

# State of Vermont Department of Environmental Conservation

## Watershed Management Division

*Results Based Accountability Report*

Fiscal Year 2015

### **Mission**

To protect, maintain, enhance, and restore the quality of Vermont's surface water resources



## 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 look 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 being rolled out statewide.

## DEPARTMENT INITIATIVE

Last year, VTDEC and the Agency of Administration trained over 60 Division and Program Managers on the basics of RBA and how it is being used in state government. A VTDEC 'Performance Management' team was developed and team members worked within their Divisions to coordinate performance measures. The measures were organized at the Department level by the categories of: clean water, clean air, healthy and safe communities, and efficient and effective government. Thirty performance measures were submitted to the Legislature as part of our recent budget proposal, the performance measure package can be found at: <http://dec.vermont.gov/commissioners-office/planning>

## WATERSHED MANAGEMENT DIVISION MEASURES

This document includes the performance measures specific to the Watershed Management Division (WSMD). These performance measures reflect the efforts of WSMD in implementing its mission to protect, maintain, enhance, and restore the quality of Vermont's surface water resources. Seven performance measures are provided at the Division level nine performance measures highlight efforts at the Program level.

## NEXT STEPS

Over the next few years, we will be working to enhance our ability to track and report performance data at the Division and Program level, and will develop additional Program level performance measures. We are also actively working to coordinate results based ability with our strategic planning efforts so that both can work hand-in-hand. We want this report to be a valuable resource for learning more about the work of our Division.



# Vermont's Environment is Clean and Sustainable



## CLEAN WATER

### POPULATION BASED INDICATORS

#### OVERALL STATE OF VERMONT'S SURFACE WATERS

Percent of Vermont's Inland Waters That Meet Water Quality Standards

Percent of Lake Champlain That Meets Water Quality Standards

### PERFORMANCE MEASURES

#### PROTECT

Protect Surface Water Quality Through Easements and Designations

*Program Measure: Protect Surface Water Quality Through Wetland Designation*

Protect Surface Water Through Education and Training

#### MAINTAIN

Maintain Surface Water Quality Through Monitoring and Assessment

*Program Measure: Maintain Surface Water Quality Through Assessment of Statewide Stream Health*

Maintain Surface Water Quality Through Permitting

*Program Measure: Maintain Surface Water Quality Through Implementation of the Shoreland Protection Act*

*Program Measure: Maintain Surface Water Quality Through Operational Stormwater Permitting*

Maintain Surface Water Quality Through Technical Assistance and Review

*Program Measure: Maintain Surface Water Quality Through Wetland Impact Avoidance*

*Program Measure: Maintain Surface Water Quality Through Oversight of Wastewater Treatment Facilities*

*Program Measure: Maintain Surface Water Quality Through Restoring Flows, Stream Stability and Floodplains*

#### ENHANCE

Enhance Surface Water Quality Through Best Management Practices

#### RESTORE

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

*Program Measure: Restore Surface Water Quality by Protecting Priority Riparian Corridors*

*Program Measure: Restore Surface Water Quality by Funding Priority Clean Water Projects*



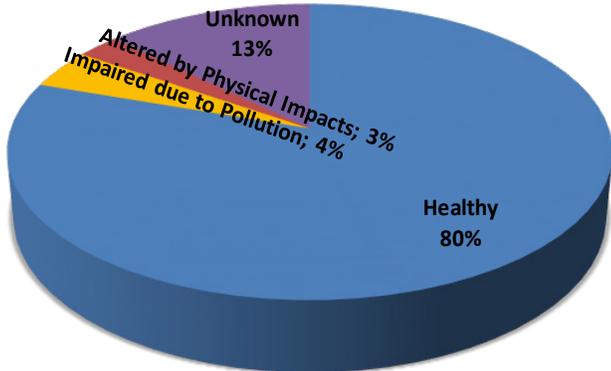
# Vermont's Environment is Clean and Sustainable



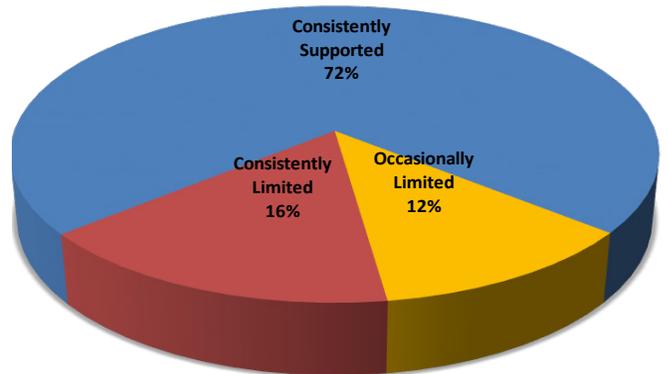
## CLEAN WATER

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

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



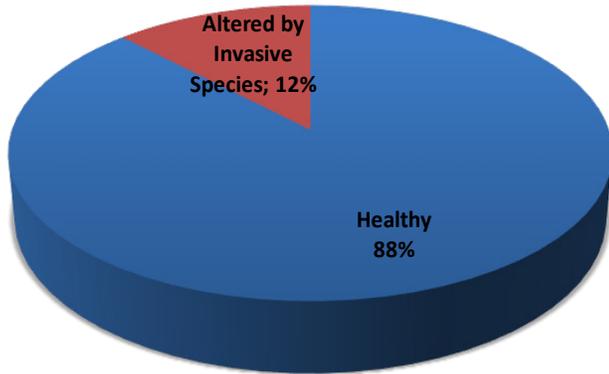
*Recreational (swimming) water quality of inland lakes*



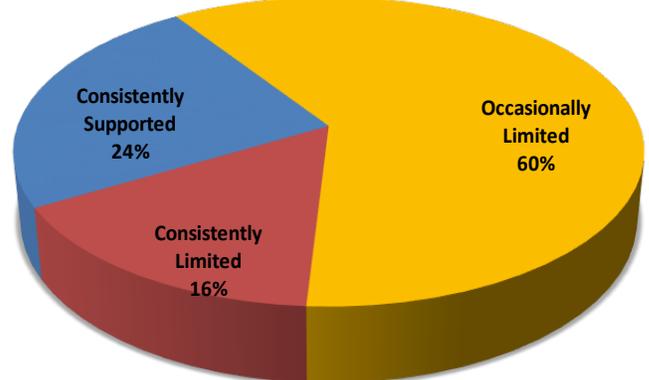
Our rivers, streams and inland lakes can suffer from the stresses of pollution, invasive species, and cyanobacteria blooms, however all of Vermont's inland waters continue to support fishing and swimming uses in the majority of locations. In 80% of our rivers and streams, the aquatic biota is considered healthy (fishable), whereas only 7% of the aquatic biota is either impaired due to pollution or altered based on physical impacts. 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 Department works to protect, maintain, enhance, and restore our rivers, streams, and lakes by avoiding or minimizing pollution and other stresses on Vermont's waters.

### Percent of Lake Champlain Meeting Water Quality Standards

*Aquatic (fishable) water quality of Lake Champlain*



*Recreational (swimming) water quality of Lake Champlain*



Lake Champlain, Vermont's largest waterbody, is stressed due to phosphorus loading, invasive species, and cyanobacteria blooms. Encouragingly, despite these stresses, in over 88% of Lake Champlain, the aquatic biota is considered healthy (fishable). 12% is altered from physical impacts. The recreational (swimming) water quality is considered to be low based on our very stringent water quality standards, especially as they relate to the phosphorus criteria, which are occasionally exceeded in approximately 60% of the lake. The passage of the Vermont Clean Water Act will greatly assist in our efforts to aggressively reduce in-lake phosphorus concentrations, and improve overall Lake Champlain's water quality.

# CLEAN WATER

## PROTECT Surface Water Quality Through Easements and Designations

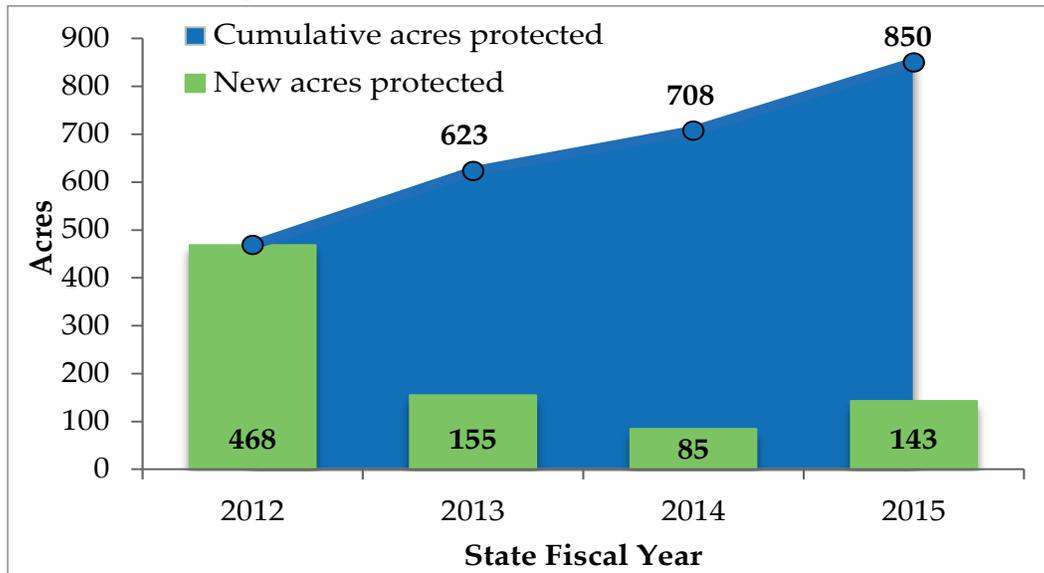
*Using tools to protect water quality and increase flood resiliency*

# 850 acres

protected by easements and designations over the past 4 Years

### PERFORMANCE TREND

#### Number of acres protected



### 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

### 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.

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.

# CLEAN WATER

## PROTECT Surface Water Quality Through Wetland Designation

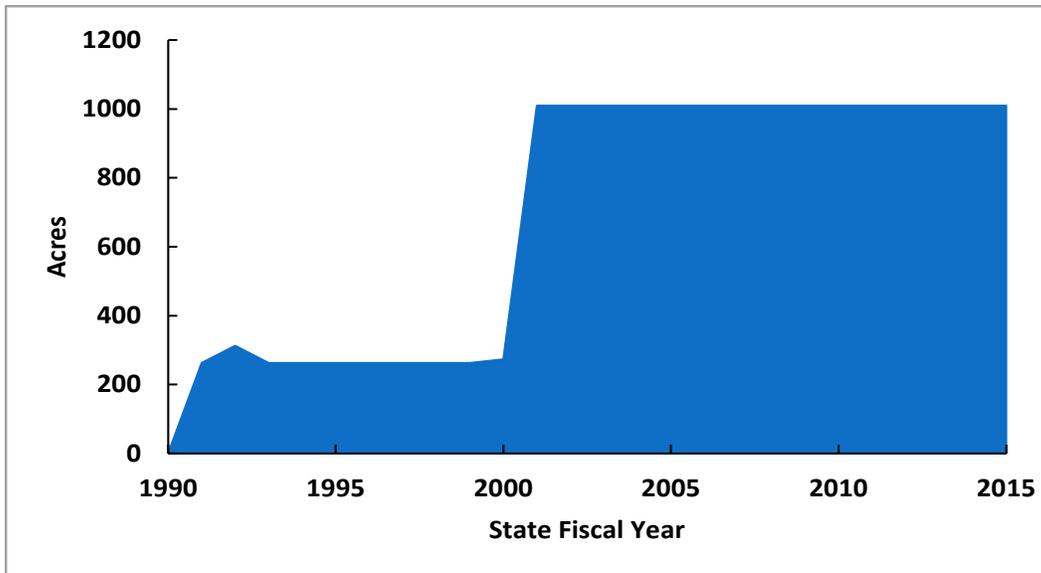
*Designating wetlands to protect them and their exceptional and irreplaceable functions*

# 1,000 acres

of wetlands protected by Class I Designation

### PERFORMANCE TREND

### Acres of Class I Wetlands Protected



### DATA ANALYSIS

Class I wetlands are critical to preserving Vermont’s natural heritage. These wetlands rate high for providing one or more function or value, such as wildlife habitat, flood storage and water quality protection. For these reasons Class I wetlands are considered exceptional and/or irreplaceable, and are afforded the highest level of protection using the Vermont Wetland Rules.

Permits in Class I wetlands may only be granted if the impact is necessary to meet a compelling public need to protect public health or safety. In addition, Class I wetlands receive a 100-foot protected buffer zone. There are many wetlands which meet the criteria for Class I designation that are currently protected only at the Class II level.

The graph above shows the total acreage of wetlands with Class I protection status since the Rules were placed in effect (1990). There are currently three wetlands in Vermont which hold Class I status: Dorset Marsh in Dorset, North Shore Wetlands in Burlington, and Tinmouth Channel in Tinmouth.

The Vermont Wetlands Program was delegated to determine Class I designations in 2012, a task previously held by the Water Resources Panel of the Natural Resources Board. No wetlands have been designated Class I since 2002, and no petitions have been filed since the Wetlands Program was delegated Class I designations.

### NEXT STEPS

The Vermont Wetlands Program has identified numerous wetlands with Class I potential throughout the State and intends to initiate administrative rule changes to designate seven additional wetlands which meet Class I standards. If successful, this work will result in a large increase (>1,000 acres) in wetland protection. As Wetland Designation must go through Rulemaking, we anticipate this protection to take place in State Fiscal Year 2017.

The Wetlands Program intends to create an official petition form so that the public may more easily create and submit Class I designation petitions for the Wetlands Program to review and move forward where appropriate. It is likely smaller increases in wetland acreage protection will occur from individual petition requests.

The Wetlands Program will be implementing the following steps to improve Class I wetland protections in FY2016:

- Creating a Class I petition for public use
- Initiating Rulemaking to designate an additional seven wetlands for Class I protection status
- Identifying additional wetlands likely to meet the standards for Class I protection

# CLEAN WATER

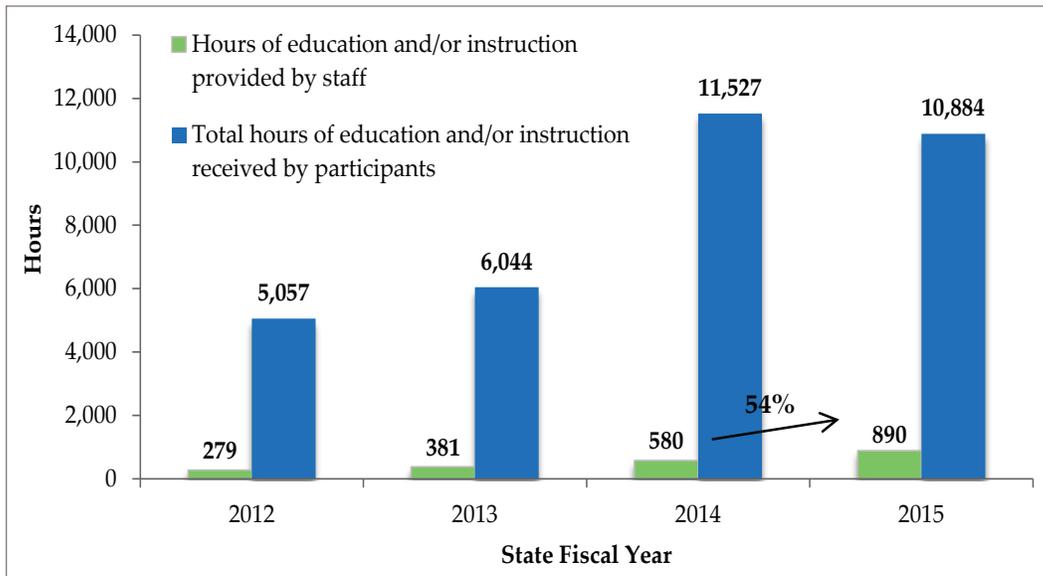
## PROTECT Surface Water Quality Through Education and Training

*Increasing environmental literacy and stewardship across Vermont*

### PERFORMANCE TREND

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

### Hours of education and training delivered



### 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

### 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 literacy 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 a 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 online. Note that the data reported above does not include technical assistance provided in terms of project review, which is reported as another measure.

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.



# CLEAN WATER

## MAINTAIN Surface Water Quality Through Monitoring and Assessment

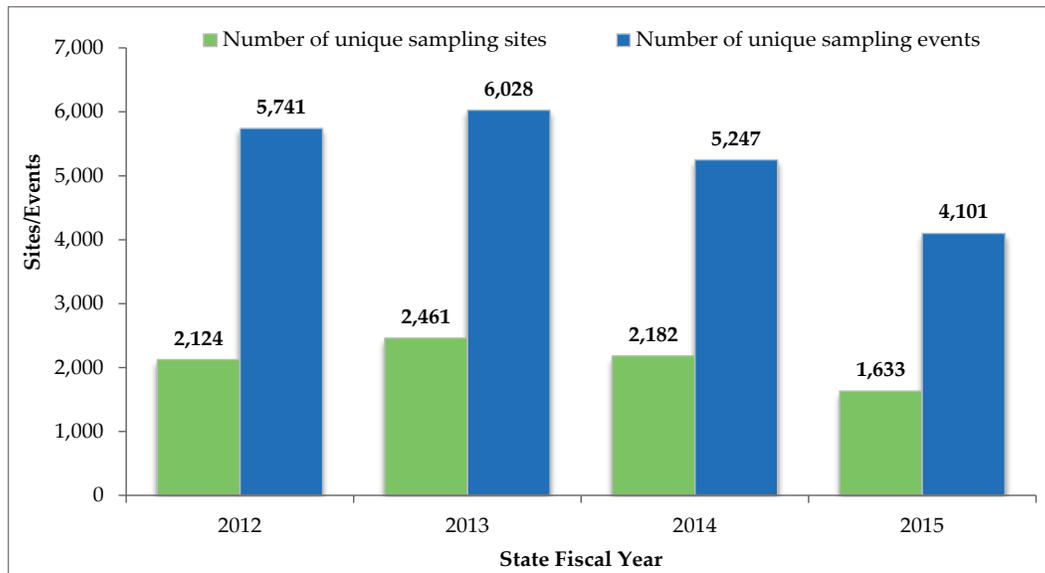
*Establishing baseline conditions, tracking trends, and ensuring water quality efforts are effective*

### PERFORMANCE TREND

# 4,101 samples

were collected and analyzed in 2015

### Total number of sampling sites and events



### 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 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 sampling events were analyzed from watersheds across the state. The number of samples collected and analyzed this year was lower than previous few years for two reasons. First, WSMD reduced the number of stream geomorphic assessments

conducted and instead shifted our focus on implementation of the projects that had been identified from the assessments from previous years. Also, the Lakes Program is using new, state of the art technologies that allow 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.

# CLEAN WATER

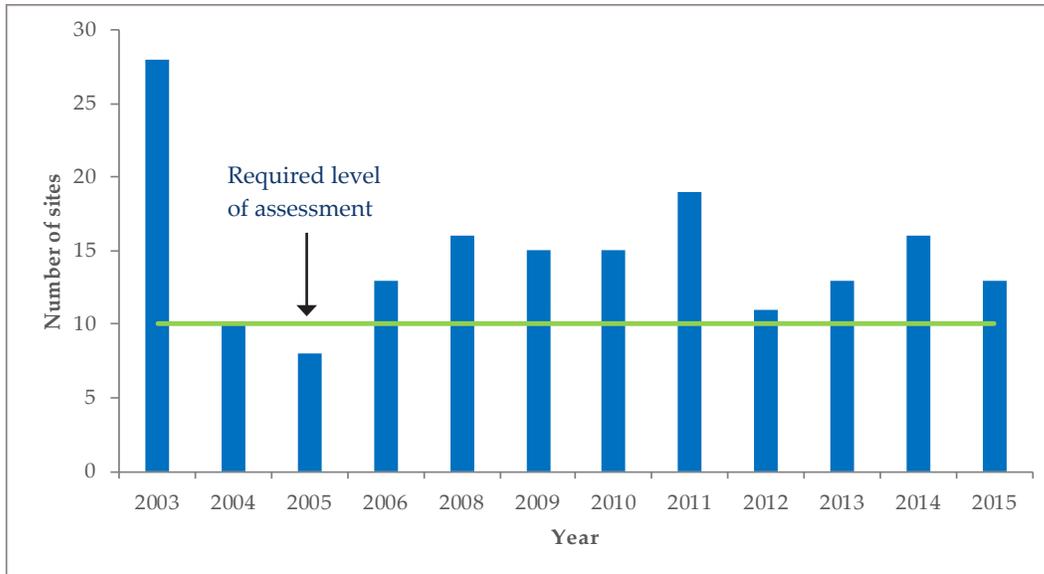
## MAINTAIN Surface Water Quality Through Assessment of Statewide Stream Health

*Ensuring capacity to survey the biological condition of streams across Vermont*

### PERFORMANCE TREND

**113%**  
of the required number of stream sites were assessed in 2015

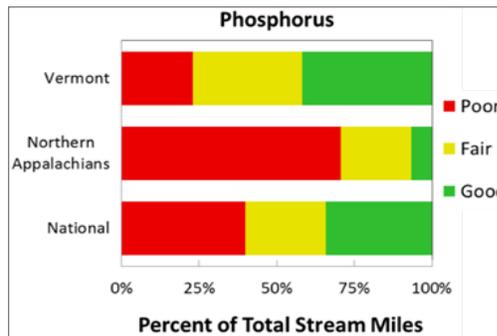
### Number of Streams Assessed Per Year for Statewide Probability Report



### DATA ANALYSIS

The Monitoring, Assessment and Planning Program’s (MAPP) probability report presents the biological condition of Vermont’s wadeable streams based on the results of an on-going statewide probability-based survey. The continuation of these surveys, on a five-year cycle, allows MAPP to examine trends in the condition of Vermont’s streams and understand how physical and chemical stressors are affecting biological health over time. These statewide surveys also coincide with US EPA’s National Rivers and Streams Assessment (NRSA), which allows the comparison of Vermont’s streams to regional and national conditions.

The above figure plots the number of probability sites that MAPP has assessed each year. The program must assess at least 10 sites a year, but shoots to meet a higher confidence standard for more accurate assessment of biological conditions across Vermont.



Phosphorus is a nutrient responsible for algae blooms of considerable importance in Vermont. Survey results indicate that 33% of Vermont streams have levels of total phosphorus considered good, and another ~40% rate as fair. As compared to other streams in the northern Appalachian region and nationally, Vermont has significantly more waters rating good or fair for total phosphorus. About 20% of streams in Vermont show poor phosphorus levels, relative to 37% nationally.

### NEXT STEPS

The recurring five-year assessment of stream health is but one of the many water testing programs coordinated by the Watershed Management Division. The goals of MAPP for this program are to continue to meet or surpass the present target, but also test additional biological communities and environmental measures, and to continue to build water testing capacity beyond the five-year assessment.

During 2015 and leading into the 2016 summertime water testing season, MAPP and the related Watershed Management Division Programs used Lean business process evaluation tools to ensure that the monitoring done by all programs of the Division continues to serve the needs of the Division to manage surface waters, by providing the most relevant and highest quality water quality information to users across the water quality management community.



# CLEAN WATER

## MAINTAIN Surface Water Quality Through Permitting

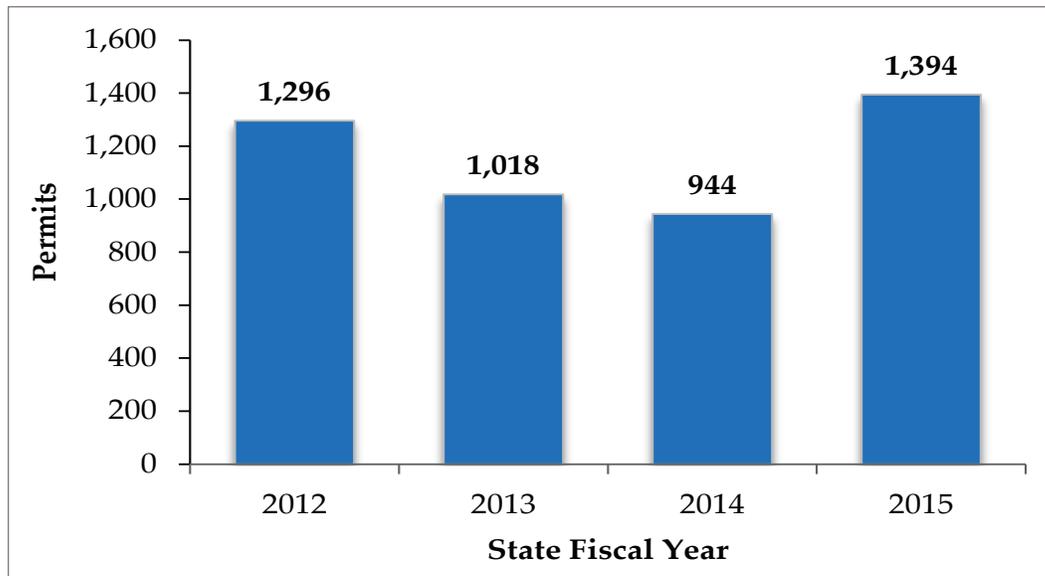
*Permitting as a tool for maintaining water quality*

# 1,390+ permits

issued and 4,300+ active permits managed in 2015

### PERFORMANCE TREND

#### Number of permits issued by year

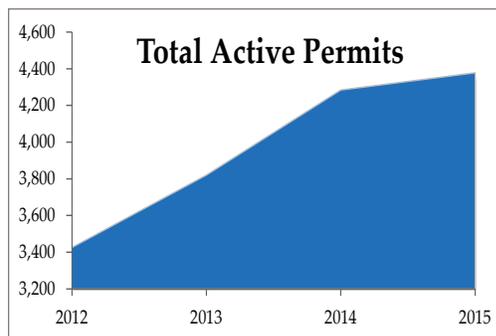


### DATA ANALYSIS

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 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.

# CLEAN WATER

# 163

Lake Encroachment and Shoreland Permits and Registrations were issued in 2015

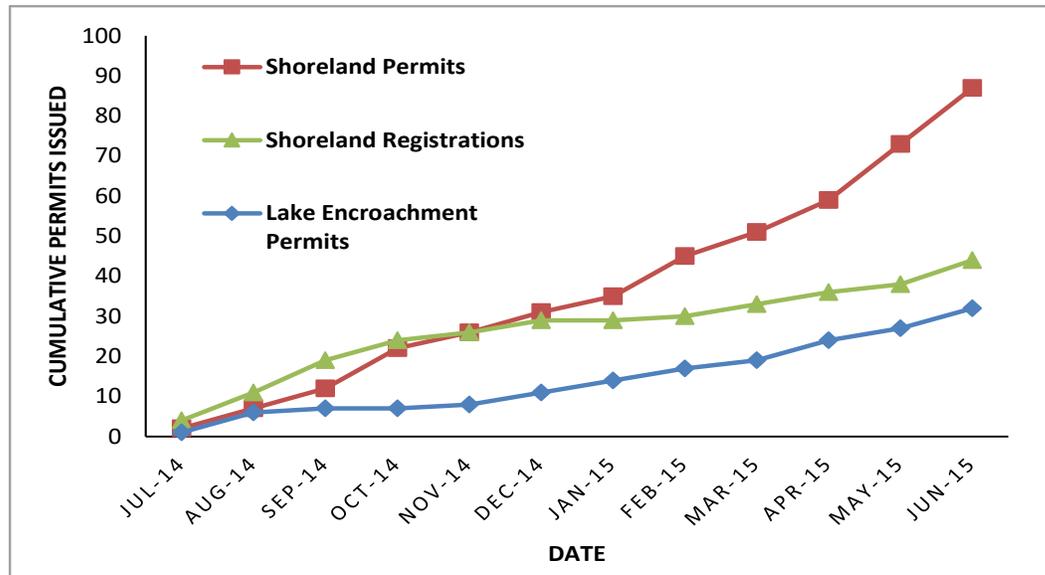
## MAINTAIN Surface Water Quality

### Through Implementation of the Shoreland Protection Act

*Protecting surface waters through shoreland permitting*

#### PERFORMANCE TREND

#### Lake Encroachment and Shoreland Permits Issued



#### NEXT STEPS

As the Lake & Ponds Program continues to work with various partners, including municipalities, on efforts to increase awareness and overall compliance with existing regulations, the Program expects the number of permit applications to increase. The number of shoreland development projects completed by landscapers, contractors, and site workers certified in Natural Shoreland Erosion Control is also expected to increase as a result of our voluntary workshop series.

During the coming monitoring season and through subsequent monitoring seasons, Lakes & Ponds will utilize water quality and habitat monitoring efforts to assess the biological condition of sites developed in accordance with the Shoreland Protection Act standards relative to sites developed prior to the Act's passage.

The Lakes & Ponds Program's plans for improvement include:

- Combining Aquatic Nuisance Control permitting into the regional analysts' duties to create a robust Lakes and Ponds permitting team;
- Pursuing environmental citation authority;
- Implementing a Lean process improvement review, and;
- Entering into the rule making process for comprehensive changes to improve Lakes & Ponds' ability to implement and enforce the Shoreland Protection Act, better protect Vermont's lake resources, and improve the stakeholder experience.

#### DATA ANALYSIS

The Shoreland Protection Act, passed by the Vermont General Assembly in May of 2014, establishes new state regulations that guide shoreland development. The law is intended to protect water quality, preserve habitat and natural shoreline stability, and protect the economic and recreation benefits of lakes and their shorelands. Clearing of vegetation and creation of new impervious surface (e.g., driveway, residence, storage shed) within 250' from the mean water level of a lake may require a permit or registration. Under existing lake encroachment regulations, development within a lake (e.g., shoreland stabilization project) may also require a permit.

Since the inception of the Shoreland Protection Act DEC's Lakes & Ponds Management and Protection Program (Lakes & Ponds) has merged 29 V.S.A. Chapter 11 ("lake encroachment") permit and Shoreland

Protection Act duties, created three regions for lake encroachment and shoreland permit review, developed guidance materials and a webpage, and conducted 72 outreach presentations, meetings, and field trainings. The Agency has delegated authority to implement the Shoreland Protection Act to four Vermont municipalities: Colchester, Greensboro, Burlington, and Elmore.

For State Fiscal Year 2015 (July 1, 2014 to June 30, 2015), Lakes & Ponds issued 87 shoreland permits, 44 shoreland registrations, and 32 lake encroachment permits.

In cooperation with DEC's Compliance Division and Lakes & Ponds' draft Compliance and Enforcement Procedure, Lakes & Ponds has investigated 35 Shoreland Protection Act complaints/incidents and 11 lake encroachment complaints/incidents.

# CLEAN WATER

## MAINTAIN Surface Water Quality Through Operational Stormwater Permitting

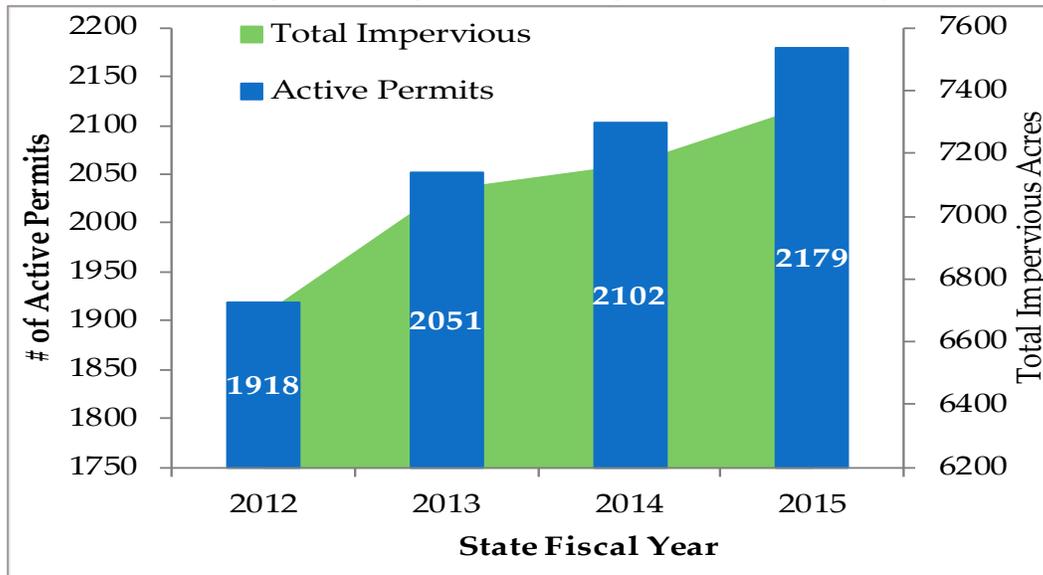
*Developed Land Managed Through Operational Stormwater Permits*

# 7,352

acres of impervious surfaces managed through operational stormwater permitting

### PERFORMANCE TREND

#### Active stormwater operational permits and impervious area managed



### NEXT STEPS

The Stormwater Program will be releasing a revised Vermont Stormwater Management Manual that better incorporates green stormwater infrastructure practices, along with enhanced nutrient removal requirements. The revised Manual will be an important component of the Division’s overall strategy to maintain high quality waters, and to address impairments. Additionally, over the next couple of years the Stormwater Program will be developing a program directed by Act 64 that will require operational permit coverage for existing impervious surfaces in excess of three acres where the project either does not have permit coverage or was permitted under standards adopted prior to the Vermont Stormwater Management Manual.

The management of over existing 2,000 operational permits, along with the ever-increasing number of permitted facilities, involves a substantial administrative component. The long term viability of the program is dependent on continuing to improve administrative and business processes such that applications are reviewed in a streamlined and predictable process, and the public has easy access to all information. Large progress has been made over the past few years, however continued improvement in administrative processes is essential for allowing staff to focus on program elements that result in water quality improvement.

### DATA ANALYSIS

Unmanaged stormwater runoff is understood to be a significant source of water pollution both nationally and in Vermont. Operational stormwater permits manage stormwater runoff from impervious surfaces and are a crucial tool for maintaining high quality water through preventing sediment, nutrients and other pollutants from reaching surface waters.

Operational stormwater permits are required for projects that create more than one acre of new or redeveloped impervious surface, or expand impervious surface by more than 5,000 square feet such that the total resulting impervious surface exceeds one acre. Because the permits are required for the life of the project, the cumulative number of active permits, and the acreage of impervious surface covered by a permit, are ever increasing. Consequently, the net benefit of this permit program also increases over time.

Operational permits require that stormwater be managed through best management practices (BMPs) that provide treatment, infiltration, and detention. The Vermont Stormwater Management Manual contains the standards and specifications for acceptable practices. The permits require annual inspection and reporting, and periodic permit renewal.

The treatment provided to the greater than 7,000 acres of impervious surface helps maintain high quality waters in watersheds experiencing development, and also reflects corrective measures applied in impaired waters. The Watershed Management Division’s monitoring efforts have demonstrated that the application of BMPs in the Vermont Stormwater Manual have the capacity to mitigate stormwater impacts and restore impaired waters.



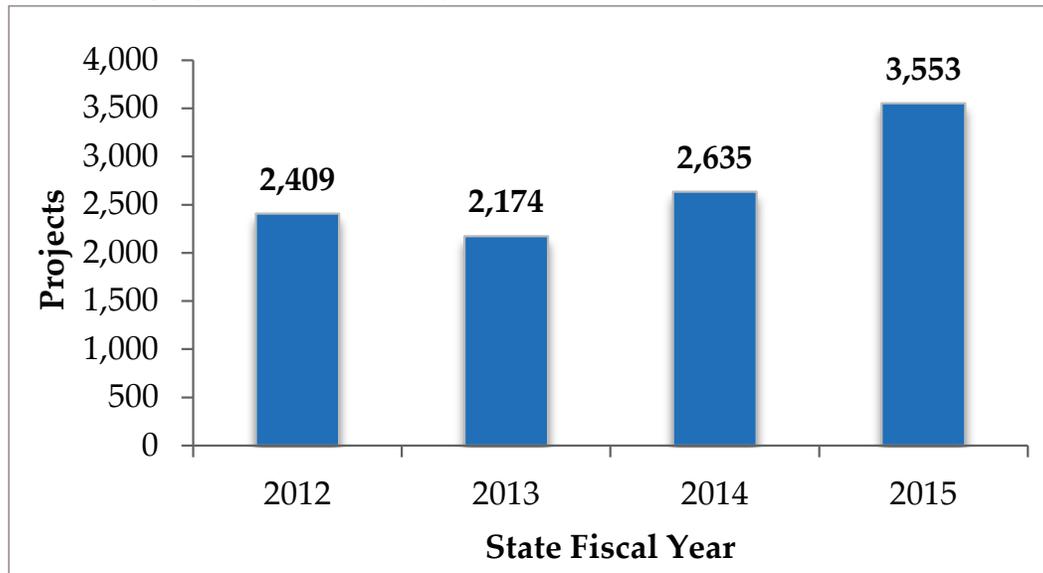
## CLEAN WATER

### MAINTAIN Surface Water Quality Through Technical Assistance and Review

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

#### 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).

# 3,500+ projects

reviewed to ensure  
maintenance of  
Vermont's water quality

#### 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 the number of staff 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.

# CLEAN WATER

## MAINTAIN Surface Water Quality Through Wetland Impact Avoidance

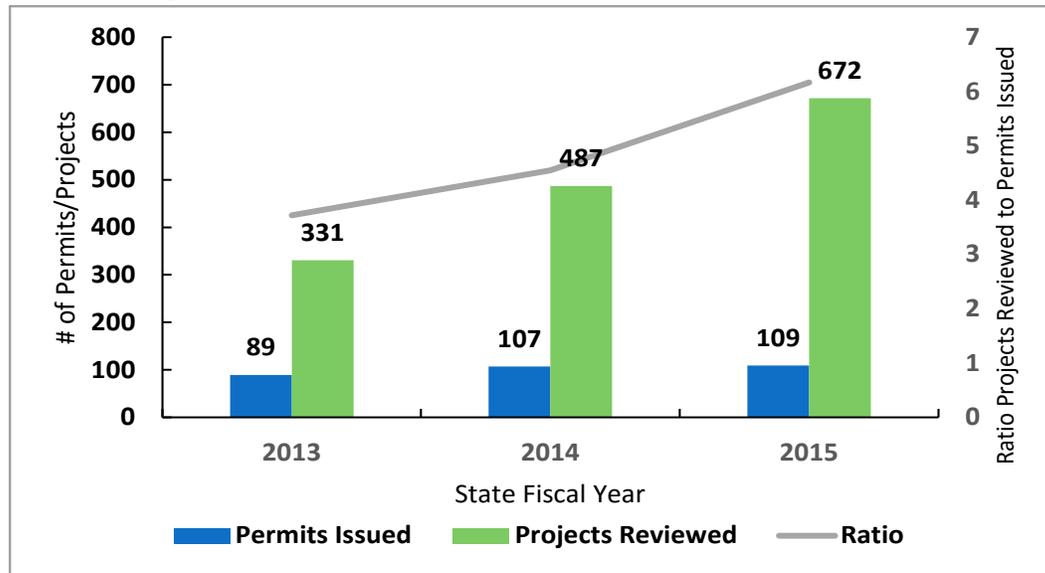
*Using technical assistance to avoid impacts to Vermont's wetlands*

6:1

wetland avoidance ratio

PERFORMANCE TREND

### Wetland Impact Avoidance



NEXT STEPS

The Wetlands Program completed a week long LEAN workshop focused on improving project management. This workshop identified and established a plan to: (1) improve upon how data is collected and managed, (2) improve upon the ability to track, document, and report, and (3) increase time that Wetland Ecologists spend on proactive wetland protection activities, including project review. As these improvements continue to be implemented, we expect proactive wetland protection to increase.

Continued plans for improvement over the next year include:

- Creating automatic form letters for Wetland Ecologists to send as follow up to site visits and meetings;
- Completing project management Standard Operating Procedures;
- Reducing the number of steps required to update State Wetland Mapping.

It is expected that solar development will continue to increase, however as developers and their consultants learn more about the Wetland Rules and wetland protection it is anticipated that projects will be cited further from wetlands, requiring less program staff involvement. This will allow staff to focus on other project types in FY2016, such as anticipated stormwater upgrades near wetlands.

DATA ANALYSIS

The primary function of the Vermont Wetlands Program is to administer the Vermont Wetland Rules, which regulate activities in most wetlands in Vermont. Program staff provide significant technical assistance and education to landowners and developers to identify wetlands and their functions and values. Whenever possible, the program strives to avoid impacts to wetlands. Wetlands provide unique wildlife habitat, fish habitat, flood water storage, and aesthetic value to the Vermont landscape. If wetland impacts cannot be avoided, a permit will only be issued if the applicant demonstrates that the proposed activity will not have an undue adverse impact on wetland functions.

As the graph indicates, each year the Wetlands Program reviews substantially more projects than permits issued. Furthermore, the number of projects reviewed and recorded by wetland staff has nearly doubled since FY2013. This large

increase is partially attributed to an increase in solar development related to state and federal incentives (29% of projects reviewed in FY2015 were for solar development). The program has been able to provide review of these additional projects due to increased capacity in the program from streamlining project review through LEAN process improvement efforts, and an increase in staffing levels. The program has also been able to better track the number of projects reviewed due to database improvements.

Despite the large increase in projects being reviewed year-to-year, the number permits has not correspondently increased. The constant level of permits from year to year is great news as one of the tools towards maintaining Vermont's water quality is by avoiding wetland impacts. A high ratio of projects reviewed relative to the number permits issued means we have been successful in wetland impact avoidance; a program success.

# CLEAN WATER

## MAINTAIN Surface Water Quality Through Oversight of Wastewater Treatment Facilities

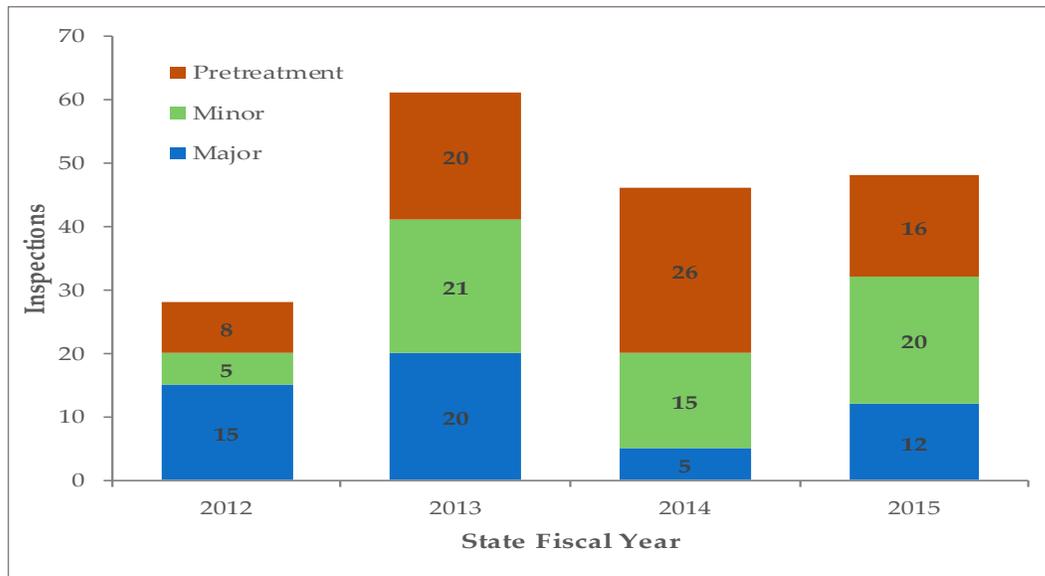
*Inspections and technical assistance support facilities' ability to meet permitted effluent limits*

# 48

wastewater treatment facility inspections were conducted in 2015

### PERFORMANCE TREND

### Number of Wastewater Treatment Facility Inspections



### NEXT STEPS

In 2015, our inspection goals were not attained due to staffing reductions. Two of the WW's eight staff accepted the State's early retirement incentive, retired, and their positions were eliminated. Due to the on-going assistance the WW staff provide to WWTFs on a daily basis, much of which is dedicated to addressing critical, time sensitive situation that require immediate attention; thus the desired inspection rate was not attained.

### DATA ANALYSIS

The Wastewater Program (WW) issues permits to facilities discharging wastewater into surface waters under Vermont's Water Pollution Control Act and the Federal Clean Water Act. The complexity of operating and maintaining these municipal, private and industrial wastewater treatment facilities (WWTF) requires technical capability and adequate maintenance plans. The program's operation and management section conducts inspections and provides technical assistance to ensure facilities have the capability to comply with their complex permit requirements.

The WW issues three types of permits: NPDES Direct Discharge Permits for the discharge of treated wastewater directly to a surface water, NPDES Industrial Pretreatment Permits for the discharge of treated wastewater discharged into a municipal sewage collection system,

and Solid Waste Management Facility Certifications for facilities that further manage the solid residuals produced by wastewater treatment.

Wastewater Program staff have the goal to inspect all municipal facilities a minimum of once every three years and all major municipal and industrial facilities once every one to two years. In addition to these inspections, WWTFs are also required to monitoring for various permit requirements and submit monthly reports for our review. These inspections coupled with WW's review of monitoring reports provide targeted technical assistance to WWTFs to help ensure the facilities' ability to comply with their permit requirements. Violations found from either inspections or monitoring reports may result in a response ranging from a phone call or letter or, for more severe issues, a Notice of Alleged Violation.

Act 64 authorized two new positions in the Wastewater Management Program to help deal with the increased workload resulting from a myriad of new initiatives. However, due to the due to the loss of two positions from the retirement incentive, this means that the Program will continue to be level staffed. Filling the new positions and training the new staff will continue to stress the program for the next one to two years. The Program's primary objective over the next year is to get these new staff properly trained and integrated into a reorganized Program structure so that it can continue to effectively support its regulated community.

# CLEAN WATER

# 3,242

river related projects were reviewed either through providing technical assistance or permit application review

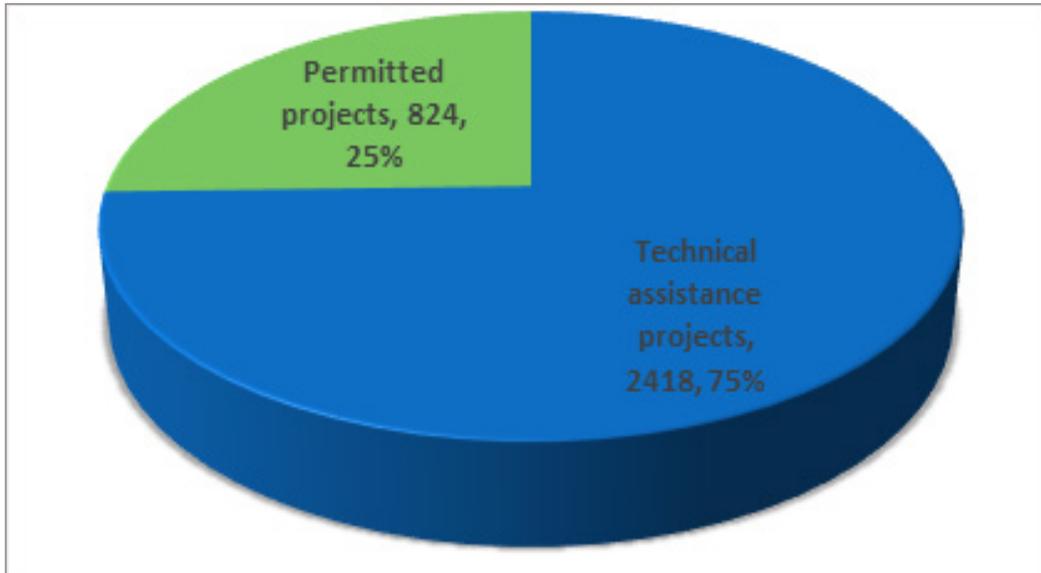
## MAINTAIN Surface Water Quality

### Through Restoring Flows, Stream Stability, and Floodplain Function

*Garnering public support for science based river and floodplain management through technical assistance*

#### PERFORMANCE TREND

#### Technical Assistance Provided for River Related Projects and Permits



#### NEXT STEPS

Streams are very dynamic systems. If unconstrained, an unstable stream will evolve, through a series of channel adjustments, toward an equilibrium condition. As such, limiting new encroachments and maintaining existing stream and floodplain conditions are part of a restoration program. In the coming year, the Rivers Program will not only continue its focus on avoidance, but will seek to augment projects, where feasible, with floodplain restoration.

Eventually, any project to maintain, enhance, or restore flows and floodplains, and contribute to the natural stability of the overall river system, should reduce in river-human conflicts and the overall regulatory effort necessary to manage rivers in Vermont. Project numbers and training hours will continue to rise for a time, but the objective is keep up our technical assistance in the field and see them begin to trend downward.

#### DATA ANALYSIS

On average, the Rivers Program field staff collectively get 10 new requests for technical and regulatory assistance from Vermont landowners, municipalities, and other state agencies for their river and floodplain projects every day. If daily requests for technical assistance, project permitting, and training were split out by season they would be significantly higher during the summer months when people are active with their projects.

Prior to the adoption of new state river conservation policies and the development of the Rivers Program in 1995, there were thousands of river and floodplain encroachments each year in Vermont that were conducted without a science basis for avoiding environmental impacts and river erosion hazards. Choices were made with no understanding of the erosion and deposition that would ensue or how certain floodplain

constraints might make river restoration or hazard mitigation difficult, if not impossible, to achieve in the future. People did not understand that stream and floodplain alterations to contain, divert, and control flows on one property would result in stream adjustments and damages on the reaches and the property of others downstream. They did not see the connection between natural flows, functioning floodplains, safe communities, water quality, and the integrity of aquatic ecosystems.

Vermonters now have ready access to in-the-field river expertise. With science-based rules, technical assistance, and training, Vermont is protecting flows and managing streams toward their least erosive, equilibrium condition. Increasingly, efforts to resolve conflicts between human investments and the stream dynamics are successfully avoiding new encroachments and restoring floodplain functions.

# CLEAN WATER

# 225

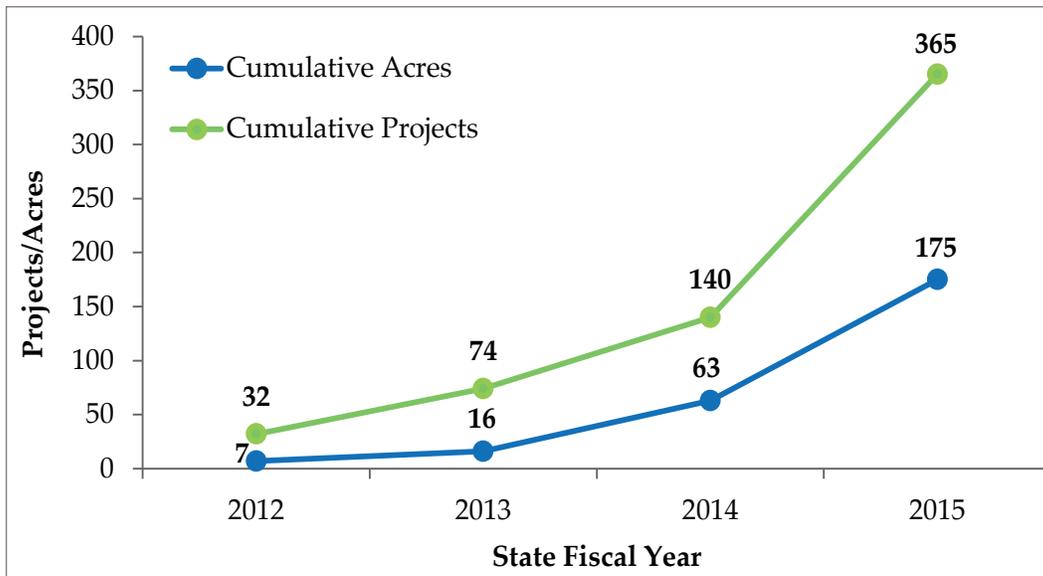
additional projects enhanced the function of 112 additional acres in 2015

## ENHANCE Surface Water Quality Through Best Management Practices

*Improving ecological and hydrologic function throughout Vermont*

### 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 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

### 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 enhanced acreage reported is low as it does not include projects reported in units other than acres. 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.

Enhancement projects not reported in acres will be reported on at the program level in the future.

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](http://www.watershedmanagement.vt.gov)

# CLEAN WATER

# 325

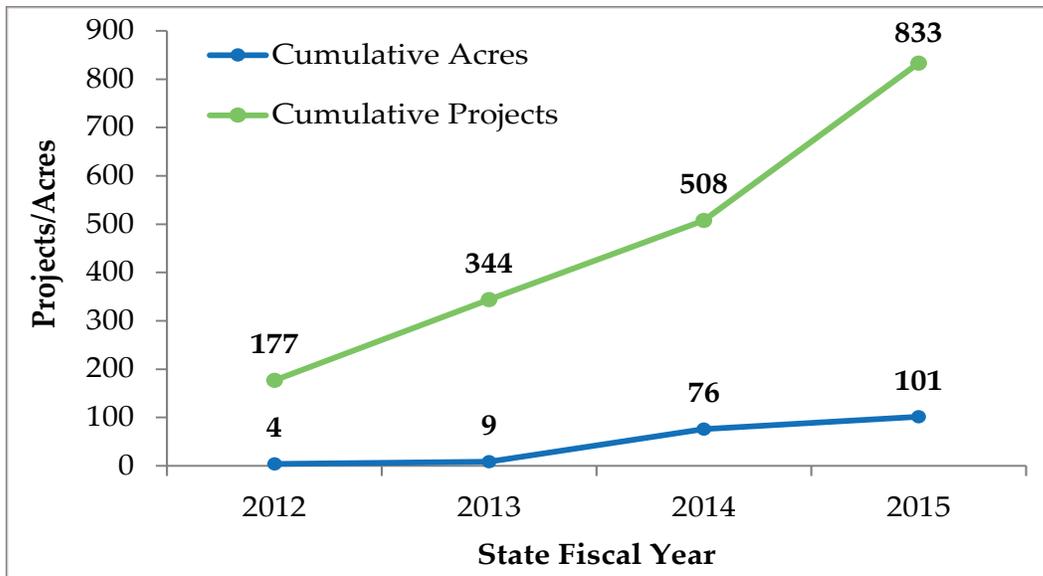
additional projects improved the function of 25 additional acres in 2015

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

*Returning ecological and hydrologic function to impaired waters*

### 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 acreage reported is low as it does not include projects restoring river corridors where the unit of measure is miles and linear feet.

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. Additionally, a few programs within the Division do not report data in units of acres; these programs will report separately at the program level in the future.

### 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.

# CLEAN WATER

## RESTORE Surface Water Quality By Protecting Priority Riparian Corridors

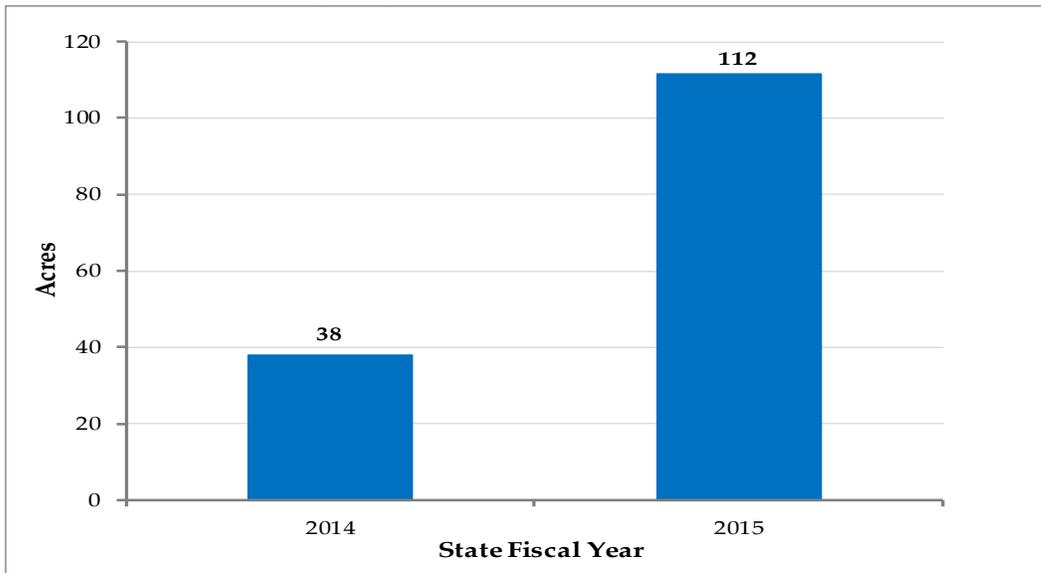
*Funding riparian corridor easements to restore water quality and improve flood resiliency*

**150 acres**

of riparian corridor  
protected through  
easements since 2014

### PERFORMANCE TREND

#### Acres Protected through Riparian Corridor Easements



### DATA ANALYSIS

Riparian corridors are priority natural areas to protect for the water quality, habitat, and flood resiliency benefits that they provide. Riparian corridors encompass the area of land immediately surrounding a river, stream, lake, pond, or wetland. These areas provide for the meandering, floodplain, and riparian functions necessary to restore and maintain the naturally stable or least erosive conditions and minimize erosion hazards over time.

To protect these natural areas and the services they provide, the WSMD Clean Water Initiative Program (CWIP), formerly known as the Ecosystem Restoration Program, coordinates funding of riparian corridor easements where other protections or regulations do not exist. Corridor easements provide funding for the purchase of corridor management rights and limit human uses within the corridor area in perpetuity.

Funds to support riparian corridor easements are primarily awarded as grants to watershed organizations, natural resources conservation districts, and other non-governmental organizations. Since 2014, the Ecosystem Restoration Grant program has invested over \$430,000 in 11 riparian corridor easement projects, protecting approximately 150 acres.

Corridor easements will permanently protect the flow, sediment, and nutrient attenuation areas within Vermont river basins, reducing nutrient pollution in Vermont’s surface waters downstream. In addition to water quality benefits, protection of these lands safeguard critical habitat and restore ecosystem function. For these reasons, protection of riparian corridors will play a huge role in restoring Vermont’s waters under the new Vermont Clean Water Act, commonly referred to as “Act 64,” and the Lake Champlain TMDL.

### NEXT STEPS

Financial resources available through CWIP funding programs are expected to increase with dollars from the Vermont Clean Water Fund, established through Act 64. CWIP will continue funding priority riparian corridor easements. In addition, the new Clean Water Fund provides more flexible dollars that can be used for outreach to gain landowner willingness to protect riparian corridors. CWIP will also continue coordinating with other WSMD programs to continuously improve project prioritization to maximize environmental results by:

- Increasing technical assistance provided to partners
- Reviewing project prioritization methodology and funding mechanisms
- Utilizing Lean business process improvement tools to improve efficiency and evaluate project prioritization methodologies

Additionally, to better track progress meeting our clean water restoration goals, CWIP is developing a project tracking system that will capture data and information on CWIP investments, including data on project performance and environmental results.

# CLEAN WATER

## RESTORE Surface Water Quality By Funding Priority Clean Water Projects

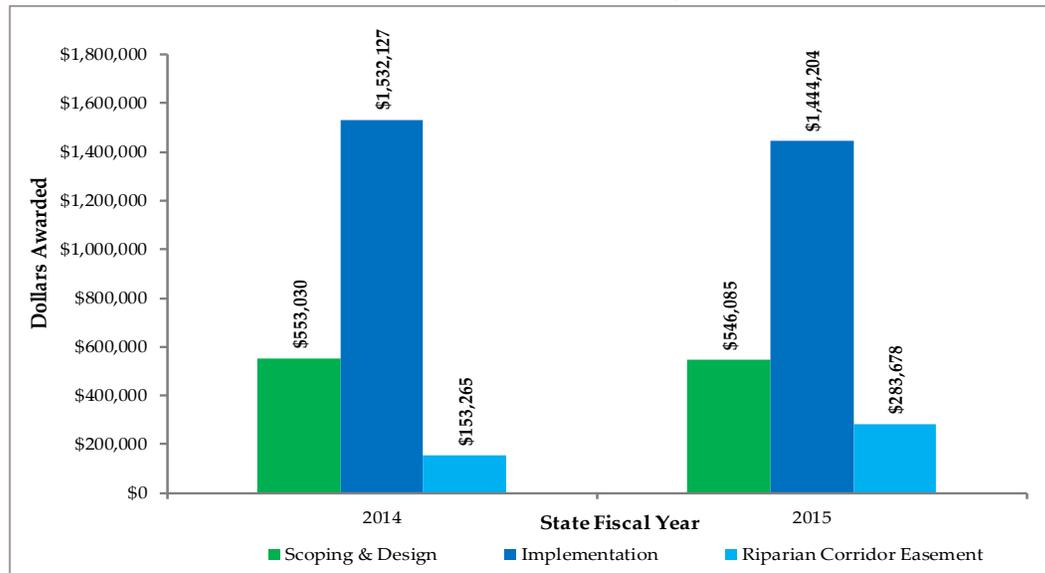
*Funding priority clean water projects to address nutrient and sediment pollution*

# 92%

of projects funded were considered high priority in 2014-2015

### PERFORMANCE TREND

### Dollars Awarded to Grants and Contracts by Project Phase



### NEXT STEPS

In the coming year, financial resources available through CWIP funding programs are expected to increase with dollars from the Vermont Clean Water Fund, established through Act 64. CWIP will continue funding project scoping, design, implementation, and easement projects. CWIP will also continue coordinating with other WSMD programs to continuously improve project prioritization to maximize environmental results by:

- Increasing technical assistance provided to partners
- Reviewing project prioritization methodology and funding mechanisms
- Utilizing Lean business process improvement tools to improve efficiency and evaluate project prioritization methodologies

Additionally, to better track progress meeting our clean water restoration goals, CWIP is developing a project tracking system that will capture data and information on CWIP investments, as well as project performance measures (e.g., acres treated, linear feet improved) and environmental results (e.g., pollutant load removed).

### DATA ANALYSIS

Nonpoint source pollution, often referred to as polluted runoff and erosion, is the leading cause of water quality degradation in Vermont. Nonpoint source pollution is caused by precipitation or snowmelt running off of developed areas, roads, agricultural lands, and logging areas, delivering excessive amounts of sediment, nutrients, and other pollutants to surface waters.

To address nutrient and sediment impairments, the WSMD Clean Water Initiative Program (CWIP), formerly known as the Ecosystem Restoration Program, coordinates funding and implementation of priority clean water restoration activities. CWIP funded projects provide stormwater treatment, agricultural runoff mitigation, river and floodplain restoration, lake shoreland and wetland restoration, and road-related runoff or erosion mitigation. Funds are primarily awarded as grants to

municipalities, watershed organizations, natural resources conservation districts, regional planning commissions, and other non-governmental organizations.

The CWIP funds projects through various phases from scoping, planning, and design, to implementation, as well as riparian corridor easements. Scoping, planning, and design projects are critical in order to identify high priority and cost effective implementation projects. In 2014 and 2015 92% of projects funded were considered high priority, consistent with tactical basin plans or other state-sanctioned plans. Since State Fiscal Year 2014, CWIP has funded 110 projects worth over \$4.5 million, with more than half of the total funding dedicated to implementation. These implementation activities will address specific requirements of the new Vermont Clean Water Act, commonly referred to as "Act 64," and the Lake Champlain Clean-up Plan.