

STATE OF VERMONT 2006 WATER QUALITY ASSESSMENT REPORT (305B REPORT)



Boating the Mighty White River near Royalton. Photo Credit: Vermont Travel Division.

Prepared by:
Vermont Department of Environmental Conservation
Water Quality Division
Building 10 North
103 South Main Street
(802) 241-3770
(802) 241-3287 FAX
www.vtwaterquality.org

April 2006

STATE OF VERMONT

2006 WATER QUALITY ASSESSMENT

CLEAN WATER ACT SECTION 305B REPORT

Vermont Agency of Natural Resources
Department of Environmental Conservation
Water Quality Division
Waterbury, Vermont 05671-0408
www.vtwaterquality.org

April 2006

The Vermont Department of Environmental Conservation is an equal opportunity agency and offers all persons the benefits of participating in each of its programs and competing in all areas of employment regardless of race, color, religion, sex, national origin, age, disability, sexual preference or other non-merit factors.

This document is available upon request in large print, braille or audio cassette.

VT Relay Service for the Hearing Impaired
1-800-253-0191 TDD > Voice
1-800-253-0195 Voice > TDD

Vermont Department of Environmental Conservation

on the internet at: < <http://www.anr.state.vt.us/dec/dec.htm> >

consisting of:

Commissioners Office (802-241-3808)
Air Pollution Control Division (241-3840)
Department Laboratory Services (244-4522)
Environmental Assistance Office (241-3589)
Facilities Engineering Division (241-3737)
Geology & Mineral Resources Division (241-3608)
Waste Management Division (241-3888)
Wastewater Management Division (241-3822)
Water Quality Division (241-3770)
Water Supply Division (241-3400)

Central Office: Waterbury

Regional Offices: Barre, Essex, Pittsford, Springfield, St. Johnsbury

DEPARTMENT VISION

We envision a Vermont where people can live in harmony with diverse and healthy natural systems;
appreciate and enjoy our natural resources;
understand the environment;
work together responsibly to reduce waste and risks to human health and the environment;
and prosper without significant degradation of natural systems.

We envision a Vermont where people breathe clean air;
drink clean water;
eat safe food;
and live in a sustained and healthy environment.

DEPARTMENT MISSION

To preserve, enhance, restore, and conserve Vermont's natural resources,
and protect human health, for the benefit of this and future generations.

**2006 Section 305b Report
Table of Contents
Reporting Period: 1/1/04 – 12/31/05**

Foreword	i
<u>Part One: Assessment Executive Summary/Overview</u>	1
(pdf, 47 KB)	
<u>Part Two: Introduction & Background</u>	6
(pdf, 232 KB)	
A. Introduction: Setting the Stage	
B. Background: An Overall Description of Vermont's Water Quality & Surface Water Resources	
<i>Summary Description of Vermont's Water Quality</i>	
<i>Atlas/Total Waters</i>	
<i>Effectiveness of Pollution Control Programs</i>	
<i>Nature & Extent of Nonpoint Source Pollutants</i>	
<i>Environmental Impact/Economic & Social Costs/Economic & Social Benefits of Effective Water Programs</i>	
<i>Strategy to Achieve Comprehensive Monitoring & Assessment Coverage</i>	
<u>Part Three: Surface Water Monitoring & Assessments</u>	23
(pdf, 9 MB)	
<i>Current Surface Water Quality Monitoring Program</i>	
<i>Assessment Methodology</i>	
<i>Rivers & Streams Water Quality Assessment (Statewide)</i>	
<i>Lakes & Ponds Water Quality Assessment (Statewide)</i>	
<i>Wetlands Assessment (Statewide)</i>	
<u>Part Four: Public Health Related Assessments</u>	67
(pdf, 68 KB)	
<i>Size of Water Affected by Toxicants</i>	
<i>Fish Consumption Monitoring</i>	
<i>Mercury Monitoring</i>	
<i>Cyanobacteria</i>	
<i>Small Community Untreated Waste Discharges</i>	
<i>Sites of Known Sediment Contamination</i>	
<i>Restrictions on Public Bathing Areas During the 2006 Reporting Period</i>	
<i>Restrictions on Surface Drinking Water Supplies During the 2006 Reporting Period</i>	
<i>Chronic or Recurring Fish Kills</i>	
<u>Part Five: Summary of Impaired Waters</u>	75
(pdf, 62 KB)	
<i>Total Maximum Daily Load Program</i>	
<i>Overview of Vermont 2006 Priority Waters List – including Section 303d List of Waters</i>	

Part Six: Groundwater Monitoring & Assessment.....79

(pdf, 67 KB)

Groundwater Strategy & Management
Cooperation & Coordination
Groundwater Investigations
Information & Public Education
State of Groundwater Quality
State of Groundwater Assessment & Use

Part Seven: Concerns & Recommendations.....87

(pdf, 85 KB)

Lakes & Ponds
Atmospheric deposition of pollutants
Hydrologic modifications in lakes
Exotic aquatic species as pollutants
Eutrophication of lakes
Nutrient criteria
Alteration of littoral habitat & effects of shoreline development on inland lakes
Rivers & Streams
Emerging contaminants
E.coli contamination & microbial source tracking
Lack of strategic statewide vegetated buffer requirements
Road salt & water quality
Polluting discharges from large farms
Groundwater

- Appendices**
- A. **[Basin Planning Progress](#)**. (pdf, 403 KB)
 - B. **[Point Source Control Program Update](#)**. (pdf, 70 KB)
 - C. **[2006 Surface Water Assessment and Listing Methodology](#)**. (pdf, 347 KB)
 - D. **[WQ Monitoring Program Strategy](#)** (pdf, 918 KB)
 - E. **[Fish Consumption Advisory \(VT Department of Health, 6/2000\)](#)** (pdf, 37 KB)

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 report on a biennial basis to the US Environmental Protection Agency (EPA) which provides information about the quality of the state's surface and ground waters. The Year 2006 Water Quality Assessment Report [often called the *305b Report*] summarizes water quality conditions throughout Vermont during the 24-month reporting period (January 1, 2004 through December 31, 2005). Also included is water resources monitoring/assessment program information for rivers and streams, lakes and ponds, wetlands and groundwater. The report contains information on certain costs and benefits, monitoring progress, swimming beach closures and special concerns. The Year 2006 305b Report, similar to reports from earlier years, is meant to provide the reader with an understanding of the programs designed to assess 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 2006 305b Report contains updated water quality information for portions of Round Four and Five of the rotating river basin assessments. These specific basins are Basin 6 (Missiquoi) and Basin 17 (Lake Memphremagog, Barton, Black, Clyde). 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 2006 Water Quality Assessment Report 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 four use support categories used by the Vermont Department of Environmental Conservation are *full support*, *stressed*, *altered*, or *impaired*. The four use support categories are described below.

Full Support - This assessment category includes waters of high quality that meet all use support standards for the water's classification and water management type.

Stressed - These are waters that support the uses for the classification but the water quality and/or aquatic habitat have been disturbed to some degree by point or by nonpoint sources of human origin and the water may require some attention to enhance its usefulness or the water quality and/or aquatic habitat may be at risk of not supporting uses in the future. Data or other information that is available confirms water quality or habitat disturbance but not to the degree that any designated or existing uses have become altered or impaired.

Altered - These are waters where a lack of flow, water level or flow fluctuations, modified hydrology, physical channel alterations, documented channel degradation or stream type change is occurring and arises from some human activity, OR where the occurrence of exotic species has had negative impacts on designated uses. The aquatic communities are altered from the expected ecological state. This category includes those waters where there is a documentation of water quality standards violations for flow and aquatic habitat but EPA does not consider the problem(s) caused by a pollutant or where a pollutant results in water quality standards not being met due to historic or previous human-caused channel alterations that are presently no longer occurring.

Impaired - These are surface waters where there are chemical, physical and/or biological data collected from quality assured and reliable monitoring efforts that reveal 1) an ongoing violation of one or more of the criteria in the Water Quality Standards and 2) a pollutant of human or human-induced origin is the most probable cause of the violation.

Water uses include, but are not limited to, drinking, aquatic life, recreation, fish consumption and agriculture. A determination of use support may be made from *monitored*¹ information or from *evaluated*² information gathered and provided to the Department of Environmental Conservation (DEC) by water resources personnel, fish and wildlife biologists, aquatic biologists, lake association members and other qualified individuals or groups. The 2006 Water Quality 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 altered or impaired) are considered not to be meeting the Water Quality Standards. However, and for CWA Section 303d³ listing and reporting purposes, impaired waters are those where one or more criteria of the 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 2006 list of waters are certain impaired waters that need or would benefit from a pollution budget determination more commonly known as a Total Maximum Daily Load or TMDL determination. The 2006 303d list of waters is being developed concurrently to the 2006 305b Report. As the 303d list needs EPA approval, that information is being prepared separate from the 2006 305b Report.

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 describing the extent of remaining problems. The 305b Report has become increasingly important to support funding award decisions to the state made 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 the last previous biennial Vermont Section 305b Report, can be found through the internet at <http://www.anr.state.vt.us/dec/waterq/wqhome.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.
- 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.

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

² Information used for assessments includes desktop modeling, some lay monitoring data, the 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.

³ 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.

- 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 is eager to see the following goals be addressed in 305b reporting:

- *Adopt 2006 Integrated Water Quality Monitoring & Assessment Report Guidance (7/29/05)*
For the 2006 Section 305b Report, DEC was able to partially adopt EPA's guidance document. For this report, DEC has not been able to convert its assessment approach to the "assessment unit" type/level of approach advocated by EPA guidance. Rather, DEC has continued to rely upon the well established and functional "waterbody" as its unit of assessment and reporting. DEC has also continued to use its own assessment database rather than converting to EPA's "Assessment Database" (ADB). As a way for DEC to evaluate the utility and functionality of ADB, EPA has agreed to load Vermont assessment information for lakes and rivers within one river basin into ADB. The Department, nonetheless, considers its assessment approach and findings to be largely consistent with the five categorical listings defined in EPA guidance. DEC's assessment process identifies surface waters in full use support (full support and stressed) and less than full use support (altered and impaired). DEC's assessment and listing processes result in the identification of waters considered as "impaired" (consistent with EPA guidance category 4A, 4B and 5) and in the identification of other waters either in need of assessment (category 3). DEC has identified waters altered by exotic species, altered by flow regulation or altered by historic physical channel changes. These are waters altered by a non-pollutant and, except for being labeled as "impaired," could be equivalent to waters for category 4C. DEC will continue to rely on its current assessment and listing approaches into the foreseeable future.
- *Expand use of biological indicators and reporting*
DEC 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, section 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 on July 2, 2000. These procedures are currently used by DEC 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.

Vermont DEC continues to build upon its biological assessment database. In the last two years, more than 450 biological site assessments have been added to its biological database. 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, DEC 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 EPA, DEC 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 DEC continues to update and make improvements to its web site (<http://www.vtwaterquality.org>) which includes information on biological monitoring programs and indicators within DEC.

- *Improve data management, increase the documentation of data quality, and increase the use of electronic databases and geographic information systems.*
DEC's analytical laboratory conducts its business under the auspices of the EPA-approved Quality Assurance/Quality Control Plan (QA/QC) and Quality Management Plan and monitoring is carried out under QA/QC Project Plans. DEC now uses an Access database for improved 305b information management and has increased the documentation of data quality. Regarding electronic reporting, DEC 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. For certain nonpoint source projects, DEC has begun expanding its use of EPA's Grants Reporting and Tracking System.
- *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. During the 2006 305b reporting period, DEC was able to complete and submit to EPA its "Water Quality Monitoring Program Strategy," a document that outlines important monitoring elements over a ten year period. The document can be found as an appendix to this report.
- *Increase assessments of drinking water use support*
This continues to remain a goal for DEC. Until sufficient resources are available to specifically perform drinking water use source support assessments, they will be performed as part of the DEC'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)*
DEC uses waterbody identification numbers (WBID) for reporting by hydrologic unit. All waterbodies in the state are assigned waterbody identification numbers and are geo-referenced. 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. In Vermont, there are 609 lake and pond waterbodies (equal to or greater than 5 acres in size) and 210 designated river and stream waterbodies. All 819 designated waterbodies have been spatially referenced onto a GIS at a scale of 1:100,000 as well as onto the 1:5,000 scale afforded by the Vermont Hydrography Dataset. The Vermont Hydrography Dataset (VHD) is based on the National Hydrography Database. DEC has developed a database table to link hydrologic unit codes (HUC-14s) to all WBIDs. This linkage allows DEC to exchange data between three watershed characterization systems: HUC's; 1:100,000 waters; and 1:5,000 VHD waters.