

# STATE OF VERMONT

## 2002 WATER QUALITY ASSESSMENT

### 305(B) REPORT



White water excitement on the West River in Jamaica, Vermont (Photo Credit: Vermont Travel Division)

Vermont Agency of Natural Resources  
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April 2002

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**CLEAN WATER ACT SECTION 305(B) REPORT**

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**COMMISSIONERS OFFICE**

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April, 2002

Dear Reader:

It is with great pleasure that I present to you Vermont's 2002 Water Quality Assessment [305b] Report, a document required by Congress under Section 305b of the Clean Water Act. This water quality assessment summarizes Vermont's water quality conditions for 2000 and 2001 and includes updated water resources program information for rivers and streams, lakes and ponds, wetlands and groundwater. The report contains detailed water quality information from round 3 of the rotational assessment, including the Lamoille River watershed, the West/Williams/Saxtons River watersheds and a portion of the upper Connecticut River watershed. The report also includes but is not limited to updated cost/benefit information, monitoring and beach closures.

The water quality assessment for the two-year period found that 78% of Vermont's total assessed river and stream miles (about 5,450 miles) fully support all water uses. Of the 55,447 inland lake acres assessed, about 32,115 acres (58% of lake acres assessed) fully support all uses. If the EPA guidelines regarding the fish consumption advisory were applied in their strictest sense, none of the state's surface waters would fully support water uses. However, states have been advised to assess their waters without the advisory so other polluting sources would not be "masked" by the mercury advisory.

Common pollutants found in these assessed waterbodies include silt, pathogens and nutrients, which come from eroding stream/lake banks, urban areas and agricultural lands. Additional causes of pollution occurring in certain of the state's watersheds include thermal modifications, organic enrichment/low dissolved oxygen, flow alterations, habitat alterations metals, noxious aquatic plants, and exotic species. Sources of these pollutants include atmospheric deposition, natural sources, flow regulation and habitat alterations, among others.

Many of Vermont's lakes and rivers have been cleaned up by construction of approximately 150 municipal and industrial waste water treatment facilities. However much work needs to be done to complete the clean-up job - primarily to reduce pollution from nonpoint, or dispersed sources. We are indeed fortunate to have many volunteer groups around the state to assist us in this important work. As of last count, there were active watershed or lay monitoring groups on close to 30 rivers, 31 lakes and 36 Lake Champlain stations. The work these groups are doing is truly needed and important and is highly valued.

Your comments on the report or other comments or suggestions on ways to improve Vermont's water resources are always welcome. Please write to me or call me at the above phone number. Alternatively, visit the web site of Department's Water Quality Division by going to "[www.vtwaterquality.org](http://www.vtwaterquality.org)."

Sincerely,

Chris Recchia  
Commissioner

enclosure

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## LIST OF ACRONYMS USED IN THIS DOCUMENT

AAP	Acceptable Agricultural Practices
AMP	Acceptable Management Practices (for logging)
ANCP	Aquatic Nuisance Control Program
ANR	Vermont Agency of Natural Resources
AOT	Vermont Agency of Transportation
BASS	Biomonitoring & Aquatic Studies Section
BMP	Best Management Practice
CSO	Combined Sewer Overflow (sanitary & storm sewer discharges in the same pipe)
DAF&M	Vermont Department of Agriculture, Food & Markets
DEC	Vermont Department of Environmental Conservation
Department	Vermont Department of Environmental Conservation
EPA, US EPA	Federal Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FS	Fully Supporting Uses as Defined by the Water Quality Standards
NPDES	National Pollution Discharge Elimination System
NOAV	Notice of Alleged Violation
NPS	Nonpoint Source Pollution
NRCS	National Resource & Conservation Service (Formerly Soil Conservation Service)
NWI	National Wetland Inventory
NS	Not Supporting Uses as Defined by the Water Quality Standards
GIS	Geographic Information System
GPS	Geo-Positioning System
HHW	Household Hazardous Waste
IBI	Index of Biotic Integrity
O&M	Operation & Maintenance
ORW	Outstanding Resource Water
TMDL	Total Maximum Daily Load
UST	Underground Storage Tank
VDEC	Vermont Department of Environmental Conservation
WBID	Waterbody Identification Number
WBS	Waterbody System
WMZ	Waste Management Zone
WWTF	Wastewater Treatment Facility

## FOREWORD

Section 305b of the Federal Water Pollution Control Act (also known as the Clean Water Act or CWA) requires each state to submit a biennial report to the US Environmental Protection Agency (EPA) which provides information about the quality of the state's surface and ground waters. This water quality assessment report [often called the *305b Report, or 305b Process*] summarizes water quality conditions throughout Vermont during the January 1, 2000 through December 31, 2001 reporting period. Also included is water resources program information for rivers and streams, lakes and ponds, wetlands and groundwater. The report contains information on certain costs and benefits, monitoring progress, beach closures and special concerns. The Year 2002 305b Report, like reports from earlier years, is meant to provide the reader with an understanding of the programs designed to assess and reduce or eliminate water quality problems, as well as put forth particular water quality based recommendations.

A rotating basin schedule is used when assessing the state's waters, assessing roughly one-fifth of the state each year. The Year 2002 305b Report contains detailed water quality information for portions of Round 2 and Round 3 of the rotating river basin assessments. The specific basins included in this report are: Basin 7 (Lamoille River watershed) and Basin 11 (West, Williams and Saxtons River watersheds). This report also contains a summary of the entire state's water quality, which has been updated with the aforementioned rotating basin water quality information.

The Water Quality Assessment describes whether or not the state's surface water uses as defined by EPA and the State Water Quality Standards fall into one of four use support categories. The categories are *fully supported*, *threatened/fully supported*, *partially supported*, or *not supported*. Water uses include, but are not limited to, drinking, aquatic life, recreation, fish consumption and agriculture. Determination of use support may be made from *monitored*<sup>1</sup> information or from *evaluated*<sup>2</sup> information by water resources personnel, fish and wildlife biologists, aquatic biologists, lake association members and other qualified individuals or groups. The assessment report identifies the distance (in miles) of rivers and streams and area (in acres) of lakes and ponds that were either monitored or evaluated.

For CWA Section 305b reporting purposes, river or stream segments and lakes and ponds where one or more uses are not fully supported (i.e. either partially supported or not supported by either monitoring or evaluated information) are considered impaired (*Guidelines for Preparation of the Comprehensive State Water Quality Assessments [305b Reports] and Electronic Updates: Supplement, September 1997*). However, and for CWA Section 303d<sup>3</sup> listing and reporting purposes, impaired waters are those where one or more criteria of the Water Quality Standards

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<sup>1</sup> Water quality assessment based on environmental data (biological, chemical or physical) less than 5 years old.

<sup>2</sup> Information used for assessments includes desktop modeling, some lay monitoring data, best professional judgement of resource managers and known sources of pollution. Also, information based on water quality sampling data which is five years old or older.

<sup>3</sup> Section 303d of the Act requires each state to identify those waters for which technology-based pollution controls are not stringent enough to attain or maintain compliance with applicable State water quality standards.

are violated. Violations of Water Quality Standards are substantiated by chemical, physical or biological water quality data collected through monitoring. In accordance with EPA 303d guidance (December 2001), waters reported for 303d purposes in the year 2002 list of waters are those impaired waters that need or require a Total Maximum Daily Load.

The 305b Report is a highly visible mechanism for communicating to Congress, Vermont residents and the Vermont General Assembly the progress made in maintaining and restoring the state's water quality and the extent of the remaining problems. The 305b Report has become increasingly important to support funding decisions to the state at the federal level under the CWA Section 106 formula. EPA's Index of Watershed Indicators relies heavily on 305b reports. Also, the 305b reporting process is an important tracking tool for the performance of water quality protection initiatives under the Core Performance Measures of the Performance Partnership Agreements and the Government Performance for Results Act. Finally, the 305b water quality assessments are one of several important sources which assist in the identification of impaired waters under Section 303d of the Clean Water Act. This report, as well as previous Vermont Section 305b Reports, can be found through the internet at <http://www.vtwaterquality.org/waterq/planassess.htm>

EPA's vision for State 305b reports is the "...reports will characterize water quality and the attainment of water quality standards at various geographic scales." EPA's more detailed vision states that the 305b reports will:

- Comprehensively characterize the waters of the States, Tribes, Territories and the Nation, including surface water, ground water and wetlands. Progress should result in full coverage by 2002.
- Use data of known quality from multiple sources to make assessments
- Indicate progress toward meeting water quality standards and goals.
- Describe causes of polluted waters and where and when waters need special protection.
- Support watershed and environmental policy decision making and resource allocation to address these needs.
- Describe the effects of prevention and restoration programs as well as associated cost and benefits.
- In the long term, describe assessment trends and predict changes.
- Initiate development of a comprehensive inventory of water quality that identifies the location and causes of polluted waters and that helps States, Tribes, Territories direct control programs and implement management decisions.

In order to achieve the vision and long-term goals for the 305b process and to coordinate reporting efforts among the States, Territories, Interstate Commissions and Tribes, EPA requested that the following goals be addressed in 305b reporting:

- *Adopt 2002 Integrated Water Quality Monitoring & Assessment Report Guidance*  
For the Year 2002 305b report, the Department was not able to fully adopt EPA's late-breaking guidance document. For this report, the Department has not been able to convert its assessment approach to the 'assessment unit' type/level of approach advocated by EPA guidance. Rather, the Department has continued to rely upon the well established and functional 'waterbody' as its unit of assessment and reporting. The Department,

nonetheless, considers its assessment approach and findings to be largely consistent with the five categories defined in EPA guidance. The Department's assessment process identifies surface waters in full use support and less than full use support. The Department's assessment and listing processes results in the identification of waters considered as 'impaired' (consistent with guidance's category 4A, 4B and 5) and in the identification of other waters either in need of assessment (category 3) or waters altered by exotic species or flow regulation (waters for category 4C). The Department is seeking further clarification from EPA on waters assessed as category 1 and category 2 under the guidance. The reader is referred to Appendix A which contains a condensed version of EPA's December 2001 monitoring and assessment guidance.

- *Expand use of biological indicators and reporting*

The Department has completed documentation of bio-criteria development and implementation procedures for macroinvertebrate and fish communities in wadeable streams (refer to documents entitled "*Wadeable Stream Biocriteria Development for Fish and Macroinvertebrate Assemblages in Vermont Streams and Rivers*" and "*Procedures for Determining Aquatic Life Use Status in Selected Wadeable Streams Pursuant to Applicable Water Quality Management Objectives and Criteria for Aquatic Biota Found in Vermont Water Quality Standards (VWQS) Chapter 3 §3-01, as Well as Those Specified in 3-02(A1 and B3), 3-03(A1 and B3), and 3-04(A1 and B4: a-d)*"). The language of these procedures is consistent with the Vermont Water Quality Standards revisions that became effective July 2, 2000. These procedures are currently used by the Department to make a variety of water quality management decisions. The role of biological indicators of ecological health has continued to expand throughout Department programs, including: NPDES and Indirect discharge permitting; CERCLA and RCRA hazardous materials site assessments; surface water biological classifications; accidental release and spill damage assessments; 303d listing and the development of TMDLs and restoration plans; non-target impact assessments for pest management programs; distribution of aquatic species in Vermont; and the development of water quality standards for a variety of water body types.

The Department continues to build upon its biological assessment data base. In the last two years, more than 450 biological site assessments have been added to the Department's biological data base. Summary reports of annual assessment results for wadeable streams are compiled for purposes including but not limited to: Section 303d listing and TMDL development; Section 305b reporting; rotating watershed assessments and watershed planning initiatives. With assistance from EPA, the Department is assessing the use of biological assessments for establishing biological criteria for temporary (vernal) pools and white cedar swamps. Field data have been collected and data are being analyzed for final reporting. With the assistance of US EPA, the Department continues to conduct research on indicators of amphibian malformations among northern leopard frogs in the Lake Champlain Valley. Development of bio-criteria for lakes is continuing.

The Water Quality Division of the Department has recently completed an updated version of its web site (<http://www.vtwaterquality.org>) which includes information on biological monitoring programs and indicators within the Department .

- Improve data management, increase the documentation of data quality, and increase the use of electronic databases and geographic information systems.*

The Department's analytical laboratory conducts its business under the auspices of EPA's Quality Assurance/Quality Control Plan (QA/QC), and monitoring is carried out under QA/QC Project Plans. The Department now uses an Access© database for improved 305b information management and has increased the documentation of data quality. Regarding electronic reporting, the Department annually submits rotating assessment data to EPA as each one-fifth of the state is completed. As to geographic information systems (GIS), Vermont is presently phasing in the ability to spatially locate water quality information for rivers and streams. At this time, lakes and ponds data have been spatially located for water quality reporting purposes.
- Demonstrate a significant expansion in the number of waters assessed across all waterbody types and uses and improve the quality of monitoring and assessment data and reporting.*

Vermont has responded to this goal by implementing a rotational assessment process such that the rivers and streams and lakes and ponds of all seventeen major basins in the state are assessed once every five years. This has resulted in much more detailed assessments and many more miles/acres of waterbodies being assessed each year, as well as specific follow-up action to monitor suspected problem sites and correct impairments.
- Increase assessments of drinking water use support*

This remains a goal for the Department. Until sufficient resources are available to specifically perform drinking water use source support assessments, they will be performed as part of the Department's yearly rotational basin assessments. It is conceivable that drinking water use source support assessments can be done via the on-going Source Water Assessment and Protection Program.
- Develop a process for reporting by hydrologic unit (geo-referencing)*

The Department uses waterbody identification numbers (WBID) for reporting by hydrologic unit. All waterbodies in the state are assigned waterbody identification numbers and are georeferenced. The WBID consists of the state two-letter abbreviation followed by a two-digit basin number, then a two-digit (river) or five-digit (lake) waterbody number. Waterbodies may consist of several small tributaries, a lake or a portion of the mainstem of a river. There are 556 lake and pond waterbodies and 210 river and stream waterbodies designated in Vermont. All 766 designated waterbodies have been spatially referenced onto a GIS. The Department has developed a data base table to link hydrologic unit codes (HUC-14s) to all WBIDs. This linkage allows the Department to exchange data between the two systems.

## **Vermont's 2002 State Water Quality Assessment: Section 305b Report Summary Overview**

### **Surface Water Quality**

The water quality for 5,450 miles, or 78 percent, of Vermont's total assessed river and stream miles fully support the designated water uses for which they have been classified. Designated uses include but are not limited to: aquatic biota, wildlife and aquatic habitat protection, water supply, aesthetics, public water supply, fishing and swimming. Of the 55,447 inland lake acres that were assessed, about 32,115 acres (or 58 percent) fully support these water uses. Of 174,175 acres of Lake Champlain assessed (1996), about 90% of those lake acres partially support water uses. Most of the state's surface waters are the subject of a fish consumption advisory, advising certain segments of the population, primarily pregnant women and young children, not to eat certain fish or to limit their intake of certain fish. The advisory is the result of mercury found in fish throughout all the northeastern states.

Aside from mercury, common causes of pollution affecting the assessed waterbodies include: silt and sediment, flow alteration, thermal modifications, nutrients, pH, organic enrichment and pathogens. These pollutants come mostly from eroding stream/lake banks, hydromodification, removal of riparian vegetation, flow regulations/modifications, agricultural lands and natural sources. Additional causes of pollution occurring in certain of the state's waters include low dissolved oxygen, habitat alterations, turbidity and exotic plants, animals and fish.

Vermont included updated assessment information for two river basins from the third of five rounds of its rotational basin assessment process. Assessment of waters in the Lamoille River Basin and in the West/Williams/Saxtons River Basin indicates that the water quality of approximately 53 percent of these assessed river miles, and approximately 61 percent of the assessed lake acres fully support their designated water uses.

### **Ground Water Quality**

The quality and quantity of groundwater varies due to both natural and human influences. No comprehensive studies have been completed on the quality of the groundwater. Generally, the quality is considered to be excellent and this is supported by the limited number of public water supplies which have detected contamination. Recently, awareness has increased regarding risks to ground water drinking water safety associated with naturally occurring geologic sources of radionuclides. Although Vermont's historically rural landscape has precluded large-scale contamination of groundwater, nearly 2,500 contaminated sites have been identified which threaten Vermont's groundwater. As the population and industrial development increase, the quality and quantity of groundwater will be threatened further. Each year, an estimated \$5-10 million is spent for cleanup of contaminated groundwater at publically and privately funded cleanup sites. Over 75% of the sites are associated with above ground and underground storage tanks (UST).

### **Programs to Restore Water Quality<sup>1</sup>**

Projects constructed through the *Point Source Program* in the last two years have resulted in additional improvements to water quality in 3 of the 4 major regional drainages within Vermont. Projects involving 15 municipalities included: combined sewer overflow corrections, construction of new

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<sup>1</sup> The following paragraphs mention only a few of the programs aimed at restoring/protecting Vermont's surface waters.

wastewater treatment facilities (WWTF), improvements to existing WWTFs, sewer line extensions and rehabilitations, and phosphorus removal.

The goal of the *Nonpoint Source Management Program* is to encourage the successful implementation of best management practices (BMPs) by farmers, developers, municipalities, lakeshore residents and landowners to prevent or reduce the runoff of pollutants from a variety of contributing sources. Some notable nonpoint source activities carried out during the last two years included completion of a seven year agricultural BMP evaluation, youth-based watershed restoration efforts, further water quality characterization for remediation of an abandoned copper mine and cooperative funding assistance from the Partnership Program for the Better Backroads Program to protect surface waters near town roads.

Vermont has begun a *Basin Planning Process*, which focuses on each of the state's seventeen major river basins every five years. The process concentrates on issues of basin importance where cooperation among municipalities, private organizations, landowners and branches of state government can be effective in protecting, restoring or enhancing water quality. A basin plan summarizes current and past assessment, planning and implementation activities. A basin plan integrates topics of special local importance and makes management recommendations on these topics. Three basins presently under study include: the White River, the Poultney/Mettooee, and the Lamoille River.

The *Lake Champlain Basin Program*, in its October 1996 Plan, recommended three priorities for action to improve the water quality of Lake Champlain. The priority areas were: 1) reduce phosphorus pollution; 2) prevent pollution from toxic substances; and 3) manage nuisance nonnative aquatic plants and animals. Steady progress has been reported in the reduction of phosphorus from both point and nonpoint sources and in remediation of sediment-bound contaminants. A TMDL for phosphorus is being finalized and will be forwarded to EPA for approval. A comprehensive basin-wide non-native species management was approved by the Aquatic Nuisance Species Task Force in May 2000. Significant progress was made in pushing water chestnut infestation back down Lake Champlain to such an extent that the northern 30 miles of infestation are now controllable by handpulling.

As a result of intensive staff training in recent years, the Agency of Natural Resources has begun to implement the principles and methods of *fluvial geomorphology* in stream alteration permits, river restoration, public hazard identification, and river education programs. Initial success with explaining complex stream problems and restoring stream reaches using a geomorphic approach presents an important opportunity for water resource managers and watershed constituents. Fluvial geomorphology - a science which seeks to explain the physics of flowing water and sediment in different land forms - is becoming an essential tool and organizing principal for community-based watershed protection and restoration. Geomorphic assessment programs are underway in the following areas: Walloomsac River, Batten Kill, Poultney River, Lewis Creek, Middlebury River, Tyler Branch, Lamoille River and certain tributaries, Mad River, upper Winooski main stem, White River and certain tributaries and Mill Brook.

### **Programs to Assess Surface Water Quality**

Surface water quality monitoring undertaken by the Department continued to support an assortment of water program activities. Notable activities include fixed-station monitoring on lakes and ponds, citizen monitoring (watershed or lake associations are presently active on approximately 26 rivers and 32 lakes in the state, representing waters in all the State's major river basins), long-term acid rain lake monitoring, compliance monitoring for permitted dischargers, toxic discharge monitoring, fish contamination monitoring, and ambient biological monitoring of aquatic insects and fish.

Vermont has adopted a 5-year rotational watershed assessment strategy for the purposes of assessing and reporting water quality information. The State has been divided into seventeen major drainage basins that have from four to twenty-two river subbasins, and mainstem segments within them. The waters of all seventeen major basins in the state are planned to be assessed at least once every five years. By focusing annual evaluations on selected watersheds each year, more systematic and intensive efforts can be made to collect and evaluate the effects from point and nonpoint sources of pollution.

4/8/02