

PROGRESS REPORT ON
RIVER BASIN WATER QUALITY MANAGEMENT PLANNING
DURING 2014

A REPORT FOR:

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

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Section 1) Introduction and Summary

In 2014, the Vermont Agency of Natural Resources, Department of Environmental Conservation (DEC, or Department) and its federal, state, municipal, regional and local watershed partners continued to be engaged in the basin planning process in all of Vermont's planning basins. The goal of the process is to develop tactical water quality watershed management plans for each of 15 planning basins that are built in a two-year timeframe, are revisited every five years, and for which implementation tables of priority actions are continually updated. The overall goal for each basin water quality management plan is to establish and carry out strategies that will:

- Enhance, maintain, protect, or restore the surface waters of the basin by directing regulatory, technical assistance, and funding to highest-priority subwatershed areas;
- 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 is prepared by the Monitoring, Assessment and Planning Program (MAPP) of the Watershed Management Division, DEC. The report outlines the status of planning efforts for each basin. During the 2014 reporting period, the five DEC 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 Basin Planners also actively translated the actions identified within tactical plan implementation tables into remediation projects for support by many funding sources. Major sources leveraged to implement work identified in tactical basin plans has included DEC Ecosystem Restoration, ANR Watershed, Lake Champlain Basin Program Local Implementation, and Connecticut River Mitigation and Enhancement Fund grant programs, and private and municipal funding. The five DEC Basin Planners are physically located in Barre, Essex Junction, St. Johnsbury, Springfield, and Rutland.

Basin plans and the basin planning process are required by Vermont Statute in 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 prior editions of this Report, DEC described the Vermont Surface Water Management Strategy and associated tactical basin planning process. This process is used to produce the tactical basin plans described throughout this report. The process is described in Chapter Four of the SWMS at http://www.vtwaterquality.org/wqd_mgtplan/swms_ch4.htm.

During 2014, significant progress was achieved, with public review, responsiveness revisions, and approval by DEC Commissioner Mears and ANR Secretary Markowitz of the following tactical basin plans:

- [Passumpsic and North Connecticut River Tactical Basin Plan](#), June 20, 2014.
- [South Lake Champlain Tactical Basin Plan](#), March 25, 2014.
- [Deerfield River Tactical Basin Plan](#), March 11, 2014.

Internal review drafts for the North Lake Champlain and West, Williams, and Saxtons River Watersheds were circulated during November and December, 2014, with the West River Plan slated for public review coincident with issuance of this report. The Wells, Waits, and Ompompanoosuc Tactical Basin Plan will be released for public review early in 2015, and the Battenkill and Hoosic River Tactical Plan during 2015.

In Section Two of this report, the reader will find descriptions of the tactical basin planning process and associated activities of interest to legislators and the public. Section Three provides individual descriptions of progress for each planning basin.

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

Progress in 2014

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 surface water resources in Vermont. Inherent in the design of the framework is the belief that many stakeholder groups and individuals should have ongoing opportunities to participate in the process of managing Vermont's watersheds. The Vermont Surface Water Management Strategy (SWMS, see Chapter 4) describes the tactical planning process for: developing individual, basin-specific and geographically explicit plans; establishing priority monitoring and assessment approaches; listing planning, permitting, or project-level initiatives to protect or restore surface waters; and meeting the legal requirements for basin plans. These tactical plans focus on important conservation and restoration objectives to be accomplished within the any given five-year cycle, including in some cases within only certain priority subwatersheds. Tactical plans contain priority lists of objectives, strategies, and actions. The tactical planning cycle consists of three phases: Monitoring and Assessment; Tactical Planning; and, Implementation.

In 2014, MAPP supported tactical planning across most basins in Vermont. Figure one shows the planning basins for Vermont, and displays how certain basins (lower Champlain direct; CT River North; CT River south) are consolidated with adjacent basins in the production of plans. Table 1 provides an indication of the planning phase for each Vermont basin for the reporting period, with a more detailed view of activities in each planning basin.

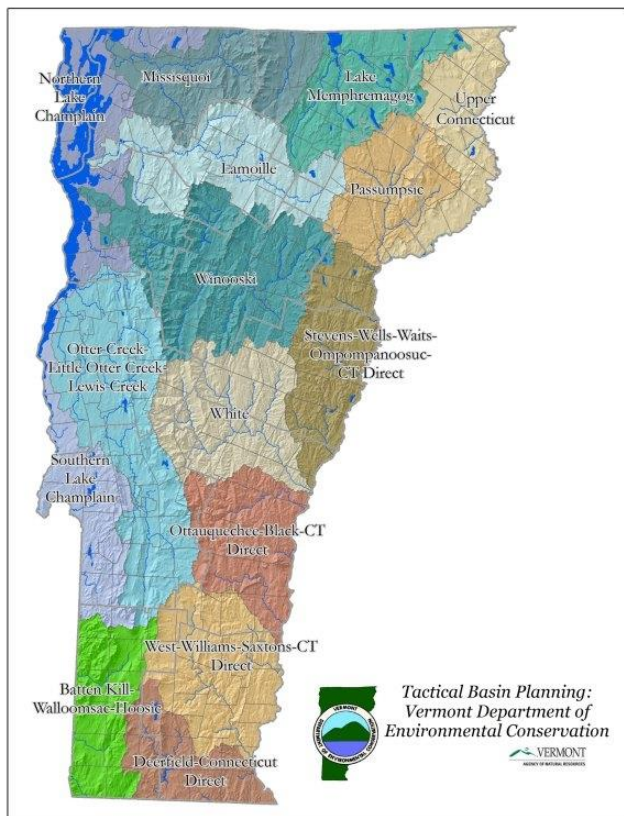


Figure 1. Tactical Planning Basins.

Tactical basin implementation plans fulfill the geographically-specific planning requirements in the Water Quality Standards, while the statewide requirements, including state-scale strategies, are contained within the Statewide Surface Water Management Strategy. This eliminates significant redundancies relative to historic basin plans, where all strategies – statewide, basin-specific, and even local, were listed in a basin-specific plan, and many elements repeated from one basin plan to the next. Further, as tactical basin plans are developed by an ongoing process involving all relevant partner organizations, and initiated by ANR and partner agencies, they reflect products not of DEC, but of all of the partner agencies and watershed stakeholders. MAPP has re-engineered the process to achieve completion of tactical basin implementation plans for all of Vermont's planning basins, every five years, as required by statute. The 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 1/1/2015.

Basin	Year of most recent plan issuance	Planning phase for 2015
Basin 1 Battenkill, Walloomsac, Hoosic	Prior to 2000	Tactical planning proceeded throughout 2014. Draft plan for public release expected 2015
Basin 2 and 4 Poultney, Mettowee, Lower Champlain Direct	2014	Implementation
Basin 3 Otter, Little Otter, Lewis	2012	Implementation
Basin 5 Upper LC, LaPlatte, Malletts Bay, St. Albans Bay, Rock, Pike	2009	Tactical Planning – draft for public review planned for winter 2015. The issuance of this plan has been delayed by three months to allow it to be used as an initial template for Lake Champlain TMDL Phase II plans (see below).
Basin 6 Missisquoi	2013	Implementation
Basin 7 Lamoille	2009	Assessment, Implementation
Basin 8 Winooski	2012	Implementation
Basin 9 White	2013	Assessment, Implementation
Basin 10 (13) Ottauquechee, Black	2012	Implementation
Basin 11 & 13 Williams, West, Saxtons, Lower CT,	2008	Tactical Planning, draft public release for early winter 2014/2015.
Basin 12 & 13 Deerfield, Lower CT, Mill	2014	Implementation
Basin 14 Stevens, Wells, Waits, Ompompanoosuc	2008	Tactical Planning, draft public release for early winter 2015.
Basin 15 / 16 – Northern CT River Watersheds	2014	Implementation
Basin 17 Memphremagog, Coaticook, Tomifobia	2012	Assessment, Implementation, development of Lake Memphremagog phosphorus TMDL.

Tactical Basin Planning and Ecosystem Restoration Grant Funding

As reported in the 2013 Legislative Report, the MAPP and Ecosystem Restoration Programs devised an improved grant evaluation and funding distribution model that ties Ecosystem Restoration grants to the highest priority outcomes identified in the relevant tactical basin plans. During 2014, DEC further strengthened the relationship between priorities identified in tactical plans, and funding allocations made for Ecosystem Restoration Grants. This was accomplished using a quantitative and transparent proposal scoring rubric, with empirical evaluations coordinated by the Basin Planners, who, along with DEC field staff, have the most intimate knowledge of the resources under consideration. As a result, the SFY2014 Ecosystem Restoration grants identified for disbursement have been more appropriately distributed across project types, and more equitably distributed across most Vermont basins, than in any prior year. Figure 2 and Table 2 provide detail on the disbursement of Ecosystem Restoration funds for the SFY2014 and early SFY2015 grant rounds.

These ongoing improvements are worthy of legislative notice for two reasons. First, implementation of this process has resulted in greater clarity among grant applicants and recipients as to the criteria for success of a project, and greater transparency to appropriators as to why certain projects were supported. Second, in the current Vermont Proposal for a Clean Lake Champlain, or “Phase I Plan,” the relationship between tactical basin planning and the distribution of capital funds is framed in the context of priority sectors of intervention; specifically agriculture, road and developed land stormwater runoff, river corridor management, and forest practices. Regardless of the mechanism ultimately employed to fund remediation of nonpoint source pollution for Lake Champlain, capital and other water quality investments must be guided by sound, integrative planning and prioritization. With this in mind, in the coming year, the MAPP and ERP programs plan to further improve the grant project identification and funding process using LEAN process improvement tools that were successfully used to guide improvement to other Department business activities in 2014.

The tactical planning process is the critical element to the successful targeting of remediation funds. Insofar as tactical basin plans also serve as the watershed-specific implementation plans of TMDL’s at all scales (e.g., Lake Champlain TMDL, Long Island Sound TMDL, Potash Brook TMDL in South Burlington), establishing clear linkages in tactical basin plans to priority clean water restoration achieves major objectives of Vermont’s surface water management program.

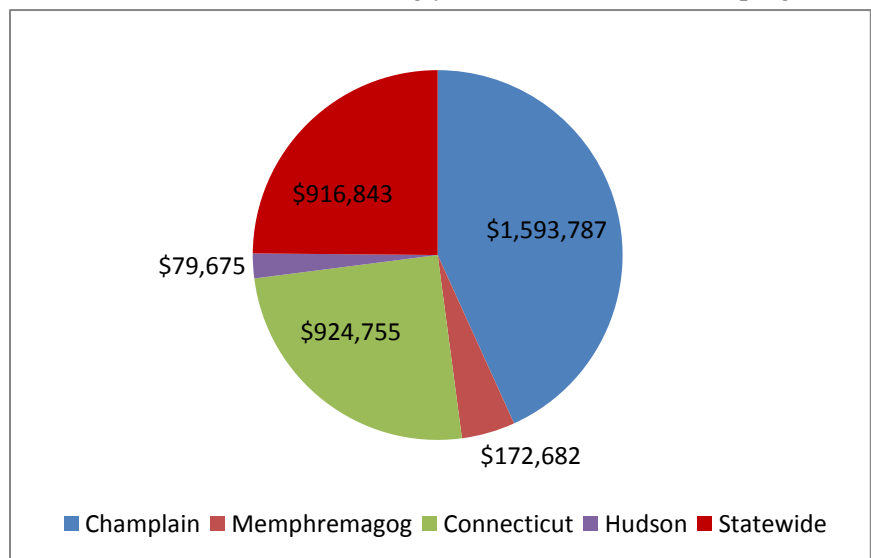


Figure 2. Provisional aggregated Ecosystem Restoration Grant Funds distributed to partner organizations based upon tactical basin plan priorities, SFY2014 and SFY2015.

Table 2. SFY2014 and SFY2015 Ecosystem Restoration funding, by major watershed and planning basin. Figures for SFY2015 are provisional, representing disbursements to date, and pending final execution of grant awards.

Fiscal Year	2014		2015 (to date)	
	Count of Projects	Sum of Total	Count of Projects	Sum of Total
Basin 1 Battenkill, Walloomsac, Hoosic	4	\$ 46,685	1	\$ 32,990
Basin 2 and 4 Poultney, Mettowee, Lower Champlain Direct	3	\$ 93,475	3	\$ 124,190
Basin 3 Otter, Little Otter, Lewis	2	\$ 44,000	1	\$ 22,750
Basin 5 Upper LC, LaPlatte, Malletts Bay, St. Albans Bay, Rock, Pike	4	\$ 210,600	3	\$ 140,468
Basin 6 Missisquoi	4	\$ 191,825	2	\$ 77,805
Basin 7 Lamoille	4	\$ 172,600	3	\$ 121,325
Basin 8 Winooski	5	\$ 208,347	7	\$ 186,402
Basin 9 White	2	\$ 112,665	2	\$ 88,663
Basin 10 (13) Ottauquechee, Black	5	\$ 189,791	2	\$ 80,888
Basin 11 & 13 Williams, West, Saxtons, Lower CT, Mill	2	\$ 109,000		
Basin 12 & 13 Deerfield, Lower CT, Mill				
Basin 14 Stevens, Wells, Waits, Ompompanoosuc	1	\$ 9,267	2	\$ 152,395
Basin 15 Passumpsuc	2	\$ 69,800	2	\$ 52,550
Basin 16 N. CT. River direct	1	\$ 8,000	1	\$ 51,736
Basin 17 Memphremagog, Coaticook, Tomifobia	2	\$ 103,424	2	\$ 69,258
MB (Multiple Basins)	7	\$ 668,943	3	\$ 247,900
Grand Total	48	\$ 2,238,422	34	\$ 1,449,320

Tactical Basin Planning and the Lake Champlain TMDL Implementation Plan

Under the US Environmental Protection Agency’s TMDL process, the programs and management approaches spelled out by the Lake Champlain TMDL Phase I plan need to be expanded into much more explicit descriptions of BMP implementation, by subwatershed. These explicit, “Phase-II” plans comprise the blueprints by which the TMDL is to be accomplished. The Lake Champlain Phase I Plan identifies tactical basin planning as the vehicle by which the required rosters of best management practices and regulatory measures will be identified and phased-in, to accomplish the goals of the TMDL. Over the course of 2014, Monitoring, Assessment, and Planning Program staffers have been working with EPA and other DEC staff to develop the mechanisms by which the Phase II rosters of actions can be developed and articulated within the tactical basin plans. [As described in the Phase I Plan](#) (Chapter 5F), this effort represents further evolution of the planning process, which when fully staffed, will incorporate empirical modeling and robust practice tracking into the existing tactical basin planning process.

The Basin Planners face a formidable workload associated with the implementation of the Lake Champlain TMDL. The roles of the Basin Planners are threefold: 1) development of the plans on a five-year recurring basis; 2) updating the tactical implementation table on a biennial basis; and 3) provide support for implementation of projects or BMPs on the ground. While Basin Planners are not the only DEC staff persons involved in directing BMP implementation, this work can be a significant component of their workload. Regional Planning Commissions and watershed organizations are critical partners in the implementation of tactical basin plans, and therefore the Lake Champlain TMDL.

The following description (Table 3), taken from the Lake Champlain Phase I Plan, describes tasks and milestones for the transition to the augmented tactical planning process described above. According to this schedule, DEC is committing to developing a first-iteration basin-wide Phase II roster of implementation steps by spring, 2016. In addition, DEC is committing to updating all tactical basin plans in the Lake Champlain watershed such that they will include first-five-year Phase II implementation actions by December, 2017. These dates are predicated both on the availability of the staff resources necessary to accomplish the job, and also on USEPA’s final timeline for TMDL issuance.

Table 3. Tasks and milestones for the development of Lake Champlain Phase II implementation actions within tactical basin plans, taken from the Lake Champlain TMDL Phase I Plan.

Task	Envisioned Timeline	Milestone
Completion of South Lake Champlain basin Tactical Plan	May, 2014	Standard Tactical Plan issued
Completion of North Lake Champlain Direct Basin Tactical Plan	Mar., 2015	Standard Tactical Plan issued
Initial development of modeling capacity	Summer through Fall, 2015	Contingent on modeling and GIS analysts on DEC staff.
Development of Phase 2 Overall Tactical Actions Plan	Fall 2015 to Spring 2016	Initial Phase II roster of interventions necessary, basin-wide, using BMP Scenario Tool and initial coarse modeling.
Development of first five-year implementation scenarios – Lamoille, Missisquoi, South Lake Champlain	Summer through Fall 2016	Geospatial and tabular representation of intervention locations and BMP options.
Completion of Lamoille Basin Tactical Plan – Implementation Table to reflect first five-year Phase 2 cycle	Dec., 2016	Plan issued, Implementation Table to reflect first five-year Phase 2 cycle. All active basin plans for the LC Basin reflect modern Tactical Plan Design.
Update Missisquoi Tactical Plan	Dec., 2016	Implementation Table to reflect first five-year Phase 2 cycle.
Update South Lake Champlain Tactical Plan	Dec., 2016	Implementation Table to reflect first five-year Phase 2 cycle.
Development first five-year implementation scenarios Winooski, Otter	Winter, 2016 to Spring, 2017	Geospatial and tabular representation of intervention locations and BMP options.
Update Winooski Tactical Plan	Dec., 2017	Implementation Table to reflect first five-year Phase 2 cycle.
Update Otter Creek Tactical Plan	Dec., 2017	Implementation Table to reflect first five-year Phase 2 cycle.

The Role of Regional Planning Commissions in Tactical Basin Planning

During the past year, and as part of the implementation of the Phase I Plan, DEC has engaged in discussions with the Vermont Association of Planning and Development Associations (VAPDA) to

develop a defined set of respective roles and responsibilities around the development and implementation of tactical basin plans. At present, the development of tactical plans is incumbent on DEC, with significant stakeholder outreach. Through this cooperative process, VAPDA and DEC have endeavored to develop a set of expectations for activities that each Regional Planning Commission (RPC) might undertake in support of tactical planning for all watersheds in the State. The development of this organizational alignment recognizes that significant municipal implementation efforts will be needed to carry out the projects and BMP installations highlighted in tactical plans, the support of which will exceed DEC's staff capacity. The development of this relationship and related roles and responsibilities specifically acknowledges the strengths of the RPCs in supporting municipal activities aimed at water quality protection and restoration. Insofar as municipalities bear responsibility for surface water restoration activities or maintenance, RPCs are the most appropriate entity to provide the organizational support to assist municipalities in achieving these responsibilities. Examples of the types of activities which may be undertaken by RPCs to complement DEC's tactical planning efforts include:

- Ensuring that municipalities are involved in all phases of the basin planning process.
- Providing technical assistance to inform municipal officials in making water quality investment decisions.
- Coordinating municipal planning and adoption or implementation of municipal development regulations to better meet state water quality policies and investment priorities.
- Participating in state water quality policy development and planning processes to ensure regional and local input.
- Participating in the development of basin plans that clearly detail regional and municipal projects, planning, and policy priorities.
- Ensuring that local plans and bylaws ensure implementation of state water quality policy.
- Providing education to municipal officials and citizens they serve regarding opportunities for enhanced protection of surface waters through reclassification or designation as Outstanding Resource Waters.

It is envisioned that over the course of the legislative session, VAPDA and DEC will continue to develop this relationship, which should result in mutually beneficial enhancements to the process.

An Added Focus on Protection

Over the past three years, the Department has realigned the basin planning process to implement the Vermont Surface Water Management Strategy at the "tactical," or basin-specific scale. Successes have come in the form of greater transparency in plan priorities, a more nimble and expeditious planning process, and appropriate direction of Ecosystem Restoration funding. In addition to these implementation priorities, Chapter 4 of the Surface Water Management Strategy identifies processes by which additional surface water protections may be achieved, either through designations, or reclassification pursuant to 10 VSA §1253.

As a result of Act 110, the authority to carry forth these designations and reclassification actions now rests with DEC. During 2014, Monitoring, Assessment and Planning Program staff have been developing the processes and scientific data necessary to support designation of surface waters as Outstanding Resource Waters, or reclassification to Class A(1), for those surface waters which are identified as suitable candidates in their respective tactical basin plans. At present, DEC is developing pre-rulemaking stakeholder outreach materials to support reclassification of a suite of surface waters within US Forest Service Lands to Class A(1). DEC further intends to follow this up during summer 2015 with the first proposal to designate an Outstanding Resource Water in over a decade. These efforts to designate or reclassify surface waters will complement the

aggressive efforts needed for remediation, by ensuring that focus also remains of the protection of very high quality surface waters.

Table 2. Detailed Status of Tactical Basin Planning (January, 2015)

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	IMP	M+A	TBP	IMP	IMP	M+A	IMP	IMP	TBP	IMP	TBP	IMP	IMP
Monitoring and Assessment	Biological monitoring	O	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/C	O			O
	Stream Geomorphic Assessment (Phase II)	O	O	O	O	O	O	O	O	C/O	C/O	C/I/O	O/O	O	O
	Bride & culvert inventory	O	O	O	O	O	O	O	O	C/I	C/O	C/I	O/O	O	O
	Basin Assessment Report	C	C/I	C	C	C	C	C	C	C	C/I	C	C/C	C	C
Tactical Basin Planning	River Corridor Plan(s)	O	O	O	O	O	O	O	O	C/O	C/O	I	O/O	O	O
	ANR internal tactical process	I	C	C	O				C	C	I	C		C	C
	Watershed partner groups identified/contacted	O	O	O	O	O	O	O	O	C/O	C/O	I/O	O/_	C	C
	SWMS strategies adapted to local plan as appropriate	I	O	C		C		C		C/O	I	C		C	C
	Local WQ concerns identified, strategies added	O	C	C	C	C	C	C	C	C/O	I	C/O	C/_	C	C
	Implementation table draft	I	C	C	O	C		C		C	I	C	C/_	C	C
	Review of town plans & zoning regulations	I	U	C	C	O	C	O	C	C		O	C/_	O	C
	Watershed plan draft		C	C	Di	C		C	C	C	C	C	Di	C	C
	Public forums	O	C	C	C	C	C	C	C	C	C	C		C	C
Final year of issuance		2014	2012*	2009*	2013*	2009*	2012*	2002/2013*	2012*	2008	2014*	2008*	2014	2012*	

Key to Table 2:

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.



Section 3 – Individual Basin Plan Contacts and Statements of Progress

Watershed Planning Basin	Contact and web links
<ul style="list-style-type: none"> • Basin 1 Battenkill, Walloomsac, Hoosic: • Basin 2 and 4 Poultney, Mettowee, Lower Champlain Direct • Basin 3 Otter, Little Otter, Lewis 	<p>Ethan Swift, Watershed Coordinator Department of Environmental Conservation 430 Asa Bloomer Building Rutland, Vermont 05701 (802) 786-2503 Ethan.Swift@state.vt.us http://www.vtwaterquality.org/planning/html/pl_battenkill.htm http://www.vtwaterquality.org/planning/html/pl_poultney.htm http://www.vtwaterquality.org/planning/html/pl_ottercreek.htm</p>
<ul style="list-style-type: none"> • Basin 5 Upper LC Direct, including LaPlatte, Malletts Bay, St. Albans Bay • Basin 6 Missisquoi Bay, including Pike and Rock • Basin 8 Winooski 	<p>Karen Bates, Watershed Coordinator DEC Regional Office 111 West Street, Essex Junction, VT 05452 802-879-2339 karen.bates@state.vt.us http://www.vtwaterquality.org/planning/html/pl_northernlcb.htm http://www.vtwaterquality.org/planning/html/pl_missisquoi.htm http://www.vtwaterquality.org/planning/html/pl_winooskibasins.htm</p>
<ul style="list-style-type: none"> • Basin 7 Lamoille • Basin 9 White • Basin 14 (+16) Stevens, Wells, Waits, Ompompanoosuc, CT River Direct 	<p>Jim Ryan, Watershed Coordinator Department of Environmental Conservation 5 Perry Street Barre VT 05641 802-476-0132 jim.ryan@state.vt.us http://www.vtwaterquality.org/planning/html/pl_lamoille.htm http://www.vtwaterquality.org/planning/html/pl_whiteriver.htm http://www.vtwaterquality.org/planning/html/pl_stevens.htm</p>
<ul style="list-style-type: none"> • Basin 10 Ottauquechee, Black, CT River Direct (Mill, Lulls, Hubbard) • Basin 11 (+13) Williams, West, Saxtons, Lower CT Direct (Commissary, Morse, East Putney, Sacketts) • Basin 12 (+13) Deerfield, Lower CT Direct, (Crosby, Whetstone, Broad, Newton) 	<p>Marie Levesque Caduto, Watershed Coordinator 100 Mineral Street, Suite 303 Springfield, VT 05156 802-885-8958 Marie.Caduto@state.vt.us http://www.vtwaterquality.org/planning/html/pl_basin10.htm http://www.vtwaterquality.org/planning/html/pl_west.htm http://www.vtwaterquality.org/planning/html/pl_deerfield.htm</p>
<ul style="list-style-type: none"> • Basin 15 Passumpsic • Basin 16 Northern CT River Watersheds • Basin 17 Memphremagog, Coaticook, Tomifobia 	<p>Ben Copans, Watershed Coordinator Department of Environmental Conservation 1229 Portland Street St. Johnsbury, VT 05819 (802) 751-2610 ben.copans@state.vt.us http://www.vtwaterquality.org/planning/html/pl_passumpsic.htm http://www.vtwaterquality.org/planning/html/pl_upper_ct.htm http://www.vtwaterquality.org/planning/html/pl_memphremagog.htm</p>

Basin 1 Battenkill, Walloomsac, Hoosic

The Vermont portions of the three rivers which comprise this river basin have the unique distinction of being the only watersheds within Vermont that are part of the larger Hudson River regional basin. The Batten Kill, Walloomsac River and Hoosic River and their associated tributaries have their origins in the southwest corner of Vermont and collectively comprise what is referred to as Basin 1. The watershed area of the Batten Kill in Vermont is about 200 square miles. The Walloomsac River in Vermont drains a watershed of about 139 square miles and eventually flows into the Hoosic River in New York. The watershed area of the Hoosic River in Vermont is about 89 square miles. The Taconic Mountains, Vermont Valley and Southern Green Mountains make up the three biophysical regions that play an integral part in the dynamic nature of the 428 square mile Basin 1.

The Tactical Basin Planning process for the Hudson River Basin commenced in 2014 to identify water resource concerns as well as water quality improvement recommendations for the Batten Kill, Walloomsac River and Hoosic River and their associated tributaries in the southwest corner of Vermont. The goal of this tactical basin planning process is to produce the Hudson River Tactical Basin Plan that identifies high priority actions for the protection and restoration of surface waters in this Basin. This Watershed Improvement Plan will draw from previous efforts identified in the draft Basin 01 Water Quality Management Plan (2009) and drawing from many river corridor plans and other biological and land use assessments.

In late 2012, the newly designated Watershed Coordinator for Basin 01 met with key stakeholders in the basin to discuss priorities for anticipated surface water monitoring and assessment efforts for the 2013 field season. With refreshed surface water quality information following the 2013 field season, DEC has been focusing on identifying priority surface water quality issues and is committed to finalizing the plan development process for the basin, and to pursuing a tactical planning approach thereafter. Despite the lack of DEC led watershed planning efforts in Basin 01 between 2008 and 2012, the DEC River Management Program has provided oversight of stream geomorphic assessments in the tributaries to the Batten Kill (including the White and Mill Creeks) and led the development of River Corridor Plans for the Batten Kill and Walloomsac River Basins (including the Roaring Branch tributary). The attendant actions recommended in these river corridor plans will build flood resiliency and reduce private property losses that occurred following Tropical Storm Irene.

Project highlights for Basin 01 Rivers in the summer of 2014 include:

- Stormwater Master Plan for the White Creek and Mill Brook watersheds in Rupert.
- Berm removal along the White Creek.
- Bank stabilization in the headwaters of Mill Brook.
- Mass failure stabilization along the White Creek in Rupert.
- Morgan Street Wetlands Conservation Project (South Stream and Jewett Brooks)
- Trout habitat restoration in Roaring Branch in Sunderland.
- Riparian buffer planting along the reach of the former Dufresne Dam location.

Also in the summer of 2014, three different Vermont Youth Conservation Crews spent considerable time in the Batten Kill River Watershed to stabilize streambanks, remove invasive species, and plant riparian buffers.

Three years after it was destroyed by Tropical Storm Irene, the Kelly Stand Road along the Roaring Branch in Sunderland was officially re-opened this fall. The total cost for repair was approximately \$3.8 million, and while still owned and maintained by the town, the Forest Service was able to funnel money from the Federal Highway Administration to pay for the repairs. The contractor has been working on the road since September of 2013, clearing debris, crushing onsite gravel to be used on the road, adding structures to the Roaring Branch to keep it within its banks, and fixing two bridges along the 4.5 miles of road they're working to restore. Part of the project also required river restoration work, as that section of river is an important trout habitat, and involved the placement of structure within the river channel to enhance aquatic habitat.

Basin 2 and 4: South Lake Champlain Basin, including Poultney, Mettowee

The tactical basin planning process for the Southern Lake Champlain Basin (comprised of the Poultney and Mettowee Rivers, and the Lower Champlain Direct drainages) commenced in 2012 to identify water resource concerns as well as water quality improvement recommendations within the southern Lake Champlain Watershed in Addison and Rutland County, Vermont. The South Lake Champlain Tactical Basin Plan was approved in June of 2014, drawing from refreshed water quality monitoring and assessment data, and with recent river corridor planning and project development in the Mettowee River Basin. The Plan provides an overall view of the health of the basin and defines on-going and future actions to address high-priority stressors (http://www.vtwaterquality.org/wqd_mgtplan/swms_ch1.htm).

High priority stressors in the Southern Champlain Basin include encroachments, channel erosion, invasive species, land erosion, pathogens, thermal stress, and flow alteration. The Southern Champlain Basin is significant in representing the source waters of South Lake Champlain, as the Lake flows from South to North. The protection and improvement of the South Lake is reflected in the actions identified in this tactical basin plan. However, there are also individual waters with elevated levels of pathogens, flood and erosion hazard risks, sediment and nutrients and basin waterways are a source of phosphorus pollution to Lake Champlain among other issues. The heart of this plan is the implementation table in chapter 4, which includes actions to protect or restore surface waters in the basin.

The Tactical Plan actions will protect, maintain, and improve surface waters by managing the activities that result in surface water stressors, and address the attendant pollutants associated with them. The actions will be strategically targeted to those sub-basins and specific waters where their implementation would achieve the greatest benefit to water quality and aquatic habitat as well as being the most cost effective. In general, the Poultney River (specifically the Castleton and Hubbardton drainages), Mettowee River (Flower Brook, Indian River drainages) and East Creek will be targeted for restoration and protection strategies while Lake Champlain direct drainages will be targeted for additional water quality and aquatic habitat monitoring and assessment work. This and all tactical basin plans benefit from biennial implementation table updates. For this South Lake Champlain Tactical Plan, the phosphorus status of south Lake Champlain will be a featured priority in the first biennial review, to implement priority actions of the Lake Champlain TMDL.

Major topics addressed through the basin planning process include agricultural land use, transportation infrastructure (bridge and culvert effects on streams and gravel road erosion), riparian corridor protection, and suburban and urban runoff (stormwater). Watershed 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 have been prioritized for funding and implementation. Already, the planning process has provided many opportunities for collaborative problem solving among stakeholders, which establishes a foundation for successful restoration and protection efforts throughout the Southern Lake Champlain Basin.

Accomplishments for 2014 include:

- The completion of the Mettowee River Corridor Plan and Project development to prioritize projects that would reduce nutrient and sediment transport from the Mettowee River and its tributaries to Lake Champlain.
- VYCC road drainage improvement project in Benson including water bar installation and rock-lined ditches at Sunset Lake and seeding and mulching of raw ditches/ backroads in Benson.
- Completion of Green Stormwater Infrastructure project at the Poultney High School with ERP funded rain garden installation and stormwater runoff mitigation with the Poultney Mettowee NRCD and Town of Poultney.

- Collaboration with the lake Bomoseen Association to develop an assessment project to identify and mitigate sources of sediment and nutrients in the Sucker Brook watershed.

Basin 3 Otter, Little Otter, Lewis

The Otter Creek Basin – Water Quality Management Plan was completed and approved by the Secretary of the Agency of Natural Resources and DEC Commissioner in May of 2012. This Plan was one of the last “hybrid” versions of watershed planning between the older “Watershed Initiative” basin plan format and the current tactical basin planning process. The Otter Creek Basin Plan contains priority recommended actions for improving and protecting surface waters in the Otter Creek Basin (including several large tributaries), as well as identifying dozens of potential river restoration projects designed to build flood resiliency and reduce private property losses that occurred following Tropical Storm Irene. The Otter Creek Basin Plan addresses the priority water quality stressors that affect surface waters in the Otter Creek Basin as well as the specific water quality concerns identified by the stakeholders in the basin planning process.

Accomplishments for 2014 include:

- The removal of the Kendrick Pond dam in Pittsford, which restored approximately ten square miles of fish passage and habitat in Sugar Hollow Brook, an important tributary to Furnace Brook;
- Mendon Brook Trees for Streams Project - planted 1000 stems on 2 acres along 1500’ of the Irene ravaged Mendon Brook in Rutland Town;
- Completion of Green Stormwater Infrastructure project on Southern Boulevard in Rutland City with ERP funded gravel wetland/ bio-infiltration for stormwater runoff mitigation with the Rutland NRCD and City of Rutland Department of Public Works;
- The ongoing monitoring and assessment of water quality conditions, and proposed actions to address the Bacteria TMDLs for the Middlebury River, Little Otter Creek, and Lewis Creek, as well as the Otter Creek itself (these restoration plans are now in the implementation phase);
- VYCC projects including rain garden revitalization project in Middlebury and Rutland City storm drain stenciling;
- Coordination of the annual Science at the Hatchery event at the Dwight D; Eisenhower National Fish Hatchery – with over 200 students from 8 different Rutland County Schools;
- The completion of the East Creek/ Tenney Brook Stormwater Master Plan to identify high priority Green Stormwater Infrastructure projects and retrofits to mitigate stormwater runoff in Rutland City;
- The implementation of a stormwater reduction and education project for residents living within the stormwater-impaired Moon Brook in Rutland City and Town, including the installation of dozens of rain gardens and rain barrels;
- River restoration in the Cold River, Neshobe River, and Mendon Brook to build flood resiliency and improve floodplain functions in these Irene damaged rivers.

Basin 5 Upper LC Direct, including LaPlatte, Malletts Bay, St. Albans Bay

The second round of basin planning for Basin 5 began in 2013 with internal meetings with Agency resource staff and a meeting with agricultural resource staff to identify areas of concern and potential strategies. The plan is scheduled to be completed by winter of 2015. The first basin plan was completed in February 2009. The planning process will draw on assessment information including water quality results obtained this year with the help of volunteers working with the Regional Stormwater Education Program, the LaPlatte Watershed Partnership and the Lake Iroquois Association who have received financial and technical assistance from the WSMD.

Completed projects this year that addressed strategies in the previous plan include the development of stormwater master plans for Georgia, St. Albans Town and City to assist municipalities in addressing stormwater runoff. Also, a large municipal-scale rain garden has also been installed in Hinesburg on Silver Street to protect the LaPlatte River by treating stormwater runoff from several acres of previously-untreated impervious surface.

Basin 6 Missisquoi Bay, including Pike and Rock

The Missisquoi Watershed plan was released to the public for review in late 2012 and signed in March 2013. During the year, assessment work supported in the plan included stormwater master planning for several towns, and biomonitoring of streams in the basin. The Missisquoi River Basin Association and a Lake Carmi watershed group continued its volunteer water quality monitoring program with financial and technical assistance from the WSMD.

Examples of a few of the plan strategies that were completed this year included:

- Buffer plantings along 6,000 feet of river;
- Stormwater management projects were completed in Fairfax, Georgia and Swanton based on ERP funded stormwater master plans for each of the towns;
- Northwest Regional Planning commission was able to buy and develop a multi town rental program for a hydro seeder for road ditches;
- WSMD continues to support best management practice implementation in the Rock River watershed as part of “Project Rock.” This project is contributing to a joint NRCS and USEPA initiative to document watershed-scale water quality improvements associated with targeted management practice installations.

Basin 7 Lamoille

The previous basin plan was completed in 2009. Approximately two-thirds of the basin plan’s action items have been implemented or are currently being developed.

Some high priority watershed protection and restoration projects implemented in 2014 include: Development of 7 municipal road erosion capital budgets by the Lamoille RPC;

- Implementation of several road erosion best management practice projects through the Better Backroads Program;
- Lamoille River trash clean-up, stormwater and green stormwater infrastructure restoration projects by the Lamoille NRCD;
- Riparian buffer plantings along the Lamoille River, the replacement of 2 culverts in the Town of Walden to promote aquatic organism passage and flood resiliency (Caledonia NRCD, USFWS, VTFWD, and DEC); , Identification of 2 additional high priority stream crossing upgrades in Wolcott and Hyde Park (USFWS, DEC, and LCNCRD);
- Three river corridor easement projects in Wolcott and Cambridge;
- Establishment of the Lamoille Paddlers Trail organization;
- Protection of Journey’s end swimming hole in Johnson with a permanent easement;
- In-stream aquatic habitat improvements on the Lee River at the Ethan Allen Firing Range; and,
- A project underway that will ultimately protect over 5 miles of Lamoille River riparian buffer in the Town of Fairfax and Fletcher (DEC, VLT, and VRC).

The tactical basin planning process will begin in 2015 to revise the original basin plan.

Basin 8 Winooski

The Basin 8 plan was completed in May 2012. Ongoing assessments supported by strategies in the plan include the development of a stormwater master plan for the upper Winooski River for the towns of

Plainfield, Calais and Marshfield. The plan will prioritize culvert replacements, and projects that will address stormwater runoff from roads and other impervious areas in the villages. The planning process also includes an illicit discharge detection and elimination plan. The Friends of the Winooski River, Huntington River group, and Friends of the Mad River continued their volunteer water quality monitoring of rivers in the basin with financial and technical assistance from the WSMD.

Completed strategies include:

- 10 acres of tree planting to enhance river buffers;
- Stormwater management planning in 2 upper Winooski watershed towns along with a design of a stormwater management practice in Plainfield; and,
- Two green stormwater infrastructure projects designed and installation begun in Northfield in a continuation of the town's efforts to manage stormwater along the Dog River.

Basin 9 White

The tactical basin plan was completed in July 2013. Fifty-one high priority Actions were identified and 28 of those Actions have either been completed or are underway.

Some watershed restoration and protection projects implemented include in 2014: the replacement of numerous municipally and federally owned stream crossing upgrades to improve aquatic organism passage, stream equilibrium and flood resiliency, several river corridor easements, FEMA floodplain buyout sites and site improvements, the installation of road erosion best management practices on 4 municipal Class 4 roads, a major wetland restoration project, White River Partnership volunteer water quality monitoring watershed-wide and river trash removal, identification of potential dams for removal for aquatic passage and stream equilibrium, the completion of the First Branch river corridor plan, and river corridor planning for the towns of Bethel and Stockbridge, a multi-community flood resiliency workshop in the upper White, and agricultural best management practice implementation on small farms in the First, Second and Third Branch watersheds.

Basin 10 Ottauquechee, Black, CT River Direct

The Basin 10-13 Basin Plan was adopted in 2012. Progress has been made on both the Black and Ottauquechee rivers with on-going project work taking place.

Along the Ottauquechee River several key projects have been completed including the removal of an old bridge abutment causing constriction of the channel in Bridgewater, and buffer installations in Woodstock, Quechee, Hartford and Bridgewater, and the clean-up and reconstruction of the former DPW storage site into a town park with rain gardens, buffers and river access also in Woodstock. In Killington the town repurposed a commercial site into the visitor's center and Park & Ride with green stormwater infrastructure throughout.

On the Black River a key river corridor easement was purchased in Plymouth protecting a site devastated by TS Irene. Volunteer monitoring continues on both rivers.

Projects already funded for 2015 include three berm removals and floodplain restorations on the Black in Plymouth, re-forestation of eroding logging roads in Plymouth and Reading and stabilization work along TSI damaged Money Brook. Pinney Hollow Brook in the Ottauquechee watershed will undergo restoration removing a berm, restoring a flood chute and re-establishing the pre-Irene riverbed for erosion stabilization and habitat improvement.

A geomorphic assessment of Mill Brook will move into project development in 2015.

The Basin Planner is also involved in larger watershed efforts including the Business Flood Resilience Forum, of the Vermont Economic Resilience Initiative in Woodstock and the state-wide Flood Resiliency on State Lands effort covering Camp Plymouth State Park, Killington ski area and Coolidge State Forest.

Basin 11 and 13 Williams, West, Saxtons, Lower CT, Mill

Initially adopted in 2008, the Basin 11 Water Quality Management Plan is being updated for 2015. A preliminary draft plan is underway and updated monitoring and assessment is being completed.

2014 brought completion of the Winhall River and Wardsboro Brook geomorphic assessments; work on the Williams River assessment, buffer plantings on the West and Saxtons Rivers, and the continuation and expansion of the Southeastern VT Watershed Alliance's water quality monitoring program.

The largest project taking place on the Connecticut River is the relicensing of three hydro-electric generation dams. The Wilder, Bellows Falls, and Vernon dams are going through the Federal Energy Regulatory Commission's relicensing process in anticipation of license renewal in 2018. The process involves ANR in permitting and review.

Several studies are now underway investigating the impact of dam operations on various natural resources. These included river flows and erosion, fish passage, a northeastern bulrush survey, a cobblestone and puritan tiger beetle survey, a dragonfly and damselfly inventory and assessment, and a Fowler's toad survey.

A one day water quality sampling event coordinated by the Connecticut River Watershed Council and supported by all three basin planners along the river, as well as NH DES, MA DEP and Yale University, monitored a total of 67 sites in Vermont, New Hampshire and Massachusetts with 23 sites in Vermont and eight sites on the mainstem of the Connecticut River. This study provides baseline data on total nitrogen, total phosphorus, chloride and dissolved organics.

Basin 12 and 13 Deerfield, Lower CT, Mill

The Deerfield River Tactical Basin Plan was completed in 2014 and is now being implemented.

A geomorphic assessment of the Green River is being completed which will lead to projects ready for implementation in 2015. Buffer plantings are taking place along the North Branch of the Deerfield River in coordination with the Windham County NRCD's Trees for Stream Program, following a geomorphic assessment and other projects are being developed

In Brattleboro efforts are underway to improve flood resiliency at the Tri-Park Housing Cooperative on the Whetstone Brook in conjunction with the ACCD and the Rivers Program and a stormwater discharge study on impaired Crosby Brook has just been released offering numerous project options.

In a continued effort led by the Southeastern Vermont Watershed Alliance, volunteers removed over 350 water chestnut plants from the Connecticut River in Vernon.

The Basin Planner is also involved in larger watershed efforts including the Business Flood Resilience Forum, of the Vermont Economic Resilience Initiative in Brattleboro as well as the RiverSmart program out of UMass and the Creating Resilient Communities effort out of Massachusetts, both are working in the Deerfield watershed.

Basin 14 and 16 Stevens, Wells, Waits, Ompompanoosuc, CT River Direct

A tactical basin plan is in draft form and will be released in winter of 2015. As part of the tactical basin planning process, DEC's Basin Planner held individual meetings with watershed partners and convened an all partners workshop to identify top watershed priorities to include in the tactical plan.

Many watershed restoration and protection projects have been completed in 2014 or are underway including:

- The removal a dam on the Wells River in Groton by the CT River Watershed Council;

- A major Trees for Streams riparian buffer project by the White River NRCD and river corridor easement on 2 parcels on the Ompompanoosuc in West Fairlee by the Upper Valley Land Trust;
- An ANR-EPA remediation plan for the Ely Mine in the Ompompanoosuc;
- Bioengineering streambank stabilization project on the Waits River in Bradford;
- One major Better Backroads project in the Town of Orange; and,
- Implementation of the CT River watershed-wide water quality monitoring event- Sample Palooza.

Additionally, the Town of Ryegate and Ticklenaked Pond Association worked with consultant, DEC and Aquatic Control Technologies to design and successfully complete an Alum Treatment of Ticklenaked Pond. The alum treatment was the last cleanup action in a TMDL action plan for the pond and was funded through a \$95,990 Ecosystem Restoration grant to the Town of Ryegate and was successful more than doubling the clarity of the water from less than 3 to over 6 meters in depth.

Basin 15 and 16 Passumpsic and Northern CT River Watersheds

A final basin was adopted for the Passumpsic and Northern Connecticut River basin in 2014. As a top priority in this plan a stormwater master planning project was initiated in the Dish Mill Brook watershed by the Caledonian County NRCD with assistance from DEC Staff and funding through an Ecosystem Restoration Grant. Projects to restore compliance of two properties with existing stormwater permits were completed with input from DEC basin planner and stormwater staff and feedback was provided on a snow management plan to address potential sediment and stormwater through regulatory means that may contribute to the stressed condition of Dish Mill Brook. The Burke Conservation Commission is considering a water quality monitoring program to further understand water quality issues in this stressed watershed along with other streams in Burke. NVDA has been working with the towns of St Johnsbury and Lyndonville and the support of DEC staff to develop local hazard mitigation plans including addressing flood hazards and the Town of Burke has been working to adopt the first river corridor zoning in the Passumpsic and Northern Connecticut River basins.

An illicit discharge detection and elimination project has largely been completed in St Johnsbury funded through an Ecosystem Restoration grant to the Caledonian County NRCD. With support from the Basin Planner, the Town of St. Johnsbury completed its second Better Backroads grant to address a major sediment source to the Passumpsic River and received a grant to complete a road erosion inventory and capital budget. The Basin Planner assisted with road erosion inventories in the towns of Burke, Newark, Concord and a rivers and roads training was held in the watershed with over 20 towns participating. The Planner assisted with the development of a new trail to the Sleepers River and the development of a river focused curriculum with participation of 140 middle school students in the St Johnsbury Town School.

In the Northern Connecticut River watershed significant work to restore fisheries habitat in the Nulhegan watershed basin was completed by Trout Unlimited with support from VT Department of Fish and Wildlife with funding through the Upper Connecticut Mitigation and Enhancement Fund. Major buffer plantings were completed along the Connecticut River and conservation efforts continued along the Nulhegan River through Ecosystem Restoration Program and Upper Connecticut River mitigation and enhancement funding. Finally the Basin Planner assisted with a Connecticut River wide sampling event lead by the Connecticut River Watershed Council that aided in understanding water quality concerns across the Connecticut River Watershed in Massachusetts, Vermont, and New Hampshire.

Basin 17 Memphremagog, Coaticook, Tomifobia

Since release of the Basin 17 water quality management plan in January of 2012, over 25% of the 79 actions listed in the plan have been completed and another 42% of the actions have been initiated. Significant progress was made in collecting information necessary to develop the phosphorus TMDL for Lake Memphremagog including:

- Developing estimates for water flows from all contributing watershed in the international basin.
- The publication of a new navigational depth chart for Lake Memphremagog in June of 2014
- Mapping of South Bay in the fall of 2014 with final map for the entire lake planned for early 2015.
- Development of a database to store data from Quebec and Vermont and an estimation of chloride and phosphorus loading necessary for the development of a TMDL for Lake Memphremagog.
- A collaborative monitoring effort on the Barton River was published by the USGS that will be helpful in developing more robust phosphorus loading estimates for this tributary to Lake Memphremagog.

A tributary water quality monitoring program identified a number of phosphorus source areas in the lake Memphremagog watershed in 2014 which were discussed at agricultural water quality working group meetings with representatives from NRCS, Agency of Agriculture, VT DEC and local consultants. These discussions have led to targeted implementation efforts in the basin as well as some enforcement of agricultural and water quality regulations. These projects were supplemented by 6 lakeshore and 4 acres of streambank buffer planting in targeted areas by the NorthWoods Stewardship Center with funding through an Ecosystem Restoration grant. The Memphremagog Watershed Association has completed a majority of an Illicit Discharge Detection and Elimination study for municipalities in the basin identifying three failed septic systems and a number of cases of wastewater entering the stormwater system and surface waters that are being addressed by landowners or towns. Due to the higher than expected number of contaminated outfalls found, additional funding will be sought to complete the assessment in the City of Newport. In the Coaticook River watershed, water level and flow monitoring was completed on Little and Great Averill Lakes and Norton Pond to address water level and flow management impacts related to dams on these waterbodies and the basin planner attended the annual meeting of the lake association to discuss these issues.