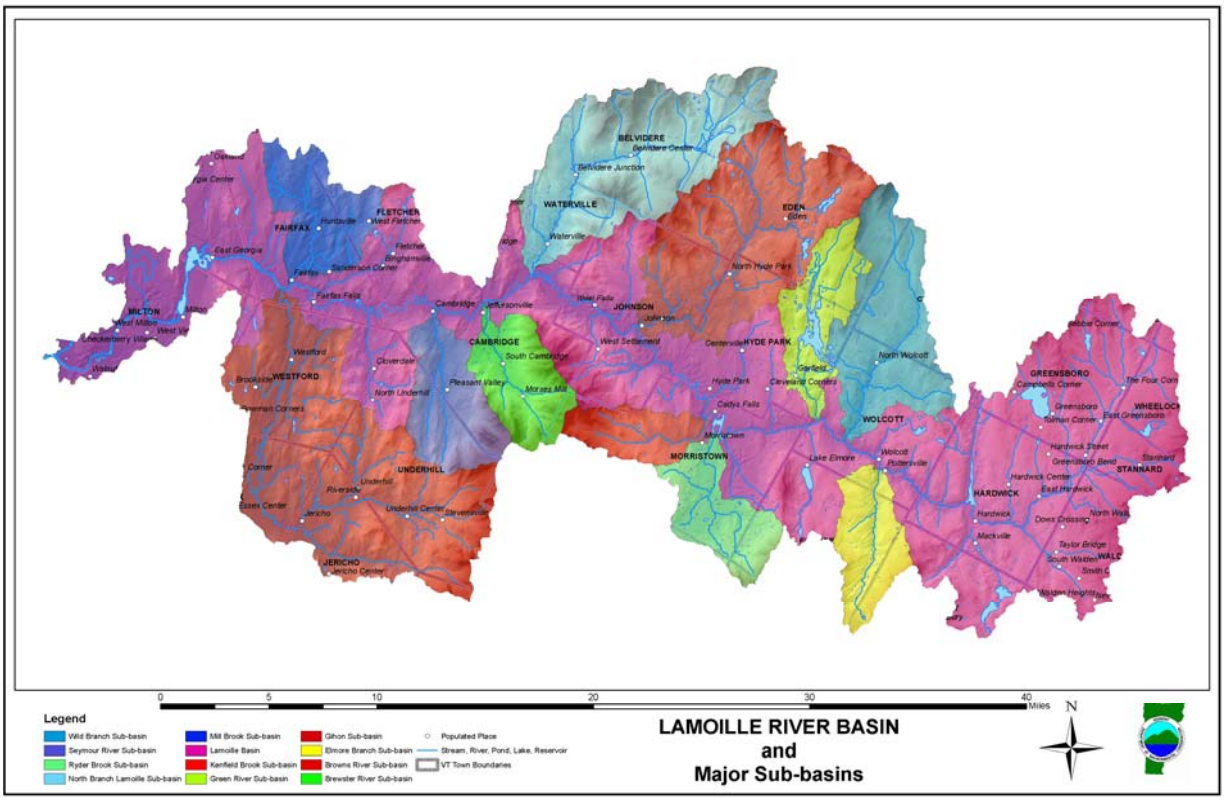
Vermont Agency of Natural Resources

LAMOILLE RIVER BASIN
Water Quality Management Plan- APPENDICES

Interim Final

November, 2008



LAMOILLE RIVER BASIN-WATER QUALITY MANAGEMENT PLAN APPENDICIES

APPENDIX A

APPENDIX A.1 - Statutory Index

Federal and State law and regulation call for the review of specific topics in each basin plan. The following is a listing of basin planning requirements that have been extracted from the Vermont Water Quality Standards (WQS), the Federal Register and the Agency of Agriculture, Food and Markets' (DAF&M) Accepted Agricultural Practice Regulations (Effective June 29, 1995), their Best Management Practice Regulation (Effective January 27, 1996), and the Memorandum of Understanding between the ANR and the VAAF&M. The requirements below are addressed in this basin plan in the section noted in bold adjacent to each requirement.

The Vermont Water Quality Standards

1. Basin plans inventory the existing and potential causes and sources of pollution that may impair the waters. **Chapters 3 and 5**

2. Basin plans establish a strategy to improve or restore waters. **Chapters 4 and 5**

3. ....shall seek public participation to identify and inventory problems, solutions, high quality waters, existing uses, other water uses, and significant resources of high public interest. **Chapters 1, 2, 3, A.2 and A.3**

4. ....shall consider approved municipal and regional plans adopted under 24 V.S.A. Chapter 117. **Appendix A.11**

5. ....shall coordinate and cooperate with the Commissioner of VAAF&M, as provided for in 6 V.S.A. Chapter 215. **Chapters 2, 3, 4, and 5**

6. ....shall identify strategies, where necessary, by which to allocate levels of pollution between various sources as well as between individual discharges. **Chapters 4 and 5, and Appendix B.2**

7.....should, to extent possible, contain specific recommendations by the secretary that include, but are not limited to the identification of all known:

- existing uses **Chapter 2**
- salmonoid spawning or nursery areas important to the establishment or maintenance of such fisheries **Chapter 2**
- reference conditions appropriate for specific waters **Chapter 6**
- any recommended changes in classification and designation of waters **Chapter 6**
- schedules and funding for remediation **Chapters 4 and 5**
- stormwater management **Chapters 3, 4, and 5**
- riparian zone management **Chapters 3, 4, and 5**
- other measures or strategies pertaining to the enhancement and maintenance of the quality of waters within the basin. **Chapters 4 and 5**

8. In basins that include class B waters which have not been allocated into one or more Water Management Type or Types pursuant to Section 3-06 of the WQS, the basin plan .....shall propose the appropriate Water Management Type or Types based on both the existing water quality and reasonably attainable and desired water quality management goals. **Chapter 6**

40 CFR, Section 130.6

9. Water Quality Management (WQM) plans....consist of initial plans produced in accordance with sections 208 and 303e of the Clean Water Act (CWA) and certified and approved updates of those plans.

10. State water quality planning should focus annually on priority issues and geographic areas and on the development of water quality controls leading to implementation measures. **Chapters 3, 4, and 5**

11. WQM plans are used to direct implementation. **Chapters 4 and 5**

12. WQM plans draw upon the water quality assessments to identify priority point and non-point water quality problems, consider alternative solutions and recommend control measures, including the financial and institutional measures necessary for implementing recommended solutions. **Chapters 3, 4, 5, and Appendix A.8**

13. State annual work programs shall be based upon the priority issues identified in the State WQM plan. **Chapters 3, 4 and 5**

14. The following plan elements shall be included in the WQM plan or referenced as part of the WQM plan if contained in separate documents when they are needed to address water quality problems:

(1) Total maximum daily loads. **Chapter 5**

(2) Effluent limitations - including water quality based effluent limitations and schedules of compliance. **Appendix B.2**

(3) Identification of anticipated municipal and industrial waste treatment works, including

(a) facilities for treatment of stormwater-induced combined sewer outfalls; **Appendix B.2**

(b) programs to provide necessary financial arrangements for such works; **Appendix B.2**

(c) establishment of construction priorities and schedules for initiation and completion of such treatment works. **Appendix B.4**

(4) Nonpoint source management and control

(a) describe the regulatory and non-regulatory programs, activities and best management practices (BMPs). (Economic, institutional and technical factors shall be considered....)..... BMPs shall be identified for the nonpoint sources identified in Section 208(b)(2)(F)-(K) of the CWA and other nonpoint sources as follows:

(i) Residual waste

Appendix B.6

(ii) Land disposal **Appendix B.3**
(iii) Agricultural and silvicultural **Chapters 3, 4, 5, and Appendix B.1**
(iv) Mines **Appendix B.7**
(v) Construction **Chapters 3, 4, 5, and Appendix B.4**
(vi) Urban stormwater **Chapters 3, 4, and 5**

The nonpoint source plan elements outlined in #14 above shall be the basis of water quality activities implemented through agreements or memoranda of understanding between EPA and other departments, agencies or instrumentalities of the United States in accordance with section 304(k) of the CWA.

(5) Identification of management agencies necessary to carry out the plan and provisions for adequate authority for intergovernmental cooperation..... **Chapters 4 and 5**

(6) Identification of implementation measures necessary to carry our the plan, including financing, time needed to carry out the plan, and the social, economic and environmental impact of carrying out the plan in accordance with 208(b)(2)(E). **Chapters 4 and 5**

(7) Identification and development of programs for the control of dredge or fill material in accordance with section 208(b)(4)(B) of the CWA. **Appendix B.10**

(8) Identification of any relationship to applicable basin plans developed under section 209 of the CWA. **This is the basin plan**

(9) Identification and development of programs for control of groundwater pollution including the provisions of section 208(b)(2)(K) of the CWA. States are not required to develop groundwater WQM plan elements beyond the requirements of section 208(b)(2)(K) of the CWA, but may develop a groundwater plan element if they determine it is necessary to address a groundwater (water) quality problem [see section 130.6(c)(9) for specifics of the groundwater plan element]. **Chapter 2 and Appendix B.11**

APPENDIX A.2 - Lamoille Watershed Council Members and Technical Advisors

Council members	
Constituent Work Group	**Name/Organization**
Municipal officials	Judy Kinner-Milton Conservation Commission Jane Sorensen- Fairfax Planning Commission Doug Molde- Johnson Planning Commission Mark Delaney- Cambridge Conservation Commission Dave Tilton- Westford Conservation Commission
Natural Resources Conservation Districts	Allison Cardwell- Lamoille NRCD Christina Goodwin- Lamoille NRCD Pamela Stefenek- Otter Creek NRCD Andrea Turner- Caledonia NRCD Kerry O'Brien- Caledonia NRCD Abbey Willard- Winooski NRCD
Farmers	Russ Lanphear- Hyde Park Mark Boyden- Cambridge Jane Sorensen- Fairfax Don Avery- Hyde Park
Farm Bureau	Hollis Edwards- Lamoille County Mark Boyden- Lamoille County
Industries and Regional Development Organizations	Annalei Babson- NVDA
Lake Organizations	Lyle Quackenbush- Arrowhead Mt. Lake Chuck Mitchell- Green River Reservoir John Saxby-Lake Elmore John Morse- Lake Elmore Liz Palletta- Lake Eden Jeanne Palletta- Lake Eden Andy Dales-Caspian Lake Doug & Cheryl Churchill- South Pond
Educators	Sheila Tyman- People's Academy High School
Loggers/Foresters	Tim Cleveland- Hardwick Jonathan Wood- Jeffersonville Bill Samal- Belvidere
Large landowners	Glenn Gingras- Vtrans Mark Delaney- Smugglers Notch
Utilities	Mike Scarzello & John Greenan- CVPS Scott Corse & John Tilton- Morrisville Water and Light Hardwick Electric- Joe Bongiovoni and Eric Werner

Residents	Bob Selby- Johnson Simon Hurd- Eden John Hayden- Cambridge
Regional Planning Commissions	Bruce Butler & Eileen Toomey- Lamoille County Annalei Babson- NVDA Ian MacDougal- Chittenden County Bethaney Hassee- Northwest
Anglers	Joe Lane- Lamoille River Anlgers Doug Molde- Lamoille River Anglers Dave Dernor- BASS
Browns River Watershed Council	Mark Fasching
Lamoille Watershed Association	Faith Ingulsrud
Technical Advisors	
Vermont Department of Environmental Conservation	Padraic Monks- Stormwater Management Mike Kline, Chris Brunell, & Barry Cahoon- River Management Susan Warren, Kellie Merrill, Neil Kamman, Ann Bove, & Mike Hauser- Lakes and Ponds Kim Greenwood & Jeff Cueto- Hydrology Shannon Morrison, Alan Quackenbush, & April Moulaert- Wetlands
Vermont Department of Fish and Wildlife	Christa Alexander, Len Gerardi, Eric Sorenson, & Brian Chipman
VT Agency of Agriculture, Foods, and Markets	Phil Benedict
USDA NRCS	Tim Mckay- Caledonia County Chuck Mitchell- Lamoille County Jim Eikenbury- Lamoille County Kathy Hakey and Dave Hoyt- Franklin Co. Bruce Chapell and Mike Fournier- Chittenden County
VT Dept of Forests and Parks	Ray Toolan- Lamoille County Jonathan Wood- Commissioner
Land Trusts	John Ramsay- Vermont Land Trust
Regional Planning Commissions	Bill Rossmassler- Lamoille County
Vermont Local Roads	Hank Lambert
Vermont Agency of Transportation	Heather Hibbard, Glenn Gingras, & Nelson Hoffman
Hardwick Electric	Joe Bongiovoni and Eric Werner
UVM graduate students	Vanessa Levesque and Liz Royar
DEC Watershed Coordinator	Jim Ryan

APPENDIX A.3 - Public Meetings Held in the Lamoille River Watershed

2001

March 21st- Browns River Watershed Council Public Forum**,** Browns River Middle School, Underhill. Hosted by the Browns River Watershed Council.
March 29th- Browns River Watershed Council Public Forum**,** Middle School, Westford**.** Hosted by the Browns River Watershed Council.
April 18th- Browns River Watershed Council Public Forum, Mt. Mansfield Union Library, Jericho. Hosted by the Browns River Watershed Council.
May 1st- Public Forum to introduce watershed planning and watershed council formation, Johnson Municipal Building.
May 23rd- Lamoille River Watershed Council Meeting, Johnson Municipal Building.
June 20th-Lamoille River Watershed Council Meeting, Johnson Municipal Building.
July 11th- Lamoille River Watershed Council Meeting and site visit- Lanphear Farm, Hyde Park.
July 23rd- Working Landscape Lamoille Watershed Public Forum watershed planning and the agricultural and forestry/logging community, co-sponsored by the Lamoille, Orleans, Winooski, and Caledonia County Natural Resources Conservation Districts, Johnson Municipal Building.
July 26th-Working Landscape Lamoille Watershed Public Forum-watershed planning and the agricultural and forestry/logging community, co-sponsored by the Lamoille, Orleans, Winooski, and Caledonia County Natural Resources Conservation Districts- Fairfax.
July 30th- Working Landscape Lamoille Watershed Public Forum- watershed planning and the agricultural and forestry/logging community, co-sponsored by the Lamoille, Orleans, Winooski, and Caledonia County Natural Resources Conservation Districts- Greensboro.
August 7th-Lamoille Watershed Public Forum-discussion of watershed planning and solicit residents' concerns regarding water quality and watershed visions, Peoples Academy, Morrisville.
August 22nd- Lamoille Watershed Public Forum- discussion of watershed planning and solicit residents' concerns regarding water quality and watershed visions, Cambridge Elementary School.
August 28th- Lamoille Watershed Public Forum**-** discussion of watershed planning and solicit residents' concerns regarding water quality and watershed visions, Milton Elementary School.
August 30th- Lamoille Watershed Public Forum**-** discussion of watershed planning and solicit the residents concerns regarding water quality and watershed visions, Hardwick Elementary School.
September 12th- Lamoille Watershed Public Forum**-** discussion of watershed planning and solicit the residents concerns regarding water quality and watershed visions, BFA Fairfax.
September 18th- Lake Champlain Phosphorous TMDL Panel Discussion-sponsored by the Lamoille Watershed Council- Johnson Municipal Building.
October 23rd-Lamoille River Watershed Council Meeting- Johnson Municipal Building.
November 15th- Lamoille River Watershed Council Meeting**-** Johnson Municipal Building.
December 13th-Lamoille River Watershed Council Meeting and Water Quality Panel Discussion-Johnson State College.

2002

January 17th- Lamoille Watershed Council meeting, Johnson
February 21st- Lamoille Watershed Council Panel Discussion- Roads and Working Landscape, Johnson
March 21st- Lamoille River Watershed Council meeting, Johnson
April 4th- Watershed Initiative Guidelines Interactive TV public forum, statewide
April 17th- Watershed Initiative Public Forum for Conservation Districts, Waterbury
April 18th- Lamoille River Watershed Council meeting, Fairfax

(2002 continued)
May 16th- Lamoille River Watershed Council meeting, Johnson
June 20th- Lamoille River Watershed Council meeting, Hyde Park
July 18th- Lamoille River Watershed Council meeting, Johnson
August 13th- Lamoille Agriculture and Water Quality technical meeting, Morrisville
August 15th- Lamoille River Watershed Council meeting, Johnson
September 19th- Lamoille River Watershed Council meeting, Johnson State College
October 17th- Lamoille River Watershed Council meeting, Morrisville
November 21st- Lamoille River Watershed Council meeting, Morrisville
December 19th- Lamoille River Watershed Council meeting, Morrisville

2003

January 16th Lamoille Watershed Council meeting, Morrisville
February 20th Lamoille Watershed Council meeting, Morrisville
March 20th Lamoille Watershed Council meeting, Morrisville
April 17th Lamoille Watershed Council meeting, Hyde Park
May 15th Lamoille Watershed Council meeting, Morrisville
June 19th Lamoille Watershed Council meeting, Morrisville
December 10th- Lamoille Watershed Council meeting, Morrisville

2004

June 17th- Lamoille Watershed Council meeting, Morrisville

2005

March 15th- Lamoille Watershed Council meeting, Morrisville

2008
October 20th- Lamoille Watershed Council meeting, Morrisville

Public Forums attendance totaled over 250 residents (Browns and Lamoille Watershed combined).

APPENDIX A.4 - Municipal Meetings Regarding Surface Water Typing and Classification

2003
March 13th Georgia Conservation Commission
March 24th Fairfax Select Board
April 7th Jericho Select Board
April 14th Georgia Select Board
April 16th Underhill Select Board
May 5th Milton Select Board
May 20th Morristown Conservation Commission
August 5th Craftsbury Select Board
August 7th Hardwick Select Board
August 11th Walden Select Board
August 14th Woodbury Select Board
September 11th Wheelock Select Board
September 18th Hardwick Select Board
September 22nd Stannard Select Board
October 1st Sheffield Select Board
October 2nd Glover Select Board

2004
January 4th Morristown Select Board
January 7th Hyde Park Select Board
January 8th Cambridge Select Board
January 8th Johnson Planning Commission
February 2nd Waterville Select Board
February 4th Wolcott Select Board
February 5th Belvidere Select Board
February 18th Eden Select Board
March 10th Elmore Select Board
June 21st Johnson Select Board
August 19th Hardwick Select Board
September 8th Milton Select Board
November 4th Underhill Select Board
November 10th Elmore Select Board
November 16th Milton Town Manager and Engineer
November 17th Eden Select Board

2005
January 20th Milton Public Hearing on Surface Water Typing proposal
February 14th Woodbury Conservation Commission
April 7th Fletcher Select Board

APPENDIX A.5 - Functions and Values of Selected Wetlands

Wetland Complex Name and Location	Wetland Features
Northern Piedmont Region	
Greensboro Brook Wetlands, Greensboro	Long linear wetland associated with river inlets.
Long Pond Wetlands, Greensboro	A northern white cedar swamp with rare and threatened plant species.
Mt. Sarah Southeast Swamp, Greensboro	A significant northern white cedar swamp
Page Brook Swamp, Wheelock and Sheffield	Northern white cedar swamp and spruce-fir-tamarack swamp. Contains diverse vegetation, isolated location, and rare endangered plant species.
Flagg Pond wetlands, Wheelock	A significant northern white cedar swamp
Bear Mt. Pond Swamp, Walden	A significant northern white cedar swamp
Northern Green Mountain Region	
Molly Bog, Morristown	A peatland complex with four bogs, northeast kettlehole bog, spruce-fir swamp and upland forest, uncommon plant species, and one of the state's greatest diversity of mosses. Owned by UVM.
Belvidere Bog, Belvidere	Highly significant cold-water fishery habitat, water quality protection, erosion control, education, recreation, and wildlife habitat. Provides habitat for loons and endangered plant species. Rated a high quality northern bog. Large undisturbed area surrounds the complex.
White Branch wetlands, Eden	A large scrub-shrub wetlands complex.
Gihon River Wetlands, Eden	A large scrub-shrub wetlands complex.
Bear Swamp, Wolcott	A large scrub-shrub wetlands complex.
Beaver Meadow, Hyde Park	A large scrub-shrub wetlands complex.
Green River Reservoir wetlands, Hyde Park	A large scrub-shrub wetlands complex.
Lake Elmore Wetlands, Elmore	A large scrub-shrub wetlands complex.
Lake Champlain Valley Region	
Sandbar State Park Wetlands, Colchester	A very large wetland complex owned and managed by the Vermont Fish and Wildlife Department. One of the best examples of flood plain forest in the state contains extensive shallow and deep-water marshes, buttonbush shrub swamps, uncommon and rare plant species and provides nesting habitat for rare and uncommon waterfowl and wading bird species. The size, location, functions, and diversity of this wetland complex make it one of the most important wetlands in the watershed.
Mill Brook Black Spruce Bog, Fairfax	A large diverse wetland complex that provides water quality protection and wildlife habitat in an environment that is becoming increasingly urbanized.
Towne Swamp, Milton	The only red maple-northern white cedar swamp located in a deltaic sandplain landscape. It is located within the sands of the historic, preglacial delta of the Lamoille, which in addition to its largely undisturbed nature makes it an important wetland. Contains rare and threatened plant species.
Lower Lamoille Oxbow swamp, Milton	A large diverse wetland complex that provides water quality protection and wildlife habitat in an environment that is becoming increasingly urbanized.
Browns River swamp, Essex	A large diverse wetland complex that provides water quality protection and wildlife habitat in an environment that is becoming increasingly urbanized.
Browns River Wetland, Jericho	A large diverse wetland complex that provides water quality protection and wildlife habitat in an environment that is becoming increasingly urbanized.
Essex Center Swamp, Essex	A large diverse wetland complex that provides water quality protection and wildlife habitat in an environment that is becoming increasingly urbanized.

APPENDIX A.6 - Fluvial Geomorphology and historic river corridor management

Fluvial geomorphic science explains the physical river processes and forms that occur in different landforms and geologic and climatic settings (DEC, 2002). The term "in adjustment" is used to describe a river that is undergoing change in its channel form and/or fluvial processes outside the range of natural variability.

Between the 18th and 19th centuries, the building of roads and railroads within the floodplains, land clearing for agriculture and housing, and the moving of streams to accommodate agriculture resulted in unstable river channels. Following floods large-scale channelization practices were employed to reclaim damaged lands. The 1970s and 1980s were also a period of extensive gravel mining in the Lamoille River and its tributaries. Post-flood channel straightening and gravel mining has had the effect of steepening the stream channels. A steep channel in a relatively flat valley may initiate a bed degradation process referred to as "headcutting." Once a stream begins to headcut, it will typically erode its way through the five-stage channel evolution process, depicted in Figure (A.7), until it has created a new floodplain at a lower elevation in the landscape.

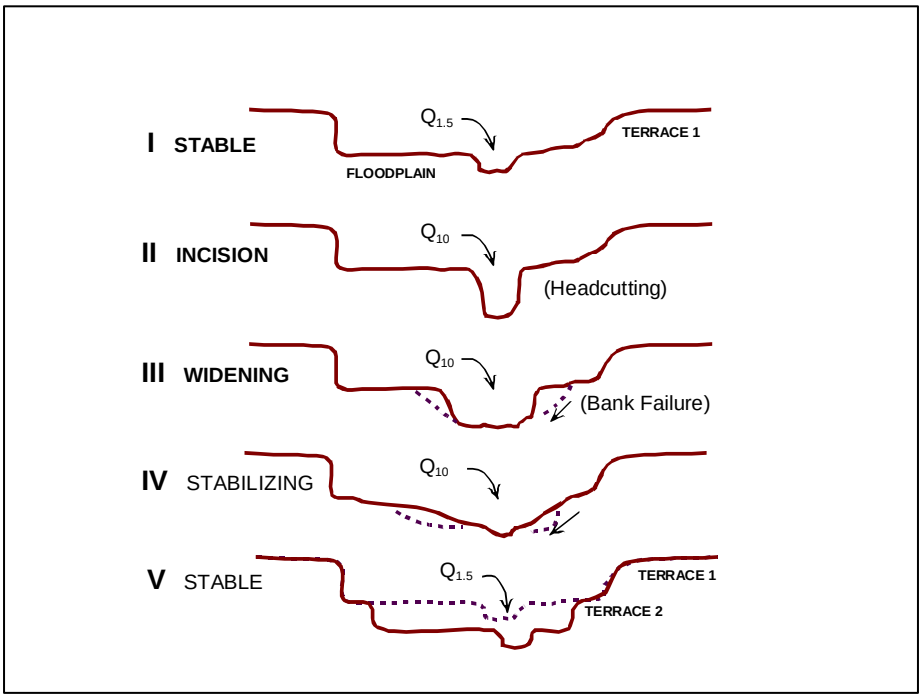


Figure A.7. Five Stages of Channel Evolution

The bed erosion that occurs when a meandering river is straightened in its valley is a problem that is compounded through its effects on other reaches of the river. Headcuts can travel upstream and into tributaries, eroding sediments from otherwise stable streambeds. These bed sediments will move into and clog areas downstream leading to lateral scour and erosion of the streambank. Channel evolution processes may take decades to play out. Landowners that have maintained wooded areas along their stream and riverbanks, or have stabilized the riverbanks with

rip-rap have experienced eroding banks as the river channel slopes have undercut banks as they adjusted to match the valley slopes, triggered by downstream or upstream channel disturbances.

A significant percentage of Vermont rivers have undergone channelization. Typically, channelized streams are straighter, steeper, wider, and largely devoid of instream and riparian features that maintain natural channel stability and provide a diversity of aquatic and riparian habitats (ANR, 2003). Channelization practices that were started over 100 years ago to accommodate early settlement, roads, railroads, logging, farms, mills, and other "human investments" have been periodically maintained through gravel removal, realignment, channel armoring, and post flood remediation projects. Many channels have incised, eroding downward, losing access to their flood plains that are essential to maintaining natural channel stability over time. Many miles of rivers have lost access to their flood plains run-off events resulting in a tremendous increase in channel adjustment and erosion.

While channelization continues today, many straightened reaches are now widening and aggrading. The physical adjustment processes (most commonly observed as streambank erosion) lead to the planform or meander changes that are imperative for the river system to attain a natural balance within its watershed. Each time a river has been straightened, dredged, bermed, and armored to mitigate flood damage without respect for the physical form and function of its channel and flood plain, adjustments were set in motion that, more often than not, led to further erosion. The decades that often intervene between major floods have given people the misperception that their channelization projects actually worked.

The cumulative impact of human actions have degraded physical habitat necessary to support healthy populations of some fish species and other aquatic life. Repeated channelization reduces the river bed and riparian structures upon which aquatic biota rely for shelter, food, and reproduction.

APPENDIX A.7 - Summary of Chemical and Biological Assessments of the Lamoille River Watershed Completed or Underway

Assessment Title	Date	Lead Organization(s)	Waterway/Location	Protocols/Summary
Biomonitoring/Biological Assessments				
Macroinvertebrate & fish community diversity monitoring	5 year rotation	DEC BASS Lab	Lamoille River, Browns River, Brewster River, Lee River, Morgan Brook, Abbey Brook, Arrowhead Lake, Stevensville Brook, Mill Brook, Gallup Branch, North Branch, Basin Brook, Beaver Meadow Brook, Wild Branch, Wolcott Pond, Elmore Branch, Long Pond, Caspian Lake, Bailey Brook, Gihon River	Monitoring data is one parameter used in determining if waterways meet Vermont Water Quality Standards (impaired waters list)
Critter Watch	2002-2004	LCNRCD and River Network	Foot Brook, Johnson	River Network macroinvertebrete protocols
Macroinvertebrate monitoring	On-going	Lamoille Union H.S.	Lamoille River main stem, Hyde Park	-
Macroinvertebrate & chemical monitoring	On-going	Peoples Academy H.S.	Lamoille River main stem, Morrisville	-
Macroinvertebrate monitoring	On-going	Sterling College	Wild Branch and Eden Pond	-
Macroinvertebrate monitoring	-	BFA Fairfax H.S.	Lamoille River main stem, Fairfax	-
CHEMICAL ASSESSMENTS				
Kenfield Brook E. coli sampling	On-going	Morristown Conservation Commission	Kenfield Brook, Lamoille River (15A), Lake Lamoille, & Beaver Meadow Brook	Swimming hole E. coli sampling
LAKE ASSESSMENTS				
Spring Phosphorus	On-going rotational	DEC- Lakes Section	Lamoille Watershed lakes & ponds	Phosphorus, dissolved oxygen, clarity
Lake Assessments	On-going	DEC- Lakes Section	Arrowhead Mt. Lake, Caspian Lake, Lake Elmore, Green River Reservoir, Half Moon Pond, Wolcott Pond, Flagg Pond, Long Pond, Lake Eden, South Pond, & Lake Lamoille	Substrate, access, shoreline features, adjacent land use, pH, DO, clarity, algae, shoreline development & erosion, wilderness characteristics, natural communities, & non-native species
Wetlands Assessments				
Significant Wetlands of the Lamoille Watershed	2001	DEC- Wetlands Section	Lamoille River watershed wetland systems	Qualitative assessment of the Lamoille's wetlands

Assessment Title	Date	Lead Organization(s)	Waterway/Location	Protocols/Summary
Hazardous Waste, Landfill, & Wastewater Treatment Facility Monitoring				
Various DEC site monitoring database inventories	On-going	DEC- Waste Management & Wastewater Management Divisions	Sites throughout the Lamoille watershed	Groundwater and surface water monitoring at hazardous waste sites, wastewater treatment facilities, and landfills. Sites are summarized in the Basin 7 Report .
Agricultural Related Assessments				
Watershed Plan, Lower Lamoille Watershed	1992	NRCS	Lower Lamoille River watershed-downstream of the Gihon River confluence	Inventory and plan that addresses waste management system needs (phosphorus) & cropland erosion.
Comprehensive Watershed Assessments & Plans				
Basin 7- Lamoille River Watershed Assessment Report	2001 5- year rotation	DEC- Planning Section	Lamoille River Watershed	Comprehensive review of physical, chemical, & biological monitoring & assessments.
Lamoille River Basin Water Quality Management Plan	1976	DEC	Lamoille River Watershed	Addresses municipal wastewater facility needs and to a lesser degree non-point source pollution & lake eutrophication.

Key:
DEC- Vermont Department of Environmental Conservation **VDFW**- Vermont Department of Fish and Wildlife
DEC's BASS Lab- Biomonitoring and Aquatic Studies Section **NRCS**- USDA Natural Resources Conservation Service
RPCs- Lamoille and Chittenden County Regional Planning Commissions

APPENDIX A.8 Fluvial Geomorphic and Other Assessments Related to the Physical Health and Stability of Streams in the Lamoille River Basin

APPENDIX A.9 - Methodology for Typing and Classification of Waterbodies in the Lamoille River Basin

For all water quality management goals, it is assumed that agricultural and silvicultural activities that follow Accepted Agricultural Practices and Acceptable Management Practices respectively will comply with the Water Quality Standards. Once the Vermont Water Resources Board adopts the water management type designations for specific waters, it is the responsibility of the Agency of Natural Resources, individuals and all levels of government to work to achieve or maintain at least the level of water quality specified by the designations.

The proposal for typing Class B waters in the Lamoille River Basin attempts to respect the community's expectations for land use while maintaining or enhancing the waters. The Water Quality Standards (Vermont Water Resources Board, 2000) state:

> "…the basin plans shall propose the appropriate Water Management Type or Types based upon both the existing water quality and reasonably attainable and desired water quality management goals."
>
> "…to review and consider approved town and regional plans" to assure compatibility of the criteria based proposals with local stated goals.

Methodology Used to Fulfill Existing and Reasonably Attainable Water Quality
A summary of the typing and classification methodology to fulfill the Existing and Reasonably Attainable Water Quality Management *Goal* included:

1. Compilation and evaluation of previous assessment and monitoring information using chemical, physical, and biological data, and best professional judgment regarding water quality and aquatic habitat of lakes, ponds, streams, and wetlands within the basin to determine approximate existing conditions. Data was collected from Vermont Department of Fish and Wildlife Fisheries Division and Non-game and Natural Heritage Program and DEC's Hydrology, Lakes and Ponds, Wetlands, Planning, BASS Lab, and River Management Sections.
2. All technical advisors listed above reviewed the compiled data.
3. The DEC Watershed Coordinator proposed a typing and classification draft.

Class B Waters

<u>B1 Waters</u>

- Most municipal and state owned lands below 2,500 feet in elevation
- Lakes and ponds that are considered wilderness or near-wilderness areas, DEC's Lake Protection Classification System (DEC, 1994)
- Surfaces waters adjacent to publicly owned lands that are remote, provide significant fish and wildlife habitat, natural communities, and recreational opportunities
- Surface waters that currently meet all or some of the B1 criteria or that B1 criteria are reasonably attainable
- Waterbodies that local officials and residents wish to manage as almost natural conditions and where such management is reasonably attainable

B3 Waters

All Class B waters that are presently managed for a moderate change in flows or stream habitat because of a dam, water level fluctuation, or water withdrawal (hydro facilities, ski area water withdrawal, and flood control) are proposed to be designated B3, which allows for flow alterations.

B2 Waters

- The proposal designates most current Class B waters as management type B2, which is the middle type of Class B waters. The B2 designation raises the threshold for water quality from the floor of B, which equals type B3. All waters not otherwise designated as A1, A2, B1, or B3 are proposed as B2.

Methodology Used to Account for the Desired Water Quality

A summary of the typing and classification methodology to fulfill the Desired Water Quality Management Goal included:

1. DEC Watershed Coordinator reviewed approved town plans, zoning, and regional plans to identify present and desired future land uses and to assure compatibility of proposals with locally stated goals. The effect of present and desired future land use on water quality is considered.
2. Coordinator presented the proposal to the Watershed Council to review and then made any recommended revisions.
3. Coordinator presented the proposal to local select boards and/or planning commissions, regional planning commissions, state land managers (Forests and Parks and Fish and Wildlife), utility companies, and relevant watershed organizations *(Appendix A.4)*.
4. Coordinator revised the original proposal as the result of step 3.
5. Coordinator presented the revised proposal to the Watershed Council.
6. The Agency considered all of the factors above before developing the final proposal.
7. The proposal is reviewed by the public.
8. DEC and Secretary makes any necessary changes to the proposal and approves plan.
9. The typing and classification proposal is submitted to the Water Resources Board.
10. The Water Resources Board holds hearings on the proposal and makes final decisions on the proposal.

APPENDEX A.10- Vermont Anti-Degradation Implementation Existing Uses Determination for Use During River Basin Planning (DRAFT)

It is the policy of the State of Vermont to protect and enhance the quality, character and usefulness of its surface waters, prevent the degradation of high quality waters, and prevent, abate or control all activities harmful to water quality. Further, Vermont's Anti-Degradation Policy requires that the existing uses and the level of water quality necessary to protect those existing uses shall be protected and maintained (Section 1-03, Vermont Water Quality Standards). Determinations on the presence of an existing use can be made during basin planning or on a case-by-case basis such as during consideration of a permit application.[1] The Agency of Natural Resources will use the following process to identify existing uses of contact recreation, fishing, boating and public drinking surface water supplies during river basin planning and the development of river basin water quality management plans.

1. The Agency will presume that all lakes and ponds that exist within a river basin have existing uses of fishing, contact recreation and boating. This simplifying assumption is being used for two principal reasons: first, the well known and extensive use of these types of waters for these activities based upon their intrinsic qualities; and, secondly, to avoid the tedium associated with the production and presentation of exhaustive lists of all of these types of waterbodies across any given river basin. This presumption may be rebutted on a case-by-case basis during the Agency's consideration of a permit application which might be deemed to affect these types of uses.
2. Each river basin plan will include a list of existing uses of contact recreation, fishing, boating in/on flowing waters and a list of public drinking surface water supplies, which will be identified using the criteria set forth below.
3. To determine the presence of an existing use of contact recreation, fishing or boating on/in flowing waters or a public drinking water supply during the river basin planning process, positive findings with respect to several conditions need to be made. The unique set of criteria for each particular existing use is set forth below.
4. The list of existing uses in each river basin plan is not intended to represent an exhaustive list of all existing uses, but merely an identification of very well known existing uses. Additional existing uses of contact recreation, boating and fishing on/in flowing waters and additional public drinking water supplies may be identified during the Agency's consideration of a permit application.

Contact Recreation in Flowing Waters

The Agency may base its determination of the presence of an existing use for contact recreation in flowing waters if it can be shown there is more than an incidental level of use of the specified water body. The application of existing use determination criteria for contact recreation shall not apply to contact recreation situations that may be occurring but at a level deemed to be incidental, irregular and/or infrequent or in situations where there is no clearly defined or previously established access to the water. In determining the presence and level of use in a specified water body, positive findings are needed for both condition 1 and 2:

Condition 1. There is documentation and/or physical evidence that people have access to the waters for contact recreation.

Documentation or physical evidence may consist of:

a. Existence of road pull-off areas, public parking areas, and public access trails.
   - ☞ Video and/or pictures taken from adjacent roads and from the water.

and

b. Status of land ownership: public lands and/or public easements defining access locations
   - ☞ Previously designated public contact recreation or public beach area.

[1] As per the Vermont Water Quality Standards, "existing use means a use which has actually occurred on or after 11/28/1975, in or on waters, whether or not the use is included in the standard for classification of the waters, and whether or not the use is presently occurring."

- ☞ Maps of municipal, state, or federal lands (including road rights-of-ways and bridge crossings).
- ☞ Documents referring to easements on private lands granting public access to the water for contact recreation purposes;

Condition 2. There is documentation and/or physical evidence of attractive contact recreation sites in and along the affected water.

Documentation or physical evidence may consist of:

a. Presence of any sandy or grassy beach or rock outcropping areas where people can comfortably rest out of the water.
   - ☞ Maps, video or pictures taken along the shore land of the affected waters.

b. Presence of area with sufficient depth, deep water holes, cascades, gorges, rock outcroppings or large boulders in or along the affected waters that create a slow and safe water area for swimming, wading, floating, tubing and/or bathing.
   - ☞ Maps, video or pictures taken of the affected waters.

c. Presence of aesthetically pleasing waters.
   - ☞ Observations concerning water clarity and substrate composition.
   - ☞ Water quality data concerning level of human health risk (such as E.coli abundance) has been regularly collected.

Recreational Boating on Flowing Waters

The Agency may base its determination of the presence of an existing use for recreational boating if it can be shown there is more than an incidental level of use of the specified water body. The application of existing use determination criteria for boating shall not apply to those recreational boating situations that may be occurring but at a level deemed to be incidental, irregular and/or infrequent or in situations where there is no clearly defined or previously established public access to the water. In determining the presence and level of boating use in, on or along a specified water body, positive findings are needed for both condition 1 and 2:

Condition 1. There is documentation and/or physical evidence that people have access to the specified reach of water for recreational boating.

Documentation or physical evidence may consist of:

a. Evidence of road pull-off areas, public parking areas, and public access to the waters edge for boat put-ins, take-outs and portage routes.
   - ☞ Maps (digital or hardcopy) of designated public boating access points and public pathways to the water.
   - ☞ Video and/or pictures taken from adjacent roads and from the water.
   - ☞ Video and/or pictures taken of specified access area in use.
   - ☞ Video and/or pictures taken of designated public boating access points and public pathways to the water.

and

b.Status of land ownership: public lands and/or public easements defining access locations.
   - ☞ Maps of municipal, state, or federal lands (including road rights-of-ways and bridge crossings) detailing public boating access points and public pathways to the water.
   - ☞ Documents referring to easements on private lands that grant public access to the water for recreational boating purposes;

Condition 2. There is documentation and/or physical evidence of attractive recreational boating in, on or along the specified reach of water.

Documentation or physical evidence may consist of:

a. Features (unique or otherwise noted) valued for recreational boating (whitewater or flat-water).
   - ☞ Video or pictures taken along the shore land of the specified waters and features.

b. Pooled water, rapids, ledges, cascades, gorges, rock outcroppings or large boulders in or along the specified reach that create rapids or pools for boating.
   - ☞ Video or pictures taken of the specified waters.

c. Aesthetically pleasing waters.
- ☞ Observation of water clarity and substrate composition.

Recreational Fishing in Flowing Waters

The Agency of Natural Resources fully supports and actively promotes fishing in Vermont's waters. While fishing may occur in most waters of the State, in many places this use may be occurring on merely an incidental level. As part of the river basin water quality management planning process, the Agency recognizes that fishing occurs in all lakes and ponds and in certain reaches of flowing waters (i.e. streams and rivers).

The existing uses for fishing were identified by staff using an Agency procedure developed specifically for use only during the preparation of basin plans. This procedure focuses solely on the identification of well recognized and documented existing uses with public access and therefore is not meant to be an exhaustive list of existing uses for fishing within any particular river basin. It is expected that additional existing uses for fishing will be identified in the future, both as a result of additional information gathered by staff during basin plan updates and as part of Agency reviews of permitting applications for projects that affect the basin. The Agency plans to develop an additional procedure to guide staff in further identifying existing uses in the context of permit application reviews.

The Agency may base its determination of the presence of an existing use for recreational fishing if it can be shown there is more than an incidental level of use of the specified water body. The application of existing use determination criteria for fishing shall not apply to situations where fishing may be occurring but it is being done at a level deemed to be incidental, irregular and/or infrequent or in situations where there is no clearly defined or previously established public access to the water. In determining the presence and level of use in a specified water body, positive findings are needed for both condition 1 and 2 or for either condition 3 or 4:

Condition 1. There is documentation and/or physical evidence that people have public access to the waters for recreational fishing.

Documentation or physical evidence may consist of:

a. Existence of road pull-off areas with public parking areas, public access trails, publically accessible streambanks or similar features.
- ☞ Video and/or pictures taken from adjacent roads and from the water.

AND

b. Status of land ownership: public lands and/or public easements defining access locations.
- ☞ Previously designated public boat launching area with vehicle parking.
- ☞ Maps of municipal, state, or federal lands (including road rights-of-ways and bridge crossings).
- ☞ Documents referring to easements on or across private lands granting public access to the water for recreational fishing purposes.
- ☞ Documentation of private ownership by 501c3 non-profit conservation organizations and/or land trusts that promote or grant public access for fishing.

AND

Condition 2. There is documentation and/or physical evidence of sites to fish in, on or along the specified reach of water.

Documentation or physical evidence may consist of:

a. Presence of any land areas along rivers where people can comfortably engage in angling.
- ☞ Video or pictures taken along the shore land of the affected waters.

b. Presence of pools, fish refuge areas and other habitats in, on or along the affected waters (especially rivers) that create sufficient habitat structure and diversity suitable for fish targeted by Vermont anglers.
- ☞ Video or pictures taken of the affected waters.

c. Presence of fish populations targeted by Vermont anglers.
- ☞ Fish population surveys documenting the presence of target species.
- ☞ Survey data concerning angler use and catch rates.

- ☞ Water quality data concerning target fish suitability and sustainability has been regularly collected.

OR

Condition 3. There is documentation of reaches where special regulations for fishing have been imposed by the State of Vermont (whether stocked fish or not).

Documentation or evidence may consist of:

a. Type, nature and subject species of special fishing regulation(s).

OR

Condition 4. There is documentation of reaches or affected waters that are stocked as a result of being identified on the State's Managed Request for Cultured Fish.

Documentation or evidence may consist of:

a. Species being stocked and stocking history of affected waters.

Public Drinking Surface Water Supply

The Agency may base its determination of the presence of an existing use for a public drinking surface water supply if there is more than an incidental use of the specified water body as a public drinking surface water supply. The application of existing use determination criteria for public drinking surface water supplies shall not apply to non-public or domestic water supply withdrawals (e.g. single family residence) from a specified surface water. In determining the presence of an existing use of a public drinking surface water supply source in a specified water body, positive findings are needed for the following condition:

Condition 1. Documentation and/or physical evidence exists that the specified waters are used as a source for public drinking water supply.

Documentation and physical evidence may consist of:

a. Recorded regular use of specified water body as an active public drinking water supply source.
   - ☞ Maps and documents detailing supply intake locations, permits, source protection areas and approximate number of connections or people served.

b. Recorded use of specified water body as a designated emergency (not in active use) public drinking water supply source.
   - ☞ Maps and documents detailing supply intake locations and inclusion in source protection areas, plans or permits, etc.

c. A physical intake for treatment and distribution of water for public drinking water supply from specified water body.

A.11- Lamoille Waters in Need of Further Assessment

Waterbody name and location	Possible problem/pollutants needing assessment	Recently completed or planned assessments and projects
Lamoille River at mouth, Colchester	Phosphorus loading to Mallets Bay segment	DEC Lakes Sections phosphorus sampling is on-going. Many plan action items will reduce P loads to outer Mallets Bay
Lower Lamoille River from Fairfax Falls dam to Arrowhead Mt. Lake	Sediment, nutrients, E. coli. Agricultural runoff and elevated levels of mercury in walleye	Buffer inventory of the main stem completed in 2004 by NWRPC. Sufficient riparian buffers can filter runoff to adjacent waterways. Implementation of the lower Lamoille FERC license hydro will address extensive water level drawdowns which may reduce mercury levels
Lamoille River: Lake Lamoille to Fairfax Falls dam	Sediment, nutrients, E. coli, bank instability, plan-form adjustment, and channel over-widening	A Phase 1 geomorphic assessment completed 2005. A Phase 2 assessment will be completed in 2009. Assessment results will better determine causes of instability and recommend appropriate treatments.
Lamoille River: Hardwick Lake to Lake Lamoille	Sediment, nutrients, E.coil., Bank instability and agricultural runoff	A buffer inventory has recently been completed by LCRPC and NVDA. A Phase 1 geomorphic assessment was completed in 2004. A Phase 2 assessment was completed in 2006. Assessment results will better determine causes of instability and recommend appropriate treatments.
Seymour River	Sediment, nutrients, bank erosion, agricultural encroachments, and channel instability	A Phase 1 is completed. Phase 2 geomorphic assessment will be completed in 2009. Assessment results will better determine causes of instability and recommend appropriate treatments.
Brewster River	Sediment, increased peak stormwater discharge, road and parking lot runoff	A new bridge has been constructed on No Name brook, which is a trib to the Brewster. A stream restoration project was implemented for an unnamed tributary to the Brewster including limestone treament in 2005 and in 2006 showing water quality and aquatic biota improvement. A new bridge, parking lot relocation, and new stormwater management BMPs at Smugglers Notch is planned in the future.
North Branch Lamoille	Toxics, sediment, bank erosion and channel instability	Phase 1 and 2 geomorphic assessment is completed. Assessment results will better determine causes of instability and recommend appropriate treatments. MTBE discharge will require additional monitoring.
Gihon River, Eden and Johnson	Leak from underground storage tank, organics oil spills in close proximity to surface water	Recent water monitoring indicates minimal impacts to adjacent waters.
Mud Brook, Morristown	Iron precipitate from corroding culverts within earthen dam impacting aquatic biota	VDFPR has initiated some work on the earthen dam to address problems and are evaluating the removal of the artificial dam and impoundment causing discharge
Wild Branch, Wolcott and Craftsbury	Hydrology changes, watershed land use change, morphologic instability	Phase 1 and 2 geomorphic assessment complete, erosion hazard mapping, and bridge and culvert survey is completed . A fluvial erosion hazard overlay district will be developed for the Town of Wolcott to avoid future human-river conflicts. Bridge and culvert survey information will be shared with towns to develop stream crossing capital budgets for upgrades.
Stannard Brook, Stannard	Flooding related effects and erosion	Phase 1 and 2 geomorphic assessment was completed in 2001 and revised to fit updated protocols in 2005. A bridge and culvert survey of the upper Lamoille watershed completed in 2004. Bridge and culvert survey information will be shared with towns to develop stream crossing capital budgets for upgrades.

APPENDIX A.12 - Review of Municipal Plan and Local Bylaws for Water Quality Provisions

Lamoille County Towns- Reviewed by the Lamoille County Planning Commission

Town of Morristown/Morrisville
Municipal Plan- 2008
The Town of Morristown's Municipal Plan includes a very well written inventory of the town's lakes and ponds. All aspects regarding local water resources, such as a discussion of major groundwater resources, wellhead protection, and aquifer recharge areas within the town are well written. The plan does include a good inventory of rivers and streams within the town. The presence of special features and swimming holes is discussed well
Shorelines within the town are clearly discussed in the municipal plan. There was a good amount of valuable information regarding the entire watershed. The municipal plan includes a well written review of soils that make up the town's lands.

Town of Morristown Zoning bylaws- 2000

- The Town of Morristown Zoning Bylaws contains many of the districts that should be present in order to protect water quality. These include flood hazard regulations and a wellhead protection area but the Town does not have shoreland regulations, which are used to protect water quality around lakes such as Lake Lamoille.
- The application requirements for a 'proposed site plan' require the identification of rivers, streams, water courses, drainage ditches, swamps, marshy areas, bogs, and unusual natural features. The bylaws have a 50-foot setback for public waterbodies and 100 feet from the Lamoille River in certain districts. Wetland setbacks are identified in the EPA district and are given a 50-foot setback except that the DRB can allow development within the 50-foot setback if it is determined not to have an impact. This should be changed so that no development is possible. State and federal legislation already pre-empt the local zoning and requires the 50-foot setback. Giving local permission may give the developer the impression that development is allowed when in fact it is not.
- The bylaws do not have shoreland regulations.
- The Flood Hazard regulations are good. The bylaws include a good purpose for the district and justification for the regulations.
- Permitted uses of flood hazard areas include agriculture, recreation, and non-structural residential uses such as gardens and play areas. Conditional uses could be more restrictive (requiring compensatory fill and prohibiting new structures in flood hazard area).
- Setbacks and buffers for streams could help water quality and bank stabilization.
- The WHPA regulations have a good justification for the regulations and purpose for the district.
- The discussion of permitted regulation is good but conditional uses and prohibited uses are less clear.
- Densities of one on-site wastewater field per acre is high for WHPAs.

Other Town Regulations & Ordinances

- Morristown does have subdivision regulations although they do not address water resources very well. No water features are required by the subdivision regulations to be shown on subdivision plats.
- Morristown has adopted road standards which is a benefit to water quality.
- Morristown has adopted a municipal sewage disposal ordinance which is also important to maintaining water quality.

Town and Village of Cambridge
Municipal Plan- 2003
The Town and Village of Cambridge Municipal Plan includes an incomplete inventory of the town's lakes and ponds, along with some current and historic water quality information. The plan does include a good inventory of rivers and streams within the town. The presence of special features and swimming holes, and the acknowledgement of floodplains are discussed well. Shorelines within the town are clearly discussed in the

municipal plan. There was a good amount of valuable information regarding the entire watershed. All aspects regarding local water resources, such as a discussion of major groundwater resources, wellhead protection, and aquifer recharge areas within the town are well written. The municipal plan includes a well written review of soils that make up the town's lands. The discussion of septic and sewer systems, as well as the town's water supply is well written. **No Zoning**

Town of Waterville

Municipal Plan- 2003

The water resources section of the Municipal Plan describes the Town's Fishing Resources, River and Stream Frontage, and Wetlands. It describes Taylor, Codding, Judevine, and Streeter Brooks and Kelley River as "providing excellent brook, rainbow, and brown trout fishing and habitat for spawning and young fish." The Plan also states that "removal of natural vegetation causes elevated water temperatures and increased stream sediment, both resulting in deterioration of cold-water fisheries and spawning. Extensive development on the river will have a deleterious effect on area fishing. Planning should contain measures for pollution prevention, stream and riverbank stabilization, protection of water habitat, and protection from erosion. The Planning Board proposes a buffer zone subject to review or according to state guidelines on both sides of Kelley River and Taylor, Codding, Judevine, and Streeter Brooks."

The Plan also states that "river and stream frontage is a valuable resource, which can help prevent water pollution, preserve wetlands, and provide for wildlife habitat, open space and scenic beauty. The Town may wish to preserve such areas for public usage and education."

Regarding wetlands the Plan states that "wetlands provide wildlife and vegetative habitat, help control erosion, improve quality of surface and groundwater, and provide invaluable beauty and education resources. Certain areas in town should be carefully considered for wetland reserves."

Town of Wolcott

Municipal Plan- 2007

The Town of Wolcott Municipal Plan includes a well written inventory of the town's lakes and ponds, along with some current and historic water quality information, and a discussion of present archaeological sites. The plan does include a good inventory of rivers and streams within the town. Consider identifying all rivers and streams within the town including their lengths. The presence of special features and swimming holes is discussed well. Shorelines within the town are clearly discussed in the municipal plan.

There was a good amount of valuable information regarding the entire watershed. All aspects regarding local water resources, such as a discussion of major groundwater resources, wellhead protection, and aquifer recharge areas within the town are well written. The municipal plan includes a well written review of soils that make up the town's lands. The discussions of septic and sewer systems and the town's water supply is well written.

Town of Wolcott Zoning Bylaws- 2001

- The Town of Wolcott Zoning Bylaws contain most of the districts that should be present in order to protect water quality including shoreland regulations and flood hazard regulations.
- Applicants are required to identify waterways on a site plan drawing but not necessarily wetlands. In future versions of the bylaws, wetlands should be required.
- The bylaws have a 150-foot setback for lakes, which is more aggressive than the recommended minimum 50-foot setback. The Wolcott Zoning bylaws require vegetative buffers around lakes but not streams, rivers, or wetlands.
- Wolcott has perhaps the best shoreland regulations in Lamoille County. The shoreland district is a very good size- lands within 500 feet of Wapanaki Lake, Wolcott Pond and Zack Woods Pond.
- As mentioned above, there is a 150-foot setback for structures and 200 feet for septic systems. Vegetation is required for the first 100 feet of shoreline.
- The Flood Hazard regulations are good. The bylaws include a good purpose for the district and justification for the regulations.
- The Town of Wolcott does not have Wellhead Protection Area Zoning regulations.

Other Town Regulations & Ordinances

- Wolcott subdivision regulations have open space provisions to ensure conservation and improvements along the banks of rivers, streams, and lakes.

- Additionally, the open space provisions are intended to protect natural drainage ways and floodwater retention areas.
- Wolcott has adopted a municipal sewage disposal ordinance which is important to maintaining water quality.

Town of Elmore

Municipal Plan- 2003

The Town of Elmore Municipal Plan does include a partial inventory of lakes and ponds within the town. The inventory of rivers and streams within the town is also incomplete.

Shorelines within the town are briefly discussed in the municipal plan, public access on Little Elmore Pond was mentioned but the issue could be more complete by addressing all accesses, fishing or not, along all shorelines. Excluding a discussion of industrial and municipal discharge locations, which could be improved by describing them as point source or non-point source. The discussion of the major surface waters within the town was satisfactory. The municipal plan includes a brief review of soils for the Worcester range area of town.

Town of Elmore Zoning Bylaws- 2000

- The Town of Elmore Zoning Bylaws contain most of the districts that should be present in order to protect water quality including shoreland regulations and flood hazard regulations. Applicants are required to identify water features on a site plan drawing.
- The bylaws have a 100-foot setback for lakes, which is more aggressive than the recommended minimum 50-foot setback, except for Lake Elmore which the town requires only a 40-foot setback. Rivers, streams, and wetlands are required to have a 50-foot setback as recommended.
- The Elmore Zoning bylaws require vegetative buffers around water features.
- The bylaws establish regulations for construction of Planned Residential Developments.
- The bylaws have very good provisions for the regulation of erosion and sediment control.
- The shoreland district is a very good size- lands within 500 feet of Lake Elmore, Elmore Pond and Hardwood Pond.
- As mentioned above, there is a 100-foot setback and 5-acre zoning (not Lake Elmore though) which are both aggressive for a district of this type.
- Like the Shoreland regulations, the Flood Hazard regulations are good. The bylaws include a good purpose for the district and justification for the regulations.
- Permitted uses of flood hazard areas include agriculture, forestry, and recreation. Conditional uses could be more restrictive (requiring compensatory fill and prohibiting new structures in flood hazard area).
- The Town of Elmore does not have Wellhead Protection Area Zoning regulations although a small area in exists on the Wolcott town line.

Other Town Regulations & Ordinances

- Elmore does not have subdivision regulations.
- Elmore has adopted a municipal sewage disposal ordinance which is also important to maintaining water quality.

Village of Hyde Park

Municipal Plan- 2001

The Village of Hyde Park does not have any identified lakes within its boundaries. The inventory of rivers and streams within the town is also incomplete. Shorelines within the town are briefly discussed in the municipal plan. There was no information in the municipal plan regarding the watershed. The municipal plan did not include a discussion of local water resources relating to major groundwater resources.

Village of Hyde Park Zoning Bylaws- 2000

- The Village of Hyde Park Zoning Bylaws contain all of the districts relevant to the district in order to protect water quality including flood hazard regulations.
- Application requirements should be listed in the bylaws and the identification of water features should be included on the list. Consider requiring the identification of all water features including, but not limited to, rivers and streams, wetlands, and lakes and ponds.

- The bylaws have a 25-foot setback for lakes and rivers in many, but not all, districts.
- The village does not have any lands which would require shoreline regulations.
- The Flood Hazard regulations are good. The bylaws include a good purpose for the district and justification for the regulations.
- There are no WHPAs in the village.

Other Town Regulations & Ordinances

- Hyde Park does not have subdivision regulations.
- Hyde Park has adopted road standards which is a benefit to water quality.
- Hyde Park has a municipal sewer system. A municipal sewage disposal ordinance applies to area outside of the sewer service area.

Town of Hyde Park

Municipal Plan- 2001

The Town of Hyde Park Municipal Plan includes an incomplete inventory of the town's lakes and ponds. The inventory of rivers and streams within the town is also incomplete. The presence of special features and swimming holes was discussed well. Shorelines within the town are briefly discussed in the municipal plan. There was a good amount of valuable information regarding the entire water shed within the town. The discussion of the major surface waters within the town was sufficient. The municipal plan includes a well written review of soils that make up the town's lands.

Town of Hyde Park Zoning Bylaws- 2001

- The Town of Hyde Park Zoning Bylaws contain all of the districts that should be present in order to protect water quality. These include shoreland regulations, flood hazard regulations, and a wellhead protection area.
- Applicants are required to show "streams and similar features" in their development proposals. A more specific requirement would be clearer for the applicant. Consider requiring the identification of all water features including, but not limited to, rivers and streams, wetlands, and lakes and ponds.
- The bylaws have a 100-foot setback for lakes, which is more aggressive than the recommended minimum 50-foot setback. Perhaps the Planning Commission could consider setbacks from rivers, streams, and wetlands as well.
- The shoreland district is a very good size- lands within 500 feet of Green River Reservoir. As mentioned above, there is a 100-foot setback and 5-acre zoning which are both aggressive for a district of this type.
- The Flood Hazard regulations are good. The bylaws include a good purpose for the district and justification for the regulations.
- Permitted uses of flood hazard areas include agriculture, recreation, and non-structural residential uses such as gardens and play areas.
- The WHPA regulations meet guidelines for permitted, conditional and prohibited uses. The current bylaws cover a 200-foot radius.

Other Town Regulations & Ordinances

- Hyde Park does not have subdivision regulations.
- Hyde Park has adopted road standards which is a benefit to water quality.
- Hyde Park has adopted a municipal sewage disposal ordinance which is also important to maintaining water quality.

Town of Johnson

Municipal Plan- 2000

The Town of Johnson Municipal Plan includes a well written inventory of the town's lakes and ponds, along with some current and historic water quality information, and a discussion of present archaeological sites. The plan does include a good inventory of rivers and streams within the town. The presence of special features and swimming holes is discussed well. Shorelines within the town are clearly discussed in the municipal plan.

There was a good amount of valuable information regarding the entire watershed. All aspects regarding local water resources, such as a discussion of major groundwater resources, wellhead protection, and aquifer recharge areas within the town are well written. The municipal plan includes a well written review of soils that make up the town's lands. The discussion of septic and sewer systems, as well as the town's water supply is well written. **No Zoning**

Town of Belvidere

Municipal Plan- 2005

The Town of Belvidere does not have any identified lakes within its boundaries. The Plan mentions Lost Pond at the headwaters of Rattling Brook and several unnamed ponds. The inventory of Lamoille watershed rivers and streams includes the North Branch, Streeter Brook, North Fork, Rattling Brook, Otter Brook, Basin Brook, and Calavale Brook. Shorelines within the town are briefly discussed in the municipal plan. The Plan describes Kelley River Falls cascades as a popular place for fishing and swimming but privately owned and not posted. The Plan also mentions the 9 mile stretch of Class II-IV whitewater boating from below Long Pond in Belvidere Corners to Waterville.

The Plan describes the Belvidere Bog as highly significant for its size, diversity, and functions including cold water fishery habitat, water quality protection, erosion control, education, recreation, and wildlife habitat (see Plan Recommendations below).

The Plan summarizes geomorphic and biological assessment results in town. The Plan summarizes the State's Surface Water Management designations and previous local efforts to reclassify the North Branch as an A1 water and states that "the Planning Commission and Select Board should consider working with DEC's watershed coordinator to establish surface water management goals of B1 for the North Branch and some of its tributaries as the water quality is such that it could support such a designation." The Plan also states that "enforcement of on-site septic and floodplain regulations would better protect this (shoreline) resource." The Plan also describes the effect of agricultural, stormwater, and logging runoff on water quality.

The Plan recommends establishing special districts to protect the natural resources of Belvidere including Belvidere Bog, the higher elevations of Laraway and Cold Hollow Mountains, and prime forest lands. Within development districts "regulations of uses adjacent to streams and rivers would go a long way to protecting water quality, wildlife habitat, and the health and safety of the public." More specifically the Plan states in the Natural Resources Goals section "for Belvidere's water resources, including its ponds, streams, rivers, wetlands, groundwater, and associated habitats to be preserved and, where degraded, improved in order to ensure water quality for drinking, recreation, and the environment."

Plan Policies language includes:

- Development near rivers and streams should be located in such a way as to minimize the number of stream crossings.
- A natural vegetative buffer 25 feet wide is required for all streams and 50 feet for the North Branch.
- All wetlands are required to have a 50 foot buffer. No filling for dredging of wetlands is permitted. Belvidere Bog should have a 100 foot buffer.
- No structures should be constructed within the flood hazard area. Filling of the flood hazard area or obstructing flow of floodwaters is also prohibited.
- No form of land waste disposal or storage of possible contaminates should be permitted in the high water table and ground water recharge areas.
- All construction where soil is to be disturbed should provide adequate erosion control so that no soil moves off site or into surface waters or wetlands.
- Agricultural and forestry must abide by AAPs and AMPs. Where an activity may have a negative impact on water quality, BMPs are recommended.

Plan Recommendations language includes:

- The Planning Commission should consider acquiring funds to have a wetland inventory of the town conducted.
- The Town should consider purchasing properties or development rights of properties with the floodplain to permanently prevent development in those areas.

- The Planning Commission should consider creating a plan for the flood hazard areas to address recreational opportunities, flood hazard protection, and the potential for implementation of water quality measures.
- Belvidere should continue to enforce On-site Septic Ordinances in order to ensure septic systems are safe and do not create a water quality problem.
- Belvidere supports the acquisition of lands within and around Belvidere Bog by local or state conservation agencies.
- The Town should petition the state to include Belvidere Bog on the Fragile Areas Registry as well as a Class I wetland sot that the area is given the greatest amount of protection from any potential encroachment.

The Plan describes the importance of flood plains flood hazard areas (see Flood Hazard Zoning below).

Flood Hazard Zoning- Amended in 2006

Belvidere's Flood Hazard Zoning regulates the use and construction of structures in the flood hazard area. Flood hazard areas are associated with most of the length of the North Branch from Belvidere Center to Morgan Bridge. Development restrictions include a development set back of 25 feet from the top of bank and "recommends a naturally vegetated buffer be maintained on all perennial streams and rivers and wetlands as well and a 50 foot setback from wetlands."

Town of Eden

Municipal Plan 2007

Orleans and Caledonia County Towns

Town of Craftsbury

No Municipal Plan or Zoning Bylaws

Town of Walden

No Municipal Plan or Zoning Bylaws

Town of Glover

No Municipal Plan or Zoning Bylaws

Flood Hazard Regulations approved in 1991. Lands within the National Flood Insurance Program floodway- permits required for new construction or improvements. Agriculture and Recreation are permitted uses. Junkyards are prohibited within the floodway. Water supply and sanitary sewage systems designed to minimize or eliminate infiltration of flood waters.

Town of Greensboro

Municipal Plan- 2001

Major objectives in the plan include "preserve Caspian Lake and its surroundings as a vacation area, and to preserve the quality of Greensboro's surface water including lakes, ponds, rivers, streams, and wetlands as sources of water supply; absorption of flood water, habitats for wildlife, waterfowl, and vegetation; recreation areas; and aesthetic enjoyment."

Protection of sensitive environments through shoreline zoning, Caspian Lake and its surroundings:

- Revise Zoning Bylaws to better control logging and housing development in lake watershed.
- Prepare new Shoreline Protection Bylaws
- Update procedures for administering the septic regulations applicable to Village and Lakeshore Districts
- Sample water on a regular basis for evidence of undesirable pathogens and other pollutants
- Promote the gradual elimination of heavily polluting 2 cycle marine engines
- Maintain a Lakeshore District for each of its lakes and major ponds (Caspian, Eligo, Long Pond, Horse Pond, and two Mud Ponds
- Encourage the Eligo Association to install and monitor a milfoil wash station
- Monitor development of new construction to ensure full compliance with zoning bylaws
- Address potential pollution from farm runoff
- Prohibit the establishment of polluting industries that would degrade water quality

- Support efforts of landowners and The Nature Conservancy to preserve Long Pond in its natural undeveloped condition
- Maintaining all rivers and streams in the natural pristine condition to maximize to the extent possible including the establishment of buffer strips to stabilize streambanks and prevent their erosion
- Preserving and protecting all of Greensboro's wetlands
- Identifying Aquifer Protection Areas and taking steps to protect groundwater from polluting activities

Flood Hazard Area and Floodway- Protect public and private investment and significant natural resources from flooding within the 100 year floodway. No development within the floodway without a conditional use permit

Zoning Bylaws- **1996**

Greensboro Village District- a compact village center around the outlet of Caspian Lake .5 acre minimum lot size, protect surface and groundwater from contamination

Greensboro Bend Village District- adjacent to the Lamoille River .5 acre minimum lot size, protect surface and groundwater from contamination

Lakeshore District- lands contiguous to and in the immediate vicinity of Caspian and Eligo Lakes, maintain high water quality, scenic beauty, and public and private uses of the lakes, 150 foot set back from public waters, 1 acre minimum lot size.

Rural Residential- minimum 5 acre lot size, 50 foot setback from public waters

Rural Lands- minimum 10 acre lot size, 50 foot setback from public waters

Resource District- minimum 25 acre lot size, 50 foot setback from public waters, Long Pond minimum frontage of 500 feet and 300 feet setback, no cutting within 50 of Long Pond,

Flood Hazard Regulations- all structures and developments designed to minimize flooding damage, flood resistant materials, anchoring, maintain flood storage capacity of the channel

Town of Sheffield

Municipal plan- 1984

Summarizes soils in the southwest corner draining to the Lamoille watershed as Paxton-Woodbridge- serious limitations to septic development and moderate limitations to homesites. Woodstock-Colrain- severe to moderate septic and homesite development. Cabot-Buckland- serious limitations to septic development and moderate limitations to homesite development. **No zoning.**

Town of Hardwick

Municipal Plan- **2002**

Municipal Plan language related to water resources includes: "Hardwick's surface waters- rives, ponds, streams, wetlands, and groundwater are precious and vulnerable natural resources…"

"Areas that are especially important to maintaining healthy wildlife resource include borders of rivers, lakes, streams, wetlands…"

"be good stewards of the town's other natural resources, including ground and surface waters, and unique natural features." "Protect and enhance the Lamoille River, Hardwick Lake, Mackville Pond, and other natural areas."

"maintain important fish and wildlife habitats such as wetlands, riparian zones…"

Flood Hazard Areas- mapped by the federal government along the Lamoille River, Cooper Brook, and Adler Brook. Federal regulations apply to these lands, and mandate standards that make new construction of permanent structures, or major expansions of existing structures difficult and expansive.

Zoning Bylaws- 2003

Rural Residential District-3 acre minimum lot size. Promote agriculture, forestry, and low to moderate density residential development. The purpose of Rural Residential is to ensure the protection of environmental resources and maintain open space, the clustering of new development is strongly encouraged. Permitted uses- accessory apartment, accessory structure, agriculture, single family dwelling, forestry, group home, home child care, and home occupation.

Conditional uses- accessory structure, adaptive reuse, bed and breakfast, campground, cemetery, contractors yard, cultural facility, day care center, multi-family dwelling, 2 family dwelling, extraction of earth resources,

greenhouse/nursery, health clinic, home industry, kennel, landfill, mobile home park, residential care facility, place of worship, public facility, outdoor recreation, retreat center, sawmill, school, telecommunications facility, veterinary clinic, and warehouse/storage.
Forest Reserve District- 25 acre minimum lot size. "The purpose of Forest Reserve is to protect significant forest resources and limit development in areas with steep slopes, shallow soils, unique or fragile resources, significant wetlands…"
Permitted uses- accessory apartment, accessory structures, agriculture, seasonal camp, forestry, group home, home child care, and home occupation.
Conditional uses- accessory structure, bed and breakfast, campground, single family dwelling, extraction of earth resources, greenhouse/nursery, health clinic, kennel, public facility, outdoor recreation, retreat, and telecommunications facility.
Flood Hazard Overlay District - "The purpose of the Flood Hazard Overlay District is to (1) protect public health, safety, and welfare by preventing or minimizing hazards to life and property due to flooding (2) to ensure property owners within this area are eligible for flood insurance under NFIP."
Section 3.12- "An undisturbed vegetative buffer shall be maintained for a minimum of 25 feet from all streams, rivers, and lakes."
Section 3.14- No development on lands greater than 25%
Protection of Water Resources- "to prevent soil erosion and sedimentation of surface waters, maintain water quality, and protect wildlife habitat, a setback of 75 feet minimum for structures to streams, rivers, and public lakes."

Town of Stannard
Municipal Plan- 1999
The plan recognizes that the improper disposal of household sewage as the main threat to fouling the town's ground and surface waters. The plan also recognizes the importance of F&W's Steam Mill Brook Wildlife Management Area. Wheelock's Flagg Pond is also recognized for its importance for fishing and recreation for Stannard residents. It recommends development that does not adversely impact the pond. The plan also recommends conducting studies to identify sensitive and scenic areas within town.

Town of Wheelock
Municipal Plan- 2001
Some plan language includes- Wellhead Protection Areas should be delineated and protected from incompatible land uses, ensure that all sewage is treated and disposed of in a safe manner, identify natural areas, create a Conservation District which at a minimum includes natural areas and wellhead protection areas. The plan also recognizes the potential for runoff from logging and recommends training workshops for loggers and landowners and forest land protection through easements. **No Zoning Bylaws.**

Chittenden County Towns

Town of Jericho
Municipal Plan- 2006
Some language includes- "Adequate planning relative to water is critical to Jericho's survival as a community. As a resource, water is uniquely vulnerable in that it is easily polluted and can only be restored to purity at great cost and with great difficulty." "Maintaining the quality of Lake Champlain is therefore of paramount interest to many residents of Jericho." "There are two river areas within Jericho that could fall under the State of Vermont criteria as outstanding water resources. These are sections of the Browns River from Old Red Mill to Old Pump Road and a section of Mill Brook along Tarbox Road. The designation as outstanding water resource indicates that these areas have significant aesthetic, cultural, natural beauty, or geologic features."
Some language in the plan documents the importance of shorelines, groundwater recharge areas, floodways, and wetlands. Some specific wetlands include: an area north of Riverside near Route 15, an area east of Cilley Hill Road along the Browns River, an area east of Skunk Hollow Road, an area near the Foothills Development, an area west of Jericho Center, areas within Ethan Allen Firing Range, an area east and south of Leary Road and Bentley Lane, an area east of the Vermont Research Forest, and portions of the Town's Mobb Farm property. The Plan describes the definition of floodways and flood hazard areas.

Language in the objectives and implementation section includes- "use town resources to obtain contiguous parcels and/or greenways to connect natural areas and to protect outstanding water features." "Establish buffer zones of undeveloped land along the boundaries of streams, wetlands, and ponds." "Identify and protect habitats that harbor critical wildlife and plant species and support initiatives such as the Upland Project of Chittenden County." Wellhead Protection Areas are identified and 5 community water systems.

Zoning Bylaws- 1992

Land Use Districts

River District- protects major water courses and their flood hazard areas in Jericho. In addition, the watercourses and their floodplains are an extremely important natural resource base for wildlife, recreation, and the rural atmosphere of Jericho. Development should be very limited and dwellings should not be constructed in this zone.

Conservation District- Contains significant aesthetic, recreational, and natural resources which help to maintain the rural character of Jericho. In addition, the district may have physical limitations such as steep slopes or high water table. Development shall be carefully regulated.

Agricultural District- Provides open land for agriculture, forestry, and rural housing. Prime forest and agricultural land and open space should be protected while allowing for limited, compatible development.

Wetland Overlay District- the purpose of the Wetlands Overlay District is to preserve public health and safety, wildlife, and existing and future water supplies, and control pollution by maintaining the quality and level of the water table and surface waters. Permitted uses include hunting and wildlife management.

Natural Resources Overlay District- to preserve wildlife habitat such as deeryards, natural areas, scenic resources (ridge lines), prime agricultural lands.

Town of Underhill

Municipal Plan 2004

Municipal Plan language related to water resources includes the following under Protect the Environment Section- "Protection and improvement of landscape has wide support in the Community." In the Significant natural and fragile areas Section- "Outstanding water resources, including lakes, rivers, aquifers, shorelines, and wetlands." As the headwaters of the Browns River commence in Underhill, we have a special responsibility for maintaining the health of the watershed, including ground water aquifers and recharge areas." "To maintain or improve the quality of air, water, wildlife, and land resources, Vermont's air, water, wildlife, mineral, and land resources should be planned for use and development according to the principles set forth in 10 VSA & 6086(a). Under the Watershed Protection Section-"Managing a watershed goes beyond municipal responsibilities because it is governed by geographic realities. Results of the assessment of the Browns River watershed by ANR might necessitate amending regulations, such as the establishing appropriate setbacks from the Browns River or the creation of an environmentally sensitive district.
Under the Section Indentify areas to be protected the Plan language states that "an inventory of fragile areas, forests, wildlife habitats, and scenic views is an essential database for all conservation efforts. One example is the Crane Brook area, a particularly rich wetland that is a valuable habitat for bear, moose, fisher, otter, deer, waterfowl, and songbirds

Zoning Bylaws- updated 1991

Districts include Residential District and Rural Residential District. Districts that protect surface and ground water and scenic views include:

Water District- aquifer recharge in Underhill Center, 5 acre minimum lot size

Soil and Water District- high elevation aquifer recharge, 15 acre minimum lot size

Preservation District- protects scenic vistas along Pleasant Valley Road, 10 acre minimum lot size

Town of Essex

Municipal Plan- 2001

The municipal plan discusses the major watersheds in town and noteworthy wetlands (including the Hanley Lane, Osgood Hill, and Browns River wetlands). The plan describes the importance of rivers, brooks, lakes, and ponds for public health, recreation, wildlife diversity, visual sensitivity, and environmental quality. Floodplain Zones are established along all of the town's waterways including flood hazard areas (100 year floodways). Minimum setbacks restrict development within riparian areas.

Town of Westford

Municipal Plan- 2004
The town plan identifies the importance of the town's surface and groundwater resources. The Browns River is specifically mentioned in addressing sedimentation and streambank erosion and supporting ongoing monitoring and assessment efforts there. The plan also calls for a Browns River green belt and protection of riparian vegetation.

Zoning Bylaws- 2003
Districts include a Water Resources Overlay- wetlands, ponds, streams, and well head protection areas to protect human health by insuring clean water and minimize impacts of development on water resources. Flood Hazard District- includes lands on the National Flood Insurance Maps and permits only land development which will not impede or divert floodwaters, or otherwise increase flood hazards to the detriment of others.

Town of Colchester
Municipal Plan- 2007
The municipal plan acknowledges the importance of maintaining water quality as a community asset. It specifically identifies Mallets Bay, Outer Mallets Bay, Lake Champlain, 3 miles of Lamoille River frontage, and the town's extensive wetlands and floodplains in this context. The plan identifies dense development along these shorelines and the possibility of failed on-site sewage systems as a threat to ground and surface water quality. The plan also discusses sediment and nutrient runoff. The plan calls for long-term cost effective solutions to water quality issues. The plan recommends water quality monitoring, water resource inventories, and implement recommendations of the Colchester Water Quality Study Committee. The Plan also states "a Lamoille River Basin Plan is currently in development …the Town should participate in this larger planning process as way of improving water quality…"

Zoning Regulations and Zoning Districts related to water resources- 2006
Watercourse Protection District- to minimize adverse impacts of development upon the sensitive natural areas adjacent to watercourses and to preserve water quality, prevent pollution, avoid erosion, and protect the ecology of streambeds and lands adjacent to watercourses. Applies to lands within 85 feet of Mallets Creek and Allen, Indian, Pond, and Sunderland Brooks and all tributaries and all other minor streams. All lands in this district are to be left in their naturally vegetative state, with the vegetative goal being a riparian forest. Minimal uses are permitted including no structures.
Wetland/Flood Plain District- similar objective as above in addition to reducing flood loses. Floodways and National Wetland Inventory wetlands are included in this district's boundaries. Uses are limited to farming and essential services excluding buildings and structures. No uses that will adversely affect soils or vegetation, impair the quantity or quality of surface and groundwater, erode soil, alter streambanks, or streambeds, or divert watercourses are permitted.
Shoreland District- to preserve the natural growth and cover of the shorelines adjacent to Lake Champlain and other waterways, to preserve the water quality and prevent pollution and to control and regulate development of the shorelines, to prevent erosion, nuisance and exploitation and to preserve the property rights of the shoreline property owners. The district is a 500 strip of land from the mean water line of Colchester Pond, Lake Champlain, and Winooski and Lamoille Rivers. Many uses are restricted and require DEC review within this district.

Franklin County Towns- municipal plans and zoning bylaws review by the Northwest Regional Planning Commission

Town of Georgia
Municipal Plan-2001
The Town Plan contains a section on its water resources which includes surface waters, groundwaters, well-head protection areas, floodplains, and wetlands. The Plan also contains a section on fragile, unique, and sensitive areas which includes sites for rare or threatened species. The section includes a number of policies on the protection of water quality, and also on protecting natural areas and critical areas from detrimental effects of development. Georgia has over seven miles of lakeshore frontage and is part of the Lake Champlain watershed. The Plan does go into great detail with regards to the Lake Champlain area. The plan recommends riparian buffers and low impact development.

Some specific plan language includes "Arrowhead Mountain Lake also provides a valuable source of water for the Georgia Dairy Industrial Park." "Wetlands are an important part of the overall ecosystem and an important water resource." "Protection and improvement of water quality is integral to the overall quality of all water resources."

Zoning Bylaws- 1997

Natural Areas and Corridors- identifies unique and irreplaceable areas of natural beauty, which should remain in their natural state

Lakeshore- to maintain the natural beauty of the lakeshore, to preserve public access, and to minimize danger of pollution

Town of Fairfax

Municipal Plan- 1998

The Town Plan contains a section on natural and cultural resources which includes geology, surface waters, groundwaters, soils, critical habitat, wetlands, riparian areas, steep slopes, headwaters, shorelands, public and water supply watersheds, and floodplains. The section includes an extensive list of goals, objectives, and policies on the protection of water quality, and also on protecting natural areas and critical areas from detrimental effects of development.

Zoning Bylaws

The Town's zoning regulations were adopted in January of 1980 and amended in 1985 and 1988. The Town is currently in the process of updating its zoning bylaws.

Town of Fletcher

Municipal Plan

The Town of Fletcher adopted its town plan in October of 1997. The previous plan was updated and adopted in 1987. The Town Plan contains an in-depth section on its natural resources which includes surface waters, groundwaters, ecologically sensitive areas, wetlands, floodplains, and shoreland and riparian areas. The section includes a number of policies on the protection of water quality, and also on protecting natural areas and critical areas from detrimental effects of development. The goals, policies, and objectives in the Fletcher Town Plan have been extremely well thought out. The Town Plan gives an excellent description of all of its water resources including uses, quality, and locations, to name a few. The Plan also takes into account all the things that can cause water quality to deteriorate.

Zoning Bylaws

The Town is currently in the process of adopting its zoning regulations which were drafted in November of 1998.

APPENDIX B - Regulatory and Non-regulatory Programs that Contain BMPs Applicable to Protecting and Restoring Waters within the Basin

APPENDIX B.1 - Agricultural Runoff Control Programs

State of Vermont Agricultural Programs

Accepted Agricultural Practices (AAP) are statewide regulations designed to reduce nonpoint pollutant discharges through implementation of improved farming techniques rather than investments in structures and equipment. The law requires that these practices must be technically feasible as well as cost effective for farmers to implement without governmental financial assistance.

AAPs are intended to reduce, not eliminate, pollutants associated with nonpoint sources such as sediments, nutrients and agricultural chemicals that can enter surface water and groundwater that would degrade water quality. AAPs are a group of basic farmland management activities, which will help conserve and protect natural resources. These practices will maintain the health and long-term productivity of the soils, water, and related plant and animal resources and reduce the potential for water pollution from agricultural nonpoint sources. Accepted Agricultural Practices include these practices among others: erosion and sediment control, animal waste management, fertilizer management, and pesticide management. AAPs are basic practices that all farm operators must follow as a part of their normal operations.

Implementation of AAPs by Vermont agricultural operators creates a rebuttable presumption of compliance with theVermont Water Quality Standards. The presumption that the use of Accepted Agricultural Practices complies with Vermont Water Quality Standards may be overcome by water quality data or results from a water quality study deemed conclusive by the Secretary. These rules, however, do not exempt farmers from the obligation to comply fully with the Vermont Water Quality Standards and the provisions of the Clean Water Act.

http://www.vermontagriculture.com/AgriculturalWaterQuality/AAP/AAP10.htm

Best Management Practices (BMP) are more restrictive than Accepted Agricultural Practices and are site-specific practices to correct a problem on a specific farm. BMPs typically require installation of structures, such as manure storage systems, to reduce agricultural nonpoint source pollution. While farmers may realize an economic benefit from BMPs, it is unlikely that they will be affordable without governmental cost sharing.

The Vermont BMP program was created to provide state financial assistance to Vermont farmers in support of their voluntary construction of on-farm improvements designed to abate non-point source agricultural waste discharges. The program makes maximum use of federal financial assistance and seeks to use the least costly methods available to accomplish the abatement required.

The Vermont Agency of Agriculture, Food, and Markets (VAAF&M) grants are limited to a cap of 35 percent of the total actual costs of the system in cases where either the federal government or other entities cost share the system, or 50 percent on projects with no other source of cost share assistance. Combined federal, state and other cost share participation may not exceed 85 percent of the eligible costs, ensuring grant recipients pay at least 15 percent of the total cost of each BMP. Awards of funding for BMP implementation shall require that the BMP be operated and maintained under contract or agreement for the design life of the practice under contract or agreement, but not to exceed 10 years.

It is a policy of the State of Vermont to assist farmers with the implementation of BMPs that will protect and maintain water quality by reducing agricultural nonpoint source pollution. The implementation of Best Management Practices is subsequent to the implementation of Accepted Agricultural Practices.

The purpose of the **Large Farm Operations** (LFO) program is to require farms with more than 700 mature dairy cows or 1,000 beef cattle to be pro-actively managed in accordance with the accepted agricultural practices and to prohibit a direct discharge from their barnyard and environments commonly known as the facility. Farms which are following the regulations for LFOs should adhere to a technical standard to assure that they will not discharge to waters of the state. If farms chose to ignore the LFO rule or to create a discharge they are required to attain a National Pollution Discharge Elimination Systems permit. There are currently no farms in Basin 11 which require an LFO permit.
http://www.vermontagriculture.com/LFO.htm

The purpose of the **Medium Farm Operations** (MFO) program is to require farms with between 200 and 699 mature dairy cows or 300 beef cattle to be pro-actively managed in accordance with the accepted agricultural practices and to prohibit a direct discharge from their barnyard and environments commonly known as the facility. Farms which are following the regulations for MFOs should adhere to a technical standard to assure that they will not discharge to waters of the state. If farms chose to ignore the MFO rule or to create a discharge they are required to attain a National Pollution Discharge Elimination Systems permit. There are currently 2 farms in Basin 11 which will require an MFO permit.
http://www.vermontagriculture.com/AgriculturalWaterQuality/MFO/revisedDGP_000.htm

The **Current Use Program** (CUP) Vermont's Agricultural and Managed Forest Land Use Value Program -- known as the Current Use Program -- was created in the 1970's as a companion to legislation that required towns to list property at 100% of fair market value. Because of escalating land values, these property taxes were placing a heavy burden on owners of productive farm and forest lands. The CUP offers landowners use value property taxation based on productive value of land rather than traditional "highest and best" use of the land. The CUP includes a Land Use Change Tax as a disincentive to develop land. The tax is 20% of fair market value of a property, or, in case of the sale of part of a property, a pro rata share of the fair market value of the entire property. The program is administered by the Vermont Department of Taxes.
http://www.state.vt.us/tax/pdf.word.excel/pvr/currentuse-geninfo.pdf

Farm Agronomic Practices Program (FAPP) provides Vermont farms with state financial assistance for implementation of soil-based practices that improve soil quality, increase crop production, and reduce erosion and agricultural waste discharges. FAPP also encourages outreach on agricultural water quality impacts and agricultural water quality regulations through educational and instructional grants. Practices eligible for assistance are: Nutrient Management Plan Update, Payments up to $2 per acre; Cover Cropping, Payments up to $20 per acre; Strip Cropping, Payments up to $24 per acre; Conservation Crop Rotation, Payments up to $25 per acre; Cross-Slope Tillage, Payments up to $10 per acre.
http://www.vermontagriculture.com/AgriculturalWaterQuality/FAP/documents/FAPProgramProcedure.pdf

Vermont Agricultural Buffer Program (VABP) Of the land currently enrolled in CREP, only 20 % is cropland. Cropland has a greater potential to contribute phosphorus and sediment to waters of Vermont and hence the VABP has been designed to allow farmers to plant harvestable permanent grasses along streams. Eligible land enrolled in the program must be planted to a perennial sod-forming crop. The ground can only be tilled to establish this mix. No manure can be applied on contracted land at anytime during contract. Non manure fertilizers can be used so long as no excessive nutrient applications are made. All buffers will be 25 feet wide. Harvesting of buffer is only allowed from June 1st to September 1st. A set rate of $123 per acre will be provided to the participant to cover cost of establishing grassed buffer when a suitable grass is not currently planted. An additional per acre incentive payment will be paid annually at the end of growing season for each of the 5 years participant is enrolled in VABP. The annual payment will be 40% of estimated total CREP payments per acre would be in a 15 year contract with filter strips.
http://www.vermontagriculture.com/documents/VABP.pdf

Federal Programs (US Department of Agriculture and US Fish & Wildlife Service)

Environmental Quality Incentives Program (EQIP) provides technical, educational, and financial assistance to eligible farmers working to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. This USDA program provides assistance to landowners in complying with Federal and State laws, and encourages environmental enhancement. Protection of surface and groundwater resources is the major focus of EQIP.

The program offers cost-share payments of up to 75% of costs up to $50,000, to implement one or more eligible practices. Five- to ten-year contracts are made with producers to use and maintain cost-shared practices and require a conservation plan be created and carried out for the length of the contract. Priority is given to livestock operations and targeted locations within the State. Applications are ranked on a point system and awarded by rank.

Conservation Reserve Enhancement Program (CREP) is a State-federal USDA conservation partnership program targeted to address specific State and nationally significant water quality, soil erosion and wildlife habitat issues related to agricultural use. The program uses financial incentives to encourage farmers and ranchers to voluntarily enroll in contracts of 10 to 15 years in duration to remove lands from agricultural production. This community-based conservation program provides a flexible design of conservation practices and financial incentives to address environmental issues. The state is considering enhancing the program to include 30-year easements on marginal pastureland where forested buffers would be required. *http://www.vermontagriculture.com/CREPwebsite/Home/Home.htm*

Conservation Reserve Program (CRP) is a voluntary program of USDA that offers long-term rental payments and cost-share assistance to establish long-term, resource-conserving cover on environmentally sensitive cropland or, in some cases, marginal pastureland. Converting highly erodible and/or environmentally sensitive cropland to permanent vegetative cover reduces soil erosion, improves water quality, and enhances or establishes wildlife habitat. CRP contracts are for a term of 10 years. However, for land devoted to certain practices such as hardwood trees, wildlife corridors, or restoration of cropped wetlands or rare and declining habitat, participants may choose contracts of up to 15 years. Incentives include annual rental payments of up to $50,000 per year, cost-share payments of up to 50% of the cost for establishing cover, plus special incentive payments for wetland restoration.

Wildlife Habitat Incentives Program (WHIP) is a voluntary program that provides financial incentives to develop habitat for fish and wildlife on private lands. The USDA program provides both technical assistance and cost sharing help to participants who agree to implement a wildlife habitat development plan. Participants work with USDA's Natural Resources Conservation Service to prepare a wildlife habitat development plan in consultation with a local conservation district. The plan describes the landowner's goals for improving wildlife habitat, includes a list of practices, a schedule for installing them, and details the steps necessary to maintain the habitat for the life of the agreement.

USDA pays up to 75% (usually no more than $10,000) of the cost of installing wildlife practices. USDA and program participants enter into a cost-share agreement that generally lasts a minimum of 10 years from the date the contract is signed.

Forestry Incentives Program (FIP) of USDA provides cost-share monies to help support good forest management practices on privately owned, non-industrial forestlands nationwide. FIP is designed to benefit the environment while meeting future demands for saw timber, pulpwood, and quality hardwoods. FIP's forest maintenance and reforestation projects also provide numerous natural resource benefits, including reduced soil and wind erosion and enhanced water quality and wildlife habitat.

FIP provides up to 65% of the total costs, with a maximum of $10,000 per person per year, to assist with the establishment of eligible practices. Private landowners of at least 10 acres and no more than 1,000 acres of suitable land are eligible for funding. Normally the length of the program is from one to 10 years. There may be certain restrictions on time limits and on certain practices to be performed. Financial assistance ranges from $50 to $10,000 per year, with an average of $1,600. Funding is limited, and priority areas for participation in the program are established at the local level.

Wetlands Reserve Program (WRP) of USDA is a voluntary program offering landowners a chance to receive payments for restoring and protecting wetlands. Marginal agricultural land that is too wet to produce, previously drained wetlands or land damaged by flooding are typical sites for WRP funding. Landowners retain control over access to their property and compatible uses such as haying, grazing, timber harvest, fee hunting, and trapping may be permitted upon request. Land can be resold. The program offers landowners three options:

1) Permanent Easement. USDA will pay up to the agricultural value of the land and 100% of the costs of restoring the wetlands and uplands.

2) 30-Year Easement. USDA will pay 75% of what would be paid for a permanent easement and 75% of the restoration costs.

3) Restoration Cost-Share Agreement. USDA will pay 75% of the cost of restoring a wetland in exchange for a minimum 10-year agreement to maintain the restoration. No land use payment is provided.

Easements and restoration cost-share agreements establish wetland protection and restoration as the primary land use for the duration of the easement or agreement. Re-stored wetlands improve water quality, filter sediment, reduce soil erosion, provide habitat for wildlife and endangered species, reduce flooding and provide outdoor recreation and education opportunities.

Farmland Protection Program (FPP) of USDA provides funds to help purchase development rights to keep productive farmland in agricultural uses. Since 1960, an average of 1.0 million acres of farmland have been converted to other uses each year, often resulting in permanent loss of valuable topsoil and agricultural land. The FPP was designed to help protect quality farmland with prime, unique, or other productive soil, from urban growth.

USDA provides up to 50 percent of the costs of purchasing easements. For the FPP, a conservation easement is an assigned right prohibiting any development, subdivision or practice that would damage the agricultural value or productivity of the farmland. To be selected for participation in the FPP, a pending offer must provide for the acquisition of an easement or other interests in land for a minimum duration of 30 years, with priority given to those offers providing permanent protection.

Watershed and River Basin Planning and Installation - Public Law 83-566 (PL-566) Technical and financial assistance is provided in cooperation with local sponsoring organizations, state, and other public agencies to voluntarily plan and install watershed-based projects on private lands. The program empowers local people or decision makers, builds partnerships and requires local and state funding contributions. The purposes of watershed projects include watershed protection, flood prevention, water quality improvements, soil erosion reduction, rural, municipal and industrial water supply, irrigation water management, sedimentation control, fish and wildlife habitat enhancement and create and restore wetlands and wetland functions.

Watershed plans involving an estimated Federal contribution in excess of $5,000,000 for construction, or construction of any single structure having a capacity in excess of 2,500 acre feet, require Congressional committee approval. Other plans are approved administratively. After approval, technical and financial assistance can be provided for installation of works of improvement specified in the plans.

Project sponsors are provided assistance in installing planned land treatment measures when plans are approved. Surveys and investigations are made and detailed designs, specifications, and engineering cost estimates are prepared for construction of structural measures. Areas where sponsors need to obtain land rights, easements, and rights-of-way are delineated. Technical assistance is also furnished to landowners and operators to accelerated planning and application of needed conservation on their individual units. There are presently over 1600 projects in operation.

Partners for Fish and Wildlife Habitat Restoration Program provides technical and financial assistance to private landowners interested in voluntarily restoring or otherwise improving native habitats for fish and wildlife on their lands. This USF&WS program focuses on restoring former and degraded wetlands, native grasslands, stream and riparian areas, and other habitats to conditions as natural as feasible. The program emphasizes the reestablishment of native vegetation and ecological communities for the benefit of fish and wildlife in concert with the needs and desires of private landowners.

The assistance that the US Fish and Wildlife Service offers to private landowners may take the form of informal advice on the design and location of potential restoration projects, or it may consist of designing and funding restoration projects under a voluntary cooperative agreement with the landowner. Under the cooperative agreements, the landowner agrees to maintain the restoration project as specified in the agreement for a minimum of 10 years. While not a program requirement, a dollar-for-dollar cost share is usually sought on a project-by-project basis.

Local Government Programs

Conservation District Technical Assistance Programs
Free technical assistance and information is provided through the conservation districts. ***http://www.vacd.org/***

Accepted Agricultural Practices Assistance- helps farmers meet the requirements of Vermont's AAP regulations. Technical assistance for manure and nutrient management, runoff potential, floodway determinations, streambank stabilization, vegetative buffer strips and soil erosion potential are all addressed by the program. Agricultural Resource Specialists (ARS) work with landowners on strategies specific to their farms and provide information and referrals for State and Federal cost-share programs.

http://www.vacd.org/onrcd/ars.html

Farm*A*Syst is a free drinking water protection program for farms based on voluntary assessments to determine how current practices and structures may pose a risk to drinking water. Voluntary Farm Assessments provide information that help ARS staff offer farm-specific suggestions for protecting the farm's drinking water.

http://www.vacd.org/onrcd/farmasyst.html

Land Treatment Planners are available to assist farmers in developing land treatment plans which provide detailed information on farm soil and water resources, recommendations for continued stewardship, and recommendations for compliance with State and Federal regulations.

http://www.vacd.org/wnrcd/LTPbrochure.pdf

Nutrient Management Planners are available to assist farmers in developing nutrient management plans and record-keeping systems in order to maximize the benefit from fertilizer and manure applications while minimizing the impact of excess nutrients on water quality.

http://www.vacd.org/wnrcd/documents/SVNMP_Brochure.pdf

Non-Governmental Programs

The **Farmland Access Program** (FAP) goal is to provide qualified diversified farmers with access to good agricultural land and to assist with the start up or expansion of commercial agricultural businesses. In this way, Vermont Land Trust hopes to facilitate the creation of new farm enterprises and greater diversification within Vermont agriculture. VLT can work with Land Link Vermont to enroll farmers in a farmland database; assist farm seekers in securing business planning services through the Farm Viability Program; assist in farm purchases when seekers locate farms; and search for, purchase, conserve or sell farms in Vermont that are suitable for diversified farm operations. Minimum qualifications require candidates to have 3 to 5 years of commercial farming experience, strong agricultural references, plans to develop an agricultural enterprise that would gross $100,000 per year within 5 years of start up, and sufficient financial resources (or ability to be financed) for start-up expenses. Our primary focus is on farms producing food and fiber that would use at least 25 acres of productive land.

http://www.vlt.org/FarmlandAccessBrochure.pdf

The **Farmland Preservation Program** (FPP) is focused on retaining the state's quality agricultural land base in strong farming regions of the state. The purchase of conservation easements on farmland preserves Vermont's working landscape--the open farm fields, woodlands and farmsteads that comprise the third largest sector in the state's economy and draw the visitors that make tourism the largest sector. Because of the Vermont Housing & Conservation Board's investment in conservation easements, Vermont's most productive farmland will remain undeveloped and the best soils will remain available for farming in the future. Selling conservation easements enables a landowner to keep land in agricultural use and also be compensated for the potential development value of the land, recognizing the asset value of the land. The landowner retains title to the land and agrees to the terms of a conservation easement limiting future ability to subdivide and develop the land.

http://www.vhcb.org/Conspage.html#Anchor-Farmlan-65515

Land Link Vermont (LLV) is a farm linking program at the University of Vermont Center for Sustainable Agriculture. Land Link Vermont connects farm seekers with farmland and farming opportunities, and provides information and support on farm start-ups and succession by offering a matching service, education, referrals, and outreach. The matching service provides the linkages among farm seekers and farmland owners. Interested parties share information on goals, acreage, location, enterprises, and tenure options considered. Participants are interested in a variety of tenure options including buy/sell, lease, joint farming and other arrangements. Farm seekers are interested in a number of different farming enterprises including dairy, vegetables, small ruminants and CSA's. Through publications and on-going workshops, Land Link Vermont provides farmers, land owners and agriculture professionals with links to education on topics like estate and retirement planning, effective leases, farm financing, business planning, and direct marketing. Land Link Vermont also helps link farmers and landowners to professionals and Vermont agricultural organizations through consultation and referrals.

http://www.uvm.edu/landlinkvt/

The **National Fish and Wildlife Foundation** conserves healthy populations of fish, wildlife and plants, on land and in the sea, through partnerships, sustainable solutions, and better education. The Foundation meets these goals by awarding challenge grants to projects benefiting conservation education, habitat protection and restoration, and natural resource management. Federal and private funds contributed to the Foundation are awarded as challenge grants to on-the-ground conservation projects. Challenge grants require that the funds awarded are matched with non-federal contributions, maximizing the total investment delivered to

conservation projects. For every dollar that Congress provides, an average of $3 in on-the-ground conservation takes place. The Foundation has made more than 4,400 grants, committing over $165 million in federal funds, matched with non-federal dollars, delivering more than $500 million for conservation.

http://www.nfwf.org/programs.cfm

The **Nature Conservancy Conservation Easements**: Land ownership carries with it a bundle of rights—the right to occupy, lease, sell, develop, construct buildings, farm, restrict access or harvest timber, among others. A landowner can give up one or more of those rights for a purpose such as conservation while retaining ownership of the remainder of the rights. Private property subject to a conservation easement remains in private ownership. Many types of private land use, such as farming, can continue under the terms of a conservation easement, and owners can continue to live on the property. The agreement may require the landowner to take certain actions to protect land and water resources, such as fencing a stream to keep livestock out or harvesting trees in certain way; or to refrain from certain actions, such as developing or subdividing the land. Conservation easements do not mean properties are automatically opened up to public access unless so specified in an easement. The terms of a conservation easement are set jointly by the landowner and the entity that will hold the easement.

http://www.nature.org/aboutus/howwework/conservationmethods/privatelands/conservationeasements/

Technical Assistance Programs through Northeast Organic Farming Association are free to farmers - made possible by a grant from the Vermont Housing Conservation Board's Farm Viability Enhancement Program. *Vegetable and Fruit Technical Assistance* provides technical assistance to organic farmers in Vermont seeking production and financial assistance on small fruit and vegetable operations. *Dairy and Livestock Technical Assistance* provides Information, Services and Support for Vermont's Organic Dairy & Livestock Community.

http://www.nofavt.org/nofa-programs.php

Vermont Farm Viability Enhancement Program (FVP) provides farmers with business planning and technical assistance. Developed by the Vermont Housing & Conservation Board in collaboration with the Vermont Agency of Agriculture, Food and Markets, the FVP is designed to strengthen the economic position of Vermont agriculture and to complement existing programs in farmland conservation. The Program uses consultants to provide technical assistance tailored to a farmer's needs to fulfill specific business goals. Examples include consultations on keeping better production or financial records, financial benchmark analysis, meetings with crop or animal health specialists, new farm enterprise analysis, estate and farm transfer planning, labor management, and value-added processing. The business planning process involves the farmer in an assessment of the farm operation's strengths and weaknesses and in an exploration of possible management changes that could increase profitability. On-farm consultations result in the preparation of a written business plan.

http://www.vhcb.org/viability.html

APPENDIX B.2 - Effluent Limitations and Point Source Control Programs

1) Design/Engineering Program

Vermont municipalities need various wastewater treatment facility and conveyance system construction and improvement projects including: original treatment facility and collection line construction; enlargement and/or refurbishment of existing facilities; implementation of nutrient removal or sludge and septage treatment improvements at existing facilities; combined sewer overflow abatement; or collection line extensions. These projects enable the municipalities to meet the effluent limits in their NPDES permit in order to meet Vermont Water Quality Standards and comply with statute; provide for centralized treatment to replace problem individual on-site systems; and provide desired wastewater treatment capacity to enable municipal growth and development.

The municipalities desire to take advantage of the state and federal capital funds appropriated for municipal pollution control projects, which we administer. We assist grant and loan recipients in developing capital planning and financing plans; assist in defining project scopes to meet the technical, regulatory, and funding requirements; assure the design of appropriate facilities; oversee facility construction; and monitor the first year's operation.

Statutory Reference

State: Title 10 VSA Chapter 55 Aid to Municipalities for Water Supply, Pollution Abatement and Sewer Separation. Title 24 VSA Chapter 120 Special Environmental Revolving Fund. Federal: Clean Water Act Title VI - State Water Pollution Control Revolving Funds.

Contacts

Design Section Supervisor, 241-3750.
Design Section, 241-3740
Financial Management Section Supervisor, 241-3734.

2) Discharge Program (Discharging Facilities and Stormwater Management)

2.A. Permits:

A discharge permit is required whenever an individual, municipality or company wants to discharge waste directly to waters of the state. Some industries are also required to treat waste before sending it to a municipal wastewater treatment facility. This section issues discharge permits and pretreatment permits. The permitting process involves a system evaluation and design being prepared by a consultant.

2.B. Operations and Management (O&M):

This group performs oversight functions of municipally owned wastewater treatment facilities, and of privately owned treatment and pretreatment facilities. In addition to performing certification and training programs, periodic discharge sampling for permit compliance checks, and laboratory evaluations. Assistance is also provided to operators and municipal officials in the proper operation, maintenance and budgeting of their wastewater facilities.

Statutory Reference

10 VSA Chapter 47

Waste Water Treatment Facilities
In the Lamoille River watershed, there are six municipal wastewater treatment facilities that discharge either to the river (Milton, Fairfax, Jeffersonville, Morrisville, Hardwick) or to a tributary (Johnson) (see table below). As of February 2000, there were 62 permitted stormwater discharges to the Lamoille River or tributaries and 22 permitted stormwater discharges to Arrowhead Mountain Reservoir.

Proposed Upgrades to Wastewater Treatment Facilities
The Lake Champlain Phosphorus TMDL includes two changes to the current phosphorus removal policy for Vermont wastewater treatment facilities. The first change is that the statutory exemption for aerated lagoon facilities with greater than 0.2 mgd permitted flow that are now exempt from the 0.8 mg/l treatment requirement will be required to remove phosphorus to 0.8 mg/l on a monthly average basis. The Hardwick wastewater treatment facility falls within this category.

The second change in the Lake Champlain Phosphorus TMDL would apply an annual load limit, calculated at an effluent phosphorus concentration of 0.6 mg/l at the currently permitted flow, to all facilities that are currently required to achieve 0.8 mg/l limit. The Johnson, Milton, Morrisville, and Wyeth (in Georgia) facilities fall within this category.

The Town of Milton has proposed extension of the current sewer line and expansion of the existing capacity. The Act 250 permit requesting the expansion is currently under appeal.

The Town of Fairfax is considering an expansion of capacity of its current facility to accommodate the town's planned growth center within the Village.

Combined Sewer Overflow (CSO) Elimination
During wet weather events, the combined volume of wastewater and stormwater runoff entering combined sewer systems often exceeds conveyance capacity. Most combined sewer systems are designed to discharge flows that exceed conveyance capacity directly to surface waters. Because CSOs contain untreated wastewater and stormwater, they can contribute microbial pathogens and other pollutants to waterways.

Hardwick was the only watershed sewage collection system that had a CSO. A sewer separation project was conducted in Hardwick and a new storm drainage system was installed in approximately 1992-1993. Two CSOs were also eliminated. The Buffalo Street Pump Station was replaced in approximately 1994-1995 with a station that does not have an overflow and the Cottage Street Bridge CSO regulator in a manhole on West Church Street was filled with concrete.

Permitted Basin Direct Discharges

Facility Name	Receiving Water	Permit ID Number/NPDES Number	Permit Expiration	Discharge Activity
Greensboro Nursing Home	Greensboro Brook	1-0301	1/01/85 Determine if future permits are needed	Well overflow
Hardwick WWTF	Lamoille River	3-1143/VT0100137	12/31/04	Sanitary Waste Outfall CSO-Cottage St Bridge CSO- Hardwick WWTF
Johnson WWTF	Gihon River	3-1149/VT0100901	3/21/04	Sanitary Waste Outfall
Morrisville WWTF	Lamoille River	3-1155/VT0100480	9/30/03	Sanitary Waste Outfall
Fairfax WWTF	Lamoille River	3-1194/VT0101087	3/30/05	Sanitary Waste Outfall
Milton WWTF	Lamoille River	3-1203/VT0100684	12/31/05	Sanitary Waste Outfall
Wyeth Nutritionals Inc	Arrowhead Mt. Lake and Perc Ponds	3-1209/VT0020702	6/30/07	Dairy Products
Jeffersonville WWTF	Lamoille River	3-1323/VT0101150	3/31/05	Sanitary Waste Outfall
Smugglers Notch-Water Treatment Plant	Brewster River	3-1409	12/31/04	Filter Backwash
Smugglers Notch-snowmaking	Brewster River	3-1416	9/30/05	Snowmaking drainage water
Kross Brewing	Morrisville WWTF	3-1442	3/31/08	Process wastewater
Manosh Corp-sawmill	Lamoille River	3-1471/VT0000914	3/30/05	Woodworking discharge
Smugglers Notch-snowmaking system drainage	No Name Brook-trib to Brewster	3-1476	9/30/05	Shutdown drainage
Rock Art Brewery	Morrisville WWTF	3-1497	3/31/08	Beverage processing
Milton General Store	Storm sewer to unnamed trib to Arrowhead Mt. Lake	3-4010	3/31/07	Treated groundwater

APPENDIX B.3 - Land Disposal (of Wastes) Program

1) Indirect Discharge Permits

DEC's Indirect Discharge Permit Section issues permits for land-based sewage treatment and disposal systems greater than 6,499 gallons per day, including septic tanks and leachfields and also treatment plants and spray disposal systems, all of which use soil as part of the waste treatment process. Following primary and/or secondary treatment, the soil provides final effluent renovation and polishing before it reaches groundwater and, eventually, surface water. This is in contrast to direct discharge systems, which may discharge through a pipe directly to surface waters.

Statutory Reference: 10 VSA, Chapter 47

Smugglers Notch Resort in Cambridge currently uses a lagoon treatment system and spray applies

the residuals. Smugglers Notch is proposing to construct a sequential batch reactor treatment facility

as part of a resort expansion project.

2) Regional Office Permits

This section issues water supply and subsurface wastewater disposal permits required for all buildings other than single family homes and all permits for subdivisions, sewer line extensions, mobile home parks and campgrounds which have flows less than 6,500 gallons per day. If the subdivision involves 10 or more lots, Act 250 may take jurisdiction. Engineers in five regional offices examine applications and approve permits. The regional offices that cover the basin include the Essex, Barre, and St. Johnsbury.

Statutory Reference:

10 VSA Chapter 61
18 VSA Section 1218

Permitted Indirect Discharges

Facility Name	Receiving Water	Permit ID Number	Permit Expiration	Discharge Activity
L. Garamella	Groundwater	7-0212	12/31/02	Underground injection control
Smugglers Notch	Unnnamed trib to Brewster River & Brewster River	9-0024	6/30/05	Treated domestic sewage from aerated lagoon & activated sludge treatment facility sprayed in forested sprayfield
Birchwood Manor Trailer Park	Lamoille River	9-0065	6/30/06	Treated domestic sewage. Park to connect to Town WWTF
Browns River Middle School	Browns River	9-0079	6/30/06	Treated domestic sewage
Wapanaki Camp	Tucker Brook	9-0085	6/30/03 Renewal pending	Treated domestic sewage
Bourgeois Properties, Morrisville	Lamoille River	9-0089	3/31/06	Treated domestic sewage
Red Fox Alpine Lodge	Brewster River	9-0092	6/30/07	Treated domestic sewage
Mt. Mansfield Union HS	Unnamed trib of Lee River	9-0100	3/31/06	Treated domestic sewage
Lamoille Union HS	Lamoille River	9-0106	6/30/06	Treated domestic sewage
Hyde Park Municipal System	Centerville Brook	9-0122	9/30/03 Pending renewal	Treated domestic sewage
Woodbriar Manor	Unnamed trib of Lamoille River	9-0143	9/30/04	Sanitary Waste Outfall
Colonial Manor Apts.	Lamoille River	9-0168	9/30/03 Pending renewal	Treated domestic sewage
Westford North Ridge Owners Assoc	Unnamed trib of Lamoille	9-0236	6/30/03	Treated domestic sewage

APPENDIX B.4 - Construction Runoff Control Program

Sediment discharges to waterbodies is a critical stormwater issue. The Department, though the Vermont Geological Survey, developed a guidance document for erosion and sediment control related to construction activities (Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites, Vermont Geological Survey, 1982, rev. 1987). This document is frequently used by developers and their consultants for project planning and responses to Criterion 4 of the Act 250.

General Permit for Stormwater Runoff from Construction Sites

The development of an erosion control plan helps to protect water quality by preventing the discharge of sediment from construction sites, minimizing the extent and duration of soil disturbance, maintaining existing drainage ways and vegetation, and protecting riparian buffer areas from disturbance.

Any construction project that disturbs one or more acres of soil, including any disturbance of less than one acre which is part of a larger common plan that will result in a total of one or more acres of disturbance.

A General Permit to permit discharge of stormwater from construction sites; requires the development and submittal of an erosion and sediment control plan.

At least 30 days prior to the commencement of construction activity.

Where: An application can be obtained from:
Vermont Agency of Natural Resources
Department of Environmental Conservation
Division of Water Quality, Stormwater Section
103 South Main Street, Building 10 North
Waterbury, VT 05671-0408
Stormwater Hotline 241-4320
http://www.anr.state.vt.us/dec/waterq/stormwater/htm/sw_cgp.htm

APPENDIX B.5 - Solid Waste Management Program

The Solid Waste Management Program regulates the treatment, storage and disposal of solid waste, with the exception of the land management (diffuse disposal) of biosolids and septage, which is regulated by the Wastewater Management Division. In order to receive a certification, a facility must demonstrate that it complies with applicable siting, design, operation, closure and post closure requirements and standards included in the Vermont Solid Waste Management Rules. The Solid Waste Management Program also assists the Enforcement Division in illegal dumping/disposal cases.

The protection of water related resources are specifically addressed in the Vermont Solid Waste Management Rules ("SWMR"), Vermont Groundwater Protection Rule and Strategy, and Agency Procedures applicable to solid waste management facilities (with the exception of biosolids or septage diffuse disposal). These requirements are to be addressed in a solid waste facility application for certification and may be specifically addressed in the requirements of a certification issued by the Agency.

Solid Waste Disposal Facilities must be in compliance with the Vermont Ground Water Protection Rule and Strategy and the Vermont Water Quality Standards to receive certification -§6-303(d) of the SWMR, Vermont Groundwater Protection Rule and Strategy, 2/8/99 Procedure Addressing Requirements For Municipal Solid Waste Landfills To Demonstrate Compliance Of The Landfill Design With Water Quality Standards, and 2/8/99 Procedure For A Combined Solid Waste Certification and Indirect Discharge Permit.

- The SWMR identifies various types of water related resources as prohibited areas for the siting of solid waste management facilities - §6-309(c)(6), §6-502(a) and §6-1104(b)3(b)(3) of the SWMR.

- Facilities must meet performance standards in order to assure that siting of the facility will have the least possible reasonable impact on the environment, including groundwater, surface water or waters of the state. §6-503 of the SWMR. and 9/12/95 Procedure Addressing the Numerical Criteria For The Distance To Drinking Water Sources From Discrete Disposal Facilities.

- Site characterization on which a facility is to be located must address groundwater and surface water - §6-603 of the SWMR.

- Facilities must be designed and operated to protect the environment, including ground water and surface water - §6-604(a)(4), §6-606(a)(3), §6-701, §6-1104(c)(2)(E) and §6-1203&1204 of the SWMR. Most landfills must be lined with leachate collection and off-site treatment and must control run-on and run-off - §6-606(b)(2) of the SWMR and 6/9/94 Procedure Addressing Requirements For Run On/Run Off Control System for Municipal Solid Waste Landfills.

- Facilities are to be monitored as deemed appropriate to detect the discharge of contaminants to groundwater and surface water. For landfills, monitoring continues through the operational life of the landfill and the post closure period (20 years for unlined landfills that

closed since 1989, 30 years for lined landfills which operated since 1994) - §6-604(a)(4) and §6-606(a)(3) of the SWMR. 2/8/99 Procedure Addressing Ground Water Quality Monitoring and Ground Water. 2/8/99 Remedial Action at Municipal Solid Waste Landfills. Procedure Addressing Post-Closure Care and Post Closure Certification At Solid Waste Landfills.

- A response involving corrective action for ground water impacts by a solid waste landfill can be required - VT Groundwater Protection Rule and Strategy and 2/8/99 Procedure Addressing Corrective Action & Financial Responsibility For Corrective Action At Solid Waste Landfills.

- Any discharge that poses a threat to the environment must be reported within 24 hours to the DEC.- §6-703(c) of the SWMR.

- Facilities must be closed in a manner that prevents discharges to surface water during and after closure -§6-1001 of the SWMR.

Statutory Reference

10 VSA Chapter 159 (Waste Management)
10 VSA Chapter 48 (Groundwater Protection).

APPENDIX B.6 - Residual Wastes Program

This program in the Wastewater Management Division oversees the management of the state's residuals, such as septage and wastewater sludge. Permits are required for treatment, storage, or disposal of these residuals and for the operation or construction of such facilities.

Statutory Reference: 10 VSA Chapter 159

There are several regulatory requirements for the land application of sludge (biosolids) and septage that assist in protecting surface waters and groundwater, such as required set backs and separation distances, maximum allowed slope of site, nutrient management for site, among others. In 1998, the Solid Waste Management Rules were revised to include, along with other items, the prohibition of land application of solid waste in the area of the 100-year floodway as another measure to assist in protecting surface water quality.

APPENDIX B.7 - Mine Runoff Control Program

Sand & Gravel Pits

Non-point source pollution is a concern associated with the operation, maintenance, and closure of sand and gravel pits in Vermont. Surface runoff and erosion contribute to the sedimentation of waterbodies adjacent to sand and gravel pits. Vegetative cover can reduce erosion and sedimentation problems, enhancing aesthetic values, and improve nesting and cover areas for wildlife. Practices for the control of erosion can be found in: USDA Natural Resources Conservation Service Technical References:

A. Vegetating Vermont Sand and Gravel Pits- VT Technical Guide, Conservation Planning Application Technical Reference #10

B. Critical Area Planting-Conservation Practice Standards code 342: Technical Guide Chapter IV (www.vt.nrcs.usda.gov/standards/342vt.html)

Also refer to Hazardous Waste Management Program.

APPENDIX B.8 - Hazardous Waste Management Program

1) Hazardous Waste

The Hazardous Waste Management Program within DEC establishes the regulatory framework for all hazardous waste generated in Vermont and provides a "cradle-to-grave" tracking system for these wastes. The program establishes the standards for proper management of hazardous waste while also addressing the environmental and human health problems that arise from the mismanagement of hazardous waste. Improper management of hazardous waste can pollute vast areas of land, rivers, streams and lakes, and can lead to unacceptable human exposure to these materials. The program is a prevention program -- when it is successful, these impacts occur less frequently and with less severity.

Statutory Reference

Title 10 VSA Chapter 159, the Waste Management Act.
Specific sections include 10 VSA 6601, 6602, 6604, 6605f, 6606, 6606a, 6606b, 6607, 6607a, 6608, 6608a, 6608b, 6609, 6610a, 6612, 6615, 6616, 6617, 6618.

2) Underground Storage Tanks

All Vermonters depend on clean water. Leaking underground storage tanks (USTs) pose a substantial threat to both human health and the environment, because substances leaked from these tanks are one of the most significant contaminants polluting ground and surface water supplies. In densely developed areas, releases from underground tanks pose an additional risk, since gasoline vapors can accumulate in basements and crawl spaces, posing health hazards as well as fire dangers.

The goal of the UST Program within DEC is to protect human health and the environment by eliminating releases of hazardous materials from underground storage tanks, and fostering proper management of underground tanks in Vermont. By regulating the installation, operation, and closure of USTs, the Underground Storage Program protects the state's water resources and prevents vapor impacts to buildings.

Statutory Reference

10 VSA Chapters 59 and 159

APPENDIX B.9 - Flow Regulations and Dams

1) Dam Safety Program

The Dam Safety Section administers the State Dam Safety program, operates and maintains the Winooski Valley Flood Control Reservoirs, and periodically inspects the 85 state-owned dams and plants found throughout Vermont for their repair/improvement needs. The section operates a permit program for construction and alteration of non-hydroelectric dams (the Public Service Board regulates hydroelectric dams) to serve the public good and provide adequately for the public safety. A permit is required to alter any dam, pond or impoundment not related to generation of electric energy for public use or part of a public utility system which is or will be capable of impounding more than 500,000 cubic feet of water or other liquid, as measured to the top of the dam. Submittal of completed application form, fee, plans and specifications and design data is required. A public information meeting may be required. The section inspects privately owned dams on a resources-available basis, maintains an inventory of dams, and provides technical assistance to dam owners.

Statutory Reference

Permit program: 10 VSA Chapter 43 (Dams).

2) Hydrology Program

This program within DEC reviews all projects that may alter the natural flow of rivers and streams, such as hydroelectric projects and all manner of water withdrawals. These reviews may take place under a number of regulatory programs, including Act 250, Agency dam orders and stream alteration permits, and projects subject to federal licenses or permits (under Section 401 of the Clean Water Act). In addition, the Hydrology program evaluates projects subject to Act 250 for riparian protection provisions, erosion control measures, and general consistency with Vermont Water Quality Standards.

Statutory References

10 V.S.A. Chapter 41 (Regulation of Stream Flow)
10 V.S.A. Chapter 43 (Dams)
10 V.S.A. Chapter 151 (Act 250)
Section 401 of the Federal Clean Water Act (33 U.S.C. §1341)

APPENDIX B.10 - Wetlands, Dredge, and Fill Material Control Programs

1) Vermont Wetlands Protection

The overall goal of the program is to achieve no net loss of wetland functions and values. The program consists of three components: a regulatory component, a scientific component, and an education/outreach component. The regulatory aspects of the program include administering the Vermont Wetland Rules, making determinations of Water Quality Certification under the Clean Water Act and the Vermont Water Quality Standards, providing project review in Act 250 land use permitting, and assisting in compliance and enforcement. Inventories and scientific investigations are carried out as special grant projects and include both the Division biomonitoring section and biologists in the Fish and Wildlife Department, Nongame and Natural Heritage program. Education and outreach is provided through technical assistance and presentations to towns, stakeholder groups, conservation commissions, schools, and other Agency programs.

Statutory references:

Sections 404 and 401 of the Clean Water Act
Section 104(b) 3 of the Clean Water Act
Act 250
Title 10 VSA Chapter 37, Sec. 905 (7-9).

2) Federal Wetlands Protection

A Corps of Engineers permit is required for all work beyond ordinary highwater in or above navigable waters of the United States under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). In New England, for the purpose of Section 10, navigable waters of the United States are those subject to the ebb and flow of the tide and a few major waterways used to transport interstate or foreign commerce. Permits are required under Section 404 of the Clean Water Act for those activities involving the discharge of dredged or fill material in all waters of the United States, including not only navigable waters of the United States but also inland rivers, lakes, streams and wetlands. In inland waters, Corps jurisdiction extends landward to the ordinary high water mark or the landward limit of any wetlands. The term"discharge" in this context may include the re-depositing of wetlands soils such as occurs during mechanized land clearing activities, including grubbing, grading and excavation.

The term "wetlands," used above, is defined by Federal regulations to mean "...those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions..." (33 C.F.R. Part 328.3 (b), as published in the November 13, 1986 Federal Register). Wetlands generally include swamps, marshes, bogs and similar areas. The term "fill material," used above, is defined by Federal regulations to mean "...any material used for the primary purpose of replacing an aquatic area with dry land or of changing the bottom elevation of a waterbody. The term does not include any pollutant discharged into the water primarily to dispose of waste..." (33 C.F.R. Part 323.2 (b), as published in the November 13, 1986 Federal Register).

APPENDIX B.11 - Groundwater Pollution Control Programs

1) Groundwater Protection

The Groundwater Protection Rule and Strategy is the groundwater management and protection strategy for the State of Vermont. The Rule outlines the principles, directives and goals relating to groundwater protection. The Rule also contains groundwater quality enforcement standards and outlines the four classes of groundwater. The Groundwater Coordinating Committee, an interagency committee, oversees the groundwater reclassification efforts and provides a forum for interagency coordination on groundwater issues. The DEC Water Supply Division provides administrative and technical support to the Committee. The program reviews weekly Act 250 applications for potential water supply and groundwater impacts. The Water Supply Division also serves as a clearinghouse on groundwater protection information. Through their regulatory and outreach programs, other divisions also protect groundwater and provide information on groundwater protection issues.

Statutory Reference

10 VSA Chapter 48

2) Underground Injection Control

This program within DEC regulates all non-sanitary sewage discharges to the groundwater. It is a federally delegated program. If the discharge receives a permit from another DEC program, the UIC permit is not required.

Statutory Reference

10 VSA Chapter 47
Section 1422 of the Federal Safe Drinking Water Act.

3) Public Water Supply (program also influences surface water)

The DEC Water Supply Division is responsible for the regulation of all public water systems in the state of Vermont. A public water system has fifteen connections or serves an average of twenty-five people at least sixty days a year. Examples of public water systems include municipalities, mobile home parks, schools, restaurants, motels. The major program functions involve permitting construction and operation, approving new sources of drinking water, review of monitoring data, technical and financial assistance, enforcement, source water protection, operator certification, enforcement, and inspections.

Statutory Reference

Federal Safe Drinking Water Act Amendments of 1996
10 VSA Chapter 56 Public Water Supply
10 VSA Chapter 55 Aid to Municipalities for Water Supply, Pollution Abatement, and Sewer Separation
24 VSA Chapter 120 Special Environmental Revolving Fund.

4) Well Driller Program

Any person who intends to engage in the business of drilling wells must obtain a license to do so. This includes both water well drillers and monitoring well drillers. Licensing is intended to protect public health and prevent degradation of groundwater quality through competent drillers

appropriately applying industry standard well construction and abandonment procedures in their work. A license may be renewed if appropriate continuing education is demonstrated on a three-year basis.

Statutory Reference
10 VSA Chapter 48

APPENDIX B.12 - Fisheries Protection Regulations

Statutory references

Title 10 and Chapters 101 through 123

This is where all the laws relating directly to fish and wildlife conservation are found. It also gives the authority to the Fish and Wildlife Board to set seasons, creel limits and size limits. Most of the laws pertaining to fish are found in Chapter 111 and primarily deal with the "taking of fish." One of these laws, section 4605 (placing fish in waters) allows for the control of introductions of exotic or competing fish species as well as diseases. Section 4607 (obstructing streams) prohibits the installation of a structure that prevents fish movement, such as a rack, weir or other obstruction, unless an approval has been granted by the Commissioner of Fish and Wildlife. This statute generally is applied to small streams with a drainage area less than 10 square miles; on larger streams Title 10, Chapters 41 or 43 is applied.

Title 10, Chapter 43 Dams

A certificate of public good is required before constructing any dam impounding more than 500,000 cu. ft. This law is administered by the Department of Environmental Conservation excepting projects involving the generation of hydroelectric energy. The Public Service Board assumes jurisdiction in those cases. Regarding public hydroelectric and flood control projects, the final authority lies with the Federal Energy Regulatory Commission.

Section 1084 requires the Fish and Wildlife Department to investigate the effect of any proposed project on fish and wildlife resources and to certify its findings to the Department of Environmental Conservation or the Public Service Board, prior to any hearing.

Section 1086 enumerates the several issue areas that must be explored before a determination of public good is made. Specifically included are recreational values; fish and wildlife; existing uses such as fishing; and the need for minimum stream flows.

Title 10, Chapter 47 Vermont Water Pollution Control Act

This law administered by the Agency of Natural Resources under auspices of the Federal Water Pollution Control Act (PL 92-500). Within the Water Pollution Control Act are sections 1252 and 1258 which, respectively, set up a classification system for state waters and authorize the Agency to manage waters to attain or maintain their classification, including the regulation of discharges to state waters. Under Section 1252, Water Quality Standards are promulgated by the Water Resources Board to establish numeric and narrative standards for the management of waters. The Standards also designate all waters as to their fish habitat type - either cold water or warm water. The Standards have the force of law and set up an important framework for management of physical water quality, such as dissolved oxygen, temperature, turbidity, and toxics and for protection of other important habitat and life-stage considerations, such as nutrient control, substrate integrity, and propagation. The authority to regulate stormwater discharges is included in Section 1264. Section 1263(a) regulates activities pertaining to control of aquatic nuisances (Aquatic Nuisance Control).

Title 10, Chapter 41 Regulation of Stream Flow; Subchapter 1, Section 1003

This section of the statute dealing with the regulation of stream flow empowers the Department of Environmental Conservation to call to conference any dam owner that regulates natural stream flow and to require the passage of adequate flows to support the stream fishery.

Title 10, Chapter 41 Regulation of Stream Flow; Subchapter 1, Section 1004

Section 1004 makes the Secretary the state agent with respect to the Federal Energy Regulatory Commission (FERC) dam licensing process and with respect to the Federal Clean Water Act Section 401 administration. Under Section 401, federal agencies cannot issue licenses or permits for activities that may affect water quality until such activities have been certified as meeting state water quality standards. This Section 401 process has proved to be a powerful tool in the review of projects subject to FERC and Corps of Engineers jurisdiction.

Title 10, Chapter 41 Regulation of Stream Flow; Subchapter 2 Alteration of Streams

A person may not change the cross-section of a stream or modify or alter it in any way by moving more than 10 cu. yd. of material without a permit from the Department of Environmental Conservation. This subchapter does not apply to dams subject to Chapter 43 or highways and bridges subject to section 5 of Title 19. Exemptions include personal use of 50 cu. yd. of gravel/year by riparian landowners (this gravel exemption also includes streams having drainage area of less than 10 mi2) and accepted agricultural and silvicultural practices. A permit will be granted if, among other criteria, it appears the project will not significantly damage fish life. There are also special provisions for protecting outstanding resource waters.

Title 10, Chapter 151 Vermont's Land Use and Development Law (Act 250)

This law provides for broad protection of streams, shorelines, and water quality through criteria related to erosion control, effect on public investments, necessary wildlife habitat, and retention of the natural condition of streams and shorelines. Protection of fisheries resources has been primarily protecting stream habitat by imposing buffer strips, minimum stream flows, and stream crossings which provide unrestricted fish passage. The development must meet all the criteria of the Act (6086(a)1-10), but District Commissions have considerable latitude in the decision since the criteria are loosely worded (e.g. "undue water pollution").

Title 29, Chapter 11 Management of Lakes and Ponds

This statute addresses encroachment onto lands lying under public waters such as from docks, marinas, boathouses, etc. Exceptions include water pipes <2 inches (inside diameter), buoys and duck blinds, docks of certain size, rafts, etc. Criteria for granting or denying a project include determination of public good (Section 405), which addresses impacts on fish habitat and recreation. In 1989, interim procedures for issuance or denial of encroachment included whether or not the project meets the requirements of the public trust doctrine. In a recent case the Vermont Superior Court ruled that the Department of Environmental Conservation overstepped its authority by including the public trust doctrine criteria in its interim procedures for permit denial. The interim procedures also addressed the potential cumulative effect of encroachment. In 1984, the Water

Resources Board overturned the Department's denial of a permit by concluding "... the consideration of the potential cumulative effect of possible future encroachments is neither contemplated nor authorized by 29 V.S.A. 405(6)." (LaFleur Appeal).

Although there are a number of other state laws that indirectly protect fisheries resources, such as T24 Floodplain Development and T10 Chapter 159 Solid Waste Disposal, the above are most applicable.

In addition to fisheries considerations addressed in the Federal Energy Regulatory Commission's rules, there are several other Federal regulations that can afford resource protection. Two of the most notable are:

1. Section 404 of the Federal Water Pollution Control Act amendments of 1972 give the U.S. Army Corps of Engineers the authority to regulate discharges of dredged or fill material into all waters of the U.S. including wetlands.

2. Section 10 of the Rivers and Harbors Act requires a Corps of Engineers permit for construction of any structure in or over any navigable water of the U.S. This includes dredging or disposal of dredged material, excavation, channelization or other modification. Projects can range in size from small docks to large breakwaters.

APPENDIX B.13 - Other Important Programs

(Monitoring & Assessment, Geologic Surveys, Pollution Prevention, etc)

1) Surface Water Monitoring & Assessment

The overall goal of the environmental monitoring and assessment program is to ensure that good science is used to develop an understanding of the attributes of, and the forces which affect, the physical, chemical, and biological characteristics of Vermont's aquatic ecosystems, and ensure that this information is available to be used as the basis for making, and evaluating the consequences of, environmental management decisions made or influenced by DEC. The specific objectives of this program include the following:

- Determine the present and future health of aquatic ecosystems in Vermont;
- Establish empirical limits of natural variation in aquatic ecosystems in Vermont;
- Diagnose abnormal conditions to identify issues in time to develop effective mitigation;
- Identify potential agents of abnormal change;
- Assess ecological changes resulting from the implementation of environmental management activities; and
- Identify risks to human health associated with the use of aquatic resources.

In order to accomplish these objectives, this program conducts activities to monitor and assess the chemical, physical, and biological components of aquatic ecosystems. Findings relate to both ecological and human health. Activities are conducted both in response to identified issues, activities, and potential problems; and in the framework of long-term environmental status and trends monitoring.

Statutory Reference

10 V.S.A. Chapter 47
Federal Clean Water Act

2) Geologic Surveys & Information

The Geology program conducts surveys and research related to Vermont geology, topography, and mineral resources; provides information to the public, government, industry, and other institutions which request assistance; and maintains and publishes Vermont geological information. Geologic research can illuminate the nature of ground water and the interaction of ground and surface waters that maintains stream discharge and temperature during low flow periods. Erosion studies that focus on slope stability and the sources of sediment released to rivers have direct bearing on water quality.

Statutory references

3 VSA, Chapter 53, Section 2879
10 VSA, Chapter 7, Sections 101-105

HAZUS-MH (stands for FEMA's Mitigation Division powerful risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes) will be used to not only

to predict the potential damage from earthquake events but from flood events and the effects of riverine erosion.

3) Pollution Prevention Program

The focus of this program within DEC is to help businesses research and identify opportunities to reduce the amount of waste generated and the amount and toxicity of chemicals used in their operations. Technical assistance may be provided on-site at the facility's request. The program is also responsible for administering Vermont's Pollution Prevention Planning Requirement affecting over 100 businesses that generate hazardous waste and/or use certain listed toxic chemicals. The Program is located in the Environmental Assistance Division and shares a toll-free number with the Small Business Compliance Assistance Program that businesses and others can use to get answers to their environmental questions.

Statutory reference:

10 V.S.A. Chapter 159 Subchapter 2. Sections 6623-6632.

4) Section 319 Nonpoint Source Management

Water pollution control in Vermont, as well as in other states across the nation, has tended to focus on the larger, more obvious discharges referred to as point sources of pollution. Recently, much greater attention has been directed at the more diffuse, harder to quantify, more difficult to control pollution sources known as nonpoint sources of pollution. Pollution from nonpoint sources (NPS) is the major source of water use impairment to Vermont surface and ground water resources. NPS pollution is apparent in each of Vermont's seventeen river basins. The types and extent of water quality problems associated with these sources of pollution, however, exhibit a considerable degree of variation between and within basins. To a large extent, NPS pollution control and NPS pollution prevention centers about the watershed approach, land use and land management.

NPS implementation through Section 319 has been available to Vermont since federal fiscal year 1990, the first year funding was appropriated. Over twelve years of annual funding (FFY1990-2001), Vermont has been awarded about $11 million, which has assisted over 100 NPS projects. Projects have been completed or are underway by a variety of interests including several towns, watershed associations and state departments, the University of Vermont and many Natural Resources Conservation Districts (refer to attached project listing). The Vermont NPS Program is involved in the following areas of concentration:

- coordination, oversight and administration of Section 319;
- influence the direction and level of NPS planning and implementation arising from other programs or funding sources (e.g. US Department of Agriculture, Lake Champlain Basin Program, Connecticut River Joint Commissions);
- assist Vermont Agency of Agriculture, Food & Markets with new agricultural NPS responsibilities (as per Act 261 of 1992);
- distribution of Clean Water Act Section 604(b) pass-through planning funds to the 12 Vermont regional planning commissions; and,
- advocate the widespread adoption of certain land management practices (especially erosion/sediment control, phosphorus management and vegetated buffer strips).

Statutory reference:

Title 10 VSA, Chapter 47, the Vermont Water Pollution Control Law

Section 319, 1987 Amendments, Federal Water Pollution Control Act (also known as Clean Water Act)

5) River Corridor Management Program

The River Corridor Management Program provides regulatory review and technical assistance to landowners, municipalities, non-governmental organizations and other agencies to help determine the appropriate stream channel and flood plain management practices necessary to resolve and avoid conflicts with river systems. The practices selected will be designed to recognize and accommodate, to the extent feasible, the stream's natural stable tendencies. The recommended conflict resolution will recognize the stream's long-term physical response to past and proposed management practices. The resulting work will provide increased property and infrastructure protection and will maintain or enhance the ecological functions and economic values of the river system. Geomorphic assessment of the Lamoille River watershed and major subwatersheds are underway (see Appendix A.8).

Statutory Reference

10 VSA Chapter 41
10 V.S.A., Chapter 32
Section 401 of the Clean Water Act

Contact

For stream alteration regulatory and technical assistance and flood damage issues:
802-879-5631.

For flood plain technical assistance:

Floodplains Management Engineer
Water Quality Division
10 North, 103 South Main St.
Waterbury, VT 05676
802-241-3759

For stream stability assessment technical assistance:

River Restoration Ecologist
Water Quality Division
10 North, 103 South Main St.
Waterbury, VT 05676
802-241-3774

6) Act 250

Act 250 provides a public, quasi-judicial process for reviewing and managing the environmental, social and fiscal consequences of major subdivisions and development in Vermont through the issuance of land use permits. Activities include review of land use permit applications for conformance with the Act's ten environmental criteria, issuance of opinions concerning the applicability of Act 250 to developments and subdivisions, monitoring for compliance with the Act and with land use permit conditions, and public education.

In an Act 250 application, applicants need to supply sufficient information for the District Commission to make findings on the ten environmental criteria. In so doing, certifications and/or approvals from other agencies and departments, utilities, regional planning commissions and local government may be necessary.

With regard to water pollution, Criterion 1 states that the project will not result in undue water or air pollution. This criterion deals with water and air pollution potential generally and such specific matters relating to water pollution as: (A) Headwaters; (B) Waste disposal; (C) Water Conservation; (D) Floodways; (E) Streams; (F) Shorelines; and (G) Wetlands.

7) Total Maximum Daily Load Program- (Vermont's Wasteload Allocation Process and Federal Requirements for TMDLs)

The primary goal of the Total Maximum Daily Load (TMDL) program is to develop solutions to restore those waters which do not meet Vermont Water Quality Standards and will not meet those standards even after all minimum required Best Practicable Treatment (BPT) alternatives are applied. In order to fulfill the requirements of the Clean Water Act, the program works in two phases and is dependent on several other programs within the Agency of Natural Resources to fulfill its goal. First, water quality monitoring data is gathered and analyzed to identify the condition of the State's waters. Those waterbodies that show a clear and documented violation of the Water Quality Standards substantiated by data collected through chemical, biological or physical monitoring are placed on the State's List of Impaired Surface Waters. The second phase is to develop TMDL plans for those waters that are Water Quality Limited Segments, defined as waters that will not achieve water quality standards even after BPTs are applied to all discharges. These plans essentially are a budget for the pollutant causing the impairment. Following investigations, all pollutant sources are identified that contribute to the impairment and each receives an allocation as to how much it can contribute to the total pollutant load. This is usually accomplished by determining from what sources reductions are necessary. The TMDL plans are structured in accordance with Clean Water Act regulations and EPA guidance. These plans involve public participation and ultimately need approval from EPA to verify their satisfaction of Clean Water Act requirements. The third phase is to implement the TMDL plan and conduct water quality monitoring in order to evaluate the effectiveness of implementation and document achievement of Water Quality Standards.

Statutory reference

Section 303(d) of the Clean Water Act
40 CFR §130.7