

**VERMONT AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION**

LAKES AND PONDS MANAGEMENT AND PROTECTION PROGRAM

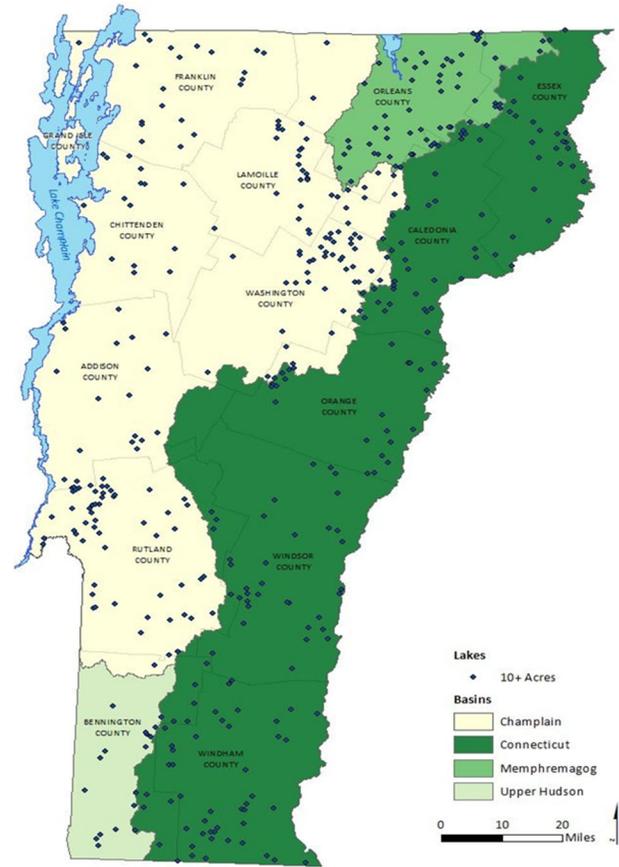
Strategic Plan

July 1, 2020 — June 30, 2022



Introduction

Three years after Congress passed the Clean Water Act in 1972, the Lakes and Ponds Management and Protection Program (Lakes and Ponds Program) was formed within the Vermont Agency of Natural Resources' Department of Environmental Conservation (DEC). Today, the Lakes and Ponds Program, which is housed within the Watershed Management Division (WSMD) of the DEC, continues to fulfill its original purpose of managing aquatic nuisance species (since 1964), permitting lake encroachment projects (since 1968), and monitoring and assessing the condition of Vermont's lakes (since 1977). The Lakes and Ponds has also expanded its mission to include aquatic invasive species prevention and management (since 1985), lake watershed surveys (intermittently since 1990), cyanobacteria tracking (since 2003), and, through outreach (since 2012) and regulation (since 2014), the protection of shorelands. The Lakes and Ponds Program also responds to new and emerging threats to lakes, while refining existing programs and assessing the impacts of development pressures, land use changes, and climate change on the state's water bodies, and its mission, vision, goals and objectives are defined in this Strategic Plan.



Vermont has >800 lakes and ponds

Purpose

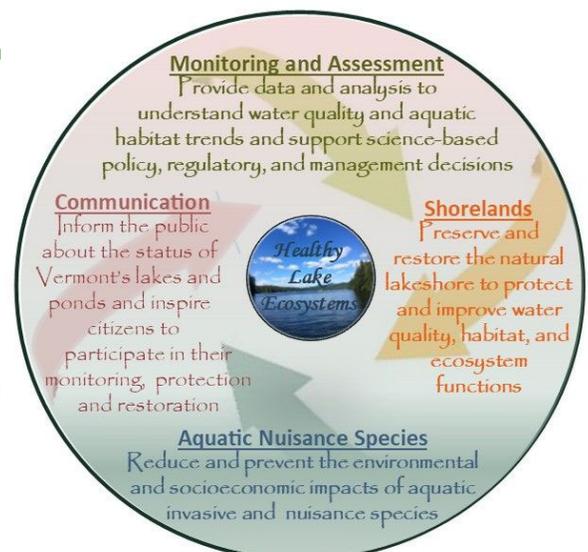
This Strategic Plan is intended to outline the Lakes and Ponds Program vision, mission, goals, objectives, and implementation strategies. This Plan will guide the work of the Program over the next three years, facilitate decision-making, and provide key performance indicators. Goals and objectives are intended to articulate how we will achieve our vision and measure our impact during this period, define our top priorities, and are nested within the broader goals of the WSMD. By maintaining this full perspective, the Lakes and Ponds Program will focus on achieving our vision, goals and objectives, while not losing sight of broader WSMD priorities and emerging lake protection and management challenges.

Mission Statement

To protect and restore ecosystem health of Vermont's lakes and ponds so that these water bodies maintain a range of uses to Vermonters.

Vision Statement

Vermont's lakes, ponds, and shorelands are vibrant and thriving. They harbor healthy and resilient ecosystems, can sustain a variety of public uses and environmental services, and are actively protected and enjoyed by the public.



Program Goals

The following goals describe how the Lakes and Ponds Program will meet its mission through monitoring, assessment, outreach, and regulation:

1. Monitor lakes and ponds to identify current and long-term water quality and aquatic habitat conditions and trends, with a focus on capturing impacts and causal mechanisms of development pressures, land use changes, atmospheric pollution, and climate change.
2. Use monitoring data to support science-based, lake-related policy decisions, regulatory efforts, and management actions, including restoring impaired waters, enhancing protection of high-quality waters, and clarifying rules governing public water use and levels.
3. Preserve and restore the natural lakeshore to protect and improve water quality, aquatic and terrestrial wildlife habitat, and lake ecosystem functions.
4. Reduce & prevent the environmental and socioeconomic impacts of aquatic invasive and nuisance species to protect and improve water quality, aquatic and littoral wildlife habitat, and lake ecosystem functions.
5. Implement a regulatory program that ensures compliance with statute, provides proactive outreach and technical assistance to the regulated community, and uses best practice, consultation and innovation to facilitate the permitting process in a manner that protects lake ecosystems & promotes reasonable development.
6. Inform the public about the status of Vermont's lakes and ponds and inspire citizens to participate in monitoring, protection and restoration of these water bodies and their watersheds.
7. Improve integration of lakes and ponds-related assessment, monitoring, permitting, and resource management efforts to enhance efficiencies, collaboration, and use of data for decision making

The Lakes and Ponds Program Strategic Plan Addresses the Watershed Management Division Goals Below

PROTECT

Protect Vermont's pristine or "special waters by safeguarding these natural systems from deleterious change over the long term through the expanded use of proactive protection tools such as upward classification of waters, designation of outstanding resource waters, Class 1 wetlands, the identification and funding of projects focused on protection, and by working to better synchronize Vermont's statutes, regulations, and water quality standards to support this overall effort.

MAINTAIN

Improve and expand the ongoing maintenance of Vermont's existing high quality waters through more protective and streamlined permitting and by updating rules and procedures to strengthen and clarify permitting standards, including Vermont's water quality standards and anti-degradation policy.



ENHANCE

Increase opportunities for the enhancement of existing high quality waters to an improved condition through the development and use of programs, policies, outreach and education efforts and other tools that are designed to proactively identify and fund projects to enhance surface waters, and to promote the use of processes and measures by existing discharges to improve the existing condition.

RESTORE

Aggressively pursue restoration of currently impaired waters through the development and timely implementation of comprehensive TMDLs, and implementation of remediation plans for Vermont's degraded waters using a combination of both regulatory and non-regulatory tools.



Program Core Values

The Lakes and Ponds Program has defined the following core values that guide the activities, goals, and conduct of the Program and which provide a foundation for decision-making and allocation of effort.

- Focus on ensuring lake and pond protection and restoration, integrated into a watershed-based approach
- Demonstrate leadership in lake monitoring, protection, and restoration approaches
- Uphold the U.S. Clean Water Act's primary objective to restore and maintain the chemical, physical, and biological integrity of Vermont's lakes and ponds
- Validate our work with data-informed scientific rigor and appropriate technology
- Build strong relationships with the public through information sharing, education, and advocacy
- Manage lakes in a manner that balances economic benefits and values of lakes and their adjacent shorelands with clearly defined protection goals
- Balance resources spent on restoration and protection to ensure that all of Vermont's lakes and ponds benefit from our work
- Promote a fun and respectful work environment that relies on teamwork to achieve greatness

Program Objectives

The Lakes and Ponds Program Strategic Plan contains objectives that are essentially the measurable actions the program will take to achieve its seven goals. The objectives are defined against each goal using the S.M.A.R.T. method (see figure 1) and are measures of change required to bring about the achievement of each respective goal. Each objective also includes one or more desired future outcomes which describe conditions that hopefully will be in place or results achieved at the end of the Plan period.

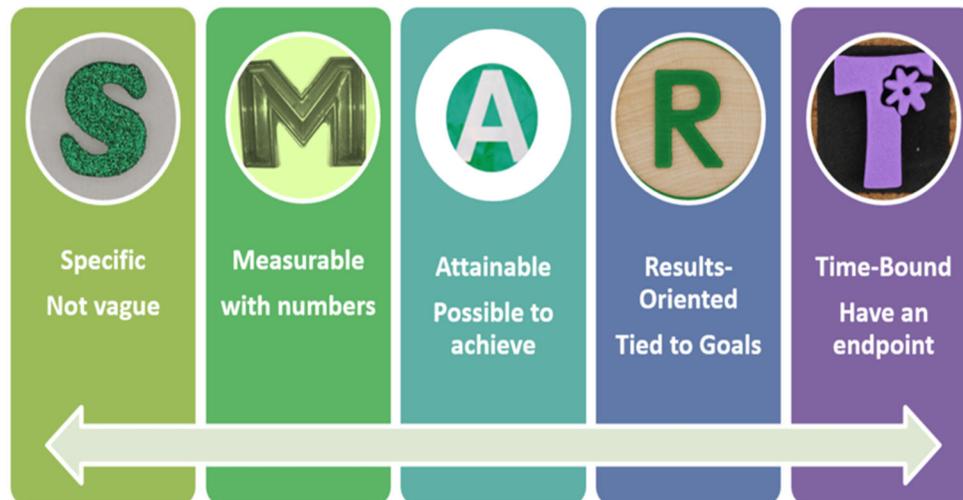


Figure 1. Definition of SMART Methodology

Doran, G. T. (1981). "There's a S.M.A.R.T. way to write management's goals and objectives". Management Review. 70 (11): 35–36.

Note on the Impacts of the COVID-19 Pandemic on this Plan: This Plan contains a set of goals and objectives that were developed prior to the impact of the COVID-19 Pandemic and the related series of Executive Orders promulgated by Vermont Governor Phil Scott. The pandemic, related economic impacts, and the "stay at home" orders are impacting our operations and may inhibit our ability to achieve some of the goals, objectives, and desired outcomes contained in this plan. However, we believe that the goals defined in this Plan are critical for protection and sound management of Vermont's Lakes and Ponds over the next two years. Furthermore, the objectives and desired outcomes established in this plan have been reviewed in light of the pandemic, and we believe that they are an attainable set of targets to strive for over the next two years in order to achieve the plan's goals. Finally, while the Pandemic will impact our work in many ways, we are operating under the assumption that our Program will continue at current staffing levels and reduced but not altogether eliminated access to the financial resources necessary to achieve the goals and objectives of this Plan. If the budgetary impacts of the Pandemic render this assumption invalid, this Plan will be altered accordingly.

Detailed Objectives and Desired Outcomes Table

| Goal One: Monitor lakes and ponds to identify current and long-term water quality and aquatic habitat conditions and trends, with a focus on capturing impacts and causal mechanisms of development pressures, land use changes, atmospheric pollution, and climate change. | | |
|---|---|-------------|
| OBJECTIVE | DESIRED OUTCOMES | LEAD |
| Objective One: Incorporate best practices and technologies into lake monitoring and assessment procedures and methods to ensure timely data acquisition and analysis | <ul style="list-style-type: none"> • Sentinel lake data incorporated into Regional Monitoring Network and our core monitoring to assess climate change impacts • Additional in-lake sensor arrays / data loggers obtained and deployed • Our network of continuous water level, temperature and dissolved oxygen arrays is expanded • Participate in the 2022 National Lake Assessment at the statewide overdraw level (n=50 lakes) like was done in 2007 and 2012 | Mon. Team |
| Objective Two: Establish verifiable indices such as bioindicators to develop enhanced benchmarks for lake and pond health and revise trophic status thresholds accordingly | <ul style="list-style-type: none"> • Contractor and macrophyte point intercept data uploaded into plant database for development of index by 12/2022 • 13-23 additional macrophyte surveys performed to achieve adequate sample size to develop macrophyte index (n=70) • Diatom transfer functions are developed by 12/2021 and indexed by 12/2022, in collaboration with UVM, NE Sediment Diatom Collabor. & EPA • Littoral macroinvertebrate data uploaded to biomonitoring database • New trophic thresholds defined by 5/21 • Biological indicators incorporated into nutrient criteria in VTWQS • Habitat listing approach being developed in Maine adapted to VT | Mon. Team |
| Objective Three: Perform regular, annual water quality and biological monitoring on Lake Champlain at ten or more sites to measure overall lake ecosystem health based on key indicators and to assess long-term effects of management actions and other environmental changes | <ul style="list-style-type: none"> • Cyanobacteria response plan w/ VTDOH and DW developed by summer 2021 • The LCBP TAC receives water quality data to enable them to make informed lake management decisions • "Delisting" of two segments of Lake Champlain that are meeting in-lake phosphorus concentrations is developed as part of broader efforts to support the TMDL | Mon. Team |
| Objective Four: Consolidate, align, and increase access to program data and geospatial information and make more information available to DEC staff and the general public | <ul style="list-style-type: none"> • With 1m resolution land cover data, characterize land cover class percentages in lake watershed, 100' stream and lake buffers and 250' shoreland protection zone • Using latest GIS tools, improve lake watershed boundaries • Recalculate the lake watershed human disturbance index in scorecard using new boundaries and 1m land cover data • Make Lake Assessment data publicly available in R Markdown • Update lake scorecard annually, including add public access info and adding scorecards to the ANR Atlas • Analyze and release results from 2012 NLA using R Shiny tool developed by EPA, compare changes/results from 2007 to nation • Add spring chloride, alkalinity, calcium, magnesium, dissolved organic carbon, turbidity and Secchi to lake scorecard as well as new trophic calculation | Mon. Team |
| Objective Five: Through the introduction of new tools and techniques, improve the capabilities of both staff-led and volunteer monitoring efforts to capture the impact of climate change and other sources of disturbances to Vermont's lakes and ponds | <ul style="list-style-type: none"> • Complete BIOBASE bathymetry mapping on 10 lakes • Lay Monitoring instituted on State Park lakes, sentinel lakes and three USFS LTM lakes for TP, chlorophyll a and Secchi • Train Lay Monitors capable of reporting observations of cyanobacteria as part of core sampling • 1m LU/LC Data used to identify potential nutrient sources in lake watersheds • Internal capacity built to assist Lake Associations with continuous sensor arrays following RMN protocols • Lake tributary sampling protocols, including sample design, and QA/QC processes for lakes with increasing phosphorus trends developed | Mon. Team |
| Objective Six: Monitor the effectiveness of best management practices aimed at reducing nutrient pollution to lakes from agriculture, forestry, road networks, and shoreland development | <ul style="list-style-type: none"> • Assessment of the impact of vegetative BMPs in reducing runoff and nutrient loading to lakes and ponds • Funding and modalities for pre/post monitoring of BMP implementation on lakes with increasing TP trends identified and monitoring efforts implemented | OP, AP, KM |

Detailed Objectives and Desired Outcomes Table

Goal Two: Use monitoring data to support science-based, lake-related policy decisions, regulatory efforts, and management actions, including restoring impaired waters, enhancing protection of high-quality waters, and clarifying rules governing public water use and levels.

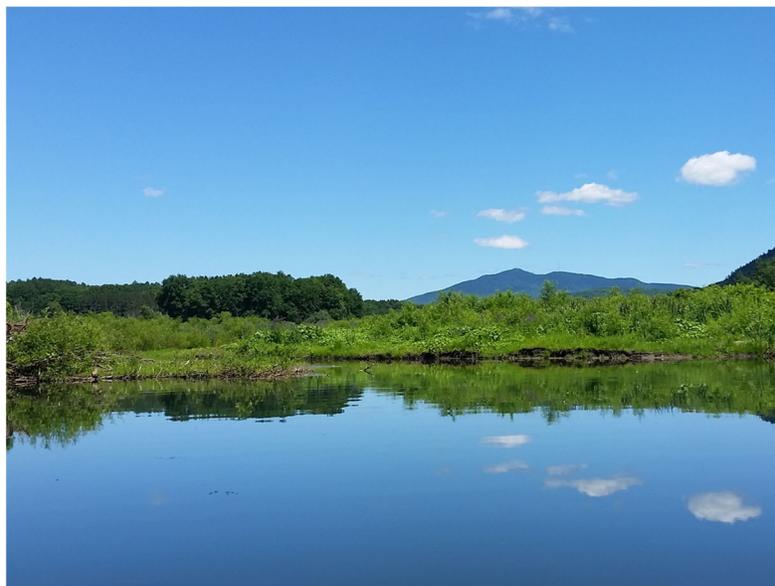
| OBJECTIVE | DESIRED OUTCOMES | LEAD |
|---|---|---------------|
| Objective One: Reclassify up to ten high-quality lakes under VT WQS as A1 and develop protection plans linked with this reclassification to maintain these high-quality waters | <ul style="list-style-type: none"> • Lake Protection Plan (a.k.a. management implications) document developed and finalized • Target lakes for reclassification identified, followed by consultation with lake associations to obtain support for this effort • Rule making process for reclassification initiated at 5 lakes • Guidance on what evidence can be used to define a lake as high quality or ORWs is developed | KM, OP |
| Objective Two: Engage in clarification and/or revision of lake-related rules and rule development for our three permitting programs so that they better support improved lake management, increased compliance, and protection efforts | <ul style="list-style-type: none"> • Procedures for mean water level rule are developed • Use of public waters rules revised to provide improved guidance on wake boat use • Lake maps that show the 200' no wake zone developed and made accessible to the public online and at access kiosks | Reg. Team, OP |
| Objective Three: Work with specific partners, i.e. basin planners, state agencies, and federal partners, on strategies and actions for better integrating Lakes and Ponds priorities into local, regional, and national management planning and protection efforts | <ul style="list-style-type: none"> • Carmi Crisis response plan updated annually • Plan for in-lake treatment options in St Albans Bay w/ ACOE and possibly Missisquoi Bay w/ LCBP is completed | OP, AS |

Goal Three: Preserve and restore the natural lakeshore to protect and improve water quality, aquatic and terrestrial wildlife habitat, and lake ecosystem functions

| OBJECTIVE | DESIRED OUTCOMES | LEAD |
|---|---|------|
| Objective One: Increase volunteer and property owner participation in the Lake Wise Program, including at Agency-owned properties (state parks, F&W areas, etc.) | <ul style="list-style-type: none"> • At least ten new Lake Wise participants identified and shoreland sites assessed during each field season • Ten Lake Wise BMP project sites identified during each summer field season • Funding sources for shoreland BMP installations are identified via partnerships | AP |
| Objective Two: Increase the number of qualified Lake Wise trainers / evaluators, specifically, Natural Resource Conservation District staff and existing ANR staff | <ul style="list-style-type: none"> • One Lake Wise Evaluator Training or Refresher Course conducted each summer • Two Active Lake Wise Evaluators supported in the Lake Wise Program each summer • Two Natural Shoreland Erosion Control Certification Trainings completed each November • One Field Erosion Control Training completed | AP |
| Objective Three: Increase native plantings and restore living shorelands to stabilize banks, filter & absorb stormwater, provide wildlife habitat and build resiliency along the shore to protect water quality and property | <ul style="list-style-type: none"> • Completion of Bioengineering Manual showcasing five years of shoreland restoration projects and methodologies for the installation of bioengineering practices • New shoreland BMP guidance to address specific lake and watershed problems produced | AP |
| Objective Four: Expand Lake Wise concepts and social science approaches to broader protection efforts | <ul style="list-style-type: none"> • The Vermont Stream Wise Program is launched • Lake Wise shoreland assessments are embedded into all Lake and Watershed Action Plans | AP |

Detailed Objectives and Desired Outcomes Table

| Goal Four: Reduce and prevent the environmental and socioeconomic impacts of aquatic invasive and nuisance species to protect and improve water quality, aquatic and littoral wildlife habitat, and lake ecosystem functions | | |
|---|--|--|
| OBJECTIVE | DESIRED OUTCOMES | LEAD |
| Objective One: Maximize reach of the Grant in Aid Program by simplifying the grant application and management process and by carefully managing available financial resources | <ul style="list-style-type: none"> Procedural guidelines to better inform applicants of reporting requirements are developed Templates for grant applications, awards & reporting in use Awards targeted towards projects that address emerging threats and eradication as opposed to simply trimming back EWM | AIS Team & AID Staff |
| Objective Two: Develop statewide invasive species management plans by incorporating realistic threats, prioritization maps, current technologies, and acceptable methods that meets Agency-wide philosophy | <ul style="list-style-type: none"> Annual AIS plant surveys completed and uploaded into the Lake Score Card AIS prevention and management efforts integrated into Lake Watershed Action Plans for priority lakes A user-friendly program to upload Greeter Program Data is developed and in use along with prioritization maps Infested waterbodies that are/may be vectors of transmission are assessed, tracked, and mapped Pilot studies on eDNA Surveys for zebra mussel and Asian clam and UAS Water Chestnut Surveys are underway and completed | AIS Team IT Staff Watershed Planners |
| Objective Three: Develop an AIS Early Detection and Rapid Response Plan for VT that includes surrounding states and interconnected waterways | <ul style="list-style-type: none"> Complete AIS Early Detection and Rapid Response Plan via collaboration with internal and external partners (such as VFWD, VFPR, VAAFM, VTRANS, TNC), representatives from nurseries, & landscapers, and NEANS Members | AIS Team |
| Objective Four: Build the capacity and efficiency of the AIS program through grant writing, networking, regional partnerships, multi-agency coordination and increased staffing | <ul style="list-style-type: none"> Incorporate new technologies and maps into workplans and budgets to maximize program efficiency External partnerships to develop regional cooperatives and resource-sharing networks are developed Grant reports used to leverage additional grant funds | AIS Team |
| Objective Five: Educate public about cyanobacteria-related risks to recreation and drinking water | <ul style="list-style-type: none"> Improved public understanding of their role in managing lakes to reduce frequency and magnitude of blooms DEC and VDH's roles in cyanobacteria management are clarified | Monitoring Team |



Detailed Objectives and Desired Outcomes Table

| Goal Five: Implement a regulatory program that ensures compliance with statute, provides proactive outreach and technical assistance to the regulated community, and uses best practice, consultation and innovation to facilitate the permitting process in a manner that protects lake ecosystems and promotes reasonable development | | |
|---|---|-----------|
| OBJECTIVE | DESIRED OUTCOMES | LEAD |
| <p>Objective One: Develop new or revised procedures, guidance, rules, policy memos, and permit templates to simplify or clarify the intent and requirements of guiding statutes and to provide clarity with enforcement and compliance issues</p> | <ul style="list-style-type: none"> • Rule making process to clarify SPA and Lake Encroachment legislation • Complete at least ten new procedures / guidance documents / policy memos to improve clarity of permitting process • ANC Internal Review Procedure finalized and disseminated | Reg. Team |
| <p>Objective Two: Encourage the regulated community, including lake associations, to adopt a holistic and watershed-based approach to managing water quality issues, including aquatic nuisances, to achieve their goals as well as the goals of the Lakes and Ponds Program</p> | <ul style="list-style-type: none"> • More robust long-range management plans to minimize the use of pesticides over time are developed by permittees • All regulatory staff are well versed in ANC, LEP, and SP jurisdictions • Regulated community guided on how to initiate and implement lake / watershed management efforts | Reg. Team |
| <p>Objective Three: Issue permits in a timely manner consistent with PEP Plan benchmarks, that draw on regional best practice, and incorporate innovative new technologies & products that achieve the goal of a project while minimizing impacts to the resource</p> | <ul style="list-style-type: none"> • PEP benchmarks for all permits met or exceeded • Continuous administrative and database improvements achieved via collaboration with BOSS • Regulatory staff more familiar with resource and aware of local lake issues via increased field work • BioBase, Lake Score Card, and aquatic plant survey data used to inform and support permit decisions | Reg. Team |
| <p>Objective Four: Increase our knowledge base regarding applicability and effectiveness of best management practices for permitted projects</p> | <ul style="list-style-type: none"> • Increased participation of regulatory staff in Lake Wise Program through completion of evaluator training and support to Natural Shoreland Erosion Control Certification Trainings • Improved collaboration within ANR and State Agencies on projects in or around jurisdictional waters | Reg. Team |



Detailed Objectives and Desired Outcomes Table

| Goal Six: Inform the public about the status of Vermont’s lakes and ponds and inspire concerned citizens to participate in monitoring, protection and restoration of these water bodies and their watersheds | | |
|--|---|-------------------------|
| OBJECTIVE | DESIRED OUTCOMES | LEAD |
| Objective One: Strengthen and expand volunteer monitoring programs, including the Lay Monitoring, Cyanobacteria Monitoring and Volunteer Invasive Patroller programs through proactive outreach and regular training for volunteers | <ul style="list-style-type: none"> Increased reporting by volunteers on cyanobacteria at both a larger spatial and more regular temporal scale Increase number of lakes with trained VIPs Identify and train lay monitoring volunteers at all state park lakes and sentinel lakes Increase cyanobacteria monitoring performed by lay monitors | Mon. and AIS Teams |
| Objective Two: Introduce tributary monitoring on targeted lakes through integration with the LaRosa Program and/or expanded sampling by LMP volunteers to better understand phosphorus loading trends | <ul style="list-style-type: none"> Tributary monitoring starts on at least five lakes with increasing TP trends | Mon. Team |
| Objective Three: Improve existing partnerships and establish new partnerships with watershed associations, lake associations, conservation districts, clean water service providers, and professional associations | <ul style="list-style-type: none"> Lake protection and restoration efforts at least ten lakes in partnership with lake associations Direct partnerships established with future CWSPs to identify high-quality lakes to protect NRM projects Staff and attend trainings/ conferences held NALMS and other lake/watershed related organizations Five Lake Watershed Action Plans developed with support from our Program | ALL |
| Objective Four: Enhance the Lakes and Ponds internet and social media presence to clarify our program’s work and facilitate access to data and information | <ul style="list-style-type: none"> Lakes and Ponds website updated to reflect goals and objectives of strategic plan Increase “follows” on our Facebook page by 100 per year | Lakes Social Media Team |
| Objective Five: Continue to support FOVLAP’s outreach, educational, and advocacy work | <ul style="list-style-type: none"> Annual Lakes Seminar is an effective and well-attended event that conveys important lake protection messages Key policy issues for FOVLAP to support are identified \$2,500 annual payment to FOVLAP is maintained | OP, AP, LD, AS |



Detailed Objectives and Desired Outcomes Table

| Goal Seven: Improve integration of lakes and ponds-related assessment, monitoring, permitting, and resource management efforts to enhance efficiencies, collaboration, and use of data for decision making | | |
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| OBJECTIVE | DESIRED OUTCOMES | LEAD |
| Objective One: Improve coordination with other WSMD Programs and DEC Divisions, with a focus on mobilizing funding managed by the Water Infrastructure Division (CWIP, Act 76, CWSRF, etc.) to support lake protection and restoration projects | <ul style="list-style-type: none"> Lake protection priorities are funded through future Water Quality Enhancement and Protection Grants under Act 76 Lake Wise Program expanded through WID support of NRCDs and other partners and via funding for shoreland restoration projects Lake protection and reclassification priorities integrated into Tactical Basin Plans | OP, AP |
| Objective Two: Enhance use of assessment and monitoring data and findings for regulatory functions and enhanced monitoring of the impact of regulatory work | <ul style="list-style-type: none"> Findings from littoral habitat study of mesotrophic lentic systems with water level manipulations are summarized Studies to determine which regulatory actions best support overall lake protection and restoration goals are completed | All |
| Objective Three: Optimize information sharing and collaboration between aquatic nuisance control permitting and aquatic invasive species prevention and management work | <ul style="list-style-type: none"> AIS experts are consulted and regularly provide input into ANC permitting decisions ANC permitting staff are consulted about and aware of AIS program activities, including grants | MC, KJ |
| Objective Four: Identify and apply two new grant opportunities to support our work | <ul style="list-style-type: none"> The Program receives at least one new external grant each year | OP |
| Objective Five: Orient monitoring and assessment resources to support realization of program mission and balance between Champlain, high-quality lakes, and altered / stressed / impaired lakes | <ul style="list-style-type: none"> Radomski and Carlson, 2018 approach adapted to support setting lake protection priorities in Vermont Empirical evidence from 2007 and 2012 NLA studies used to set our program priorities | Mon. Team |

