Lake Workgroup directly benefits from this assessment work in providing 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 NRCDC, and DEC Water Quality Division.

Watershed Planning Initiatives

Activity	Status	Comments/Information
Public forums held	C	Initial public forums are anticipated to be held during the winter and spring of 2008 - 2009
Watershed Council formed	O	The South Lake Group was expanded to serve the role of watershed council.
Local water quality (WQ) issues identified	C	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	C	South Lake Workplan developed (2010).
Draft white papers for WQ issues	I	As per issues identified in the Workplan.
Review of town plans and zoning	C	Rutland RPC reviewed town plans and zoning regulations in the Poultney-Mettowee Basin as part of a 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. Addison County RPC also conducted a review of town plans in its region.
Develop water management type (WMT) classification proposal	On-hold	
Meetings with individual towns on the WMT classification proposal	On-hold	
Draft basin plan	O	South Lake Workgroup is undertaken development of South Lake Workplan. Draft agricultural plan developed for Basin 4 – Lower Champlain Direct.
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 Bio-regionalism classes).
Basin Assessment Report	I	
Phase I Stream Geomorphic Assessments done	O	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&2 SGA initiated for East Creek.
Phase II Stream Geomorphic Assessments done	O	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 underway or completed for each town in the Poultney-Mettowee basin. Castleton assessment completed in 2005 via ANR protocols.
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 and East Creek (Basin 4)

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

Other watershed initiatives include:

Water Quality Monitoring for Lower Champlain Direct Tributaries

The DEC Watershed Coordinator continues to collect water quality samples on East, Hospital, and Whitney Creeks. Total Phosphorus results have proven to be the most compelling thus far. Compiled water quality data thus far show approximate summer flow data for the South Lake area (via Putnam Creek, NY) and water

quality monitoring data for total phosphorus, total nitrogen, turbidity, and *E. coli*. These data were collected for the first time for South Lake tributaries with samples analyzed by the DEC LaRosa Lab this year.

Draft Lower Champlain Direct Agricultural Plan Outreach

The Agricultural Resource Specialist for the Lower Champlain Direct drainage and the DEC Watershed Coordinator have been conducting meetings to present the draft Basin 4 Agricultural Plan to the Addison County Farm Bureau, Otter Creek NRCD and the Addison County RPC.

East Creek Basin – Corridor Planning Steering Committee

A kick-off meeting was held this summer for river corridor assessment and planning for the East Creek Basin in Orwell and Shoreham with participation from town officials, riparian landowners and farmers. In addition, conservation opportunities were discussed through NRCS' Wetlands Reserve Program. Preliminary assessment information shows that reaches assessed thus far tend to be heavily wetland influenced and seem to have relatively stable channels. The soils are typically cohesive clay with little sediment transport evident. Most of reaches assessed also indicate extensive buffer plantings have been recently installed via the Conservation Reserve Enhancement program (CREP).

Conclusion & Plans for 2011

Overall, the planning process has provided many opportunities for collaborative problem solving among stakeholders that we anticipate for future, successful restoration efforts throughout the Southern Lake Champlain Basin.

For 2011, stakeholders and water quality issue groups will review and revise the South Lake Workplan and will evaluate the Plan as per the revised Lake Champlain TMDL Implementation Plan. Following a broader vetting via the Lake Champlain Citizens Advisory Committee, South Lake Workgroup partners have initiated project implementation and other monitoring and assessment activities that have been identified in 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). These 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 Direct Drainages - Basin 5

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Introduction

A watershed council for this drainage area met for the first time in late April 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 ANR'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 NRCD 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 waterbodies.

ANR and various watershed partners have been involved in strategy implementation since 2005. In addition, the ANR'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 Planning Initiatives

Activity	Status	Comments/Information
Public forums held	C	Forums held in Shelburne, Colchester, North Hero, 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 2003.
Strategies for water quality issues	C	Strategies were developed with local groups and then reviewed and

were formulated		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	On hold	
Meetings with individual towns on the WMT classification proposal		
Draft basin plan	C	Draft basin plan has been completed.
Public hearings on draft plan	C	Public hearings held in South Hero, Hinesburg, South Burlington.
Final basin plan	C	Signed as approved by DEC and ANR October 2009.
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 sent to all town officials in the basin. Articles have appeared in local newspapers.
Basin Assessment Report	C	Basin assessment report completed December 2003. Updated assessment information is available to watershed stakeholders directly from the DEC on an as-needed or as requested basis.
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: https://anrnode.anr.state.vt.us/ssl/sga/security/frmlogin.cfm
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

Notable River & Stream Restoration Projects in 2010¹

Waterway	Water Quality Concern	Current Actions
Northern Lake Champlain Basin	Nutrients, sediment, hydrology	Provided education on lake-friendly lawn care to retailers and homeowners including distribution of "Don't P on your lawn and other lake-friendly lawn care practices" brochure with partners, coordinated display at baseball game.
Northern Lake Champlain Basin	Nutrients sediment hydrology	Continued to assist in promotion of LID practices that treat stormwater from existing development. Projects included: rain garden contest, rain garden workshop, 4 rain barrel workshops (60). Education efforts include assisting with the development of stream team effort to promote volunteerism within the MS4 towns. Efforts to encourage the business community to implement practices including a LID presentation and display at a conference for small businesses (also applies to Basin 8 and also see efforts in Potash Brook.)
Northern Lake Champlain Basin	Nutrients Sediment hydrology	Assisted ReSource, a youth job training program, in obtaining a grant to build affordable rain barrels for sale and provide stormwater education information. Distribution of over 200 barrels is expected (also applies to Basin 8).

¹ Projects assisted by the DEC watershed coordinator between 2004 -2009 can be found in previous basin planning progress reports to the Legislature.

Potash Brook	Nutrients sediment hydrology	Assisted with developing city disconnect program and residential stormwater education including encouraging the use of rain barrel, rain gardens. Assisted in the distribution of 100 rain barrels and one rain garden workshop.
Lake Iroquois	Nutrients sediment	Assisted lake assn. with planning and successful grant application to reduce sediment deposition from stream erosion.
Thorp Brook	Nutrients, sediment	Continued assist and fund watershed group monitor WQ project, including project to determine nutrient removal from floodplain forest.

Conclusion & Plans for 2011

In 2011, 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.

Missisquoi River - Basin 6

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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 ANR and the Deputy Secretary of the Vermont 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 ANR 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.

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. Vermont's 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 rivers process. The legislation was authorized by Congress in 2009. Local representatives are participating in a steering committee that is 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 Planning Initiatives (up through August 2008)

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 developed prior to August 2008. Northwest RPC awarded grant to assist WQD with plan completion in 2011.
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	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 WQD-RMP.
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 Underway	Projects	C/O	
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Key: I = initiated, O = ongoing, C= completed

Conclusion & Plans for 2011

Since the departure of DEC's Watershed Coordinator in 2008, basin planning activities have largely been curtailed in favor of ongoing implementation directed by the Center for Clean and Clear. Basin planning work will continue in 2011 in relation to Wild and Scenic efforts being coordinated by the National Park Service (study area includes Vermont portion of the upper Missisquoi from its headwaters to Richford and the Trout River). Additional planning efforts by DEC include oversight of grant funds being used by the Northwest Regional Planning Commission to help complete the drafting of the basin plan.

Lamoille River – Basin 7

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Introduction

DEC's Watershed Coordinator and watershed partners developed a water quality improvement plan for the Lamoille River watershed. A series of public meetings were held in the fall 2008 to solicit public input to the plan. The plan, signed as approved by DEC and ANR in October 2009, 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 Plan have been initiated or completed.

Assessment and Monitoring

Additional physical, chemical, and biological monitoring and assessment activities in the basin's lakes, ponds, and streams occurred because of the watershed initiative. Phase 1 and 2 geomorphic assessments were completed or underway in the following sub-watersheds: Browns River, Gihon River, Centerville Brook, North Branch, Elmore Branch, Wild Branch, Rodman Brook, and entire Lamoille main stem. Geomorphic assessment work has been administered by the Lamoille Regional Planning Commission and Caledonia NRCD and 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 bacteria source tracking at over 20 sites in major Lamoille basin subwatersheds with the UVM EPSCoR program. This program has continued in 2010.

Urban-related Runoff Restoration & Outreach

Numerous watershed restoration projects were identified and implemented during the 2010 field season. The Watershed Coordinator assisted the Town of Walden in the remediation of two road-related erosion projects with Better Backroads grant funding in Belvidere and Walden. Additionally the Coordinator assisted these towns in submitting two additional road erosion remediation proposals for Better Backroads.

The Coordinator worked with the Lamoille River Anglers Association, the Vermont River Conservancy, DEC-WQD 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 has been working with the Stormwater Section and Green Infrastructure Coordinator and secured funding to inventory and map stormwater related projects in many of the village centers along the Lamoille River.

Agriculture & Logging-related Restoration & Outreach

The Coordinator assisted the Caledonia, Winooski, and Lamoille NRCs in the establishment of riparian buffers at several sites along the Lamoille River and Browns River. (Also see Impaired Waters Remediation) The Coordinator, Lamoille NRC, and Vermont DF&P launched an initiative called the Portable Skidder Bridge Rental 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.

The Coordinator is actively involved in the Lamoille Local Work Group which has identified and prioritized top water and natural resource concerns in the watershed.

Impaired Waters Remediation

The Coordinator and watershed partners have initiated watershed restoration and inventory activities in the geomorphically altered Browns River watershed. Working closely with the DEC-WQD River Management Program, the Winooski NRC, 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 have secured funding for fish passage improvement projects on four stream crossings, expanding riparian forest buffers and filter strips along agricultural lands, reducing erosion from municipal roads, restoring wetlands, and excluding livestock from waterways. Additionally, funding was secured to remove four abandoned bridge abutments and one active undersized bridge that were constricting flows and responsible for bank erosion on the Browns River. The Coordinator, Vermont River Conservancy and River Management Program secured funding to protect approximately 2 miles of river frontage of the Browns River in Jericho with a permanent river corridor easement. An Agriculture and Water Quality workshop and field trip for small farmers occurred in October 2009. DEC has also submitted funding proposals to prepare a River Corridor Management Plan for the impaired Mill Brook watershed.

Swimming Hole Protection

The Coordinator is working with the Vermont River Conservancy, the Town of Johnson and a landowner to protect a significant swimming hole and gorge in the Foote Brook watershed.

Lakes, Ponds, Wetlands

The 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.

The Vermont Nature Conservancy has successfully secured funding to protect the shoreline around Flag Pond which had been identified as significant wetland habitat.

Potential Dam Removal Project

The Coordinator initiated discussion with the Town of Jericho about the possible removal of dam which is a significant sediment impediment on the Browns River. The dam has been identified as responsible for significant upstream streambank erosion.

Watershed Planning Initiatives

Activity	Status	Comments/Information
Public forums held	C	8 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 has held over 40 meetings with select boards, planning commissions, and conservation commissions.
Draft basin plan	C	A draft basin plan has been developed.
Public hearings on draft plan	I	Held during 2008.
Final basin plan	I	Approved October 2009.
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 basin.
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 basin wide (see below).

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

Notable Watershed Restoration Projects in 2010

Waterway	Water Quality Concern	Current Actions
Browns River,	The Browns River is	A river corridor management plan was prepared for the towns of

Chittenden County	adversely impacted by severe streambank instability and erosion	Essex, Jericho, Underhill and Westford. A wetlands inventory mapping project has been completed. Coordinator, DEC River Management & Winooski NRCDC have 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 this watershed.
Browns River watershed, Westford	Road-related erosion to waters	Coordinator identified several road erosion sites within town and provided technical assistance to remediate problems.
Riparian Buffer Establishment, basin wide	Lack of riparian buffer	Coordinator is working closely with NRCDCs providing technical assistance in site identification based upon geomorphic compatibility
Upper & mid-Lamoille	Logging-related erosion at stream crossings	Continued the successful Lamoille Portable Skidder Bridge Rental Project with Lamoille NRCDC to reduce erosion at stream crossings
Roads in Walden	Erosion and sedimentation from town gravel roads	Coordinator provided technical assistance in the implementation of 2 projects to address erosion related to municipal road systems.
Zack Woods Pond and Mud Pond, Hyde Park	Erosion & sedimentation from town road	Coordinator provided technical assistance to the Friends of Zack Woods and Morrisville Water & Light Department 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.

Conclusion & Plans for 2011

Plans for 2011 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. Projects include flood plain encroachment removals, buffer plantings, securing river corridor easements, livestock exclusion from waterways, and upgrading five culverts for fish passage and sediment transport.
- Undertake Phase 2 Geomorphic Assessment and River Corridor Management Plan for the Mill Brook watershed (impaired waterway) and the North Branch watershed.
- Initiate a pilot buffer planting project in the Mill Brook watershed.
- Prioritize and submit funding proposals for upgrades of stream crossings in the upper and middle Lamoille watershed to accommodate aquatic organism passage.
- 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.
- Development of a fluvial erosion hazard map for the towns of Underhill and Jericho.

- Continue establishment of riparian buffers along lakes and streams throughout the watershed with watershed NRCDs.
- Assist additional towns in securing funds for road runoff issues.
- Integrate completed chemical, physical, and biological assessment and monitoring results to better target watershed restoration and protection projects.

Winooski River - 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. In July 2009, 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 Planning 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	O	A lower and an upper council were formed and have met monthly since the late winter 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	C	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	On hold	
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 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: https://anrnode.anr.state.vt.us/ssl/sga/security/frmlogin.cfm

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 Underway	Projects C/O	Numerous projects are underway basin wide (see below).

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

Notable River & Stream Restoration Projects in 2010

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.
Winooski River	Sediment, chlorides	Developed and funded workshop with partners for town road crew and conservation commissions to help facilitate implementation of more road BMPs.
Winooski River	Sediment, nutrients, hydrology	Published manual to encourage community residents to promote implementation of LID practices in their neighborhoods. Also see projects in Basin 5.
Mid-Winooski	all	Provided funding to watershed group for educational program with high school students and community.
Huntington River	Sediment	Assisted Hinesburg Town Forest committee in developing a successful grant application to stabilize logging roads.
Huntington River	E. coli	Facilitated meeting to review water quality data collected with partners to identify sources as part of the development of the E. coli TMDL
Winooski River, Marshfield, Plainfield, Worcester	Lack of riparian buffer	Riparian buffers established along several thousand feet.
Upper Winooski	Sediment, nutrients, hydrology	Assisted in promoting practices that treat stormwater on existing surfaces. Installed rain garden at Cabot school with partners, organized and led to rain barrel workshops in Barre.
Upper Winooski	Fish passage Sediment temperature	Prep work on removal of Marshfield #8 dam continues, with removal planned for 2011.
Dog River	Fish passage Sediment	Union Brook Dam in Northfield removed in September 2010.

	temperature	
Lower Winooski	Sediment, nutrients, hydrology	Led neighborhood rain barrel workshop.
West Branch	Nutrients	Wrote newspaper article on lake friendly lawn care.
Allen Brook	Sediment	Funded stream buffer & flood plain restoration project at brook's mouth.
Alder Brook	Nutrients	Funded and assisting with neighborhood education program.

Conclusion & Plans for 2011

The DEC Watershed Coordinator will continue to work closely with watershed partners in the Winooski River basin. 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 2011 the watershed planning efforts will include beginning to draft a Basin 8 water quality management plan, likely using the structure identified in section 2 of this report, and defining objectives, tasks, responsible parties, schedules and potential funding sources.

White River – Basin 9

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Introduction

ANR adopted the water quality management plan for waters of the basin in November 2002 and the Vermont Water Resources Board (Board; now Water Resources Panel) held public hearings in February 2005 and subsequently approved the Agency's water management typing and classification proposal for surface waters in the basin. The Legislative Committee on Administrative Rules (LCAR) reviewed the Board's proposed rule but has not approved them. At LCAR's request, parties opposing the proposal, ANR and the Panel are in discussions to develop a revised proposal, including a process for developing future typing and classification proposals.

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 & Partner 2010 Efforts

Following a brief absence, in 2009 DEC reestablished its watershed planning initiative in the White River basin. The DEC watershed coordinator and ANR watershed forester have co-developed the Class 4 Road Erosion Inventory Project with the WRP and the Two Rivers RPC. 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.

Project partners successfully secured funding to undertake remediation efforts in 4 towns on 6 separate road projects. Funding was secured for a Vermont Youth Conservation Corps Crew to implement road best management practices such as stone-lined ditching, stone turnouts, streambank stabilization, culvert headers, and culvert outlet stabilization structures. Four weeks of crew work was completed in 2010. The participating municipalities provided in-kind support in using their highway crew labor and equipment. Over \$80,000 was secured for these projects. These partners continue to apply for funding from various sources to implement road erosion remediation and aquatic passage improvement projects throughout the watershed.

DEC's watershed coordinator assisted the Towns of Chelsea and Randolph and the White River NRCD in submitting four Better Backroads grant proposals to undertake road erosion remediation, stream crossing upgrades, and develop road improvement capital budgets.

DEC's Watershed Coordinator assisted the WRP, Trout Unlimited, and US Forest Service staff in replacing a failed in-stream culvert baffle structure. The baffle structures improve fish and aquatic organism passage.

The WRP also initiated the first in the nation 'Landscape Auction' to protect high priority water and natural resources in the White River basin area. Over \$20,000 was raised for this project.

The Coordinator assisted the WRP with riparian buffer plantings and watershed ecology outreach to middle school students.

The White River NRC, the Vermont Agency of Agriculture and DEC have secured a \$13,000 Clean and Clear grant to undertake an agricultural BMP need inventory and project restoration in the Second Branch sub-watershed.

DEC's Watershed Coordinator also provided assistance to the WRP in selecting water quality monitoring sites for their LaRosa Lab grant.

The Coordinator participated in the White River NRC Local Work Group to identify and prioritize water and natural resource priorities for the watershed.

Watershed Planning Initiatives

Activity	Status 2002 / 2010	Comments/Information
Public forums held	C/NI	Four public forums held in 2000.
Watershed Council formed	C/NI	White River Partnership and others served this function.
Local water quality issues identified	C/NI	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/NI	Technical staff participated in development of strategies, gave presentations during public hearings.
Strategies for water quality issues formed	C/NI	Strategies were developed to resolve each priority water quality issue.
White papers on WQ issues	C/NI	8 water quality issue fact sheets were developed.
Review of town plans and zoning	C/NI	All town plans and regulations were reviewed.
Develop water management type (WMT) classification proposal	C/I	A water management typing proposal, developed by DEC (2002) and based on existing, reasonably attainable and desired water quality, was withdrawn. Two Rivers Ottauquechee RPC has been charged by Legislature to develop typing recommendations for basin 9 waters before January 31, 2011.
Meetings with individual towns on the WMT classification proposal	C/NI	Information about the typing proposal went to all watershed towns. DEC met with 17 selectboards and planning commissions, 1 conservation commission.
Draft basin plan	C/NI	Working Draft Fall 2001.
Public hearings on draft plan	C/NI	September 2002.
Final basin plan	C/NI	Signed and adopted 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 completed November 2002.
Phase I Stream Geomorphic	C	Completed on upper White, First, Second, Third Branches and

Assessments		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 to bracket possible sources of pollution and determine long-term water quality trends.
Restoration/Protection Underway	O/I	Numerous watershed and restoration projects are underway basin wide (see below).

Key: I = initiated, O = ongoing, C= completed, NI= not initiated

Notable River & Stream Restoration Projects in 2010

Waterway	Water Quality Concern	Current Actions
Basin wide	Erosion from Class 4 town roads	Partners have identified and prioritized road with significant erosion and sedimentation entering waterways. Partners have prepared several funding proposals to address these sites. Six sites in 4 towns have been improved reducing significant sources of erosion and sediment to various waterways in the basin.
Basin wide	Fish & aquatic passage at stream crossings	Watershed partners have identified several stream crossings for replacement or retrofitting to better accommodate fish and aquatic passage. One structure was improved in 2010 and funding secured for several others.

Conclusion & Plans for 2011

The DEC Watershed Coordinator will initiate proposed tactical planning process and 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 3 and and Class 4 Roads.
- Increasing riparian buffer establishment especially in the 2nd and 3rd Branches and Ayers Brook.
- Agricultural BMP needs inventory and implementation in the 2nd Branch.
- 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 consistent with DEC's new Tactical Basin Plan process and template.
- Identification of high priority stream reaches for river corridor protection easements and swimming hole protection in the lower main stem and direct tributaries area.

Ottauquechee and Black Rivers – Basin 10

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Introduction

The river basin water quality planning process of holding watershed council meetings has been completed and the draft plan is being written. Council members focused on a number of topics relevant within the Basin which are showcased below.

Agriculture	Invasive species	Use & Values of surface water
Buffers	Lakes & Ponds	Water quality conditions
Dams	Recreation	Wildlife & travel corridors
Fisheries	Roads	
Floods & flood hazards	Town planning & Zoning	

Recommendations from these meeting have been drafted into strategies and incorporated into the draft Plan. Above all others, the greatest concern and the most recommended solution to water quality concerns is the need for riparian buffers. The lack of buffers is a problem on developed and agricultural lands. Riparian buffers are needed to protect water quality, fisheries, wildlife habitat and travel corridors, prevent flood damages, improve recreational sites, and keep streambanks from eroding. There was no topic in which buffers was not mentioned. Hence, buffers play a large role in the strategies laid out in the Plan.

The schedule of draft Plan issuance was modified to accommodate the Water Quality Division's re-evaluation of the basin planning process and development of a Statewide water management plan. As the Basin 10 process was well underway prior to the development of the proposed new format, it is envisioned that the Basin 10 water quality management plan will be a hybrid between the old and new formats. This will make the Basin 10 Plan more useful as the proposed revised planning process comes into full use.

Some exciting projects have developed in 2010. The Ottauquechee River Group (ORG) initiated the re-birth of water quality monitoring on the river after an 18 year hiatus. The program successfully monitored 10 sites on the river and tributaries. Further, the first in the state Cooperative Invasive Species Management Area has been established in the watershed.

The deliberate contamination of the Black River arising from over 4,000 gallons of released fuel oil was a blow to the river and shock to watershed citizens. Survey and assessment work continues and will be followed in 2011 to determine the long-term impacts of this act.

Stream geomorphic assessment in both the Black and Ottauquechee watersheds are and will provide the basis for future project development and implementation and active partners like BRAT, ORG, Lake Rescue Association, Green Mountain Horse Association and the local RPCs and NRCDs 2011 should be an active year.

Watershed Planning Initiatives

Activity	Status	Comments/Information
Public forums held	C	Four introductory forums held.
Watershed Council formed	C	13 meetings held.
Local WQ concerns identified	C	Local watershed groups and watershed residents are expressing concerns for particular waterbodies and issues.
Panel discussions on WQ issues	C	Topics covered to date are listed above.
Strategies for WQ issues formulated	C	Over 150 preliminary recommendations from council members have been formulated into plan strategies.
Draft white papers for WQ issues		
Review of town plans & zoning	O	One RPC has completed town plan reviews for 10 of 19 Basin towns.
Develop water management type classification proposal	On hold	
Meetings with individual towns on WMT classification proposal	On hold	
Watershed plan draft	O	Draft plan nearing completion.
Public hearings on draft plan		Scheduled for early 2011.
Final basin plan		
Outreach to area schools and local groups	O	Meetings with town committees, local groups, college classes continue.
Basin Assessment Report completed	O	Basin in current rotation for new assessment report, field work completed 2008.
Stream Geomorphic Assessments	C, O	SGA & CCP completed on the Black River mainstem and significant tributaries, also on tributaries to Round Pond. SGA study being initiated on the Ottauquechee River.
Bridge and Culvert Inventory (B&C)	O	Completed as part of P2 SGA on Black, underway on Ottauquechee by RPC and as part of SGA work.
Dam Inventory		
Biological Monitoring	O	BASS monitored in 2007 for assessment rotation.
Restoration/Protection Projects Underway or Completed in 2010	I,O	Projects are underway, see narrative above and chart below.

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

Notable River & Stream Restoration Projects in 2010

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).
	Stormwater contamination & runoff	Springfield Stormwater Survey, system survey and mapping completed and remediation options presented to town.
		Rain barrel Workshop offered by BRAT.
	Springfield Reservoir dam condition	Meetings with Springfield and Weathersfield held, Emergency Action Plan developed, town discussion initiated regarding long-term actions.
	SGA, CCP, FEH	SGA & CCP completed, FEH meetings with towns held.
	Lack of buffer ordinance	Assistance provided on development of buffer ordinance – Town of Windsor.
	Oil spill contamination	Provided assistance with river surveys, biological assessment, reporting.
Lake Rescue (Round Pond)	Sedimentation	Working with Lake Rescue Assoc., Lakes & Ponds Div., to identify sources of sediment and address road erosion issues.
		WQD completed new Lake Depth Survey.
	Buffer outreach needed	Addressed Annual Meeting gathering with I&E on buffers, assessment water quality & future planned work.
Ottauquechee	Lack of buffers	Expanded agricultural buffer planting, secured funds for further planting.
		Assisted Woodstock Con. Comm. with buffer and wetland zoning language development.
	Water quality	Initiated ORG Monitoring Program.
		Discovered illegal dumping, reported and fined.
		Secured funding SGA & CCP, work initiated.
		Held Kedron Brook Outreach meeting with Ag Resource Specialist to address horse related concerns and develop project to address them.
	Invasive species	Assisting with the development of the State's first CISMA (Cooperative Invasive Species Management Area) focused on the Ottauquechee watershed.
Basin 10	Road runoff	Active Better Backroads Program in Ludlow.

	Lack of water quality protection in town plans & zoning	Working with RPC to incorporate language into town plans and ordinances.
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Conclusion & Plans for 2011

Complete Basin 10 plan and public review process and bring plan to ANR Secretary for signature action.

Seek towns willing to sponsor Local Roads workshops and bring water quality related workshops to the Basin.

Ensure that all Basin towns and boards receive information on the new Basin 10 Plan and its contents and uses.

Black River:

Secure funding and carry out the remediation of the gully erosion site off Lincoln Street in Springfield identified in the Stormwater Survey study.

Work with the town to address other identified stormwater issues.

Hold more rain barrel workshops.

Lake Rescue:

Install a demonstration buffer on the shoreline.

Provide coordination for the Lake Rescue Association-supported sediment core sampling study.

Ottauquechee River:

Complete Ottauquechee Corridor Plan and initiate projects.

Further expand the Billings Farm agricultural buffer.

Hold outreach meetings in the Kedron Brook watershed and work with landowners on streambank restoration.

West, Williams, Saxtons Rivers – Basin 11

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Introduction

The ANR-adopted Basin 11 Water Quality Management Plan (2008) is being implemented by the DEC Watershed Coordinator in corporation with its many partners. Plan strategies being implemented by DEC and local partners include floodplain habitat restoration at Herrick’s Cove, re-establishing water quality monitoring through the Southeast Vermont Watershed Alliance, invasive species education and surveying, buffer plantings and geomorphic assessment work. Public outreach and gathering of input has continued with work on the Williams River bacteria problems, invasives plant VIP training, SGA presentations and work with town committees on zoning ordinances to protect sensitive wetlands and buffer zones.

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 April 1, 2004. Council members have been and continue to be part of all public forums.
Local WQ concerns identified	C	The 5 top WQ concerns identified by the watershed council are thermal modification, sedimentation, habitat alteration, flow alteration and 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 classification proposal	C/I	As part of plan development, water management typing recommendations were completed for all 29 towns in Basin 11. Protocol of typing process documented and submitted. Plan did not contain any typing recommendations. Windham RPC has been charged by the Vermont Legislature to develop proposed typing recommendations for

		basin 11 waters by January 31, 2011.
Meetings with individual towns on WMT classification proposal	On hold	10 of 29 basin towns had WMT presentations and discussions as part of basin plan development.
Watershed plan draft	C	Public meetings on the draft Plan held January 2008.
Public hearings on draft plan	C	Completed May 2008.
Final basin plan	C	Adopted 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 water quality related land management topics. Watershed coordinator offers presentations to towns, groups, schools and 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 and 2 completed. Rock River Phase 1 & 2 reports complete, Corridor Plan underway. Ball Mountain Brook Phase 1 & 2 and 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 Phase 2 assessments. 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 2010	I, O, C	Projects are being carried out throughout the basin, see narrative above and chart below.

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

Notable River & Stream Restoration Projects in 2010

Waterway	Water Quality Concern	Current Actions
Basin 11	Water Quality	SeVWA re-established its water quality monitoring program testing 17 sites and setup a laboratory services exchange with the CT River Watershed Council lab.
West River	Aquatic Nuisance Species	Retreat Meadows aquatic invasive species control project, river and lake VIP surveys, public education & VIP trainings offered, invasive educational display at Herrick's Cove Wildlife Festival.

	Development encroachment	Worked with town committee to minimize impact of recreational area development on riverbank and properly manage the floodplain.
	Stormwater	Proposed adding to the 303d list a tributary to Mill Brook for stormwater due to development area impacts.
	Flow impact on river ecology	The Nature Conservancy, working with USACOE, is studying the impact of dam operations on flora, fauna and floodplains in the Basin to potentially alter future operational procedures.
		USACOE hydro dams proposals – tracking progress of licensing process and issues.
	Erosion	Replaced failing culvert using SEP funds in Brookline.
	Invasives	Wantastiquet Lake (Weston) – dam replacement planning led to a survey of the lake to check for a suspected population of invasive rusty crayfish; none were found.
	<i>E. coli</i> contamination	Bacteria TMDL is being developed for the South Londonderry reach which will include recommendations for remediation options.
Williams River	Agricultural runoff	Trees for Streams program by WCNCRD – buffer planting on agricultural lands – 900’ in Chester.
	<i>E. coli</i> contamination	Public meeting held by SeVWA & WQD to discuss bacteria levels, gather input and form next steps for monitoring program to address issue.
	Floodplain habitat	Herrick’s Cover Habitat Restoration project, a joint effort with Ascutney Mountain Audubon has planted over 100 trees and shrubs in the floodplain.
Saxtons River	River Stability	A full geomorphic assessment and a corridor conservation plan were completed. A public presentation of the plan was given and priority projects are being implemented.
		Working with the Village of Saxtons River on re-development of an unstable riverbank on town property.
		Basin Farm – Twin Falls hydro dam proposal – tracking progress of licensing process and issues.

Conclusion & Plans for 2011

Continue to seek funding to implement actions and recommendations in the Basin Plan.

Fund and carry out a survey of the reach of the Williams River where monitoring has revealed a bacteria problem. Increase monitoring to bracket this area to better define the potential source(s) of contamination.

Fund and seek removal of Kidder Hill Dam.

Continue the Herrick's Cove restoration project expanding the wildlife habitat work and into buffer establishment and bank stabilization work.

Support local efforts working on Outstanding Resource Water designation proposal for the Rock River.

Lower Connecticut River drainages – Basin 13

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Introduction

Although basin planning in the Lower Connecticut River basin has not officially begun, the DEC Watershed Coordinator 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 needed projects. Several of these are currently underway. Project work has been focused in the Brattleboro area where both Crosby Brook and Whetstone Brook are listed as impaired waters.

The most notable project was the successful campaign to purchase the Locke Farm Field in West Brattleboro. This 5.34 acre parcel is one of the last remaining open lots in the lower Whetstone Brook watershed which can still function as a flood water retention area. Local groups lead by the Windham County NRCD and the West Brattleboro Association raised over \$30,000 which, along with \$65,000 from Clean & Clear grants, allowed for the purchase and conservation of the field for future floodplain restoration.

Black Mountain Road running along Crosby Brook, contributes significant amounts of sediment from road runoff to this impaired stream. With assistance from a VYCC crew, seven steep eroding slumps were stabilized with fabric and plants and a long section of streambank was planted with willows. Riparian buffers were also planted behind two businesses on Route 5.

Watershed Planning Initiatives

Activity	Status	Comments/Information
Public forums held	O	As related to specific stream projects.
Watershed Council formed		
Local WQ concerns identified	I, O	Partners, local watershed groups and watershed residents are expressing concerns regarding 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 several other brooks and Mill Pond.
Strategies for WQ issues formulated	I, O	Strategies are being developed to address these issues and projects implemented.
Draft white papers for WQ issues	O	As related to specific stream projects.

Review of town plans and zoning	I, O	As requested by individual towns.
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 on issues and projects is being done by DEC, WCNRCD, WRC and SeVWA.
Basin Assessment Report completed	C	Sampling completed in 2008.
Stream Geomorphic Assessments	C, O	Full Assessments and Corridor Plans are completed on Whetstone and Crosby Brooks, Phase 1 on Hubbard Brook, funding is being sought for others.
Bridge and Culvert Inventory (B&C)	C, O	As part of Phase 2 assessments.
Dam Inventory		
Biological Monitoring	C, O	Sampling completed in 2008.
Restoration/Protection Projects Underway or Completed in 2010	I, O, C	Projects are being carried out throughout the basin, see narrative above and chart below.

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

Notable River & Stream Restoration Projects in 2010

Waterway	Water Quality Concern	Current Actions
Basin	Habitat degradation, stormwater runoff	Kettle Pond survey, sand storage runoff.
	Erosion, sedimentation	CREP buffer planting along the Morse Brook in Westminster.
Crosby Brook	Road runoff - erosion	Black Mountain Road maintenance and repair AOT Stormwater Mitigation project.
		Black Mountain Road – buffer planting and slump stabilizations.

		Buffer plantings – Mobil Station, Motel 6.
Crosby & Whetstone Brooks	Stormwater & bacterial contamination	Stormwater system survey completed and mitigation projects proposed to Town of Brattleboro, IDDE monitoring underway.
Whetstone Brook	Flooding	Conservation of Locke Farm Field, successful fundraising campaign - >\$30K, purchase and protection of 5.34 floodplain acre parcel in watershed.
	Flooding outreach	Windham Env. Coalition presentation & discussion.
	Erosion, sedimentation	Mallory Lot buffer installation, invasives control for Japanese knotweed, pervious pavement.
	Water quality	SeVWA re-established WQ monitoring program testing for 3 sites on Whetstone Brook.
Mill Pond	Invasives, wetland damage	Milfoil control underway, work with landowners on access control, wetland restoration planned and funding sought.

Conclusion & Plans for 2011

As the Tactical Planning Process is implemented, the individual subwatersheds of Basin 13 may be considered for inclusion into the planning processes for other nearby Basins.

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

Continue coordination of projects and meetings on Crosby Brook improvements. Seek funding for streambank restoration project behind Bickford's.

Continue coordination of projects and meetings on Whetstone Brook improvements prioritized in the Corridor Plan.

Seek funding for Phase 2 assessment on Hubbard Brook.

Wells, Waits, Stevens and Ompompanoosuc Rivers – Basin 14

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Introduction

In 2010, project partners in the Stevens, Wells, Waits, and Ompompanoosuc River basin meet to prioritize efforts to implement strategies in the Basin 14 Water Quality Management Plan (Plan was approved by DEC and ANR in 2008). Out of a total of 117 strategies in the Plan, fifty have been initiated or completed as of October 2010. Projects in the basin this year included a project development grant for the Waits River, a Phase 2 geomorphic assessment for the Stevens River watershed and a Phase 2 geomorphic assessment of the Ompompanoosuc River in Thetford and West Fairlee. In addition, buffer planting projects were held along the Wells River, the West Branch of the Ompompanoosuc River and Middle Brook.

The Ticklenaked Pond TMDL was approved by EPA in 2010 and buffer planting projects, a rain barrel demonstration workshop, and a driveway erosion control demonstration project were completed as part of an ecosystem restoration grant to reduce phosphorus levels in the waterbody. The DEC Watershed Coordinator identified a new Eurasian Watermilfoil infestation in Ticklenaked Pond in the fall 2010 and has been working with the Ticklenaked Pond Association and DEC's Aquatic Nuisance Control Program to develop a plan for controlling this invasive species. The DEC coordinator also assisted in securing Ecosystem Restoration funding for a feasibility and design study that is necessary to implement internal nutrient control for this pond.

Watershed Planning 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 water quality 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 water quality 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 as adopted in June 2008
Outreach to area schools and local	O	Participation in the Blue Camp which has a focus on the

groups		Wells River watershed.
Basin Assessment Report	C	The basin assessment report was completed April 1999.
Phase I Stream Geomorphic Assessments	C	Phase 1 assessments have been completed on all watersheds in the basin.
Phase II Stream Geomorphic Assessments	O/C	Phase 2 assessments have been completed for all of the waters in the basin except for the lower east branch of the Ompompanoosuc and upper Wells River and an update for the Stevens River watershed is in the works.
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 in 2007/2008
Restoration/Protection Projects Underway	O	See below.

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

Notable River & Stream Restoration Projects in 2010

Waterway	Water Quality Concern	Current Actions
Ticklenaked Pond	Phosphorus impairment	Completed a driveway retrofit demonstration project as well as rain barrel workshop and buffer restoration projects. Funding for internal treatment study has been received.
Waits River	Aquatic habitat and elevated temperatures	Assisted with a project development grant that has identified a wetland protection and river corridor protection project in the Waits River watershed.
Ompompanoosuc River	Aquatic habitat	Buffer planting projects were completed on Middle Brook and the West Branch of the Ompompanoosuc River.

Conclusion & Plans for 2011

The DEC Watershed Coordinator will be assisting a contractor on a study of an internal treatment for phosphorus for Ticklenaked Pond, funded through an Ecosystem Restoration Grant. This study will determine if this is a cost effective and feasible way to restore this phosphorus impaired water. Efforts to minimize the impact of a recent Eurasian Watermilfoil infestation will also be continued, which is particularly

relevant given the potential for increased plant growth as phosphorus levels are reduced in this waterbody and water clarity improves. Phase 2 Stream geomorphic assessments will be completed in 2011 on the Stevens River and proposals have been submitted to completing the phase 2 stream geomorphic assessment of the Ompompanoosuc River. Finally there are plans to continue the Ompompanoosuc River trees for streams program.

Lake Memphremagog, Tomifobia and Coaticook Rivers – 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 in the basin including wetland restoration, runoff from agricultural lands, and TMDL development. Through these and earlier meetings a table of actions has been developed to address the top priority issues in the basin. The Coordinator worked with Orleans County NRCD to hold a joint agricultural meeting to discuss common agricultural issues and areas of potential collaboration between Quebec and Vermont in the Lake Memphremagog Watershed.

The Coordinator has also been working closely with the Memphremagog Watershed Association (MWA), a local watershed group which the Coordinator helped to get off the ground three years ago. The Coordinator assisted the MWA in organizing a Black River educational meeting to discuss water quality in this important watershed and a boat trip down the Black River to increase awareness of basin resources.

Watershed Assessments

The DEC Watershed Coordinator assisted with a number of assessments completed in the basin in 2010. These include: water quality sampling on the small tributaries to Lake Memphremagog and in the Black River watershed, a stream geomorphic assessment of the Black River, and water sampling on major tributaries in 2010, targeting high flow events to better quantify phosphorus and chloride loading from major tributaries to Lake Memphremagog. Additional in-lake sampling was also done to better understand phosphorus and chloride gradients in the lake, involving collaboration with partners in Quebec to sample northern portions of the lake using similar methodology. This monitoring information will allow DEC to develop a full lake phosphorus model which is needed to develop a phosphorus TMDL for the lake.

Phosphorus export model

The Watershed Coordinator also assisted in a phosphorus modeling effort for the Lake Memphremagog watershed by regional partners in Quebec and updated the model to more accurately represent loading from across the basin. The model will allow for the estimation of phosphorus loading from unmonitored tributaries and will help to target projects to high phosphorus export areas.

Watershed Projects

The DEC Watershed Coordinator also assisted in the planning and planting of over a mile of riparian buffer on the Barton, Clyde and Black Rivers through a number of grant programs and collaborative efforts. In addition to this, the Coordinator assisted with the Northeast Kingdom Lakeshore Buffering program that planted buffers on over 800 feet of lakeshore on Lake Memphremagog, Seymour Lake and Hosmer Pond. The Coordinator compiled assessment information on some of the remotest ponds in the basin in the Bill
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Slydak Wildlife Management Area to assist the Long Range Management Team in the development of a Long Range Management plan for these ponds and surrounding lands.

Watershed Planning 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 diverse and broad cross section of the watershed.
Local water quality (WQ) issues identified	C	In 2008, the watershed council prioritized the issues of nutrient enrichment, invasive species, aquatic habitat, and surface water contamination. The Quebec/Vermont Steering Committee on Lake Memphremagog meets twice/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	C	14 panel discussions were held Between 2008 and 2010.
Strategies for WQ issues formulated	C	Draft strategies to address roads, river corridor management, lakeshore management, stormwater runoff, aquatic nuisance species, agricultural runoff 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	On hold	
Meetings with individual towns on the WMT classification proposal	On hold	
Draft basin plan	I	Development of a draft plan is nearly complete.
Public hearings on draft plan		Targeted for 2011.
Final basin plan		
Outreach to area schools and local groups	O	Watershed coordinator spoke with a local college class about watershed issues.
Basin Assessment Report	C	Basin assessment report completed in 2006.
Phase I Stream Geomorphic Assessments	I/C	Phase 1 assessments were completed on the Clyde River, Barton River, Willoughby River, Johns River and Black River by 2010.
Phase II Stream Geomorphic Assessments	I/C	Phase 2 assessments were completed on the Clyde River, Barton River, Willoughby River, Johns River, and Black River by 2010. Phase 2 assessments of major tributaries in the Black River Watershed are in progress in the fall 2010.
Bridge and Culvert Inventory	I/C	Fish and Wildlife Department has completed bridge and culvert surveys on portions of the Clyde and Barton Rivers, and NVDA completed an assessment of bridge and culverts in the watershed in 2008.
Dam Inventory		

Biological Monitoring		Completed in fall 2009.
Restoration/Protection Projects Underway	O/C	See below.

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

Notable River & Stream Restoration Projects in 2010

Waterway	Water Quality Concern	Current Actions
Barton, Black, and Clyde Rivers	Nutrients and Aquatic Habitat	The coordinator helped with buffer planting projects covering over a mile of stream in the basin through a number of collaborative projects with funding from a wide variety of sources.
Seymour Lake, Lake Memphremagog, Hosmer Lake	Nutrients and Aquatic Habitat	The coordinator assisted with the Northeast Kingdom Lakeshore Buffering program planting buffers on over 800 feet of lakeshore. Funding secured for additional rebuffering through the Ecosystem Restoration.
Willoughby Lake	Sedimentation and phosphorus	The coordinator worked with the Old Cottage Road Association to develop a better back roads project to reduce sedimentation into the lake.

Conclusion & Plans for 2011

There is a large amount 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 the planning process has also greatly increased the discussion of water quality issues and threats in the basin as well as projects to address these. In 2011, the list of draft strategies that has been developed with the watershed council will be edited, compiled into a draft tactical basin plan, and projects will be targeted to areas of the basin where they can have the greatest impact and these strategies will be rolled into a water quality management plan for final approval.

Geomorphic assessment projects will be completed covering the remainder of Black River watershed and the results of these assessments will be presented publicly in addition to being used to develop projects in these watersheds. The joint monitoring program between Quebec and Vermont for Lake Memphremagog and its major tributaries will be continued. This will allow for the development of an in-lake phosphorus model, which combined with the updated watershed phosphorus export model will allow us to begin the process of developing a TMDL for this phosphorus impaired waterbody.

There are a number of potential projects in the works for next year that the Watershed Coordinator will be assisting with, including another round of shoreline planting projects on the Black, Barton and Clyde Rivers through the trees for streams program and the expansion of this program to include outreach on enrolling landowners in state and federal agricultural programs such as CREP to restore buffers and WRP to restore

wetlands. The DEC Watershed Coordinator will continue to help with the lakeshore buffering program. Local partners hope to continue water quality sampling on the Black River to further identify watersheds which may be targets for restoration work to reduce phosphorus loading to Lake Memphremagog.