

**PROGRESS REPORT ON
RIVER BASIN WATER QUALITY MANAGEMENT PLANNING
DURING 2011**

A REPORT FOR:

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

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Introduction

In 2011, 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 to varying levels of commitment in all of Vermont's 17 planning basins. The goal of the process is to develop water quality 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.

This report outlines planning efforts and status for each planning basin, and newly initiates annual reporting on the status of the Vermont Surface Water Management Strategy (SWMS), which DEC considers of interest to legislators and affected stakeholders. The SWMS is the statewide template of programs and strategies that, when fully implemented, will result in support of Vermont's goals and objectives for surface water use, safety, and integrity. The SWMS is carried out by means of the Tactical Basin Planning Process. This report also discusses a newly defined relationship between the Tactical Planning Process, and the Ecosystem Restoration (formerly Clean and Clear) Program.

During the 2011 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 tactical planning 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. In the 2011 edition of this Report, DEC described the SWMS and tactical planning process. During 2011, plans that had previously been in development under the Watershed initiative approach were completed as “hybrids” between traditional Plans and the Tactical Plans described by the SWMS. Hybrid plans were completed for the Memphremagog, Winooski, Otter Creek, and Ottauqueechee/Black River. As of this writing, all these plans have been finalized and are in, or entering, public review. One exception is the Memphremagog Basin Plan, which is awaiting final ANR signature. With the assistance of the Northwest Regional Planning Commission, a hybrid Plan for the Missisquoi River Basin has also been prepared, which is in internal DEC review as of this writing. Hence, 2011 saw the development of four basin plans and significant progress on a fifth. In Section Three of this report, the reader will find descriptions of on-going planning activities. In certain basins, planning activities are reported using the historic Watershed Initiative format. In other instances, activities are described following the new Tactical Planning Process, consistent with the watershed coordinators preferred approach for reporting.

In the February, 2011 DEC also received a final report of 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). DEC reviewed this report, provided feedback to the RPC's, and participated in discussions with the Water Resources Panel concerning the Water Management Typing Recommendations provided by our partner RPCs.

Tactical Basin Planning and Ecosystem Restoration Grant Funding

During 2011, VTDEC comprehensively examined the funding allocation approach used up to 2010 for Ecosystem Restoration Grants (previously known as Clean and Clear grants). Ecosystem Restoration funding

allocation has nearly always benefitted from a competitive proposal process, with proposals evaluated by a leadership team within ANR and Agency of Agriculture, Food, and Markets (AAFM). Through 2010, this method yielded sound projects of considerable local interest, and with quantifiable efforts aimed at sediment and nutrient control. Where this process was found to fall short, however, was in the alignment of projects to the highest priorities identified by River Corridor¹ or Basin Plans that were prepared independently of the Center for Clean and Clear. Further, a review of historic funding decisions revealed that the geographic distribution of funding was not consistently matched the extent of alterations and impairments within the basins across Vermont.

As a result, in consultation with ANR and AAFM leadership, the Monitoring, Assessment and Planning and Ecosystem Restoration Programs devised an improved funding allocation model that ties Ecosystem Restoration grants to the highest priority outcomes identified in the relevant Basin/Corridor Plans. This is accomplished using a quantitative and transparent proposal scoring rubric, with initial proposal evaluations conducted by field staff with intimate knowledge of the resources under consideration. As a result, the SFY2012 Ecosystem Restoration grant funding that is now allocated is more evenly distributed across project development, project implementation and easement/corridor protection activities, and is more equitably distributed to the high priority projects across most Vermont Basins. Some project highlights are provided in Section 3 of this Report and in the annual legislative report of the Ecosystem Restoration Program.

The Importance of Basin Planning in the Face of Flooding

Two major flooding events were the climatological highlights of 2011. In April, heavy rains upon snowmelt produced significant flooding in several Vermont watersheds, most notably in the Champlain Basin, where river flows attained 20 to 50 year flood stages, with resulting Lake Champlain water levels attaining previously unrecorded highs. Later, in August, when Vermont citizens thought they had survived the worst flooding they likely would see in any given year, Tropical Storm Irene dumped between four and 10 inches of rain on the river valleys throughout the State. As readers are already well aware, the devastation wrought by Irene in Basins from the Winooski and White River south was only exceeded by the flooding of 1927. With soils already saturated from a wet August, the runoff quickly filled river channels beyond their recognized floodplains and rivers, and with a newly acquired energy, ripped out roads, bridges, culverts and buildings across much of central and southern Vermont.

We can expect to see the intensity and extensiveness of these storms repeated in the future with greater frequency as Vermont's climate warms, so ANR has been considering how we can best adapt to protect the most vulnerable resources, areas, and sectors in the state by enhancing flood resiliency. The loss of the natural landscape to urbanization and increased runoff from developed lands has resulted in a loss of floodplain connectivity, resulting in significant losses of flood storage along river corridors and floodplains. Enhancing flood resiliency necessarily involves:

- Improving infrastructure to handle more intense storms;
- Minimizing conflicts within the river corridor where possible;
- Re-armoring only areas where critical infrastructure protection is needed; and,
- Protecting and securing flood attenuation assets such as floodplains, wetlands, and green infrastructure.

¹ River Corridor Plans rely on geomorphic assessment of rivers to identify key river locations for floodplain access and restoration of the stream's equilibrium condition. See the Vermont Surface Water Management Strategy (Channel Erosion chapter) for more information.

In the face of the destruction wrought by Irene, how do communities rebuild to reduce the likelihood of damages from the next storm? Development and implementation of hazard identification and mitigation plans are part of the solution and the Agency, regional planning commissions and other partners will provide assistance to communities to produce robust plans to reduce conflicts with rivers and improve infrastructure. We must also consider fluvial geomorphic principals when rebuilding infrastructure adjacent to rivers. This means rebuilding in a manner that balances protection of infrastructure against the protection of downstream property and infrastructure, while accounting for the legal requirement to support river integrity. State and partner-led actions need to foster protection of critical infrastructure and personal property, while ensuring that new development does not further compromise river corridors and flood attenuation assets. To paraphrase from Barry Cahoon, stream alteration engineer for the Agency of Natural Resources:

“We cannot isolate ourselves from rivers, confine rivers to where we perceive they are ‘supposed to be, belong, or always were’, or ignore the message we have been given, that the rivers often need the space we have chosen to take away from them. With all that we have invested over generations, in our homes, our commerce, and our public infrastructure, we have created tremendous conflict with the physical imperatives of rivers when rivers are energized by storm events, now of increasing frequency and magnitude. Some strategic separation and confinement of these incredibly powerful and dynamic natural systems is needed to protect these investments, but this work must be done in a way that embraces an informed recognition and implementation of fluvial conflict reduction options for the benefit of this and future generations, and the rivers themselves.” Figures one and two (below) illustrate the importance of securing river corridor protections and floodplain assets to protect infrastructure while supporting goals of clean water.



Figure 1. US Rt 4 and Mendon Brook, showing how a small confined river channel created new meanders at the expense of critical infrastructure, along what was a highly armored section of road.

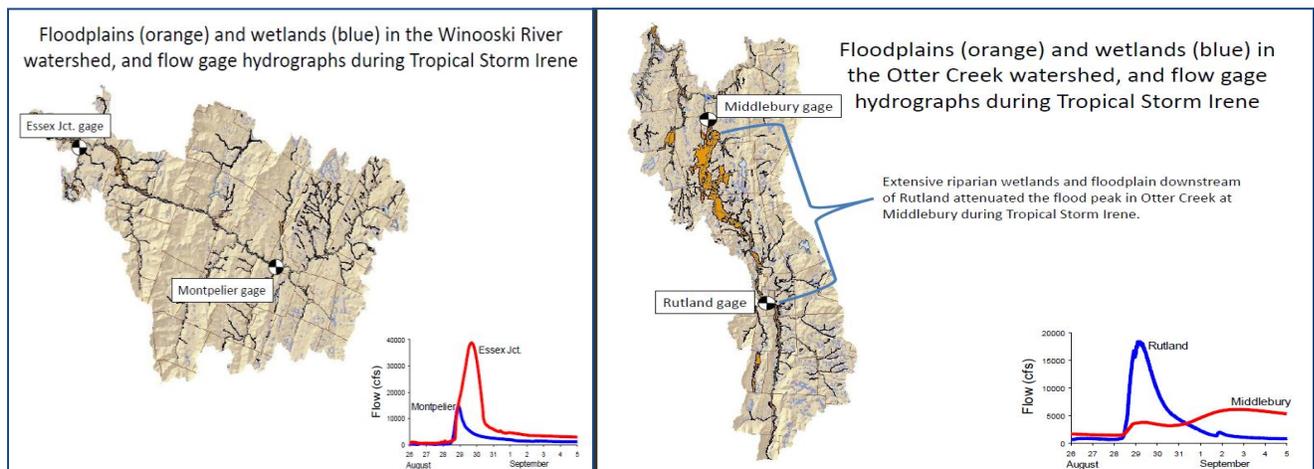


Figure 2. A comparison of upstream and downstream flows during the peak of Irene, for a river basin with few floodplains, and one with extensive floodplains. Note the flood protections conferred to downstream watershed areas by extensive floodplains in the Otter Creek Basin.

The opportunities presented by Irene for the enhancement of resiliency are presented to Vermonters along with limited funding for restoration of flood-ravaged areas. Given the need for protection of critical flood attenuation assets and new pollution control fixes for non-flood related problems, basin planning emerges as a critical prioritization tool for Vermont’s restoration and resiliency efforts. In recognition of this, DEC planners and river scientists have engaged in a collaborative process with Regional Planning Commissions to map critical infrastructure damage, and prioritize restoration.

The role played by basin planning is to provide information for prioritization of projects. As an example, while a local road crew may have 25 culverts to rebuild, the planning process, by virtue of its integration of other relevant ANR and partner plans, can provide the information on which replacements will also produce additional pollution control benefits beyond simply rebuilding the road. By strategically prioritizing post-Irene implementation efforts, multiple surface water protection and remediation goals can be met. At present, the Monitoring, Assessment and Planning Program is initiating an improved collaborative approach to enhance Basin Planning with RPC skills and abilities, such that resulting Tactical Basin Plans contain a prioritized combination of fluvial erosion hazard mitigation, sediment and erosion controls, prioritized protection of flood attenuation assets and identification of surface waters characterized by particularly high quality.

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



The Vermont Surface Water Management Strategy was prepared in 2010 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 (renamed the Watershed Management Division, in late 2011, or WMD) in working with partner programs and watershed stakeholders.

Specifically, the 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 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, and is reported in detail in the 2010 edition of this Report. Chapter three of the Strategy features a comprehensive gap analysis of DEC's surface water programs, and provides prioritized recommendations to enhance surface water protections and restorations. During 2011, the WMD worked with DEC and ANR leadership to support and implement high priority recommendations on the Strategy. The following high-priority recommendations were fulfilled during 2011:

Monitoring and Assessment:

- Establishment of dedicated information management support across WMD, to provide integrated access to surface water data, watershed conditions, and stream condition, in support of DEC regulatory and non-regulatory programs.
- Alignment of volunteer monitoring capacity with priority regulatory needs in addition to local concerns; and, alignment of internal monitoring and assessment processes with the needs of regulated entities.

Technical Assistance:

- Establishment of additional regional river engineering capacity to provide technical assistance for river management. The establishment of this capacity provided critical during the response period for Irene.
- During Irene response, DEC deputized WMD and non-WMD staff to provide assistance to river engineers, to enhance response capacity.
- Establishment of additional hydrological analysis capacity to provide technical assistance to municipalities and regulated entities in the analysis of hydrologic modification associated with development.
- Participated in the refinement and initial implementation of a Green Infrastructure Initiative Strategic Plan, including incorporation of elements into the SWMS.

Funding:

- Development of a tactical planning approach to evaluating funding priorities for projects proposed for support under the WMD Ecosystem Restoration Program. This change in project evaluation resulted in the selection of the highest-priority projects using a transparent and replicable process. Scoring factors were established that provide incentives for towns to pursue Act 110 compliance.

Regulatory:

- Coordinated with the Agency of Agriculture, Food and Markets on potential modifications to AAP's that would confer additional protections to surface waters.
- Pursued outreach towards the development of a statewide lakeshore buffer standard.
- Enhanced the capacity of the Stormwater program to support Green Infrastructure and enhance surface water protections by incorporating green infrastructure specialization into the program.
- Developed a draft approach to consider regulatory controls on contaminants associated with coal tar sealants.

Education and Outreach:

- Conducted media outreach on the SWMS to enhance awareness of the Tactical Planning Approach.
- Developed a web-based portal for surface water information to provide data to the public
- Cooperated with Vermont Department of Health on the development of new web-based content on safe swimming.
- Assisted Lake Champlain Basin Program on education and outreach efforts

Section 2) Tactical Basin Planning Process: Implementation of the Statewide Strategy at the Basin Level

The Tactical Basin Planning Framework is not new, 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. The SWMS (Chapter 4) describes the tactical planning process for developing individual, basin-specific and geographically explicit plans, establishing 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 focus on important conservation and restoration objectives to be accomplished within the any given five-year cycle, in some cases within only certain target subwatersheds in need of priority intervention. Tactical plans contain priority lists of objectives, strategies, and actions. The tactical planning cycle consists of three planning phases: Monitoring and Assessment; Tactical Planning; and Implementation. In 2011, WMD supported tactical planning across most basins in Vermont. Figure three shows the planning basins for Vermont, and displays how certain basins (lower Champlain direct; CT River North; CT River south) will be packaged with adjacent basins in the future production of plans. Table 1 provides an indication of the planning phase for each Vermont basin for the reporting period, and for 2012. Table 2 provides a more detailed view of activities in each planning basin.

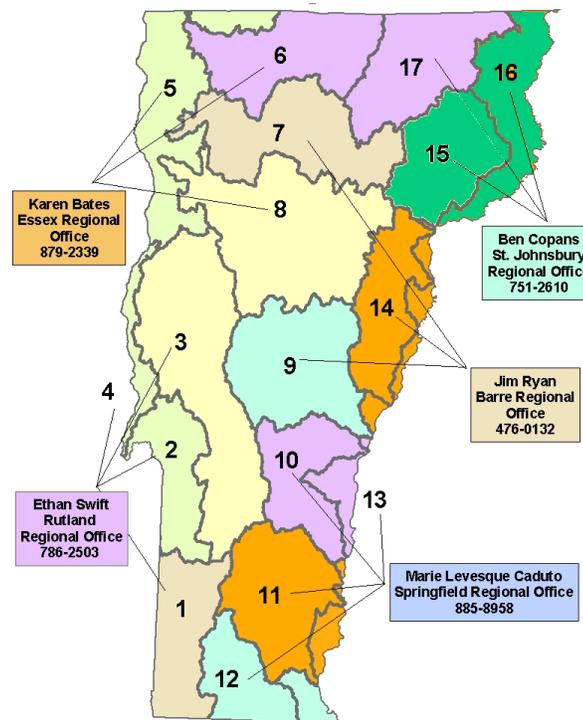


Figure 3. Vermont's tactical planning basins

Tactical basin implementation plans will fulfill all of the geographically-specific planning requirements in the Water Quality Standards, while the statewide planning requirements, including state-scale strategies, are contained within this Statewide Strategy. This new approach is designed to yield considerable efficiency relative to historic basin planning efforts, where all strategies – statewide, basin-specific, and even local, were listed in a basin-specific plan, and repeated from one basin plan to the next. The WMD further proposes that tactical basin plans, developed by an ongoing process involving all relevant partner organizations, will become products not of the WMD, but of all of the partner agencies and watershed stakeholders. The WMD has envisioned a structure for this new process to achieve completion of tactical basin implementation plans for all of Vermont’s planning basins, every five years, as required by statute. The newly streamlined process for issuing tactical basin plans will facilitate targeting of the strategies and prioritization of resources to those projects that will have the greatest impact on surface water protection or remediation.

Table 1. Overall Status of Basin Planning as of 1/15/2012.

Basin	Planning phase in 2011	Planning phase for 2012
Basin 1 Battenkill, Wall, Hoosic	Planning (following prior Watershed Initiative approach)	Tactical Planning
Basin 2 and 4 Poultney, Mettawee, Lower Champlain Direct	Implementation, Monitoring and Assessment	Tactical Planning
Basin 3 Otter, Little Otter, Lewis	Tactical Planning – <i>Draft Plan in public review</i>	Implementation
Basin 5 Upper LC, LaPlatte, Malletts Bay, St. Albans Bay, Rock, Pike	Implementation, Monitoring and Assessment	Assessment
Basin 6 Missisquoi	RPC-led development of a draft traditional basin plan	Tactical Planning Implementation
Basin 7 Lamoille	Implementation	Implementation
Basin 8 Winooski	Tactical Planning - <i>Draft Plan in public review</i>	Implementation
Basin 9 White	Assessment, Tactical Planning*	Tactical Planning
Basin 10 (13) Ottauquechee, Black	Tactical Planning - <i>Draft Plan in public review</i>	Implementation
Basin 11 & 13 Williams, West, Saxtons, Lower CT, Mill	Implementation	Monitoring and Assessment
Basin 12 & 13 Deerfield, Lower CT, Mill	Tactical Planning	Tactical Planning
Basin 14 Stevens, Wells, Waits, Ompompanoosuc	Implementation	Monitoring and Assessment
Basin 15 Passumpsic	Monitoring and Assessment	Tactical Planning
Basin 16 Upper CT, Nulhegan, Willard, Paul Stream	No activity	Tactical Planning (initiation)
Basin 17 Memphremagog, Coaticook, Tomifobia	Tactical Planning - <i>Plan issued</i>	Implementation

Table 2. Detailed Status of Tactical Basin Planning (January, 2012)

Basin Number	1	2/4	3	5	6	7	8	9	10/13	11/13	12/13	14/16	15/16	17
Planning Phase for Basin	TBP	TBP	IMP	M+A	TBP/IMP	IMP	IMP	TBP	IMP	M+A	TBP	M+A	TBP/NA	IMP
Monitoring and Assessment	Biological monitoring	O	O	O	O	O	O	O	O	O	O	O/O	O	O
	LaRosa Partnership-supported citizen monitoring		O	O	O	O		O	O	O/C	O	I		O
	Stream Geomorphic Assessment (Phase II)	O	O	O	O	O	O	O	C/I	C/O	I	O/O	O	O
	Bride & culvert inventory	O	O	O	O	O	O	O	C/I	C/O	I	O/O	O	O
	Basin Assessment Report	C	C/I	C	C	C	C	C	C	C	C	C	C/C	C
Tactical Basin Planning	River Corridor Plan(s)	O	O	O	O	O	O	O	C/I	C/O	I	O/O	O	O
	ANR internal tactical process		I					I	I		I		I	C
	Watershed partner groups identified/contacted	O	O	O	O	O	O	O	O	C/O	I/O	O/_		C
	SWMS strategies adapted to local plan as appropriate			C		C		C		C/O				C
	Local WQ concerns identified, strategies added	O	C	C	C	C	C	C	C	C/O	C/O		C/_	C
	Implementation table draft			C				C		C			C/_	C
	Review of town plans & zoning regulations	I	C	C	C	I	C	I	C	C	C		C/_	C
	Watershed plan draft	Di		Di		Di		Dp		Dp				
	Public forums	O	C	O	C	I	C	O	I	C/O	C		C/_	C
Final basin plan (year of issuance)		2005/ NA	2012*	2009*	2012	2009*	2012*	2002	2012*	2008			2008	2012*

IMP = Implementation; M+A = Monitoring and Assessment; TBP = Tactical Planning Process; I = initiated; O = ongoing; C = completed
 Di = Internal Review Draft Developed; Dp = Review Draft issued for Public Comment *) Plan signed and “approved” by ANR, but 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 = Lamouille River; Basin 8 = Winooski River; Basin 9 = White River; Basin 10 = Ottauquechee/Black; Basin 11 = West/Williams/SaOtons; 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

Section 3 – Individual Basin Summaries

Batten Kill, Walloomsac & Hoosic – Basin 1

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Introduction

The DEC Watershed Coordinator for the Batten Kill, Walloomsac and Hoosic River was first 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 during 2007. 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.

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

In 2010 and 2011, DEC maintained contact with members of the watershed councils and the Bennington RPC, although at reduced intensity owing to reductions in staffing within the program. The Department remains committed to finalizing the plan development process for the basin, and to pursuing a tactical planning approach thereafter.

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		Strategies for major water quality issues have been formulated by the

formulated	O/C	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 2012.
Final basin plan		Targeted for 2012.
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 2012

With the assistance from resources already provided by the Bennington RPC (evaluation of water quality based elements found in the town plans and town land use regulations for towns within Basin 1; existing uses), the Department intends to pick up the planning process using a Tactical Planning approach beginning mid-2012.

Poultney-Mettowee – Basin 2

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Introduction

The Poultney-Mettowee Basin 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 has allowed for distribution of the final plan to partners and residents throughout the Poultney Mettowee Basin. The plan has served as a roadmap to guide projects within the watershed, and it will help to leverage funds to accomplish the goals it sets forth. Most of the strategies identified in the basin plan have either already been implemented or are in the process of implementation. Those remaining strategies are either in the process of implementation or haven't 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.

Effects of Irene on the Poultney River and Mettowee River Basins

While the western portion of Rutland County did not experience nearly the damage that was experienced in the eastern portion, there were numerous and substantive damage to infrastructure and property. In the Poultney River Basin, it was primarily the upland and headwater tributaries that were affected, including Lavery, Finel Hollow, and Lewis Brooks where several roads, bridges, and culverts washed out. In addition, flood damage along the Hubbardton River washed out out River Road in West Haven and undermined Route 140 in Benson. Within the Castleton River Basin in Castleton, several culverts and residential bridges washed out along Belgo Brook and Britain Brook. In addition, there was significant aggradation and related flood damage response work along the Castleton River mainstem in West Rutland and Ira. For the Flower Brook within the Mettowee River Basin, there was substantial damage to dam and bridge in downtown Pawlet. Flower Brook washed out Route 133 in a couple places, where culverts, roads and bridges were overwhelmed caused by debris jams and subsequently washed out. Also within the Mettowee Basin, the Indian River avulsed through several backyards that were washed away in West Pawlet.

Watershed Initiative Status

Activity	Status	Comments/Information
Public forums held	C	Public forums were held in 2001 and 2002 to identify water quality issues and concerns and also actions in which the participants were most interested
Watershed Council formed	C	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 water management typing and classification proposal for the basin is included in the final plan. A subsequent analysis of potential water management types was conducted as per guidance issued by the Water Resources Panel to ensure a transparent and defensible protocol is used for future typing efforts. However, 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 in February 2005 by Secretary of ANR
Outreach to area schools and local groups	O	Partners engage in continued outreach and involvement with schools and colleges in the basin (Fair Haven Elementary, Poultney Elementary, Mettowee Community School, Castleton State College, and Green Mountain College – Watershed Planning and Bioregionalism classes).
Basin Assessment Report	C	Last assessment report completed in 1999.
Phase I Stream Geomorphic Assessments done	C	ANR Phase 1 geomorphic assessments completed for Poultney, Mettowee, Hubbardton, and Castleton Rivers. Additional Phase 1 SGA is underway for select tributaries to these larger rivers.
Phase II Stream Geomorphic Assessments done	C	Mettowee River phase 2 assessment completed 2007. Phase 2 now completed for Poultney (and select tributaries), Mettowee, and Hubbardton Rivers.
Bridge and Culvert Inventory	C	Culvert assessment in-progress or completed for each town in the Poultney Mettowee basin. Castleton assessment completed via ANR protocols 2005.
Dam Inventory and Assessment	O	Associated with Phase 2 and 3 stream geomorphic assessments in progress to complete dam assessment where appropriate.

Biological Monitoring	O	There are approximately 60 biomonitoring sites that are sampled on a rotational basis throughout the basin.
Restoration/Protection Projects Underway	O/C	Most are agriculturally related streambank restoration sites on farms in the Mettowee and Poultney River basins.

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

Notable River & Stream Restoration Projects in 2011

Waterway	Water Quality Concern	Current Actions
Rivers and streams throughout the Basin	Back road runoff as a result of ditching and soil disturbance	Poultney Mettowee NRCD purchased hydroseeder for shared use by basin towns using Ecosystem Restoration funding
Lake Bomoseen	Stormwater runoff, sedimentation, nutrient enrichment, littoral zone encroachment	Crystal Beach Stormwater Mitigation and Demonstration Project. Incorporation of BMP's to minimize stormwater runoff using LID techniques as a demonstration
Poultney River	Sedimentation, nutrient enrichment, geomorphic instability, elevated levels of pathogenic bacteria	River corridor planning and assessment, riparian buffer planting and livestock exclusion, animal walkways (crossings), ongoing water quality monitoring.
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 (CREP), river conservation easements and passive river restoration project implementation (berm removal)

Several highlights for 2011 include these ongoing projects throughout the basin:

Crystal Beach Stormwater Mitigation and Demonstration Project

The stormwater management system from this Castleton municipal beach parking area, pathway and building roof is poorly designed. A drain is located at one corner of the parking lot, and this runoff discharges directly into the lake. This drain is easily overwhelmed in a rain event and the excess drains off the parking lot and across the beach area itself. The beach sand needs to be replaced by the town at least 3-4 times per year creating sedimentation issues along with contributing pollutants. The runoff from buildings also runs down a path across the beach area.

This project will dramatically improve lake water quality, thereby enhancing the public recreation of this area. The town manager and beach manager are anxious to use this site as a demonstration for other municipalities. The project will include 3 educational signs to educate the public, extensive press, and at least one site tour that will be done for other municipal officers following completion. The raingarden sign has already been designed through previous PMRNCD work, and will include a waterproof brochure box that will hold raingarden development brochures created by the Winooski Conservation District. The location of this site on Rt. 30 in Castleton makes it a perfect location for a high traffic demonstration project.

South Lake Hydroseeder Project

The Vermont Department of Environmental Conservation has awarded the Poultney Mettowee Natural Resource Conservation District (NRCDC) a \$12,351 Ecosystem Restoration Grant to support the purchase of a hydroseeder, which will be used by towns in the Southern Lake Champlain Basin. A hydroseeder is an effective tool in addressing dirt road, ditch and culvert runoff by creating vegetative stabilization along roadways. The NRCDC will work with local partners and municipalities to address the remediation of runoff from road erosion with the use of the hydroseeder.

While hydroseeders have been proven to be of value in controlling runoff and erosion, it is an expensive purchase without prior buy in and commitment from local town government. The Poultney Mettowee NRCDC believes that the purchase of a hydroseeder for shared use by the towns in the Poultney River watershed would be an economically viable project that will result in improved water quality.

The purpose of this project is for the Grantee to work with local partners and municipalities to address nutrient reduction in the southern most segments of Lake Champlain. According to the State of the Lake report produced by the Lake Champlain Basin Program, South Lake A has not met its target for phosphorus concentrations in the past five years, and South Lake B has only met it 1-3 times in the past five years.

Mettowee Watershed Corridor Planning and Project Implementation

The Mettowee River watershed is continually demonstrating high water quality concerns that are affecting the phosphorus loading in the impaired Lake Champlain as well as potentially human health. The purpose of this project is to develop a river corridor plan for the Mettowee River that will result in implemented projects that address the ongoing water quality concerns in this watershed.

The Mettowee River drains into South Lake B of Lake Champlain. This segment of the lake continues to show no trends towards improvement towards its targeted phosphorus load (LCBP, 2009). In addition, recent statistical work by Medalie and Hirsche (USGS) indicates that the Mettowee's phosphorus contribution has been grossly underestimated and demonstrates an approximate 4% increase in flow normalized phosphorus concentration between 2000 and 2008. Flower Brook, a major tributary of the Mettowee, is on the Vermont 303(d) list of impaired waters for ongoing high *E. coli* counts, and the Mettowee River has previously been on the 303(d) list as impaired for temperature. These reasons indicate the strong environmental need for corridor improvements in this watershed.

The purpose of this project is to take a comprehensive approach to a planning process using available stream geomorphic assessment data and work with the local communities, municipalities, farmers and landowners to prioritize, develop and implement strategic, water quality improvement projects. The results of this effort will be used to develop the Implementation Table of the next Basin 2/4 Tactical Basin Plan.

Conclusion and Plans for 2012

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 currently are being implemented in the areas of nutrient management, water quality monitoring and education, and

streambank assessment and restoration. Resources have been allocated to provide additional nutrient management education and outreach services to farmers including education about new technologies and practices, and individual assistance for record keeping and nutrient management plan implementation.

For 2012, the partners involved in the basin planning process are committed to the ongoing implementation of strategies identified in the basin plan, and development of a combined plan representing basins two and four (Lake Champlain Direct – see below). In addition, this plan will be assessed against the revised Lake Champlain TMDL Implementation Plan (2010) and also the forthcoming re-written Lake Champlain TMDL that is being prepared by USEPA.

There will be expanded river corridor planning and associated project implementation throughout the Mettowee River watershed. Agricultural cooperators will see an increase of nutrient management technical assistance, resources, and funding through the **Southern Vermont Nutrient Management Program**, including an enhanced focus on the use of new technology, including the use of soil aeration and no-till drills. 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.

Otter Creek – Basin 3

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Introduction

Draft Basin Plan Development and Planning Process

The *draft* Otter Creek Basin Plan is anticipated to be available for review this winter 2012. Independent sections of the plan have been developed and reviewed as white papers (issue papers) with partner collaboration and input. Public review is anticipated for mid February.

A comprehensive list of Existing Uses for swimming, fishing, and water supply surface waters for the draft Otter Creek Basin Plan has also been drafted and reviewed for inclusion in the draft basin plan. The Agricultural section of the draft plan has been reviewed by the Agency of Agriculture and will be incorporated into the draft plan.

In general, the VANR 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.

The *draft* Otter Creek Basin Plan was 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 it will help to leverage funds to accomplish the goals it sets forth.

Effects of Irene on the Otter Creek Basins

The Otter Creek Basin experienced substantial damage during Tropical Storm Irene, including wide-scale damage to major roads and bridges along significant sub-basins, especially within the southern portion of the Otter Creek watershed in Rutland County. The following is a description of some of that damage:

Mill River - Several homes substantially damaged in Wallingford. Route 140 was closed due to bridges/culverts out and is now re-opened. The Mill River washed away Evening Song Farm in Cuttingsville when the river avulsed through the berms. Also, state route 103 washed out in Cuttingsville.

Cold River –The Route 7 bridge was washed away south of Rutland. Lower reaches of the river below Route 7 caused significant damage and required significant response from the state Agency of Transportation, the National Guard, and many independent contractors.

Mendon Brook – The three-lane Route 4 between Killington and Rutland washed away. The flooding along Mendon Brook also destroyed Rutland City water intake for treatment plant. Two fatalities were documented. East Creek damaged Route 7 and the East Pittsford Road in Rutland Town.

Neshobe River – Route 7 washed away in downtown Brandon, including several buildings that were damaged and/or condemned (one building removed so far). Reaches upstream of the downtown area were significantly affected in Forestdale. Several homes were substantially damaged and vacated.

Middlebury River - In East Middlebury, the flooding caused erosion-related damage between the Lower Plains Bridge and the Grist Mill Bridge where subsequent dredging and channeling occurred in that section.

Agricultural Impacts (Source - USDA, FSA Vermont State Office – 12/22/2011):

Addison County: Producers impacted: 41
 Corn acres damaged: 941
 Hay acres damaged: 1266
 Fruit/Vegetable acres damaged: apples: 110
 Pasture acres damaged: 1168
 Acres of land damage: 60

Rutland County: Producers impacted: 92
 Corn acres damaged: 1140
 Hay acres damaged: 1438
 Fruit/Vegetable acres damaged: 75
 Pasture acres damaged: 192
 Acres of land damage: 4020

Watershed Initiative Status

Activity	Status	Comments/Information
Public forums held	C	A series of public forums were held in Rutland County in the winter of 2003 and in Addison County during the spring of 2004.
Watershed Council formed	C	The Upper Otter Creek Watershed Council was formed in the spring of 2003. Existing watershed groups are established in the Addison County portion of the basin. A basin wide AG 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 WQ issues.
Draft white papers for water quality issues	C	Issue papers for priority WQ concerns identified thus far are currently being drafted and reviewed.
Review of town plans and zoning	C	Completed for Rutland County. Completed as a 604(b) grant project for Addison County RPC for 2006.
Develop water management type (WMT) classification proposal	On-Hold	To be determined
Meetings with towns on the WMT classification proposal	On-Hold	The Addison and Rutland RPC's had been assisting in this effort. However, the status of WMT is TBD.
Draft basin plan	O	A rough draft plan has been developed with anticipated public review in early 2012
Public hearings on draft plan	I	Anticipated in early 2012
Final basin plan		

Outreach to area schools and local groups	O	Partners engage in outreach and education with schools and colleges in the basin (Smokey House Center, Currier School, Success School, Rutland High School, Stafford Tech Center, North Branch School, Middlebury High School, Middlebury College, Mount Abraham Union HS, Champlain Valley Union HS, The Watershed Center, UVM, CCV, and Patricia A. Hannaford Career Center).
Basin Assessment Report	C	The last assessment report was completed in 1998. An updated assessment report is anticipated.
Phase I and II Stream Geomorphic Assessments	O/C	Phase 2 and river corridor planning 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 2011 include these ongoing projects throughout the basin:

During 2011, the **Addison County River Watch Collaborative (ACRWC)** completed a flow monitoring component of this year's Addison County River Watch Collaborative water quality monitoring project via the LaRosa Analytical Partnership program. This made possible the determination of comparative loadings of both dissolved and particulate phosphorus to identify 1) annual phosphorus loads contributed to Lake Champlain from priority sub-basins, 2) Within a priority sub-basin (Little Otter Creek), to determine approximate phosphorus loading rates per tributary and 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 VANR (DEC), USDA-NRCS and the Addison County River Watch Collaborative.

In the **Upper Otter Creek Watershed**, the Rutland Natural Resources Conservation District (RNRCD) and the Vermont Agency of Natural Resources (VANR) 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 2011 calendar year, the Rutland NRCD continued implementation of the **Rutland City - Moon Brook Watershed Low Impact Development (LID) Project**. In cooperation with the City of Rutland and VANR, we are 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. We have now developed site plans for a couple of these urban properties where landowners are agreeable to LID practices to address stormwater runoff in the City. In addition, the Rutland

NRCD has embarked on a concurrent **rooftop disconnection project** to remove residential direct connects to the stormwater sewer system as a means to reduce stormwater volume and pollutant load.

Kendrick Pond Alternatives Analysis – Sugar Hollow Brook Basin

The Town of Pittsford, Vermont is considering removal of Kendrick Pond Dam on Sugar Hollow Brook as it is obsolete, the impoundment is filled with sediment, the structure is in disrepair, and the site is generally unsafe. Vermont Department of Environmental Conservation performed survey, sediment probing, and sediment quality testing to initiate data collection for dam removal. An engineering consulting firm has been working for the Town to continue data collection and develop a Sediment Management Plan to reduce the risks of dam removal.

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

The goal of this project is to develop a reasonable 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 we would follow up with a survey of the outfalls to make sure there are no cross-connections with the wastewater system. If a cross-connection (also called an illicit discharge) was found we would look up the drainage system and try and isolate the location of the cross-connection. 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 response (spill) purposes. This work is ongoing from 2010 with 6 Otter Creek basin municipalities including Vergennes, Middlebury, Pittsford, Brandon, Rutland Town, and Rutland City.

River and Stream Restoration Projects

The watershed coordinator has collaborated on multiple projects and/or grants leading to projects, often for multiple years and funding cycles with partners in the basin since 2001. These grant types include EPA pass-through grants (319 and 604(b)), 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 Ecosystem Restoration). 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)
- LaRosa Analytical Partnership Grants with the Addison County River Watch Collaborative and Upper Otter Creek Watershed Initiative
- Flow monitoring and assessment work in the Little Otter Creek
- Moon Brook (Combination Pond) Alternatives Analysis (underway)
- Kendrick Pond Sediment Management Plan development (drafted)
- 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 RNRCD
- 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 (completed)

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. Bacteria TMDL developed.
Moon and Mussey Brooks East Creek (Rutland)	High levels of pathogenic bacteria, sedimentation, nutrient enrichment, urban (stormwater) impairment due to runoff, thermal modification, and low dissolved oxygen levels resulting from impoundments and hydro operations (East Creek)	Watershed improvement projects underway with Rutland City – river corridor planning and project identification (underway). Public outreach and awareness underway for residents of the Moon/Mussey watershed. Stormwater runoff remediation project(s) implemented in Rutland.
Middlebury River	High levels of pathogenic bacteria, sedimentation, nutrient enrichment, impairment due to agricultural runoff	River corridor planning process underway. Riparian corridor restoration through buffer planting, livestock exclusion, AG land taken out of production along riparian corridor. Passive river restoration (conservation easement) project underway in east Middlebury. Bacteria TMDL developed.
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 the town of 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. Bacteria TMDL developed.
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. Bacteria TMDL developed.

Conclusion and Plans for 2012

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

For 2012, 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) as well as basin towns 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.

The Otter Creek Basin Plan and related Implementation Table will provide the focus of water quality improvement (restoration and protection) projects that will be implemented during the next 5 years until the next cycle of tactical basin planning for the Otter Creek watershed. One significant goal of this Basin Plan is to reduce the phosphorus load delivered to Lake Champlain. The Implementation Table lays out broad objectives for this effort, and then begins to frame-out specific actions to achieve the stated objectives. The list of action items has been expanded, based on input from agency staff and watershed partners, and 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 specific implementation activities; action items should be able to be accomplished within the next five years. Action items reflect some of the primary goals and objectives identified in Opportunities for Action and the Lake Champlain Phosphorus TMDL. This workplan was developed to identify high priority implementation actions and tasks that provide opportunities for all stakeholders in the Otter Creek portion of Lake Champlain Basin to pursue technical and financial support for 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 for issues ranging from aquatic invasive species to phosphorus load reductions. Several resolutions regarding the South Lake initiative have been submitted to the Lake Champlain Citizens Advisory Committee for consideration. The group has expanded to include the entire South Lake (South Lake “A” and “B”) and has included partners on the New York side of the Lake as well.

Following a series of meetings convened to present an overview of several ANR and AAFM 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 Initiative Status

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	The Rutland Regional Planning Commission reviewed town plans and zoning regulations in the Poultney Mettowie 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. The Addison County Regional Planning Commission also conducted a review of town plans in Addison County.
Develop water management type (WMT) classification proposal	On-hold	
Meetings with individual towns on the WMT classification proposal	On-hold	
Draft basin plan	I	South Lake Workgroup has drafted the initial South Lake Workplan (February, 2010). The AG Plan developed for Basin 4 – Lower Champlain Direct also drafted during this period.
Public hearings on draft plan		
Final basin plan		
Outreach to area schools and local groups	O	Partners engage in continued outreach and involvement with schools and colleges in the basin (Fair Haven High School), Castleton State College, and Green Mountain College – Watershed Planning and Bioregionalism classes).
Basin Assessment Report	I	
Phase I Stream Geomorphic Assessments done	O	ANR Phase 1 geomorphic assessments completed for Poultney, Mettowie, 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 in the Lower Champlain Direct.
Phase II Stream Geomorphic Assessments done	O	Mettowie River phase 2 assessment completed 2007. Phase 2 now completed for Poultney (and select tributaries), Mettowie, and Hubbardton Rivers.
Bridge and Culvert Inventory	C	Culvert assessment in-progress or completed for each town in the Poultney Mettowie basin. Castleton assessment completed via ANR protocols 2005.
Dam Inventory and Assessment	O	Associated with Phase 2 and 3 stream geomorphic assessments in progress to complete dam assessment where appropriate.
Biological Monitoring	O	There are approximately 60 biomonitoring sites that are sampled on a rotational basis throughout the basin.
Restoration/Protection Projects Underway	O/C	Most are agriculturally related streambank restoration sites on farms in the Hubbardton, Mettowie, 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 Watershed Coordinator continued to collect water quality samples on East, Hospital, and Whitney Creeks for a second year in a row. 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 second year in a row for South Lake tributaries with samples analyzed by the DEC LaRosa Lab.

Lower Champlain Direct Agricultural Plan Outreach

The Agricultural Resource Specialist for the Lower Champlain Direct drainage and the VANR Watershed Coordinator will be incorporating the Lower Champlain Direct Agricultural Plan into the anticipated tactical basin plan that will be developed for the Lower Champlain Direct and Poultney Mettowee River Basins.

East Creek Basin – River Corridor Planning and Wetland Restoration

In 2012, a selected consultant will build upon the existing River Corridor Management Plan for the East Creek in Shoreham, Orwell and Benson. Based on stream geomorphic assessment data, East Creek was found to have significant wetland dominated reaches. The contractor will be responsible for incorporating these wetland dominated reaches into the River Corridor Plan using the Wetland Restoration Plan as the guide. This project will act as a demonstration project in a highly wetland dominated stream for how to include the Wetland Restoration Plan into the River Corridor Plan.

The Corridor Plan will catalogue and prioritize protection and restoration needs, identify appropriate restoration and/or protection strategies and list opportunities and barriers to implementation. The selected consultant will meet with corridor landowners and their neighbors in a collaborative process, discussing the benefits of corridor planning and alternative management strategies, and learning from their extensive knowledge of the land and stream segment. The goal is development of a River Corridor Management Plan (RCP) that identifies mutually agreeable stewardship practices through restoration, easements, corridor purchase, etc. with riparian landowners. The plan will identify areas of contiguous landowners where large scale projects may be undertaken.

Conclusion and Plans for 2012

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

For 2012, stakeholders and water quality issue groups will review and revise the South Lake Workplan and will evaluate the Plan as per the approach to Tactical Basin Planning concurrent with the Poultney and Mettowee River Basins that comprise the “South Lake Basin” in Vermont. This plan will be assessed against the revised Lake Champlain TMDL Implementation Plan (2010) and also the forthcoming re-written Lake Champlain TMDL that is being prepared by USEPA.

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

An interim basin plan was completed in 2008 and the final draft plan was signed as approved by the ANR Secretary in October. ANR and various watershed partners have been involved in strategy implementation since 2005. In addition, the ANR's Clean and Clear Center had initiated and implemented projects in Basin 5. The 2008 Clean and Clear Work Plan, which guided the Center's work, includes strategies developed during the Basin 5 planning process. Overall, at least 48 of the 65 strategies in the basin plan have been addressed through the completion of one or more projects.

Watershed Initiative Status

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 were formulated	C	Strategies were developed with local groups and then reviewed and revised by the watershed council. Strategy development took place during 13 meetings.
Review of town plans and zoning	C	Town plans were completely reviewed for Chittenden and Franklin counties.
Develop water management typing (WMT) and classification proposal	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 at least 15 streams. See Stream Geomorphic data base for complete list: https://anrnode.anr.state.vt.us/ssl/sga/security/frmlogin.cfm as well as the River Management Report to the legislature

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 2011²

Waterway	Water Quality Concern	Current Actions – assisted by the Watershed Coordinator
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 and development of a workshop for retailers.
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, rain barrel workshops). (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 developing a program to build affordable rain barrels for sale and provide stormwater education information. Distribution of 75 barrels this year, and the program will continue next years as well. (also applies to Basin 8).
Potash Brook	Nutrients sediment hydrology	Continued assisting with developing South Burlington’s disconnect program and residential stormwater education including encouraging the use of rain barrel, rain gardens.
Lake Iroquois	Nutrients sediment	Assisted lake assn. with development of LaRosa Lab supported water quality monitoring program for volunteers.
Thorp Brook	Nutrients, sediment	Continued assist and fund watershed group monitor WQ project, including project to determine nutrient removal from floodplain forest; coordinated with AAFM to identify options to improve ag-related impacts identified by watershed partners.
Holmes Brook	Nutrients, sediment	Helped Charlotte parks committee plant a buffer along the brook on town property. Assisted group in writing article for Burlington Free Press to educate community about project and benefits of buffers,
LaPlatte River	Nutrients, sediment	Assisted LaPlatte Watershed Partnership to develop project to discourage piping of stormwater instead of using open ditches.

Conclusion & Plans for 2012

In 2012, DEC will pursue continuation of 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. The Basin 5 plan will be reviewed against the revised Lake Champlain TMDL Implementation Plan (2010) and also the forthcoming re-written Lake Champlain TMDL that is being prepared by USEPA.

² Projects assisted by the DEC watershed coordinator between 2004 -2009 can be found in previous basin planning progress reports to the Legislature.

Missisquoi River - Basin 6

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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 up to the end 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.

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 and DEC 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.

Between 2008 and the present, DEC, ANR, and partner organizations such as Lake Champlain Basin Program have invested heavily in project identification, development, and implementation in the Missisquoi River Basin. Much of this work was coordinated through the Ecosystem Restoration Program (formerly Clean and Clear) The most consequential assessment of subwatershed-level phosphorus loadings ever done in Vermont was completed in 2011 jointly by Stone Environmental, Inc., and the Natural Resources Conservation Service, using partnership funding from a variety of sources. The outcomes of this project identify geographically explicit target areas, known as critical source areas, for targeted nutrient reductions, and identify the specific contributions of phosphorus and sediment associated with in-channel stream erosion. Several other projects are underway as well, as are reported in the 2011 Ecosystem Restoration Program annual legislative report.

In 2011, DEC contracted with the Northwest Regional Planning Commission to commission a revision of the draft basin plan initiated in 2008.

Watershed Initiative Status

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, and refined recently by NorthwestRPC.
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. Delivered, Nov., 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 Projects Underway	C/O	

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

Conclusion & Plans for 2012

Basin planning work will continue in 2012 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 Enosburg and the Trout River). Further, DEC will work with the RPC and the public on the refinement and roll out of the RPC-prepared Plan, in 2012. This will include the development of a targeted implementation table that will summarize the highest priority efforts identified by existing river Corridor Plans and in the 2010 Lake Champlain TMDL Implementation Plan, and also the forthcoming re-written Lake Champlain TMDL that is being prepared by USEPA.

Lamoille River – Basin 7

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Introduction

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

Assessment and Monitoring

Additional physical, chemical, and biological monitoring and assessment activities in the Lamoille's lakes, ponds, and streams have taken place since passage of the Plan. 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 NRC 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 source tracking at over 20 sites in major Lamoille basin sub watersheds with the UVM EPSCoR program. This program has continued through 2011.

Urban-related Runoff Restoration and Outreach

Numerous watershed restoration projects were identified and implemented during the 2011 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 the Towns of Belvidere and Walden. Additionally the Coordinator assisted these Towns in submitting two additional road erosion remediation proposals for Better Backroads.

The Coordinator has been working with the Stormwater Section and Green Infrastructure Coordinator and have secured funding to inventory and map stormwater related projects in many of the village centers along the Lamoille River.

Agriculture and Logging-related Restoration and 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 VT DFPR 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 Brown's River watershed. Working closely with the DEC 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.

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. A project has also been initiated to protect a large farm by purchasing the development rights with the Vermont Land Trust. The protection of valuable river corridor for recreational access to high priority whitewater boating is also being negotiated with VLT and VRC.

Aquatic Passage-Upper Lamoille

The Coordinator is working closely with The Nature Conservancy, VT F&W, the River Management Program and NRCs in conducting assessments of stream crossings for improved aquatic passage. Funding has been secured to prepare designs for the implementation of stream crossing retrofits for 4 high priority structures.

Watershed Initiative Status

Activity	Status	Comments/Information
Public forums held	C	Eight public forums were held at the onset of basin planning. Three additional forums were held for the release of the draft basin plan
Watershed Council formed	C	A diverse task force was formed and assisted DEC in the development of a draft watershed plan
Local water quality (WQ) issues identified	C	Top local water quality issues include stormwater, streambank erosion and flooding, agricultural runoff, loss of working farm and forestland, lake and pond issues, and dam-related issues
Panel discussions on WQ issues held	C	A series of panel discussions was held for each of the top water quality issues
Strategies for WQ issues formed	C	The strategies are written.
Review of town plans and zoning	C	Completed
Develop water management type	C	A WMT proposal was developed based on existing,

(WMT) classification proposal		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	Scheduled for 2008
Final basin plan	I	Planned for December 2008
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 in February 2001.
Phase 1 Stream Geomorphic Assessments	C/O	Phase 1 geomorphic assessments completed in the upper Lamoille, the entire Lamoille mainstem, the Wild Branch, Elmore Branch, Gihon River, Browns River, North Branch, lower Lamoille, and many smaller tributaries.
Phase 2 Stream Geomorphic Assessments	C/O	Phase 2 geomorphic assessments have been completed in the upper Lamoille, Browns River, Gihon, Centerville Brook, Lamoille River, Elmore Branch, and Wild Branch sub-watersheds.
Bridge and Culvert Inventory	C	Bridge and culvert surveys have been completed in the entire upper Lamoille watershed except for some smaller tributaries.
Dam Inventory	C	A dam inventory has been completed for the entire Lamoille watershed.
Biological and Chemical Monitoring	C/O	The Lamoille Water Quality Monitoring and Exchange Program was launched in 2008 with the Lamoille NRC, Johnson State College, and the EPSCoR program. Major sub watersheds were sampled for Phosphorus, E. coli and macroinvertebrates
Restoration/Protection Projects Underway	C/O	Numerous projects are underway watershed wide (see below).

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

Watershed Restoration and Protection Projects

Waterway	Water Quality Concern	Current Actions
Lower Lamoille Corridor protection	Protection of developable river corridor	DEC is working closely with CVPS in securing permanent river corridor protection easements on several reaches in the lower Lamoille.
Livestock Exclusion- mid Lamoille	Un-fenced livestock have access to surface waters	DEC has assisted the Lamoille NRCD in identifying high priority sites to implement a livestock fencing project to exclude livestock from waterways.
Town of Hardwick Road BMP project	Erosion and sediment from roads	A VYCC crew has implemented 3 weeks of road erosion BMP work at 4 sites in town. Practices included culvert headers, stone-lined ditches, and culvert outlet stabilization.
Browns River, Chittenden County	The Brown River is adversely impacted by severe streambank instability and erosion	A river corridor management plan was prepared for the towns of Essex, Jericho, Underhill, and Westford. A wetlands inventory mapping project has been completed. Coordinator, DEC River Management and Winooski NRCD 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 the sub-watershed.
Riparian Buffer Establishment, watershed wide	Lack of riparian buffer	Watershed Coordinator is working closely with NRCDs providing technical assistance in site identification based upon geomorphic compatibility
Upper and mid Lamoille	Logging-related erosion at stream crossings	Continued the successful Lamoille Portable Skidder Bridge Rental Project with Lamoille NRCD to reduce erosion at stream crossings

Plans for 2012

Plans for 2012 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 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.

- Secure funding to protect high priority river corridors in the lower Lamoille River watershed
- Implement the installation of designed culvert upgrades for aquatic passage in the Upper Lamoille.,
- Development of a fluvial erosion hazard map for the town of 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
- These activities will be reviewed against the revised Lake Champlain TMDL Implementation Plan (2010) and also the forthcoming re-written Lake Champlain TMDL that is being prepared by USEPA.

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. The draft basin plan is out for public review and expected to signed in winter of 2012.

Watershed Initiative Status

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	C	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	On hold	
Draft basin plan	C	
Public hearings on draft plan	O	
Final basin plan	O	
Outreach to area schools and local groups	O	Educational programs presented at Winooski Valley Park District, 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 and the River Management Program's report
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 2011

Waterway and location	Water Quality Concern	Current Actions assisted by watershed coordinator
Winooski River	Sediment, nutrients, hydrology	Assisted the Town of Richmond to develop a successful application for a rain garden. IDDE project underway.
Upper Winooski	Sediment, nutrients, hydrology	Assisted Central Vermont RPC and others to develop project to assess class IV roads in North Branch and Kingsbury Branch Assisted development of a LaRosa Partnership award to support monitoring.
Mad River	Sediment Fish passage hydrology	Assisted Friends of Mad River in identifying priority culverts for replacement or upgrade
Lower Winooski	Sediment, nutrients, hydrology	See ReSource project, LID projects and ‘Don’t P on the Lawn’ project in Basin 5
Huntington River	<i>E. coli</i>	Assisted in the development of the statewide TMDL for <i>E. coli</i> bacteria. Completed microbial source tracking study in partnership with local organization and USGS.
Mill Brook	Sediment temperature	Assisted Trout Unlimited in planting of buffer
Allen Brook	Sediment	Prepared for stream buffer & flood plain restoration project at brook’s mouth.
Alder Brook	Nutrients	Developed plans and received funding for a rain garden at elementary school.
Alder Brook	Sediment, nutrients	Assisted the Friends of the Winooski River with a buffer planting
Centennial Brook	Sediment, nutrients	Developed plans and arranged for funding for a rain garden at an elementary school. Provided workshop to 4 th grade at school that followed rain garden installation.

Conclusion & Plans for 2012

The DEC Watershed Coordinator will hold public meetings on the draft plan and finalize plan for agency signature. The coordinator will also continue to work closely with watershed partners in the Winooski River basin to implement strategies in the plan.

White River – Basin 9

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Introduction

The Agency of Natural Resources adopted the plan in November 2002 and has been implementing it since that time. There is a long history of basin planning in the White River basin.

The White River Partnership 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 and Partner 2011 Efforts

After a brief absence, in 2009 DEC reestablished its watershed planning efforts in the White River basin. The watershed coordinator and ANR watershed forester have co-developed the Class 4 Road Erosion Inventory Project with the WRP and 2 Rivers Regional Planning Commission. High priority eroded sites were identified. Partners have developed grant proposals to implement restoration efforts at numerous high priority sites. Additionally, a multi-organization collaborative effort was initiated to identify high priority stream crossings for upgrades to improve fish and aquatic organism passage.

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. ANR, DEC, and the WRP identified 5 additional Class 4 road sites in the Towns of Roxbury, Braintree, and Chittenden. Four weeks of VYCC work was completed in the 2011 field season. 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 Natural Resources Conservation District (NRCD) in submitting 4 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 a first in the nation Landscape Auction to protect high priority water and natural resources in the White River watershed. 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 NRCD, the VT Agency and 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. Funding was secured from ERP to continue this project in the White for the 2012 field season. 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.

Irene Impacts- the White River watershed was devastated by Tropical Storm Irene. Irene was a 100+ year flood event and greatly impacted the southern and western portions of the watershed. Some sub-watersheds hit especially hard include the Tweed River, Lilliesville Brook, the West Branch, Riford Brook, Thayer Brook, the Third Branch of the White, Camp Brook, Gilead Brook, Stony Brook, Fetcher Brook, Davis Hill Brook, Guernsey Brook, Broad Brook, and the entire main stem. Miles of state and town roads were washed away, houses and property lost or destroyed, and significant damage to agricultural fields. Numerous stream crossings failed, were plugged and/or outflanked damaging adjacent roads, approaches, and property. Enormous amounts of sediment and debris entered the waterways from overwhelmed headwater streams. Miles of state highway Route 107, Route 100 and Route 73 were partially or completely destroyed and had to be rebuilt. The damage was both flood inundation-related and from erosive forces. Much of the transportation and private and public infrastructure located within floodways and flood plains was damaged or destroyed. In many cases rivers were dredged for the gravel resources needed to rebuild road embankments immediately following the flood, negatively impacting aquatic habitat and water quality. The devastation resulted in millions of dollars' worth of damage to state and municipal entities and private citizens.

Watershed Initiative Status

Activity	Status	Comments/Information
	2002/2009	
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/NI	A water management typing proposal was developed based on existing, reasonably attainable and desired water quality.
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 select boards 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 published November 2002.
Tactical basin planning was initiated in 2011.	I	High priority sub-watersheds and watershed issues were identified. Internal partners meetings were held
Outreach to area schools and local	C/I	DEC did outreach throughout planning process.

groups		Ongoing outreach by the White River Partnership.
Basin Assessment Report	C	An updated report was done in November 2002.
Phase I Stream Geomorphic Assessments	C	Completed on upper White, First, Second, Third Branches and numerous tributaries.
Phase II Stream Geomorphic Assessments	C	Completed on many of the rivers and streams for which Phase I was done (see above).
Bridge and Culvert Inventory		
Dam Inventory	C	Field inventory done.
Biological Monitoring	C	Additional waters sampled (biological monitoring) to bracket possible sources of pollution and determine long-term water quality trends.
Restoration/Protection Projects Underway	O/IC	Numerous watershed and restoration projects are underway watershed wide (see below)

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

Plans for 2012

The watershed coordinator initiated the first instance of true Tactical Planning in the White River basin, in the early summer of 2011. By coordinating a series of internal and partner-organization meetings, the initial outline of a revised Basin 9 plan was developed. DEC's intention, pre-Irene, was to carry forward the process and produce an initial partner review draft for the end of 2011. However, the response to Irene interrupted that process, and pulled the watershed coordinator into consequential flood-recovery duty. The Tactical Planning process will re-start in the White River basin as of January, 2012.

Ottawaquechee and Black Rivers – Basin 10

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Introduction

The Draft Basin 10 Plan has been completed and submitted to ANR for review. It is expected that a public review draft will be available by February, 2012.

The draft plan contains 95 recommendations for action addressing nine of the ten major stressors identified in the Vermont Surface Water Management Strategy and water quality concerns identified by the local community. Priority recommendations from the Corridor Plan for the Black River and its tributaries are also included.

The Draft Plan is undergoing internal review from across ANR departments prior to finalization of the draft for public release.

Tropical Storm Irene meted out massive changes to the watershed altering the geology, hydrology and ecology of the system. The results of the storm and the recovery efforts will be evaluated over the coming years.

Accomplishments for 2011 have included 1) the completion of an assessment of the stormwater system for the Town of Springfield which identified the systems outlets to the Black River and streams and will lead to identifying where pollutants are entering the stormwater system ultimately working to eliminate those reaching the river; 2) Kedron Brook stream crossing improvements installed to reduce erosion and sedimentation; 3) initiation of a Skidder Bridge Rental Program for foresters and loggers to improve stream crossings and reduce erosion and sedimentation; and 4) addressing gravel road erosion along Lake Rescue through Better Backroads projects. The total funding coordinated in basin 10 to date is \$361,886.

Watershed Initiative Status

Activity	Done	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 held	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 and zoning	O	One RPC has completed town plan reviews for 10 of the 19 Basin towns
Develop water		On-hold

management type classification proposal		
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 2012
Final basin plan		Scheduled for early 2012
Outreach to area schools and local groups	O	Meetings with town committees, local groups, college classes are continuing
Basin Assessment Report completed	O	Basin in current rotation for new assessment report, field work completed 2008
Stream Geomorphic Assessments	C, O	Corridor plan completed on the Black River mainstem and significant tributaries, also on tributaries to Round Pond. SGA study in progress 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 2011	I,O	Projects are underway, see narrative above and chart below.

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

River and Stream Restoration Projects for 2011

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 and Runoff	Springfield Stormwater Survey, system survey and mapping completed and remediation options presented to town
		Rain barrel Workshops offered by BRAT
Lake Rescue (Round Pond)	Sedimentation	Working with Lake Rescue Assoc. and Lakes & Ponds Program, to identify sources of sediment and address road erosion issues
		Sediment core sampling conducted, awaiting analysis results
Ottauquechee	Lack of Buffers	Expanded ag buffer planting, secured funds for further planting
	Water Quality	Continued and expanded ORG Monitoring Program
		Improved horse crossing installed on six streamside properties along Kedron Brook
River Condition	SGA initiated Phase 1 underway, Phase 2 & corridor plan - 2012	
Basin 10	Road runoff	Active Better Backroads Program in Ludlow
	Lack of water quality protection in town	Working with RPC to incorporate language into town plans and ordinances

	plans and zoning	
	Water Quality	Skidder Bridge rental program initiated

Plans for 2012

Complete public review process, have plan signed by Agency Secretary.

Work with towns to encourage adoption of FEH measures and address flood resiliency.

Encourage and sponsor wide-spread buffer plantings and strategic protection of flood attenuation assets in response to the damage done to river corridors from TS Irene.

Black River

- Complete IDDE assessment and monitoring and work with town of Springfield to remediated discovered pollutant inputs
- Complete remediation of the Lincoln Street gully erosion site in Springfield
- Work with Springfield to address other identified stormwater issues
- Hold more rain barrel workshops

Lake Rescue:

- Install a demonstration buffer on the shoreline
- Complete the sediment core sampling study
- Re-establish the navigation channel destroyed by TS Irene

Ottawaquechee River:

- Complete Ottawaquechee Corridor Plan and initiate projects
- Further expand the Billings Farm agricultural buffer
- Continue Kedron Brook watershed rehabilitation projects working with willing landowners on streambank restoration

West, Williams, Saxtons Rivers – Basin 11

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Introduction

The adopted 2008 Basin 11 Water Quality Management Plan is being implemented by the Watershed Coordinator in corporation with its many partners.

Plan strategies being implemented by DEC and local partners include working with towns to address fluvial erosion hazards, continuing volunteer water quality monitoring through the Southeast Vermont Watershed Alliance, assessing sources of bacterial contamination in response to the TMDL on the West River, working with state and federal agencies to respond to and the potential development of three hydroelectric projects in the Basin, and providing assistance and educational outreach to landowners and towns in response to Tropical Storm Irene. The total funding coordinated in Basin 11 to date is \$ 426,438.

Tropical Storm Irene meted out massive changes to the watershed altering the geology, hydrology and ecology of the system. The results of the storm and the recovery efforts will be evaluated over the coming years.

Watershed Initiative Status

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	Water Management Typing has been completed for all 29 towns in Basin 11. Protocol of typing process documented and submitted.
Meetings with individual towns on WMT classification proposal	On hold	10 of the 29 basin towns have had WMT presentations and discussions. Further meetings have been postponed pending needed decisions by the Water Resources Panel.

Watershed plan draft	C	The Draft Plan was completed and public meetings held in January of 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 and 2 assessments completed.
Bridge and Culvert Inventory (B&C)	C, O	Completed where 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 2011	I, O, C	Projects are being carried out throughout the basin, see narrative above and chart below.

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

River and Stream Restoration Projects for 2011

Waterway	Water Quality Concern	Current Actions
Basin 11	Water Quality	Continued and expanded SeVWA water quality monitoring program testing 19 sites and continued the laboratory services exchange with the Connecticut 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, invasives educational display at Herrick's Cove Wildlife Festival
	Flow impact on river ecology	The Nature Conservancy, working with USACE, is studying the impact of dam operations on flora, fauna and floodplains in the Basin to potentially alter future operational procedures USACE hydro dams proposals – tracking progress of licensing process and issues
	<i>E. coli</i> contamination	Bacteria TMDL developed for the So. Londonderry reach which includes recommendations for remediation options
Williams River	Agricultural runoff	Trees for Streams program by WCNRC – buffer

		planting on ag lands – 900’ in Chester
	<i>E. coli</i> contamination	Targeted monitoring by SeVWA to assess high bacteria levels
	Floodplain habitat	Herrick’s Cover Habitat Restoration project, a joint effort with Ascutney Mountain Audubon has again planted over 100 trees and shrubs in the floodplain
Saxtons River	River Stability	Continued working with the Village of Saxtons River on re-development of an unstable riverbank on town property
		Tracking Basin Farm – Twin Falls hydro development – licensing process and habitat issues

Plans for 2012

Continue seeking funding for and implementing 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.

Remove and restore riverbanks at collapsed bridge in West River.

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

Support the local efforts working on ORW designation for the Rock River.

Deerfield Basin Progress Report – Basin 12

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Introduction

The Deerfield River basin was recently assigned to the DEC Watershed Coordinator based in Springfield. The planning process for the river and the southernmost streams draining to the Connecticut River will begin in 2012, following the Tactical Planning Process.

Outreach to local groups and contacts in the Deerfield watershed has begun.

Funding has been provided to the Windham Regional Commission to update the Stream Geomorphic assessment of the North Branch of the river and expand this to a full Corridor Conservation Plan.

The Watershed Coordinator is working with designees from Massachusetts and two community funds as fund managers for the Deerfield River Enhancement Fund a mitigation grant fund from TransCanada dam operations. Four grants were awarded this year three to Vermont organizations. The total funding coordinated to date is \$26,336.

Tactical Planning Status

	Planning Phase for Basin	Activity	Comments
Monitoring and Assessment	Biological monitoring	O	Monitored in 2010
	LaRosa Partnership-supported citizen monitoring		
	Stream Geomorphic Assessment (Phase II)	C, I,O	SGA completed on the North Branch of the Deerfield but is in need of updating and CCP
	Bride & culvert inventory		
	Basin Assessment Report	O	Basin in current rotation for new assessment report, field work completed 2003
Tactical Basin Planning	River Corridor Plan(s)	I	
	ANR internal tactical process		
	Watershed partner groups identified/contacted		
	SWMS strategies adapted to local plan as appropriate		
	Local WQ concerns identified, strategies added		
	Implementation table draft		
	Review of town plans & zoning regulations		
	Watershed plan draft		
	Public forums		

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

River and Stream Restoration Projects for 2011

Waterway	Water Quality Concern	Current Actions
Deerfield River	Planning process	Initial outreach to local groups to gather support for planning process
	Flow Alteration	Monitoring FERC re-licensing process
	Project development	Assisting with fund management of Deerfield River Enhancement Fund

Plans for 2012

Increase outreach to groups and individuals and begin public forums on basin planning.

Coordinate with ANR departments and divisions on data sources and needs for monitoring and assessment in support of the planning process.

Work with towns to address flood resiliency and encourage adoption of FEH measures.

Encourage and sponsor wide-spread buffer plantings and strategic protection of flood attenuation assets in response to the damage done to river corridors from TS Irene.

Lower Connecticut River drainages – Basin 13

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Introduction

The Basin planning process in the Lower Connecticut River basin has not officially begun, however the process will get underway for the southernmost portion beginning in 2012. For planning purposes the streams south of the West River confluence are being combined with planning for the Deerfield River. The DEC Watershed Coordinator is working on a number of important projects in the Basin to address water quality issues.

The Locke Farm Field in West Brattleboro, a 5.34 acre parcel, is now protected by river corridor conservation easements and has been transferred to the Westgate Housing Authority for use as open space, recreational land and community gardens. It will remain as floodplain access to help mitigate flooding from the Halliday and Whetstone Brooks.

A stormwater system survey of Brattleboro has been completed to identify illicit discharges of pollutants into the stormwater system and hence the West and Connecticut Rivers. A number of issues have already been corrected by the town DPW.

In Sweet Pond State Park, Guilford, a hazardous dam condition has prompted the draining of the pond in preparation for remediation work. Water quality and sediment issues are being addressed and stabilization work planned.

Flood response outreach and erosion control projects have taken place in Windsor, and the Whetstone Brook experienced sustained damage from Irene. Water quality monitoring of the Connecticut River is being planned in Putney and the process for re-licensing of hydro dams along the river is underway.

The total funding coordinated in Basin 13 to date is \$484,081.

Tactical Planning Status

	Planning Phase for Basin	Activity	Comments
Monitoring and Assessment	Biological monitoring	O	Re-sampling completed in 2008 season
	LaRosa Partnership-supported citizen monitoring		
	Stream Geomorphic Assessment (Phase II)	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.
	Bride & culvert inventory	C, O	As part of Phase 2 assessments on Whetstone and Crosby Brooks
	Basin Assessment Report	C	2002, update pending

Planning Phase for Basin		Activity	Comments
Tactical Basin Planning	River Corridor Plan(s)		
	ANR internal tactical process	I	Portions adjacent to Basin 12 (Whetstone Bk. and vicinity, Brattleboro)
	Watershed partner groups identified/contacted		
	SWMS strategies adapted to local plan as appropriate		
	Local WQ concerns identified, strategies added	I, O	Partners, local watershed groups and watershed residents are expressing concerns regarding particular waterbodies and issues. Strategies are being developed to address these issues and projects implemented
	Implementation table draft		
	Review of town plans & zoning regulations	I, O	As requested by individual towns
	Watershed plan draft	I	Portions to begin in 2012
	Public forums	O	As related to specific stream projects and on flood-related issues.

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

River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Basin 13	Erosion, sedimentation	Project planning underway in Windsor
	Flow Alterations	Monitoring FERC re-licensing of hydro dams
	Water Quality	Working to establish monitoring program with Putney Rowing Club
Crosby & Whetstone Brooks	Stormwater and 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 purchase and transfer of 5.34 acres floodplain parcel in Whetstone Brook watershed
	Flooding Outreach	Public forums of TS Irene
	Water Quality	SeVWA continued water quality monitoring of 3 sites on Whetstone Brook
Sweet Pond	Habitat and recreation	Worked to drain pond and remediate sediment transport and habitat issues
Lake Runnemedede	Sedimentation	Working with town to address mass failure erosion site on lakeshore

Plans for 2012

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

Begin outreach and establishing contact with local groups, towns and residents in the southern end of Basin as part of planning for the Deerfield River begins.

Implement the funded streambank restoration project behind Bickford's in Brattleboro.

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 River Basin Progress Report – Basin 14

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Introduction

In 2011, project partners in the Stevens, Wells, Waits, and Ompompanoosuc River watersheds completed a number of projects. Out of a total of 117 strategies in the plan, 63 have been initiated or completed as of December, 2011. A project development grant for the Waits River has resulted in two river corridor protection projects moving forward in the towns of Corinth and Bradford. In addition to this, buffer planting projects were held along the Wells River, the West Branch of the Ompompanoosuc River, Middle Brook and Lake Fairlee.

A study regarding an internal treatment for Ticklenaked Pond was completed in 2011 and funding to complete internal treatment through an Ecosystem Restoration Grant has been wait listed pending an evaluation of funding demand for corridor protection projects. The watershed coordinator identified a new Eurasian watermilfoil infestation in Ticklenaked Pond in the fall of 2010 and has been working with the Ticklenaked Pond Association and Aquatic Nuisance Control Program to develop a plan for controlling this invasive species which was implemented in the summer 2011.

Tactical Planning Status

Activity		Status 14/16	Comments/Information
Monitoring and Assessment	Biological monitoring	O/O	Completed in 2007/2008
	LaRosa Partnership-supported citizen monitoring		Stevens River water quality sampling project completed in 2005 and 2006 and Ompompanoosuc River water sampling project completed in 2006 and 2007.
	Stream Geomorphic Assessment (Phase II)	O/O	Phase 2 assessments have been completed for the Stevens, lower Wells, Waits, upper Ompompanoosuc rivers and Blood Brook.
	Bridge & culvert inventory	O/O	Bridge and culvert surveys were completed in the Stevens River watershed in 2004 and in the Waits, Ompompanoosuc River watershed and a portion of the Wells River watershed in 2006.
	Basin Assessment Report	C/C	The basin assessment report was completed for Basin 14 in April 1999 and for Basin 16 in 2011.
Tactical Planning	River Corridor Plan(s)	O/O	Completed for the Stevens, Lower Wells, Waits and upper Ompompanoosuc rivers.
	ANR internal tactical process		Completed
	Watershed partner groups identified/contacted	C/_	Completed
	SWMS strategies adapted to local plan as appropriate		Completed
	Local WQ concerns identified, strategies added	C/_	Local water quality issues have been identified in each of the four watersheds
	Implementation table draft	C/_	Updated in December of 2011
Review of town plans & zoning regulations	C/_	Completed in 2008	

Activity	Status 14/16	Comments/Information
Watershed plan draft		Released in 2008
Public forums	C/_	Held in 2008
Final basin plan (year of issuance)	2008	

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

River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Ticklenaked Pond	Phosphorus impairment	Completed a study regarding an internal treatment for Ticklenaked Pond and applied for funding to complete internal treatment through an ecosystem restoration grant has been wait listed.
Ticklenaked Pond	Eurasian watermilfoil	Worked with association to control Eurasian water milfoil that was identified in the fall of 2010.
Waits River	Aquatic habitat and elevated temperatures	Completed a project development grant for the Waits River watershed that has led to a wetland protection river corridor protection project and another corridor protection has been submitted for funding.
Impaired Tributary to Tabor Branch	Agricultural impairment	A 319-funded project has been completed to address runoff from a farm in this small watershed
Lake Fairlee	Aquatic habitat and nutrient enrichment	Assisted with a better backroads project to establish a buffer between Lake Road and Lake Fairlee.
Ompompanoosuc River	Aquatic habitat	Funding for a phase 2 stream geomorphic assessment for the lower watershed has been received. Remediation is underway at the Elizabeth Mine, where a treatment facility is operating that addresses acidic mine drainage. The biological condition of the receiving stream is now significantly improved, as is the aesthetic appearance of the streambed.
Ompompanoosuc River	Aquatic habitat and E. coli	Buffer planting projects were completed on Middle Brook and the West Branch of the Ompompanoosuc River.

Conclusion and Plans for 2012

The watershed coordinator will be working with be working with other ANR staff and partners in the basin will continue to implement priority strategies listed in the Basin 14 water quality management plan. The

internal treatment for Ticklenaked Pond will move forward if funding is received. A workshop with road crews in the watershed is being planned to help them better address streams dynamics as towns continue to repair and rebuild roads and replace bridges and culverts in the basin. Phase 2 stream geomorphic assessments are moving forward in the lower Ompompanoosuc River watershed as part of a project which also includes project development in West Fairlee and Thetford and along with this there are plans for the White River Natural Resources Conservation Districts, Ompompanoosuc River trees for streams program to continue to expand. Funding has also been received to develop projects along the lower Wells River in Newbury.

Passumpsic and Upper Connecticut River – Basins 15/16

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Introduction

In 2011 the watershed coordinator compiled information from recent biological assessments, stream geomorphic assessments and the basin assessment report to identify key stressors in the basin. The watershed coordinator also worked with the Caledonia County Natural Resources Conservation District to advise the town of Lyndon on strengthening flood regulations to help address flooding issues in the town, in addition to working on a number of specific mitigation projects. Finally the coordinator is the grant manager on an ecosystem restoration grant that is essential to a conservation project along the Connecticut River that will protect a 50 foot buffer on 6 miles of river and stream and conserve and restore a number of wetlands.

Tactical Planning Status

Activity		Status 15/16	Comments/Information
Monitoring and Assessment	Biological monitoring	O	
	LaRosa Partnership-supported citizen monitoring		
	Stream Geomorphic Assessment (Phase II)	O	Completed for Nulhegan, Upper Passumpsic watersheds.
	Bride & culvert inventory	O	Completed for Passumpsic Watershed
	Basin Assessment Report	C	Basin 15 report completed in 2009 and Basin 16 report completed in 2011
Tactical Basin Planning	River Corridor Plan(s)	O	Completed for upper Passumpsic River
	ANR internal tactical process	I	Data collection and review has been initiated.
	Watershed partner groups identified/contacted		
	SWMS strategies adapted to local plan as appropriate		
	Local WQ concerns identified, strategies added		
	Implementation table draft		
	Review of town plans & zoning regulations		
	Watershed plan draft		
	Public forums		
Final basin plan (year of issuance)			

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

River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Passumpsic River	Flooding, Nutrients and Aquatic Habitat	The Passumpsic River flood mitigation project has included working with the Town of Lyndon to review zoning regulations and moving town garage.
Passumpsic River	Sediment and nutrients	St Johnsbury stormwater system mapping was completed.
Connecticut River	Phosphorus	Johnson Farm project has been funded partially through an Ecosystem Restoration Grant which includes over 6 miles of buffer along the Connecticut River and tributaries and extensive wetlands.
Leach Creak	Aquatic Habitat	A river corridor protection project has been funded through an Ecosystem Restoration Grant.

Conclusion and Plans for 2012

The watershed coordinator will be actively engaged in the Tactical Planning process by working with other ANR staff and partners in the basin to further refine the list of primary stressors in this basin. Public meetings will be held to get input on these priorities to make sure they also reflect public concerns. Finally, state surface water management strategies that are most relevant to this basin will be identified and modified to fit the specifics of this basin and new approaches to effectively address key basin stressors will be discussed.

Lake Memphremagog, Tomifobia and Coaticook Watershed – Basin 17

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Introduction

The watershed coordinator has released the Draft basin 17 Water Quality Management Plan for public comment. The draft plan includes a table of 79 priority actions for this basin focused on addressing nutrient enrichment, aquatic invasive species spread and the protection and restoring aquatic habitat. The primary focus of the plan is reducing phosphorus loading to Lake Memphremagog which is currently impaired due to elevated levels of phosphorus. The plan includes targeted areas for stream buffer plantings and river corridor protection projects across the basin and an analysis of water sampling and watershed phosphorus modeling to target implementation projects to portions of the basin where these can have the greatest impact. The watershed coordinator has also worked closely with the Memphremagog Watershed Association in organizing a Black River educational meeting to discuss water quality in this important watershed.

The watershed coordinator assisted with a number of assessments completed in the basin in 2011. These include: water quality sampling on the small tributaries to Lake Memphremagog and in the Black River watershed, the final release of the Black River stream geomorphic assessment, and water sampling on major tributaries in 2011, 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 VT DEC to develop a full lake phosphorus model which is needed for the development of a phosphorus Total Maximum Daily Load (TMDL) for Lake Memphremagog.

The watershed coordinator also assisted in the planning and planting of a half mile of riparian buffer on the Barton, Clyde and Black Rivers through a number of grant programs and collaborative efforts. The coordinator assisted with a rain barrel workshop and the Northeast Kingdom Lakeshore Buffering program that planted buffers on over 800 feet of lakeshore on lakes in the basin in addition to a number of better back roads grants. The watershed coordinator worked with a local consultant to identify potential wetland restoration sites in the Black River watershed and one of these is moving forward through the Wetlands Reserve Program, and the coordinator also assisted with partners in the basin to identifying a large Conservation Reserve Enhancement Project in a priority phosphorus reduction watershed.

Tactical Planning Status

Activity		Status	Comments/Information
Monitoring and Assessment	Biological monitoring	O	Completed in the fall of 2009
	LaRosa Partnership-supported citizen monitoring	O	Water sampling in the Lake Memphremagog watershed focused on phosphorus, nitrogen, and turbidity has been completed in 2011 and proposed for 2012. Seymour Lake study completed in 2008 and 2009.
	Stream Geomorphic Assessment (Phase II)	O	Phase 2 assessments were completed on the Clyde River, Barton River, Willoughby River, Johns, and Black rivers.
	Bridge & culvert inventory	O	The Fish and Wildlife Department has completed bridge and culvert surveys on portions of the Clyde and Barton Rivers, and Northeast Vermont Development Association completed an assessment of culverts in Coventry.
	Basin Assessment Report	C	The basin assessment report was completed in 2006.
Tactical Planning	River Corridor Plan(s)	O	Completed for the Black, Barton, and Johns Rivers.
	ANR internal tactical process		Completed
	Watershed partner groups identified/contacted	C	Completed
	SWMS strategies adapted to local plan as appropriate	C	14 panel discussions were held between 2008 and 2011 and strategies to address roads, river corridor management, lakeshore management, stormwater runoff, aquatic nuisance species, agricultural runoff have been developed
	Local WQ concerns identified, strategies added	C	In 2008, the watershed council prioritized the issues of nutrient enrichment, invasive species, aquatic habitat, and surface water contamination.
	Implementation table draft	C	Completed with 79 actions listed
	Review of town plans & zoning regulations	C	Town plans and zoning were reviewed in 2011.
	Watershed plan draft	Dp	Released for public comment in November 2011
Public forums	C	Held on December 1 st and 5 th .	
Final basin plan (year of issuance)	2012	Plan to be approved pending final revisions and responsiveness summary regarding public comments.	

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

River and Stream Restoration Projects

Waterway	Water Quality Concern	Current Actions
Barton, Black, and Clyde Rivers	Nutrients and Aquatic Habitat	The coordinator helped with buffer planting projects covering a half 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 North East Kingdom Lakeshore Buffering program planting buffers on over 800 feet of lakeshore in the basin.
Lake Memphremagog	Phosphorus	The Watershed coordinator worked with partners in the basin to host a rain barrel workshop.

Black River	High nutrient and sediment levels	The watershed coordinator worked with a local consultant on a project to identify wetlands to restore along the Black River and this project identified one project which is moving forward as a WRP project.
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 Willoughby Lake.

Conclusion and Plans for 2012

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 Draft Basin 17 Water Quality Management Plan has been revised based on public comment received at the December public meetings and the final plan will be released in early 2012.

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.

Funding has been received to support the identification of critical phosphorus source areas in the basin. This work should allow us to further target our implementation and outreach efforts in the basin where these can have the greatest phosphorus reduction impact. Also funded through this grant are two agricultural best management practice projects, continued efforts to identify wetlands restoration projects in addition to continued lakeshore and stream buffering projects. On top of this a watershed grant has been submitted to help fund education about lakeshore development issues and a local supplemental environmental project has been received to fund an erosion control project on a trail that drains to Holland Pond. Work will also continue to establish an agricultural water quality group to help guide and advance actions in the Basin 17 plan to address water quality issues associated with this land use.