VERMONT

AGENCY OF NATURAL RESOURCES

Department of Environmental Conservation
Fiscal Year 2017

Department Performance Measures

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

To 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 how the Department tracks and measures the performance of our programs using Results Based Accountability (RBA). This framework is currently used by the Agency of Human Services and the Agency of Administration's office to challenge Departments to answer the three primary questions used in RBA: (1) How much did we do? (2) How well did we do it? (3) Is anyone better off?

Performance accountability and RBA are now widely used in the Department's administration and management; ranging from included performance measures in grants and contracts, to incorporating RBA into our strategic planning and FY17 budget development.

DEVELOPMENT OF THIS DOCUMENT

For the FY16 budget proposal, the Department staff trained over 60 managers on the basics of RBA, how it is being used in state government and the potential opportunities for the future which could include budgeting and strategic planning. After training our managers and key staff, we formed an internal "Performance Management" team with members representing a diverse cross-section of Department programs.

In support of the FY17 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 populations 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 in this report.

NEXT STEPS

The Department is wrapping up our strategic plan for FY16-FY18. The plan was created using an RBA framework and focuses on tracking performance measures and results. As we continue to implement Lean process improvement throughout the Department, we will align these efforts with RBA with our strategic plan setting the goals and desired trends and using Lean as a tool to move our programs towards increased 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 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 identify common measures between programs.

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

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

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

Addresses: waste management; septic systems; natural hazards

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

Department of Environmental Conservation

Population Based Outcomes and Indicators

Clean Air

13.21
Greenhouse gas emmissions per capita in metric tons

4
# of days with air quality alerts

-9
% change in average annual concentration of mobile source-related (i.e. vehicle) air toxics

Clean Water

89.7
% of river miles with water quality that meets designated uses

62.7
% of sampled watersheds where aquatic biota rated "good" or "better"

39
# of previously imparied waters meeting standards based on corrective actions

94
% of community water systems in compliance with health based standards

Healthy and Safe Communities

3.6
Disposal rate of municipal solid waste in lbs/person/day

1410
# of brownfield acres that have been cleaned up/ redeveloped

5
# of dams reporting an upgrade in condition

<1
% of communities with asset management plans for environmental infrastructure

54
% of river corridors in Vermont with municipal/state protections to reduce flood and fluvial erosion hazards

Efficient and Effective Government

19
# of Lean (process improvement) events successfully completed across state government

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

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Clean Water

ENHANCE Surface Water Quality Through Best Management Practices

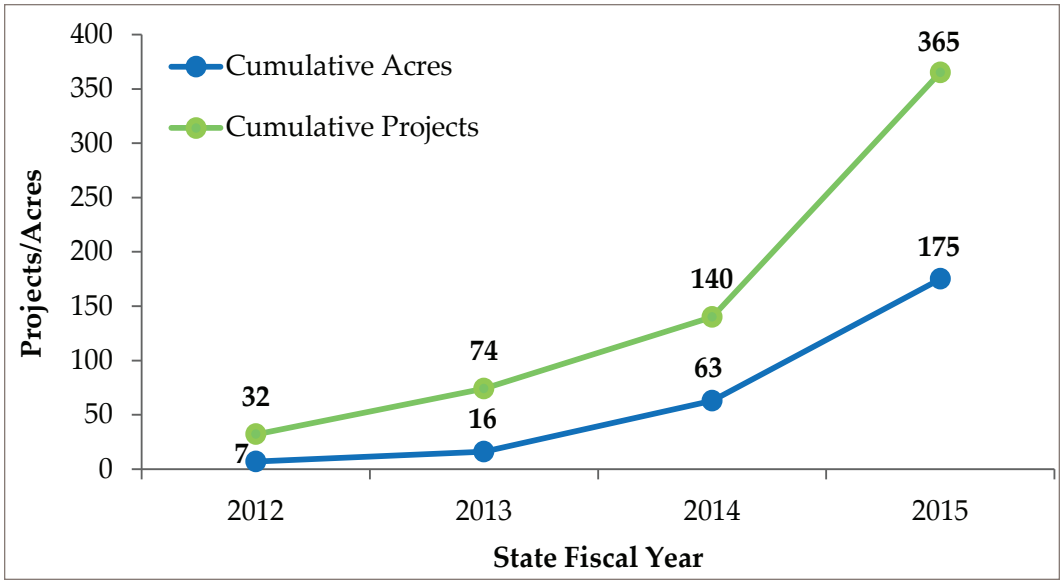
Improving ecological and hydrologic function throughout Vermont

225

additional projects enhanced the function of 112 additional acres in 2015

PERFORMANCE TREND

Number of enhancement projects undertaken and resulting acres improved



DATA ANALYSIS

In efforts to enhance water quality, the Watershed Management Division (WSMD) uses a multi-pronged and comprehensive approach. This approach includes strategies to avoid, minimize, and manage impacts to Vermont's surface waters. Managing impacts is particularly important considering that watersheds, could easily become stressed or impaired as a result of cumulative and legacy impacts. In these watersheds, it is important to use best management practices and other means to enhance, or improve upon ecological and hydrologic functions, in an effort to improve water quality.

Enhancement projects include:

- Implementation of best management practices on lakeshore properties
- Riparian buffer plantings and in-stream improvements
- Flow protection and culvert enhancement projects
- Removal of invasive species from eight different wetland complexes
- Installation of green stormwater infrastructure practices such as rain gardens and bioretention

In 2015, WSMD facilitated or helped to fund 225 unique enhancement projects, collectively resulting in improvement to 112 acres. The results of some enhancement projects are measured in units other than acres, such as miles or linear feet, thereby making the restored acreage appear lower. These projects will be included in future reports. 2015 shows a significant jump in number of projects due to a large number of flow protection and culvert enhancement projects and an increase in the number of acres due to wetland buffer enhancement projects.

NEXT STEPS

Enhancement projects are an important tool in WSMD's efforts to improve water quality throughout Vermont. When implemented and sited properly, they can have noteworthy results. To date, WSMD has relied heavily on its Tactical Basin Planning process and partner organizations to identify, develop, and implement projects. In the future, WSMD will continue along this track but also plans to increase its efforts by:

- Further engaging municipalities and other partners in this work
- Increasing the amount of funding available for project scoping and implementation
- Increasing the amount of technical assistance provided by WSMD staff
- Using Lean business process improvement tools to evaluate and advance project prioritization methodologies

WSMD is currently working on developing a data tracking system to better track enhancement projects and our overall progress on this performance measure.

DATA SOURCE: Watershed Management Division

PREPARED BY: Watershed Management Division (802) 828-1535
www.watershedmanagement.vt.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

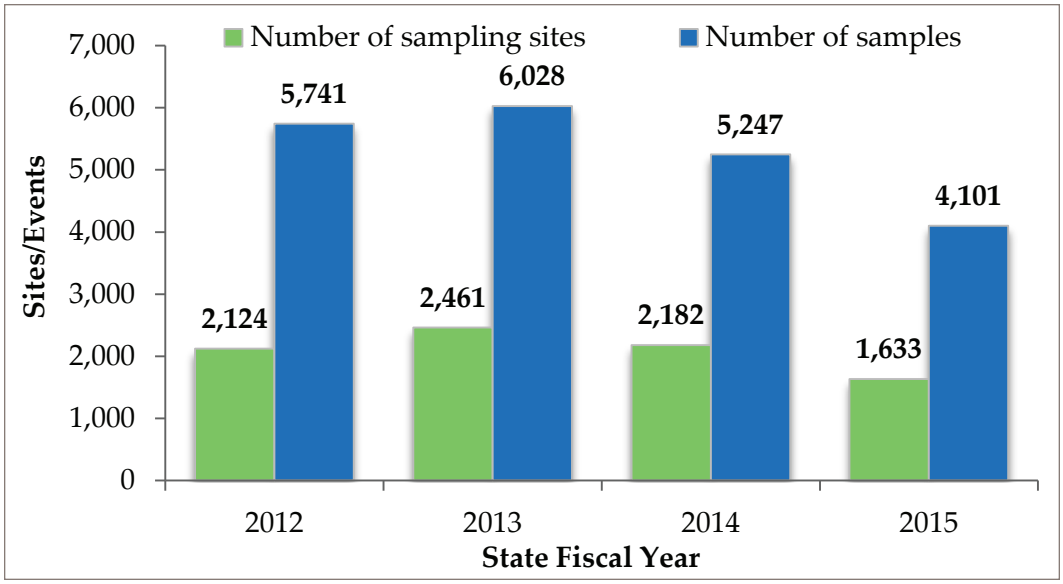
MAINTAIN Surface Water Quality Through Monitoring and Assessment

Establishing baseline conditions, tracking trends, and ensuring water quality efforts are effective

4,101 samples were collected and analyzed in 2015

PERFORMANCE TREND

Total number of sampling sites and events



DATA ANALYSIS

The Watershed Management Division (WSMD) has been involved in monitoring and assessment efforts since 1977. Monitoring and assessment efforts are critical to establishing baseline conditions, tracking long-term changes in water quality and designated uses, and informing management efforts. Through the work of staff scientists and citizen volunteers, we are able to evaluate the impacts of stressors (e.g., encroachment, nutrient loading, invasive species, and erosion), prioritize mitigation and restoration efforts, and evaluate their effectiveness.

In 2015, WSMD monitored 1,600+ unique sites and 4,101 samples were collected from watersheds across the state. The number of samples collected and analyzed this year was lower then previous few years for two reasons. First, WSMD reduced the number of stream geomorphic assessments conducted and instead shifted our focused on implementation of the projects that had been identified from the assessments from previous years. Also, the Lakes Program is using a new strategy for targeted data collection that allows scientists to make fewer visits to individual lakes, but to learn more from each visit. For these two reasons, despite the lower numbers of samples collected and analyzed this year, the Division's monitoring and assessment efforts remained very strong.

The assessment of our monitoring data enables us to gauge compliance with the Vermont water quality standards and compare water quality to that of other states; where we rank very highly. Our monitoring and assessment efforts identify where protection, restoration, enhancement, and maintenance should be targeted to best ensure the quality of Vermont's surface waters.

NEXT STEPS

Monitoring and assessment is a critical function provided by WSMD staff. Collected data and information helps direct implementation efforts in our watersheds. Ongoing water quality data collection and assessment, combined with permit compliance monitoring, aids in maintaining waters at a high standard. Given this, WSMD hopes to continue to steadily increase its efforts over the next few years.

WSMD also supports monitoring and assessment efforts by volunteer groups and partners. Their involvement greatly increases the number of sites monitored and thus expands the amount of available data. It also creates an important connection between the State, citizen scientist groups, and other associations. WSMD plans to bolster these local level efforts over the next few years.

Specifically, WSMD will:

- Continue high level data collection and assessment efforts
- Continue permit compliance monitoring
- Increase sampling in Lake Champlain
- Increase training opportunities for interested citizen scientists
- Increase training and monitoring performed by volunteer groups and partners

DATA SOURCE: Watershed Management Division

PREPARED BY: Watershed Management Division (802) 828-1535
www.watershedmanagement.vt.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

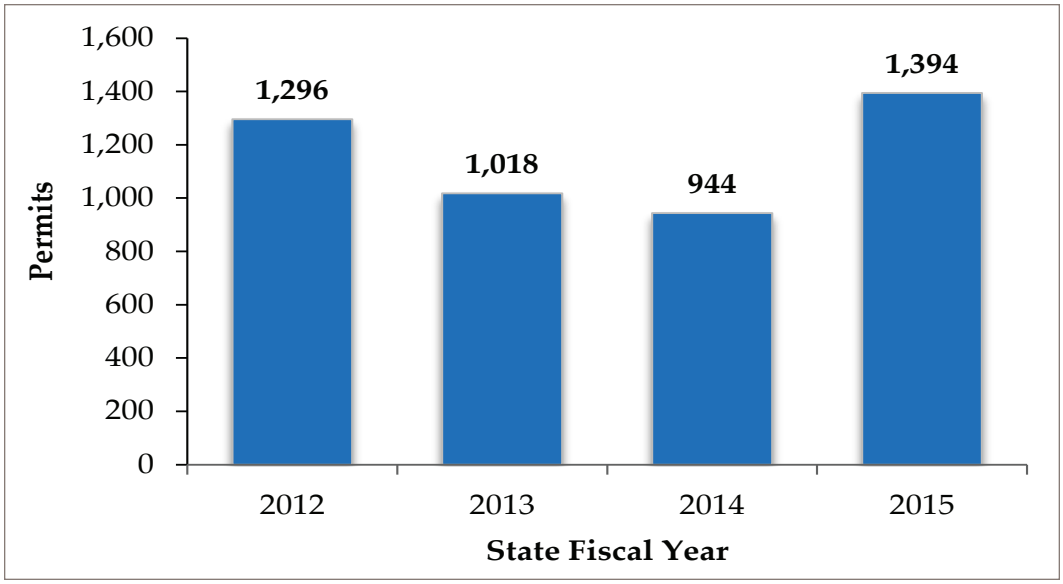
MAINTAIN Surface Water Quality Through Permitting

Permitting as a tool for maintaining water quality

1,390+ permits
issued and 4,300+ active permits managed in 2015

PERFORMANCE TREND

Number of permits issued by year

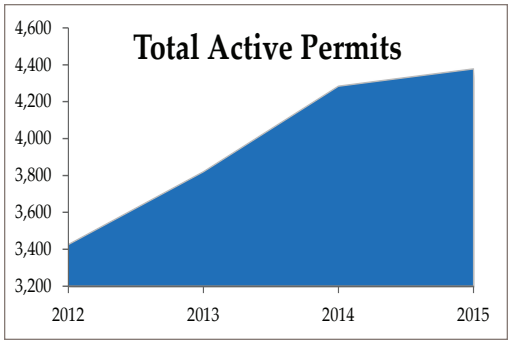


DATA ANALYSIS

WSMD requires permit coverage for a variety of activities which have a potential to impact water resources. The permit process is meant to avoid or minimize impacts to water quality. Permit coverage is required for aquatic nuisance control, lake and shoreland encroachments, stream alterations, construction and operational stormwater management, wastewater direct discharges, residuals management, and wetland encroachments.

The high number of permits issued in 2012 is a result of a renewal cycle for the Multi-Sector General Permit (stormwater) and additional authorizations provided after Tropical Storm Irene. The following two year downward trend reflects a return to normal permitting levels.

In 2015, WSMD issued 1,390+ new permits; a 48% increase from 2014. This increase is due to new regulatory permitting authority for shorelands, flood hazard areas, and river corridors.



The number of active permits rose to 4,377 in 2015; a slight increase from 2014. Active permits remain in effect beyond the initial project or development and require ongoing evaluation and monitoring. The long-term nature of these permits and monitoring and compliance requirements enable us to ensure water quality is maintained.

NEXT STEPS

WSMD has received additional regulatory authority as part of the Vermont Clean Water Act (Act 64) which will phase in over the next few years. To make sure that new regulatory processes are implemented properly, and that existing processes continue to maintain water quality at a high standard, WSMD proposes to:

- Engage a wide variety of stakeholders in the creation of new regulatory systems
- Utilize Lean business process tools to improve efficiency and permit processes
- Increase the number of staff resources dedicated to permit review and processing
- Develop an on-line permit application submittal system
- Review requirements associated with active permits and update as necessary
- Evaluate potential legislative changes needed to improve permit effectiveness

The processing and management of permits represents a large portion of WSMD's workload. Given expected permit increases in the coming years, finding ways to make the permit process more efficient and effective will be critical to adapting to this increase in workload and ensuring the health of Vermont's surface waters.

DATA SOURCE: Watershed Management Division

PREPARED BY: Watershed Management Division (802) 828-1535
www.watershedmanagement.vt.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

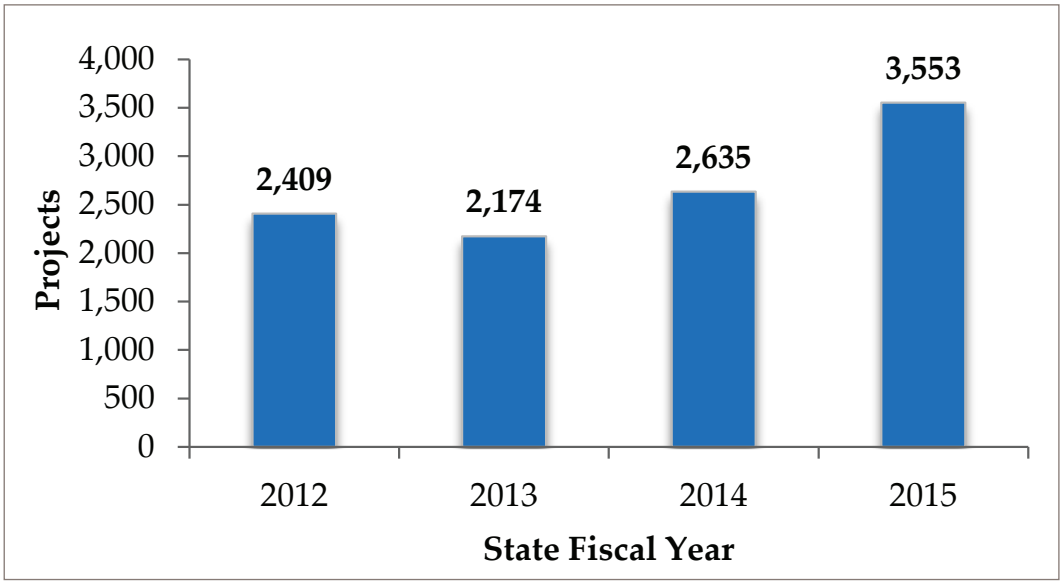
MAINTAIN Surface Water Quality Through Technical Assistance and Review

Mitigating impacts to surface waters through sound advice and scientific knowledge

3,500+ projects reviewed to ensure maintenance of Vermont's water quality

PERFORMANCE TREND

Number of projects reviewed by year



DATA ANALYSIS

The Watershed Management Division (WSMD) regularly provides technical assistance to municipalities, landowners, developers, and partner organizations (lake and watershed associations) to ensure that water quality standards are met and ecological functions and values are maintained. This type of assistance can take many forms. In many cases, it is regulatory in nature, as the majority of projects coming in to WSMD do so through a defined permit process. In other cases, it is purely advisory or collaborative. For example, many WSMD staff support local partners in the design and implementation of watershed restoration projects. All the technical assistance provided serves a critical function in maintaining watershed health.

In 2015, WSMD staff provided technical assistance on over 3,500 unique projects. This total includes, jurisdictional determinations, review of permit applications and renewals, municipal and partner support, bylaw reviews, illicit discharge detection and elimination efforts, and grant application review and management. Out of the over 3,500 projects reviewed; close to half of them were related to Vermont rivers, including bed and bank stabilization, bridge and culvert repair, and municipal projects.

The data shows a large number of projects reviewed in 2012, this is due to the additional technical assistance provided in the aftermath of Tropical Storm Irene. This is particularly true of the Rivers Program which played a critical role in the state's recovery efforts. As you can see, the projects reviewed and technical assistance has risen steadily from 2013 to 2015.

We expect our technical assistance and project reviews to continue to increase in 2016 as we provide additional technical assistance related to the implementation of the Vermont Clean Water Act (Act 64).

NEXT STEPS

Technical review by experts in the environmental field is key to limiting stressors to Vermont surface waters (as described in Vermont's Surface Water Management Strategy). As stewards of Vermont's surface waters, WSMD strives to have a strong, active, and meaningful presence across the Vermont landscape. As such, WSMD plans to increase the number of projects reviewed by staff over the next few years.

Specifically, WSMD will:

- Continue high level involvement in project reviews
- Utilize Lean business process tools to improve efficiency and identify ways to better use limited technical resources
- Increase staff resources dedicated to project review and technical assistance
- Find new ways to support municipalities and partner organizations in project identification, development, and implementation

The data we have available currently on technical assistance and review is fairly limited. Given this, WSMD will also craft a data development plan that will set the stage for more robust reporting on this performance measure in the future.

DATA SOURCE: Watershed Management Division

PREPARED BY: Watershed Management Division (802) 828-1535
www.watershedmanagement.vt.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

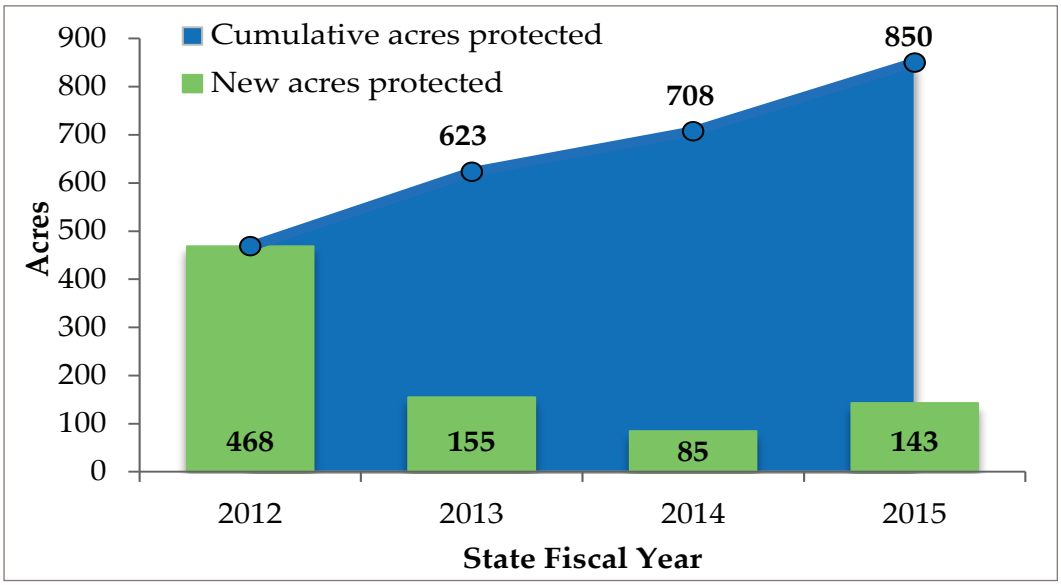
PROTECT Surface Water Quality Through Easements and Designations

Using tools to protect water quality and increase flood resiliency

850 acres
protected by easements and designations over the past 4 Years

PERFORMANCE TREND

Number of acres protected



DATA ANALYSIS

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

While a variety of tools exist for safeguarding natural systems from deleterious change, designations and easements are the most effective. These tools place additional restrictions on development activities and are an excellent method for reducing flood hazards, protecting water quality, and restoring wetland and riparian habitats.

Protection efforts and tools include:

- River corridor easements and floodplain protection measures
- Parcel buyouts
- Reclassification of surface waters
- Outstanding Resource Water designations
- Class I wetland designations

Over the past 4 years, WSMD has used these tools to directly protect 850 acres across Vermont. In 2015 specifically, an additional 143 acres were preserved; 112 of which were through WSMD grant-funded projects that now protect 14,402 linear feet of riparian corridor. These projects and acres protected have added to our water quality protection efforts and help increase our State's flood resiliency.

The large number of acres protected in 2012 is a result of buyouts and municipal efforts in the aftermath of Tropical Storm Irene. These buyouts were a cost effective way to ensure the protection and stability of Vermont's rivers.

NEXT STEPS

With an influx of funding for projects associated with the statewide Clean Water Fund, WSMD expects to report a significant increase in the number of projects undertaken and number of acres protected in the coming years. We are currently revising the Vermont water quality standards to be better able to protect Vermont's waters.

Strategies will include:

- Prioritizing work based on Tactical Basin Planning priorities
- Increasing the total number of projects implemented and acres protected
- Providing tools and technical assistance to municipalities and other partners
- Reviewing existing conservation prioritization methodologies
- Increasing the number of water reclassifications under the Vermont Water Quality Standards
- Designating Outstanding Resource Waters and Class I wetlands

In addition, WSMD is establishing a data development plan that will set the stage for more robust reporting on this performance measure in the future, especially as it relates to the Vermont Clean Water Act (Act 64) and the Lake Champlain clean up plan.

DATA SOURCE: Watershed Management Division

PREPARED BY: Watershed Management Division (802) 828-1535
www.watershedmanagement.vt.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

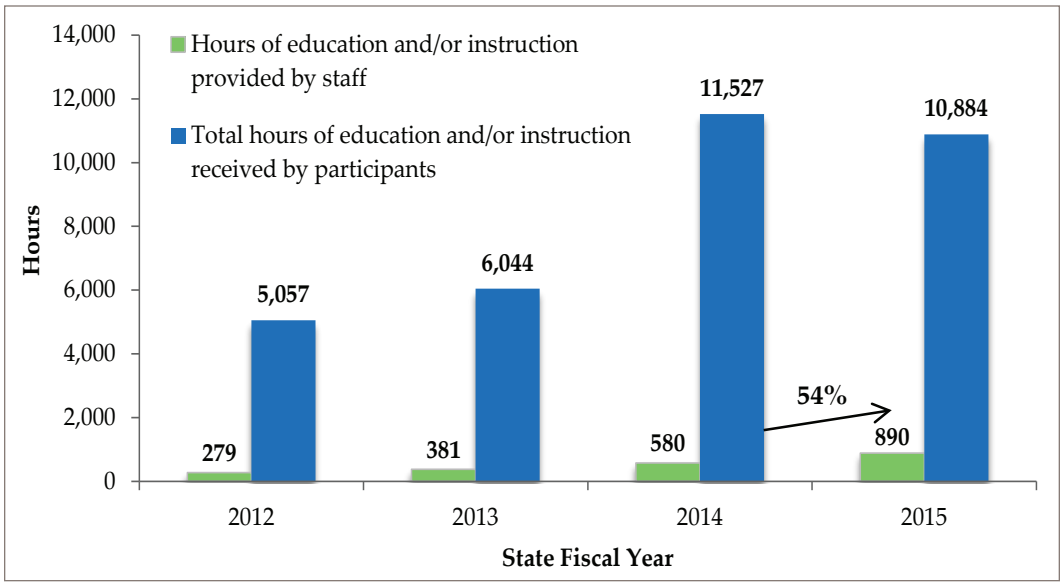
PROTECT Surface Water Quality Through Education and Training

Increasing environmental educations and stewardship across Vermont

54% increase
in hours of education and/or instruction provided

PERFORMANCE TREND

Hours of education and training delivered



DATA ANALYSIS

Strategies to protect Vermont's water resources often include the procurement of easements or the designation of high quality waters. However, education, outreach, and training are also important tools to utilize in this effort. Often, only a small increase in environmental education is needed to change individual behavior and engender environmental stewardship.

In 2015, the Watershed Management Division (WSMD) provided a total of 890 hours of education and instruction to Vermonters throughout the state. These education, outreach, and training opportunities included:

- Rivers and Roads trainings on smart road development and culvert design
- Training on wetland habitats and functions
- Workshops to help prevent the spread of aquatic invasive species
- Presentations on regulations and permit requirements to municipal officials
- Webinars and trainings to inform people about stormwater management alternatives and basin planning efforts
- Lake-wise workshops to landowners and contractors on lake friendly development

Although the hours of instruction provided by staff this year increased from previous years, the total hours of education or instruction received by participants was slightly lower than last year. This decrease was due to us providing more trainings to smaller groups this year (average number of participants in 2015 was 12 versus 20 in 2014). In addition to the numbers reported for this year, we also had over 2,000 YouTube views from our webinars and trainings available on-line. Note that the data reported above does not include technical assistance provided in terms of project review, which is reported as another measure.

NEXT STEPS

WSMD believes strongly in the importance of education and instruction as a tool for environmental protection and has steadily increased the number of hours provided to Vermonters. While this is a positive trend, staff time constraints from filling both technical and education/outreach roles require us to find ways to increase our total impact through being more efficient and effective in our educational efforts. Given this, WSMD proposes to:

- Increase the average number of participants per event to have a larger impact and reach a greater audience
- Continue to leverage technology to increase access to trainings by recording and uploading webinars and presentations for online viewing
- More effectively utilize partner distribution networks
- Establish a Shoreland Contractor pilot training program

WSMD is in the process of creating an electronic reporting form to better track our education and training efforts moving forward, particularly as it relates to the Vermont Clean Water Act (Act 64) reporting.

DATA SOURCE: Watershed Management Division

PREPARED BY: Watershed Management Division (802) 828-1535
www.watershedmanagement.vt.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

RESTORE Surface Water Quality Through Implementation of Priority Projects in Impaired Waters

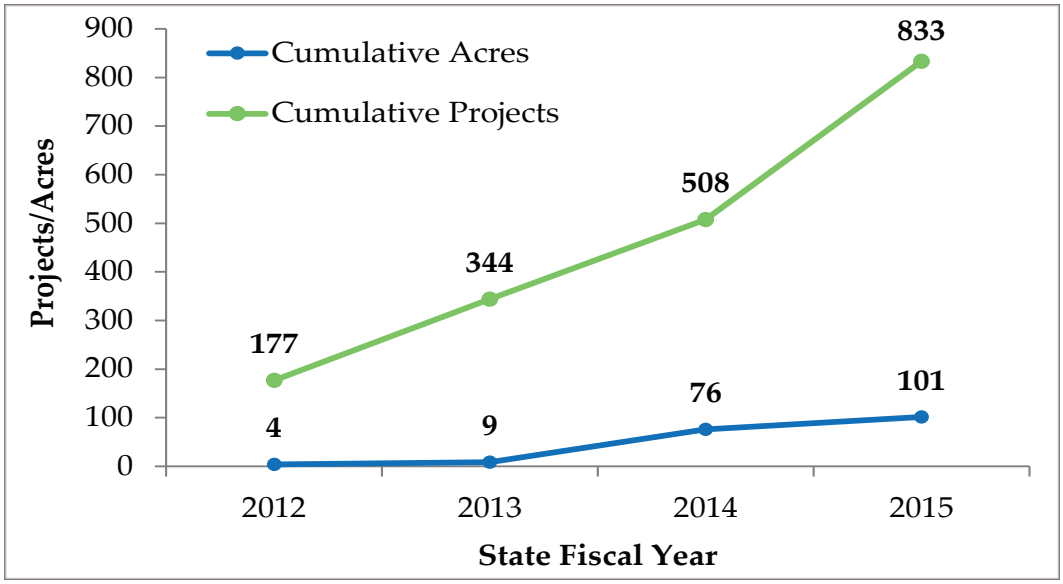
Returning ecological and hydrologic function to impaired waters

325

additional projects improved the function of 25 additional acres in 2015

PERFORMANCE TREND

Number of restoration projects undertaken and resulting acres improved



DATA ANALYSIS

Due to cumulative and legacy impacts of development and land use change, a number of Vermont's surface waters do not currently meet water quality standards. Restoring ecologic and hydrologic function to these impaired waters is critical to resilient and self-sustaining natural systems and essential to achieving the water quality goals and objectives as articulated in the Surface Water Management Strategy.

Project implementation is a primary tool in which WSMD facilitates improvements in impaired waters. This work includes: implementation of sediment and phosphorus removal measures, water quality remediation projects, river and floodplain restoration projects, wetlands restoration work, additional permit requirements for impaired waters, and the development and implementation of restoration plans.

In 2015 WSMD facilitated 325 restoration projects in impaired waters. This is a large increase from previous years due to an increase in WSMD grant-funded projects. These projects address water quality issues by restoring natural function. The results of some enhancement projects are measured in units other than acres, such as miles or linear feet, thereby making the restored acreage appear lower. These projects will be included in future r

It should also be noted that the data available for 2012 and 2013 is incomplete. Given this, the data presented is an underestimate of the actual acres restored.

NEXT STEPS

Restoration projects are an important tool in WSMD's efforts to improve water quality throughout Vermont. Traditionally, WSMD has relied heavily on Tactical Basin Plans, development and implementation of restoration plans, and increased permitting requirements for restoring water quality where it has been degraded. While this approach will continue into the future, WSMD plans to expand upon these efforts by:

- Increasing the amount of funding available for restoration project scoping and implementation
- Increasing the amount of technical assistance provided by WSMD staff to partners
- Reviewing project prioritization methodology and funding mechanisms
- Utilize Lean business process improvement tools to improve efficiency and evaluate and advance project prioritization methodologies

Additionally, since the data currently available in relation to our restoration projects is fairly limited, WSMD will create a data development plan to better track progress on this performance measure.

DATA SOURCE: Watershed Management Division

PREPARED BY: Watershed Management Division, (802) 828-1535
www.watershedmanagement.vt.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

Finance Water Infrastructure Upgrades

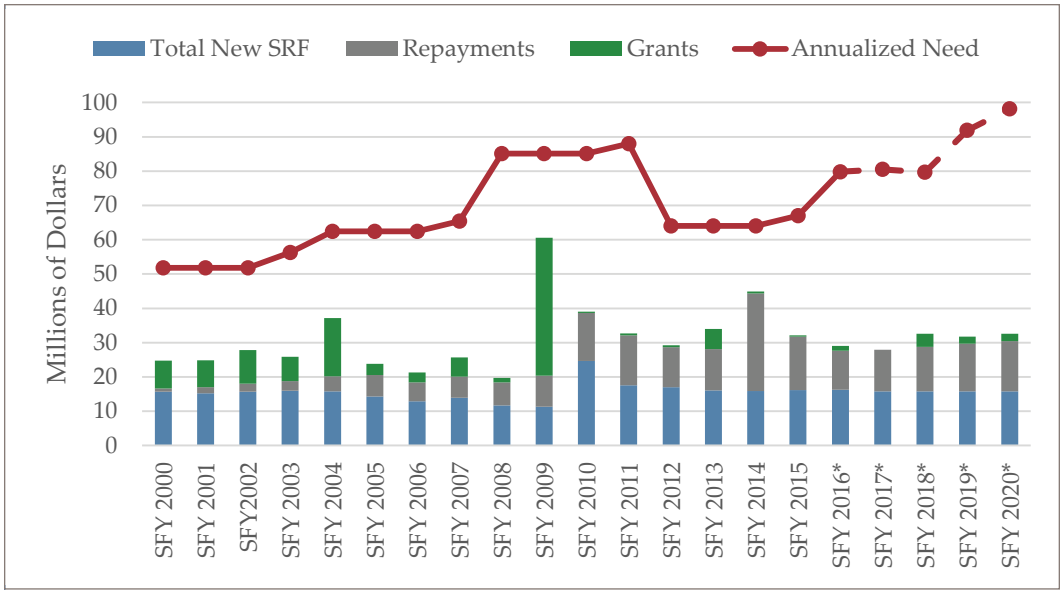
Providing low cost loans and grants to municipalities

$83.4 million

current balance of available funds

PERFORMANCE TREND

Incoming water infrastructure loan and grant dollars compared to need



DATA ANALYSIS

Available funding, including grants and state revolving fund loans, is forecasted to lag behind the annualized need for funds for public water infrastructure.

Grants available to municipalities for wastewater projects, have generally decreased over time as other demands for state funds have increased. Loans available through Drinking Water and Clean Water State Revolving Funds are forecasted to decrease due to anticipated decreases in federal funding. Repayments from existing loans are generally anticipated to increase over time due to the revolving nature of the fund, but lag when loans entering repayment slows.

Increasing demand for Drinking Water funding largely reflects evolving regulatory requirements and ageing water system infrastructure.

Increasing demand for Clean Water funding is anticipated due to the proposed/new TMDLs for Lake Champlain and Long Island Sound, stormwater regulations, the adoption of new standards for combined sewer overflows, and aging wastewater infrastructure.

The new onsite loan program has provided funding to repair 12 failed wastewater systems and 2 failed water systems. The cumulative loan awards for the Clean Water and Drinking Water SRF programs are $265.6M and $182.7M respectively, for cumulative total of $448.3M. Additionally, the two programs have administered $73M in grants for a grand total infrastructure investment of $521.3M since the loan programs came into existence.

NEXT STEPS

1. Implementing checklists developed as part of the Lean process for construction inspection services provided by our program.
2. Drafted proposed legislation to:
   - Expand the eligibility of Clean Water State Revolving Fund loans to include additional project types and some privately owned facilities;
   - Modify the municipal pollution control priority system; and,
   - Modernize the pollution control grant system to better reflect today's water quality objectives.
3. Implementing a new computer system to replace legacy systems in an effort to enhance financial management and allow for auto generating routine correspondence.

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

PREPARED BY: Facilities Engineering Division
www.anr.state.vt.us/dec/fed/fed.htm

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

Ensure Public Drinking Water System Compliance

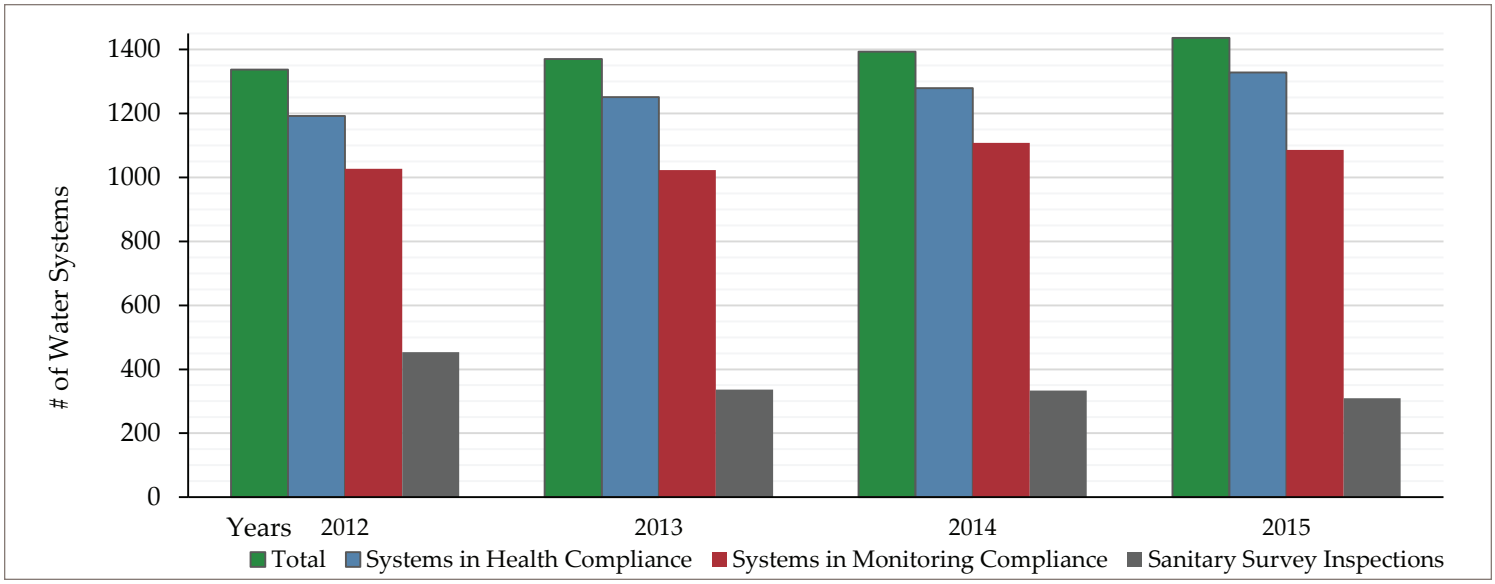
Providing safe drinking water to Public Water System users

94%

of Public Water Systems produced safe drinking water

PERFORMANCE TREND

Compliance with health standards and monitoring requirements



DATA ANALYSIS

While most public drinking water systems provide safe drinking water, approximately 10% struggle to meet standards. Primary reasons are coliform contamination events and disinfection by-products exceedances. 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. Less frequent 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, water quality monitoring, and 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
- operating 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 a 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
www.drinkingwater.vermont.gov; (1-800) 823-6500

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Water

Ensure Dam Safety to Protect the Public and the Environment

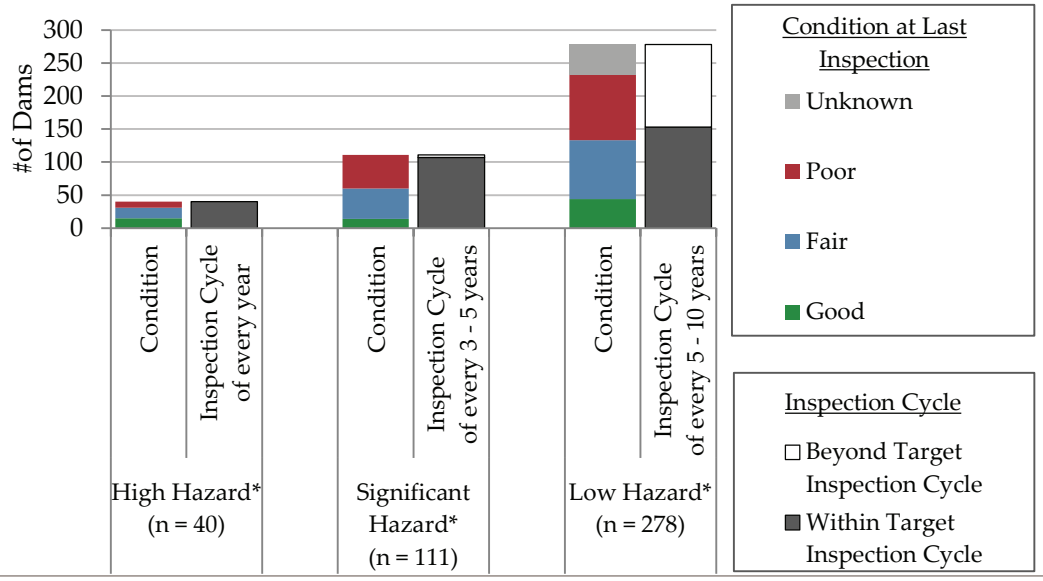
Inspecting, permitting, and informing dam owners

70%

of dams receive timely inspections

PERFORMANCE TREND

Summary of Dams Inspected and Hazard Class



*** Hazard Rating**

Based on dam failure consequences

High = Loss of life is more than a few; economic impact is extensive (community, industry or agriculture)

Significant = Loss of life is few; Economic impact is notable (agriculture, industry or structures)

Low = No loss of life; economic impact is minimal (undeveloped to occasional structures or agriculture)

DATA ANALYSIS

Vermont has 429 dams impounding greater than 500,000 cubic feet of water and subject to periodic inspections by the Dam Safety Program.

Annually the program inspects all the high hazard dams and generally meets the target number of inspections on significant hazard dams. Annual number of inspections on low hazard dams are not met due to staff resource restrictions.

Inspections determine the condition of each dam with poor being the lowest rating. More than a third of the high and significant hazard dams are in poor condition.

Almost half of the low hazard dams have not been inspected in the last decade and in some cases have probably become higher hazard dams due to greater dangers in the event of a dam failure, such as recent development down-river of the dam.


Mill Pond Dam, *Windsor, VT*
High Hazard Dam

NEXT STEPS

- Reduce the staff resources needed to manage flood control dams by transferring ownership of three dams to the Army Corps of Engineers.
- Seek additional staff resources to increase from 90 to 130 the number of dams inspected each year.

DATA SOURCE: State Dam Safety Program.

PREPARED BY: Facilities Engineering Division
www.anr.state.vt.us/dec/fed/fed.htm

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Air

Support Climate Policy with Sound Science and Technical Expertise

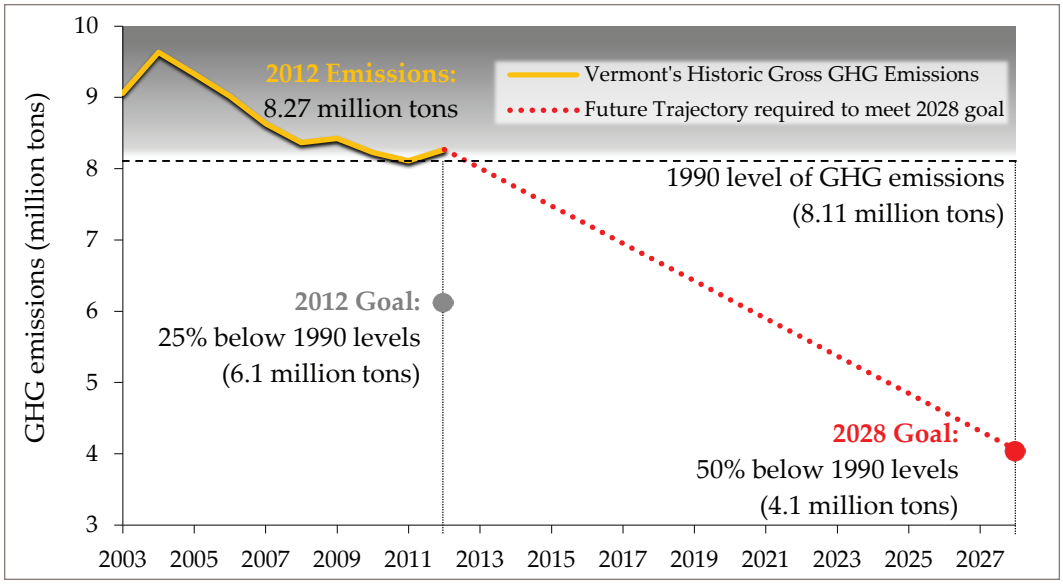
Quantifying tons of greenhouse gases emitted in Vermont

50%

reduction in GHG emissions statewide required to meet the statutory target by 2028

PERFORMANCE TREND

Vermont greenhouse gas emissions inventory, 2003-2012



DATA ANALYSIS

This performance measure tracks Vermont's progress in meeting the state's greenhouse gas reduction goals. Emissions from most sectors declined slightly or remained nearly constant between 2010 and 2012, however emissions from the electricity sector have been rising in the past few years despite effective energy efficiency programs and an increase in in-state renewable energy generation. This has been caused by a marked decrease in reliance on nuclear generation, an increased reliance on higher GHG-emitting regional market power in Vermont's contracted electricity mix, and ongoing sales of Renewable Energy Certificates (RECs) to entities outside of Vermont.

Vermont did not achieve its 2012 goal of reducing greenhouse gas emissions to 25% below 1990 levels. Vermont now must focus its attention on the next goal on the horizon of reducing GHG emissions 50% below 1990 levels by 2028 as set forth by state statute.

This will require a substantial, but not impossible, effort by Vermont State Government and all Vermonters. As illustrated above, the average rate of decline from 2004 through 2008 was somewhat steeper than what will be required in the future to meet the 2028 goal.

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 emissions inventory for 2013 will be available in late winter of 2016.

NEXT STEPS

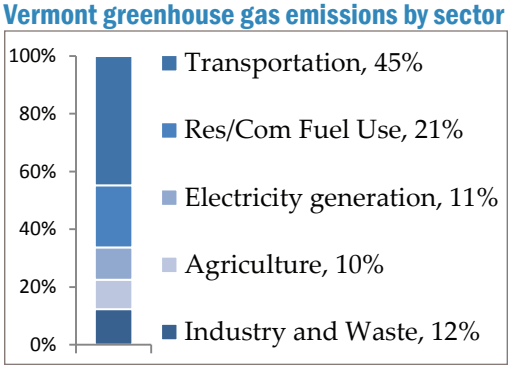
To meet Vermont's GHG reduction goals, Vermont state government, businesses, communities and individuals must continue to develop and implement effective policies and actions to reduce annual GHG emissions by increasing energy efficiency, conservation, and renewable energy sources.

The Air Quality and Climate Division will continue to publish GHG emissions inventory updates on an annual basis to track progress and inform climate policy.

ANR provides Vermonters with science and technical information on climate change through a number of channels:

- Climate Dashboard (expected spring 2016)
- Climate Connections newsletter
- @vtclimatechange on Twitter

Vermont greenhouse gas emissions by sector



DATA SOURCE: Air Quality and Climate Division Greenhouse Gas Emissions Inventory Update 1990-2012

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

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Air

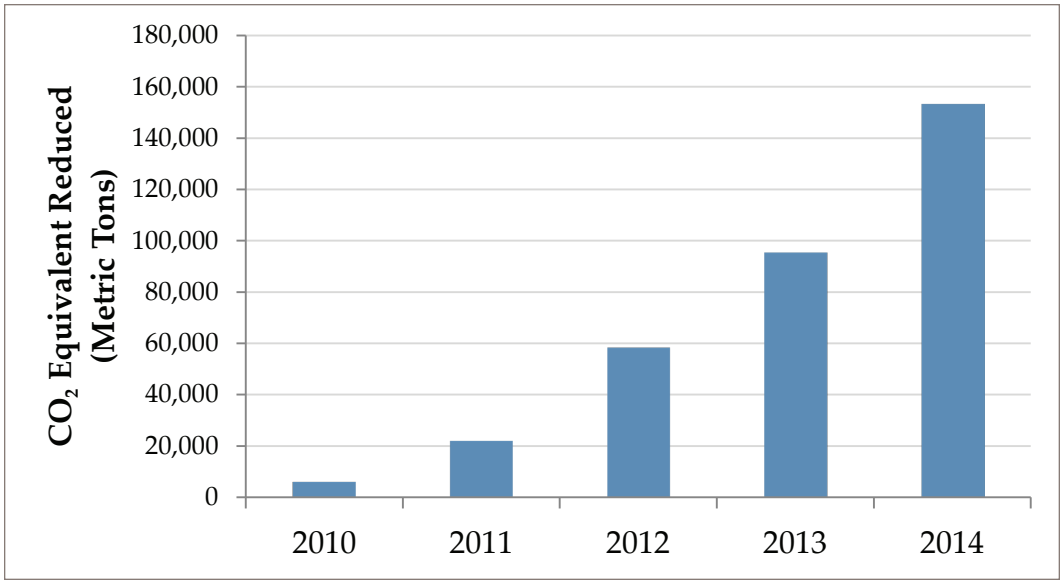
Promote the Reduction of Greenhouse Gas Emissions

Implementing environmental recognition programs and assisting businesses and municipalities

150,000
metric tons of greenhouse gases reduced

PERFORMANCE TREND

Cumulative greenhouse gases reduced via the Green Business Program



DATA ANALYSIS

The Vermont Green Business Program is a voluntary assistance and recognition program that is available to all Vermont businesses that wish to reduce environmental impacts and promote sustainability of their business operations. Vermont Green Business members implement best management practices to reduce waste, conserve water and energy, reduce toxic chemical use, and adopt environmental purchasing policies.

All program applicants are provided with an on-site visit by staff to help identify opportunities to reduce environmental impacts and become more environmentally sustainable. In the program there are sectors such as Green Hotels, Clean Marinas, Green Restaurants, Green Links, and Green Grocers. Recognition and publicity are provided to program members as well as ongoing technical assistance. The Program tracks and measures environmental outcomes from membership applications and annual reports filed by members. There are nearly 200 Green Business members.

The annual Vermont Governor's Awards for Environmental Excellence recognizes actions taken by businesses, not-for-profit organizations, institutions, public agencies and individuals to conserve and protect natural resources, prevent pollution, and promote environmental sustainability. Through applications received, environmental practices implemented are tracked and measured, and converted to metric tons of carbon dioxide emissions reduced, as well as other environmental outcome measures.

Since 2010, over 150,000 metric tons carbon dioxide emissions have been reduced through energy conservation, water conservation, waste reduction and environmentally preferable purchasing from nearly 200 green businesses and 125 Governor's Awards applicants.

NEXT STEPS

Recognition and assistance programs prevent pollution and promote environmental sustainability in measureable ways. By publicizing these efforts, others become informed and are encouraged to take action to promote sustainability. The following strategies will be pursued for program improvement:

- Enhance publicity and marketing to increase the number of applicants to the Vermont Green Business Program and annual Vermont Governor's Awards for Environmental Excellence
- Improve the Vermont Green Business Program web site, including improved application forms and assistance resources
- Enhance electronic reporting and application forms for recognition programs
- Increase the number of annual applications to the Green Business Program by 100 % by 2017 and increase Program members to 225
- Partner with various public and private organizations to enhance the visibility of these programs

DATA SOURCE: VT Green Business Program and VT Governor's Awards Data
PREPARED BY: Environmental Assistance Office

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Air

Achieve and Maintain Healthy Air Quality

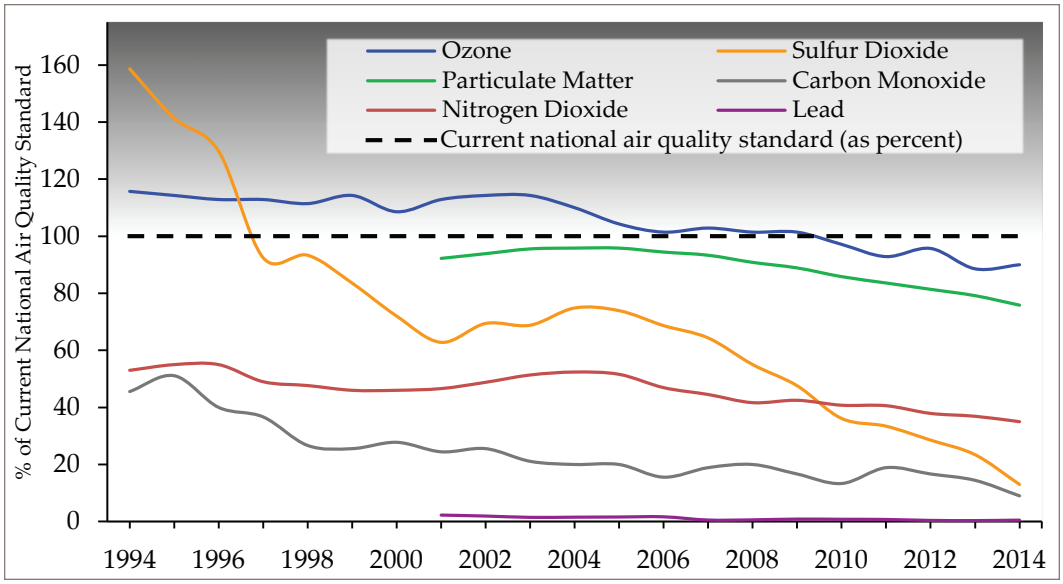
Monitoring Vermont's air pollutant concentrations

53%

of particulate matter emissions ($PM_{2.5}$) in Vermont come from residential wood burning

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: ozone, particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, and lead.

Monitored concentrations of these common air pollutants in Vermont's ambient air provide direct performance measures 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 for each pollutant (National Ambient Air Quality Standards). All six pollutants have been declining over time, and are currently achieving the levels of current health standards (the dashed line). Ozone and particulate matter are the pollutants that come closest to exceeding standards. 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 like 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 particulate matter pollution is heavily influenced by interstate transport in the summer, 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 2011

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

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Air

Reduce Mobile Source Air Pollution

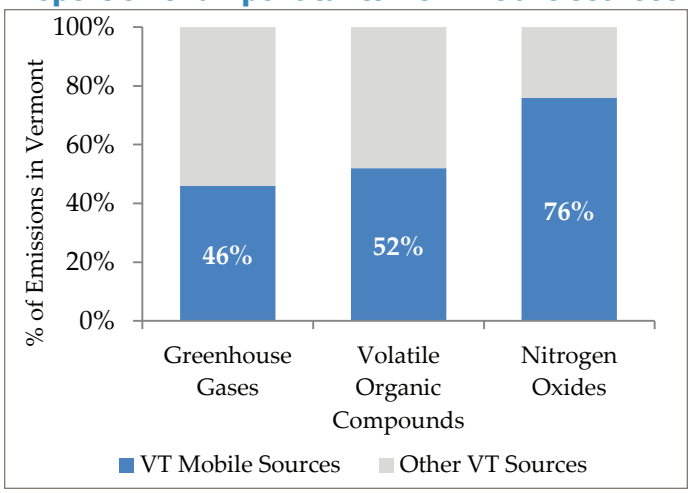
Increasing electric vehicles in Vermont will reduce air pollution emissions

76%

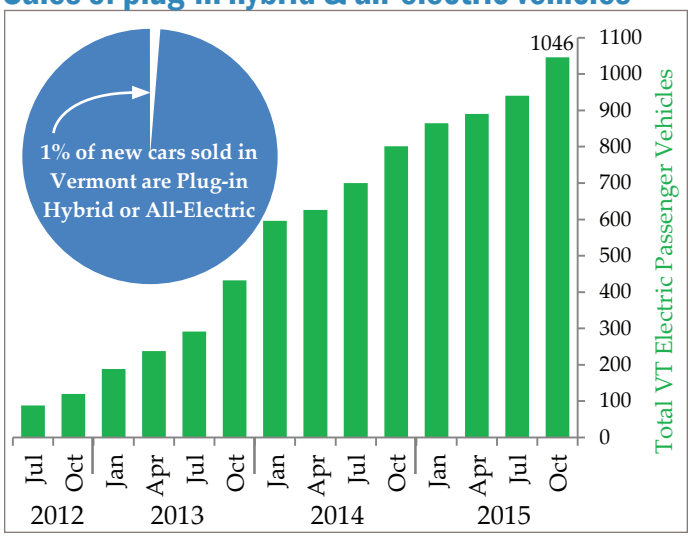
of NO_x emissions in Vermont are from mobile sources

PERFORMANCE TREND

Proportion of air pollutants from mobile sources



Sales of plug-in hybrid & all-electric vehicles



DATA ANALYSIS

In Vermont, mobile sources (i.e. vehicles, engines, and equipment) are the largest source of many air pollutants, including greenhouse gases and the ozone-forming volatile organic compounds (VOCs) and nitrogen oxides (NO_x).

Over the last thirty years, the number of cars and trucks registered in Vermont has increased by nearly 60%, while the number of vehicle miles traveled (VMT) each year in Vermont has nearly doubled.

Cleaner conventional vehicles and alternatively fueled vehicles such as plug-in hybrid and all-electric vehicles are necessary to help offset 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, plug-in hybrid and all-electric 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 VT's Zero Emission Vehicle (ZEV) Action Plan which identifies actions to expand the ZEV market in VT, and continue to participate in Multi-State ZEV Action Plan.
- Continue adoption of California vehicle emissions standards, including ZEV requirements.
- Continue and enhance VT's vehicle emissions inspection and maintenance program to maximize benefits from investments in emissions control technology.
- Continue to reduce diesel emissions through technical support and funding for vehicle and equipment replacement, and installation of idling reduction technologies.
- Continue providing information and training to VT automotive technicians to ensure effective maintenance and repair of vehicle emission control systems.

DATA SOURCE: VT submission to US EPA 2011 National Emissions Inventory
VT Department of Motor Vehicles Motor Vehicle Registrations

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

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Clean Air

Reduce Public Exposure to Industrial Air Pollution

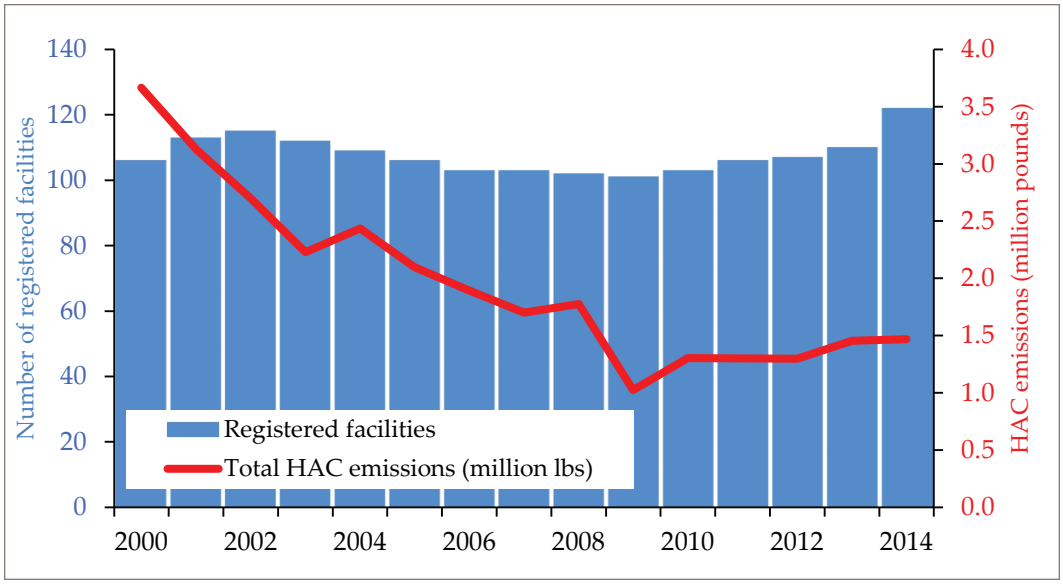
Regulating toxic air pollution emissions from stationary sources

60%

reduction in Hazardous Air Contaminant emissions since 2000

PERFORMANCE TREND

Hazardous Air Contaminant emissions and number of stationary sources



DATA ANALYSIS

The Air Quality and Climate Division (AQCD) regulates industrial stationary sources of air pollution through permits, inspections, regulations, and registration of actual emissions. These programs have effectively helped reduce toxic Hazardous Air Contaminant (HAC) emissions (e.g. benzene, mercury, formaldehyde, and others) from these sources over time. These emissions have been reduced by 60 percent since the year 2000, even while the number of stationary sources has remained relatively constant. As emissions decrease, further reductions become more difficult and require expanded efforts with smaller and smaller sources.

In 2015, the Air Program issued 23 permits for new or modifying stationary sources, issued 16 operating permits for existing sources, issued 20 permits for open burning, conducted 64 inspections, reviewed 20 excess emission reports, oversaw 25 stack emission compliance tests, responded to 38 public complaints, and referred 5 cases for formal prosecution.

The number of HAC-emitting facilities is notably up from 2013. This is due to the fact that 'CowPower' digesters were added to our registration roster. While often considered a renewable source of energy, they still have notable combustion emissions of sulfur dioxide and formaldehyde that are required to be registered.

NEXT STEPS

- Continue permitting of new and modifying sources to ensure they are as clean as possible.
- Continue permitting of existing sources to ensure emission reductions are achieved when reasonable and necessary.
- Continue inspections and compliance testing and outreach to ensure facilities operate properly and in compliance.
- Continue registration of facility actual emissions to identify emission sources and reduction opportunities.
- Revise the emission registration fee structure to reflect current science of relative toxicity and provide incentive to further reduce emissions.
- Expand outreach to source categories that cumulatively contribute significant emissions.

DATA SOURCE: AQCD Emissions Registration Program

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

Healthy and Safe Communities

Promote the Sustainable Management of Waste

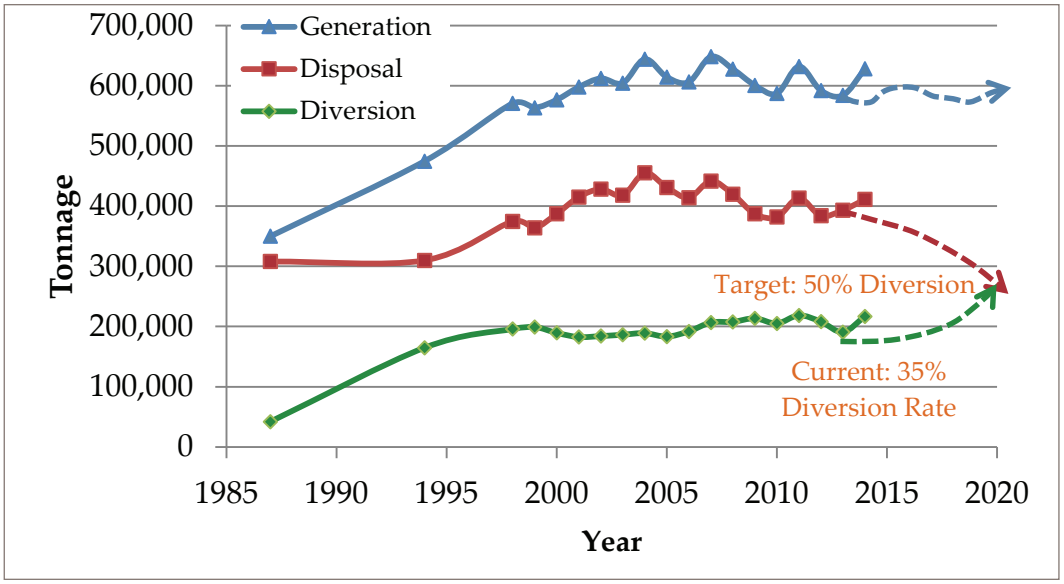
Increasing the statewide diversion rate of all solid waste generated by Vermonters

3.6 lbs

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

PERFORMANCE TREND

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



DATA ANALYSIS

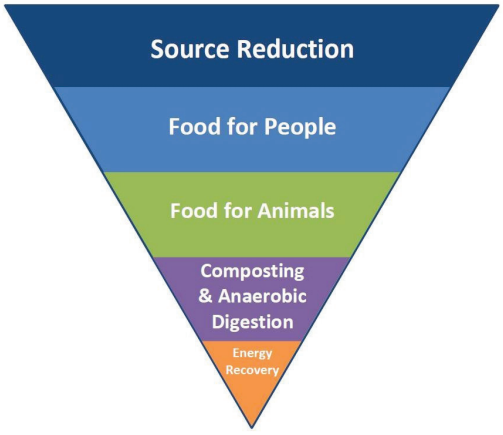
Solid waste generation has increased steadily in Vermont, parallel to national trends. The disposal of these materials results in the loss of reusable and recyclable materials along with lost opportunities to save energy, conserve resources, reduce greenhouse gases, and create business opportunities.

In 2013 Vermont began implementing the Universal Recycling Law, an innovative and encompassing change to the State's solid waste material management system. Largely focused on removing all recyclables and organics from disposal, Universal Recycling aims to make diversion convenient and available for all residents. It is estimated that these efforts can result in a diversion rate of 50% by 2020, an ambitious, but feasible goal.

Diversion, primarily recycling and composting, efforts in 2014 resulted in Vermonters diverting 35% of their waste away from landfill disposal, an increase of 2% over the 2013 diversion rate.

The generation of waste tends to follow economic growth and this is likely influencing the increases seen in generation and disposal of waste in 2014. Although a decrease in disposal is anticipated as Universal Recyling is implemented over the next five years, it is encouraging that despite an increase in waste generation, Vermonters have continued to divert waste from the landfills and slightly increased diversion rates in this last year.

Vermont Food Recovery Hierarchy



NEXT STEPS

- Requiring the parallel collection of recyclables and organics at locations or by haulers that collect municipal solid waste (MSW)
- Encouraging the use of the Food Recovery Hierarchy
- Providing financial incentive to reduce waste by implementing a 'Pay as You Throw' pricing system for MSW
- Implementation of updated Solid Waste Implementation Plans by the State's various solid waste management entities
- Banning these materials from disposal in Vermont landfills:

  1. *Recyclables*
     -- as of July 2015
     Results Coming Soon
  2. *Leaf and Yard Debris*
     – by July 2016
  3. *Food Scraps*
     – by July 2020

.

DATA SOURCE: Solid Waste Management Program

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

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Healthy and Safe Communities

Minimize Exposure to Hazardous Materials

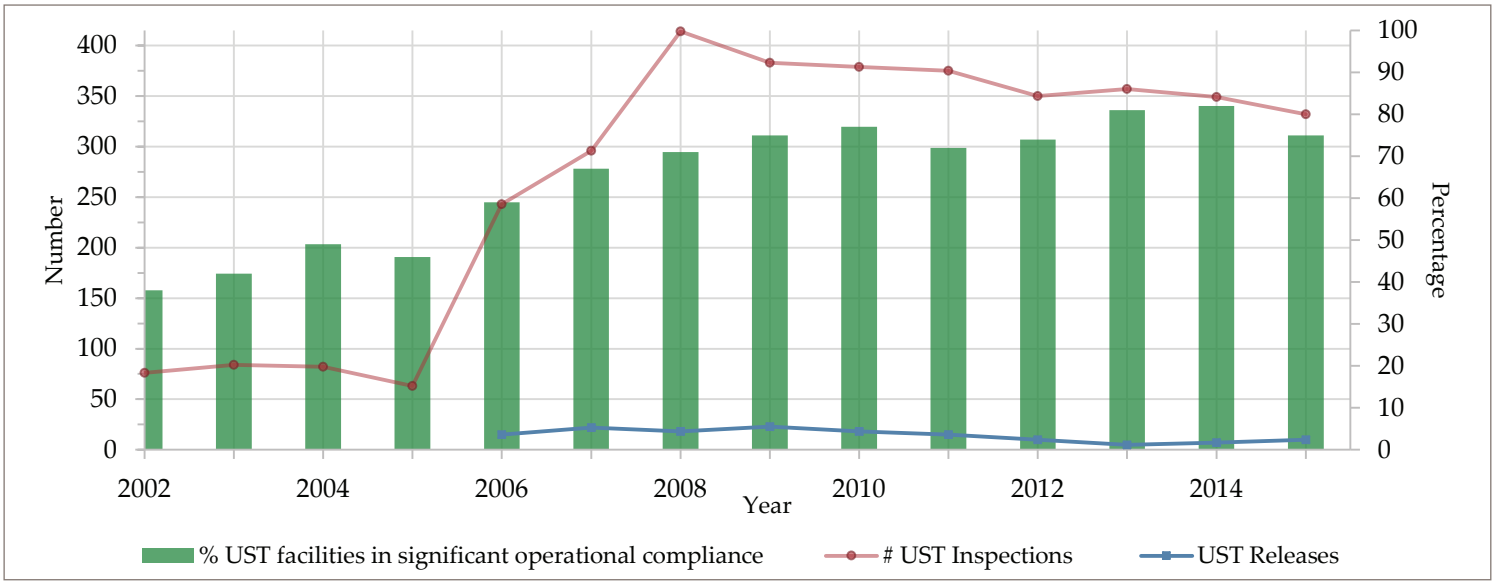
Ensuring proper management of hazardous materials to prevent releases and site contamination

332

underground storage tanks were inspected in 2015

PERFORMANCE TREND

Underground storage tank (UST) inspections reduce the number of releases



DATA ANALYSIS

Vermont has over 1,400 sites that have been contaminated with hazardous materials and are currently in need of clean up. Many of our education, outreach, inspection, and other regulatory efforts attempt to identify potential sources and uses of these hazardous materials that could potentially contribute to contamination of a property. This work is largely an attempt to minimize the exposure and release of these materials before a property has an opportunity to become contaminated. We achieve this by encouraging appropriate property management and containment of hazardous materials and ensuring compliance with appropriate regulations. The direct impact of this program is fewer releases from underground strorage tanks requiring listing as contaminated sites each year.

One example of 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, the UST program developed a new data base and streamlined their inspection processing and dramatically increased the number of annual inspections completed at underground petroleum storage tank facilities. This increased site presence has resulted in a nearly 30% increase in the number of facilities found to be in significant operational compliance with relevant management practices. The UST program has also decreased the number of emergency spill responses which has directly resulted in a reduction in the number of underground storage tank facilities being listed as contaminated sites each year.

NEXT STEPS

- Enforcement of the Salvage Yard Rules, which require the registration and the development of best management practices of salvage yards.
- Enforcement of the Above Ground Storage Tank rules will improve compliance with the best management practices for design, installation, operation, and removal of potential contaminante sources.
- Completion of annual self-registration of compliance by small quantity generators of hazardous waste will increase awareness of regulations and improve overall compliance rates.

DATA SOURCE: RCRA and Sites Management Section

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

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Healthy and Safe Communities

Transition Contaminated Sites Back to Productive and Beneficial Use

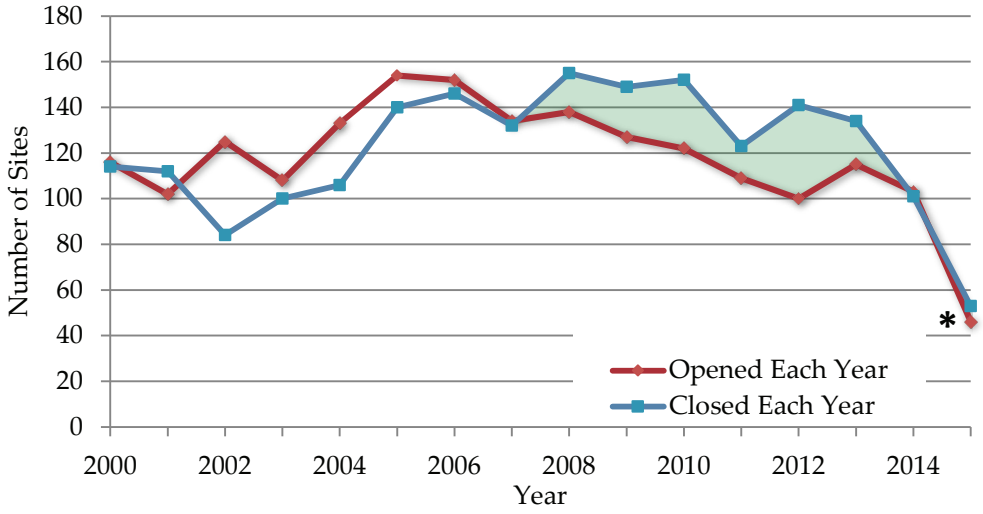
Facilitating efficient clean-up and closure processes for contaminated sites

7

more sites were cleaned and removed from the hazardous sites list than were added in 2015

PERFORMANCE TREND

Contaminated sites opened and closed (cleaned) each year



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

DATA ANALYSIS

There are many factors that 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. Our contribution to supporting successful clean-up of these properties includes providing technical and financial assistance for site assessment and supporting the implementation of clean-up remedies. It can also include assistance in pursuing redevelopment of difficult-to-clean sites, such as abandoned and vacant properties. In all cases, the ultimate end goal is to be protective while returning the impacted property to a productive and beneficial use.

In 2015, the Sites Management Section adjusted the procedures for handling residential heating oil releases. In the past, these releases have been a significant number of the new sites entered in to the program every year. Rather than process these releases as open hazardous waste sites, we have transitioned to managing them as spills. Residential heating oil releases often are small in scale and contained quickly. As a spill, emphasis can be placed on cleaning the site efficiently and limiting the scope of needed investigation. So, this transition better aligns the level of our administration and oversight with the scale of the problem and allows for more efficient use of limited available funds and staff time. This provides for increased management of older, pre-existing sites and increases the program's sustainability.

NEXT STEPS

- Working towards solutions to ensure the long term sustainability of the Environmental Contingency Fund (ECF)
- Utilize the ECF to support the clean-up of Vermont's most challenging contaminated sites and supports Vermont's participation in the federal Superfund and Brownfields programs.
- Continue to gain efficiencies through the Petroleum Cleanup Fund Reimbursement Fund 2014 Lean evening, including implementation of an online submission system
- Develop new strategies like this years change in management of residential heating oil releases to allow our hydrogeologists and engineers to better focus on technical aspects of site clean-up rather than claims processing.

DATA SOURCE: Sites Management Section.

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

Healthy and Safe Communities

Reduce Toxic Chemical Use and Hazardous Waste Generation

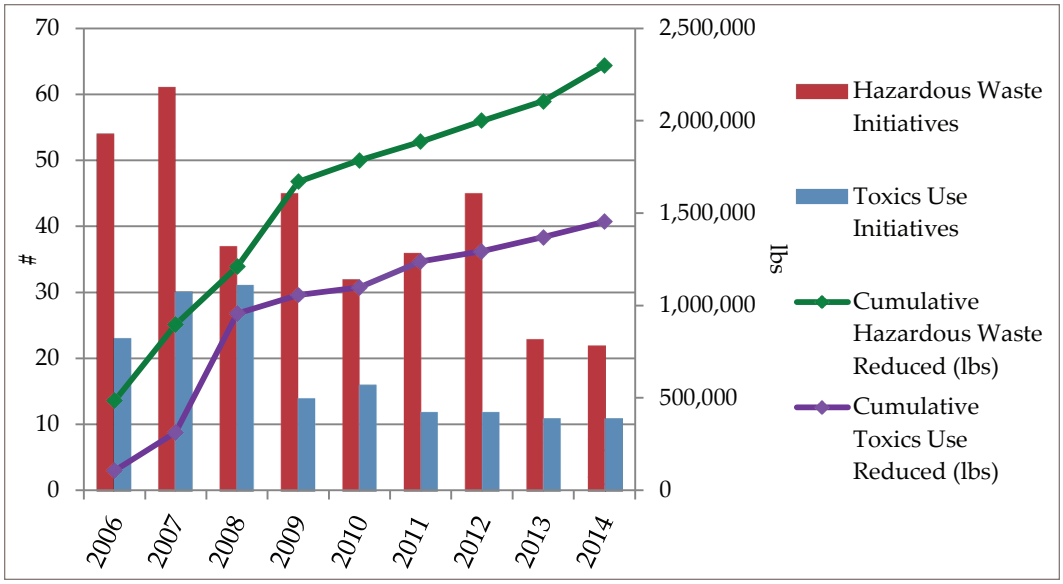
Working with businesses to increase pollution prevention

2.3 million lbs
of hazardous waste reduced

1.5 million lbs
of toxics use reduced since 2006

PERFORMANCE TREND

Hazardous waste and toxics use reduced through Department initiatives



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 hazardous waste generation in industrial processes. These facilities are required to then implement reduction practices that are identified as technically and economically feasible. Many Vermont facilities have been subject to these planning requirements since 1994.

Initially nearly 200 facilities were subject to this required planning; this number has been reduced to about 65 facilities. Over the years, many facilities reduced their toxics use and hazardous waste below the thresholds required for planning. Nearly 100% of facilities are in compliance with planning requirements which include annual progress reports in addition to a three-year plan.

In addition to reviewing plans for compliance, the Environmental Assistance Office provides technical assistance in identifying and implementing reduction measures. Facilities with plans are visited on-site at least once during the three-year planning cycle to review their progress in planning, assist in identifying new reduction opportunities, and provide assistance when requested in evaluating technical and economic feasibility of these opportunities.

Reduction strategies may include employee training to prevent waste of materials, equipment upgrades, and chemical substitution of less toxic and hazardous materials in manufacturing processes. Often, by implementing reduction strategies, Vermont businesses are saving money, reducing liability and reducing worker exposure to toxic and hazardous materials.

NEXT STEPS

Information sharing and technical assistance are important to sustaining toxics use and hazardous waste reduction over time. The Environmental Assistance Office will be focusing on the following strategies:

- Enhance web site resources on toxics use and hazardous waste reduction methodologies
- Focus on assisting facilities that are new to the planning process
- Develop and publicize case studies of successful toxics use and hazardous waste reduction efforts that are transferable to other businesses

The Environmental Assistance Office will also focus on the following strategies to enhance the effectiveness of the planning requirements:

- Develop electronic reporting systems for all reporting requirements
- Continue to identify facilities that are subject to the requirements but not filing plans as required by law
- Evaluate alternative sustainability planning for facilities that have exhausted all opportunities for toxics use and hazardous waste reduction

DATA SOURCE: Pollution Prevention Planning Data
PREPARED BY: Environmental Assistance Office

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Healthy and Safe Communities

Reduce the Number of Releases from Hazardous Materials

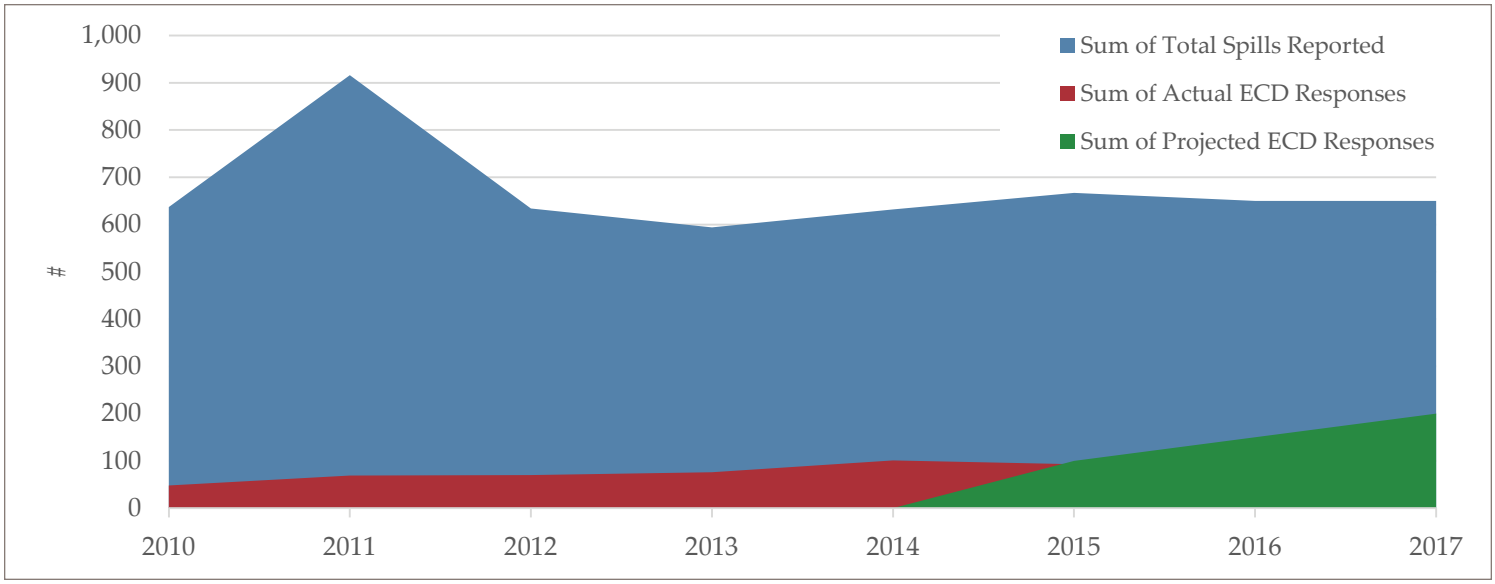
Increasing enforcement responses to preventable and significant releases.

14%

of spills were responded to in person in 2015

PERFORMANCE TREND

Hazardous material releases and responses by Enforcement Officers



DATA ANALYSIS

In an average year the Department of Environmental Conservation receives 600 hazardous material release reports. One exception to this was 2011, which was anomalously high as a result of the flooding from tropical storm Irene.

The number of reported releases has remained relatively constant over the past several years. While some releases are relatively minor, and only require minimal remediation, others are significant and can result in environmental harm as well as potential harm to human health.

When a release is significant, it often is referred to the Sites Management Section and results in the expenditure of a significant amount of money from the Petroleum Clean-Up Fund.

The goal of the Environmental Compliance Division (ECD) is to reduce the number of preventable releases by increasing the response rate to spills as they occur. When an investigation determines that a spill was preventable or significant, and enforcement action will be taken. This will result in an increase in the level of deterrence and prevention efforts which should help to reduce the number of spills that occur.

NEXT STEPS

- Improve communications between the Environmental Compliance Division and Waste Management and Prevention Division
- Enter release reports and complaints into the DEC incident tracking system to enable prompt response by investigators, resulting in a more consistent enforcement response
- Increased response rates will lead to enhanced enforcement outcomes and provide an incentive to improve future compliance

DATA SOURCE: ECD and WMPD Tracking Databases

PREPARED BY: Environmental Compliance Division
(802) 828-1254

Healthy and Safe Communities

Meet Environmental Standards for Potable Water and Waste Water Projects

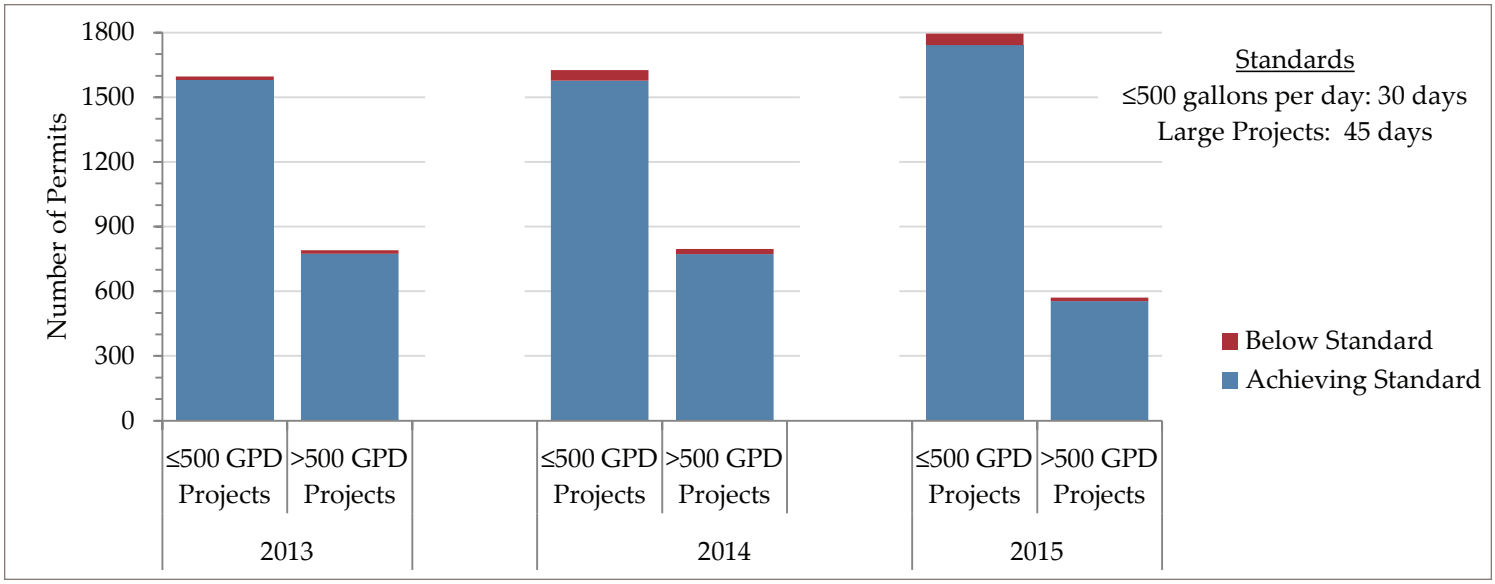
Completing permits in a timely manner

97%

permits are issued within time standards; averaging 11 days in house.

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 an average of 2880 permit applications per year for the past 11 years. Permits can be for small residential projects (<500 gallons per day flows) to projects treating and disposing of less than 6500 gallons per day to a soil-based wastewater system.

The program also permits potable water supplies, sanitary sewer extensions and sewer and water service connections to municipal and private collection/distribution sytems. Two review time standards are applied to this program;: either a 30-day in-house review period for the small projects (less than 500 gallons per day), or a 45-day in-house review period for the larger ones.

Due to a budget reduction in the SFY16 budget, the regional office staff was reduced 40% in October 2015. A number of initiatives are being implemented in an effort to continue issuing timely permits including: requiring use of electronic applications that will auto-fill permits and the compliance tracking system, providing training, and holding designers accountable for submitting complete applications.

NEXT STEPS

- Develop a new version of E-DEC online applications
- Install a new database which will enable compliance tracking
- Train designers and internal staff on the new database and applications
- Require electronic permit application submittals

DATA SOURCE: Drinking Water and Groundwater Protection Division Regional Office Databases

PREPARED BY: Drinking Water and Groundwater Protection Division
www.septic.vermont.gov

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Healthy and Safe Communities

Ensure Sustainable Onsite Septic Systems

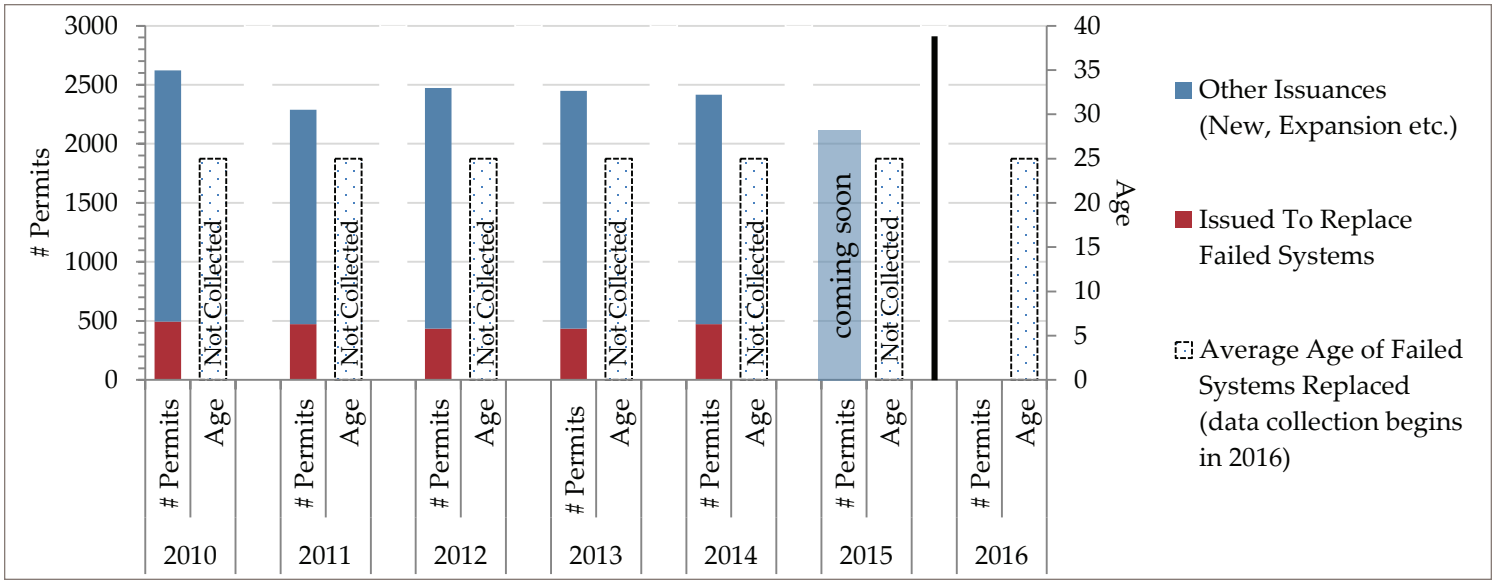
Monitoring the function of onsite wastewater (septic) systems

474

permits issued to replace failed septic systems in 2015

PERFORMANCE TREND

Permits issued to replace failed septic systems



DATA ANALYSIS

Onsite wastewater (septic) systems have been regulated since 1969 with a comprehensive statewide program covering all onsite systems beginning in 2007.

The science around wastewater treatment and the role of soils, new advanced treatment technologies, and multiple leachfield options has greatly advanced over this time. Currently, onsite systems are typically designed and constructed with a lifetime expectation of 20 or more years.

Given this designed lifetime, our goal is to track the age of septic systems as they fail to confirm that they are functioning as intended. Additionally, tracking failure of residential vs. commercial systems; innovative or alternative designs vs. conventional designs, and permitted vs. not permitted systems will allow for us to better understand these relationships between design and longevity.

The software to track this was supposed to be developed in FY15 but is now projected to be completed in FY16.

NEXT STEPS

- The software in development will include fields for the date of initial installation of any systems to track average age of failure
- Administrative staff to be trained on new database Spring 2016

DATA SOURCE: Regional Office Database

PREPARED BY: Drinking Water & Groundwater Protection Division
www.septic.vermont.gov
(802) 828-1535

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Healthy and Safe Communities

Assess Geologic Impacts on Human Health

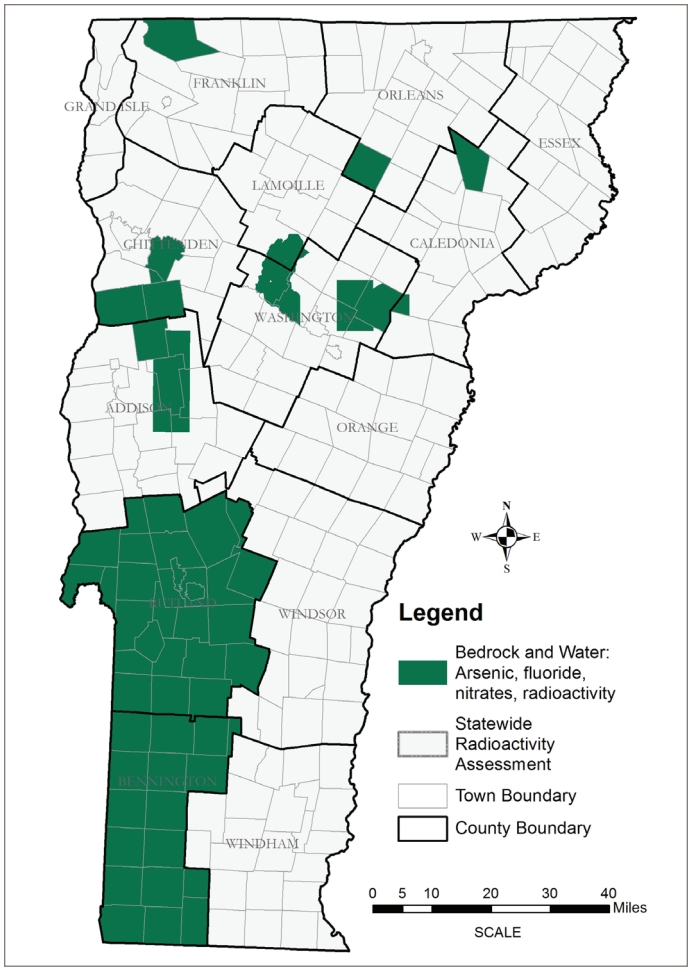
Providing science-based aid and advice concerning community vulnerability

26%

of Vermont towns recieved some assessment of public health utilizing geologic studies

PERFORMANCE TREND

Regions with completed studies assessing potential geologic impacts



DATA ANALYSIS

Vermont's geology, the bedrock, glacial materials and soils, potentially can impact human health. In some cases the impact is a positive one with geologic materials providing essential nutrients or filtering contaminants and preventing them from reaching drinking water sources. The same earth materials can also be a natural source of contaminants, such as radionuclides, arsenic, fluoride, manganese and asbestos. These natural contaminants can move through the physical systems of air, soil and water and into the biologic systems of plants and animals, including humans.

The Vermont Geological Survey (VGS) and partners work to determine the source and transport of these materials within the earth's systems and to help inform our understanding of their impact on human health and environmental issues. As seen in the map, this type of work has been conducted across the State. For example, preliminary data showed arsenic levels above health-based standards in drinking water supplies in some areas in southwestern Vermont.

By collecting additional data and interpreting the geochemistry from drinking water wells, plus determining the influence of the local bedrock, the VGS is well positioned to inform the public about the potential risks and how to minimize potential exposure. By continuing to research issues like this, the VGS is able to provide reliable science to assist in reducing Vermonters' exposure to chemical and mineralogical contaminants.

NEXT STEPS

- Document the extent of known contaminants through well water sampling, data analyses, monitoring and field studies.
- Expand the regions analyzed for the presence of constituents of concern.
- Prioritize and propose new studies in geographic areas of concern in order to characterize the source and transport of contaminants.
- Collaborate with partners, like the Vermont Department of Health, to expand public awareness of how geology can contribute to health issues and to reduce the exposure of Vermonters to these naturally-occurring hazards.

DATA SOURCE: Vermont Geological Survey Database

PREPARED BY: Vermont Geological Survey
www.anr.state.vt.us/dec/geo/vgs.html

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Healthy and Safe Communities

Identify the Occurence of Hazardous Geologic Events

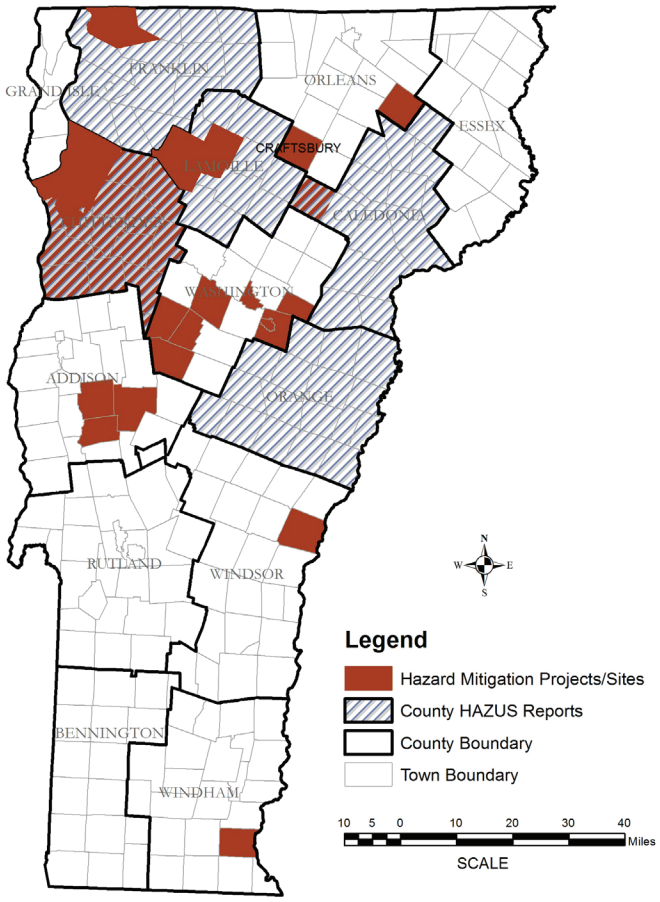
Evaluating existing and potential risk from landslides, rockfalls, earthquakes, floods and drought

5-10

scientific Hazard Evaluations completed annually

PERFORMANCE TREND

Towns with hazard mitigation sites or completed assessment projects



DATA ANALYSIS

Physical hazards, like landslides, rocks falls, earthquakes, floods and drought all have the potential to threaten Vermonters lives and livelihoods. The Vermont Geological Survey's (VGS) Geology and Hazards program works with partners to identify, monitor and research these high-impact, low frequency natural hazards so that policymakers, communities and individuals can better prepare and respond. Environmental changes will continue to impact our landscape and this research will assist in helping Vermonters be more resilient and prepared for addressing these challenges.

Many hazard mitigation sites are first identified during routine field mapping completed as part of the Vermont bedrock and surficial mapping programs. However, they are also identified through community reports and targeted hazard assessments. The VGS works and supports its partners in identifying the risk at a site or region, implements a mapping protocol to define the extent, and assists in the development of a long-term mitigation, monitoring and avoidance strategy. The map shows areas where studies have been conducted, including local landslide sites and regional seismic hazard analyses. Hazards occur throughout the state and have the potential to occur in many more locations.

The VGS provides reliable, science-based information on frequency, magnitude, extent, consequences, and when possible, hazard avoidance strategies. To address potential future risks, hazard assessment projects, like the Landslide Hazard Mapping project and the HAZUS-MH analysis, are completed across Vermont. By identifying regions sensitive to physical hazards and utilizing a scientific assessment to characterize the risks, the VGS is providing a tool to protect Vermonters in these vulnerable areas.

NEXT STEPS

- Respond to and manage existing and future identified hazards.
- Complete a Phase I trial of the Landslide Hazard Mapping Program in Addison County. This is a new and efficient remote sensing technique for mapping existing landslides and areas prone to landslides.
- Complete surficial mapping projects in understudied regions to identify areas prone to physical hazards.
- Conduct regional groundwater studies to assist drought resiliency and response planning.
- Communicate reliable, science-based statements regarding physical risk occurrence and potential with emergency management personnel and other local and regional planning partners.
- All reports and assessments will continue to be made available at the VGS website

DATA SOURCE: Vermont Geological Survey Database

PREPARED BY: Vermont Geological Survey
www.anr.state.vt.us/dec/geo/vgs.html

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Health and Safe Communities

Strengthen Decision Making with Geologic Mapping

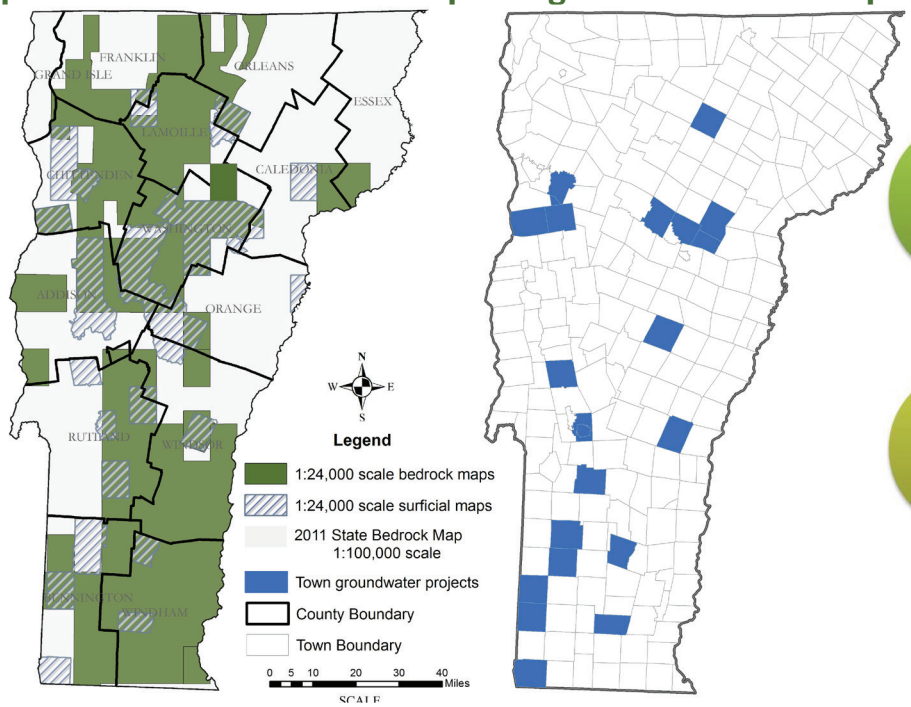
Supporting land-use management, planning and conservation decisions

2-3

annual requests from communities for groundwater mapping assistance

PERFORMANCE TREND

Completed bedrock and surficial maps and groundwater resource projects



DATA ANALYSIS

For land-use management, conservation of natural resources and general environmental protection, government agencies, industry and the public depend on geologic map information to help evaluate environmental impacts. The Vermont Geological Survey (VGS) serves as the state lead in geologic mapping by planning, developing priorities, coordinating with partners, conducting field studies and compiling datasets.

Geologic mapping uses a scientific process to investigate and depict the composition and structure of geologic materials at the earth's surface and at depth. The analysis and interpretation of diverse data sources leads to results communicated through publications and maps.Although this process has not changed significantly, new developments, namely geographic information systems (GIS) and LiDAR, have refined the approach and, along with increasing and changing demands, there is renewed need to update and expand Vermont's geologic mapping program.

An example of active mapping projects is illustrated by the right map above. Groundwater is increasingly being recognized as a valuable resource which must be better understood for effective management and protection. Groundwater maps for planning can provide information on the well yield and favorability of an area for both public and private water supplies, plus identify potential naturally occurring contaminants. The VGS works to involve communities directly and towns can request mapping projects at the annual STATEMAP Committee meeting. In 2015, two towns requested that this work be completed to support their planning needs.

NEXT STEPS

- Identify priority areas for mapping projects through coordination with other agencies, conservation groups, planners and municipalities.
- Coordinate with partners, primarily university researchers, to further develop existing projects.
- Continue building regional datasets by compiling individual project information.
- As requested, provide interpretation of existing geologic mapped areas to support Agency work.
- Obtain funding for mapping programs and to complete community requests.

DATA SOURCE: Vermont Geological Survey Database

PREPARED BY: Vermont Geological Survey
www.anr.state.vt.us/dec/geo/vgs.html

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Efficient and Effective Government

Improve Staff Performance Evaluations

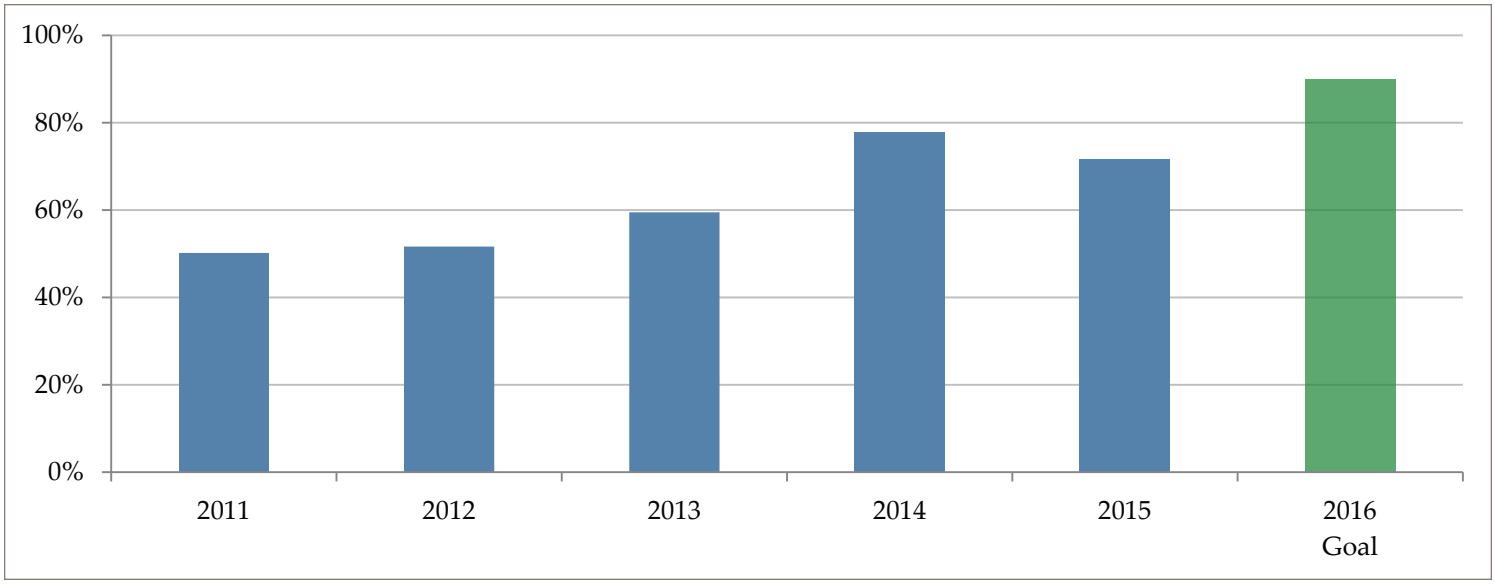
Completing evaluations on time and enhancing supervisor and staff communication

74%

of all performance evaluations were completed in 2015

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. Over the past several years, DEC has launched efforts to improve staff morale and job satisfaction. This includes increased communication between upper management and mid-level management, additional regular supervisor meetings, and an improved performance evaluation process.

In November 2013, DEC began using this new process, which includes regular quarterly performance meetings between employees and supervisors, a pre-evaluation survey completed by the employee and a thorough evaluation that clearly states what type of activities the employee can do to improve. In 2015, a staff survey was distributed to gain feedback on the new evaluation process. With 143 responses (approximately 45% of staff), the following information was gleaned:

- 80% of staff have been evaluated under the new system
- 56% of staff have participated in quarterly performance meetings; 74% of supervisors find quarterly meetings very useful
- In general staff feel that their supervisors are accessible and giving timely feedback
- 45% of supervisors want to change something about the evaluation process
- 51% of supervisors do not feel that evaluations are improving performance

Under DEC's culture of continuous improvement, we will continue to improve this process with more emphasis on creating evaluations that lead to improved performance.

The number of performance evaluation completed has decreased slightly in 2015 partly due to difficulty in the tracking system and the number of new staff and supervisors requiring training on the performance evaluation system. Also, DEC experienced a significant amount of turnover, on average a total of ~21 positions were vacant at all times throughout 2015. In addition, DEC also had 14 positions which took advantage of the retirement incentive offered in September 2015 none of which have been authorized to be refilled.

NEXT STEPS

- Continue tri-annual meetings for all DEC supervisors
- Provide ongoing training on the performance evaluation system
- See feedback and continue to improve performance evaluation process
- Evaluate the Agency's career ladders for technical staff
- Develop an updated hiring and recruiting manual for hiring managers
- Add performance evaluation guidance to the Department's internal website.

DATA SOURCE: ANR Human Resource Database

PREPARED BY: Administration and Innovation Division
(802) 828-1556

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Efficient and Effective Government

Improve Business Practices to Gain Efficiencies

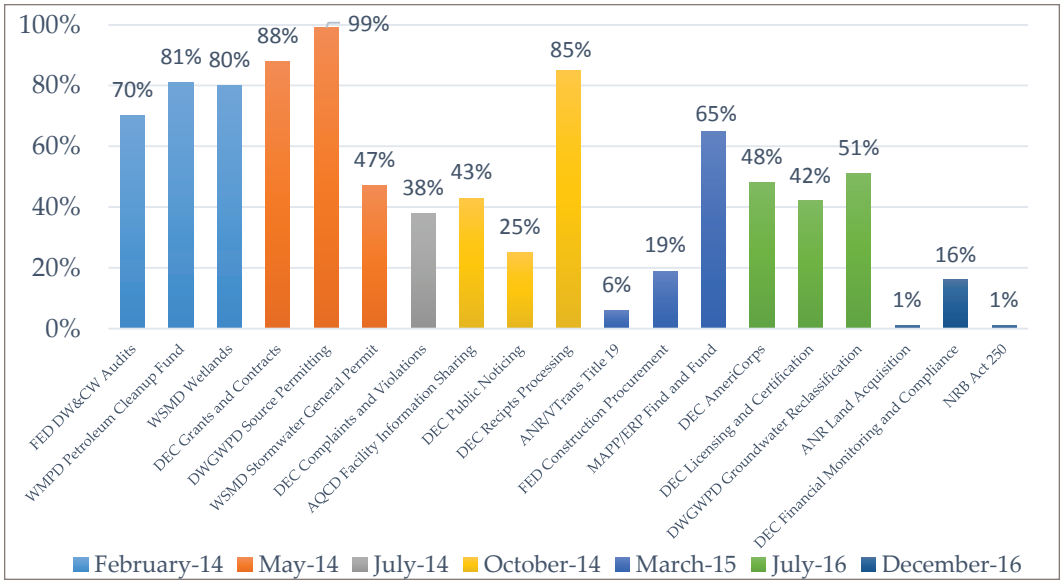
Developing a culture of continuous improvement through Lean

19+

Lean projects in active implementation since 2013

PERFORMANCE TREND

Lean projects initiated and measurement of implementation progress



DATA ANALYSIS

The Vermont 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 2015, DEC applied Lean methodologies, through a week-long "Kaizen" model, to nine distinct processes, including but not limited to financial monitoring and compliance, groundwater reclassification, and licensing and certification. Counting the ten projects initiated in 2014, DEC now has 19 Lean projects in varying stages of implementation, three of which involved sister agencies/departments. This does not include the variety of smaller, narrowly focused "mini-Kaizen" events (~10) that occurred over the past two years.

All told, over 50% of DEC's 300 staff members have participated in Lean activities since the inception of the initiative with 56 of those staff receiving formal training (nearly 18% of staff). Including participation from other Agencies and stakeholder groups, over 251 people have received firsthand exposure to Lean.

The application of Lean at DEC has resulted in the a number of tangible process improvements, including but not limited to:

- 76% reduction in the State Revolving Fund audit backlog.
- 40% decrease in the average days from date of invoice to payment for grants and contracts.
- Evaluation and correction of public notice data errors for seven environmental programs.
- 62% increase in the number of claims paid within 30 days for the Petroleum Cleanup Fund.

NEXT STEPS

- Grow the range and variety of Lean events undertaken and tools used, specifically the A3 and Skills Matrix.
- Develop a list of strategic priority processes to Lean at the Division and Department level.
- Maintain focus on project implementation by holding staff accountable for implementation progress.
- Close out first round of 2014 Lean projects.
- Train more staff in both basic and more advanced Lean methods.
- Help to spread Lean to other state agencies by continuing to share our trainings, soliciting participation in our internal Lean events, holding cross-agency events, and developing an external website.

DATA SOURCE: Business Transformation Initiative

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

Efficient and Effective Government

Support the Implemenation and Use of Online Permitting

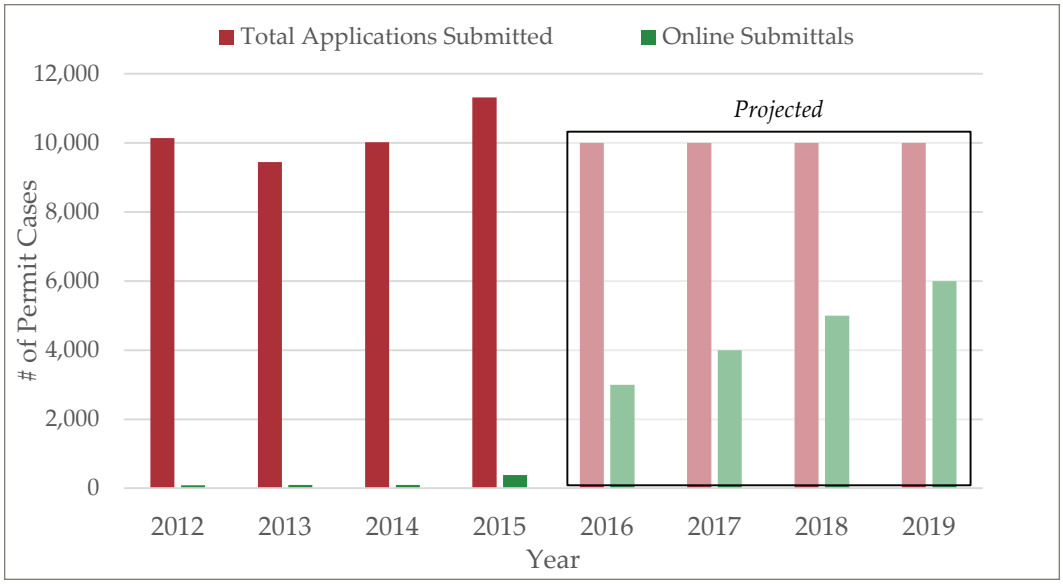
Increasing use of technology for a web-based submittal system

3%

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 2015, approximately 10,000 permitting cases were received, 97% of which were received in paper format.

In January 2015, a significant software initiative created a new electronic submittal system known as ANR Online. As a result, two additional programs have on-line submittal capability. This number will continue to grow as solid waste management facility applications, hazardous site petroleum cleanup applications, drinking water state revolving fund applications, annual dam safety registrations, and applications for Wastewater System and Potable Water Supplies come online.

Also in 2015, DEC initiated a significant effort to obtain an Enterprise Content Management System (ECMS). The ECMS will create an organized platform and method for the storage, access, retention, and disposal of internal and external DEC documentation, including environmental permits and licenses. The ECMS will integrate with existing Agency web forms and technologies to receive applications and other documents in an effort to further advance DEC towards more electronic permitting and records management while applying Lean concepts to evaluate inefficiencies in our work-flow and implement improvements. The ECMS system will be designed to support DEC business processes from receipt, creation, or ingestion of applications and supporting documents through document versioning, work-flows, approvals, records management, and the eventual disposition of the content. It will also provide easy access to public records.

NEXT STEPS

- Grow capacity for a web based permit application, data submittal system, and payment process
- In all programs train program staff to create on-line forms
- Prioritize submittals needing ANR Information Technology services to provide functionality connecting to program databases
- Leverage technology by electronically tracking the status of submittal and notifying applicant of status
- 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

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Efficient and Effective Government

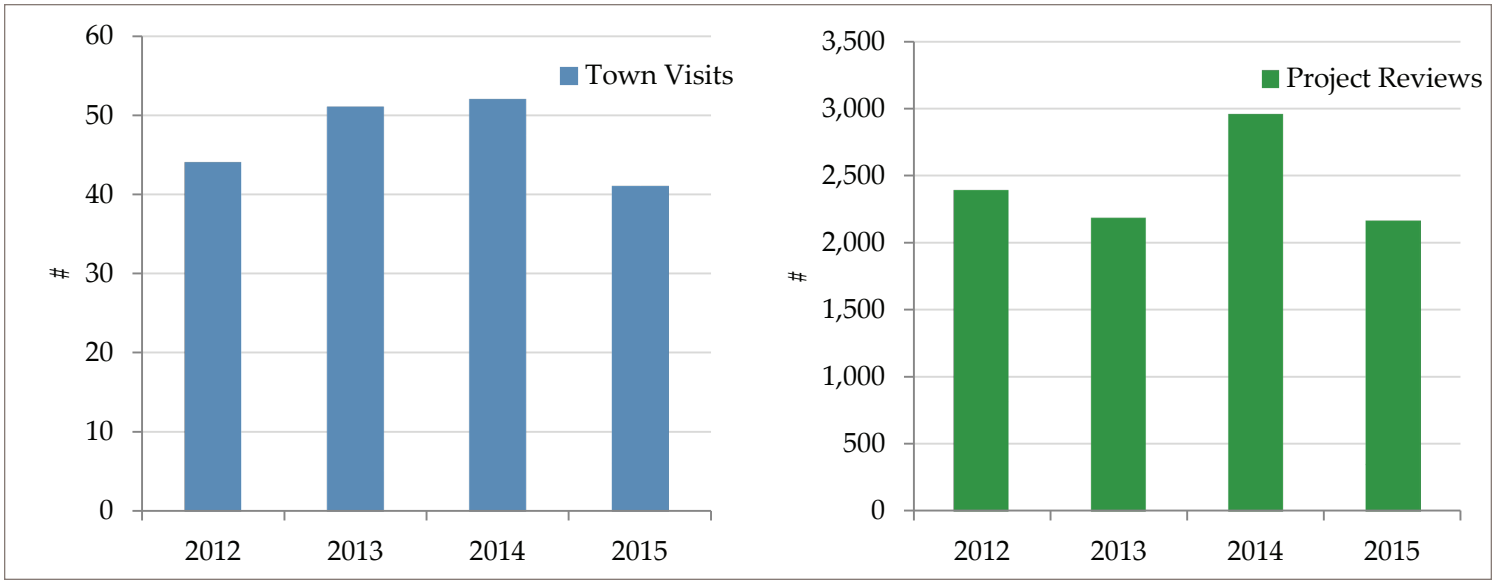
Provide Permit Assistance

Assisting the public in identifying environmental and state permits

2,000
project reviews in 2015

PERFORMANCE TREND

Number of town visits and project reviews



DATA ANALYSIS

Permit Specialists in the five ANR regional offices (Barre, Essex, Rutland, St. Johnsbury, and Springfield) assist permit applicants or their consultants in identifying environmental and other state permits that may be required for a development project. This is often accomplished by completing a Project Review Sheet that identifies potential permits, provides contact information, and a fact sheet description of the relevant permit programs.

In addition to project reviews, the Permit Specialists respond to general questions from the public about the state permitting process and prepare correspondence; answering questions about general permit requirements or policies and directing the public inquiries to the appropriate state agencies. Permit Specialists also assist municipal officials, such as zoning administrators, to understand the state permitting process so that local project applicants are aware of state permitting requirements. They represent the Department at a variety of public events to explain its regulatory authorities and provide general information on other state agency programs.

The number of project reviews can be affected by the strength of the economy, despite this there has been a general upward trend in numbers over the last several years. In 2015 the number of town visits and project reviews decreased due to a 75% turnover in permit assistance staff. There is a recognition that assistance visits to town offices should increase beyond the 20% of towns annually visited to provide permit information and assistance. The Permit Handbook, which contains fact sheets and contact information on most state permits, and the Do You Need a Permit? brochure are widely disseminated by hard copy or via the web and are frequently in need of update due to changes in permit programs and program contacts.

NEXT STEPS

To enhance Permit Assistance functions provided in the ANR Regional Offices, the following strategies will be implemented:

- Create a annual schedule for updating the Permit Handbook in 2016
- Enhance Permit Assistance web pages and resources
- Increase the number of municipal site visits by 25% in 2016
- Increase outreach and public presentations to business groups and consultants about the Permit Assistance Program

DATA SOURCE: Permit Specialist Data
PREPARED BY: Environmental Assistance Office

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Efficient and Effective Government

Increase the Number of Formal Enforcement Actions

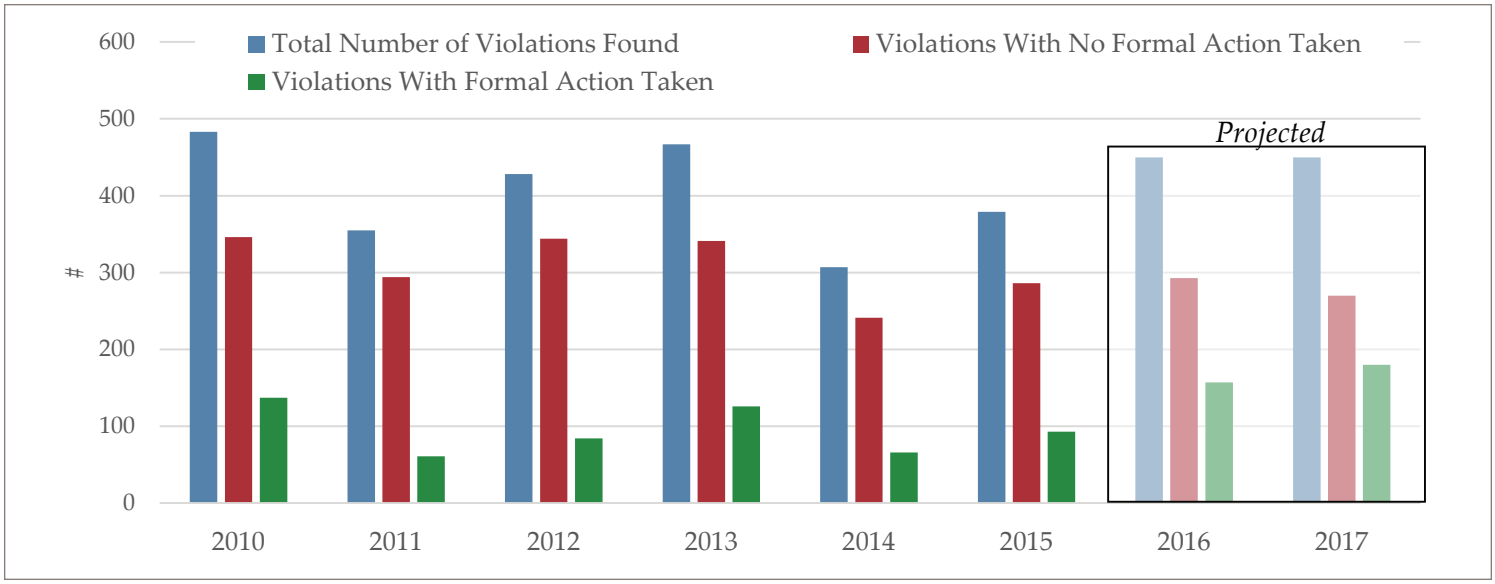
Responding efficiently to violations as they are reported

23%

of violations found resulted in formal action in 2015

PERFORMANCE TREND

Number of violations and the number of formal actions taken in response



DATA ANALYSIS

As part of the State's delegation of authority to run federal environmental programs, the Department of Environmental Conservation (DEC) is required to respond to citizen complaints and reports of environmental infractions in a timely way. These citizen complaints and reports often lead to the discovery of violations, at which point formal actions by Environmental Enforcement Officers may be pursued.

Over the last five years the total number of annual complaints received by the Environmental Compliance Division (ECD) has been fairly steady. However, over this same time, the number of Environmental Enforcement Officers was decreasing. With limited staff resources available for the number of violations reported and found, only a small percentage were able to receive formal enforcement actions addressing and correcting the violation.

Ensuring that the capacity exists for adequate enforcement action to be taken on violations found is important: the proportion between violations found and formal enforcement action is a critical relationship to track effectiveness. Reported complaints, resulting in more requests for assistance, will continue to place a significant strain on enforcement and legal resources.

NEXT STEPS

- In March 2015, the Environmental Compliance Division hired an additional Environmental Enforcement Officer, ramping up to fully trained status in early 2016
- With the recent hire, staff levels now more closely match the demand for Enforcement Officer services.
- Given the training required for new officers, formal actions are expected to increase in 2016.

DATA SOURCE: ECD Incident Tracking Database

PREPARED BY: Environmental Compliance Division
(802) 828-1254