

Watershed Management Division
2024-2025 Water Quality Monitoring and Assessment Summary
Report



This report supplements our obligations to EPA under Sections 303(d), 305(b), and 314 of the federal Clean Water Act.

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1. Introduction

The Watershed Management Division 2024-2025 Water Quality Monitoring and Assessment Summary Report summarizes the Division’s monitoring and assessment efforts, highlights recent changes in waterbody listing status, and describes several Division monitoring and assessment priorities. Portions of this report fulfill narrative requirements of the federal Integrated Water Quality Assessment Report, the 305(b) Report; Appendix (Table A2) also supplies links to information for additional 305(b) reporting elements that have not been specifically called out in this report. Most of the data associated with the biennial 305(b) Report has been submitted electronically to the federal Environmental Protection Agency. This data can be accessed through EPA’s [“How’s My Waterway?”](#) application as both a statewide summary and at a local watershed scale.

2. Division Mission, Vision, & Goals

The Division’s Mission is to efficiently and effectively manage Vermont’s surface waters through a comprehensive, integrated and holistic watershed-based system. This mission is expressed through our four goals to protect, maintain, enhance, and restore Vermont’s surface waters, including wetlands, lakes and ponds, and rivers and streams. Inherent in this effort is the support of both healthy ecosystems and public uses in and on these surface waters.

Mission: To manage Vermont’s surface water resources efficiently and effectively through a comprehensive, integrated, and holistic watershed-based system.

Vision: To achieve full support of both healthy ecosystems and public uses in all Vermont’s surface waters.

Goals:

1. Protect Vermont’s very high quality or “special” waters from deleterious change over the long-term through proactive protection tools, such as reclassification and protective easements.
2. Maintain the current high quality of Vermont’s surface waters through regulations and permitting, technical assistance, and outreach.
3. Enhance and restore the condition of Vermont’s surface waters by implementing regulations, and targeting technical, outreach, and funding resources.

3. How We Work

The interrelationship of land use impacts and the connectivity of surface water resources are the primary reasons why monitoring, assessment, management, and restoration are most effective when conducted at a watershed scale. This concept of holistic watershed management is foundational to our division's structure and methods. The Division includes three media-based programs – Wetlands, Lakes and Ponds, and Rivers – focused on resource-specific management through monitoring and assessment, outreach and technical assistance, and regulatory programs. The Division also administers three federally delegated permitting programs – Stormwater, Wastewater, and CAFO (Concentrated Animal Feeding Operations) – that regulate discharges to surface waters. Two additional programs provide cross-divisional support – the TASC (TMDL, Assessment, Standards and Compliance program), and BOSS (Business and Operational Support Services), which provides administrative, financial, and compliance services for the Division. In total, the Division employs nearly 100 permanent staff and approximately 15 temporary staff. The Division also benefits from several partnership positions with organizations such as Lake Champlain Sea Grant, NEIWPCC, and ECO AmeriCorps.



Figure 3.1. Programs of the Watershed Management Division.

Given the physical nature of watersheds, the consideration of land-based activities affecting watersheds, and the synergy between the individual watershed elements (e.g., rivers, lakes, and wetlands), a corresponding organizational structure is the most predictable and comprehensive means of ensuring

clear, efficient, and effective surface water management. The central goal driving the composition and design of the [Division's organizational structure](#) is to better leverage the concept of holistic watershed management.

An Overview of Vermont Water Quality Standards

As required by the federal Clean Water Act, the [Vermont Water Quality Standards](#) establish designated uses, which must be protected and maintained. In Vermont, the designated uses are:

- Aquatic biota and wildlife that may utilize or are present in the waters;
- Aquatic habitat to support aquatic biota, wildlife, or plant life;
- The use of waters for swimming and other primary contact recreation;
- The use of waters for boating and related recreational uses;
- The use of waters for fishing and related recreational uses;
- The use of waters for the enjoyment of aesthetic conditions;
- The use of the water for public water source; and
- The use of water for irrigation of crops and other agricultural uses.

A surface water is classified for each designated use. The class of the water determines the management objectives and the minimum water quality criteria. There are four possible classes of Vermont surface waters:

- Class A(1) – waters in their natural condition that have significant ecological value;
- Class B(1) – waters in which one or more uses are of demonstrably and consistently higher quality than Class B(2) waters;
- Class B(2) – good quality waters that support all designated uses; and
- A(2) – waters that are suitable for a public water source with filtration and disinfection or other required treatment.

The state legislature established that all waters above 2,500 are Class A(1), unless they are a public water source, in which case they are Class A(2). All other waters are Class B(2) unless they have been reclassified. Reclassification is proposed through rulemaking by the Agency of Natural Resources Secretary pursuant to 10 V.S.A. § 1253 or the public may petition the Agency to reclassify a waterbody for any of the designated uses. In 2017, all surface waters in the wilderness areas of Green Mountain National Forest were reclassified to A(1), along with three streams in or near Ripton, Vermont in 2022 for the designated uses of aquatic biota and wildlife, aquatic habitat, and aesthetics.

If a surface water meets or exceeds the minimum water quality criteria for its designated use and class – A(1), B(1), B(2), or A(2) – it is a high quality water. A surface water may be high quality for only some parameters (for example, a surface water may meet minimum criteria for all parameters except for total phosphorus). If it meets the minimum criteria, then the designated use is an existing use. Existing uses must always be protected and maintained. If it does not meet the minimum criteria, the surface water is impaired, and a restoration plan must be developed and implemented.

In addition to designated uses and the minimum water quality criteria necessary to protect and maintain them, the Vermont Water Quality Standards include the Antidegradation Policy. The Clean Water Act requires that states establish an Antidegradation Policy in their Water Quality Standards and the

methodology to implement it. The Antidegradation Policy ensures the protection of water quality in outstanding resource waters (“Tier 3”); the protection and maintenance of water quality in high quality waters (“Tier 2”); protection of existing uses (“Tier 1”).

States are required to update their water quality standards at least every three years. This process is called a triennial review. In Vermont, updates to the Water Quality Standards are proposed through rulemaking. Once a rule is final, it then gets submitted to the Environmental Protection Agency for approval. The most recent Vermont Water Quality Standards Rule was adopted November 15, 2022.

As of January 2025, 153 waters currently meet the data standard for reclassification (Figure A1 and Table A4 in the Appendix). To protect the waters of the State of Vermont, the Watershed Management Division (WSMD) can initiate rulemaking to reclassify surface waters to maintain a higher standard. The public may also petition the Division to request the initiation of rulemaking.

4. Program Overviews

Business and Operational Support Services (BOSS) Program

The Business and Operational Support Services (BOSS) Program provides administrative and technical assistance for the division’s permitting and resource-based programs, as well as advanced operational support. The BOSS team administratively reviews and processes permit applications, tracks permit compliance, performs permit billing and accounts receivable functions, and coordinates database and website development. BOSS staff support the division in achieving the overall mission of protecting, maintaining, enhancing, and restoring Vermont’s surface water resources by promoting efficiency and consistency, and leveraging technology.

Concentrated Animal Feeding Operation (CAFO) Program

The Concentrated Animal Feeding Operation Program regulates agricultural point source discharges through inspections, investigations, formal and informal enforcement, and by administering National Pollutant Discharge Elimination System (NPDES) permits for agricultural operations that meet a certain animal population threshold or, regardless of population, are determined to be a significant contributor of pollutants to waters of the United States.

Lakes and Ponds Management and Protection Program

The Lakes and Ponds Management and Protection Program works to protect, maintain, enhance, and restore the health of Vermont lakes and the public uses that healthy lake ecosystems provide, such as swimming, boating, and fishing. Lakes and Ponds staff conduct education and outreach, assessment and monitoring, and administer regulatory programs. A current focus is to preserve or restore the natural lakeshore to protect and improve water quality, aquatic and terrestrial wildlife habitat, and lake ecosystem functions into the future.

TMDLs, Assessment, Standards and Compliance Program (TASC)

TASC houses staff focused on TMDL development and coordination, assessment and documentation of the condition of surface waters, development and implementation of the Vermont Water Quality

Standards, and the support and coordination of compliance and enforcement measures across the Division.

Rivers Program

The Rivers Program provides technical and regulatory assistance for projects affecting the flows and physical integrity of streams, rivers, river corridors, and floodplains. Two primary objectives guide this work: (1) to avoid and mitigate flood and erosion hazards, and (2) to restore and protect stream processes, floodplain functions, and critical habitat. The Rivers Program carries out stream geomorphic assessments and river corridor planning to support river diagnostics, river corridor easements, channel maintenance and restoration designs, and technical assistance during flood recovery operations. The program maintains and restores natural stream flows by regulating water withdrawals and hydropower projects, and manages the National Flood Insurance Program (NFIP) for Vermont. The Program also houses the Biomonitoring and Aquatic Studies Section (BASS) that conducts environmental monitoring of aquatic resources, with an emphasis on the assessment of biological integrity.

Stormwater Program

The Stormwater Program provides regulatory oversight and technical assistance to ensure proper design and construction of stormwater treatment and control practices, as well as construction-related erosion prevention and sediment control practices, necessary to minimize the adverse impacts of stormwater runoff to surface waters throughout Vermont. Stormwater Program regulations address discharges from new and existing development, roads, industrial sites, municipal stormwater systems, and construction sites.

Wastewater Program

The Wastewater Program is responsible for protecting Vermont's surface waters from discharges of industrial and municipal wastewater and other direct discharges. These discharges can carry chemicals, toxics, and pathogens that are harmful to water quality, fish and wildlife habitat, and public health. If not properly treated and controlled, these discharges can negatively impact surface water quality and limit recreational opportunities.

Wetlands Program

Wetlands, commonly called swamps, marshes, or bogs, are transitional areas between open water and land. Wetlands provide important ecosystem services such as flood protection, water quality improvement, and wildlife habitat. The mission of the Wetlands Program is to identify, monitor, and protect wetlands that provide significant functions and values; to encourage the restoration and enhancement of impaired wetlands; and to teach Vermonters about wetland issues and the importance of wetland stewardship. The program also has a goal of no net loss of wetland acreage, function, or value.

5. Monitoring and Assessing Vermont's Surface Waters

The Watershed Management Division has monitored and assessed Vermont's surface waters since 1977. Monitoring and assessment are the foundation of the division's science-based decision-making used to implement regulations, identify surface water protection and restoration strategies and priorities, and evaluate effectiveness.

Division scientists and community volunteers monitor annually an average of 1,300 sites statewide, including wetlands, lakes and ponds, rivers and streams, and their surrounding watersheds. Monitoring and assessment are conducted in collaboration with federal, state, and local partners to leverage resources, increase geographic coverage, and promote consistency in monitoring and assessment methods and results reporting.

Monitoring and assessment enable the division to:

- Determine water quality status and trends of individual surface waters relative to Vermont Water Quality Standards, as well as water quality status and trends of waters statewide, and compare our waters regionally and nationally.
- Assess cumulative impacts to surface waters to inform actions necessary to protect, maintain, enhance, and restore water quality.
- Provide water quality assessment information to support the identification of restoration or protection priorities.
- Inform and ensure compliance with permit conditions.
- Identify and track known and emerging stressors that threaten the integrity and uses of Vermont surface waters.
- Respond to public concerns and local emergencies regarding Vermont's surface waters.

Monitoring and assessment strategies and priorities drive the development of short- and long-term monitoring projects. A cross-programmatic monitoring team meets regularly to review annual monitoring and assessment priorities and track progress implementing longer-term strategies. Project objectives determine the sampling parameters, design, and sites selected. Watershed Management Division scientists measure:

- Chemical parameters, such as nutrients, conductivity, salinity, pH, and priority metals.
- Physical parameters, such as lake shoreline condition, stream geomorphic condition, water levels and stream flow, and land use type and conversion.
- Biological parameters, such as macroinvertebrates, algae, fish species, and fish tissue contaminants.

[Background on Vermont's Surface Waters](#)

Vermont has 7,100 miles of rivers and streams based on EPA's Total Waters Database which uses 1:100,000 scale maps. Currently, the State of Vermont uses this scale to account for assessed and unassessed stream miles. Vermont has approximately 230,900 acres of lakes, reservoirs, and ponds and approximately 300,000 acres of freshwater wetlands (Table 5.1). Vermont water resources and related spatial data can be accessed on the [Vermont Natural Resources Atlas](#).

Table 5.1. Information on the State of Vermont and surface water resources.

State population (2020)	643,077
State population change (since 2010)	+2.7%
State surface area	9,616 square miles
State population density	67 persons/square mile
Miles of perennial rivers & streams	7,100
Border miles of shared rivers and streams	262 (238 with New Hampshire along the Connecticut River, 24 miles along the Poultney River with New York)
Longest river in the state, not including the Connecticut River	Otter Creek (100 miles)
Largest river watershed in the state, not including the Connecticut River	Winooski River Watershed (1,080 square miles)
Number of lakes, reservoirs & ponds over 10 acres	446
Number of significant lakes, reservoirs & ponds less than 5 acres	206
Deepest inland lake	Lake Willoughby (337 feet)
Greatest depth of Lake Champlain	Off Thompson's Point (394 feet)
Acres of lakes, reservoirs & ponds	242,219 acres, including 171,967 acres of Lake Champlain in Vermont
Acres of freshwater wetlands in the National Wetland Inventory.	350,390

Monitoring by Design

Monitoring designs are selected to achieve specific objectives, such as assessing waters against Vermont Water Quality Standards, understanding water quality trends and climate change impacts, identifying stressors, or establishing permit conditions. A few examples are:

- Targeted, fixed station monitoring: Fixed stations are selected to better understand status and trends of individual lakes, ponds, wetlands, rivers and streams. Within this category, the division conducts:
 - Long-term monitoring projects: Extensive lake, river, and stream monitoring networks designed to assess status and trends.
 - Special and TMDL studies: Used for stressor identification and when more data is necessary to develop a restoration plan called a TMDL or Total Maximum Daily Load.
 - Rotational basin monitoring: Systematic, comprehensive monitoring and assessment of select watersheds on a rotational basis, with statewide coverage achieved every five years.

- Probability-based monitoring: Conducted in coordination with EPA, randomly generated sites provide a statistically valid determination of statewide water quality conditions by surface water type.

Assessment of the Condition of Vermont Waters

In accordance with the federal Water Pollution Control Act (also known as the *Clean Water Act*), the Watershed Management Division periodically assesses the quality of Vermont’s surface waters relative to the [Vermont Water Quality Standards](#) as described in the [Surface Water Assessment and Listing Methodology](#). Through the assessment process, program scientists interpret water quality monitoring information from sites within an area of interest, and, where appropriate, relate that information to causes of observed problems and sources of pollutants.

Vermont Priority Waters List

For the purposes of identifying and tracking important water quality problems where the [Vermont Water Quality Standards](#) (VTWQS) are not met, VTDEC has developed the [Vermont Priority Waters List](#). This list is composed of several parts, each identifying a group of waters with unique water quality concerns that are either impaired or altered:

Impaired

Part A (303d list): These waters are assessed as impaired due to one or more pollutants for which a [TMDL](#) is required to be developed. This list is developed in even-numbered years and submitted to EPA for approval according to federal Clean Water Act regulations.

Part B: These waters are assessed as impaired by a pollutant but because other pollution control mechanisms are in place, no TMDL is required to be developed. [Water Quality Remediation Plans](#) are one potential tool for addressing impairments.

Part D: These waters are assessed as impaired by a pollutant and have a completed [TMDL](#) that has been approved by EPA.

Altered

Part E: These waters are assessed as altered where aquatic habitat and/or other designated uses are not supported due to the extent of aquatic invasive species.

Part F: These waters are assessed as altered due to hydrologic factors. These often include a lack of flow, water level or flow fluctuations or some other modified hydrologic condition.

Changes to waterbody assessments between the 2020 and 2022 listing cycles are given in the Appendix.

Water Quality Remediation Plans

Pursuant to 40 C.F.R. §130.7(b), the State may use a Water Quality Remediation Plan (WQRP) in lieu of a TMDL for an impaired water when the State determines that the pollution control requirements of the WQRP are stringent enough to meet State Water Quality Standards within a reasonable period of time. The [WQRP procedure is described here](#).

Lakes Monitoring and Assessment

Inland Lake Assessment Program

The primary function of the [Lake Assessment Program](#) is to monitor the status and trends of Vermont's inland lakes. Sampling conducted at spring turnover (through the [Spring Phosphorus Program](#)) since 1977 is used to monitor inland lake water quality trends. To assess the status or current condition of Vermont's inland lakes, the program conducts summer sampling as part of the National Lake Assessment and Vermont Next Generation Lake Assessment. Additional special studies may focus on a particular stressor or a particular lake, or aid in the development of new methodologies to measure Vermont Water Quality Standards or in interpreting status or trend data.

Vermont Lay Monitoring Program

The [Lay Monitoring Program](#) is a statewide, volunteer lake monitoring program that has sampled more than 100 inland lakes and 40 stations on Lake Champlain since 1979.

From June through August, Lay Monitors follow a strict protocol to measure Secchi transparency and collect water samples that are tested for the nutrient Total Phosphorus and Chlorophyll-a, the green pigment in algae. Results characterize a lake's trophic status and allow us to track water quality trends over time. Lay monitoring data is used to assess compliance with Vermont's Water Quality Standards and to identify lakes eligible for upwards reclassification or impairment designations.

Vermont Lakes Score Card

The [Vermont Inland Lake Score Card](#) is a user-friendly interface developed by the Vermont Lakes and Ponds Management and Protection Program (VLPP) to share available data on overall lake health with lake users. Using Google Earth, viewers can select from more than 800 lakes in the state and learn about four key aspects of lake health: nutrients, aquatic invasive species, shoreland and lake habitat, and mercury pollution. Links embedded in the Score Card open deeper views into the underlying data and point to steps Vermonters can take to protect their lakes.

The Vermont Inland Lake Score Card aims to answer the question "how is a lake doing?" with easy-to-interpret graphics and images. The Lake Scores are based on the best available data and information the Vermont Lakes and Ponds Program (VLPP) has currently. While the data upon which a score is based is empirically derived, the actual thresholds differentiating lake scores were based on best professional judgement. Final scores were reviewed by VLPP scientists.

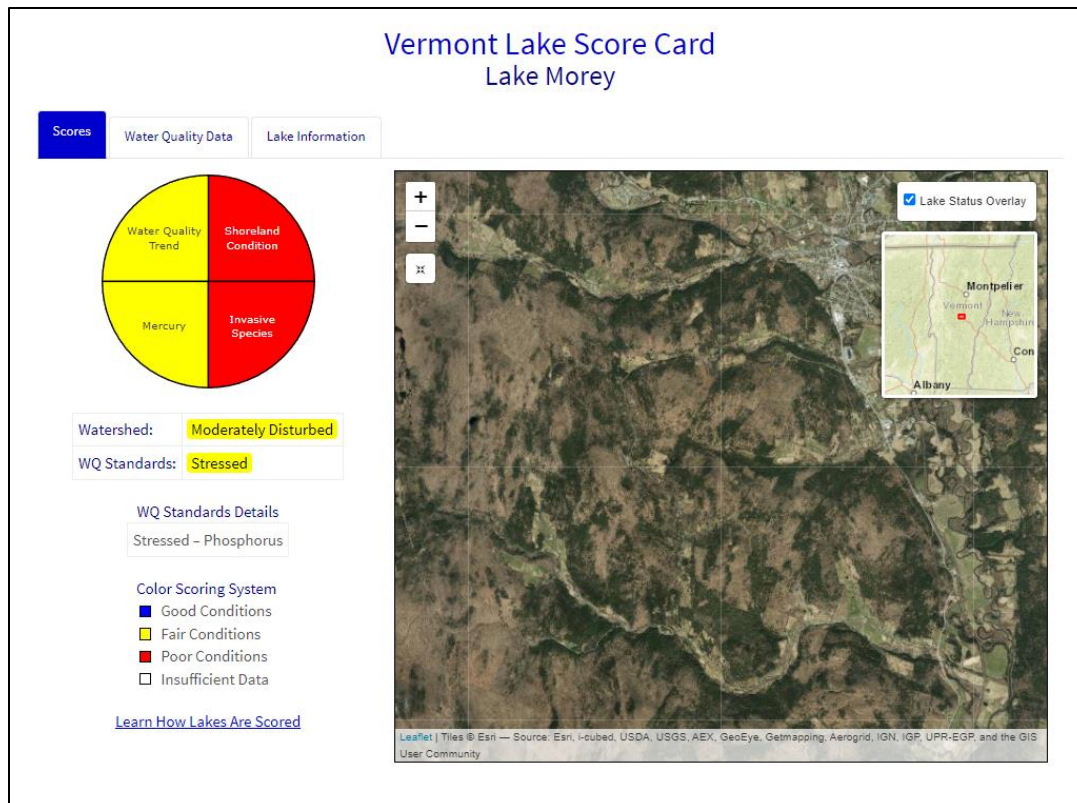


Figure 5.2. An example of data displayed on the Vermont Lakes Scorecard.

Cyanobacteria Monitoring and Tracking

Vermont DEC staff monitor the prevalence of cyanobacteria blooms on lakes and ponds throughout the summer and fall months, provide weekly updates on the status of all affected waters, and perform taxonomic analyses of cyanobacteria samples in a laboratory. Volunteer cyanobacteria monitors around the State help track the status and presence of cyanobacteria blooms. The Vermont Department of Health maintains a [Cyanobacteria Tracker](#) website, where you can report blooms and where you can see recent reports of blooms around the state. Our volunteer monitors take visual observations of lake conditions every week, whether or not there is a bloom present. These observations help us to better understand how common blooms are in different locations, and to better compare bloom severity across years.

Lake Champlain Long-Term Water Quality and Biological Monitoring Project

The Lake Champlain [Long-Term Water Quality and Biological Monitoring Project](#) surveys the quality of Lake Champlain waters on a bi-weekly basis, at 15 locations throughout the lake. Twenty-one major tributaries are sampled on an event-basis as well. The program's large physico-chemical parameter list includes: species of phosphorus, nitrogen and organic carbon; chlorophyll-a; base cations and alkalinity; TSS; dissolved oxygen; conductivity; and pH. The project also performs biological sampling, which is primarily aimed at assessing phytoplankton, zooplankton, and macroinvertebrate communities.



Figure 5.3. A WSMD boat.

National Lakes Assessment

Division scientists participate in the [National Lakes Assessment](#), which is a survey of the condition of the nation's lakes, ponds and reservoirs.

Vermont Long-Term Monitoring (VLTM) of Acid Sensitive Lakes

The VT Department of Environmental Conservation has been monitoring the chemistry of low ionic strength lakes in Vermont since the winter of 1980. In 1983, the US EPA Long-Term Monitoring Project was initiated within the National Acid Precipitation Assessment Program (NAPAP). Since then, the VLTM project has been conducted in cooperation with the US EPA. This cooperative project consists of six federal/state agencies and universities in different regions of the U.S. and is managed by the US EPA's Clean Air Markets Division. Currently, Vermont monitors the chemistry of 12 lakes. Each lake has been monitored under the current VLTM project from 28 to 32 years, making it one of the oldest lake monitoring programs designed specifically to assess acidification. Funding for this program ends in June 2025.

Rivers Monitoring and Assessment

Biomonitoring

Biomonitoring is the use of biological community surveys to assess stream health. Biological communities, such as fish, mussels, and macroinvertebrates, are influenced by the range of physical and chemical conditions in a stream over time and integrate impacts from stressors at the local and watershed scale. As a direct measure of aquatic ecosystems, biological communities are a powerful tool for providing a holistic assessment of stream health. Water chemistry data and physical habitat observations are typically collected to help interpret the biological condition. Biomonitoring is a primary tool of the Vermont Department of Environmental Conservation (VTDEC) Watershed Management Division (WSMD) for evaluating the status of Vermont's wadeable streams and informing management decisions.



Figure 5.4. A Division scientist collects macroinvertebrate samples from a stream.

Ambient Biomonitoring Network (ABN)

The Ambient Biomonitoring Network (ABN) program was established by the Vermont DEC in 1985 to:

- monitor long-term trends in water quality as revealed in changes over time to ambient aquatic fish and macroinvertebrate communities,
- to evaluate site-specific impacts of point and non-point discharges to aquatic biological communities, and
- to establish baseline data to assist the Department in establishing Vermont-specific biological criteria for water quality classification attainment determinations in rivers and streams.

Biomonitoring program staff monitor over 150 stream sites annually to assess attainment status with Vermont Water Quality Standards and identify streams that are impaired or are very high quality. All

chemical and biological monitoring results can be accessed via the [Vermont Integrated Watershed Information System](#).

Probabilistic Stream Monitoring

The majority of WSMD biomonitoring resources are directed towards streams that have a specific management interest. Examples of this targeted monitoring include the bracketing of point-source discharges, tracking the restoration efficacy of impaired streams, and the collection of long-term data from reference sites to understand the effects of climate change. In 2002, the Watershed Management Division (WSMD) began to integrate probabilistic monitoring into its biomonitoring program, a design that focuses on randomly selected sites. Site locations are provided by the U.S. Environmental Protection Agency (EPA) and are selected from the National Hydrography Dataset using a random design stratified by stream order. Unlike the targeted approach, this allows for an unbiased assessment of the overall biological condition of Vermont's wadeable streams. [Probabilistic monitoring](#) is one method that the WSMD can use to evaluate progress towards achieving its goals of protecting, maintaining, enhancing, and restoring Vermont's waters.

Results from probabilistic monitoring sites are used to calculate estimates for the percent of all Vermont stream miles in each assessment category for two biological community types: macroinvertebrates and fish. These estimates were used to determine the overall biological condition of Vermont's wadeable streams during the survey period from 2021-2023. This is the fifth probabilistic stream survey to be completed by VTDEC. Each of the five probabilistic surveys estimate that approximately 50% or more of Vermont wadeable stream miles are Very High Quality (*Very Good* or *Excellent* assessment rating) for at least one biological community, and approximately 70% or more of Vermont wadeable stream miles support at least one community in *Good* or better condition. This is strong evidence that the majority of wadeable stream miles in Vermont meet or exceed Vermont Water Quality Standards (VWQS) for at least one biological community. Streams that fail to meet VWQS (*Poor* or *Fair* assessment rating) typically account for a smaller percentage (less than 30%) than the other assessment categories but are important indicators of stressors impacting water quality and stream health in Vermont.

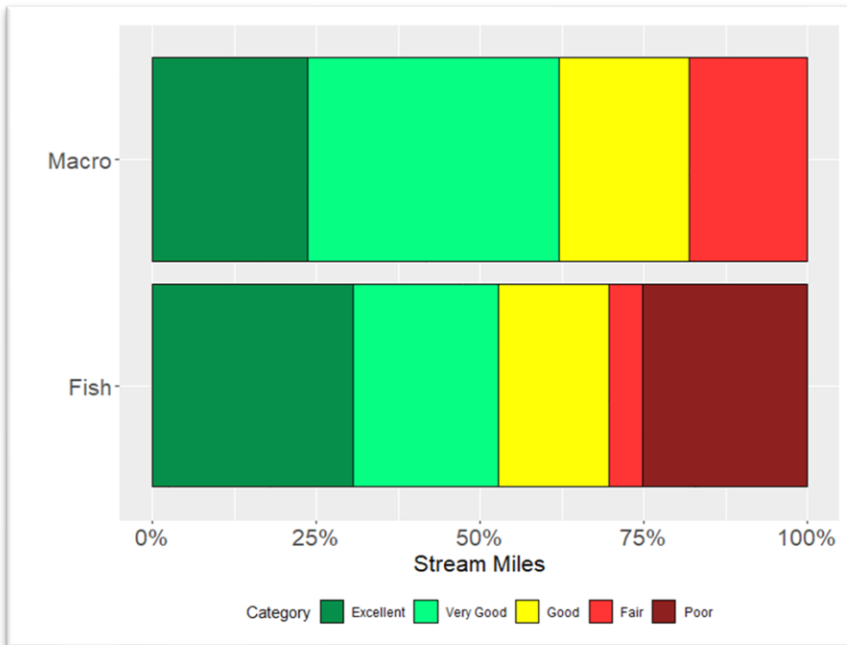


Figure 5.5. Estimate for percentage of stream miles in each assessment category for macroinvertebrates and fish from the 2021-2023 probabilistic survey of wadeable streams.

National Rivers and Streams Assessment

Division scientists participate in the [National Rivers and Streams Assessment](#), which is a survey of the condition of the nation’s rivers and streams.

Stream Geomorphic Assessment

The Rivers Program provides technical assistance to conduct geomorphic assessments of streams and their watersheds. The [Vermont Stream Geomorphic Assessment Handbooks](#) have been developed as tools to use in assessing, understanding, and evaluating the condition of the river system. The information gathered can be used for basin planning; river and riparian corridor protection, management, and restoration projects; aquatic and riparian habitat assessment; and hazard assessments to reduce property loss and damage from riverine erosion during floods.

Water Quality Monitoring

WSMD scientists collect thousands of water quality samples each year to monitor status and trends in lakes, rivers, and wetlands. Commonly analyzed water chemistry parameters include total and dissolved phosphorus, total nitrogen, nitrate, nitrite, alkalinity, pH, temperature, chloride, conductivity, sodium, calcium, potassium, magnesium, iron, aluminum, and turbidity. Regular water chemistry monitoring is conducted throughout the state. Monitoring and Assessment Program staff work with the Stormwater, Wastewater, and CAFO Programs to collect water chemistry information that informs permitting decisions. Waters that receive direct discharges from wastewater treatment facilities and CAFOs are monitored for additional water chemistry parameters such as total metals and dissolved organic carbon. Stormwater impacted streams are monitored frequently for chloride and conductivity. When resources allow, high-frequency data loggers are deployed in streams to collect continuous water quality data that provide detailed information about water temperature, chloride, and/or conductivity. These are

frequently deployed in stormwater-impacted streams or to bracket a specific event such as a dam removal. Select surface waters are also monitored for PFAS. Selected water quality data are available via the [Vermont Integrated Watershed Information System](#).

LaRosa Partnership Program

The [LaRosa Partnership Program](#) (LPP) is a community-science initiative that empowers watershed organizations and monitoring groups with access to water quality sampling. Each summer, approximately 30 partner organizations monitor over 250 sites across the state for priority parameters, including nutrients and chloride. Since 2003, this program has allowed community members to engage with their local streams and rivers firsthand, learn about water quality issues, and use water testing to identify where impacts are present. Significant program improvements have been implemented in the past few years that have streamlined the process for partners, removed barriers to participation, and more closely aligned monitoring efforts with Division priorities.

LPP focuses on five monitoring categories with the following objectives: characterize water quality conditions upstream of wastewater treatment facilities; identify potentially very high-quality waters; sample lake tributaries to assess their contribution to nutrients and chloride loading in lakes; identify stressed or impaired waters and/or refine the extent and source of the stressor; and evaluate the effectiveness of remediation efforts.

Wetlands Monitoring and Assessment

Wetlands Monitoring

Division scientists conduct monitoring and mapping efforts to identify, characterize, and monitor condition of wetlands throughout the state. The Wetlands Program has developed a [Vermont Rapid Assessment Method for Wetlands](#), which informs further bioassessment monitoring and mapping efforts. The Program utilizes three different survey types which are reflective of the EPA's Level 1, 2, and 3 approach to wetland monitoring. All three levels may be applied at any given site. Level 1 is a broad landscape-scale assessment performed as a desktop review using GIS, LiDAR and aerial imagery; Level 2 is a rapid field assessment at the wetland scale and are to be validated by and calibrated to Level 3 assessments; Level 3 is a site-intensive biological assessment using multi-metric indices. Chemical and physical data are collected as well. The condition, function, value, and quality of a variety of wetland types are assessed with the goal of improving wetland protection and restoration.

In addition to targeted monitoring under the Rotational Basin Monitoring program, the Wetlands Program also conducts assessment of sites based on random stratified site selection and monitors restoration sites. With the random stratified sampling, random points are selected in each of the following wetland types: emergent marsh, shrub swamp, and forested wetland. Sites are usually selected in one of the basins targeted for rotational basin planning, and are only selected in an area that has newly updated final or draft VSWI mapping (in the case of draft mapping, this monitoring also functions as mapping reconnaissance). Around 4 to 6 sites are sampled each year, based on capacity and landowner permissions, and around 5-10 sites where access is not granted are assessed via desktop review. In the case of restoration monitoring, several wetland restoration sites are monitored each year, with emphasis on revisiting sites with past monitoring data to gauge restoration success. This sampling

may include Level 3 sampling and always includes level 2 VRAM rapid assessments and calculation of the Restoration Indicators of Success index.



Figure 5.6. Wetland restoration site, Middlebury, VT 2023.

National Wetlands Condition Assessment

Division scientists participate in the [National Wetlands Condition Assessment](#), which is a survey of the condition of the nation's wetlands.

Wetland Mapping

The Wetlands Program is prioritizing the improvements to the statewide wetland maps. Simply put, we cannot target our protection and restoration efforts without a good sense of where wetlands are on the landscape. In recognition of the regulatory status and importance of wetlands, the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) has been producing wetland maps and geospatial data since the mid-1970s to document the location and extent of wetlands, and to analyze wetland trends over time. About half of the NWI wetland mapping in Vermont was created in the 1970s and 1980s. Our initial efforts to update the NWI in Vermont have yielded vast improvements to our knowledge of wetland location and quality. NWI mapping was updated Missisquoi Basin in Northwestern

Vermont in 2019 which increased identified wetland area by 38%. The Program's plan is to have the entire state wetland mapping updated by the end of 2025.

As mapping is updated throughout the state, analysis will be conducted to predict wetland function at a level 1 scale (landscape). Wetland function prediction will be based on each wetlands landscape position, landform, and water flow path (LLWW) classifications following Tiner (2011a)¹ and appropriate Vermont-specific updates to the method. The Program's plan is to have an analysis for the entire state by the end of 2027.

Class I Wetlands

Class I wetlands are exceptional or irreplaceable in their contribution to Vermont's natural heritage. They provide unmatched environmental functions and values and therefore merit the highest level of protection. Approximately 2,500 acres of wetland have been protected in Vermont through the Class I designation. There are over 50 wetlands identified as needing further study for Class I designation or candidate Class I. Because there are so many potential Class Is already identified, the Program is focusing on collecting data for those currently identified potential Class Is to aid in reclassification.

6. Division Focus Areas

Monitoring and assessment results, combined with analysis of existing stressor mitigation tools, provide the basis for identifying division strategies and priorities, including additional monitoring and assessment needs. The [Vermont Water Quality Monitoring Program Strategy](#), [Vermont Surface Water Management Strategy](#), and [Watershed Management Division Strategic Plan](#) describe this work.

In addition to the core monitoring and assessment programs described above, the Division is focused on the following areas:

- PFAS
- Chloride
- Cyanobacteria

PFAS

Act No. 21 of 2019 required the Vermont Agency of Natural Resources (ANR) to develop a plan for the adoption of surface water quality standards for per- and polyfluoroalkyl substances (PFAS). In February 2020, ANR's Department of Environmental Conservation (DEC) released the [State of Vermont Plan for Deriving Ambient Water Quality Standards for the Emerging Chemicals of Concern: Per- and Polyfluoroalkyl Substances \(PFAS\)](#). The plan includes collecting fish tissue contaminant data to develop human health criteria, creating programs to limit sources of PFAS to wastewater treatment plants, and working with EPA and state partners to develop aquatic biota standards. Additionally, Act 21 requires that ANR file a final rule to adopt PFAS surface water quality standards no later than January 1, 2024.

¹ Tiner, R.W. 2011a. Dichotomous Keys and Mapping Codes for Wetland Landscape Position, Landform, Water Flow Path, and Waterbody Type Descriptors: Version 2.0. U.S. Fish and Wildlife Service, National Wetlands Inventory Program, Northeast Region, Hadley, MA.

To implement the plan outlined in the 2020 report, DEC's Watershed Management Division (WSMD) initiated monitoring in 2021 to collect PFAS data in surface waters and fish tissue around Vermont. The goal of this work is to establish a baseline understanding of PFAS concentrations and to identify major contributors to contamination. Common sources of PFAS include municipal wastewater treatment plants, airports, industrial waste dischargers, and areas with significant urban runoff.

Ambient Monitoring for PFAS in Surface Waters

The WSMD has conducted monitoring of surface water and fish tissue in [2021](#), [2022](#), and 2024. In 2021, WSMD collected surface water samples at 19 sites in northern Vermont that were located near potential PFAS hotspots. Ten of the sites were within the Lake Memphremagog watershed, with the goal of investigating potential impacts from the NEWSVT landfill in Coventry, VT. The other nine sites were chosen to assess water quality impacts from municipal wastewater treatment facilities and the Vermont Air National Guard Base. In coordination with Vermont Fish and Wildlife, WSMD also collected fish tissue samples at eight of the 19 sites.

Highlights from the 2021 monitoring results include:

- All surface water sites were below Vermont's PFAS drinking water maximum contaminant level, which is 20 parts per trillion for the sum of PFOA, PFOS, PFHxS, PFNA, and PFHpA..
- The highest PFAS surface water concentrations were observed at the mouth of the Muddy Brook and at the Winooski River below Allen Brook (both in South Burlington, upstream of the Air National Guard Base), which are areas with significant urban inputs.
- The highest PFAS fish tissue concentrations were observed at the mouth of the Winooski River and the mouth of the Otter Creek, which are downstream of urban areas and multiple wastewater treatment discharges.

Monitoring efforts continued in 2022, with further sampling at the sites with the highest observed fish tissue PFAS concentrations, as well as at locations upstream and downstream of known industrial and municipal discharges on the Winooski River and Otter Creek to assess point source impacts. WSMD is also targeting new sites close to industrial discharges on the Missisquoi River.

In 2024, two sites on the Winooski River were sampled for PFAS concentrations in both fish tissue and water, the mouth of the Winooski River and immediately below the Winooski Falls at the Salmon Hole. The report discussing these results is currently in development but will be posted on the Division "[PFAS in Surface Waters](#)" website.

Beginning in 2023, the Vermont Department of Environmental Conservation used ARPA (American Rescue Plan Act) funding to test influent, effluent, and septage received at municipal Wastewater Treatment Facilities for PFAS/PFAS precursor compounds. The project will be carried out in two phases:

- Phase 1: Collection of quarterly influent and effluent data from all direct discharge municipal facilities with all samples analyzed for PFAS via isotope dilution and all influent samples also analyzed using the Total Oxidizable Precursor Assay. Septage received by at least 5 wastewater facilities will also be assessed for PFAS levels on a quarterly basis.
- Phase 2: Based on results from phase 1, focused sewershed studies to determine sources of PFAS loading to municipal WWTFs.

WSMD regularly collaborates with several partners as part of its PFAS monitoring and assessment program. Staff are working with the Vermont Department of Health to determine data needs for the development of a fish consumption advisory. Additionally, Vermont Fish and Wildlife is an important partner for collecting and analyzing fish tissue samples. Finally, WSMD participates in several PFAS-focused workgroups, including the Fish Contaminant Monitoring Committee, which is comprised of representatives from multiple Vermont government agencies, as well as regional and national organizations to learn from colleagues in other states about their PFAS programs.

The department has been working on PFAS since 2016 when widespread groundwater contamination was discovered in Bennington. Review the [PFAS Road Map](#), which outlines strategic priorities relating to PFAS and summarizes the actions taken by DEC to address PFAS in Vermont. For the latest information on PFAS, see the [VTDEC PFAS webpage](#).

Chloride

Current Chloride Standards

Chloride pollution enters Vermont's surface waters and groundwater mainly through runoff from impervious surfaces containing road salt (sodium chloride). Other sources of chloride include agricultural runoff, septic systems, wastewater treatment facilities, and water softeners.

The Vermont Water Quality Standards (VTWQS) have chloride specific criteria for both acute and chronic exposures. These criteria were recommended to states by the US Environmental Protection Agency (USEPA) in 1988 for adoption as their WQS. States can set more stringent standards if warranted, however, the process to develop them is very resource intensive. The acute exposure criterion is 860 mg/l as a one-hour average not to be exceeded every three years. The chronic criterion is 230 mg/l as a four-day average not to be exceeded every three years. Neither the USEPA nor the VTWQS have recommended water quality criteria for sodium.

Currently (2024), the Watershed Management Division (WSMD) has identified eight streams impaired due to high chloride concentrations and another four where chloride is suspected as a contributing factor of aquatic biota impairment, but sufficient data has not yet been collected. Additionally, three ponds have recorded chloride concentrations greater than the chronic criterion of 230 mg/L but the amount of data is insufficient to list these as impaired.

In 2024, a TMDL was developed for a tributary to Sunnyside Brook in Colchester that determined the maximum amount of chloride (primarily through road salt) the watershed could receive and still meet the criteria concentrations. This loading target can help drive ongoing salt reduction strategies of State, local, and private applicators of road salt.

Impacts below water quality standards criteria

There is evidence that negative impacts still occur below the VTWQS criteria concentrations. Macroinvertebrate community health in Vermont streams appears to be negatively impacted at chloride levels as low as 50 mg/l. Chloride at lower concentrations can especially stress aquatic biota communities when combined with other stressors (e.g., sediment, nutrients, toxics).

Scientific literature also suggests that negative impacts to lake zooplankton may also occur at concentrations near 50 mg/l.

As a reference, chloride concentrations in streams of mostly forested watersheds are normally less than 10 mg/l in Vermont. A USGS report on stream chemistry along the Appalachian Mountains (Argue et al, 2001) presents the median chloride value of 1.75 mg/L in the Taconics and southern Green Mountains and 2.07 mg/L in the Vermont New Hampshire Uplands. There is no significant natural source of chloride in Vermont bedrock or soils.

USEPA is reviewing more recent toxicity studies regarding chloride impacts to aquatic biota, but any future recommendations to revise the VTWQS are likely several years away.

Chloride reduction approaches

The WSMD currently does not have a universal approach to reduce road salt application and subsequent runoff to surface waters. However, a few limited approaches are in place and include:

- In Municipal Separate Storm Sewer System (MS4) communities where a chloride impaired waterbody has been documented, the towns, and VTrans are required to develop and implement Chloride Response Plans as part of permit requirements. These typically include strategies to reduce the amounts of road salt applied by utilizing well maintained and calibrated spreading equipment and focusing applications at temperatures when road salt is most effective.
- Facilities covered under the stormwater Multi-Sector General Permit are required to cover salt storage piles.
- The WSMD has worked with Act 250 permittees required to develop chloride reduction plans as part of permit requirements.
- The WSMD is actively working with several ski areas to direct monitoring and assess impacts chloride is having on the aquatic biota in streams. This work helps them to realize impacts and to focus their chloride reduction efforts.

Chloride in Vermont surface waters

Chloride is routinely sampled in lakes, wetlands, and streams as part of several monitoring programs conducted by the WSMD and in 2023, 97 lakes and 156 streams were sampled for chloride concentration. Targeted chloride monitoring is also conducted in streams of known/suspected elevated concentrations. To efficiently target monitoring needs, the Division uses land cover and soils data, watershed road densities, and the presence/absence of salt storage sheds to predict instream chloride concentrations using a predictive model trained on existing chloride data. Targeted monitoring creates a more robust and extensive dataset to properly document chloride impaired waters. Lake-specific chloride data are available within the [Vermont lake data](#) application.

The following figures illustrate the extent and trends of chloride concentrations in our lakes and streams.

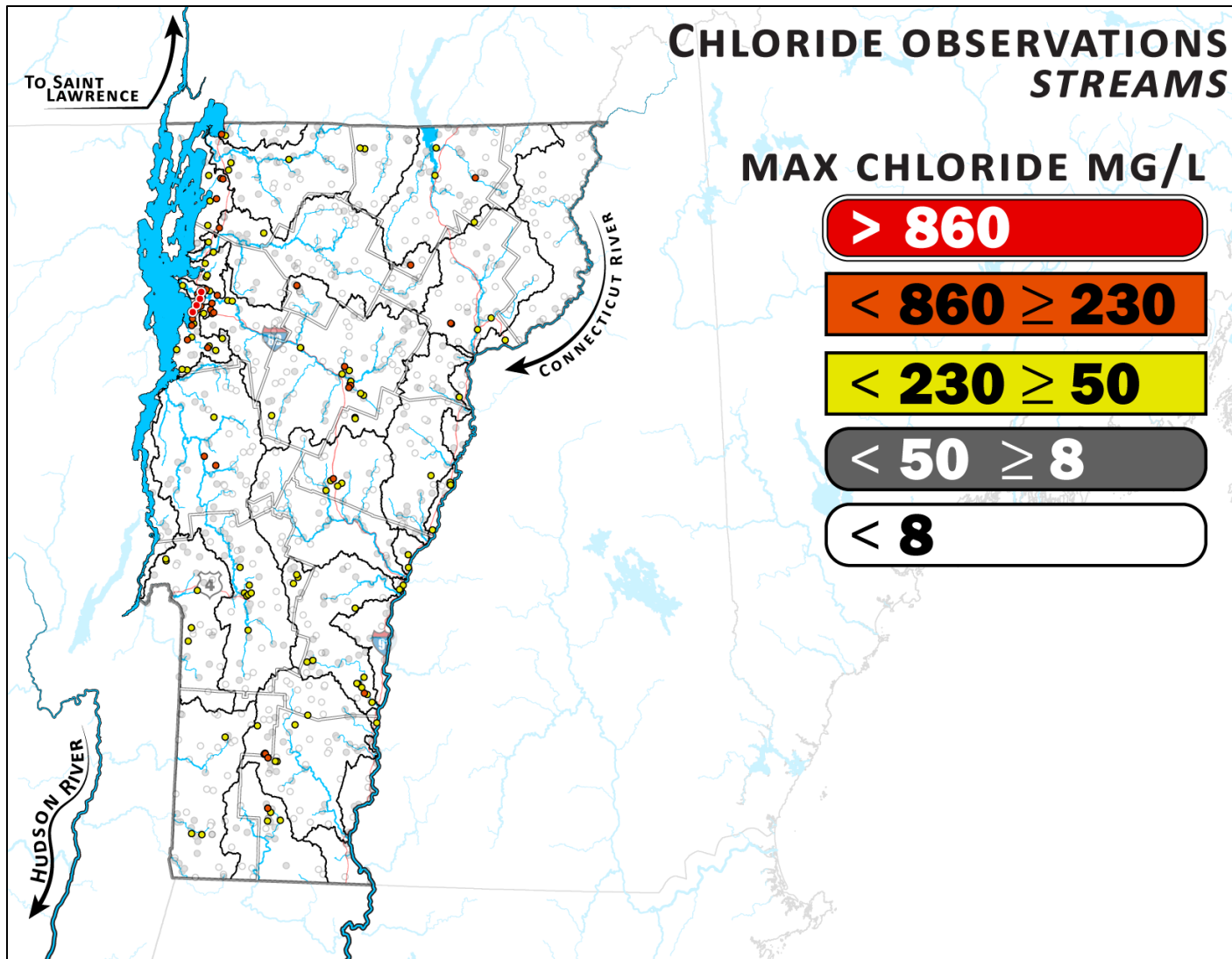


Figure 6.1. Distribution of chloride concentrations in streams of Vermont. These data points represent single observations of the maximum observed chloride concentrations but do not necessarily represent streams determined to be impaired or otherwise. Sufficient data needs to be collected to make impairment determinations according to assessment methodologies supportive of the water quality standards. Where elevated levels exist however, there is a greater chance of impairment existing.

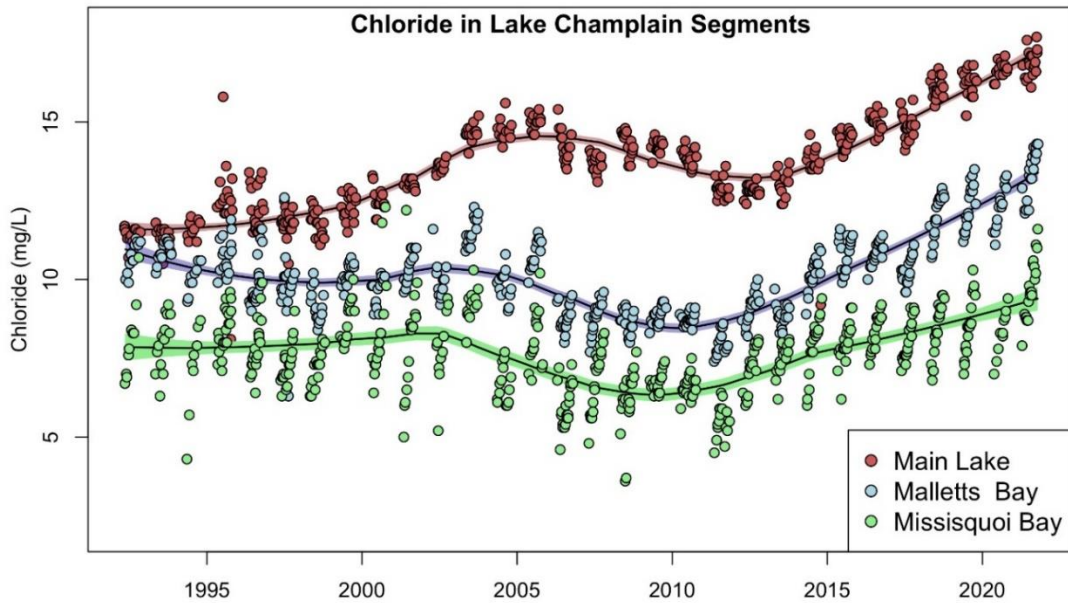


Figure 6.2. Total chloride in three basins of Lake Champlain. Points are individual observations from the Lake Champlain Long-term Monitoring Program. Hypolimnion samples are omitted. Shaded areas around the trend line represent a 95% confidence interval around the estimate of the mean concentration. All lake segments have significant increasing trends ($p < 0.05$) over the monitoring period.

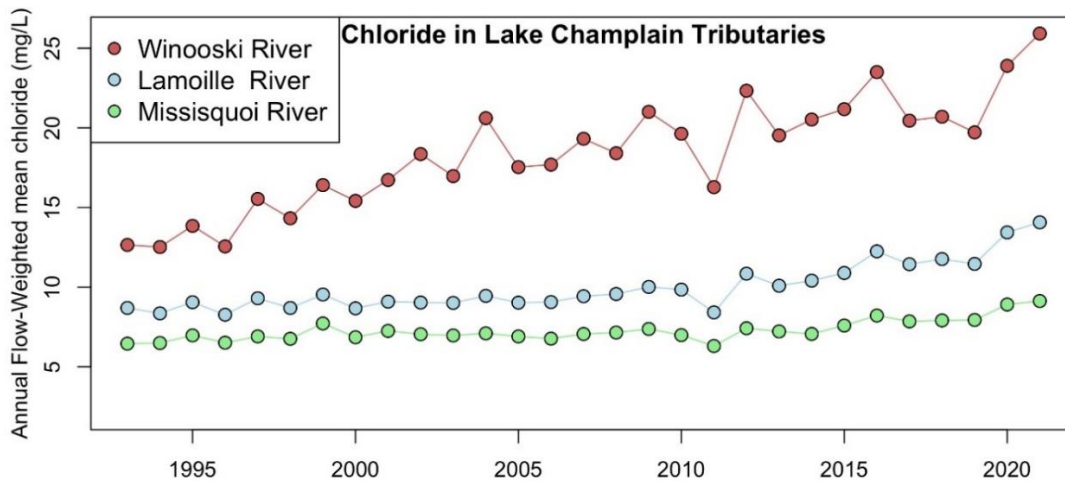


Figure 6.3. Annual flow-weighted mean concentrations (FWMC) of chloride from three large Vermont rivers draining to Lake Champlain. FWMCs are calculated as annual load divided by annual discharge. If everything coming out of a tributary in a year was collected in a large bucket, the concentration of a solute in that bucket would be equivalent to the FWMC. FWMC is increasing significantly ($p < 0.001$) in all rivers shown here.

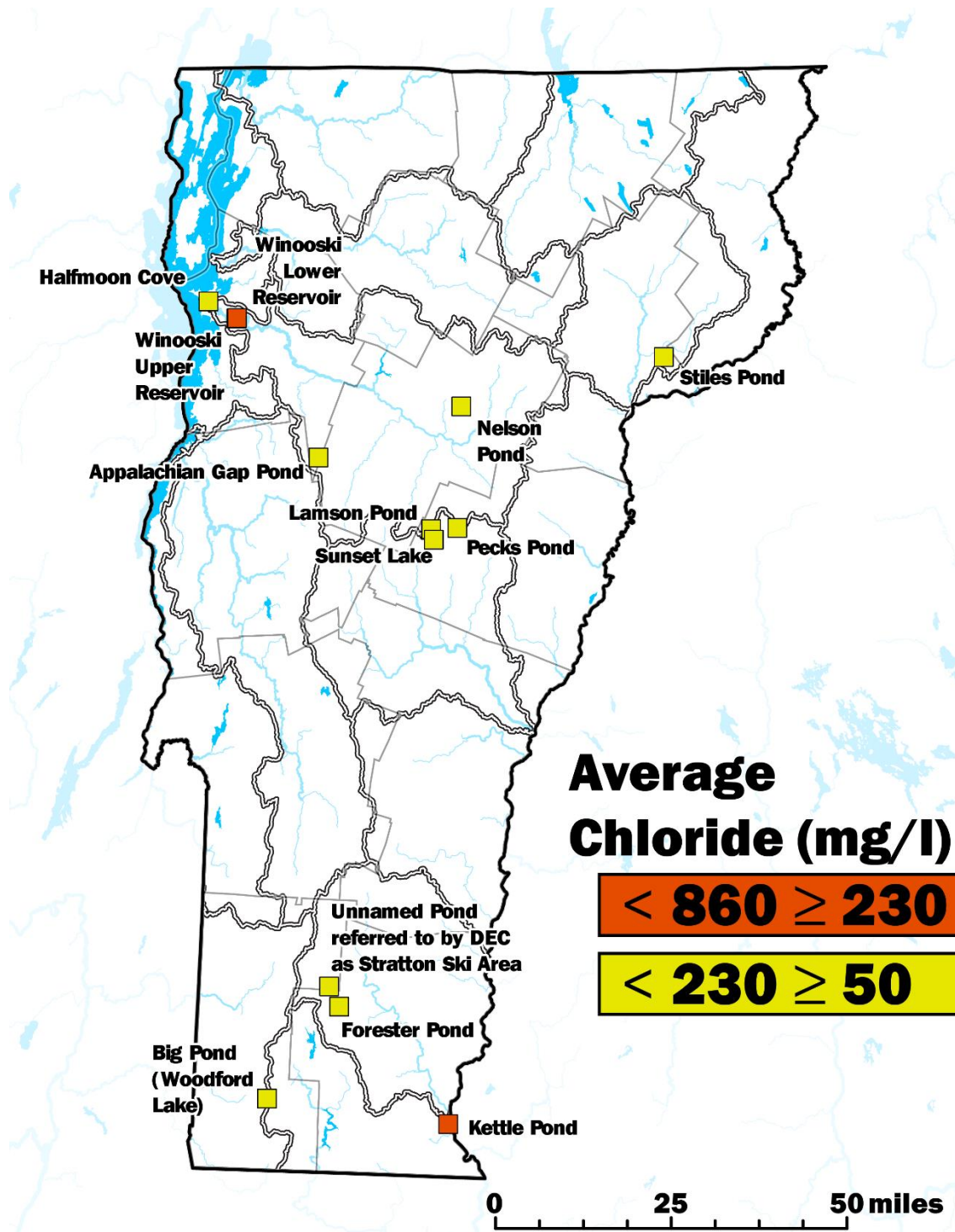


Figure 6.4. Distribution of elevated chloride concentrations in lakes of Vermont. A total of 468 inland lakes and ponds have been monitored for chloride at least once. Of these, average chloride concentrations exceed 50 mg/L at 13 lakes and ponds, including three that have exceeded 230 mg/L. For 62 lakes, sufficient data exist to determine whether there has been a statistically significant, increasing chloride trend. Of these, 9 lakes have significantly increasing trends.

Cyanobacteria Monitoring on Lake Champlain and Vermont Inland Lakes

The Cyanobacteria Monitoring Project is a partnership between Vermont Department of Environmental Conservation (VTDEC), the Vermont Department of Health (VDH), and the Lake Champlain Committee (LCC). The project consists of three main components:

- 1) a network of volunteer monitors and program staff making visual observation of cyanobacteria bloom conditions;
- 2) a centralized, interactive reporting website where bloom observations are vetted by trained staff and viewable by the public; and
- 3) collection of samples for toxin analyses and cyanobacterial cell counts.

VTDEC is principally responsible for the third component of this program (for cell counts and, beginning in 2023, cyanotoxin analyses), together with project coordination, data analysis, and reporting. Additionally, VTDEC staff assist with volunteer coordination (particularly in inland VT lakes outside of the Lake Champlain basin) and with vetting of visual observations based on submitted photos. The VTDEC portion of the cyanobacteria monitoring program is typically carried out by two staff members, with the assistance of a UVM intern for 3 months from mid-May through mid-August.

Summary of 2023 Activities

In 2023, community science volunteers, staff, and the general public submitted 2,928 site-specific visual reports (fig. 1), with 2,353 from Lake Champlain and 576 from other lakes in Vermont. In total, there were reports of bloom status in 40 inland lakes in Vermont apart from Lake Champlain (note that a status report does not indicate that a bloom occurred—some lakes consistently had “generally safe” conditions). In addition, 60 samples were analyzed for microcystins, and 59 for anatoxins. Toxin levels were usually below detection but occasionally exceeded recreational water standards for Microcystins. In addition, microscopic cell counts were performed on 177 samples from Lake Champlain, Lake Carmi, Lake Memphremagog, and Ticklenaked Pond.

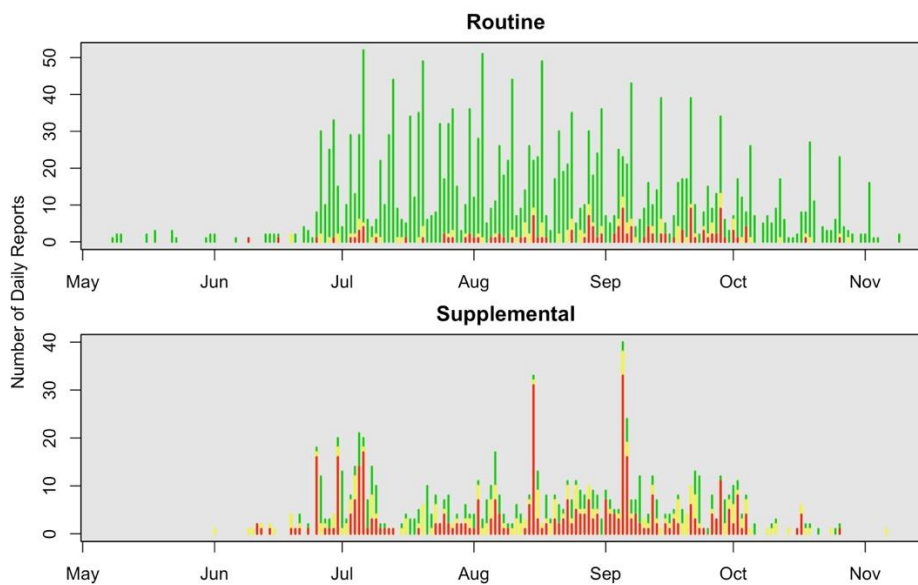


Figure 6.5. Number of visual reports of generally safe (green), low alert (yellow) or high alert (red) cyanobacteria blooms in 2023 from routine weekly reports (top) and supplemental reports (bottom)

Summary of Conditions in 2023

In general, 2023 was a relatively strong year for bloom activity. There were several strong blooms reported in Lake Champlain, including a notable bloom over Labor Day weekend. 2023 saw the highest annual incidence of reported blooms in St. Albans Bay and the Inland Sea, and high incidence in the Main Lake North Region. Among the inland lakes, Lake Memphremagog also experienced the highest reported incidence of bloom conditions among sampled years.

Routine Reports

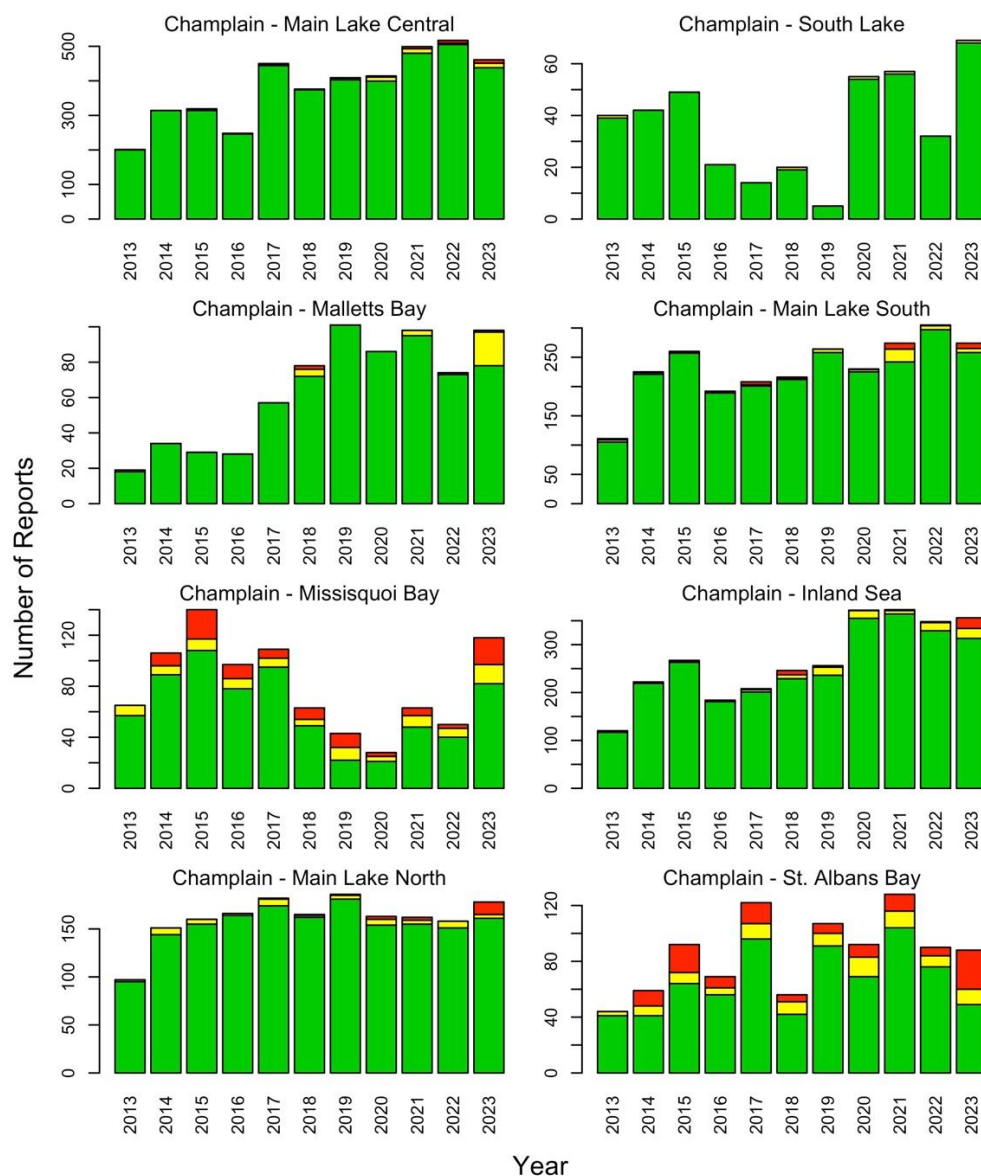


Figure 6.7. Number of reports of generally safe (green), low alert (yellow) or high alert (red) cyanobacteria conditions observed in the basins of Lake Champlain between 2013 and 2023

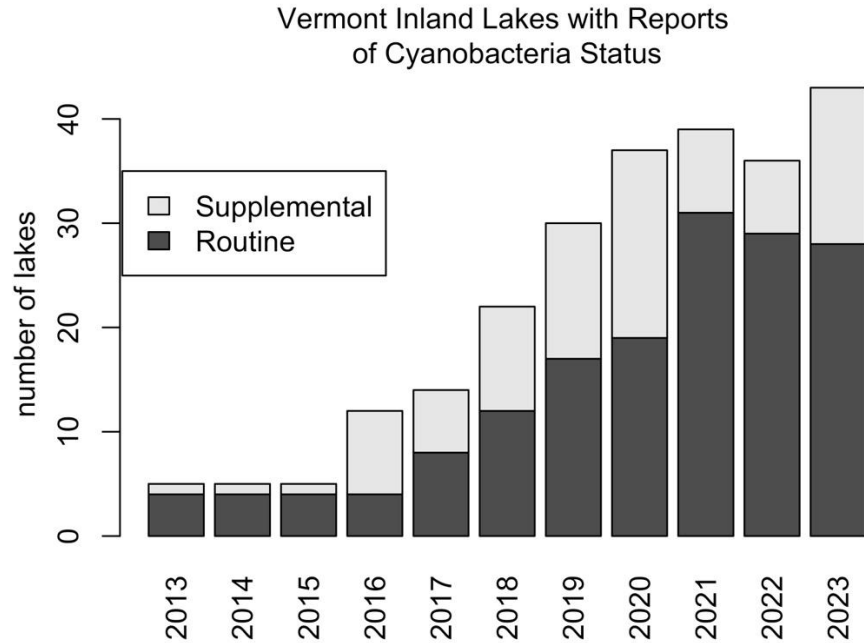


Figure 6.6. Number of Vermont lakes (excluding Lake Champlain) with reports of cyanobacteria conditions. Dark bar represents lakes with regular (usually weekly) reporting, light gray bars represent lakes with "supplemental" reports.

Changes in 2024

In 2024, VTDEC expanded cyanotoxin testing as part of the Cyanobacteria Monitoring Program from Vermont Department of Health, with an influx of one-time funds to the LCBP earmarked for cyanotoxin testing from NOAA. These funds will be administered by VTDEC and should cover expanded cyanotoxin testing for three field seasons from 2024 to 2026. In addition to continuing quality assurance sampling as outlined in the project QAPP, the extra testing capacity over three years will be used to target as many observed bloom events as possible (current sampling is on a regular schedule and captures mostly non-bloom conditions).

The testing includes four groups of cyanotoxins (microcystins, anatoxins, cylindrospermopsins, and saxitoxins). Saxitoxins, for which VTDEC had no prior testing data, are known to be produced by *Lyngbya/Microseira*, which formed recent blooms in Lake Morey and has been observed frequently in Lake Carmi. Saxitoxins are a group of toxin most frequently associated with paralytic shellfish poisoning (a food-borne illness common with "red tides" in coastal settings).

7. Vermont 303(d) Prioritization Framework

In working with the states, the US Environmental Protection Agency (EPA) developed the *2022 - 2032 Vision for the Clean Water Act Section 303(d) Program* (“2022 Vision”) that identifies opportunities to manage effectively Clean Water Act (CWA) Section 303(d) program activities to achieve water quality goals for the Nation’s aquatic resources such as streams, rivers, lakes, estuaries, and wetlands. The Vision is designed to help coordinate and focus efforts to advance the effectiveness of CWA Section 303(d) program implementation in the coming decade.

As crafted, the 2022 Vision is intended to encourage flexible and innovative approaches for states, territories, and authorized tribes to implement CWA Section 303(d), as well as to identify ways to best use limited resources to lead to restoration and protection, to leverage partnerships, and to encourage development of solutions to emerging and difficult waters quality issues. A key part of the Vision is the Prioritization Framework whereby EPA encourages states to explain how the states establish long-term plans for impaired waters identified on the 303(d) List of Impairments, whether as TMDLs or other restoration approaches.

In the spirit of the Vision to address impaired waters on the 303(d) List, Vermont has compiled this summary of the approaches used to address broad impairment categories of the Vermont 303(d) List. Vermont relies on a full suite of management approaches and doesn’t rely solely on TMDL development; however, TMDLs are a part of the overall strategy and short-term priority TMDLs have been identified through 2026.

Much of the Vermont strategy relies on a “direct to implementation” approach that addresses the root causes of impairment without the added step of a loading determination. Such approaches include permitting, water quality remediation plans, or sector-specific regulations aimed at reducing pollutant loading. These approaches are varied and are included in the impairment category summaries below.

Priority Waters List

Vermont Department of Environmental Conservation compiles a biannual list that identifies waters not in compliance with the Vermont Water Quality Standards – called the [Vermont Priority Waters List](#). The process by which these waters are assessed as impaired is detailed in the Vermont [Assessment and Listing Methodology](#). The list is composed of the following parts:

Part A (303d list): These waters are assessed as impaired due to one or more pollutants for which a [TMDL](#) is required to be developed. This list is developed in even-numbered years and submitted to EPA for approval according to federal Clean Water Act regulations.

Part B: These waters are assessed as impaired by a pollutant but because other pollution control mechanisms are in place, no TMDL is required to be developed. [Water Quality Remediation Plans](#) are one potential tool for addressing impairments.

Part D: These waters are assessed as impaired by a pollutant and have a completed [TMDL](#) that has been approved by EPA.

Part E: These waters are assessed as altered where aquatic habitat and/or other designated uses are not supported due to the extent of invasive aquatic species.

Part F: These waters are assessed as altered due to hydrologic factors. These often include a lack of flow, water level or flow fluctuations or some other modified hydrologic condition.

The focus of this Prioritization Framework is solely on the Clean Water Act required Part A – 303(d) List of impaired waters.

303(d) List Management Categories

The 2024 303(d) List is used in this framework as its initial basis. Updates to this framework are anticipated as future 303(d) Lists are compiled

A summary of the impairment categories is presented in the following table, including the number of water segments.

Impairment category	Number of impaired segments	Impairment category	Number of impaired segments
Acid Precipitation	12	Nutrients, lakes	6
Chloride	10	Nutrients, nonpoint source agriculture related	25
Combined Sewer Overflows	9	PCBs, fish tissue	11
E. coli, unknown sources	12	Stormwater runoff, developed lands	5
Iron seeps, groundwater	5	Miscellaneous	15
Landfills, Mines, and Contaminated sites	20		

A brief description of the TMDL management approach for each category is given below. While this summary gives the general management approach for each impairment category, there may be unique situations in specific segments where management may deviate from the stated approach.

Acid Precipitation

These impaired waterbodies are primarily high-elevation ponds and streams with either undeveloped or very low developed watersheds. The low pH condition is a direct result of decades of elevated acid precipitation in these low-buffered watersheds.

VTDEC has previously developed TMDLs for 39 similarly impaired ponds. The 2024 303(d) List has a remaining 12 acid-impaired waters, four lakes and eight streams. To date, VTDEC has only developed a TMDL methodology for lakes but not for streams.

Since a TMDL methodology currently exists, VTDEC intends to develop TMDLs for the remaining listed ponds, although at a moderate priority since there are no local controls to be implemented to alleviate the acid inputs. The acid-impaired streams will remain a low priority for TMDL development because no acid loading TMDL methodology has been developed.

Historically, VTDEC has relied upon federal-mandated Clean Air Act atmospheric pollutant reductions to reduce the acidic impacts. Overall, there has been notable water quality improvement in this impairment category and some segments have attained compliance, but most impairments remain.

Chloride

Chloride impairments are caused primarily by road salt application in small watersheds with high percentages of paved areas. Nine segments are identified on the 2024 303(d) List and all have been documented with elevated chloride concentrations above standards.

A TMDL methodology has been developed for this impairment category and applied in a pilot case TMDL that has received EPA approval. VTDEC expects to employ it for all 303(d) listed waters. It's hoped that the TMDL watershed loading target will be a useful tool in developing chloride management strategies to address this complex impairment.

These chloride impairments have been identified as the primary focus of TMDL development through 2026.

Combined Sewer Overflows

These impairments result from the periodic overflow of combined sewers. TMDLs are a low priority for these waters. Restoration of these impairments relies on the mandated Long-Term Control Plans municipalities are currently in the process of implementing pursuant to the Vermont CSO Rule. The goal of these plans is to restore compliance with the Water Quality Standards.

E. coli, unknown sources

This impairment category is defined by unknown, and likely diverse sources of E. coli contamination. A targeted management approach is difficult to apply to such a diverse group of waters and a better understanding of sources requires local, intensive investigation. A statewide E. coli TMDL was completed in 2011 that set reductions targets for 22 waterbodies. Since that time an additional 12 waters have been added to the 303(d) list with swimming use impaired due to elevated levels of E. coli.

Since a previous TMDL exists for multiple E. coli impairments, there is an opportunity to replicate a TMDL for these remaining impairments. However, even if a TMDL calculation is conducted, intensive follow-up investigation needs will remain to identify problematic sources.

Iron seeps, groundwater

This category of impairment consists of small streams impaired for aquatic biota use that receive localized inflow of iron-rich groundwater from stream banks. In addition to high concentrations of iron, perhaps the most impact to the aquatic biota is from the proliferation of iron-reducing bacteria. These bacteria grow to form extensive, localized mats that significantly degrade habitat conditions. Iron groundwater seeps can occur in areas with iron-rich mineral soils that have been disturbed, usually due to adjacent infrastructure improvements such as road building, culvert placement or general soil backfilling.

TMDLs are generally not recommended for these impairments since sources are very localized and don't occur on a watershed scale. TMDL endpoint targets are difficult to determine since often it's not the iron loading that limits the biology but rather the specific conditions that allow iron-reducing bacteria to proliferate.

Several attempts of localized control have been made on small scales by intercepting groundwater flow with limestone filled trenches to increase pH and reduce mobilization of iron. However, these remediation activities have met with mixed success, but implementations of this technique are still being attempted. Additionally, some of these impairments occur in steep-sided ravines where such groundwater interception projects would be extremely difficult to implement and could further impact the stream from the excessive further disturbance to buffers, streambanks, and the channel with uncertain results.

Landfills, Mines, and Contaminated sites

Impairments identified in this category consist of aquatic life use impairments caused by contaminants from known landfills or mine sites and typically involve loading of metals believed to impair the local stream biology. For all but for a few old and abandoned landfills, the landfill and mine sources are from sites managed by the Waste Management Division. Management actions can vary depending on unique site circumstances but since sources of impairment are known, remediation proceeds without the need for a TMDL allocation.

Nutrients in lakes

There are six lakes on the 303(d) List impaired for aesthetics use caused by periodic, excessive algal growth that reduces water clarity. One lake (Lake Morey) received an alum treatment in 2024 which is expected to alleviate the impairment. TMDLs are not scheduled soon for the remaining five lakes, although their watersheds remain priorities for BMP project implementation, particularly in agricultural watersheds. Continued in-lake data collection is necessary for any future TMDL development.

Nutrients in streams, agriculture related nonpoint source

This is a large group of impairments characterized by failure of aquatic biota support due to nutrients and/or sediment runoff. These watersheds are primarily dominated by agricultural land uses but with varying amounts of forested and developed areas within them.

VTDEC and the Vermont Agency of Agriculture, Food and Markets both have a role in monitoring and enforcing pollution control requirements on agricultural lands. The VTDEC Water Investment Division also plays a role in identifying and funding specific, non-regulatory projects in these areas.

The WSMD is investigating (through desktop modeling) the impact that required agricultural practices to reduce erosion and nutrient runoff to nearby waters will have on restoring the waters to compliance. However, this is a simple desktop analysis that relies on generalized watershed conditions and is considered planning level. The analysis is limited by a lack of specific, on-site conditions and identified pollutant sources necessary to develop TMDLs. However, it can be useful to identify the level of effort necessary to control nutrient and sediment in agricultural and other land use sectors in these watersheds.

To date, TMDL development has not been an option due to technical difficulties in developing site-specific sediment and nutrient loading targets that relate to biological condition. Resources are also limited for intensive pollutant and flow monitoring to identify current pollutant loading conditions.

PCBs, fish tissue

This impairment category is limited to segments of Lake Champlain and the Hoosic River. Fish tissue sampling is conducted sporadically as resources are allocated and assessments are updated to reflect the most up to date data.

Stormwater runoff, developed lands

These impairments refer to the combined impacts of runoff from developed lands with sediment the primary source of aquatic biota impacts. VTDEC has previously developed TMDLs for twelve similarly impaired waters; however, those twelve were in low elevation areas with high levels of development and impervious cover. The remaining three impairments in this category differ in that they are located at higher elevation ski areas with relatively dense development in otherwise forested, but steep watersheds. However, the localized impacts of impervious runoff have caused aquatic biota impairment.

TMDLs have not been a high priority in these circumstances because the low-elevation TMDL methodology was not transferable to these unique watersheds. In their place, VTDEC has developed an alternative approach through the development of Water Quality Remediation Plans. This approach has proven successful in similar watersheds to alleviate impairment by using an iterative approach of identifying problematic sediment sources, applying BMPs, and monitoring stream conditions. This approach has been successful because the management of the land and development is controlled by a single party, so beneficial actions can be quickly identified and implemented.

All five stream segments in this category are currently in various stages of WQRP development and implementation, all associated with ski resorts and surrounding lands.

Miscellaneous

The above categories encapsulate the vast majority of 303(d) listed impairments but there remain a few miscellaneous impairments that will require unique attention to determine if a TMDL or other management approach is the most efficient. Approximately 10% of the remaining impairments fall into this category.

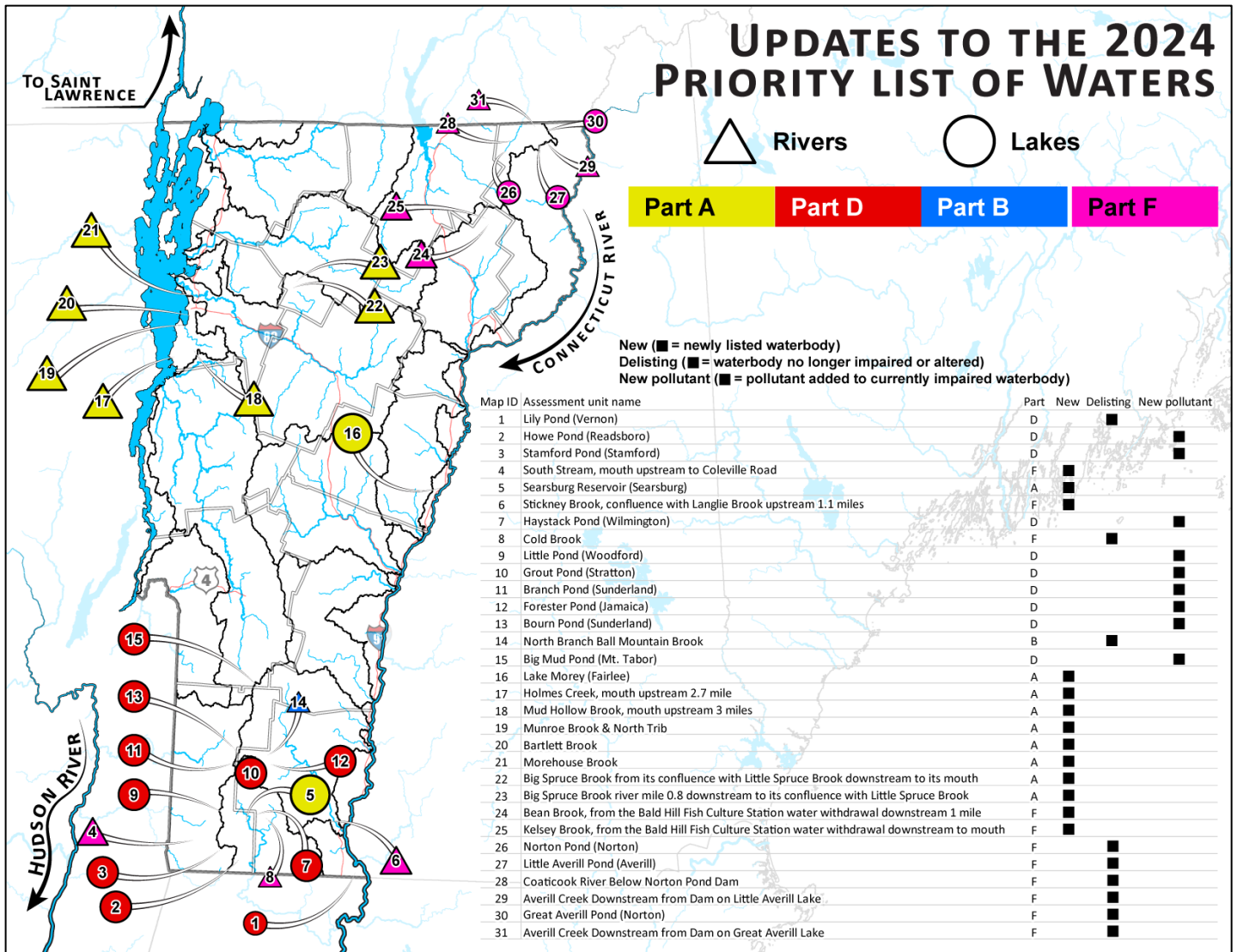
TMDL priorities

The EPA Vision provides that the states identify, and report to EPA, its priorities for near-term TMDL development. Waters identified for priority TMDL development through 2026 are listed in the table below.

Waterbody ID	Pollutant	Stream name, impaired segments
VT05-10	chloride	Englesby Brook, mouth to river mile 1.3
VT05-11	chloride	Munroe Brook, mouth to river mile 2.8 (Including North Trib.)
VT05-11	chloride	Bartlett Brook, mouth to river mile 0.7
VT05-11	chloride	Potash Brook, multiple segments
VT08-02	chloride	Centennial Brook, mouth to river mile 1.2
VT08-02	chloride	Morehouse Brook, mouth to river mile 0.6

Appendix

This document will summarize changes made to the 2022 priority list of waters² whereby creating the 2024 list. Changes to each part of the list will be broken down for Impairments and Alterations by: 1. Newly listed waters, 2. De-listed waters, 3. Changes to known pollutants and sources



² <https://dec.vermont.gov/watershed/map/assessment>

Figure 2 Updates to the 2024 listing cycle.

Impairments (Parts A, B, and D)

Newly listed waters, (Map ID), part (A, B, or D), Assessment Unit ID, longitude and latitude

- **Lake Morey (16), A, VT16-20L01_01, (-72.153, 43.923)**
 - Phosphorus concentrations consistently elevated above criteria (18 µg/l) due to internal loading from sediment impairs the use of waters for the enjoyment of aesthetic conditions.
- **Searsburg Reservoir (Searsburg) (5), A, VT12-04L05, (-72.951, 42.904)**
 - The reservoir is extremely sensitive to acidification due to gran alkalinities below criteria (2.5 mg/l CaCO₃) because of acid deposition, and impairs Aquatic habitat to support aquatic biota, wildlife, or plant life.
- **Big Spruce Brook from its confluence with Little Spruce Brook downstream to its confluence with West Branch Little River (22), A, VT08-12.12, (-72.777, 44.526)**
 - Extensive iron seeps resulting in extensive iron bacteria mats and chloride, sediment, and erosion from Little Spruce Brook impairs Aquatic biota and wildlife that may utilize or are present in the waters.
- **Big Spruce Brook from river mile 0.8 (100m below Spruce Peak road) downstream to its confluence with Little Spruce Brook (23), A, VT08-12.05, (-72.775, 44.531)**
 - Extensive iron seeps resulting in extensive iron bacteria mats impairs Aquatic biota and wildlife that may utilize or are present in the waters.
- **Mud Hollow Brook, mouth upstream 3 miles (18), A, VT05-11.05, (-73.198, 44.342)**
 - Elevated phosphorus and nitrogen concentrations due to runoff from agricultural lands impairs Aquatic biota and wildlife that may utilize or are present in the waters.
- **Holmes Creek, mouth upstream 2.7 miles (17), A, VT05-12.03, (-73.272, 44.326)**
 - Phosphorus and nitrogen concentrations and sedimentation due to riparian encroachment and runoff from agricultural lands impairs Aquatic biota and wildlife that may utilize or are present in the waters.
- **Munroe Brook, Mouth to rm 2.8 (Including North Trib.) (19), A, VT05-11.01, (-73.213, 44.406)**
 - Chloride concentration is above chronic criteria based on continuous monitoring and impairs Aquatic biota and wildlife that may utilize or are present in the waters.
- **Bartlett Brook, Mouth to rm 0.7 (20), A, VT05-11.02, (-73.211, 44.426)**
 - Chloride concentration is above chronic criteria based on continuous monitoring and impairs Aquatic biota and wildlife that may utilize or are present in the waters.
- **Morehouse Brook, Mouth to rm 0.6 (21), A, VT08-02.06, (-73.197, 44.5)**
 - Chloride concentration is above chronic criteria based on continuous monitoring and impairs Aquatic biota and wildlife that may utilize or are present in the waters.

De-listed waters, (Map ID), part (A, B, or D), Assessment Unit ID, longitude and latitude

- **No. Branch, Ball Mtn Brook, Stratton Lake to Kidder Brook (14), B, VT11-15.06, (-72.876, 43.112)**
 - Restoration activities at Stratton Mountain Resort have reduced manganese in discharges which have significantly reduced staining of stream substrate.
- **Lily Pond (Vernon) (1), D, VT13-16L01, (-72.509, 42.737)**
 - Gran alkalinity has consistently been above criteria (2.5 mg/l CaCO₃).

Additions of new pollutants, (Map ID), part (A, B, or D), Assessment Unit ID, longitude and latitude

- Bourn Pond (Sunderland) **(13), D, VT01-05L01, (-73.002, 43.106)** – aluminum
 - Observed aluminum (Al) always exceeds Acute criteria.
- Branch Pond (Sunderland) **(11), D, VT01-05L01, (-73.002, 43.106)** – aluminum
 - Observed Al always exceeds Acute criteria.
- Big Mud Pond (Mt. Tabor) **(15), D, VT03-18L03, (-72.931, 43.315)** – aluminum
 - Observed Al always exceeds Acute criteria.
- Forester Pond (Jamaica) **(12), D, VT11-15L01, (-72.867, 43.082)** – aluminum
 - Observed Al always exceeds Acute criteria.
- Howe Pond (Readsboro) **(2), D, VT12-02L02, (-72.984, 42.784)** – aluminum
 - Observed Al consistently exceeds Acute criteria.
- Stamford Pond (Stamford) **(3), D, VT12-02L03, (-73.065, 42.822)** – aluminum
 - Observed Al consistently exceeds Acute criteria.
- Grout Pond (Stratton) **(10), D, VT12-03L01, (-72.943, 43.043)** – aluminum
 - Observed Al consistently exceeds Acute criteria.
- Little Pond (Woodford) **(9), D, VT12-04L04, (-73.065, 42.925)** – aluminum
 - Observed Al consistently exceeds Acute criteria.
- Haystack Pond (Wilmington) **(7), D, VT12-05L01, (-72.917, 42.918)** – aluminum
 - Observed Al always exceeds Acute criteria.

Alterations (Part E and F)

Newly listed waters, (Map ID), part (E or F), Assessment Unit ID, longitude and latitude

- Stickney Brook, confluence with Langlie Brook upstream 1.1 miles **(6), F, VT11-08.02, (-72.639, 42.909)**
 - Artificial flow condition, seasonally devoid of flow below diversion dam; dredging, impairs Aquatic biota and wildlife that may utilize or are present in the waters.
- Kelsey Brook, from the Bald Hill Fish Culture Station water withdrawal downstream to mouth **(25), F, VT15-08.04, (-71.949, 44.72)**
 - Insufficient conservation flow downstream of Bald Hill fish hatchery withdrawal Aquatic biota and wildlife that may utilize or are present in the waters.
- Bean Brook, from the Bald Hill Fish Culture Station water withdrawal downstream 1 mile **(24), F, VT15-08.03, (-71.949, 44.716)**
 - Insufficient conservation flow downstream of Bald Hill fish hatchery withdrawal Aquatic biota and wildlife that may utilize or are present in the waters.
- South Stream, mouth upstream to Coleville Road **(4), F, VT01-03.10, (-73.176, 42.862)**
 - Insufficient conservation flow downstream of Bennington fish hatchery withdrawal Aquatic biota and wildlife that may utilize or are present in the waters.

De-listed waters, (Map ID), part (E or F), Assessment Unit ID, longitude and latitude

- Cold Brook (0.58 Miles) **(8), F, VT12-05.07, (-72.885, 42.922)**
 - Passing conservation flow equal to FMF
- Coaticook River Below Norton Pond Dam (3 Miles) **(28), F, VT17-03.01, (-71.832, 44.962)**

- Settlement Agreement Accepted by PUC, Coaticook and all other Parties.
- Averill Creek Downstream from Dam on Great Averill Lake (5.4 Miles) **(31), F, VT17-03.02, (-71.743, 45.001)**
 - Settlement Agreement Accepted by PUC, Coaticook and all other Parties.
- Averill Creek Downstream from Dam on Little Averill Lake (1 Mile) **(29), F, VT17-03.03, (-71.699, 44.965)**
 - Settlement Agreement Accepted by PUC, Coaticook and all other Parties.
- Little Averill Pond (Averill) **(27), F, VT17-03L01, (-71.718, 44.955)**
 - Settlement Agreement Accepted by PUC, Coaticook and all other Parties.
- Great Averill Pond (Norton) **(30), F, VT17-03L02, (-71.703, 44.984)**
 - Settlement Agreement Accepted by PUC, Coaticook and all other Parties.
- Norton Pond (Norton) **(26), F, VT17-03L04, (-71.865, 44.935)**
 - Settlement Agreement Accepted by PUC, Coaticook and all other Parties.

305(b) Report Requirements

The majority of the Section 305(b) reporting requirements are fulfilled by the State of Vermont via data uploads to EPA’s ATTAINS (Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System) and through portions of this report. The uploaded data can be accessed through EPA’s [“How’s My Waterway?”](#) application as both a statewide summary and at local watershed scale. Table A.2. supplies additional information requirements not contained in this report.

Table A.2. Links to information for additional 305(b) reporting elements that not specifically called out in this report.

Section 305(b) Reporting Element	Information source	Link to information
<i>Water Pollution Control Program</i>		
An estimate of the extent and costs to which CWA control programs have improved water	The Water Investment Division produces an annual Performance Report that summarizes clean water efforts and demonstrates how investments are making a difference in water quality of Vermont’s rivers, lakes, and wetlands the details	https://dec.vermont.gov/water-investment/cwi/reports
<i>Surface Water Monitoring and Assessment</i>		
Description of the surface water monitoring program	The Watershed Management Division (WSMD) produces the Water Quality Monitoring Program Strategy to detail the various monitoring approaches used for surface waters.	https://dec.vermont.gov/watershed/map/monitor
Description of data and information used to make attainment determinations	The WSMD produces the Surface Water Assessment and Listing Methodology that describes the decision-making process used for	https://dec.vermont.gov/watershed/map/assessment

Section 305(b) Reporting Element	Information source	Link to information
	surface water assessments.	
<i>Ground Water Monitoring and Assessment</i>		
Description of the nature and extent of ground-water pollution and recommendations of State plans or programs needed to maintain or improve ground-water quality	<p>The Vermont Groundwater Management Plan lays out three high level objectives:</p> <ul style="list-style-type: none"> • improve information available for GW management decisions, • protect public health and safety and the environment, and • C) expand communications. 	https://dec.vermont.gov/water/groundwater
<i>Public Participation</i>		
Description of required public participation process, comments received, and responsiveness summary related to 303(d) listing process	The WSMD posts the comments received, response summary and EPA approval documentation for the latest 303(d) listing cycle.	https://dec.vermont.gov/watershed/map/assessment

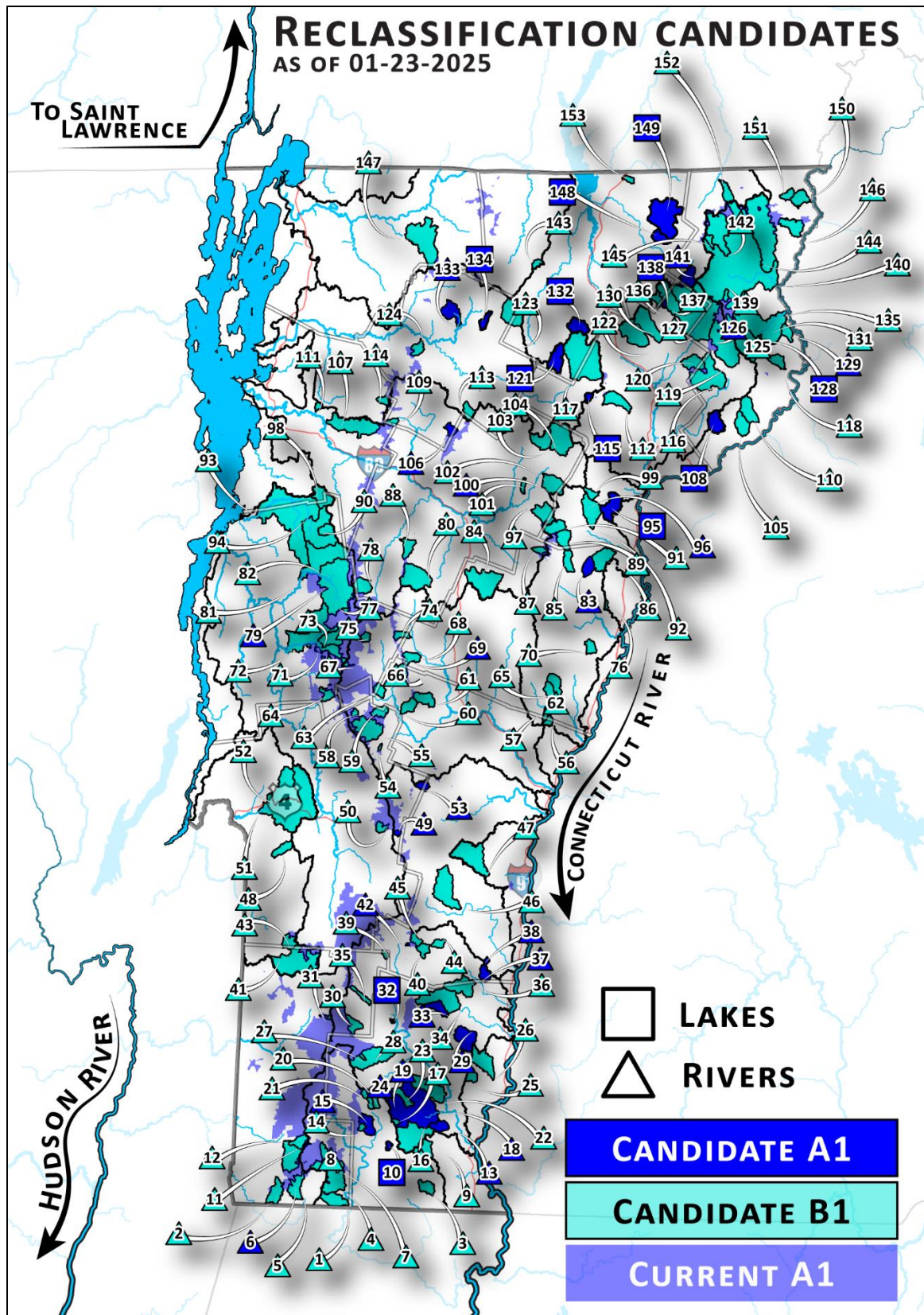


Figure A.1. Lake and river reclassification candidates.

Table A.4. Lake reclassification candidates.

Map ID	Name	Latitude	Longitude	Candidate	Towns	Lake (ac)
10	Lake Raponda	42.8743	-72.8148	A1	Wilmington	123.8
32	Cole Pond	43.1475	-72.8063	A1	Londonderry, Jamaica	41.4
95	Harveys Lake	44.2711	-72.1491	A1	Barnet, Ryegate	357.2
108	Miles Pond	44.4569	-71.8271	A1	Concord	221.1
115	Coles Pond	44.5113	-72.2143	A1	Stannard, Walden	106.8
121	Caspian Lake	44.5985	-72.3128	A1	Greensboro	789.8
128	Maidstone Lake	44.6474	-71.6446	A1	Ferdinand, Granby, Maidstone	755.8
132	Shadow Lake	44.669	-72.2479	A1	Glover	217.3
134	South Pond	44.681	-72.5346	A1	Hyde Park, Eden	112.5
138	Newark Pond	44.7178	-71.9796	A1	Westmore, Newark	158.2
148	Echo Lake	44.898	-71.9835	A1	Holland, Morgan, Charleston	546.5
149	Seymour Lake	44.9	-71.9864	A1	Holland, Morgan, Charleston	1777.2
	Lake Willoughby	44.745	-72.057	A1	Westmore	1864

Table A.5. River reclassification candidates.

Map ID	Name	Latitude	Longitude	Candidate	Towns	River (mi)
1	South Branch Deerfield River, 0.3	42.7508	-72.9418	B1	Readsboro, Stamford	15.0
2	Broad Brook, 2.4	42.7574	-73.1696	B1	Pownal, Stamford	19.4
3	Green River Trib 6, 1.7	42.7669	-72.672	B1	Halifax, Guilford	8.5
4	West Branch Deerfield River, 0.6	42.776	-72.9528	B1	Woodford, Searsburg, Readsboro, Stamford	55.8
5	Roaring Brook, 0.2	42.784	-73.0853	B1	Stamford	22.7
6	Cardinal Brook, 0.1	42.7885	-73.0951	A1	Stamford	2.4
7	Lamb Brook, 0.1	42.8258	-72.9667	B1	Readsboro	5.0
8	West Branch Deerfield River Trib 7, 1.8	42.8483	-72.9889	B1	Searsburg, Readsboro	4.6

Map ID	Name	Latitude	Longitude	Candidate	Towns	River (mi)
9	Whetstone Brook, 10.7	42.8707	-72.6533	B1	Marlboro	8.6
11	City Stream, 2	42.8763	-73.0891	B1	Woodford	9.5
12	City Stream, 1.3	42.8886	-73.1194	B1	Woodford, Stamford	34.5
13	Stickney Brook, 2.3	42.911	-72.6417	A1	Newfane, Dummerston, Marlboro	7.1
14	Haystack Brook, 0.1	42.9113	-72.8955	B1	Wilmington	4.1
15	Cold Brook, 0.1	42.9256	-72.8865	A1	Dover, Wilmington	20.5
16	Marlboro Branch, 1.9	42.9258	-72.7133	B1	Newfane, Marlboro	39.6
17	Hunter Brook, 2.4	42.9279	-72.789	B1	Dover, Wilmington, Marlboro	1.8
18	Rock River, 1.5	42.9482	-72.658	A1	Wardsboro, Newfane, Dover, Wilmington, Marlboro	128.3
19	Rock River, 10.8	42.9618	-72.7958	A1	Wardsboro, Dover	3.7
20	Ellis Brook, 2.9	42.9672	-72.8556	B1	Wardsboro, Dover	4.4
21	Blue Brook, 0.7	42.9691	-72.8713	B1	Stratton, Dover	10.2
22	Smith Brook, 0.7	42.9705	-72.659	B1	Townshend, Wardsboro, Newfane	28.9
23	Adams Brook, 0.8	42.982	-72.7741	B1	Wardsboro, Newfane, Dover	10.2
24	Waite Brook, 0.8	43.0083	-72.8435	A1	Wardsboro, Dover	10.2
25	Sacketts Brook, 4.8	43.0095	-72.5493	B1	Westminster, Brookline, Putney	10.6
26	East Putney Brook, 3.8	43.0245	-72.5081	B1	Westminster, Putney, Athens	36.4
27	Bear Creek, 0.7	43.0675	-72.8911	B1	Stratton	2.6
28	Ball Mountain Brook, 3.1	43.068	-72.8512	B1	Jamaica, Stratton, Wardsboro	35.2
29	Bull Creek, 2	43.1347	-72.5639	A1	Townshend, Westminster, Athens	27.2
30	Winhall River, 6.4	43.1402	-72.9252	B1	Winhall, Stratton	8.3
31	Bourn Brook, 1.6	43.1432	-72.9924	B1	Winhall, Manchester	1.1
33	Howe Brook, 1.6	43.1639	-72.6492	A1	Grafton, Windham	12.5
34	Saxtons River, 14.1	43.1721	-72.6067	B1	Grafton, Windham	45.1
35	Eddy Brook, 1.8	43.1984	-72.893	B1	Peru, Winhall	6.3
36	Hall Brook, 0.7	43.2328	-72.563	B1	Grafton, Chester	21.3
37	Skunk Hollow Brook, 0.4	43.2369	-72.5395	A1	Springfield, Chester, Rockingham	8.9

Map ID	Name	Latitude	Longitude	Candidate	Towns	River (mi)
38	Chester Brook Trib #4, 0.2	43.2837	-72.526	A1	Springfield	0.9
39	Holden Hill Brook, 1.4	43.2883	-72.8169	B1	Weston, Landgrove	2.7
40	Andover Branch, 4.4	43.2894	-72.7145	B1	Andover	6.8
41	Mettawee River, 32.5	43.2899	-73.1395	B1	Danby, Rupert, Dorset	61.0
42	Burton Brook, 1.8	43.3058	-72.7758	A1	Weston, Andover	0.9
43	Sykes Hollow Brook, 0.9	43.3116	-73.1271	B1	Pawlet, Danby, Rupert, Dorset	8.8
44	Chase Brook, 0.7	43.3298	-72.6557	B1	Andover, Chester, Ludlow	4.9
45	Williams River, 26.8	43.3341	-72.7133	B1	Andover	5.8
46	Twenty Mile Stream, 0.6	43.395	-72.603	B1	Plymouth, Reading, Cavendish, Ludlow	42.5
47	Mill Brook, 11.4	43.4666	-72.5266	B1	Reading, Woodstock, West Windsor	44.8
48	Lavery Brook, 0.3	43.517	-73.1508	B1	Poultney, Middletown Springs, Ira	11.3
49	Tinker Brook, 2.5	43.5517	-72.775	A1	Shrewsbury	2.2
50	Sargent Brook, 1.6	43.5567	-72.8533	B1	Shrewsbury, Mendon	6.1
51	Castleton River, 6	43.6042	-73.2074	B1	Poultney, Hubbardton, Castleton, Ira, Pittsford, West Rutland, Proctor	132.8
52	North Breton Brook, 0.6	43.6293	-73.1591	B1	Hubbardton, Castleton, Ira, Pittsford, West Rutland	36.9
53	North Branch Ottauquechee Trib #15, 0.1	43.6603	-72.7149	A1	Killington, Bridgewater	5.7
54	Townsend Brook Trib #2, 0.2	43.7482	-72.8464	B1	Chittenden	1.4
55	West Branch Tweed River, 1.9	43.7747	-72.8422	B1	Pittsfield, Chittenden	35.0
56	Lord Brook, 3.3	43.8142	-72.318	B1	Strafford, Thetford, Sharon, Norwich	4.0
57	Sargent Brook, 0.2	43.8219	-72.3452	B1	Strafford, Sharon	3.5
58	Chittenden Brook, 2.4	43.826	-72.9133	B1	Chittenden	3.8
59	Corporation Brook, 1.1	43.8264	-72.8563	B1	Rochester, Pittsfield, Chittenden	8.7
60	Breakneck Brook, 0.2	43.8294	-72.7727	B1	Rochester, Bethel, Stockbridge	7.9
61	Camp Brook, 2.5	43.8441	-72.6824	B1	Rochester, Bethel	12.0
62	Abbott Brook, 1.2	43.848	-72.3158	B1	Strafford, Thetford	25.2
63	Wing Brook, 0.2	43.8614	-72.847	B1	Hancock, Rochester	5.5
64	North Branch Neshobe River, 0.5	43.8623	-73.0148	B1	Goshen	11.5

Map ID	Name	Latitude	Longitude	Candidate	Towns	River (mi)
65	Abbott Brook Trib #3, 0.6	43.8703	-72.3147	B1	Strafford, Thetford	11.7
66	Marsh Brook, 1	43.9086	-72.8002	B1	Rochester, Braintree	7.8
67	Robbins Branch, 1.4	43.9256	-72.9325	B1	Hancock	3.8
68	Riford Brook, 0.9	43.946	-72.7299	B1	Rochester, Braintree	10.4
69	Riford Brook, 2.6	43.9479	-72.7631	A1	Rochester, Braintree	3.9
70	Middle Brook, 6.3	43.9506	-72.2173	B1	West Fairlee	6.3
71	South Branch Middlebury River, 1	43.9678	-73.0305	B1	Ripton, Hancock, Salisbury, Goshen	16.5
72	Middlebury River, 3.6	43.9694	-73.1034	B1	Bristol, Lincoln, Middlebury, Ripton, Hancock, Salisbury, Goshen	101.4
73	Middle Branch Middlebury River, 0.2	43.9757	-73.0156	B1	Ripton	23.8
74	Brackett Brook, 0.1	43.9907	-72.7776	B1	Braintree, Granville	5.5
75	White River, 55.2	43.9941	-72.883	B1	Granville	6.1
76	Roaring Brook, 4.4	44.0444	-72.1392	B1	Newbury, Bradford	1.3
77	New Haven River, 21.8	44.0616	-72.968	B1	Lincoln, Ripton	1.9
78	Lincoln Brook, 0.9	44.1017	-72.8749	B1	Lincoln, Warren	20.4
79	New Haven River Trib 27, 0.5	44.1065	-73.0106	A1	Bristol, Lincoln	3.1
80	Dog River, 14.8	44.1113	-72.6926	B1	Northfield, Waitsfield, Roxbury, Warren	38.0
81	New Haven River, 8.7	44.1126	-73.0948	B1	Starksboro, Monkton, Fayston, Buels Gore, Bristol, Lincoln, Ripton	155.0
82	New Haven River, 13.7	44.1205	-73.0248	B1	Starksboro, Bristol, Lincoln, Ripton	101.5
83	Tabor Branch Trib 5, 0.4	44.132	-72.2266	A1	Topsham	11.3
84	Stevens Branch, 11.9	44.1369	-72.5311	B1	Williamstown	36.8
85	Tabor Branch, 7.5	44.1499	-72.2764	B1	Topsham	13.6
86	Scott Brook, 0.7	44.166	-72.1637	B1	Topsham, Newbury	19.9
87	Nelson Brook, 2.3	44.1803	-72.3702	B1	Orange	3.8
88	Pine Brook, 0.5	44.1956	-72.7737	B1	Northfield, Waitsfield	15.5
89	Heath Brook, 0.1	44.2043	-72.2868	B1	Groton, Topsham	11.3
90	Hillsboro Brook, 0.5	44.2068	-73.0283	B1	Starksboro	9.6
91	South Branch Wells River, 4.3	44.2291	-72.2866	B1	Groton, Plainfield	10.5

Map ID	Name	Latitude	Longitude	Candidate	Towns	River (mi)
92	North Branch Wells River, 0.9	44.2312	-72.2073	B1	Barnet, Peacham, Groton, Ryegate	18.6
93	Lewis Creek, 3.7	44.2498	-73.2258	B1	Charlotte, Huntington, Starksboro, Monkton, Ferrisburgh, Bristol, Hinesburg	207.4
94	Lewis Creek, 19	44.2546	-73.0702	B1	Starksboro, Monkton, Bristol	55.5
96	Red Brook, 0.2	44.2747	-72.2195	A1	Peacham, Groton	7.5
97	Nasmith Brook, 2.7	44.2748	-72.3738	B1	Marshfield, Groton, Plainfield	16.0
98	Hollow Brook, 2.2	44.2932	-73.0488	B1	Huntington, Starksboro, Hinesburg	20.3
99	Mud Pond Brook, 0.6	44.3041	-72.1884	B1	Peacham	1.4
100	Turtlehead Pond Trib #1, 0.2	44.3168	-72.3381	A1	Marshfield	1.1
101	Guernsey Brook, 0.9	44.3195	-72.4135	B1	Marshfield	4.1
102	Marshfield Brook, 0.1	44.3393	-72.3499	B1	Peacham, Marshfield	13.1
103	Jug Brook, 1.4	44.3995	-72.3407	B1	Woodbury, Cabot	14.8
104	Winooski River, 85.3	44.4011	-72.3166	B1	Walden, Woodbury, Cabot	37.5
105	Scales Brook, 0.9	44.4362	-71.7506	B1	Lunenburg, Concord	8.4
106	Gold Brook, 3	44.4468	-72.6546	A1	Stowe, Worcester	11.4
107	Mill Brook, 0.3	44.4504	-72.9692	B1	Jericho, Bolton, Richmond	37.7
109	Michigan Brook, 0.1	44.4652	-72.8003	B1	Stowe, Bolton, Waterbury	5.9
110	Mink Brook, 2.7	44.47	-71.712	B1	Lunenburg	12.6
111	Sand Hill Brook, 0.4	44.4833	-73.0487	B1	Essex	2.5
112	Houghton Brook, 0.8	44.4901	-72.0895	B1	Wheelock, Stannard, Walden, Danville	16.1
113	Bedell Brook, 2.7	44.4946	-72.5926	B1	Morristown, Elmore, Worcester	10.3
114	Stevensville Brook, 1.3	44.5084	-72.8639	B1	Underhill, Stowe	6.6
116	Bog Brook, 0.2	44.5362	-71.8085	B1	East Haven, Burke, Victory, Kirby	40.1
117	Lamoille River, 80.2	44.5552	-72.2609	B1	Glover, Sheffield, Greensboro, Wheelock, Stannard	54.3
118	Washburn Brook, 1	44.5707	-71.6071	B1	Granby, Guildhall	6.9
119	Moose River, 25.7	44.5887	-71.7883	B1	East Haven, Granby, Victory	47.1
120	Dish Mill Brook, 0.8	44.5956	-71.9021	B1	Burke, Victory	16.4
122	Calendar Brook, 5.3	44.6224	-72.0216	B1	Sutton, Sheffield	28.3

Map ID	Name	Latitude	Longitude	Candidate	Towns	River (mi)
123	Wild Branch, 11.2	44.6304	-72.4311	B1	Craftsbury, Eden	25.1
124	Smith Brook, 0.9	44.6363	-72.7264	B1	Cambridge, Johnson	10.1
125	Granby Stream, 0.1	44.6398	-71.6933	B1	Ferdinand, East Haven, Granby	30.7
126	West Branch Moose River, 0.1	44.6435	-71.824	A1	East Haven	12.2
127	East Branch Passumpsic River, 8.9	44.646	-71.8922	B1	Brighton, Westmore, Ferdinand, Newark, East Haven	142.9
129	Rich Brook, 0.1	44.6545	-71.5954	A1	Maidstone	2.8
130	Sutton River, 0.1	44.6575	-72.0171	B1	Sutton, Burke	29.8
131	Taylor Brook, 0.1	44.6587	-71.5903	B1	Brunswick, Maidstone	4.6
133	Wild Brook, 0.3	44.67	-72.6138	A1	Belvidere, Johnson, Eden	21.0
135	Paul Stream, 0.1	44.6872	-71.6259	B1	Ferdinand, Brunswick, East Haven, Granby, Maidstone	89.0
136	Arcadia Brook, 0.3	44.7059	-72.0042	B1	Westmore, Newark	6.1
137	Bean Brook, 3.1	44.713	-71.9452	B1	Westmore, Newark	19.6
139	Murphy Brook, 3.1	44.7334	-71.7893	B1	Ferdinand	2.5
140	Nulhegan River, 0.3	44.7611	-71.6458	B1	Averill, Lemington, Avery's Gore, Warren's Gore, Lewis, Bloomfield, Brighton, Ferdinand, Brunswick	320.3
141	Oswegatchie Brook, 0.1	44.7873	-71.9092	A1	Brighton, Newark	14.4
142	North Branch Nulhegan River, 6	44.8122	-71.7778	B1	Avery's Gore, Warren's Gore, Lewis, Brighton	42.3
143	Mineral Spring Brook, 5	44.816	-72.3833	B1	Irasburg, Lowell	3.6
144	East Branch Nulhegan River, 0.9	44.8174	-71.6712	B1	Averill, Lemington, Lewis, Bloomfield	67.2
145	Clay Hill Brook, 6.1	44.8358	-71.8328	B1	Avery's Gore, Lewis, Brighton	8.1
146	Blodgett Brook, 0.5	44.8611	-71.5589	B1	Lemington	15.1
147	Tyler Branch, 5.3	44.8634	-72.7634	B1	Enosburgh, Bakersfield, Belvidere, Montgomery	49.8
150	Capon Brook, 0.1	44.9479	-71.5443	B1	Canaan, Lemington	12.3
151	Clay Brook, 0.2	44.954	-71.6015	B1	Canaan, Averill, Lemington	5.8
152	Number Five Brook, 0.7	44.9813	-71.7965	B1	Norton, Avery's Gore	10.3
153	Crystal Brook, 0.3	44.9915	-72.0965	B1	Derby	3.2