



# **Department of Environmental Conservation Fiscal Year 2019**

## **Department Performance Report**

### **VISION**

We envision a Vermont where people live in harmony with diverse and healthy natural systems; appreciate and enjoy our natural resources; work together responsibly to reduce waste and risks to human health and the environment; and prosper without significant degradation of natural systems. We envision a Vermont where people breathe clean air; drink clean water; eat safe food; and live in a sustained and healthy environment.

### **MISSION**

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

## OVERVIEW

The Department of Environmental Conservation launched an effort beginning in 2014 to improve the performance of our programs and processes through the application of two continuous improvement frameworks: Results Based Accountability (RBA) and Lean. The former provides a mechanism for measuring and monitoring the success of our programs while the latter provides a means for improving the effectiveness and efficiency of our processes. Both are now widely used in the administration and management of the Department, which has resulted in the inclusion of performance measures in grants and contracts, the streamlining of various Department regulatory programs, and the incorporation of RBA into our strategic planning and FY19 budget development. In alignment with Act 186, the following report provides information on a number of Results Based Accountability indicators and performance measures for which the Department and its programs are responsible. Information about the Department's recent Lean efforts can be found [here](#).

## DEVELOPMENT OF THIS DOCUMENT

The information contained in this document was pulled together by an internal "Performance Management" team with members representing a diverse cross-section of the Department's programs. Members of the Performance Management Team work with technical staff and managers in their respective divisions to gather the data and develop content for the informational sheets which highlight some measurable results delivered by the Department.

In support of the FY19 budget proposal, all performance measures in this document and associated text have been updated with the most recent data, trends and program activities. In addition, a dashboard of population based indicators developed from the Department's Strategic Plan and Act 186: *An Act relating to reporting on population-level outcomes and indicators* is included at the front of this report.

## NEXT STEPS

The Department is embarking on a new strategic planning process for FY19-FY21. It will follow the RBA framework of our previous plan with a focus on tracking performance measures and results. The new plan will also include more information on how the goals of the Department fit in the Agency of Natural Resource's strategic goals and the Governor's priorities. As we continue to implement Lean process improvement throughout the Department, we will align these efforts with higher level planning efforts, budgeting and RBA. Strategic planning sets the goals and desired trends and we will use Lean as a tool to move our programs towards increased effectiveness and efficiency by focusing on outcomes, and identifying opportunities to improve our work flow and business processes.

Each page includes next steps which outline what actions we will undertake to maintain current trends or "turn the curve" to move towards our goals and outcomes identified in the FY16-FY18 Department Strategic Plan and Act 186. The measures presented in this document are the highest level measures and indicators we currently track as a Department. Over the next year, the Performance Management team will align program-level performance measures with the Department Strategic Plan and continue to identify common measures between programs.

## USING THIS DOCUMENT

This document can be used in its entirety, or each page can stand alone to describe our performance in a specific area. The indicators and performance measures presented in this document are organized by category rather than by program, division or appropriation. These outcomes are as follows:



### Clean Water

Addresses: surface water and groundwater resources management; drinking water program



### Clean Air

Addresses: air quality; pollution emissions; climate change; greenhouse gas reduction programs



### Healthy and Safe Communities

Addresses: waste management; septic systems; natural hazards



### Efficient and Effective Government

Addresses: administration and innovation; human resources; enforcement

## KEY DEFINITIONS

Outcome - A condition of well-being for children, adults, families, communities or the environment.

Indicator - A measure that helps quantify the achievement of an outcome.

Performance Measure - A measure of how well a program or agency is working.

# Department of Environmental Conservation

## Population Based Outcomes and Indicators

### Clean Water

**80%**

of Vermont's rivers and lakes support fishing

Good Progress

**84%**

of Vermont's rivers and lakes support swimming

Good Progress

**631**

tons per year of phosphorous reach Lake Champlain

Stable

**98%**

of public water systems produce safe drinking water

Good Progress

### Healthy and Safe Communities

**3.3**

lbs/person/day of municipal solid waste disposed

Good Progress

**1,437**

acres enrolled in the Brownfields Reuse Initiative for clean up or redevelopment

Good Progress

**4**

dams reported an upgrade in condition

Stable

**10%**

of communities have developed asset management plans

Good Progress

### Effective and Efficient Government

**36**

Lean (process improvement) events initiated since 2013

Good Progress

### Clean Air

**14**

metric tons of greenhouse gasses emitted per capita

Needs Improvement

**59**

days of moderate or greater risk to sensitive populations due to air quality

Needs Improvement

# Table of Contents

## Introduction

Document Overview  
Indicator Scorecard

## Clean Water



### INDICATORS

1. Ensure Public Drinking Water System Compliance
2. Water Quality of Vermont's Rivers and Lakes
3. Reduce Lake Champlain Phosphorus Pollution

### PERFORMANCE MEASURES

4. Easements and Designations to Protect Surface Water Quality
5. Education and Training to Increase Knowledge and Stewardship of Vermont's Waters
6. Technical Assistance and Permitting to Protect Water Quality
7. Project Implementation to Improve Water Quality
8. Finance Water Infrastructure Upgrade
9. Protect Public Health Through Aquifer Characterization



## Clean Air

### INDICATORS

10. Greenhouse Gas Emissions by Vermont
11. Number of Days Air Quality Moderate or Worse

### PERFORMANCE MEASURE

12. Reduce Mobile Source Air Pollution



## Healthy and Safe Communities

### INDICATORS

13. Promote the Sustainable Management of Waste
14. Support the Redevelopment of Vermont's Underdeveloped Properties
15. Ensure Sustainable Environmental Infrastructure
16. Percentage of Dams Receiving an Upgrade in Condition

### PERFORMANCE MEASURES

17. Minimize Exposure to Hazardous Materials
18. Transition Contaminated Sites Back to Productive and Beneficial Use
19. Reduce Hazardous Waste and Toxic Chemical Use
20. Meet Environmental Standards for Potable Water Supply and Wastewater Projects
21. Identify Vulnerability to Geologic Hazards



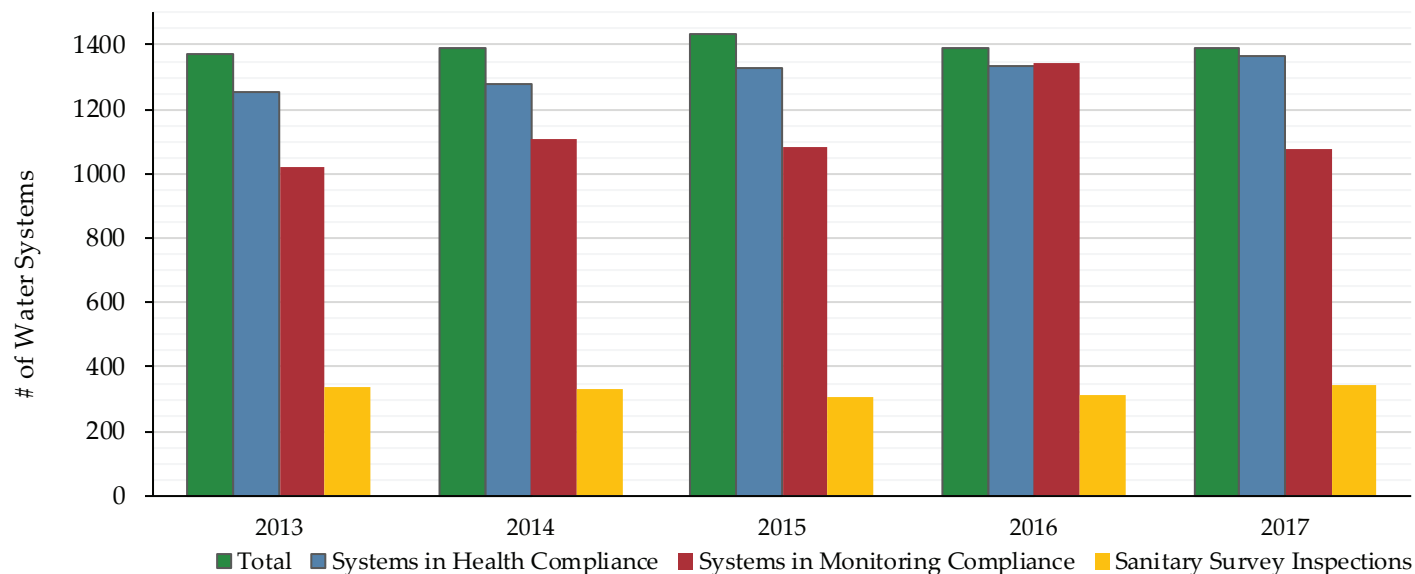
## **Efficient and Effective Government**

### **PERFORMANCE MEASURES**

22. Improve Business Practices to Gain Efficiencies
23. Improve Staff Performance Evaluations
24. Support the Implementation and Use of Online Permitting
25. Resolving Environmental Violations

**Indicator****Clean Water****Ensure Public Drinking Water System Compliance***Providing safe drinking water to Public Water System users***98%**

of Public Water Systems produced safe drinking water

**INDICATOR TREND****Compliance with health standards and monitoring requirements****DATA ANALYSIS**

While most public drinking water systems provide safe drinking water, a small percentage struggle to meet standards. Primary reasons are exceeding chemical standards (e.g. disinfection by-products) and coliform issues. Coliform contamination indicates the system's vulnerability to bacteria and viruses. Disinfection by-products form when organic matter in surface water interacts with chlorine during the disinfection process. Other contamination issues include naturally occurring high levels of arsenic or radionuclides.

The Water Supply Program focuses on proactively preventing compliance problems from occurring in the first place. This is accomplished by having requirements pertaining to source protection, well construction, drinking water treatment, drinking water quality monitoring, and public water system operations.

More specifically:

- well construction plans and the source water's quality/quantity are assessed prior to issuing the source permit;
- engineering plans are reviewed to ensure technical requirements are met prior to issuing a construction permit;
- sanitary survey inspections identify unsafe or unsanitary operations; and
- operations permits contain monitoring and operational requirements including a compliance schedule to bring a system back into compliance when necessary.

When water quality exceedances occur, or public health risks are found, public water systems must take action to ensure that public health is protected. For example, system owners may be required to issue boil water notices to their users or to make modifications to their system (e.g. install treatment or repair a distribution system).

**NEXT STEPS**

- Continue to require water systems to meet standards via the operating permit.
- Continue to monitor and assess whether water systems meet operational standards.
- Continue to monitor and assess whether water systems meet federal Maximum Contaminant Levels (MCLs), monitoring, reporting, and treatment technique standards.
- Continue to improve the source protection program, with policy and rule changes.
- Continue to provide technical assistance to municipalities and volunteer-run private systems.
- Take enforcement actions against chronic non-compliers.

**DATA SOURCE:** USEPA SDWIS database; DWGPD database

**PREPARED BY:** Drinking Water and Groundwater Protection Division, (800) 823-6500

**Indicator**



**Clean Water**

**Water Quality of Vermont's Rivers and Lakes**

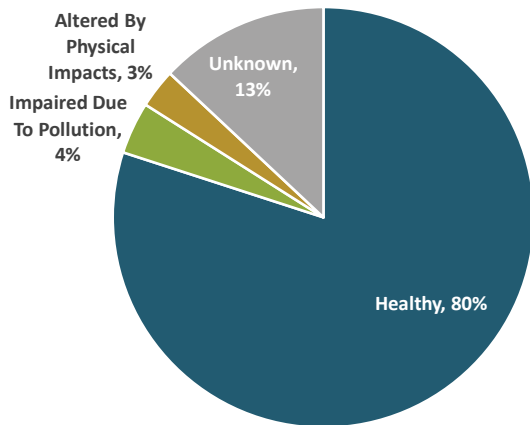
*Vermont's rivers, streams, and lakes are healthy overall and support fishing and swimming activities for residents' enjoyment and tourism*

**80%**  
are healthy for fishing

**84%**  
support swimming

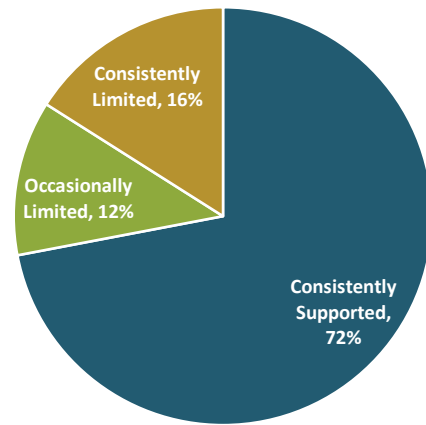
**INDICATOR TREND**

**Quality of rivers and streams for fishing**



**Percent of total miles meeting aquatic water quality standards (fishable)**

**Quality of lakes for swimming**



**Percent of total acres\* meeting recreational water quality standards (swimmable)**

\* excluding Lake Champlain

**DATA ANALYSIS**

Human activity on the land can affect the quality of our waters through stressors such as pollution, channelization, invasive species, and cyanobacteria blooms. Though these stressors have been identified in locations around Vermont, the majority of Vermont's rivers, streams, and lakes support swimming and fishing activities.

Of our river and streams, 80% support healthy communities of aquatic organisms and are considered fishable by the Vermont Water Quality Standards. Only 7% of total river/stream miles are considered impaired due to pollution or altered by physical impacts such as water level fluctuations from dam operations.

Of our lakes (excluding Lake Champlain), 84% support recreational uses such as swimming, although up to 12% may be occasionally limited for swimming due to aquatic invasive species or cyanobacteria

(blue-green algae) blooms. In the remaining 16%, swimming is consistently limited due to these reasons.

The Watershed Management Division actively works to protect, maintain, enhance and restore Vermont's rivers, streams, lakes and ponds. Through a variety of tools and regulations such as the 2015 Vermont Clean Water Act (Act 64), we limit new sources of water pollution and reduce what is coming from existing ones.

To protect Vermont's existing high-quality waters and restore waters that have been impacted by pollution and stressors we utilize several tools/approaches:

- Easements and designations
- Implementation of pollution-reducing practices and projects
- Education and training
- Technical assistance and permitting

**NEXT STEPS**

- Division scientists, planners and permit staff will continue to work with stakeholders through the Tactical Basin Planning process to identify goals at the watershed level.
- Utilize basin plans to outline and prioritize specific activities across the state.
- Support and monitor project implementation through grants and partnerships.
- Continue water quality monitoring to evaluate the success of our collective efforts

**DATA SOURCE:** Watershed Management Division

**PREPARED BY:** Watershed Management Division; (802) 828-1535; <http://dec.vermont.gov/watershed>



**Indicator**



**Clean Water**

**Reduce Lake Champlain Phosphorus Pollution**

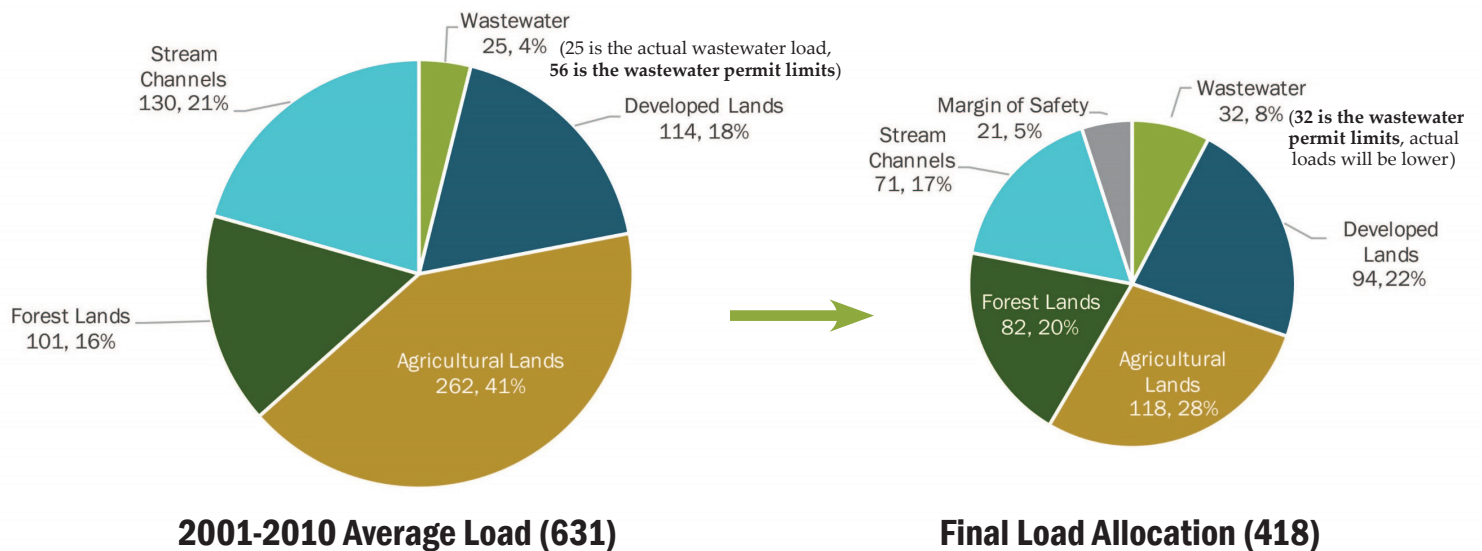
*The Vermont Clean Water Act targets reducing the total phosphorus pollution reaching Lake Champlain from Vermont sources*

**631**

metric tons/year of phosphorus reach Lake Champlain

**INDICATOR TREND**

**Phosphorus reduction needed (metric tons/year, percent of total)**



**DATA ANALYSIS**

The amount of phosphorus reaching Lake Champlain must be reduced to meet water quality standards and improve overall lake health. The estimated average phosphorus load to the lake from Vermont sources from 2001-2010 is 631 metric tons/year (MT). The target load, specified by the federal regulatory limits outlined in the Champlain Maximum Total Daily Load (TMDL) is 418 MT. This substantial reduction will require all sectors to work together to achieve Vermont’s goals for a healthy Lake Champlain.

The passage of the Vermont Clean Water Act (Act 64) provides additional regulation and funding mechanisms targeting phosphorus pollution at the source. Act 64 supports the restoration, protection and maintenance of water quality statewide.

Achieving phosphorus goals for Lake Champlain is expected to take many years. To reach them we must reduce existing loads and limit future sources of phosphorus pollution.

Implementing the approaches proposed as next steps (to the right) and utilizing the increased regulation and funding provided by the passage of the Vermont Clean Water Act we can continue our efforts to substantially cut the phosphorus pollution reaching Lake Champlain and other Vermont waters.

We are working on developing a mechanism to report changes in monitored phosphorus loading to Lake Champlain. This will allow us to better evaluate and report on the current phosphorus loads and show changes over time.

**NEXT STEPS**

- Support easements and designations to protect natural landscape features that reduce phosphorus pollution.
- Implement pollution-reducing practices and projects (riparian buffer plantings, green stormwater infrastructure).
- Continue education and training to increase knowledge of behaviors that can help protect and provide stewardship of our waters.
- Provide technical assistance and permitting to prevent pollution from degrading our surface waters

**DATA SOURCE:** Watershed Management Division

**PREPARED BY:** Watershed Management Division; (802) 828-1535; <http://dec.vermont.gov/watershed>



# Clean Water

## Easements and Designations to Protect Surface Water Quality

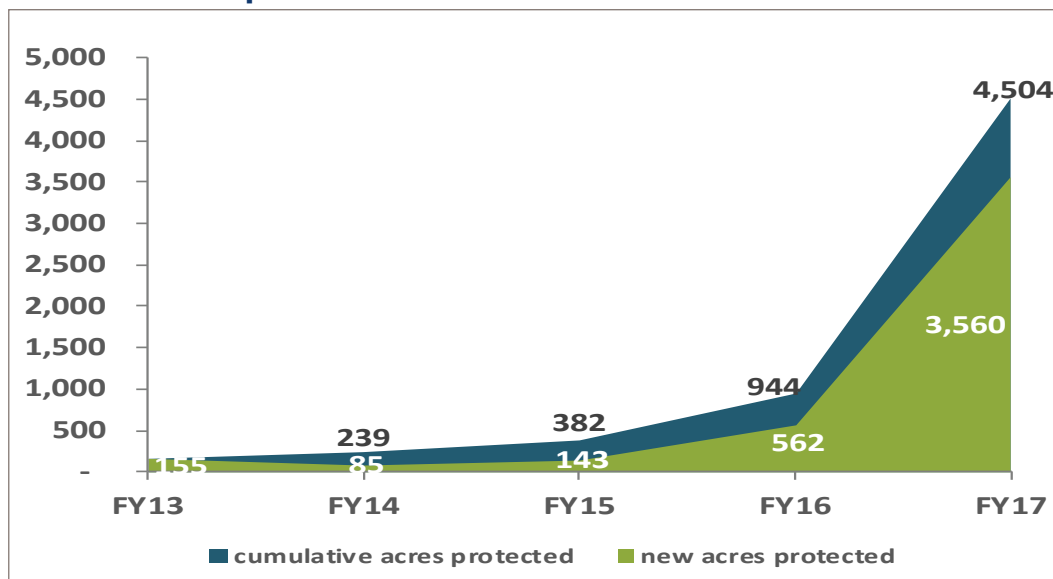
*Protecting water quality and increasing flood resilience, recreational opportunities, and wildlife habitat*

# 4,500+ acres

protected by easements and designations over the past 5 years

### PERFORMANCE TREND

### Number of acres protected



### DATA ANALYSIS

Vermont’s natural aquatic ecosystems, and the functions and values they provide, are a finite resource. The Watershed Management Division (WSMD) has a primary responsibility in ensuring these water resources remain intact for future generations.

Designations and easements are among the most effective tools for safeguarding natural systems from deleterious change. These tools place restrictions on activities and are an excellent method for reducing flood hazards, protecting water quality, and restoring wetland and riparian habitats.

Easements and designations include:

- River corridor easements and floodplain protection measures
- Parcel buy-outs
- Reclassification of surface waters
- Outstanding Resource Water designations
- Reclassification of wetlands (Class I designation)

Over the past five years, the WSMD has used easements and designations to directly protect more than 4,500 acres.

In 2017 alone, more than 3,500 acres were protected; a substantial increase from previous years. One of the reasons for the large increase was due to the revision of the Wetlands Rules, which accounted for the protection of 2,500 of these acres through the designation of three additional wetlands as Class I (Dennis Pond Wetlands in Brunswick, Chickering Fen in Calais, and Sandbar Wetlands in Milton and Colchester). Class I designations are reserved for wetlands that are determined to be irreplaceable or exceptional in their contribution to Vermont’s natural heritage and protects them from most impacts.

Easements and designations (such as Class I wetlands) help to protect water quality and increase our State’s flood resilience, recreational opportunities, and wildlife habitat.

### NEXT STEPS

Strategies to increase easements and designations include:

- Increasing the number of water reclassifications under the Vermont Water Quality Standards.
- Increasing the number of Class I wetland designations under the Vermont Wetland Rules.
- Providing tools and technical assistance to municipalities and other partners to help them understand their role in helping protect designated and conserved waters.
- Reviewing existing conservation prioritization methodologies.
- Finalizing the procedure for designating Outstanding Resource Waters (ORW).
- Initiating ORW designations through tactical basin planning.

Some easements and designations do not currently have acreage associated with them, and we will continue to work on better ways to quantify and report on the protections associated with these projects.



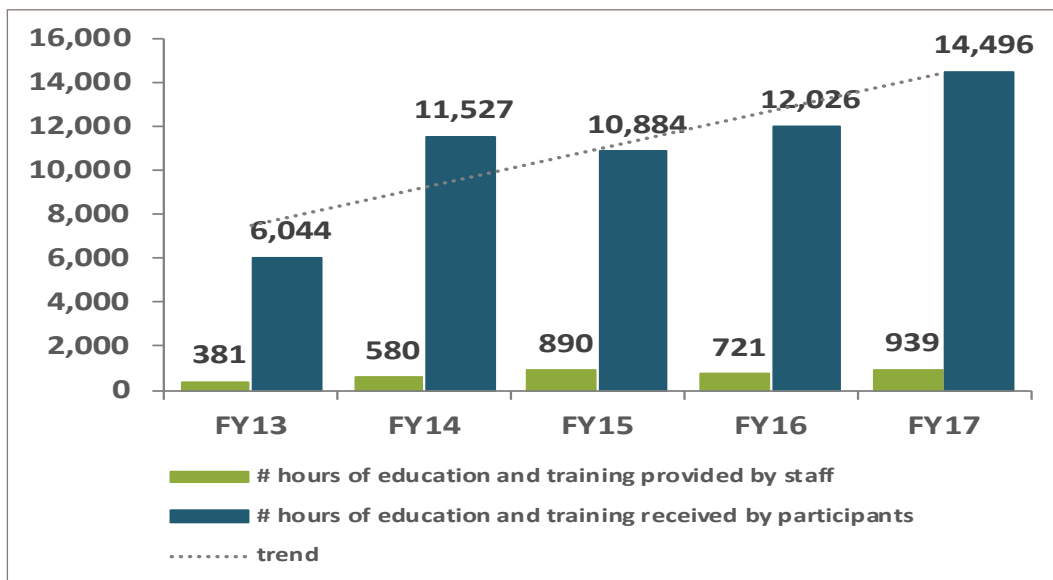
# Clean Water

## Education and Training to Increase Knowledge and Stewardship of Vermont's Waters

*Increasing knowledge and stewardship of Vermont's waters*

### PERFORMANCE TREND

#### Hours of education and training



### DATA ANALYSIS

Reducing or preventing pollution sources fundamentally means changing or adjusting our land uses and employing sound land use management practices. Individuals from all sectors need opportunities to learn about the problems caused by polluted runoff, understand their options to address the problems, and subsequently act to support clean water.

Education and training are important tools to achieve our water quality goals. Often, only a small increase in environmental education can change individual behavior and engender environmental stewardship.

In 2017, the Watershed Management Division (WSMD) provided more than 900 hours of education and training that lead to more than 14,000 hours of education and training, not including any technical assistance provided through project and permit review.

**DATA SOURCE:** Watershed Management Division

**PREPARED BY:** Watershed Management Division; (802) 828-1535; <http://dec.vermont.gov/watershed>

**ADDITIONAL INFORMATION:** Clean Water Initiative Investment Report; <http://dec.vermont.gov/watershed/cwi/cwf#report>

These education and training opportunities included:

- Rivers and Roads trainings on smart road development and culvert design
- Natural Shoreland Erosion Control certification course
- Training on wetland habitats and functions
- Workshops to help prevent the spread of aquatic invasive species
- Informational webinars
- Vermont Lake Wise workshops to Lake Wise leaders on lake-friendly development

The Vermont Clean Water Initiative Annual Investment Report includes a chapter on outreach and technical assistance provided by state agency staff and external partners under a state grant or contract. See the Investment Report for additional information.

# 14,000+ hours

of education and training received by participants

### NEXT STEPS

WSMD anticipates continuing to expand our education and training efforts through effective use of technology and expanded use of the train-the-trainers model, thereby maximizing the impact of staff time devoted to this work.

Strategies to increase and improve our education and training efforts include:

- Establishing means to quantify the impact of our education and training efforts in changing behavior.
- Continuing to leverage technology to increase access to trainings by making them available for online viewing.
- Utilizing partner distribution networks and a train-the-trainers model to expand the reach of education and training.
- Emphasize the importance of education and training in managing work loads and staff job duties.



# Clean Water

## Technical Assistance and Permitting to Protect Water Quality

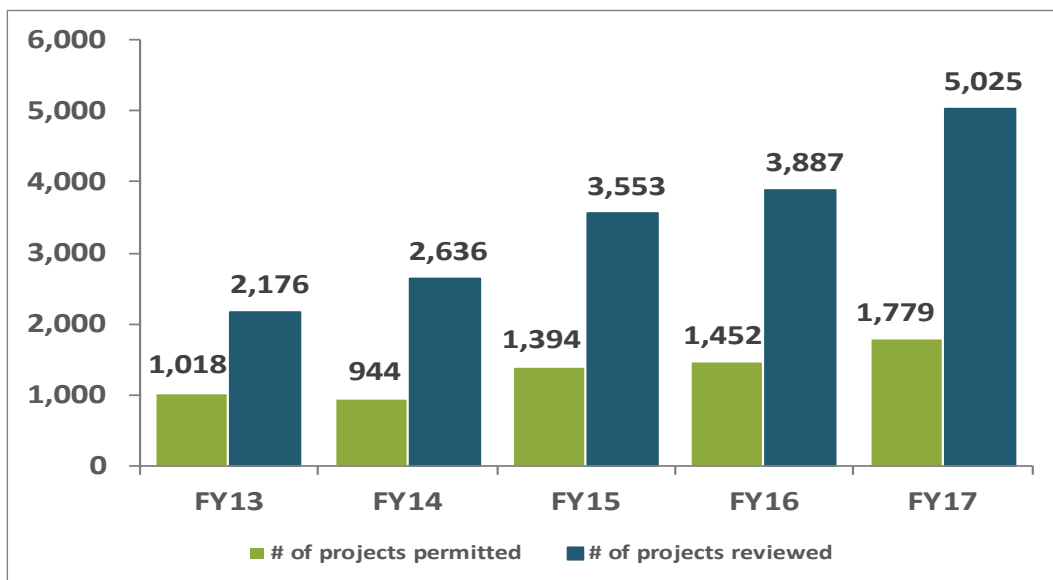
*Preventing pollution from degrading surface waters and preventing wetland loss*

# 3:1

three projects are reviewed for every one permitted

### PERFORMANCE TREND

#### Number of projects reviewed and permits issued



### DATA ANALYSIS

The Watershed Management Division (WSMD) utilizes both technical assistance and permitting to prevent pollution from degrading surface waters and loss of natural resources. This two-pronged approach helps us utilize the best tool for the specific project. In resource permitting, avoidance or minimization of impacts is required and project review can provide the technical assistance to avoid these impacts so permits may not be necessary.

The WSMD regularly provides technical assistance to municipalities, landowners, developers, and partner organizations to ensure that water quality standards are met and ecological functions are maintained. A strength of our resource-based programs (rivers, wetlands, and lakes) is providing technical assistance to redirect activities to avoid resource impacts. Examples include:

- Redirecting development to outside wetlands or protected shoreland areas
- Consultation regarding road designs to

avoid impacting river or stream flows

- Grant application review and project assistance

In other situations, or when impacts can not be completely avoided, permitting is the tool best utilized to minimize impacts to water quality. Permits often require monitoring to ensure water quality is maintained.

Activities requiring permits include:

- Construction and operational stormwater management
- Aquatic nuisance control
- Wastewater discharges
- Shoreland development
- Stream alterations
- Activities in wetlands

In 2017, WSMD staff provided technical assistance to over 5,000 projects. Only a third of these (less than 1,800) received permits. All technical assistance and permitting serve a critical function in maintaining watershed health and flood resiliency.

### NEXT STEPS

Technical review and permit issuance are key to limiting stressors to Vermont surface waters. The WSMD strives to have a strong, active, and meaningful presence across the Vermont landscape and prevent pollution from degrading our waters through the effective use of these tools. These activities represent a large portion of the Division’s workload.

Given the expected increase in both due to additional regulatory authority from the Clean Water Act (Act 64), it is critical that we find ways to streamline and increase efficiencies in these processes such as:

- Utilizing Lean business process tools to improve efficiency and to identify ways to better use limited technical resources.
- Continuing to support the increasing demand for project review and technical assistance.
- Improving permitting processes by use of electronic and online tools.
- Continue to cross-train within the division to maximize technical assistance the division can provide.





# Clean Water

## Project Implementation to Improve Water Quality

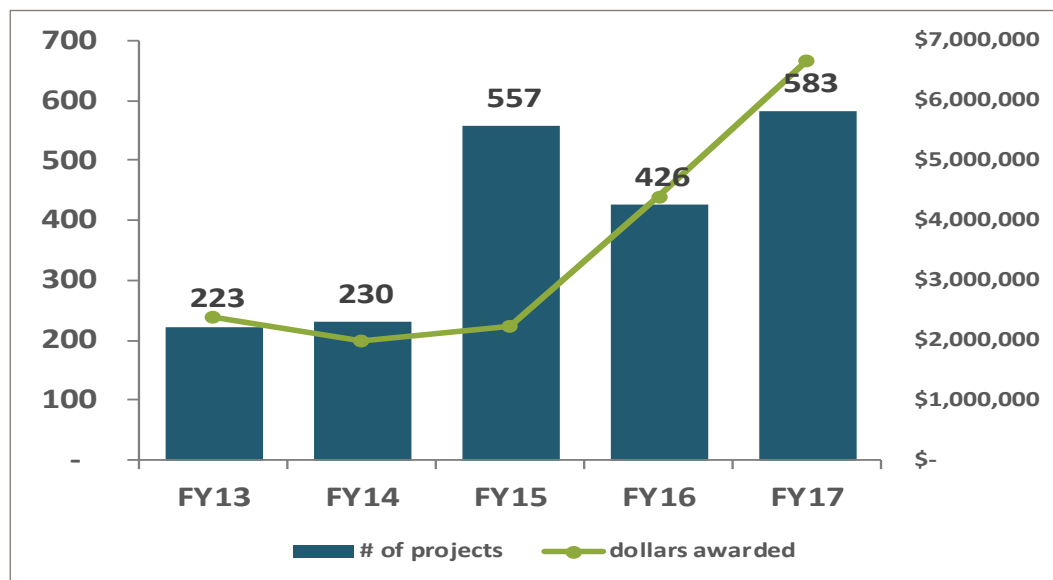
*Restoring and enhancing water quality in our rivers, wetlands and lakes through facilitating and funding project implementation*

# 583

water quality improvement projects implemented in FY17

### PERFORMANCE TREND

#### Number water quality improvement projects implemented



### NEXT STEPS

When projects are properly constructed and maintained, they can have significant results. WSMD relies heavily on its Tactical Basin Planning process and partner organizations to identify, prioritize, develop, and implement projects.

The WSMD plans to expand and improve on these efforts by:

- Further engaging municipalities and other partners in this work.
- Enhancing project prioritization methodologies to target cost-effective projects.
- Enhancing grant programs to support the implementation of clean water projects.
- Creating meaningful incentives across state grant programs to increase participation in voluntary measures.

### DATA ANALYSIS

Most of Vermont’s water quality concerns are caused by nonpoint sources of pollution. Nonpoint source pollution is caused by the transport of pollutants, such as nutrients and sediment, from land to water bodies by rain and snowmelt. Nonpoint source pollution comes from all land uses – neighborhoods, downtown and commercial areas, roads, farmland, and logging sites. Improving Vermont’s waters requires implementation of projects across the landscape that abate and treat nonpoint source pollution.

The Watershed Management Division (WSMD) offers financial and technical assistance and administers regulatory programs to facilitate the implementation of priority projects to improve Vermont’s waters. Project examples include:

- Implementation of best management practices on lake-shore properties

- Floodplain and stream restoration
- Installation of green stormwater infrastructure practices
- Wetland restoration and protection

In 2017, WSMD facilitated nearly 600 unique improvement projects. Of these projects, 105 received funding assistance through Ecosystem Restoration Grants supported by the Vermont Clean Water Fund and other funding sources. This is nearly double the number of projects funded in prior year. This increase is due to increased funding available for grants and contracts from the Vermont Clean Water Fund.

State agencies’ investments in clean water projects and the results of these investments are summarized in the Vermont Clean Water Initiative Annual Investment Report.

Next year, we will report on the benefits in terms of pollution prevented or treated through the implementation of these projects, instead of merely the number of projects and dollars awarded.

**DATA SOURCE:** Watershed Management Division

**PREPARED BY:** Watershed Management Division (802) 828-1535; <http://dec.vermont.gov/watershed>

**ADDITIONAL INFORMATION:** Clean Water Initiative Investment Report; <http://dec.vermont.gov/watershed/cwi/cwf#report>



# Clean Water

## Finance Water Infrastructure Upgrades

*Providing low cost loans and grants to municipalities*

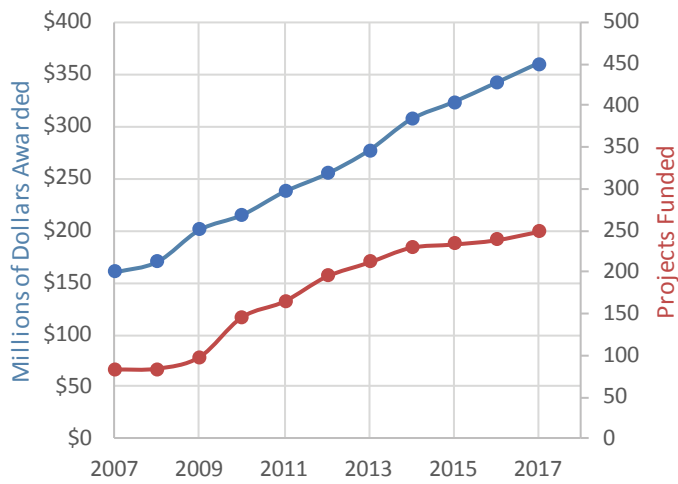
# \$278 million

invested in infrastructure upgrades in the past 10 years

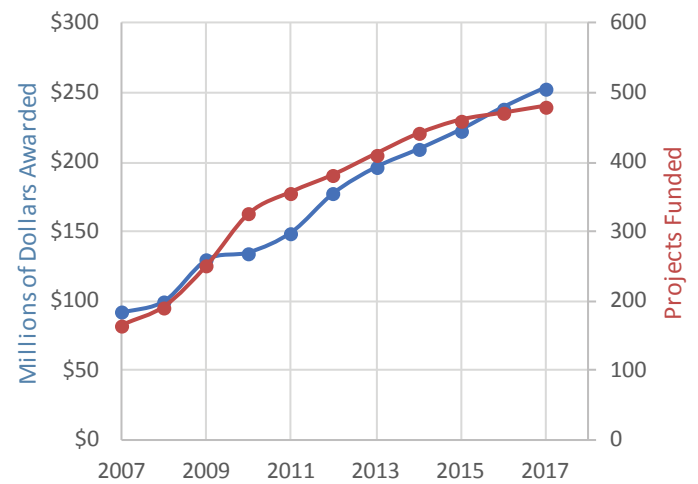
### PERFORMANCE TREND

### Investments for wastewater and drinking water infrastructure upgrades

#### Wastewater



#### Drinking Water



### DATA ANALYSIS

Municipalities and some non-profits are eligible to apply for low interest loans from the Clean Water and Drinking Water State Revolving Loan Funds (SRF). These funds are made available by the US EPA, with matching funds from state capital appropriations.

The Clean Water State Revolving Loan Fund (CWSRF) provides low cost loans to municipalities for projects such as wastewater collection and treatment system upgrades, stormwater conveyance and/or treatment, and combined sewer overflow abatement. There are approximately 90 wastewater treatment facilities in the state that are eligible for this funding.

The Drinking Water State Revolving Fund (DWSRF) provides low-cost loans to municipal and some privately-owned public water systems for capital improvements that increase public health protection and facilitate compliance with the Safe Drinking Water Act. There are over 400 public community drinking water systems in Vermont that include both municipally and privately owned water systems serving residential units. Additionally,

non-profit non-community systems qualify for this funding, which are systems serving non-residential uses, such as schools. Vermont has had great success at awarding loans to small water systems, with 89% of funding awarded to systems serving less than 10,000 people.

The Department oversees the application, selection, coordination for financing, construction oversight and engineering review for these projects. In 2017, the CWSRF funded 10 projects totaling \$3.6 million and the DWSRF funded 10 projects totaling \$11.5 million. Drinking water projects tend to be smaller and more numerous than clean water projects.

Upgrading Vermont's aging water infrastructure is critically important to supporting a vibrant economy by investing in safe drinking water, and protecting our rivers, lakes and ponds. Some of Vermont's most vulnerable populations benefit from these low-cost loans that help maintain affordability of public drinking water and wastewater infrastructure.

### NEXT STEPS

- Fully implement a new computer system to replace legacy systems to improve program efficiency by enhancing financial management.
- Pursue expansion of the use of the CWSRF to addressing non-point pollution by broadening eligibilities allowed for under federal law.
- Fully implement the recently adopted revised Municipal Pollution Control Priority System Rule.
- Improve the accuracy of the 20-year municipal clean water needs projection to enhance capital budget planning

**DATA SOURCE:** State records on funds available, annual requests for funding and forecasted trends.

**PREPARED BY:** Facilities Engineering Division; <http://www.anr.state.vt.us/dec/fed/fed.htm>

# WATER

## Protect Public Health Through Aquifer Characterization

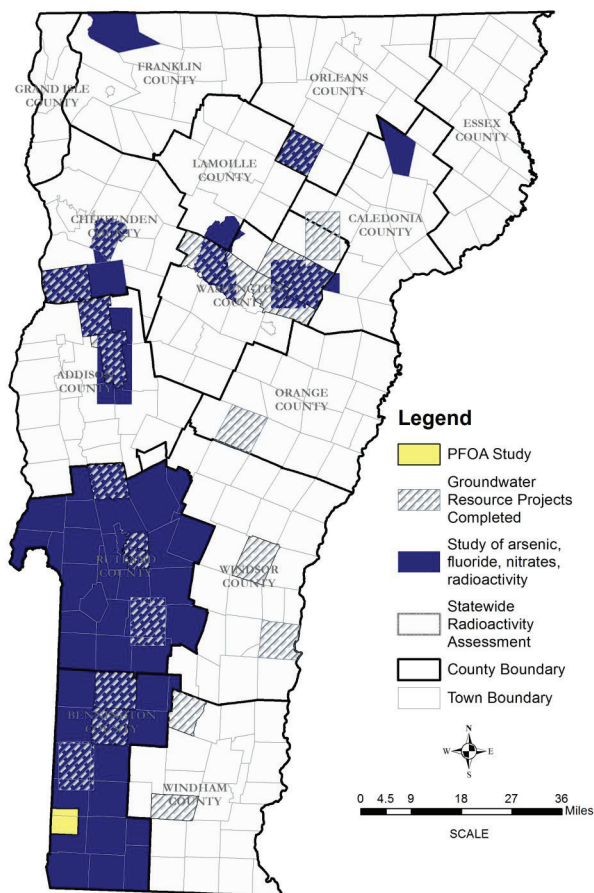
*By providing essential geoscience for Vermont communities*

# 21

Town Groundwater Projects Completed

### PERFORMANCE TREND

### Regions benefitting from geologic solutions



### DATA ANALYSIS

Vermont’s geology, characterized by deformed rock and unconsolidated glacial deposits, holds our valuable groundwater resources. Groundwater chemistry, including naturally occurring contaminants (ex. arsenic, radioactivity) is directly related to regional geology. By collecting data, interpreting the geochemistry from drinking water wells, and determining the influence of the local geologic materials, the Geologic

Survey (VGS) can inform the public about potential risk.

The Division also informs understanding of groundwater contamination from non-geologic sources, like the ongoing investigation of per- and polyfluoroalkyl substance (PFAS) contamination in the state. An intense effort by staff and partners is on-going in the Bennington area to map bedrock and glacial deposits, characterize the aquifer, develop

three-dimensional and temporal models, and understand the groundwater system. This type of work provides reliable advice to assist in reducing exposure to chemical and mineralogical contaminants, thereby serving to protect human health and the environment.

Another component of VGS’s work is the collection and compilation of datasets used to support planning and protection of groundwater drinking supplies. Data from drilled water wells and geologic maps is used to develop aquifer favorability maps for counties and to identify priority areas for more detailed groundwater resource mapping. In 2017, with funding through a federal grant, the VGS initiated a project to upgrade datasets and evaluate statewide water use. This work will improve understanding of local groundwater recharge and water budgets and will better inform planning for drinking water supply.

VGS provides support to communities and state agencies through sampling, research and mapping. As seen in the map above, a variety of groundwater resource projects have been completed, but there is still significant work to be accomplished. Active collaboration with the Drinking Water and Groundwater Protection and Waste Management Divisions in DEC, university partners, non-profit organizations and federal partners (EPA and USGS) are key to our success.

### NEXT STEPS

- Prioritize projects and document the extent of human induced contamination through well water sampling, data analyses, monitoring and field studies. This includes continuing investigative work in the Bennington area to address PFAS contamination.
- Collaborate with partners, to increase public awareness of geologic influences on groundwater to reduce exposure of Vermonters to these known hazards.
- Build statewide databases for groundwater and produce GIS maps as a planning tool for at risk public water supplies.
- Maintain funding for mapping programs and their application to groundwater resources.
- Develop water resource maps for three (3) towns in 2018-2019. These projects were identified during workshops held with partners in 2017. These workshops were targeted at learning about regional priorities and promoting groundwater protection and planning.

Indicator



# Clean Air

## Greenhouse Gas Emissions by Vermont

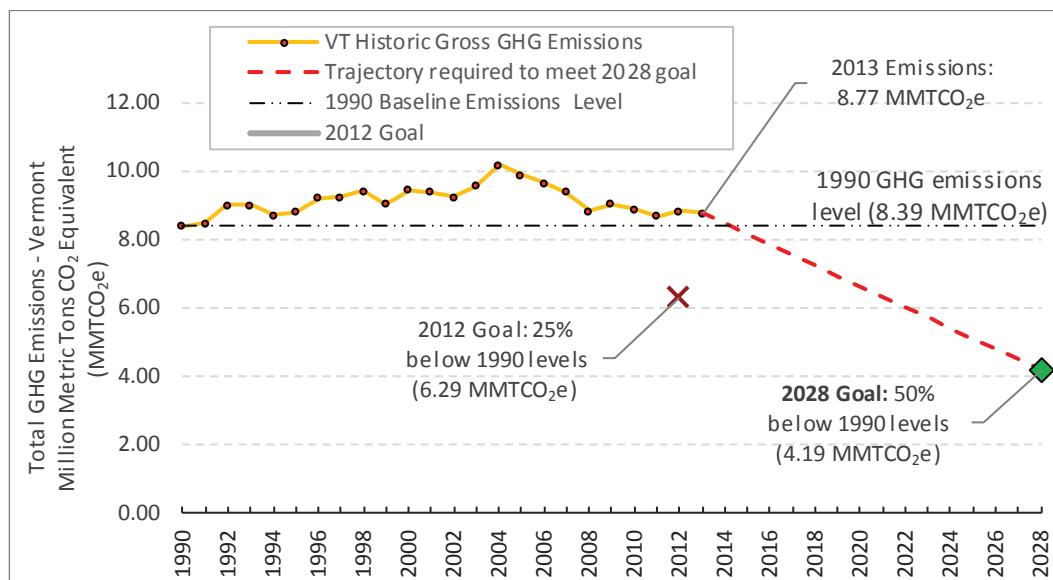
*Quantifying tons of greenhouse gases emitted*

# 14

metric tons GHGs emitted per capita in 2013

INDICATOR TREND

### Vermont greenhouse gas emissions inventory, 1990-2013



DATA ANALYSIS

Vermont did not achieve the statutory goal for 2012 (10 V.S.A. § 578) to reduce GHG emissions to 25% below 1990 levels. The next goal on the horizon is to attain 50% of 1990 levels by 2028. This will require substantial and immediate action. Strategies will need to be implemented in multiple sectors to attain emission reductions at levels that match or exceed those achieved between 2004 and 2008, but must be sustained through 2028, which will require major and long term commitments.

In 2013 the average metric tons of GHG per capita was 14. To meet Vermont’s reduction goal for 2028, this amount must decrease to 6.7 metric tons per capita. To reach the 2028 goal (ten years from now), an average annual reduction of 7.1% from 2013 emissions levels would be required.

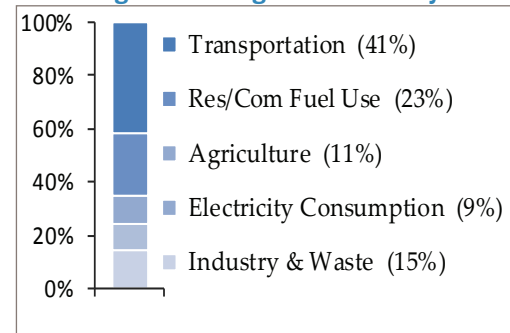
declined slightly between 2012 and 2013, mostly due to a drop in emissions associated with electricity generation/ consumption, as well as a slight decline in emissions from the transportation sector. Emissions from most other sectors remained relatively constant, with a slight increase in the residential-commercial-industrial (RCI) sector due to heating demands during a cold winter.

The Vermont Greenhouse Gas Emissions Inventory is released on an annual basis, with a delay of three years from the year that emissions are being calculated. This is due to the staggered availability of multiple data sources at state and federal levels, from which this report is compiled. The GHG emissions inventory for 2014 will be available later in 2018.

NEXT STEPS

- Support lower vehicle emissions standards through the low and zero emission vehicle program (LEV and ZEV), and enhance public transportation.
- Improve building weatherization and heating efficiency improvements for the residential-commercial-industrial (RCI) sector;
- Push toward demand-side efficiencies and low carbon, appropriately-sited, renewable sources for the electricity sector.
- Continue to publish GHG emissions inventory updates on an annual basis to track progress and inform climate policy.

### Vermont greenhouse gas emissions by sector



Overall GHG emissions in Vermont



## Indicator



## Clean Air

59

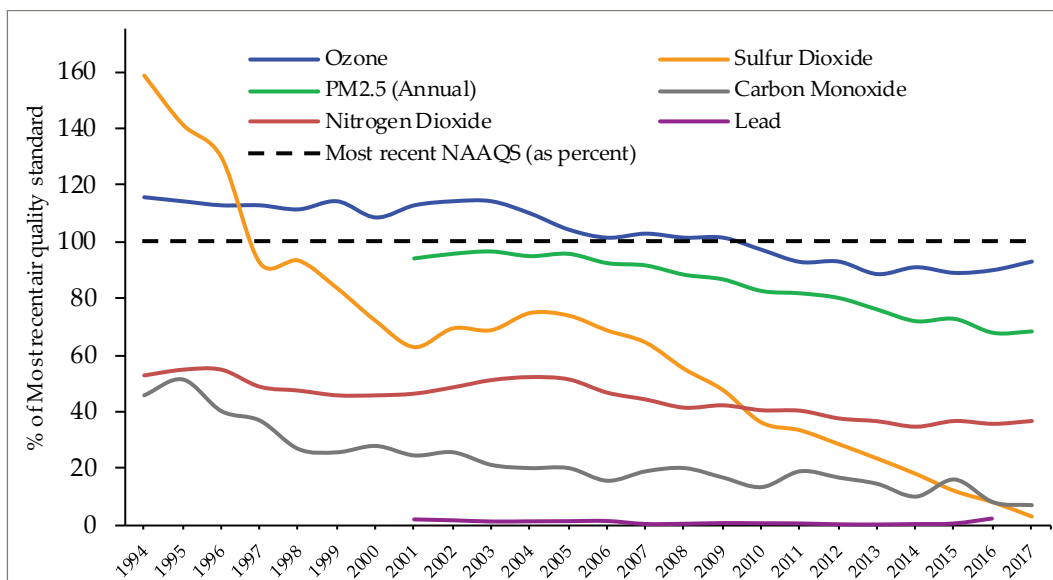
days in 2017, ambient air quality posed a moderate or greater risk to sensitive populations

## Number of Days Air Quality Moderate or Worse

*Monitoring Vermont's air pollutant concentrations*

## PERFORMANCE TREND

## Ambient air quality trends for Criteria Air Pollutants in Vermont



## DATA ANALYSIS

Vermonters' health, welfare and environment are affected by exposures to many different pollutants present in our air that result from a combination of local and out-of-state sources. The US EPA sets and periodically revises National Ambient Air Quality Standards (NAAQS) for six of the most common air pollutants, illustrated in the graph above.

The monitored concentrations of common air pollutants in Vermont's ambient air provide an indication of the effectiveness of the integrated efforts of the entire Air Quality and Climate Division (AQCD) program to reduce air pollution emissions, in combination with parallel efforts from upwind states and national programs in the US and Canada.

Concentrations of the pollutants plotted above are based on the highest concentrations measured in Vermont, and are expressed as percentages of the current

health standards, or NAAQS. All six pollutants have been declining over time, and are achieving the health standards (below the dashed line). Although the standards are being met, there are times when elevated pollutant concentrations are unhealthy. The AQCD produces daily air quality forecasts and issues alerts to the public when pollution levels are expected to be unsafe. In 2017, there were 59 days when air pollution posed a moderate or greater risk to sensitive groups such as people with heart or lung disease, older adults, children, and teenagers. Concentrations of ozone or particulate matter were classified as moderate or above in at least one area of Vermont on those days. There was only one day in 2017 that exceeded the health standard, classified as "unsafe for sensitive groups."

Continued reductions of these pollutants will be needed to meet future, more stringent, standards.

## NEXT STEPS

- Vermont's ground level ozone concentrations are heavily influenced by transport from upwind states, and active participation in regional organizations such as the multi-state Ozone Transport Commission is essential to achieve future progress.
- Vermont's in-state contributions to ozone come primarily from mobile sources. These emissions will also need to be reduced to assure the health of future generations.
- Vermont's summer particulate matter pollution is heavily influenced by interstate transport, and will benefit from regional programs like EPA's Cross State Air Pollution Rule.
- Vermont's winter particulate levels are often dominated by local emissions, especially in mountain valley towns where reductions from local sources like wood stoves will be needed to meet more protective future standards.

**DATA SOURCE:** AQCD Ambient Air Monitoring Network; US EPA Air Quality System (AQS); National Emissions Inventory 2014

**PREPARED BY:** Air Quality and Climate Division; (802) 828-1288



# Clean Air

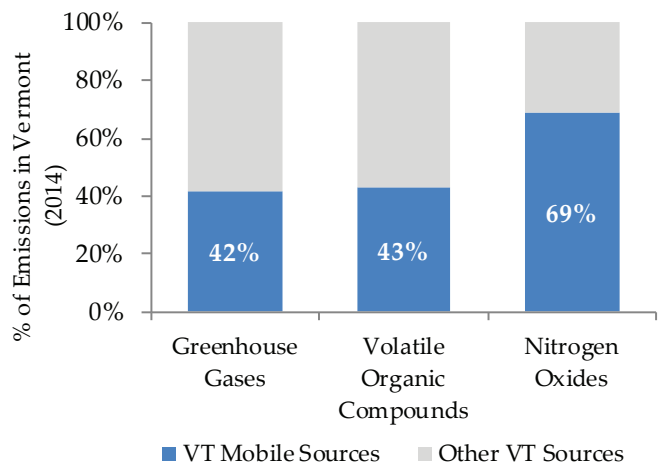
## Reduce Mobile Source Air Pollution

*Promoting electric and other low emission vehicles in Vermont will reduce air pollution emissions*

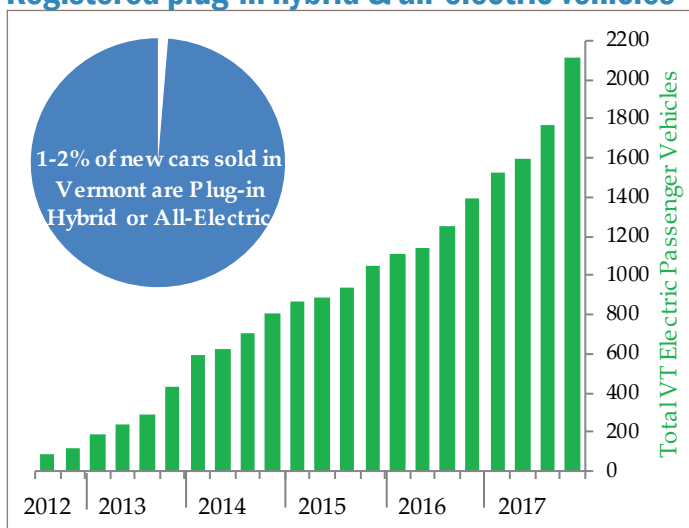
**69%**  
of NO<sub>x</sub> emissions in Vermont are from mobile sources

**PERFORMANCE TREND**

### Proportion of air pollutants from mobile sources



### Registered plug-in hybrid & all-electric vehicles



**DATA ANALYSIS**

Mobile sources (i.e. vehicles, engines, and equipment) are the largest source of many air pollutants in Vermont, including greenhouse gases and the ozone-forming volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>),

as well as hazardous air pollutants which contribute to human health impacts ranging from respiratory diseases to cancer.

Vehicle miles traveled (VMT) in Vermont are nearly twice as high as they were thirty years

ago. During that time, the number of cars and trucks registered in Vermont has increased by nearly 60%.

Cleaner conventional vehicles and alternatively fueled vehicles such as plug-in hybrid and all-electric vehicles are necessary to help offset potential increases in vehicle population and VMT.

While the continuous growth rate of new electric vehicles registered in Vermont is encouraging, these vehicles are still only a very small fraction of the total new vehicles registered. In order to improve air quality and meet our greenhouse gas emission reduction goals, alternative fueled vehicles will need to be a much larger fraction of total new vehicles registered in Vermont.

At the same time, efforts to reduce air pollution from conventional vehicles must continue. These include continued adoption of California vehicle emissions standards, inspection and maintenance of vehicle emission control systems, and enhancement of emissions control technology upgrade programs for diesel engines.

**NEXT STEPS**

- Implement Vermont’s Zero Emission Vehicle (ZEV) Action Plan which identifies actions to expand the ZEV market in Vermont, and continue to participate in Multi-State ZEV Action Plan.
- Adopt California vehicle emissions standards, including ZEV requirements.
- Enhance Vermont’s vehicle emissions inspection and maintenance program to maximize benefits from investments in emissions control technology.
- Reduce diesel emissions through technical support and funding for vehicle and equipment replacement, and installation of idling reduction technologies.
- Provide information and training to Vermont automotive technicians to ensure effective maintenance and repair of vehicle emission control systems.

**DATA SOURCE:** U.S. EPA 2014 National Emissions Inventory (NEI) Vermont Department of Motor Vehicles Motor Vehicle Registrations

**PREPARED BY:** Air Quality and Climate Division; (802) 828-1288



Indicator



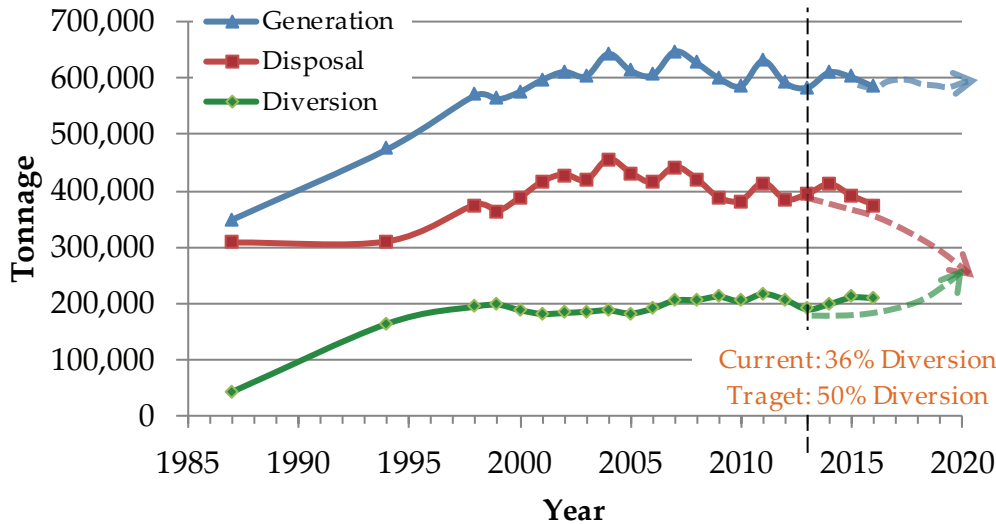
# Healthy and Safe Communities

## Promote the Sustainable Management of Waste

*Increasing the statewide diversion rate of all solid waste generated by Vermonters*

PERFORMANCE TREND

### Tons of solid waste generated, diverted and disposed of by Vermonters



DATA ANALYSIS

Parallel to national trends, Vermont has continued to generate more and more solid waste over the past few decades. Vermont residents, businesses, and institutions also continue to send reusable and recyclable materials to the landfill. When Vermonters keep these valuable materials out of the landfill, it saves energy, conserves resources, reduces greenhouse gases and creates new business opportunities.

In 2013, Vermont began to implement the Universal Recycling Law, an innovative and encompassing change to the State’s solid waste management program. Largely focused on keeping recyclables and organics out of, or diverted from, the landfill, the Universal Recycling Law strives to make this convenient for all residents. It is estimated that the Law and its associated efforts can raise the diversion rate to 50% by 2020 and reduce the amount of waste disposed by the average

Vermonters to 2.7 lbs per day, ambitious but feasible goals. In 2016 Vermonters diverted, primarily through recycling and composting, 36% of their waste from landfill disposal. This is a 1% increase over the 2015 diversion rate, marking slow but steady progress towards the 2020 goal.

Notably, Vermonters also generated 3.5% less waste overall in 2016. Many factors influence the total waste generated each year, including population size, economic activity, and changing materials types within the waste stream. Regardless of the cause of the 2016 decline, generating less waste conserves resources and preserves limited landfill space.

Vermonters are throwing less away and recycling more, illustrating the continued success of Vermont’s Universal Recycling Law.

# 3.3 lbs

the amount of waste disposed of by an average Vermonter each day

NEXT STEPS

- Providing outreach and education so that everyone knows how, where and what can be recycled and what the requirements and options are for organics management.
- Exploring funding opportunities to support implementation of organics management systems by partners.
- Supporting the parallel collection organics at drop-offs or by haulers that collect municipal solid waste.
- Implementing landfill ban on food scraps, which will take full effect in 2020.
- Encouraging the use of the Food Recovery Hierarchy by supporting source reduction, providing food to people and feeding animals.
- Implementing of updated Solid Waste Implementation Plans by regional solid waste management entities.
- Enforcing the 2015 landfill ban on recyclables and 2016 ban on leaf and yard debris.
- Evaluating the impact of the recycling and leaf and yard debris landfill bans by compiling 2017 diversion and disposal data in 2018.

DATA SOURCE: Solid Waste Management Program

PREPARED BY: Waste Management and Prevention Division; (802) 828-1138

## Indicator



# Healthy and Safe Communities

## Support the Redevelopment of Vermont's Underdeveloped Properties

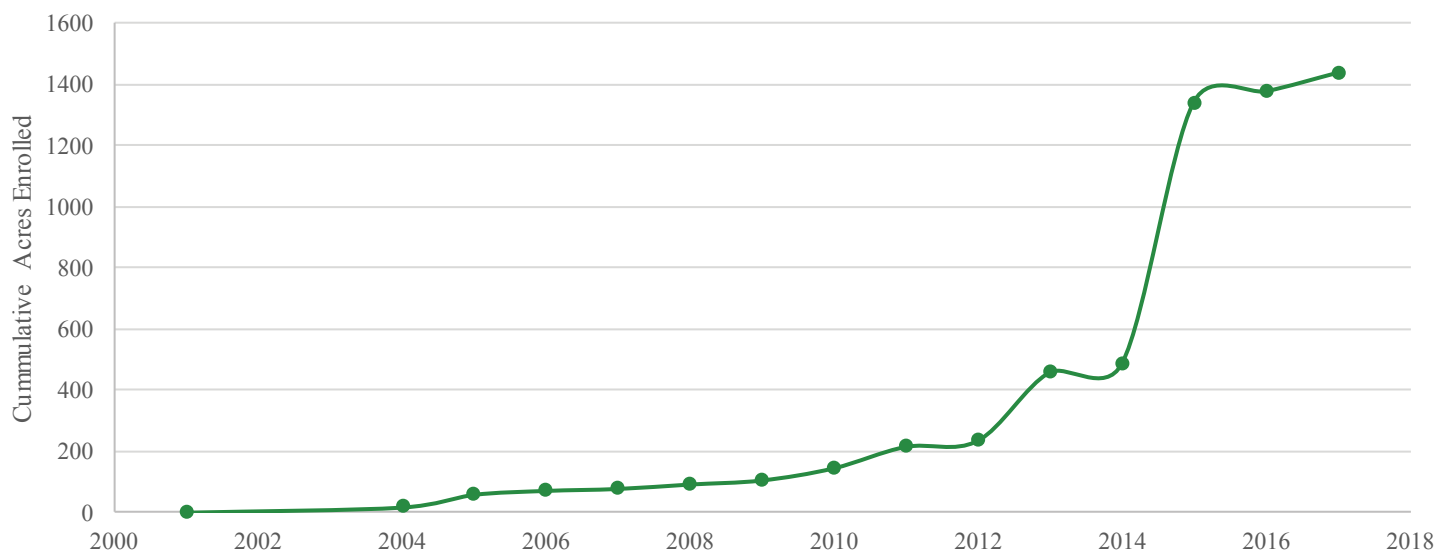
*Safely clean-up and sustainably reuse brownfields*

# 1,437

acres enrolled in the Brownfields Reuse Initiative

## INDICATOR TREND

### Acres enrolled in the Brownfield Reuse Initiative



## DATA ANALYSIS

The Brownfield Program provides developers interested in developing a brownfield site with tools to complete a project in a safe, timely and cost effective manner. This is accomplished by providing technical assistance, financial assistance and liability protections related to environmental liability. This work is completed primarily through DEC, but also in collaboration with the Agency of Commerce and Community Development (ACCD) and regional planning commissions.

Brownfields in Vermont are defined as property on which expansion, redevelopment, or reuse may be complicated by the release or threatened release of a hazardous material. Brownfield redevelopment advances sound land-use practices while promoting community and economic growth by removing impacts to the environment and public health. Brownfields are also consistent with other state goals, including redevelopment of downtowns, providing affordable housing, cleaning up hazardous waste sites and the environment, increasing property values and tax revenue,

and supporting municipal and non-profit organizations.

The Vermont Brownfields program is currently a very successful program, with almost 400 acres cleaned up since the beginning of the program in the late 1990s. In total, there have been 137 projects enrolled in the Brownfields Reuse and Environmental Liability Limitation Program. During 2014, the program enrolled 16 new sites, the highest number of sites enrolled in one year. Several large acreage projects were added in 2017 bringing the total number of acres enrolled in the program to 1,437.

With the increased enrollment, current funding allocations are unsustainable. Each year DEC and ACCD apply to EPA for funds to support the Program in assisting with the investigation and cleanup of brownfields and the amount awarded is stable, or decreasing over time. This funding supports the Program in assisting with the investigation and cleanup of brownfields while providing financial and legal assurances to developers.

## NEXT STEPS

- Based on projected funding needs for current Brownfields projects, DEC anticipates a shortfall in funding that will impede redevelopment. With increasing annual enrollment and declining federal funding, other funding mechanisms need to be evaluated.
- An informal analysis of potential future Brownfield sites and estimates for assessment and clean-up of these properties projects an annual need of \$19M.
- Continue efforts to promote the benefits of the Brownfields Program to landowners, municipalities, and developers by publishing success stories and conducting outreach and education events.

Indicator



# Healthy and Safe Communities

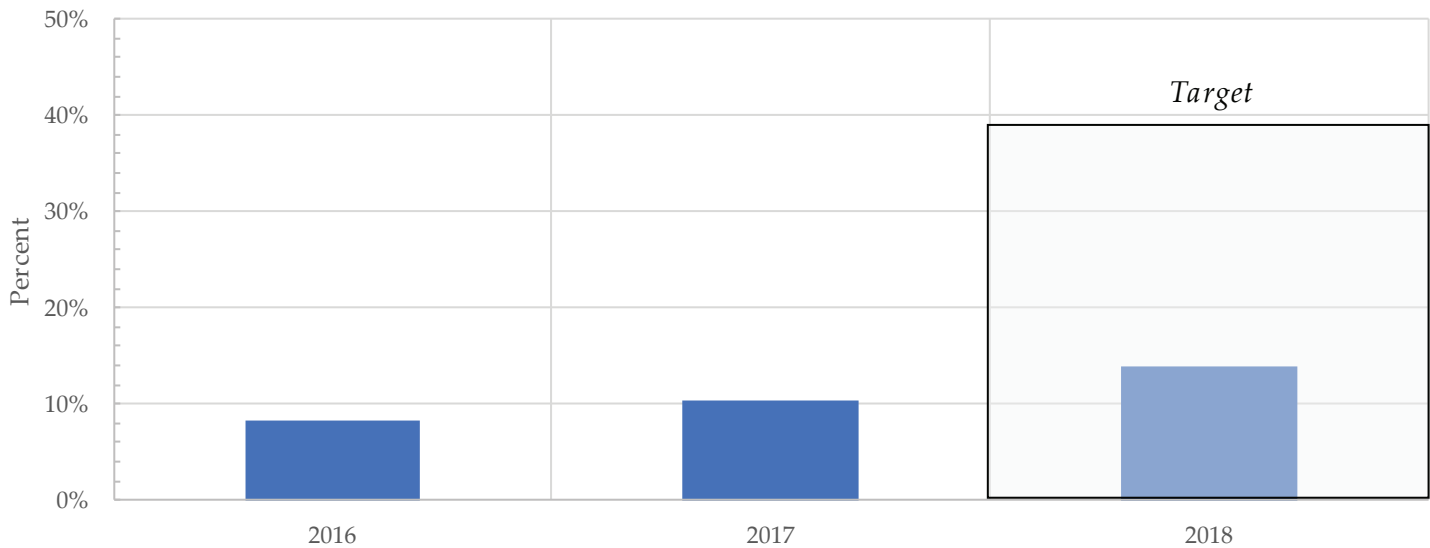
## Ensure Sustainable Environmental Infrastructure

*Helping public drinking water systems plan for the future*

**10%**  
of communities  
with asset  
management  
plans

INDICATOR TREND

### Public community drinking water systems with asset management plans



DATA ANALYSIS

Money from utility reserves and public financing is not enough to address Vermont’s drinking water infrastructure needs. This financial shortfall is the greatest challenge for most public community water systems. The Drinking Water program developed a strategy to help systems meet this challenge, by encouraging systems to create and use an Asset Management Program.

An effective Asset Management Program uses detailed asset inventories, operation and maintenance tasks, life-cycle cost analyses, and long-range financial planning to build capacity and make systems more sustainable. It can help systems operate more efficiently, prolong asset life, plan and pay for future repairs and replacements, inform decisions, justify system needs, and make the best use of limited resources.

In 2015 and 2016, several multi-day

workshops were held around Vermont to instruct systems in the techniques of asset management planning. Of the 419 community water systems in the state, 35 participated in these initial efforts. It was recognized through this work that while systems can typically complete some portion of their asset management plans easily, support is needed, particularly for small water systems to complete the program. The Drinking Water program has been providing grants up to \$20,000 to public water systems to develop a complete Asset Management Plan. In 2016, 27 systems were awarded an Asset Management grant; 19 of which either completed the Asset Management workshops in 2015 or 2016. In 2017, 21 systems were awarded an Asset Management grant; 6 of the 21 grantees received grants in 2016 for other components of an Asset Management Program.

NEXT STEPS

- A shortened asset management training workshop will be provided to community water systems across the state in the spring of 2018. These workshops help communities identify resources within their systems and assist in the preliminary development of community asset management plans.
- The asset management grant program is being phased out and efforts are shifting to an Asset Management Planning Loan program. The target for 2018 is to have 14% of systems with asset management plans.

DATA SOURCE: Capacity Program

PREPARED BY: Drinking Water and Groundwater Protection Division; (800) 823-6500



**Indicator**



# Healthy and Safe Communities

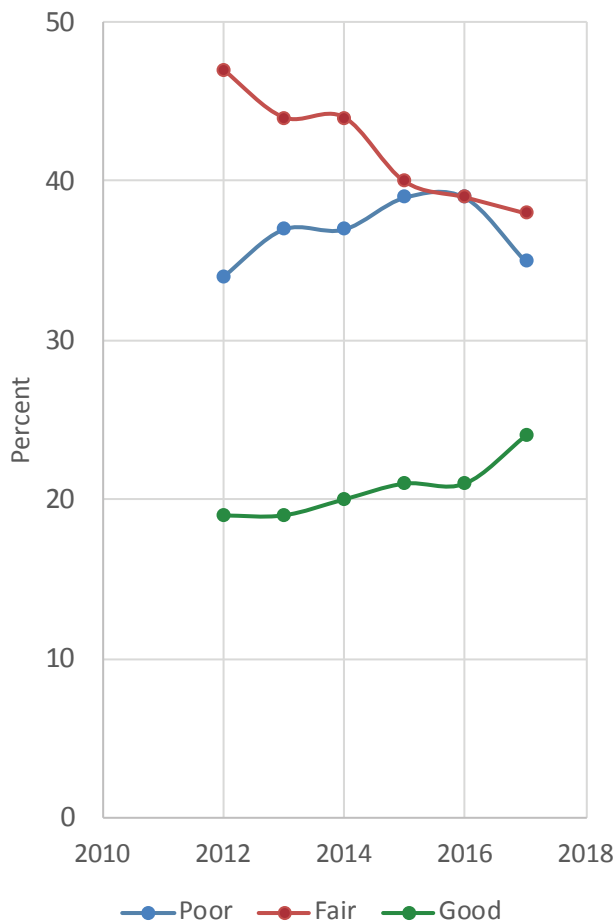
## Percent of Dams Receiving an Upgrade in Condition

*Taking actions necessary to reduce potential failure or threat from dams*

**2**  
dams upgraded and  
**2**  
dams removed  
in 2017

**INDICATOR TREND**

**Percent of dams in each condition class**



data available to the Dam Safety Program. Only through continued care and regular inspection can there be any chance that unsafe conditions be detected and remedied. Annually, a small number of dams complete repair, rehabilitation, or operation and management activities sufficient to receive an upgrade in condition upon re-inspection. There are currently 413 registered dams capable of impounding more than 500,000 cubic feet that are in the Program’s jurisdiction and inspected on a regular schedule.

The Agency may also find some dams to be unsafe and a menace to people or property above or below the dam. In these instances, the Program may administer the Unsafe Dam Revolving Fund which can provide funding to nonprofit, private or municipal dam owners for the reconstruction, repair, removal, breaching, draining, or other actions necessary to reduce the threat of a dam, or portion of a dam, determined to be unsafe.

In 2017, two poor condition jurisdictional dams were completely removed. The benefits of dam removal include restoration of flows for fish, wildlife, and natural sediment transport, improved natural water temperatures and nutrient levels, as well as eliminating safety risks and ongoing costs of dam ownership associated with operations and maintenance.

**NEXT STEPS**

- Continue to educate dam owners through the inspection program. Communicating with dam owners will improve their understanding of the liabilities and responsibilities of dam ownership.
- Seek additional staff resources to increase the number of inspections. Increased inspection rates will improve communications to dam owners and increase the rate of dam reconstruction, repair and/or removal.
- Perform public outreach and educational efforts through mailings to dam owners, public information meetings on dam safety topics, and development of fact sheets posted on the website that detail current Dam Safety Program methods and polices.

**DATA ANALYSIS**

The assignment of dam hazard classification is based on the potential for damage or loss of life downstream if a dam were to fail. It is not related to the potential for failure or the condition of the dam. For this reason, the Dam Safety Program assigns a condition rating to each dam they inspect. The inspection program focuses on dams that impound greater than 500,000 cubic feet of water,

liquid, and sediments that require authorization by the program to repair, rehabilitate, replace or remove. However, we do occasionally perform inspections on dams that impound less than 500,000 cubic feet if requested by the owner.

The reported condition of a dam is based on field observations at the time of inspection and any other



# Healthy and Safe Communities

# 365

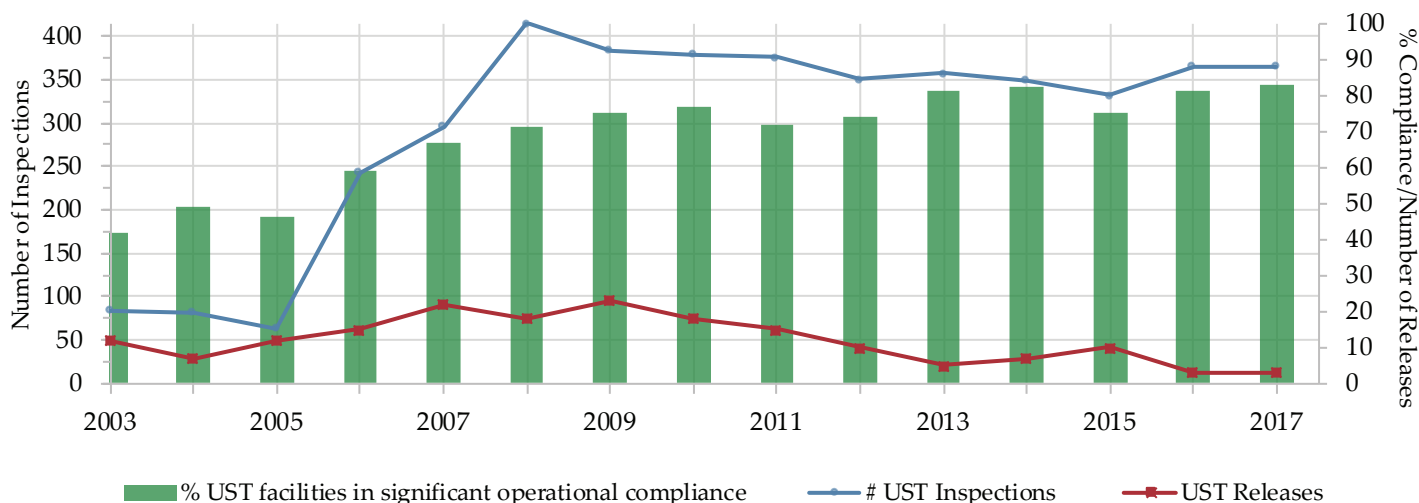
underground storage tank facilities were inspected in 2017

## Minimize Exposure to Hazardous Materials

*Ensuring proper management of hazardous materials to prevent releases and site contamination*

### PERFORMANCE TREND

#### Underground storage tank (UST) inspections reduce the number of new sites



### DATA ANALYSIS

Many waste management activities aim to identify hazardous materials and dangerous practices. Once potential problems are identified, we can work with businesses to encourage appropriate management and containment of hazardous materials, and ensure compliance with appropriate regulations. This minimizes the exposure and release of these materials before a property becomes contaminated.

An action that has contributed to fewer hazardous materials exposures and property contamination is the work of the Underground Storage Tank (UST) program. In 2005, this program streamlined their inspection process and dramatically increased the number of annual inspections completed at petroleum UST facilities. This increased site presence resulted in a nearly 30% increase in the number of facilities found to be in significant operational compliance (SOC) with relevant management practices. Improvements have continued with further implementation of this program with a 2% increase in facility SOC over this past year. The number of UST releases requiring emergency spill response

has also decreased, which reduced the number of underground storage tank facilities being listed as contaminated sites each year.

Vermont statute [10 VSA §1927(e) and (f)] established deadlines for closure of all remaining single-wall and combination UST systems (1/1/2016, and 1/1/2018, respectively). The only regulated single-wall tanks remaining in use have all been lined internally, which provides an additional level of protection from leaks, but even those tanks have a deadline by which they must be permanently closed.

Other activities that serve to minimize Vermonter’s exposure to hazardous waste include:

- permitting and inspections of hazardous waste generators and haulers that handle these materials,
- the development of best management practices, and a permitting and inspection program for salvage yard facilities, and
- the development and implementation of rules for above ground storage tanks.

### NEXT STEPS

- Revision of the Underground Storage Tank Regulations that incorporate new stricter federal standards for demonstrations of significant operational compliance.
- Enforcement of the 2017 Above Ground Storage Tank rules which will improve compliance with the best management practices for design, installation, and removal of potential contaminated sources.
- Completion of annual self-registration of compliance by small quantity generators of hazardous waste which will increase awareness of regulations and improve overall compliance rates.

**DATA SOURCE:** Underground Storage Tank Program

**PREPARED BY:** Waste Management and Prevention Division, (802) 828-1138





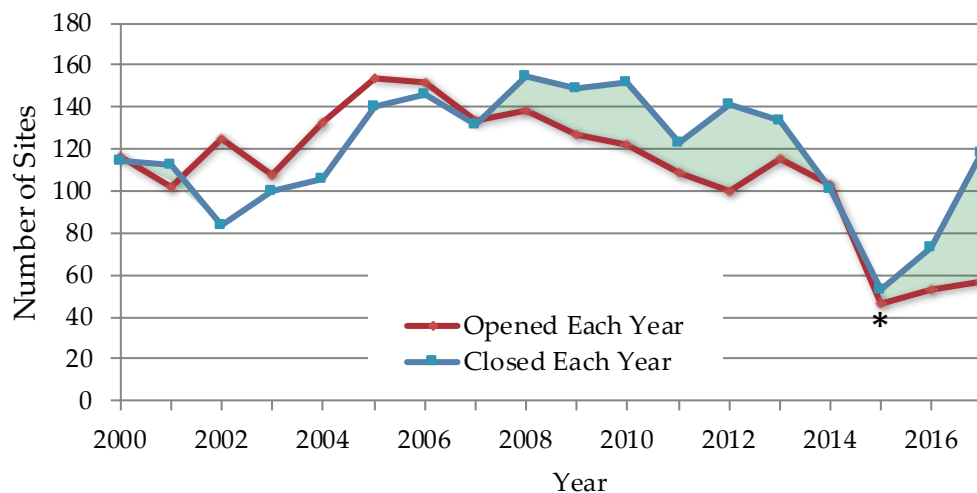
# Healthy and Safe Communities

## Transition Contaminated Sites Back to Productive and Beneficial Use

*Facilitating efficient clean-up and closure processes for contaminated sites*

### PERFORMANCE TREND

#### Contaminated sites opened and closed (cleaned) each year



\*Residential heating oil releases began being treated as spills in 2015

### DATA ANALYSIS

Many factors contribute to successful remediation of contaminated sites, including the extent and type of contamination, financial capability of the property owner, and degree of impact on the environment or human health. The Sites Management Section (SMS) contributes to supporting successful clean-up of these properties by providing technical and financial assistance for site assessment and supporting the implementation of clean-up remedies. In all cases, the ultimate end goal is to be protective while returning the impacted property to a productive and beneficial use.

In 2017, the SMS continued rigorous response to wide-spread contamination by per- and polyfluoroalkyl substances (PFAS), such as PFOA, throughout Bennington county. The contamination has been found at significant levels in drinking water within North Bennington and Bennington and within groundwater at various other locations across the state. This contamination has impacted over 400 private water supplies within North Bennington/Bennington alone. Over

300 of these water supplies have been impacted at levels above the Vermont Health Advisory for PFOA. The SMS has coordinated ongoing response and testing of over 600 drinking water supplies, has facilitated the installation and ongoing operation and maintenance of point of entry treatment systems, has coordinated with potentially responsible parties, and has assisted with the ongoing installation of water line extensions for the area. This wide-spread contamination will require active management and significant resources for many years to come.

Despite the significant time commitment that the PFAS response required, the SMS has continued to manage over 1,200 active sites. In 2017 SMS added 57 new sites into the program, and successfully supported the remediation and closure of 118 sites, resulting in a net decrease of 61 sites from the active sites listing and 45 more sites being closed in 2017 than 2016. The ability to remain a viable program despite the stresses on resources is due in part to process improvements that the SMS has adopted in recent years.

DATA SOURCE: Sites Management Section

PREPARED BY: Waste Management and Prevention Division, (802) 828-1138

# 118

sites were cleaned in 2017

### NEXT STEPS

#### Environmental Contingency Fund (ECF)

- The ongoing PFAS response has placed unexpected demands on the ECF. In combination with our contractual financial obligations at federal superfund sites and ongoing costs to cleanup Vermont's orphan sites such as dry cleaner sites, the balance of the ECF is projected to become negative within the next four years.
- DEC has investigated ways to sustain the ECF while still completing critical site work. In 2017, funding, using capital funds, was secured to cover pending superfund obligations.

#### Petroleum Cleanup Fund (PCF)

- In 2014 the PCF reimbursement process was evaluated. Major efficiencies and enhancements were implemented for both staff and stakeholders. Our final significant process improvement, online claim submissions, is currently undergoing external stakeholder testing and modification.







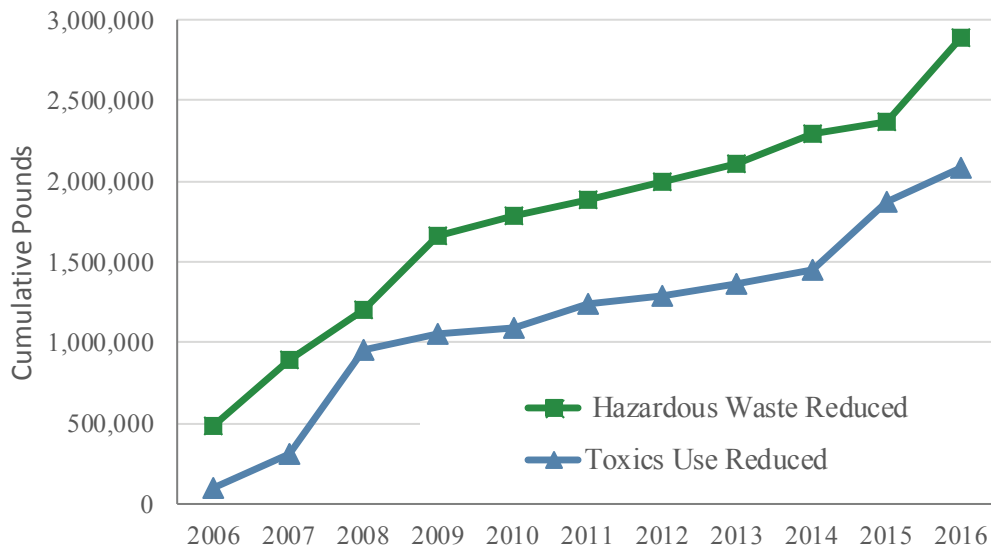
# Healthy and Safe Communities

## Reduce Hazardous Waste and Toxic Chemical Use

*By working with businesses to provide assistance in pollution prevention*

### PERFORMANCE TREND

#### Reduction in hazardous waste & toxic chemical use



### DATA ANALYSIS

Vermont’s largest users of toxic chemicals and generators of hazardous waste are required to develop three-year plans to identify opportunities for reducing use of toxic chemicals and generation of hazardous waste in industrial processes. Many Vermont facilities have been subject to these planning requirements since 1994. The success of the program is, that over the years, numerous facilities have reduced their toxics use and hazardous waste generation to below the thresholds required for planning. The graph above shows that planners continue to reduce toxics use and hazardous waste.

The Environmental Assistance Office reviews plans, analyzes annual progress report data and provides technical assistance in identifying and implementing reduction measures.

Planning facilities are visited at least once during each three-year planning cycle to review progress in planning, assist in identifying new reduction opportunities, and provide assistance in evaluating technical and economic feasibility of these opportunities.

By implementing toxics use reduction strategies and hazardous waste reduction strategies, Vermont businesses:

- save money
- reduce liability
- reduce worker exposure to hazardous chemicals
- reduce regulatory obligations
- satisfy customer demand for safer products

**2.8 million lbs**  
of hazardous waste  
reduced

**2 million lbs**  
of toxics use reduced  
since 2006

### NEXT STEPS

Information sharing and technical assistance are important to sustaining reductions in toxics and hazardous waste use. Efforts to support this will include:

- Enhancing web site resources on toxics use and hazardous waste reduction methodologies and improve engagement with the planner community.
- Assisting facilities that are new to the planning process.
- Developing and publicizing case studies of successful toxics use and hazardous waste reduction efforts that are transferable to other businesses.

Additional efforts will focus on strategies to enhance the effectiveness of the planning requirements, including:

- Providing input and recommendations for ways to modernize the program’s enabling statute.
- Identifying facilities that are subject to the requirements but not filing plans as required by law.
- Improving efficiency in administration of the program to increase capacity of program staff to focus on technical assistance and outreach.



# Healthy and Safe Communities

# 95%

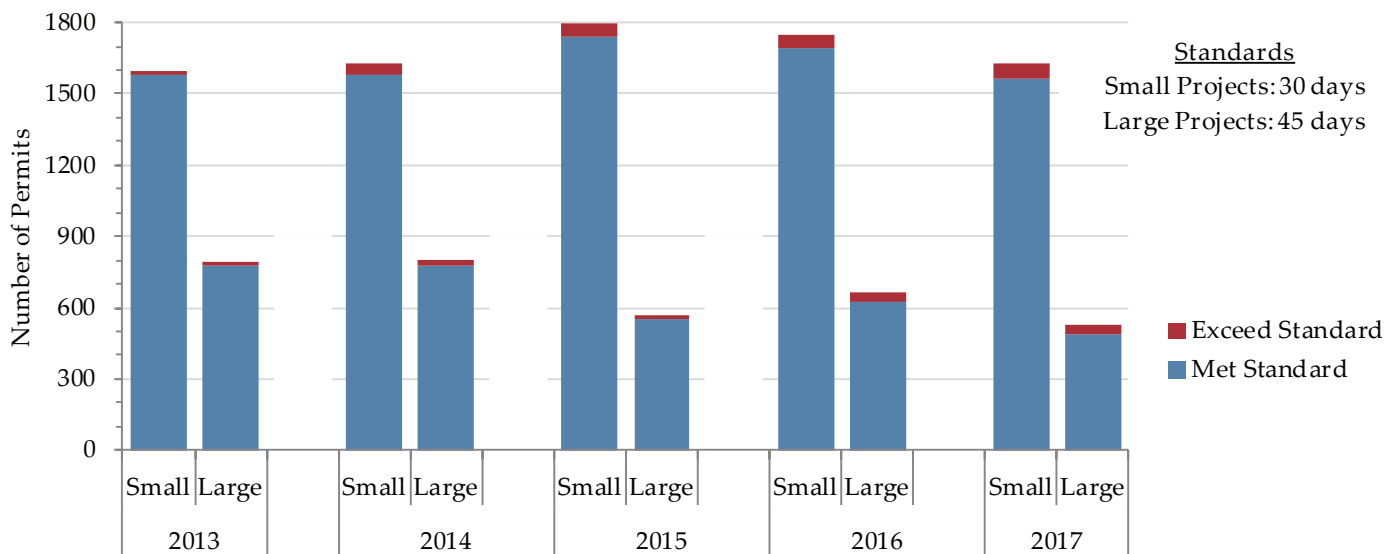
permits are issued within time standards; averaging 14 days in house

## Meet Environmental Standards for Potable Water and Wastewater Projects

*Issuing permits in a timely manner*

### PERFORMANCE TREND

### Water and wastewater permits achieving time limits



### DATA ANALYSIS

Timely permitting supports local economic development, both on an individual homeowner level up to large commercial and community developments.

The Regional Office Water/Wastewater Program has processed approximately 2,400 permits every year for the last four years. Permits are separated into two classes, small projects (<500 gallons per day flows), typically residential, and large projects (≥500 gallons per day flows). Staff aim to achieve an in-house review time of 30 days for small systems and 45 days for large systems.

A new wastewater tracking system was developed and deployed in April 2016. As part of this system, permit applicants are required to submit all applications electronically and applicants have the ability to track their permit through the review process. It is estimated that 85 to 90 percent of the applications are now submitted through the ANR Online, electronic

application system, while the remaining are submitted by designers who have a waiver to submit paper applications.

The Regional Office Program received 2368 applications and permitted 2,159 applications with 2050 applications processed within the PEP standard of 95% of the time during FY17. Review times varied during the year as staff adjusted to increased workload due to the decrease in staffing the previous year that included completing projects left by those who were reassigned to other duties. The average number of days to log-in an application was 2, a slight decrease from the previous year, and the average number of days for a technical review was approximately 14, also a slight decrease from the previous year. Overall, the percent of applications meeting standard review time has remained steady at 95%.

### NEXT STEPS

- As a result of a Lean event during FY 17, changes to the online application submittal process and the Wastewater Tracking System (WWTS) are being made to make the process more efficient.
- Implement the electronic records management system.
- Expand the WWTS database to enable compliance tracking needs completion in FY 18.
- Create new program performance measures.
- Adopt and implement the updated draft Wastewater System and Potable Water Supply Rule.



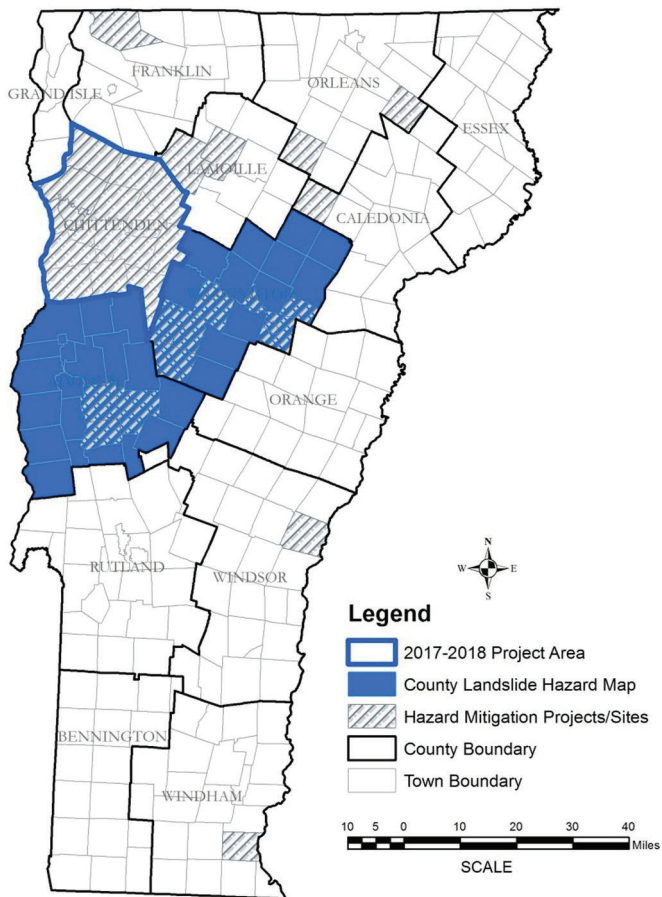
# Healthy and Safe Communities

## Identify Vulnerability to Geologic Hazards

*Geologic assessments of landslide, erosion, drought and seismic hazards*

### PERFORMANCE TREND

### Hazard mitigation sites and completed assessment projects



### DATA ANALYSIS

The Vermont Geological Survey collects and interprets data about landslides, earthquakes, flood and drought to inform mitigation efforts and preparedness for these low frequency, high impact events. The Survey provides reliable, science-based information regarding frequency, magnitude, extent, and consequences of physical hazards, and when possible, hazard avoidance strategies.

A hazard map identifies areas of higher risk and is a primary tool for hazard avoidance and mitigation.

The Survey works with towns, Regional Planning Commissions, and Vermont Emergency Management to implement the landslide hazard mapping protocol. The above map shows areas where studies have been conducted, including local

landslide sites and regional seismic hazard analyses. Sites of concern are often identified while mapping bedrock and glacial deposits; they are also identified through community reports and targeted hazard assessments. Mapping tools, like LIDAR and GIS, allow us to accelerate landslide hazard mapping at a planning level. In 2015 the Geological Survey began a program to provide planning-level landslide hazard maps for Vermont counties, completing Addison County in 2016 and Washington County in 2017. The maps help Vermont prepare for safer growth and development, develop mitigation and hazard avoidance strategies, avoid economic loss, and be prepared to respond to events.

By identifying regions sensitive to physical hazards and utilizing a scientific assessment to characterize the risks, the Survey provides a tool to protect Vermonters in vulnerable areas and guide land use planning. Communication of physical hazards and avoidance is facilitated through our hazards web pages which include a new on-line [Report a Landslide](#) feature in which the public can add to our landslide inventory. Information developed for landslides, earthquakes, flood and drought contributes to mitigation and preparedness for these low frequency, high impact events.

**1**

county landslide hazard map completed in 2017

### NEXT STEPS

- In partnership with the Central Vermont Regional Planning Commission and Norwich University, assess the hazard and produce a landslide hazard susceptibility map for Chittenden County.
- Evaluate LIDAR availability and begin planning for mapping of the fourth (4th) county in the state.
- Respond to and monitor landslide and rockfall events.
- Conduct surficial geologic mapping and identify areas prone to erosion and landslides.
- Conduct regional groundwater studies for drought resiliency and response.
- Continue coordination with Vermont Emergency Management, the Northeast States Emergency Consortium (NESEC), Regional Planning Commissions and universities to create hazard mitigation information.

Indicator



# Efficient and Effective Government

## Improve Business Practices to Gain Efficiencies

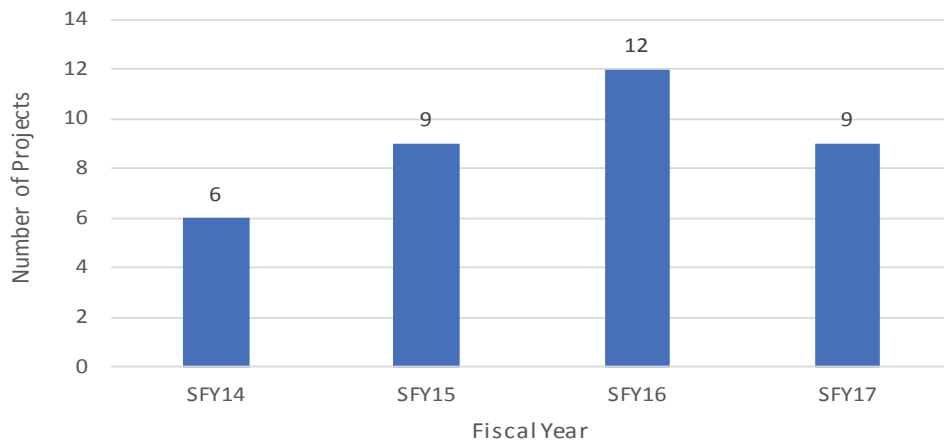
*Developing a culture of continuous improvement through Lean*

**36**

Lean projects initiated since 2013

INDICATOR TREND

### Number and type of Lean projects initiated



\* Numbers indicate projects where DEC is the lead.

DATA ANALYSIS

The Department of Environmental Conservation (DEC) adopted Lean in 2013 in an effort to better serve the Vermont public through more efficient, timely and transparent processes. Lean is a term used to describe a management philosophy and set of practices developed by Toyota that helps organizations improve the speed, transparency and quality of processes while minimizing cost and protecting the environment.

In FY 2017, the Department strengthened and formalized its Lean efforts through the adoption of a 3-Year Implementation Plan which lays out training and staff participation goals, processes for project identification, initiation and development, and communication strategies. At least 37 DEC staff received training and 74 staff participated in Lean activities this fiscal year. Participation occurred across nine projects of varying complexity touching upon processes such as stream alteration permitting, onsite wastewater application processing, permit process tracking, and wetlands enforcement. In addition to initiating these new projects, we also

closed seven existing projects which resulted in:

- An expansion of our AmeriCorps program to 24 members
- A return of \$3,139,497 in funding to the State Revolving Fund
- A decrease in time to develop grants and contracts
- A decrease in time to pay external partners for services
- The development of a system to track water quality projects
- A greater than 100% increase in electronic payments submitted
- An increase in Wetlands staff time spent on proactive site visits

On top of the work identified above, staff from our Business Transformation Initiative (BTI) played a critical role in assisting the State’s Chief Performance Officer (CPO) in developing the specific programmatic elements of the Governor’s Program to Improve Vermont Outcomes Together and rolling it out across the state.

NEXT STEPS

- Build upon successes to date and expand utilization of principles and tools across the Department.
- Encourage and support everyday improvements at the operational level.
- Provide assistance to managers in their efforts to improve program performance.
- Identify and implement three to four Department-wide projects which carry high impact and leverage.
- Continue to build staff capacity through training and practical application.
- Bolster communication about Lean efforts internally and externally.

DATA SOURCE: Business Transformation Initiative

PREPARED BY: Administration and Innovation Division, (802) 585-4888





# Efficient and Effective Government

## Improve Staff Performance Evaluations

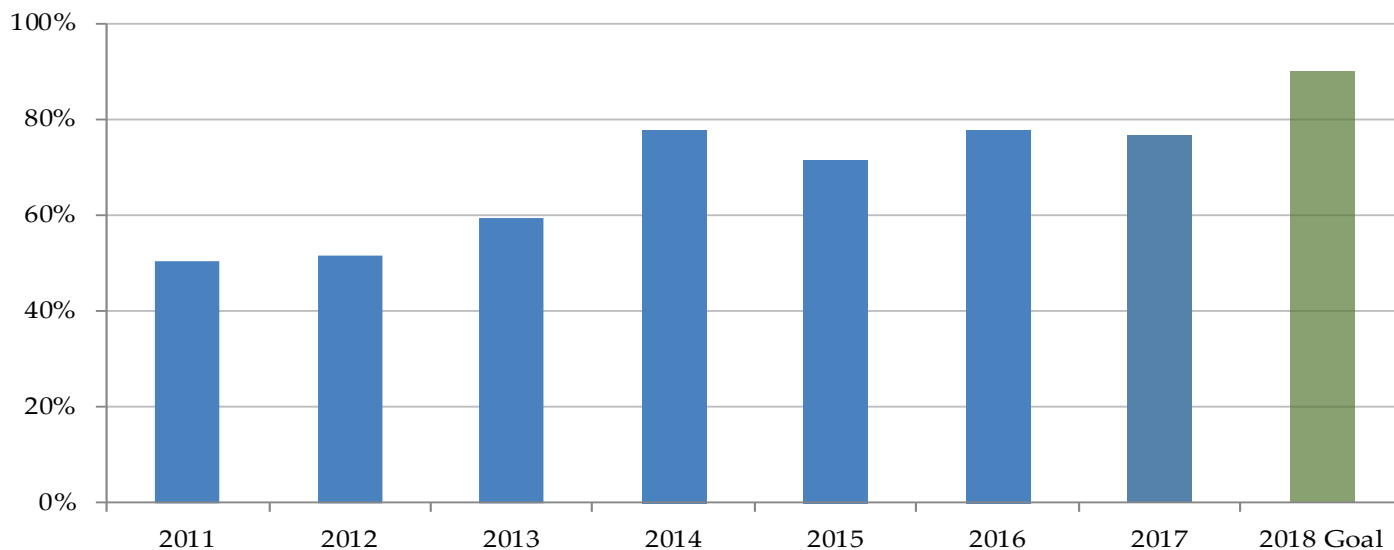
*Completing evaluations on time and enhancing supervisor and staff communication*

**77%**

of all performance evaluations were completed in 2017

### PERFORMANCE TREND

#### Percent of staff performance evaluations completed



### DATA ANALYSIS

Approximately 25% of Department of Environmental Conservation (DEC) staff are responsible for supervising other employees. DEC continues to expand efforts to increase staff morale and job satisfaction including increased communication between upper management and mid-level management, increased staff recognition efforts, regular meetings of supervisors to share information and an improved performance evaluation process.

DEC's current evaluation system includes quarterly meetings between employees and supervisors, a pre-evaluation survey completed by the employee and a thorough evaluation that clearly states what types of activities the employee can do to improve. The number of performance evaluations completed in 2017 is consistent with the previous years. Maintaining a 77% completion rate of performance evaluation is especially significant because during 2017 DEC continued to experience a significant number of retirements

and staff turnover, which makes performance evaluations difficult to track.

Based on the Department of Human Resources Annual Engagement Survey, 80% of DEC staff report that their supervisor gives them opportunity to do their best work. One area identified in the survey that continues to need improvement is staff training, the survey indicated that only 54% of staff feel they have the necessary training to do their job.

Changes have been implemented to improve access to training for employees by promoting state supported training through the Department of Human Resources and the Department of Libraries. In addition to allocated training in each division's budget, the Department began tracking when and why training requests were denied to gain a better understanding of necessary training for staff and whether it would be more efficient to bring training to the Department rather than sending individual to training that often involves out of state travel.

### NEXT STEPS

- Continue bi-annual meetings for all DEC supervisors.
- Provide ongoing training on the performance evaluation system.
- Seek feedback and continue to improve performance evaluation process.
- Continue to analyze training needs and support training plans for new and existing staff.



# Efficient and Effective Government

## Support the Implementation and Use of Online Permitting

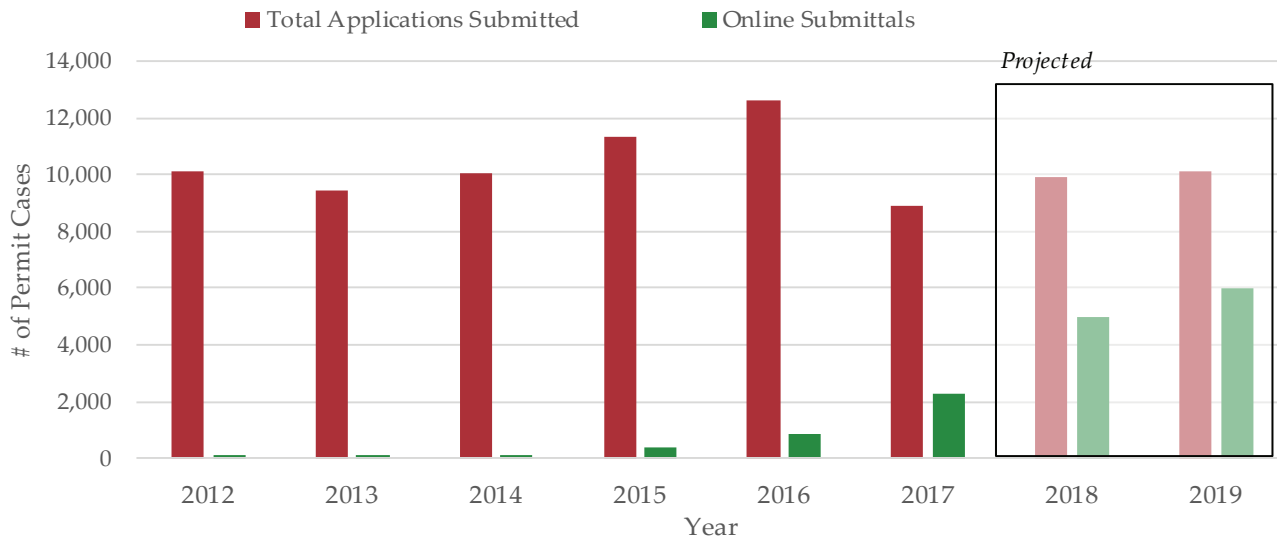
*Increasing use of technology for a web-based submittal system*

# 26%

of permit applications submitted online

### PERFORMANCE TREND

#### ANR Online electronic application submittal



### DATA ANALYSIS

Programs in Air, Water, Waste and Facilities have numerous permitting programs which include construction, treatment, discharge, operations, certifications, registrations, and licensing. These programs necessitate technical assistance and regulatory oversight to ensure compliance with state and federal law. In State fiscal year 2017, approximately 8,694 permitting cases were received, 74% of which were received in paper format.

The Department launched a web-based submittal system in February 2015 known as ANR Online. The system allows permitting and other programs to accept online applications and data. Approximately 35 permit application, registration and reporting forms have been completed and are currently available in ANR Online with another 24 forms currently under development. Since July 1, 2015, the Department has received more than 8,000 online application/report submissions. Our goal is to reach 40% of applications submitted online by the end of state fiscal year 2018.

Since Act 150 was passed into law in early 2016, the Department has been working diligently creating the Environmental Notice Bulletin Version 2 (ENBv2) which will publicize all notices and documents related to permits being processed through the Department. One feature that will be available is an email subscription service available to the public, consultants, and other interested parties enabling them to receive all public notice updates for selected regions, activities or permits. ENBv2 launched on January 1, 2018 and has integrated data from 13 databases and 20 DEC programs. All internal staff who manage permitting activities that will be publicly noticed on ENBv2 have been trained. The development of this new online tool will make it easier for applicants and the public to stay aware and informed of happenings in their community. ENBv2 allows public users to provide public comments and request public meetings. These efforts all serve to improve accessibility, transparency and user satisfaction.

### NEXT STEPS

- Grow capacity for a web based permit application, data submittal system, and payment process.
- Train program staff to create on-line forms.
- Build capacity by reducing the need for data entry and satisfy customer request for online submission and payment.
- Work to eliminate paper processes to simplify information requests.

**DATA SOURCE:** DEC Annual Report of Permit Activity

**PREPARED BY:** Administration and Innovation Division; (802) 585-4888



# Efficient and Effective Government

# 88%

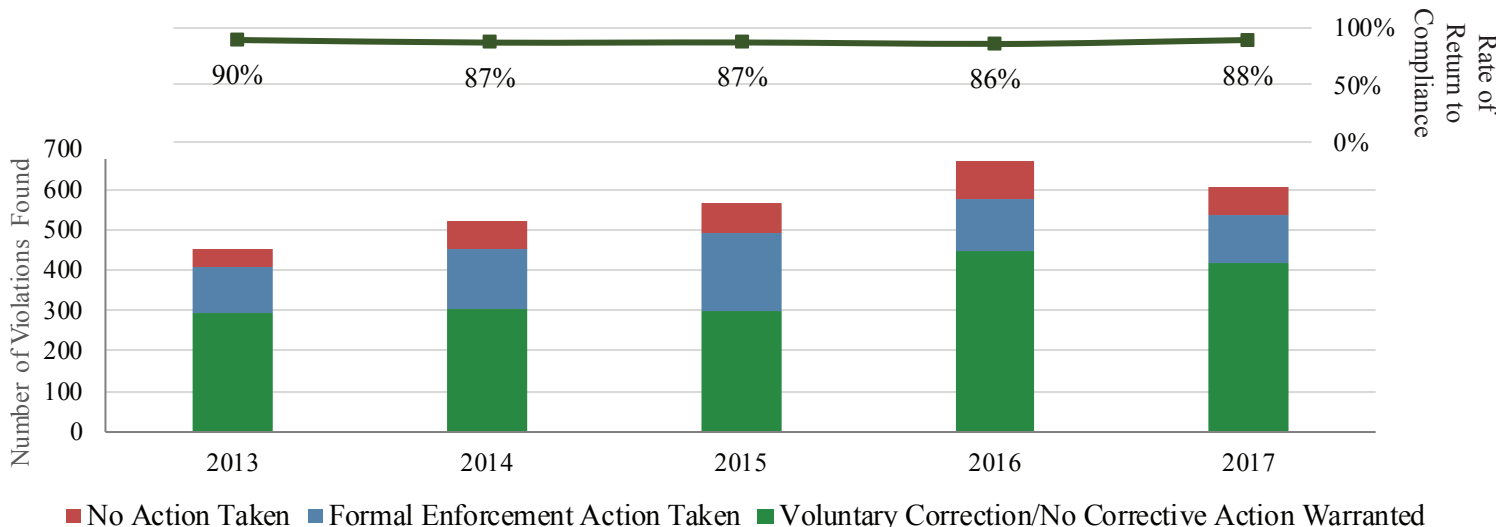
of incidents were returned to compliance after a violation was found in 2017

## Resolving Environmental Violations

*Through investigations and enforcement actions*

### PERFORMANCE TREND

### Outcomes for incidents with a violation found



### DATA ANALYSIS

The department is responsible for the investigation and documentation of all alleged violations (including citizen complaints) of environmental permits, rules, regulations, and statutes that are under the jurisdiction of DEC, the Department of Forest Parks and Recreation, and for coordination on violations relating to the Natural Resources Board and the Agency of Agriculture, Food and Markets.

DEC investigates and closes on average 1,500 complaints per year. About 35% of these complaints are found to have a violation. When a violation is found, the goal is to return the incident to compliance. Obtaining compliance can be sought through a variety of methods including: voluntary correction, requiring a permit to be obtained, or pursuing formal enforcement through a case or citation.

Infrequently, when a violation is found returning the incident to compliance may not be achieved. This may be due to a lack of resources, lack of evidence, or the violation may have minimal impact on

human health or the environment.

When a violation is found the majority are successfully returned to compliance. Most compliance is attained through voluntary correction. If an incident is particularly egregious, threatens DEC program integrity, or voluntary compliance is unable to be achieved, formal enforcement action is pursued. Formal enforcement action typically involves compliance directives to return the incident to compliance and a monetary penalty to deter both the respondent and regulated community from committing future violations.

Since 2013, the rate of incidents returned to compliance has remained steady. The hiring of the new investigator and additional employee training has assured rapid response and helped maintain a strong return to compliance rate. To deliver services more efficiently and consistently, the Enforcement Section has also developed training on enforcement basics and case documentation to offer to DEC staff members.

### NEXT STEPS

- Continue and expand trainings offered to DEC staff members on enforcement basics and case documentation.
- Phase in recommendations of recent environmental compliance audit conducted by the State Auditor's Office.
- Strategically prioritize investigations and cases by the potential and/or actual impact to human health and the environment.