

Vermont's Clean Water Initiative



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Introduction

The State of Vermont¹ submits this report describing Vermont's Clean Water Initiative in order to satisfy a request from the Vermont General Assembly and in response to the growing chorus of Vermonters who are demanding action to protect the streams, rivers, ponds and lakes that they cherish as a vital part of Vermont's landscape of cities, towns and villages surrounded by working forests, farms and mountains.

This report is offered in the context of decades of work to protect the biological, chemical and physical integrity of Vermont's surface waters as required under the federal Clean Water Act. The State of Vermont has taken on the responsibility of implementing this landmark federal law under the supervision of the United State Environmental Protection Agency (EPA). Clean water is a shared resource, belonging to all Vermonters, with a corresponding responsibility that we all bear to protect and restore our waters.

Over the last decade, the State of Vermont has invested millions in the form of grants and low-interest loans to local governments, farmers, watershed groups, conservation districts, regional planning commissions and others to protect and restore water quality. For example, the State of Vermont has invested roughly \$100 million to support municipal wastewater treatment infrastructure,² \$24 million in grants under the Ecosystem Restoration Program and \$26 million in grants and technical assistance to farmers. Vermont has also, over the past decade, strengthened the programs for controlling polluted stormwater runoff for both farms and developed land.

Following EPA's decision to require a new plan for addressing pollution into Lake Champlain in 2011, Governor Shumlin's Administration has elevated this work as a central environmental priority, not just for the Agency of Natural Resources, but across all of the state agencies with responsibility and tools for contributing to clean water. The importance of the state's commitment to ensure the health of our rivers and lakes was further elevated by our experience following the floods of 2011. The state's response to these events has required and contributed to an unprecedented level of collaboration among state agencies and local governments as we work to ensure that we identify and implement opportunities to protect clean water, our communities and our economy.

In spite of years of hard work and investment, the State of Vermont has been unable to support the full set of investments necessary to meet all of the needs associated with clean water – in the Lake Champlain Basin and around the State. Now, for this reason and in response to EPA requirements focused on Lake Champlain, the State is launching this Clean Water Initiative. The goals of this Initiative are to satisfy the State's legal obligations under the federal Clean Water Act, and to protect Vermont's environment, economy and the wellbeing of its citizens.

¹ This report was prepared by the Agency of Natural Resources (ANR), Department of Environmental Conservation (DEC), in collaboration with the Agencies of Agriculture, Food and Markets (VAAF), Transportation (VTrans), and Commerce and Community Development (ACCD).

² Includes State contributions through the Capital Bill for grants directly to municipalities and as a match to Federal funds in the State Revolving Loan program, and funds paid back from loan repayments from SFY2004-2013.

The recommendations in this report rely primarily on the strategies outlined in the State's Lake Champlain Phosphorus Total Maximum Daily Load³ Phase One Implementation Plan (Phase I Plan) submitted to EPA on May 29, 2014. Nearly every body of water in the state faces the same challenge resulting from the discharge of excess nutrients as do the streams, rivers, ponds and lakes within the Lake Champlain watershed. The Phase I Plan describes management strategies, sets timelines and provides accountability measures for reducing phosphorus pollution into Lake Champlain. These recommendations require a comprehensive, multi-sector approach to managing surface water pollution. In this way, the Phase I Plan provides a helpful framework for understanding how the State could use its regulatory, education and outreach, financing and other tools to achieve water quality improvements throughout Vermont.

This report also draws upon ANR's Surface Water Management Strategy, our plan for the protection and management of all pollutants that degrade Vermont's waterways.⁴ The Surface Water Management Strategy describes in detail the full range of current programs to identify and manage stressors and reduce both point and nonpoint sources of surface water pollution in Vermont. ANR uses the Strategy to guide the decision-making to ensure efficient, predictable, consistent and coordinated water resources management actions.

Abstract

The accountability framework proposed by EPA for the Lake Champlain TMDL will require Vermont to establish programs and permits necessary to implement the initial three years of milestones outlined in the Phase I Plan. In the event that Vermont does not achieve these milestones, EPA will use its authority under the Clean Water Act to take direct actions to reduce pollution into Lake Champlain.

The Phase I Plan, in turn, references the tactical basin planning process that ANR uses to achieve the Surface Water Management Strategy. In the tactical basin plans, the state describes the most significant sources of pollution (stressors) and proposes actions designed to strategically focus responses to address those stressors. The actions identified in the tactical basin plans will become subject to EPA's accountability framework once adopted in Phase II of the Lake Champlain TMDL implementation milestones. Outside of the Lake Champlain watershed, tactical basin plans will also drive work, but will not be subject to EPA's accountability framework for Lake Champlain.

Our three-stage proposal for funding this work, described below, is designed to accommodate this iterative process. The three stages for funding clean water work are designed to anticipate and accommodate the synchronized planning process and implementation work being done under both the Lake Champlain TMDL and the Surface Water Management Strategy.

³ A "Total Maximum Daily Load" or "TMDL" is a term in the U.S. Clean Water Act that is used to mean both the maximum amount of a pollutant that a waterbody can assimilate without harm to the uses of that waterbody, and the plan that a state may implement in order to reduce pollutant loading to that level. In the case of Lake Champlain, the state has determined that the levels of phosphorus in the lake exceed state water quality standards and so is required to work with the U.S. Environmental Protection Agency to reduce sources of phosphorus pollution.

⁴ The Surface Water Management Strategy is available at: <http://www.watershedmanagement.vt.gov/swms.html>.

Stage One. In order to meet that first accountability milestone, this report describes priorities and funding options needed to:

- Create a new Clean Water Fund, capable of receiving private donations, impact fees, dedicated state revenue and, where appropriate, federal dollars, and distributing those funds to farmers, municipalities, small businesses and private landowners through existing grant and loan programs at ANR, VAAF, VTrans and ACCD;
- Establish a governance process for clean water funding in order to evaluate annual needs, recommend funding levels, and recommend revenue allocations and potential new sources of revenue annually to the Administration and General Assembly;
- Support coordinated planning, including tactical basin planning, stormwater planning, transportation planning and land use planning, among the State of Vermont Agencies, Regional Planning Commissions (RPCs) and Vermont League of Cities and Towns (VLCT); and
- Enhance or establish new regulatory programs, permits and standards at ANR, VAAF and VTrans, in order to:
 - Update the Accepted Agricultural Practices (AAPs) administered by VAAF;
 - Increase effectiveness of nutrient management planning under the AAPs;
 - Establish small farm certification and manure applicator certification programs at VAAF;
 - Add phosphorus reduction obligations and continue flow monitoring requirements in the municipal separate storm sewer system program (MS4);
 - Establish a new transportation separate storm sewer system permit (TS4);
 - Issue a new general permit with standards for management of stormwater on municipal roads; and
 - Require stormwater retrofit obligations for existing developed lands to the extent not covered under the MS4 or TS4 permits or municipal roads general permit.

Stage Two. Following successful completion of the stage one goals described above, the State of Vermont and its partners will move forward with the additional projects and practices necessary to protect clean water. Clean Water Fund allocations will continue to support coordinated planning, regulatory oversight and technical support from the State of Vermont Agencies, RPCs and VLCT. In addition, the Clean Water Fund will provide enhanced funding for existing grant and loan programs at ANR, VAAF, VTrans and ACCD.

ANR's basin planners will work with the RPCs, VLCT and municipalities to identify strategic priorities and investments for each of the priority sectors described within this report, within the various drainage basins of Lake Champlain, and in other watersheds across Vermont. Other groups, including conservation districts, watershed groups, the UVM Extension program, and the Lake Champlain Basin Program, will participate in the planning process and implementation phase as consultants, grant recipients and contractors. In this way, our "Stage Two" corresponds and overlaps with the "Phase II" planning phase of the Lake Champlain Phosphorus TMDL implementation process as described above.

The Clean Water Fund reporting and governance process will ensure that the Clean Water Initiative continues to receive the resources and support necessary to meet the goals in the Phase I Plan and Surface Water Management Strategy. An annual report from the Fund will

describe projects supported, completed, and outstanding, as well as needs for next fiscal year(s) and recommended funding levels. Increased funding and potential sources of new revenue would be recommended by an Administration steering committee in consultation with an advisory board responsible to the General Assembly and other clean water stakeholders appointed by the Governor.

Stage Three. The primary metrics for measuring the effectiveness of the Clean Water Initiative will be (i) the accountability framework established by EPA for the Lake Champlain TMDL, and (ii) monitoring and mapping efforts established in the basin planning process and carried out by ANR, VAAF and VTrans staff in collaboration with the RPCs, municipalities, farmers and other clean water stakeholders. The Administration will also work with the General Assembly to establish other Results Based Accountability measures to gauge the population level impacts and effectiveness of investments made by the State of Vermont under the Clean Water Initiative. “Lean” government principles will be used to ensure that new and enhanced programs deliver timely and predictable results.

The Value of Clean Water

Our clean water laws, both federal and state, are expressly premised upon a shared state and federal goal to protect the ecological integrity of our waters. This goal is captured in the Clean Water Act objective to eliminate the discharge of pollutants into our waters in order to “restore and maintain the chemical, physical and biological integrity of the Nation’s water.”⁵ Under this law, the State has a legal obligation to ensure that it has programs and standards in place to ensure that our waters provide for a full range of uses – to ensure that our waters are “fishable and swimmable.”⁶ While compliance with federal and state law, and the fundamental importance of protecting our waters for their aesthetic and ecological value alone, these reasons are not the only imperative for action.

Vermont’s economic future is intimately tied to the Clean Water Initiative. As is often described in discussions about water quality in Vermont, this is in part because Vermont’s exceptional natural features—open landscapes, clean water, and rural, agrarian communities—have made Vermont a popular destination for travelers, new businesses and Vermonters alike.

Vermont’s clean water:

- Provides fishing and other recreational uses, bolsters tourism and property values, and protects public health.
- Supports commercial uses, ranging from local farms to international firms.
- Ensures Vermont’s vision of sustainable working landscape, an essential legacy for Vermont’s future generations.

The economic benefits of clean water are not limited to tourism, recreation and attractiveness to new businesses. Some businesses have been able to develop new business models for reducing pollution while generating new products, such as the collaboration between some farmers and

⁵ 33 U.S.C. Section 1251(a).

⁶ 33 U.S.C. Section 1313.

electric generation companies to harness the energy generated from cow manure. Other businesses, particularly in the engineering and environmental consulting fields, are critical to the development of new and emerging pollution control practices and are an essential link between state agencies and business owners. Further, investing in new infrastructure for our water pollution control efforts, including stormwater management and wastewater treatment facilities, will pay dividends for communities both in terms of cleaner water and also in the form of jobs and attracting new economic development.

Vermont's Clean Water Initiative will have benefits beyond water quality. Many of the actions necessary to address nutrient pollution in stormwater runoff provide benefits that go far beyond the immediate benefits to our waterways. For example:

- Improving manure and fertilizer management, together with good soil conservation practices, can reduce farmers' costs and protect the vitality of the soil.
- Reducing the inputs of nutrients like phosphorus and nitrogen into farming practices and treating these important elements as commodities can save costs and reduce pollution.
- Correcting chronic erosion problems at culverts and ditches on gravel roads can save on maintenance costs over the long term.
- Restoring and protecting the stability of Vermont's streambanks and stream channels can reduce the infrastructure damage and property loss that occur during major flooding, while at the same time improving habitat for fish and wildlife and resilience to climate change.
- Using green stormwater infrastructure and low impact development methods to control stormwater pollution can reduce energy costs, reduce risk of flooding, provide aesthetic benefits, and contribute to more livable, walkable communities.

The comprehensive nature of the Clean Water Initiative, combined with the far-reaching benefits of this work, require that this initiative involve collaboration among all levels of government including state, federal, and local agencies and officials. The coalition of state agencies working to implement the Clean Water Initiative includes not just ANR, but VAAF, VTrans and ACCD.

Further, this is not a challenge that the public sector can overcome without broad support from Vermonters from every corner of the state, a broad coalition of conservation organizations, and every business sector. For this reason, we will continue to work with statewide and community based conservation groups, farmers, businesses, and the general public. In the area of businesses, we will continue working across multiple economic sectors including agriculture, consulting, energy, real estate and manufacturing.

We will also continue to work with regional development corporations, regional planning commissions, and business alliances. We have learned that it is critical to include the business community as partners in our efforts to address water pollution as well as environmental advocates, and to include planners as well as investors. We are listening to the people of Vermont – in our meetings, we have learned that Vermonters care deeply about clean water and that we have more in common than differences when it comes to a commitment to action and results.

Only by working together, can we develop a plan that will achieve our clean water goals and the economic benefits associated with clean water. Only by working together we can protect Vermont's surface waters, including Lake Champlain, maintain our working landscape of farms and forests, create jobs, and promote prosperous communities.

I. Overview and Background

This report reflects the commitment of the State of Vermont to improving water quality in surface waters across the state. This report was prepared by the Agency of Natural Resources (ANR), in consultation with the Agency of Agriculture, Food and Markets (VAAF), the Agency of Transportation (VTTrans) and the Agency of Commerce and Community Development (ACCD). We prepared this report in accordance with No. 97 of the Acts and Resolves of 2013 (Adj. Sess. 2014), as modified by No. 171 of the Acts and Resolves of 2013 (Adj. Sess. 2014). (Act 97). Act 97 directed the State of Vermont to provide specific recommendations for administering, implementing, and financing water quality improvement in Vermont over the next ten years. This report is also referenced in the State's commitments to EPA, described in the Lake Champlain Phosphorus TMDL Phase One Implementation Plan (Phase I Plan).⁷

Act 97 requires that the State address the following required elements in the report:

- Five priority actions over next ten years to improve water quality, addressing the water quality benefit of each action, the necessity of each action and any impetus to prioritize action.
- Two proposals for financing water quality, sufficient to fund implementation of priority actions and revenue generated from each action.
- Definition of state government role in administering, implementing and overseeing implementation of the priority actions, including staffing, organizational, structural and restructuring needs, and modes of public interface.
- Recommended process for addressing and financing priority actions.

In addition to the requirements set forth in Act 97, this report also examines the lessons learned from our past experience working to reduce phosphorus pollution in Vermont. We have accomplished a great deal since the passage of the Clean Water Act in 1972, particularly in the area of wastewater treatment. Our work in the area of addressing polluted stormwater runoff has accelerated dramatically with the implementation of better controls on runoff from new development, and increased oversight of agricultural sources of water pollution. While there have been important successes, we have also learned that we can do better by reaching a broader range of pollution sources, and by more carefully targeting our collective resources.

⁷ The Phase I Plan is available at: <http://www.watershedmanagement.vt.gov/erp/champlain/docs/LCTMDLphaseIplan.pdf#zoom=100>.

Building on Lessons Learned

During the past decade, the state of Vermont has made significant investments to reduce phosphorus pollution from nonpoint sources going into Lake Champlain, Lake Carmi, Lake Memphremagog and other waters of the state. Despite these efforts, phosphorus levels from its tributary rivers have not measurably declined, and blue-green algae blooms persist in many of our surface waters. While important reductions have been made, the Clean Water Act requires the State to increase regulation, funding and support of the various sectors that contribute pollution to our surface waters.

Reviewing the “lessons learned” from this experience will help us build upon what is already working, stop or modify actions that are not demonstrating results, and in that way, improve how we go about restoring and safeguarding clean water for this and future generations.

Lesson No. 1: We must support Vermont communities to achieve the Clean Water Initiative.

Despite gains during the last decade, the funding and capacities needed to implement a nonpoint source controls statewide and, in particular, phosphorus controls within the Lake Champlain Basin, are much greater than previously estimated. This Initiative will require a statewide level of effort and investments by local governments, community-based conservation groups, and regional planning and development organizations, as well as farms and businesses. Sources of funding and capacity will need to come from an array of sources. The federal government has an obligation to assist Vermont in protecting national resources such as the Connecticut River, Lake Memphremagog and Lake Champlain.

Local governments will be required to contribute resources as will farmers, landowners and businesses. Private philanthropy can play a critical role in supporting innovation, advocacy, and education and outreach. Finally, the state will need to increase its investments across a range of programs, to fill gaps in funding needs left by the patchwork of federal programs, and to ensure a fair allocation of responsibility, so that the burden of clean water does not fall disproportionately on any one sector or region.

Municipalities, businesses, farms and the public at large all benefit from clean water, and each of those groups must also assume some degree of responsibility for sharing the investments needed to implement the management practices needed to safeguard clean water for current and future generations. Implementation of Vermont’s Clean Water Initiative, including the Phase I Plan and the Vermont Surface Water Management Strategy, will require substantial action and investment from a broad spectrum of governmental and non-governmental organizations, including the three implementing agencies, ANR, AAFM and VTrans, federal agency partners, and businesses, farmers and other property owners.

Lesson No. 2: To address the problem cost-effectively, Vermont needs to deal with the sources pollution strategically.

Given the price of restoring and safeguarding water quality, it is imperative that funds be spent in the most strategic and cost-effective manner. We know that investments to reduce polluted

stormwater runoff from farms, fields, roads and developed areas, as well as investments in reducing streambank erosion, are the most cost-effective means to achieve the greatest reductions of nutrients like phosphorus and nitrogen. These “nonpoint sources” of pollution are now the largest contributor to nutrient pollution into Vermont’s waters. About 97 percent of the phosphorus load to Lake Champlain comes from nonpoint sources, and a similar situation exists for phosphorus loading to Lake Memphremagog and for nitrogen loading to the Connecticut River from Vermont.

The prevalence of nonpoint source pollution is overwhelming the progress the state has made in delivering clean water to the public and posing threats to public health and safety. To be successful, a long-term plan for restoring Lake Champlain and the surface waters of the state must address these nonpoint sources.

We have also learned from recent research in the Missisquoi Bay watershed that application of “critical source area” targeting of phosphorus reduction practices based on specific site characteristics can result in two to three times more phosphorus reduction than an untargeted approach.⁸ We will use this type of “critical source area”⁹ targeting method to work to identify and map priority sites for technical, financial, and regulatory assistance.

This lesson should not obscure the fact that an important success story in Vermont and nationally is the water quality improvements from “point sources” of pollution such as wastewater treatment plants. Beginning in the 1970s, Vermont and the rest of the country have made significant gains in controlling pollution through regulatory permit requirements that manage discharges from “point sources.”¹⁰ The State and federal government undertook a shared responsibility to provide Vermonters with clean water, investing over \$600 million for wastewater treatment.¹¹ We cannot rest now and need to ensure that we continue to maintain that investment, and use evolving technologies to continue improvement in this sector.

The most critical lesson learned which is driving the priorities set forth in this report is, however, that Vermont faces the challenge of better controlling precipitation-driven stormwater and nonpoint source pollution.¹²

⁸ Stone Environmental, Inc. 2011. Identification of critical source areas of phosphorus within the Vermont sector of the Missisquoi Bay Basin. Prep. for Lake Champlain Basin Program. Grand Isle, VT., available at: http://www.lcbp.org/techreportPDF/63_Missisquoi_CSA.pdf.

⁹ Critical source areas, also commonly referred to as pollution “hot spots,” are those areas on the landscape that are at risk of disproportionately contributing the pollutant of concern, such as phosphorus, to surface waters.

¹⁰ Point sources are, “any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.” 33 U. S. C. § 1362(14).

¹¹ Investment is in total nominal dollars, awarded between 1955 and 2012.

¹² Nonpoint sources of pollution are sources that do not meet the Clean Water Act’s legal definition of point source. U. S. Environmental Protection Agency, Nonpoint Source Pollution: The Nation’s Largest Water Quality Problem, EPA841-F-96-004A, available at: <http://water.epa.gov/polwaste/nps/outreach/point1.cfm>; Smeltzer, E. , Dunlap, F. , and Simoneau, M. 2009. Lake Champlain phosphorus concentrations and loading rates, 1990-2008. Lake Champlain Basin Program Technical Report No. 57. Grand Isle, VT., available at: http://www.lcbp.org/techreportPDF/57_Phosphorus>Loading_1990-2008.pdf

Lesson No. 3: We are not starting from scratch. Efforts to date to Restore Lake Champlain are making an important difference and we should build on this work.

Vermont has made substantial investment over the last twenty years to reduce nonpoint sources of phosphorus and sediment pollution within the Lake Champlain Basin and statewide. Those efforts accelerated substantially as a result of state's work to implement the 2002 Lake Champlain Phosphorus TMDL.

Since that time VAAFMs have significantly improved their ability to direct both state and federal conservation dollars to farms where they are needed, and to improve inspection and compliance with medium and large farm water quality regulations. DEC has built a strong Stormwater Management Program to minimize nonpoint source impacts from developed lands using a variety of stormwater permit programs. VTTrans has taken on the Vermont Better Back Roads Program to help municipalities correct physical road conditions. Improved road practices protect road infrastructure, reduce maintenance costs over the long term and reduce the amount of sediment and phosphorus pollution entering waterways.

DEC has also developed an effective State River Management Program, which has provided detailed information about the physical state of our rivers to communities across the state using that information to minimize risks to public safety and property from flooding. This investment of effort will also, over the long-term, result in reduced erosion of our streams and rivers.

DEC has awarded on average of \$2 – \$2.5 million of state capital dollars annually in the form of grants to municipalities, conservation districts, and other partner organizations throughout the state to implement water quality protection and restoration projects at the local level. DEC has also used federal grants from the EPA to award approximately \$10 million dollars per year in the form of low or negative interest loans to municipalities for investments in water pollution control.

While we still have much to do, the work over the past decade has established a firm foundation on which to build the Clean Water Initiative.

Lesson No. 4: Given changing weather conditions, land development pressures, and mistakes of the past, restoring water quality will require time, and patience. Putting off investments in new approaches to ensuring clean water only increases this challenge.

Vermont's increasing frequency of severe weather events has been hampering efforts to deliver clean water. Severe storms and floods bring turbid flood waters that carry enormous amounts of sediment and phosphorus into waterways, which seemingly overwhelm progress made in other areas. Reducing runoff has many solutions, but each comes with its own challenges.

- To promote flood resilience, we must restore natural stream channel movements in our rivers and streams and minimize human alterations and structural encroachments.

River channels are slow to adjust and, for this reason, will require decades to achieve more natural channels.

- Restoring wetlands or vegetated buffers along streams can help reduce phosphorus, but it takes several years for the new plants to grow.
- Proper nutrient management on farms can reverse decades of over-fertilization that has occurred in some areas with associated phosphorus runoff into nearby streams, but the build-up of excess phosphorus in the soil will decline only slowly.
- Thoughtful decisions can be made about land use changes, such as conversion from forest to developed land, from grassland to cropland, or from open land to developed land. Each of these can increase the rate of phosphorus runoff per acre in spite of the application of good water quality management practices.
- Phosphorus runoff into Lake Champlain can be curtailed by implementing a sound and thorough plan, but the accumulation of phosphorus-rich sediment in the bottom of the lake may delay the lake's recovery.

All these challenges can be overcome through a vigorous and sustained effort, but expectations going forward should be realistic about the resources and commitment required to achieve clean water for Vermont's future.

II. Critical Priorities

The State of Vermont will address five priority areas (Clean Water Priorities) over the next twenty years to improve water quality. The Clean Water Priorities reflect the lesson that every Vermonter has a responsibility to protect water quality, across the state and in every land use sector. Farmers have an important role to play, and so do businesses. Regional and municipal planners, state officials, consumers and tax payers – all have an important role to play. Working together to achieve the Clean Water Priorities, Vermonters will bring about benefits to our natural environment and economy. The Clean Water Priorities described in this report are:

1. Implementing agriculture best management practices,
2. Treating stormwater runoff from developed lands,
3. Installing pollution controls on state and municipal roads,
4. Restoring and protect natural infrastructure – river corridors, floodplains, wetlands, and forest cover – for flood resilience and water quality, and
5. Increasing investments in municipal wastewater treatment infrastructure.

Priority No. 1: Implementing Agriculture Best Management Practices

Farms are not just a vital part of Vermont's culture and economy. A well-managed farm can help capture nutrients and stormwater runoff and is far preferable, from the standpoint of clean water, to suburban sprawl. At the same time, modern agricultural practices have evolved without

sufficient consideration to water quality impacts. As estimated by the previously discussed modelling efforts for Lake Champlain, agricultural nonpoint sources of phosphorus account for approximately 40 percent of the overall phosphorus load delivered to the Lake from Vermont. Similar water quality concerns exist statewide.¹³ In order to ensure that new regulations and requirements will achieve better protection for water quality without unduly impacting the economic viability of farms, VAAFMM and ANR have convened and continue to work with an advisory group of Vermont farmers (the Agricultural Working Group) to develop the details of implementing the recommendations set forth below.

The Vermont Accepted Agricultural Practice Rule (AAPs), initially adopted in 1995 and updated in 2006, require that all farms in the state, regardless of size and type of operation, adopt and implement a set of minimum conservation practices to protect water quality. The program was previously overseen on a complaint-driven basis due to limited resources. Prior to 2013, VAAFMM performed approximately 120 investigations across the state annually. The investigations targeted specific complaints or obvious violations; they did not involve evaluating the entire farm operation to determine extent of AAP compliance. VAAFMM also uses medium and large farm operations (MFO and LFO) state permits that impose additional requirements and enforcement authorities.

While oversight of MFOs and LFOs has been extensive and resulted in dramatic farm improvements over the past few years, VAAFMM has been limited in its ability to work as effectively with small farms. In addition to the hiring of a Small Farm Operation (SFO) coordinator in 2013, the following actions will strengthen the AAPs and increase oversight and education within the agricultural community.

Actions to Address Priority No. 1: Implementing Agriculture Best Management Practices

- Increase enforcement of state agricultural water quality permit programs;
- Increase education of small farms regarding AAPs;
- Revise the Accepted Agricultural Practices (AAPs) Rule to: (a) require a minimum buffer width of 25 feet along streams and lake shoreland, (b) require a minimum buffer width of 10 feet on field and road-side ditches; (c) require stabilization of eroding gullies; (d) require farms to conduct nutrient management planning — the agronomic planning tool designed to assist farmers in optimizing nutrient application and utilization as part of a cropping system; (e) reduce the soil loss tolerance standard — the accepted amount of soil loss that is allowed to occur from farm fields for each soil type (measured in tons per acre per year); and (f) strengthen livestock exclusion requirements;
- Increase education and training for farmers in the development and implementation of nutrient management plans;
- Implement a manure application certification program;
- Implement a small farm certification program to demonstrate compliance with Accepted Agricultural Practices Rule;
- Increase the capacity of agricultural sector partners to deliver greater technical, educational, and financial assistance to reduce phosphorus pollution from farms;

¹³ There are over 500 shipping dairy farms in Lake Champlain Basin, and nearly 400 shipping dairy farms outside of the Basin. Vermont Agency of Agriculture, Food and Markets.

- Target additional technical, educational, financial, and enforcement resources to watersheds with high phosphorus pollution loading attributed to agricultural operations;
- Implement a pilot program using incentives for farms in watersheds with high phosphorus pollution to increase implementation; and
- Investigate technical and educational options for addressing the impacts of tile drains.

Priority No. 2: Treating Stormwater Runoff and Erosion from Developed Lands

Developed land involves the construction of buildings, roads, parking areas, driveways, sidewalks, and other impervious surfaces. The concern is that impervious surfaces cause rainwater and snowmelt to quickly flow over these surfaces and discharge into surface waters, rather than infiltrate into the ground or be absorbed by plants. The quantity and velocity of stormwater runoff can increase flooding, damage infrastructure, and contribute to stream instability. In addition to nutrient and sediment pollution, stormwater runoff also picks up and delivers other pollutants to surface waters, such as bacteria, pesticides and fertilizers, oils, and heavy metals.

Vermont is a rural state; the percentage of the land area as impervious surface is low. However, developed lands are responsible for significant water quality impacts and generate, on a per acre basis, a large proportion of the phosphorus loading to Vermont's surface waters. Additionally, the majority of existing developed land is not regulated under federal or state stormwater permits and owners are frequently not managing or treating stormwater. For example, only six percent of the impervious surface area in the Lake Champlain basin is currently subject to regulation under a state operational stormwater permit, and only 12 percent of the impervious area is covered by the Municipal Separate Storm Sewer System (MS4) permit.

Actions to Implement Priority No. 2: Treating Stormwater Runoff and Erosion from Developed Lands

- Continue to address the threat of stormwater pollution from new development through existing ANR programs;
- Implement a new general permit to address stormwater pollution from designated existing developed lands, where discharges are currently not regulated;
- Re-issue the existing municipal general permit, referred to as the Municipal Separate Storm Sewer System (MS4) permit to be consistent with requirements of the new Lake Champlain TMDL;
- Further reduce phosphorus pollution from new development by updating the state standards contained in the Vermont State Stormwater Manual — the rulebook for developments that require a state stormwater permit. Updates include improved practices, with an emphasis on green stormwater infrastructure — actions that mimic or utilize natural processes to capture, reuse, or infiltrate stormwater;
- Provide municipalities with greater technical assistance in identifying, prioritizing, and implementing stormwater control needs; and
- Enhance technical assistance to municipalities, developers, and property owners in the application and maintenance of green stormwater infrastructure practices.

Priority No. 3: Installing Pollution Controls on State and Municipal Roads

A major category of developed lands are the state and local highways and roads which contribute significant amounts of phosphorus laden runoff to surface waters. There are over 14,000 miles of public roads in Vermont. Vermont municipalities maintain approximately 11,000 miles of road; three-quarters of these municipal roads need erosion control improvements. Two-thirds of these roads are unpaved gravel or unimproved roads, and nearly all require ditches and culverts for water drainage.

If roads are not properly constructed and maintained, there is significant potential for erosion of sediment carrying phosphorus into the drainage network and adjoining streams and eventually into the major water bodies such as Lake Champlain, Lake Memphremagog, the Connecticut River Basin, and the Hudson River Basin. Stormwater runoff from paved roads can accumulate and deliver debris, oils, salts, and other chemicals, sediment, nutrients, and other pollutants to surface waters. Paved roads can also affect the volume of stormwater runoff being generated, which in turn, can alter the hydrology and ecological health of receiving waters.

Actions to Implement Priority No. 3: Installing Pollution Controls on State and Municipal Roads

- Continue to grow financial assistance through programs such as the Vermont Better Back Roads Program to support municipalities in implementing management practices;
- Continue to support adoption of the VTrans 2013 Road and Bridge Standards across the State;
- Implement a new state highway stormwater general permit to reduce erosion and stormwater discharges from the state-operated transportation system;
- Implement municipal road stormwater standards and management practices to reduce erosion and stormwater discharges from municipal roads within the Lake Champlain Basin;
- Provide technical assistance to municipalities in conducting road inventories that identify and prioritize critical areas in need of erosion and sediment control; and
- Expand technical and educational assistance to municipalities in implementing management practices that protect roads from erosion while prevent the transport and discharge of phosphorus and sediment into streams.

Priority No. 4: Restoring and Protecting Natural Infrastructure for Flood Resiliency and Water Quality Improvements

Healthy and well-functioning natural infrastructure – rivers and their floodplains, wetlands, and forests – provide people and communities with a suite of economic, social, and ecological benefits. The term “natural infrastructure” is sometimes used to describe the importance of these features to our communities. The benefits of restoring and protecting our natural infrastructure include providing resilience to the impacts from future flooding, delivering clean water, supporting recreation and tourism, maintaining property values, protecting public health, minimizing water quality treatment, and sustaining aquatic habitat. Restoring and protecting our

natural infrastructure maximize these benefits to society, and can save money by avoiding future treatment costs.

Rivers, Streams, and Floodplains

Extensive stream channel erosion occurs throughout Vermont. Stream channel erosion is largely the result of past and present human activities that alter runoff patterns and stream channel conditions, which lead to stream instability (or disequilibrium). Human activities include channel confinement, straightening, building berms, dredging, and armoring practices. Other human activities contributing to greater stream bank and streambed instability include the stormwater runoff and land drainage activities that can deliver greater volumes of water at faster rates to receiving waters. Another class of human activities are structural controls such as rock armoring (or “riprap”), which may prevent flooding and erosion at one site, but increase erosion downstream.

Activities that cause stream disequilibrium increase the power of floods, thereby threatening public safety and increasing risk of property damages as well as contributing to water quality degradation. Unstable streams can no longer access their floodplains to store sediment and nutrient pollution during flooding. The sediment and nutrient pollution are transported downstream, where they can contribute to water quality problems downstream in receiving waters such as inland lakes and Lake Champlain. An estimated 22 percent of the total nonpoint phosphorus load delivered to Lake Champlain comes from stream erosion and the loss of floodplain function.

Avoiding new buildings, utilities, or public infrastructure in river corridors and floodplains and maintaining native plant-vegetated buffers are essential to attaining and maintaining equilibrium conditions. Avoiding new encroachments decreases adverse river channel modifications and increases the capacity of valley landforms to store floodwaters, sediments, and phosphorus.

Vermont recognizes the importance of maintaining native plant vegetated buffers along streams, lakes, and wetlands to maintain water quality. Buffers filter and absorb nutrients in runoff. Buffers also support the integrity of stream banks to help guard against erosion due to the root strength, root depth, and root density of the vegetation. Healthy vegetated buffers offer additional benefits such as support fish habitat function, provide habitat and movement corridors for wildlife.

Wetlands

Wetlands are one of the most important natural features that protect water quality and abate soil loss and flood damages from flooding in a watershed. Wetlands are natural flood regulators; they store floodwaters, sediments, and nutrients, including phosphorus, during storm events, and slowly release waters downstream. Wetlands remove as much as 80-90 percent of sediments in water moving through them.

The economic benefits that natural wetlands offer can be significant to Vermont communities. For example, the Gund Institute at the University of Vermont estimated that the Otter Creek wetlands complex upstream of Middlebury helped that town avoid five million dollars of flood damages.

Over the decades, wetlands have been lost to a variety of causes including conversion for agricultural production and development. Between 1780 and 1980 Vermont lost over 35 percent of its natural wetlands, subsequently losing phosphorus sinks throughout the State. The potential increase in phosphorus retention from restoring the natural hydrology of these lost wetlands would be substantial for the health of Vermont's waters.

Forests

The Clean Water Initiative must include working forests. Forests produce the cleanest water of any land use. A forest cover strategy of no net forest cover loss supports the creation of a system to promote forest cover goals in priority zones, including riparian and developed areas, coupled with mechanisms to ensure the health, maintenance and conservation of existing cover. Healthy forests translate into functional ecosystems that bind phosphorus and water, preventing additional runoff.

Sediment, which carries phosphorus, is the most common pollutant associated with timber harvesting. Soil is carried by rainwater after timber harvesting equipment and trees dragged or carried over the ground loosen and expose the soil. Bare ground exposed during harvesting operations can be eroded by rainwater and enter nearby streams.

Stream crossing used during harvesting are a particular area of concern. An estimated 14.5 percent of the total nonpoint phosphorus load delivered to the Lake comes from forestland. With forest covering more than 4.6 million acres and representing over 70 percent of Vermont's total land base, forestry is an important area of focus for reducing phosphorus loading to state waters.

Actions to Implement Priority No. 4: Restoring and Protecting Natural Infrastructure for Flood Resiliency and Water Quality Improvements

- Implement the newly adopted state floodplain rule — the Vermont Flood Hazard Area and River Corridor Rule. This rule addresses developments exempt from municipal regulation in flood hazard areas and river corridors. The rule enhances flood resilience statewide, and ensures state compliance with the National Flood Insurance Program (NFIP);
- Further expand technical and regulatory assistance to municipalities in the adoption of enhanced floodplain and river corridor protection bylaws that exceed NFIP minimum requirements;
- Continue to develop and maintain river corridor maps to support floodplain restoration and protection projects;
- Continue floodplain and river corridor restoration and protection projects;
- Support the newly established a Flood Resilient Communities Program that offers municipalities financial and technical assistance incentives to enhance flood resilience at the community level;
- Promote the newly launched “Flood Ready” website to promote municipal flood resiliency planning and adoption of floodplain and river corridor bylaws that minimize flood risks and maximize floodplain function;

- Expand technical, educational, and regulatory assistance to municipalities in stream alterations, including emergency and pre-flood protective measures, to maximize equilibrium (or natural stream stability) conditions;
- Expand technical, educational, financial, and regulatory assistance to landowners in wetland restoration and protection;
- Partner with federal and state agencies, local partners, and landowners to identify and implement wetland restoration projects;
- Increase inspections to achieve greater wetland permit compliance;
- Target critical wetlands for State Class I wetlands protection for flood resilience and phosphorus reduction;
- Revise the existing Forestry Acceptable Management Practices (AMPs) to: (a) specify compliance with standards within the State stream alteration general permit, referencing stream crossing standards, and (b) enhance ditch standards for skid trails and logging truck roads;
- Provide incentive financing via a “Vermont Forestry Direct Link Loan Program” to reduce pollution risks on logging jobs. The Program provides qualified logging professionals access to low-interest financing to support logging best management practices and equipment;
- Increase efforts to reduce soil erosion and sedimentation along logging roads on private lands, in partnership with the U. S. Department of Agriculture Natural Resources Conservation Service’s (NRCS) “forest legacy roads” cost-share program;
- Enhance forest cover to improve watershed health by: (a) supporting forest conservation, (b) restoring river and lake-side forested buffers, (c) expanding developed land forest cover, and (d) mitigating the impacts from invasive tree pests that will cause impacts to forested buffers and developed land forest cover; and
- Promote “climate-smart” forest adaptation strategies. One strategy includes creating funding priorities within the Working Lands Enterprise Fund to support environmentally sound logging technologies to improve forest resilience to climate change impacts.

Priority No. 5: Increasing Investments in Municipal Wastewater Treatment Infrastructure

The State and the federal government have invested over \$600 million since the 1970s to safeguard public health by providing wastewater treatment. There are over 120 municipally and privately owned wastewater collection and treatment facilities in Vermont, serving a population of over 370,000. Those investments continue to pay substantial dividends to public health and safety, local economies, and the environment.

Many municipal wastewater facilities are facing nutrient removal treatment requirements to meet TMDL plans for Lake Champlain (phosphorus), Lake Memphremagog (phosphorus) and the Long Island Sound/Connecticut River (nitrogen). Investments to date have been successful in nutrient pollution removal. For example, since 1991, upgrades to Vermont facilities in the Lake Champlain basin have resulted in an 84 percent decrease in wastewater phosphorus loading to Lake Champlain.

On the other hand, we must maintain this investment to ensure that we do not lose ground or impede future economic development opportunities. Deteriorating wastewater treatment systems pose real threats to human health and the environment. Aging systems also drive up the operation and maintenance costs, compromise service, and force municipalities to continually seek ways to defer maintenance or avoid upgrades.

The needs to address aging wastewater treatment systems are significant. Nearly all municipalities with aging wastewater treatment systems need assistance in managing their assets. Many systems must implement improvements to either maintain or attain compliance with state clean water standards to protect public health and the environment.¹⁴ Some facilities may be required to meet nutrient pollution load reductions as part of the Lake Champlain TMDL underway and future TMDL plans for Lake Memphremagog, and the Long Island Sound/Connecticut River. Additionally, implementing state goals that promote compact village and urban centers to help local economies and protect public health will require adequate water and sewer in those communities.

Actions to Implement Priority No. 5: Increasing Investment in Municipal Wastewater Treatment Infrastructure

- Offer increased technical assistance and financial guidance to municipalities, wastewater treatment governing boards, and plant operators to better manage aging and deteriorating sewer infrastructure systems, map and evaluate systems, plan for future repair and replacement, plan for emergencies and larger projects, and establish appropriate rate structures;
- Provide additional technical assistance to municipalities to improve optimization of operations to maximize phosphorus removal, enhanced protection of public health, and improved environmental protection associated with reductions in phosphorus loadings;
- Reissue Clean Water Act permits for direct discharge facilities in a manner that maximizes available opportunities for flexibility under federal law and policy; and
- Further maximize the use of federal loans and grants from agencies such as the U.S. Department of Agriculture's Rural Development agency, the U.S. Environmental Protection Agency state clean water revolving loan capitalization grants, and the U.S. Army Corps of Engineers.

III. Achieving Vermont's Clean Water Initiative: Funding and Revenue Sources by Stage

Finding adequate resources to support Vermont's Clean Water Initiative poses a significant challenge. As described above, funding needs associated with the Clean Water Initiative will impact a broad range of stakeholders in Vermont, including municipalities, businesses, farmers and the general public, as well as state and federal agencies and non-governmental organizations.

¹⁴ Improvements include collection system refurbishment, replacement, separating stormwater from collection systems, pump station upgrades, and water pollution control facility upgrades.

Because sources of pollution are both diffuse (i.e., precipitation driven, nonpoint source pollution across the Vermont landscape) and interrelated (e. g. runoff from fields or parking lots can affect runoff treatment needs on roads and contribute to the instability of river systems), it is impossible to provide a detailed accounting of all of the needed investments or predict the exact cost of addressing the priorities described above. Further, a number of the Clean Water Priorities depend upon new or expanded regulatory requirements and permits, increased support and technical assistance to regulated entities, and coordination with external partners. These programs are not yet fully developed and cost estimates for implementation will need to be developed and reconsidered as the programs are established.

In order to meet these challenges in a stepwise fashion, the State of Vermont recommends implementation of the Clean Water Initiative over three discrete stages.

- In stage one (SFY 2016-2017), while continuing all ongoing efforts, the State will focus on establishing the new or expanded structures, partner and program capacity needed to fully implement that Clean Water Priorities as described in this report.
- In stage two (starting in SFY 2017 and continuing), the State will implement the new or expanded programs and requirements, including tactical basin planning necessary to achieve the Clean Water Priorities, including funding, regulatory, education and outreach, and other tools to address the most significant sources of pollution.
- In stage three (starting in SFY 2020 and continuing), the State will evaluate results, report on outcomes and redirect resources and priorities as needed.

Stage One – Building Capacity

Vermont Clean Water Fund

The first step in stage one will be to create a dedicated special fund (the Clean Water Fund or Fund) to coordinate investments by the State in addressing polluted runoff into the state's surface waters. The Fund will be used primarily to distribute state funds, but could also be used to manage certain federal and private money where appropriate. Possible sources of private funds might be philanthropic, payments made to account for impacts on Vermont's water resources, or public-private partnerships to achieve shared goals with civic-minded corporations.

The funds will be used to provide matching funds necessary for the state, local governments or others to obtain federal funds, which often come with a match requirement. The Fund will be administered by state agencies, primarily ANR, VAAF, VTrans and ACCD to support municipalities, farmers, small businesses and other private landowners undertaking the actions necessary to meet the obligations required under the State's strategy.

Annually, Fund dollars will be available through state grant and loan programs to support regulation, planning, design, construction and operation of water pollution control strategies and practices. Initially, the priority for the fund will be to build capacity within partner organizations and state agencies responsible for implementation of the Clean Water Priorities, including personnel and administration needs and information technology systems. As part of stage one but especially in stages two and three of the Clean Water Initiative, the Fund will extend the

State's capacity to provide direct support to municipalities, businesses, farmers, loggers, and homeowners in identifying and implementing high priority water quality improvement projects.

The Fund will build on existing grant and loan programs within each state agency and rely on those programs to provide administrative support and Fund management. Those programs will direct money to grant and loan recipients, contractors and to partner organizations and state agencies. Existing grant programs that would be responsible for Clean Water Fund investments and enhanced by the Clean Water Fund include clean water grant programs such as the VTrans Vermont Better Back Roads Program, VAAFMs Best Management Practices Program, and ANR's Ecosystem Restoration Program.

The Clean Water Fund will operate under the following governance structure, with a reporting process intended to ensure that the Clean Water Initiative continues to receive the resources and support necessary to meet the goals in the Clean Water Priorities:

- The Clean Water Fund will be managed by a steering committee consisting of state government officials appointed by the Governor and staffed by state agency employees.
- The Steering Committee will act in consultation with an Advisory Board made up of appointments by the Governor and General Assembly, representing stakeholder interests.
- The Steering Committee will report annually on expenditures, progress, and future needs; identify funding and implementation priorities; and recommend revenue options for Fund needs.
- Funds will be administered by state agencies to invest directly in pollution control and to support state agencies and partner organizations doing that work.

Federal Funding to Support Clean Water Initiatives in Vermont

Federal agencies and programs continue to serve a crucial role in helping to leverage local and state funds to support Vermont's clean water goals. Vermont receives federal funding and assistance from a mix of federal agency programs to help the State target the five priority areas described above. Below is a list of important federal partners. Although some of these programs have experienced budget cuts in recent years, maintaining and enhancing federal funding is an essential to accomplishing the Vermont Clean Water Initiative.

- US Department of Agriculture, Natural Resources Conservation Service
 - Environmental Quality Incentive Program
 - Nutrient Management Planning,
 - Wetland Protection and Restoration
 - Conservation District Agricultural Resource Specialists
- US Department of Agriculture, Farm Services Agency of Natural Resources
 - Conservation Reserve Enhancement Program
- US Department of Agriculture, US Forest Service
 - Urban and Community Forestry
- US Department of Agriculture, Rural Development
 - Loans and grants to rural communities for wastewater treatment plant projects
- US Environmental Protection Agency

- Section 319 Nonpoint Source Program
- Section 604(b) Water Quality Planning Grant Program
- Capitalization grants to the Clean Water State Revolving Loan Fund
- Lake Champlain Basin Program
- Great Lakes Fishery Commission
- US Army Corps of Engineers
- Federal Highway Administration
- US Fish and Wildlife Service, Partners for Fish and Wildlife

ANR, VAAF, and VTrans continue to seek additional federal resources to support planning clean water actions, including the following opportunities:

- In August, 2014, USDA Secretary Vilsack announced that his agency would make \$45 million available over the next five years through the Natural Resource Conservation Service (NRCS) to continue to support implementation of agricultural nonpoint source controls specifically in the Lake Champlain Basin. Approximately \$7 million of the \$45 million represents new funding.
- In September, 2014, VAAF submitted a \$20 million, 5-year proposal to the NRCS Regional Conservation Partnership Program, in collaboration with the State of New York, to increase implementation of agricultural water quality projects in the Lake Champlain Basin. If successful, this grant will allow Vermont to leverage up to \$25 million additional dollars from a variety of public and private partners for a total \$45 million investment in water quality protections.
- In November, 2014, ACCD, with VTrans and ANR, submitted a threshold request to the U.S. Department of Housing and Urban Development pursuant to the National Disaster Resilience Competition Notice of Funding Availability (NOFA). If selected to continue in the next round of the competition, Vermont anticipates presenting a proposal to fund resilience efforts in eligible communities, with expected benefits for water quality.
- ANR, VAAF and VTrans will continue to work closely with the EPA-funded Lake Champlain Basin Program, which supports a number of important clean water initiatives, grant and loan programs.

Key Partners in Delivering Assistance to Municipalities, Farms, and Small Businesses

Two key partners in the State of Vermont’s Clean Water Initiative are Vermont’s eleven regional planning and development agencies (the RPCs) and the Vermont League of Cities and Towns (VLCT).

Under the Vermont Municipal and Regional Development Act, the Vermont RPCs have responsibility to support and oversee municipal planning efforts.¹⁵ By law, all municipalities within the RPC jurisdictions are members of a regional planning commission, and most participate in the regional planning process. Each RPC is governed by a board with members appointed by the municipalities, and the RPCs implement a variety of projects and programs

¹⁵ The RPCs operate under Vermont Municipal and Regional Planning and Development Act, 24 V. S. A. § 4301–4498.

tailored to municipal needs. As part of the Clean Water Initiative, the State proposes to leverage planning and oversight of municipal planning by helping to add a water resources coordinator at each RPC. These coordinators will help towns manage the growing number of overlapping local, state, and regional plans for transportation, floodplain and river management, flood hazard mitigation, stormwater management, and other plans that address land use and development. Each of these planning efforts has evolved separately yet, when viewed together, will provide the state and local communities a map for managing land use consistently, with the goal of protecting water quality and guiding investment priorities of the Clean Water Fund.

Some examples of ways that RPCs will assist in meeting the State's clean water goals are:

- Sponsor Stormwater Master Planning. This kind of planning looks comprehensively at a municipality's impervious surfaces to identify, prioritize and remediate polluted runoff and erosion problems.
- Review municipal plans for compliance with State Statute. In their work with towns to ensure that municipal plans are compliant with state statute, RPCs can ensure that there is adequate consideration for clean water, including management of stormwater runoff.
- Provide technical assistance in the development of water quality and flood resilience language in municipal bylaws and town plans. RPCs will provide technical assistance in the development and promotion of model bylaws and language for town plans that focus on important clean water priorities, such as stormwater management and flood resilience.¹⁶
- Assist in Trainings and Workshops. RPCs will work with ANR staff, VTrans, ACCD, VLCT, conservation districts and watershed groups in providing trainings on regulatory and non-regulatory water quality topics.
- Support the Tactical Basin Planning Process. The RPCs can help promote greater participation in the development of tactical basin plans, provide monitoring and assessment assistance, aid in communications, develop maps, reports.
- Assist in Road Inventories, Prioritization, and Mapping. The RPCs will assist municipalities to develop road inventories and map priorities for implementation of best management practices.
- Assist in Mapping of Flood Hazards. The RPCs will develop flood risk maps and other information on flood hazards.
- Source of information about the permitting process. The RPCs can play an important role in helping direct the public and developers to the appropriate jurisdictions when they have projects which may impact water resources.

In addition, the State proposes to further support municipalities by expanding operational capacity at the Vermont League of Cities and Towns (VLCT). Currently, VLCT has a part-time water resources coordinator, who delivers education, outreach, and technical assistance to municipalities on a range of water quality and flood resiliency-related topics. Increasing that position to full time will enable VLCT to offer more trainings, workshops, and seminars, local ordinance and bylaw development, and direct communications to municipalities via monthly newsletter articles, weekly legislative reports, and technical papers.

¹⁶ Vermont League of Cities and Towns have a model stormwater bylaw: <http://www.vlct.org/municipal-assistance-center/water-resources-assistance/>

Reducing polluted runoff fundamentally means changing or making adjustments to our land uses. Changing land uses requires education. All polluted runoff sources – farmers, municipal road crew and highway departments, commercial business owners with large parking lots, developers at construction sites, and residential homeowners – need opportunities to learn about the problems with polluted runoff, understand their options to address the problems, and subsequently how to take action.

There are many other important partners in Vermont that conduct restoration projects at the local level as well as offer educational programs to targeted audiences. These partners include farmer alliances and cooperatives, watershed organizations, conservation districts, regional stormwater runoff education programs, and stormwater utilities. ANR's Ecosystem Restoration Program (ERP) will continue to support these organizations through expanding its competitive grant program.

In addition, ANR currently offers only limited grants to support delivery of technical assistance and educational program, targeting municipalities, road crews, businesses including farmers, homeowners, and the public. The Clean Water Fund will support an expansion of the Ecosystem Restoration Program to specifically support this need.

Stage One Needs at the Agencies of Natural Resources, Agriculture, Food and Markets and Transportation

The three principal state agencies engaged in water quality restoration and protection – VAAF, VTrans, and ANR – are preparing to conduct capital project planning, provide technical assistance, oversee implementation, and ensure compliance with obligations required as part of state and federal clean water directives.

New revenue will be necessary in SFY 2016 in order to establish the Clean Water Fund and begin meeting stage one needs. Revenue sources to support implementation of stage one include a mix of capital funds, fees, and the Clean Water Fund. The Governor's budget proposal, to be submitted to the General Assembly in January, 2015, will describe the state's proposals for additional fee revenue and capital fund requests dedicated to clean water.

The new Clean Water Fund will be structured to receive eligible federal financial assistance and contributions from private donations. The Fund will be instrumental in filling gaps in existing programs to ensure that municipalities, farms, and businesses are getting the technical and financial support they need to implement water quality improvement projects.

Below is a short description of the recommended financial tools for the new Clean Water Fund. These options were selected from those described in the Act 138 Report and other sources,¹⁷ based on the long term viability and stability of the options to support the Fund, as well as the degree to which the financial tool bears a relationship to water quality. We estimate that the Clean Water Fund will need approximately four to six million dollars in Fiscal Year 2016 depending on variables such as the amount of federal grants, and private contributions. The

¹⁷ Water Quality Remediation, Implementation and Funding Report, January 14, 2013: http://www.watershedmanagement.vt.gov/erp/docs/erp_act138report.pdf

revenue sources may be expanded or contracted in the future as we get a greater understanding of the needs and opportunities for the uses of the Clean Water Fund.

These funds could be raised through two primary sources of revenue:

A Simple Impervious Cover Fee, applied to Commercial, Industrial, Institutional, and Agricultural Parcels in the Lake Champlain Basin

This financial tool would apply a simple tiered fee system applicable to commercial, industrial, institutional and agricultural land use categories within the Lake Champlain Basin. The fee would vary, based on the relative size of the parcel and the land use category. For farms, the size of the parcel would be limited to the farmstead, where most of the farm's impervious cover is located, and would not include fields. The benefit of an impervious cover fee is the association of the fee with the factors that influence the generation of stormwater runoff, i.e. impervious areas and agricultural lands (parking lot, building footprint, driveways, and barnyards).

Agricultural nonpoint sources represent the largest source of nutrient and sediment pollution in the Lake Champlain basin and statewide. Likewise, although commercial, industrial and institutional land uses represent a relatively small fraction of the overall impervious acres in the Lake Champlain Basin, commercial, industrial and institutional parcels are typically more intensely developed. The median percent impervious for commercial properties is nearly 50 percent, meaning that nearly 50 percent of the land area on commercial properties is impervious.¹⁸

Nationwide, there are over 1,400 financial management systems in 39 states and the District of Columbia used to raise funds for investment in better managing stormwater runoff and providing flood protection.¹⁹ More than 80 percent of the of these financial systems use an impervious cover fee based on an Equivalent Residential Unit (ERU) as a proxy for the extent of impervious cover.²⁰ This approach applies a fee that is based on the amount of impervious area for each land use category, in relation to the typical amount of impervious area for a single family residential household. Each category can be further partitioned into tiers based on size to be more equitable. The ERU then becomes a multiplier to determine rates for properties that make up the other land use categories.

¹⁸ O'Neil-Dunne, J. Impervious Surface Land Use Analysis. University of Vermont, Spatial Analysis Laboratory, January 12, 2014.

¹⁹ Campbell, W. (2013) Western Kentucky University Stormwater Utility Survey. Western Kentucky University, Bowling Green, KY, *available at*: http://www.wku.edu/engineering/civil/fpm/swusurvey/western_kentucky_university_swu_survey_2013.pdf.

²⁰ Equivalent Residential Unit (ERU) is a square footage unit of imperviousness that represents the median horizontal impervious area of a typical residential property in Lake Champlain Basin. We are using ERUs as a unit of measure in this analysis, even though we are not proposing to assess the fee on residences, since it can be determined using an established methodology. As described in this report, impervious area is the most important factor affecting stormwater runoff and influencing the cost of managing the impacts from runoff.

Using this approach to raise \$1 million, annual impervious cover fees applied to commercial, industrial, institutional,²¹ and agricultural parcels would range from \$100 to \$400 per ERU depending on how the fee is structured. For each additional \$1 million increment sought to be raised, the fee would need to be increased accordingly. Most commercial properties have the equivalent of three ERUs.

In order to refine this option, over the coming months, the Administration proposes to work with the General Assembly to answer a number of key logistical questions, including:

- Identifying the precise number of commercial, industrial, institutional and agricultural parcels and farms in the Lake Champlain Basin, including refined information regarding the average amount of impervious areas on the parcels subject to the fee;
- Describing the process to set and modify fee rates;
- Identifying the most effective collection mechanism for the fee;
- Assessing the value of further partitioning the land use categories based on size of total impervious area;
- Describing a process to conduct public outreach and education to engage businesses, farms, municipalities and the public regarding the fee;
- Evaluating the potential for reduced fees for certain parcels:
 - for parcels in designated downtowns to promote smart growth, and
 - for parcels in communities that already collect stormwater fees; and
- Exploring how to implement a system of credits for properties implementing appropriate best management practices to capture and treat stormwater, in order to reduce the fee burden for those properties.

Phosphorus and Nitrogen Fertilizer Charge

Another financial tool closely linked to water quality would be a charge on fertilizers. Nearly every state imposes a fee on fertilizers, and many assess those fees on fertilizers at a higher rate than Vermont. A focus on fertilizers makes sense because of the heightened risk of water pollution associated with the application of nutrients to land (e.g., fertilizer application on farm fields or gardens), and monitoring data shows that phosphorus and nitrogen are the two major nutrients of concerns for Vermont's surface waters. Nutrients in fertilizers are of a particular concern, since they are in the chemical form that is more readily assimilated by algae, which can result in excessive algae growth and increased incidence of algae blooms.

Currently, agricultural fertilizers used on Vermont farms are exempt from a sales or excise tax. Since the majority of fertilizers sold in Vermont are imported, the added benefit of placing an excise tax on fertilizer products would be to use price to influence the amount of fertilizer being imported into the basin and improve nutrient management by encouraging field-specific application of fertilizers. A one percent excise tax on all fertilizers, including the non-agricultural fertilizer use (already subject to an excise tax) would raise approximately \$450,000 annually.²²

²¹ "Institutional" refers to Vermont's colleges, universities and hospitals.

²² This figure is based on 2013 data from the Vermont Agency of Agriculture, Food and Markets.

Vermont currently employs a fertilizer registration and tonnage fee to support inspection of all commercial fertilizer products sold in Vermont. The current fee supports inspections to ensure that fertilizer products are labeled correctly, meet the chemical guarantee specified on the label, and are stored safely. The current fee is \$0.25 per ton sold in Vermont, with a minimum fee of \$50.

VAAFM and ANR anticipate convening the Agriculture Workgroup over the coming months to explore these and other funding options. The Agriculture Workgroup is an informal advisory committee made up of farmers and farm service providers. The Workgroup assisted the State in evaluating strategies to reduce agricultural runoff that are described in the TMDL Phase I Implementation Plan.

More detailed information on this revenue option will be presented to the General Assembly with the Governor's budget in January. The Administration will continue to work with stakeholders to discuss these and other revenue options over coming months in anticipation of needs for implementing Stages 2 and 3 of this strategy.

Stages Two and Three – Moving Projects Forward and Getting Results

Following investment in the structural and personnel needs required to launch the Clean Water Initiative, the State will begin work with partner organizations, municipalities, farmers, businesses and other private landowners to address the Clean Water Priorities through full implementation of the Phase I Plan, Phase II planning and implementation under the Lake Champlain TMDL, as well as continued implementation of the Surface Water Strategy statewide through the ANR tactical basin planning process.

Finally, the State will continuously monitor and report the results of stage one and stage two investments, evaluate the effectiveness of planning and implementation processes, and provide recommendations for new, increased or refocused efforts. The primary metrics for measuring the effectiveness of the Clean Water Initiative will be (i) the accountability framework established by EPA for the Lake Champlain TMDL, and (ii) monitoring and mapping efforts established in the basin planning process and carried out by ANR, VAAFM and VTrans staff in collaboration with the RPCs, municipalities, farmers and other clean water stakeholders. The Administration will also work with the General Assembly to establish other Results Based Accountability measures to gauge the population level impacts and effectiveness of investments made by the State of Vermont under the Clean Water Initiative. "Lean" government principles will be used to ensure that new and enhanced programs deliver timely and predictable results. The ANR Surface Water Strategy also describes a full suite of monitoring and assessment tools to support watershed specific planning and implementation processes.

Stages two and three will feature increased incentives, grants and loans through the Clean Water Fund to municipalities, farmers and private landowners to implement Phase II plans and comply with new regulatory requirements implemented as part of the Phase I Plan and Surface Water Strategy. As noted above, ongoing funding needs will be determined on an annual basis and reported by the implementing agencies to the General Assembly through the Clean Water Fund governance and reporting process. Although total needs to address all of the Clean Water Priorities cannot be calculated with precision today, it is predicted that Clean Water Fund

expenditures will increase in State Fiscal Years 2017 and 2018, in order to support the increased cost of compliance with new regulatory requirements established during stage one. Annual Clean Water Fund reports will include recommendations for new sources of revenue, as needed to support those increased investments.

Conclusion

This report describes a Clean Water Initiative for all of Vermont, and involving many state agencies and partners, not just the Vermont Agency of Natural Resources. Over the next twenty years, ANR will continue to work with our partner agencies, particularly VAAF, VTrans and ACCD, but also with the Tax Department, the Vermont Treasurer's Office, Buildings and General Services, the Office of the Attorney General and the other affected state offices to ensure that Vermont has a coordinated approach to achieving the clean water strategies identified in this report.

Our federal partners and the members of the Vermont federal congressional delegation will also play a critical role in ensuring that Vermont has the resources to achieve our shared goals.

Finally, we will work with Vermont's communities, regional planning and development organizations, local and statewide conservation groups and businesses across all affected sectors to ensure that we implement these strategies in a manner that reflects Vermonters' strong commitment to clean water.

As noted, this effort will require substantial new investments. New revenue is needed to support capacity needs at the responsible state agencies and partner organizations, as well as to fund grant and loan programs capable of providing a state share of costs required to fulfill the obligations of municipalities, farmers, businesses and private landowners. Given, however, the wide scope of needs and diffuse sources of water pollution in the Lake Champlain Basin and around Vermont, the cost to fully implement the Clean Water Initiative is unknown. Likewise, the extent of support from Federal partners and private donations is also unknown. Finally, the timeline for full recovery of Lake Champlain and other surface waters cannot be estimated with complete precision so the State will have to continually refocus its efforts as new monitoring data is received, new results are mapped and new milestones reached, to ensure that investments continue to target the most strategic, cost-effective needs around the State. Mindful of those and other unknown factors, the State has set forth a stepwise plan to build capacity, plan and invest in a clean water future. Annual progress will be reported through the Clean Water Fund, and annual recommendations to the General Assembly will detail new and ongoing funding needs and potential sources of new revenue needed to meet those needs.

Appendix

Signs of Success: Agricultural Applications



Corn crop showing bare soil & no buffer, increasing erosion and phosphorus loading



Hay crop & buffer reduce erosion and phosphorus delivery to streams



Gully erosion from concentrated water



Grassed waterway to prevent gully formation

Signs of Success: Agricultural Applications



Uncontrolled livestock access to stream



Installation of livestock fencing & buffer



Runoff draining into ditch



Vegetated buffer along ditch

Signs of Success: Agricultural Applications



Gully formation & runoff on bare soils



Cover crop protecting soils from weathering

Signs of Success: Agricultural Applications



Phosphorus-laden silage leachate discharging to stream



Silage leachate treatment



Improved manure storage

Signs of Success: Stormwater Management



Streambank erosion from stormwater runoff



Stormwater treatment ponds



Eroding roadside ditch



Ditch stabilization saves road and reduces erosion

Signs of Success: Rivers Channel Stabilized



Restored floodplain



Removal of elevated railroad embankment

Signs of Success: Wetlands Management



Flooded cornfield, former wetland



Restored wetland, former farmland

Signs of Success: Forest Management



Unmanaged stream crossing at logging site



Temporary skidder bridge