

VERMONT DEPARTMENT OF  
ENVIRONMENTAL CONSERVATION  
**WATERSHED**  
MANAGEMENT DIVISION



**VERMONT**

**AGENCY OF NATURAL RESOURCES**  
Department of Environmental Conservation

**State of Vermont**  
**Department of Environmental Conservation**

**Watershed Management Division**

**Division Performance Report**

**Fiscal Year 2016**

**MISSION**

*To efficiently and effectively manage Vermont's surface water resources through a comprehensive, integrated, and holistic watershed-based system*

**VISION**

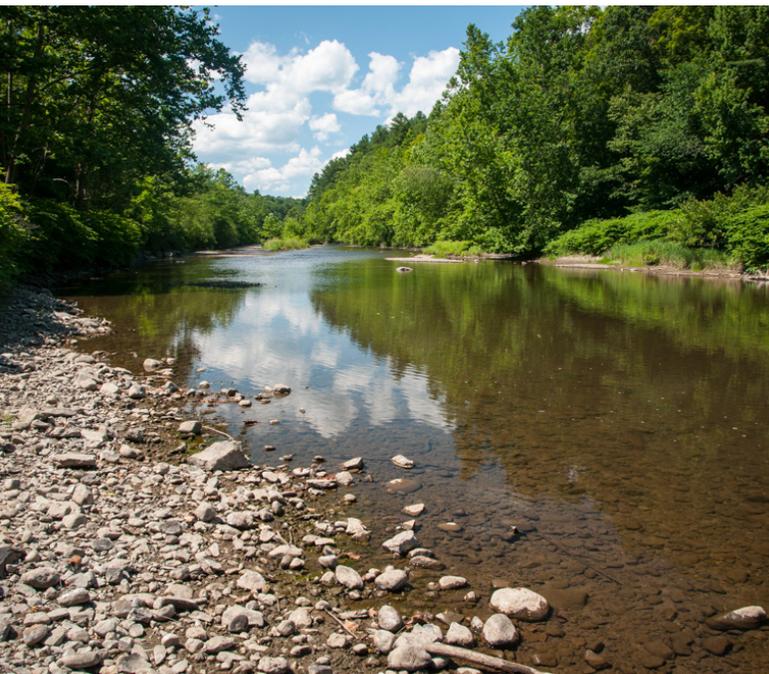
*To achieve full support of both healthy ecosystems and public uses in all of Vermont's waters*



# Vermont Department of Environmental Conservation, Watershed Management Division

The Watershed Management Division is responsible for protecting, maintaining, enhancing, and restoring the quality of Vermont's surface water resources. Inherent in this effort is the support of both healthy ecosystems and public uses in and on Vermont's 800 lakes and ponds, 23,000 miles of rivers and streams, and 300,000 acres of wetlands.

The Division's mission is to efficiently and effectively manage Vermont's surface waters through a comprehensive, integrated, and holistic watershed-based system. This mission is expressed through our four goals: to protect, maintain, enhance, and restore Vermont's surface waters. Our Division's Strategic Plan guides the collective work of the Division to meet these four goals. Progress is tracked via Results Based Accountability performance measures that summarize work across our Division, as well as through program-specific performance measures.



## GOALS

### *Protect*

*Protect Vermont's pristine or 'special' waters from deleterious change over the long term*

### *Maintain*

*Improve and expand the ongoing maintenance of Vermont's existing high quality waters*

### *Enhance*

*Increase opportunities to improve the condition of Vermont's high quality waters*

### *Restore*

*Aggressively pursue restoration of currently impaired waters*

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- *Square Miles of River Corridors Protected*

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### PROTECT

- *Protect Surface Water Quality Through Easements and Designations*
- *Protect Surface Water Quality Through Education and Training*

### MAINTAIN

- *Maintain Surface Water Quality Through Monitoring and Assessment*
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- *Maintain Surface Water Quality Through Technical Assistance and Review*

### ENHANCE

- *Enhance Surface Water Quality Through Best Management Practices*

### RESTORE

- *Restore Surface Water Quality Through Targeted Projects in Impaired Waters*



## Overview

In 2014, the Department of Environmental Conservation (VTDEC) launched an effort to improve how the Department tracks and measures performance using Results Based Accountability (RBA). RBA is a framework used to measure how well an agency, department, division or program is performing. RBA looks to answer three primary questions: (1) How much did we do? (2) How well did we do it? (3) Is anyone better off? RBA is required by Act 186 and is currently used by the Agency of Human Services and the Secretary of Administration's office.

## Watershed Management Division Performance Report

Included in this report are the population based indicators (high level measure of Vermont's water quality), Division performance measures (cumulative measure of the Division's efforts), as well as specific program level performance measures (highlight efforts at the program level).

## Measuring and Tracking Progress

Vermont has substantially improved water quality by significantly reducing pollutant discharges to its lakes, rivers, and wetlands through controls of discrete sources of pollution or point sources, such as wastewater treatment facility and industrial discharges. While these point sources require continual control, sources of nonpoint pollution need increasing attention. Nonpoint pollution sources include stormwater runoff from developed lands, road ways, and agricultural land, sediment pollution from unstable streambanks, loss of protective buffers and wetlands, and aquatic invasive species. Over the past several years, the Division has reorganized internally to most efficiently and effectively manage threats from these pollutant sources and other stressors on water quality.

Inherent to our success over the past year and necessary for future success are:

- Using Lean to garner efficiencies and promote consistency
- Leveraging technology to streamline business and permitting processes
- Enhancing federal, state, and local partnerships
- Strategically targeting projects and funding

Progress in implementing the Strategic Plan will be measured through this Results Based Accountability (RBA) framework. In addition to annual RBA reporting, the Division is developing a comprehensive database to track our efforts in meeting Act 64 requirements (Vermont Clean Water Act), and implementing the Lake Champlain TMDL and Phase 1 Plan, and tactical basin plans.

# Department of Environmental Conservation, Watershed Management Division

## Score Card



### Indicators

**80**

% of inland waters that meet aquatic water quality standards

**Good Progress**

**84**

% of inland waters that meet recreational water quality standards

**Good Progress**

**88**

% of Lake Champlain that meets aquatic water quality standards

**Good Progress**

**85**

% of Lake Champlain that meets recreational water quality standards

**Good Progress**

**631**

metric tons of phosphorous loading to Lake Champlain

**Good Progress**

**175**

# of square miles in Vermont preserved to reduce flood and fluvial erosion hazards

**Good Progress**



### Performance Measures

**1,400+  
acres**

protected by easements and designations over the past 5 Years

**Protect**

**797  
hours**

of education and/or instruction provided by staff

**140 projects**

undertaken to enhance water quality in 2016

**Enhance**

**8,000+**

locations tested over the past 5 years

**1,400+  
permits**

issued and 4,400+ active permits managed in 2016

**Maintain**

**3,800+  
projects**

reviewed to ensure maintenance of Vermont's water quality

**255**

additional projects improved the function of 455 additional acres in 2016

**Restore**

**Indicator**



# Clean Water

## Percent of Vermont's Inland Waters Meeting Water Quality Standards

*Vermont's inland waters are healthy overall and support fishing and swimming activities for residents' enjoyment and tourism*

80%

aquatic (fishable)

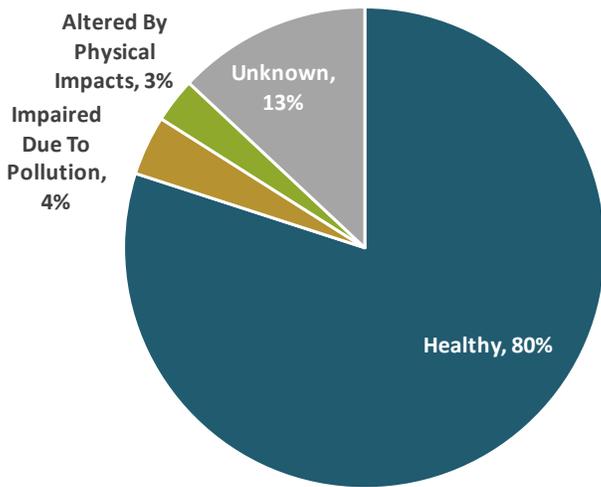
84%

recreational (swimmable)

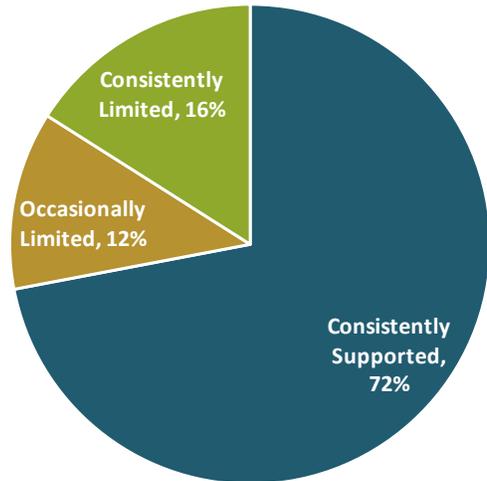
**INDICATOR TREND**

### Aquatic (fishable) water quality of rivers and streams

### Recreational (swimmable) water quality of inland lakes



**Percent of total miles**



**Percent of total acres**

**DATA ANALYSIS**

While our rivers, streams, and inland lakes can suffer from the stresses of pollution, channelization, invasive species, and cyanobacteria blooms, the majority of Vermont's inland waters continue to support fishing and swimming uses at all times.

In 80% of our rivers and streams, the aquatic biota is considered healthy (fishable), whereas only 7% of the aquatic biota is either impaired due to pollution or altered based on physical impacts like poorly managed dams.

In our inland lakes, 72% of the total acreage consistently supports recreational uses (swimming), meaning that the phosphorus standard is being met and invasive species or cyanobacteria blooms are not prevalent.

The Watershed Management Division works to protect, maintain, enhance, and restore our rivers, streams, and lakes by avoiding or minimizing pollution and other stressors on Vermont's waters.

Some of the key initiatives we were involved in over the last year to help improve inland water quality were:

- Refined tactical basin planning process to identify the highest priority projects to restore waters
- Streamlined priority project identification and funding processes
- Promoted proactive resource protection through surface water reclassifications, Class I Wetland designation, and revisions to Vermont Water Quality Standards

**NEXT STEPS**

Although the quality of Vermont's inland waters is overall very good, we are proactively and aggressively working to increase protections to improve aquatic and recreational uses. Our specific efforts include:

- Further increasing our education and training efforts
- Increasing our aquatic invasive species detection and elimination efforts
- Initiating additional protections through Class I wetland and high quality water designations

**DATA SOURCE:** Watershed Management Division

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

**Indicator**



**Clean Water**

**Percent of Lake Champlain Meeting Water Quality Standards**

*Lake Champlain is well known for its high quality fishing, however recreational uses are sometimes limited; the Vermont Clean Water Act aims to improve this*

**88%**

aquatic (fishable)

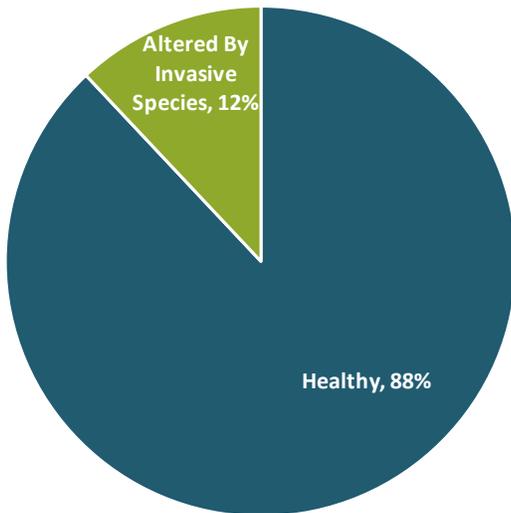
**85%**

recreational (swimmable)

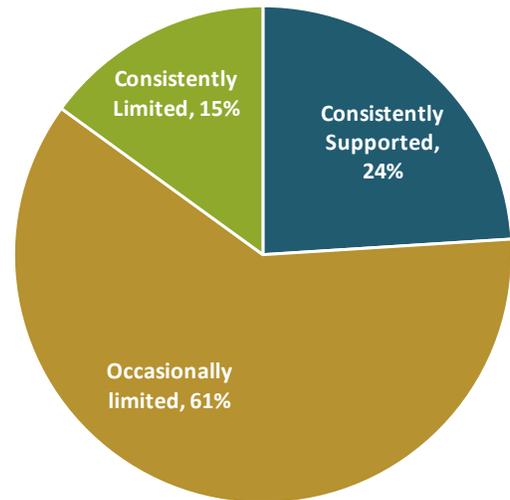
**INDICATOR TREND**

**Aquatic (fishable) water quality of Lake Champlain**

**Recreational (swimmable) water quality of Lake Champlain**



**Percent of total acres**



**Percent of total acres**

**DATA ANALYSIS**

Lake Champlain is Vermont’s largest water body at 429 square miles and 129 miles in length, running between Vermont and New York and up to Quebec. The Lake is designated as impaired due to phosphorus concentrations. Uses are also limited at times due to invasive species, and cyanobacteria blooms.

Encouragingly, the Lake Champlain fishery is considered healthy (fishable) in 88% of the lake. The remaining 12% is altered by invasive species (such as water chestnut and Eurasian watermilfoil).

Vermont has very stringent water quality standards for phosphorus. While 24% of the lake consistently has good swimming conditions, 61% of the lake is occasionally limited for swimming by invasive species

and cyanobacteria blooms. These organisms consistently limit swimming in 15% of the lake.

The Watershed Management Division works to protect, maintain, enhance, and restore our rivers, streams, and lakes by avoiding or minimizing pollution and other stressors on Vermont’s waters.

Some of the key initiatives we were involved in over the last year to help improve the water quality of Lake Champlain were:

- Finalized Lake Champlain Phosphorus TMDL Phase 1 Implementation Plan
- Developed Combined Sewer Overflow (CSO) Rule
- Identified and directed phosphorus reduction projects

**NEXT STEPS**

The passage of the Vermont Clean Water Act and the Lake Champlain TMDL Phase 1 Plan greatly assist our efforts to aggressively reduce in-lake phosphorus, and improve Lake Champlain’s overall water quality. The clean-up of Lake Champlain is expected to take many years. Our specific efforts will include:

- Timely implementation of requirements under Act 64, the Lake Champlain TMDL and Phase 1 Implementation Plan
- Implementing expanded permitting programs and requirements
- Continuing to tighten priority project identification and funding

**DATA SOURCE:** Watershed Management Division

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

**Indicator**

**Clean Water**

**631**

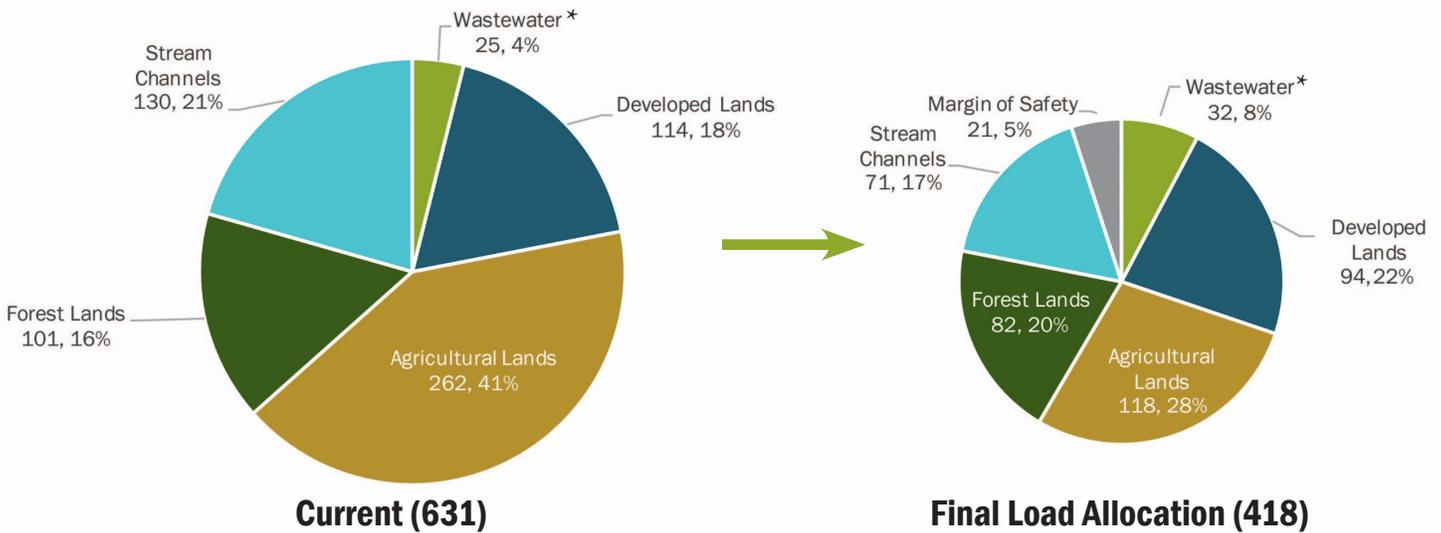
metric tons/year of phosphorus reach Lake Champlain

**Total Phosphorus Loading to Lake Champlain**

*The Vermont Clean Water Act is intended to reduce the total phosphorus loading to Lake Champlain from Vermont sources*

**INDICATOR TREND**

**Reduction Needed in Phosphorus Loading to Lake Champlain (metric tons, percent of total)**



\* Current load for Wastewater is shown as current actual loads (25 MT), current permit limits are higher (56 MT). The final load allocation shows future permit limits (32 MT).

**DATA ANALYSIS**

The amount of phosphorus reaching Lake Champlain must be reduced to meet water quality standards. Phosphorus is a pollutant that comes from many sources (see graphic above). The current estimated phosphorus load to Lake Champlain from Vermont sources is 631 metric tons/year and the target loading, specified by the federal regulatory limits or the Lake Champlain Total Maximum Daily Load (TMDL), is 418 metric tons/year. This substantial reduction will require all contributing sectors to work together to achieve this.

The passage of the Vermont Clean Water Act (Act 64), in 2015, provides the additional regulatory and funding mechanisms necessary to reduce phosphorus pollution in Lake Champlain, as well as to restore,

protect, and maintain water quality statewide. The State has developed a tracking system to monitor progress by these regulatory and funding programs. Currently, the State is tracking phosphorus reductions for State-funded projects and is developing procedures to track reductions achieved through regulatory programs. This will allow us to report on the estimated phosphorus load reductions achieved.

Key initiatives over the last year were:

- Finalized Lake Champlain Phosphorus TMDL Phase 1 Implementation Plan
- Developed Vermont Clean Water Tracking System
- Continued to develop new regulatory programs

**NEXT STEPS**

The passage of the Vermont Clean Water Act will greatly assist in our efforts to substantially reduce in-lake phosphorus concentrations, and improve Lake Champlain’s overall water quality. The clean-up of Lake Champlain is expected to take many years. Specific efforts will include:

- Implementing Required Agricultural Practices
- Increasing education, training and technical assistance efforts
- Implementing expanded permitting programs
- Establishing long term revenue sources for the Vermont Clean Water Fund

**Indicator**



# Clean Water

## Square Miles of River Corridors Protected

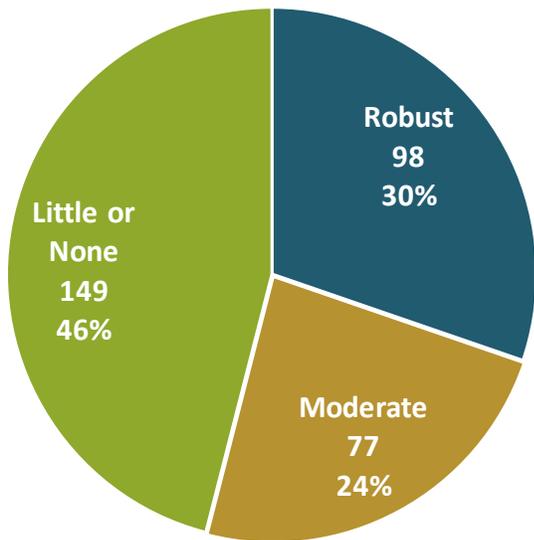
*Protection of river corridors helps reduce flood and fluvial erosion hazards and improve water quality and aquatic habitat*

# 175 sq. miles

of river corridors have protections in place

**INDICATOR TREND**

### Types of River Corridor Protection (square miles and percent)



### Robust Protections

- State Held River Corridor Easements
- State Protected Wetlands
- State/Municipal Protected Floodways
- Act 250 Parcels

### Moderate Protections

- Public Lands
- Conservation Easements/Ownership
- Municipally Adopted River Corridor Bylaws
- Flood Hazard Area Protection Bylaws

**DATA ANALYSIS**

River corridors encompass the area of land surrounding a river. They provide the meandering, floodplain, and riparian functions necessary to restore and maintain a naturally stable or least erosive form of river, thereby minimizing erosion hazards over time. Lands within a river corridor are at higher risk to fluvial (streambed and streambank) erosion. Giving rivers room to move avoids costly measures to protect investments, which often increase erosion upstream and downstream and adversely affect public safety, landowners, and river ecosystems.

The Watershed Management Division has delineated river corridors for streams with a drainage area greater than two square miles, which encompasses 324 square miles of

land statewide. Over half the river corridor area (175 square miles) has some type(s) of protection; however not all types of protection are equal. State ownership and/or regulation with specific water resource-based land use restrictions are likely to result in more robust river corridor protections. Both robust and moderate protections help to ensure stable streams and rivers.

Naturally stable streams and rivers are a tremendous community asset. If river corridors are not protected at the community level, the State will bear an ever-increasing burden (i.e., in terms of flood disasters and associated human misery) when there are less and less places on the landscape where streams can expend the flows and erosive energy of a flood.

**NEXT STEPS**

River corridor protection is important to river and stream stability and has economic benefits. Specifically, we aim to help increase these protection efforts through:

- Working with regional planning commissions to assist municipalities with preparing town river corridor maps
- Continuing development of the Flood Resilient Communities Program
- Finalizing a state river corridor and floodplain protection bylaw model to assist municipal land use planning and regulation

**DATA SOURCE:** Watershed Management Division

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

**ADDITIONAL INFORMATION:** Vermont Flood Ready <http://floodready.vermont.gov>





# Clean Water

## ENHANCE Surface Water Quality Through Best Management Practices

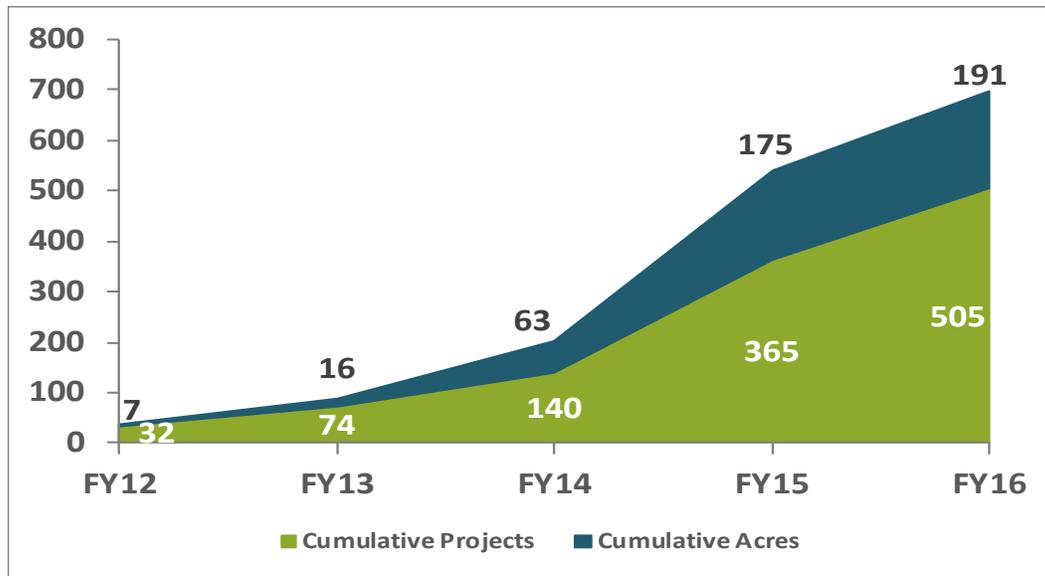
*Improving ecological and hydrologic function*

# 140 projects

undertaken to enhance water quality in 2016

PERFORMANCE TREND

### Number of enhancement projects undertaken and resulting acres improved



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 significant 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
- Continuing to tighten priority project identification and funding
- Using Lean business process improvement tools to evaluate and advance project prioritization methodologies

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 can 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 water quality by improving ecological and hydrologic functions.

Enhancement projects include:

- Implementation of best management practices on lake-shore properties
- Riparian buffer plantings and in-stream improvements
- Flow protection and culvert projects

- Removal of invasive species
- Installation of green stormwater infrastructure practices, such as rain gardens and bioretention

In 2016, WSMD facilitated or helped to fund 140 unique enhancement projects, collectively resulting in improvement to 16 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. The graph above also shows a significant jump in the number of projects in 2015 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.

DATA SOURCE: Watershed Management Division

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



# Clean Water

## MAINTAIN Surface Water Quality Through Monitoring and Assessment

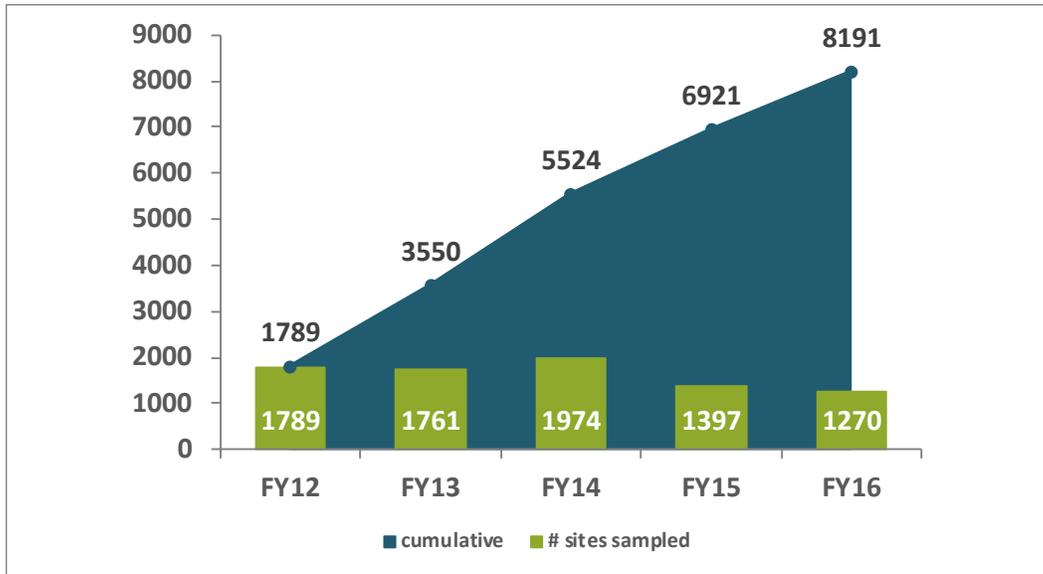
*Establishing baseline conditions, tracking trends, and ensuring water quality efforts are effective*

### PERFORMANCE TREND

**8,000+**  
**locations**

tested over the past 5 years

### Total number of sampling sites



### 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
- Participation in the USEPA sponsored National Wetlands Assessment
- Continue permit compliance monitoring
- Increase training opportunities for interested citizen scientists
- Increase monitoring performed by volunteer groups and partners

### DATA ANALYSIS

The Watershed Management Division (WSMD) has been involved in monitoring and assessment efforts since 1977. Monitoring and assessment 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 water quality stressors (see Vermont’s Surface Water Management Strategy), prioritize mitigation and restoration efforts, and evaluate their effectiveness.

For the 2016 reporting year, WSMD monitored 1,270 unique sites. Cumulatively, 8,191 sites have been visited over the past five years. The number of samples collected and analyzed this year was lower than the previous few years for two reasons. First, WSMD reduced the number of stream geomorphic assessments

conducted and instead shifted our focus to 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. 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.



# Clean Water

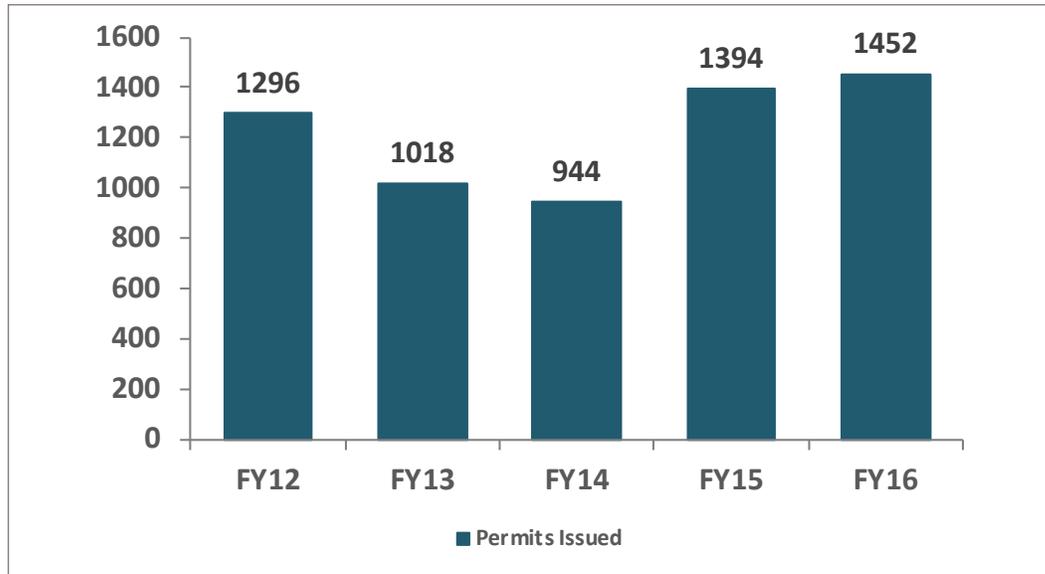
## MAINTAIN Surface Water Quality Through Permitting

*Permitting as a tool for maintaining water quality*

**1,400+**  
**permits**  
issued and 4,400+  
active permits managed  
in 2016

### PERFORMANCE TREND

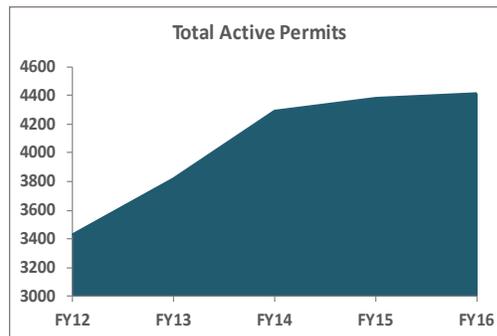
#### Number of permits issued by year



### DATA ANALYSIS

Permit coverage is required for a variety of activities that have a potential impact on water resources. The permit process is meant to avoid or minimize impacts to water quality. Permit coverage is required for aquatic nuisance control, shoreland development, lake encroachments, stream alterations, construction and operational stormwater management, wastewater discharges and activities in wetlands. Permits often require monitoring to ensure water quality is maintained after permit issuance.

The Watershed Management Division (WSMD) issued 1,452 permits in 2016. The increase in permitting levels over the past three years reflects an increase in construction activities, and new regulatory authority for shorelands, flood hazard areas, and river corridors.



The number of active permits rose to 4,412 in 2016; a slight increase from 2015. Active permits remain in effect beyond initial project construction or development and require ongoing compliance oversight and monitoring. The long-term nature of these permit requirements is designed to ensure water quality is maintained.

### NEXT STEPS

The Vermont Clean Water Act (Act 64) provided additional regulatory authority which will phase in over the next few years. Activities over the next year will include:

- Implementing the newly adopted 2017 Vermont Stormwater Management Manual
- Developing a new stormwater management rule
- Developing and issuing new stormwater general permits
- Reissuing priority wastewater treatment facility permits
- Continuing to issue tactical basin plans to identify opportunities for protecting and improving Vermont's surface waters

Environmental permitting processes represent a large portion of Division's workload. Given the expected permit increases in the coming years, it is critical we find ways to streamline and increase efficiency in these processes, such as:

- Engaging stakeholders in the creation of new regulatory systems
- Utilizing Lean business processes and electronic tools to improve efficiency and permit processes
- Developing an on-line permit application and electronic reporting submittal system



# Clean Water

## MAINTAIN Surface Water Quality Through Technical Assistance and Review

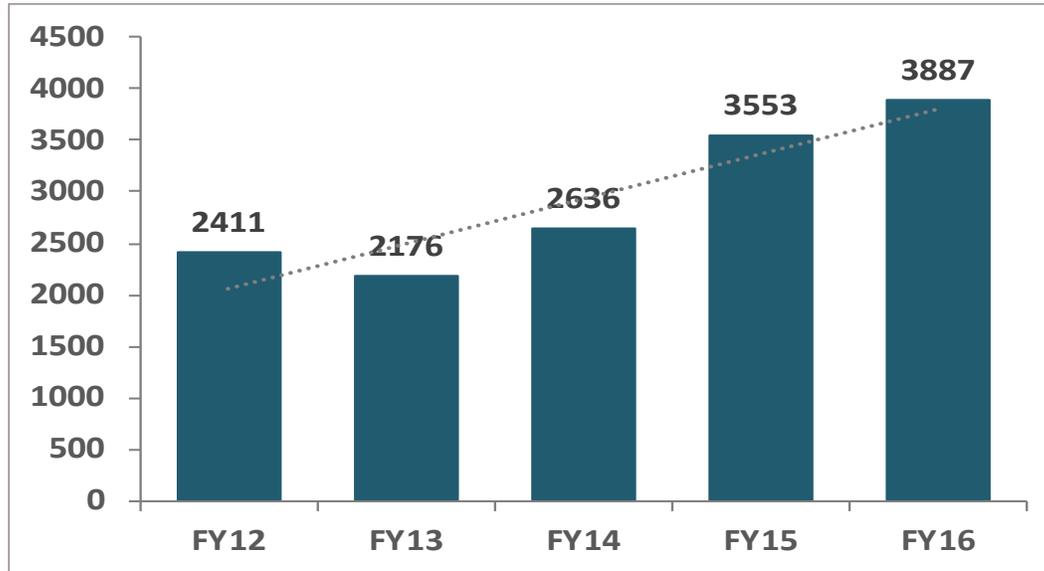
*Mitigating impacts to surface waters through sound advice and scientific knowledge*

**PERFORMANCE TREND**

**3,800+**  
**projects**

reviewed to ensure maintenance of Vermont's water quality

### Number of projects reviewed by year



**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 staff members strive 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
- Continue to support the increasing demand for project review and technical assistance
- Find new ways to support municipalities and partner organizations in project identification, development, and implementation

**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 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 protection and restoration projects. All technical assistance provided serves a critical function in maintaining watershed health and flood resiliency.

In 2016, WSMD staff provided technical assistance on over 3,800 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 3,800 projects reviewed; close to half of them were related to Vermont rivers, maintaining stream stability, connectivity, and floodplain function.

The graph above also 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. The continued rise from 2013 to 2015 is due to flood resiliency programs established through Act 138 to better manage river corridors, stream alterations and floodplain development. We expect our technical assistance and project reviews to continue to increase as we provide additional technical assistance related to the implementation of the Vermont Clean Water Act (Act 64).

The data we have available currently on technical assistance and review are 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; <http://dec.vermont.gov/watershed>



# Clean Water

## PROTECT Surface Water Quality Through Easements and Designations

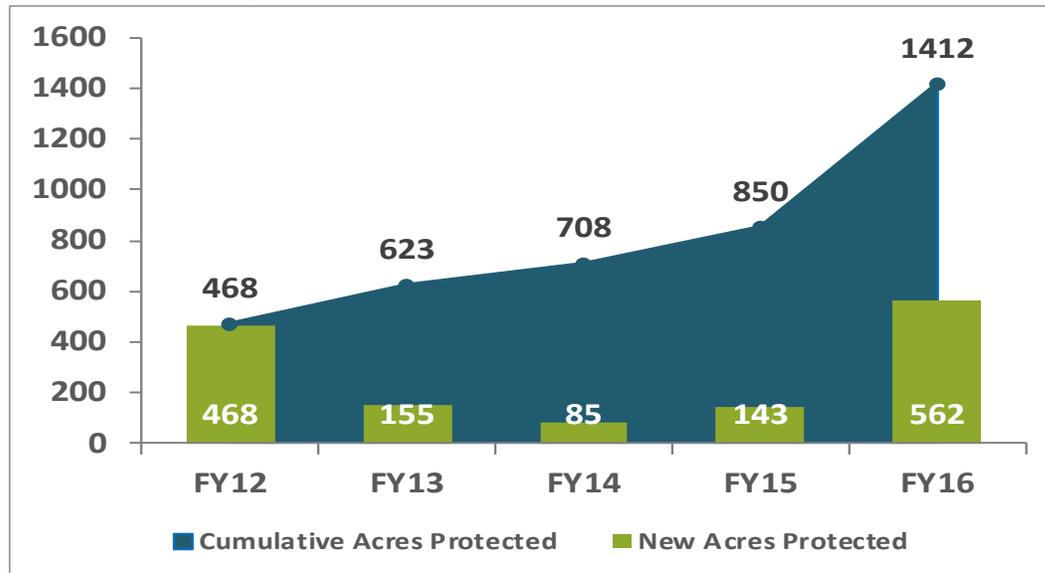
*Using tools to protect water quality and increase flood resiliency*

# 1,400+ acres

protected by easements and designations over the past 5 Years

### PERFORMANCE TREND

#### Number of acres protected



### NEXT STEPS

With an influx of funding for projects associated with the statewide Clean Water Fund, the WSMD expects to report a significant increase in the number of projects undertaken and number of acres protected in the coming years. Additionally, the WSMD is currently updating priorities to align our work with the newly revised Vermont Water Quality Standards. 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

### DATA ANALYSIS

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

While a variety of tools exist for safeguarding natural systems from deleterious change, designations and easements are among the most effective. These tools place restrictions on 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

In the past 5 years, the WSMD has used these tools to directly protect 1,412 acres across Vermont. In 2016 alone, an additional 562 acres were preserved; 421 of which were through the Regional Conservation Partnership Program (RCPP) wetland incentive payment program. The WSMD provided additional incentive payments to farmers to enroll in the Natural Resource Conservation Service (NRCS) Wetland Reserve Easement program to restore and protect wetlands in perpetuity. These projects, and the acres protected, have added to our water quality protection efforts and helped to increase our State’s flood resilience.

The graph above also shows a large number of acres protected in 2012; this was 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.

The WSMD used its new tracking system to track these performance measures in 2016, and will continue to track these performance measures in the future, especially as they relate to the accountability/reporting requirements of the Vermont Clean Water Act (Act 64) and the Lake Champlain clean-up plan.



# Clean Water

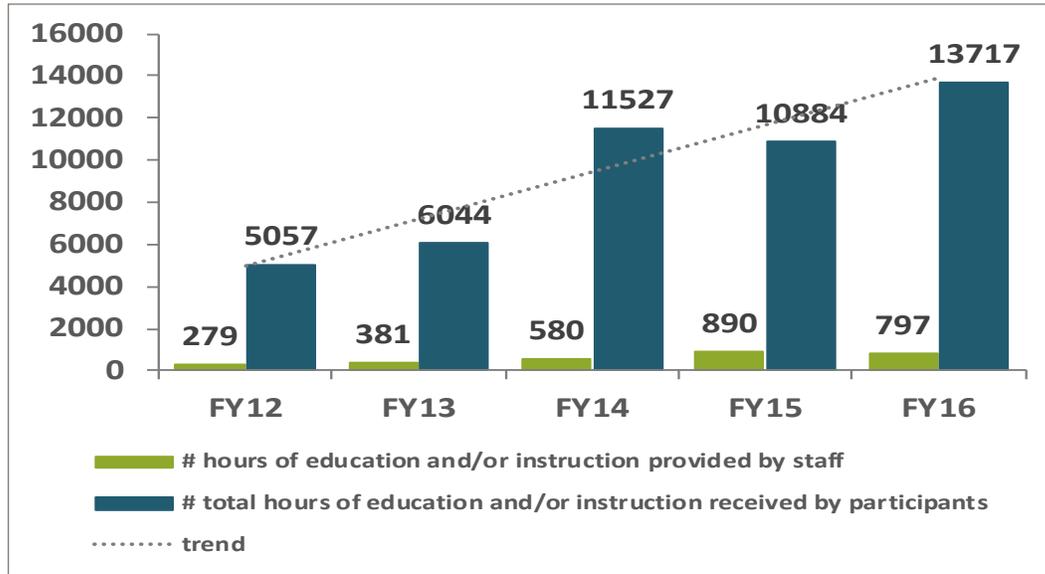
## PROTECT Surface Water Quality Through Education and Training

*Increasing environmental education and stewardship across Vermont*

**PERFORMANCE TREND**

**797**  
**hours**  
of education and/or  
instruction provided by  
staff

### Hours of education and training delivered



**NEXT STEPS**

WSMD believes strongly in the importance of education and instruction as a tool for environmental protection. We anticipate continuing to expand our outreach efforts through effective use of technology and expanded use of the train-the-trainers model, thereby maximizing the impact of staff time devoted to this work. During the coming year, WSMD proposes to:

- Carefully consider which events need to be delivered to small groups and which could be effective in larger formats, adjusting marketing and venues accordingly
- Continue to leverage technology to increase access to trainings by recording and uploading webinars and presentations for on-line viewing
- More effectively utilize partner distribution networks and partnerships, using a train-the-trainers model

**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 can change individual behavior and engender environmental stewardship, especially when applied in a train-the-trainers model.

In 2016, the Watershed Management Division (WSMD) provided a total of 797 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
- Natural Shoreland Erosion Control certification course
- 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 (an example of training the trainers)
- Webinars and trainings to inform people about stormwater management alternatives and basin planning efforts
- Vermont Lake Wise workshops to Lake Wise leaders on lake-friendly development (another example of training the trainers)

In 2016, the total number of hours spent by staff in conducting outreach was slightly lower than in 2015, while the total number of hours of instruction received by participants increased substantially. This pattern is a result of concerted efforts over the past year to be more efficient in our delivery of outreach. Note that the data reported do not include technical assistance provided in terms of project review, which is reported as another measure.

WSMD launched an electronic reporting form to better track our education and training efforts as they relate to the Vermont Clean Water Act (Act 64) reporting requirements. These efforts are now more effectively tracked through this system allowing us better reporting on these efforts and fuller assessment of their impacts.

**DATA SOURCE:** Watershed Management Division

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



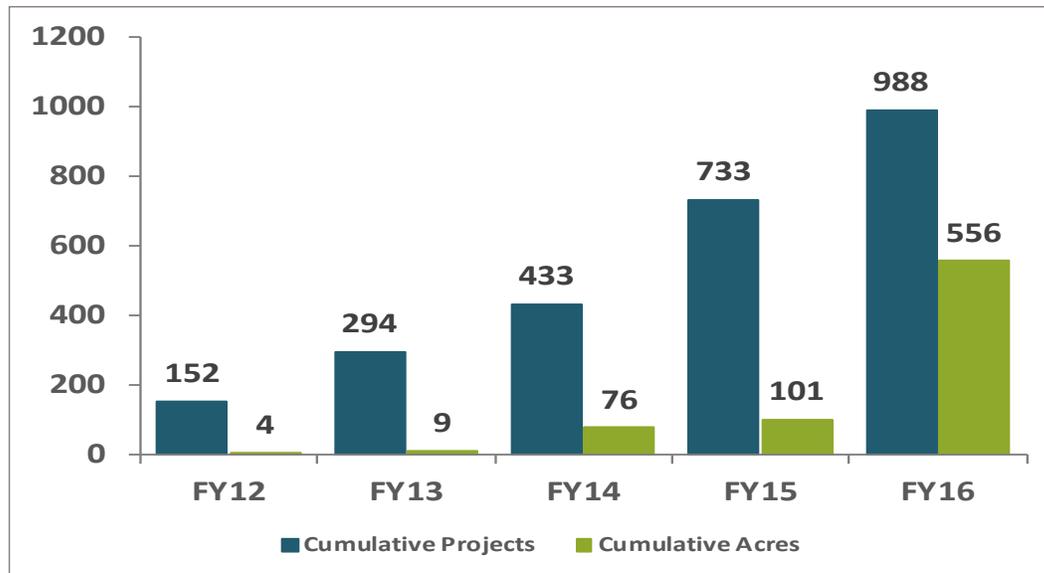
## Clean Water

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

*Returning ecological and hydrologic function to impaired waters*

#### PERFORMANCE TREND

#### Restoration projects undertaken and resulting acres improved



#### DATA ANALYSIS

Due to cumulative and legacy impacts of land uses on developed lands, roads, agricultural lands, and logging areas, some of Vermont's surface waters do not currently meet water quality standards. Restoring ecologic and hydrologic function to impaired waters is critical to support resilient and self-sustaining natural systems, and essential to achieving the water quality goals and objectives of Vermont's Surface Water Management Strategy.

The Watershed Management Division (WSMD) coordinates the implementation of priority projects to restore Vermont's impaired waters. This work includes: funding the installation of best management practices and restoration projects. This work may be driven through financial and technical assistance, permit requirements, or implementation of restoration plans.

In 2016, WSMD facilitated 255 projects aimed at restoring impaired waters. This large increase from previous years is due to increased funding available for grants and contracts through the Vermont Clean Water Fund and the Lake Champlain Regional Conservation Partnership Program (RCPP). Of the 255 restoration projects completed, 9 projects restored the ecological and hydrological function of 455 acres. Results of the remaining 246 projects are measured in units other than acres (e.g., miles or linear feet).

It should be noted that the 2012-2015 data is incomplete and likely underestimated. In 2016, WSMD used a new tracking system for State-funded projects. In future years, this measure will be expanded to include the projects with non-acre related results, especially as it relates to the accountability/reporting requirements of the Vermont Clean Water Act (Act 64) and the Lake Champlain clean-up plan.

# 255

additional projects  
improved the function of  
455 additional acres in  
2016

#### NEXT STEPS

Technical assistance, financial and regulatory programs, and restoration plans are important tools used by the WSMD to drive implementation of priority projects to restore impaired waters throughout Vermont.

The WSMD relies heavily on Tactical Basin Plans, development and implementation of restoration plans, and increased permitting requirements for restoring water quality where it has been degraded. This approach will continue, and the WSMD plans to expand upon these efforts by:

- Increasing clean water funding for development and implementation of priority restoration projects
- Establishing long term revenue sources for the Vermont Clean Water Fund
- Increasing the WSMD's technical assistance efforts to partners
- Enhancing project prioritization methodologies to target cost effective actions
- Continuing to tighten priority project identification and funding