

The Acton Wakefield Watersheds Alliance

Youth Conservation Corps

2021 Season Report



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Program Coordinator

James Shimansky

2021 Crew

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Jaden Dussault

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About AWWA

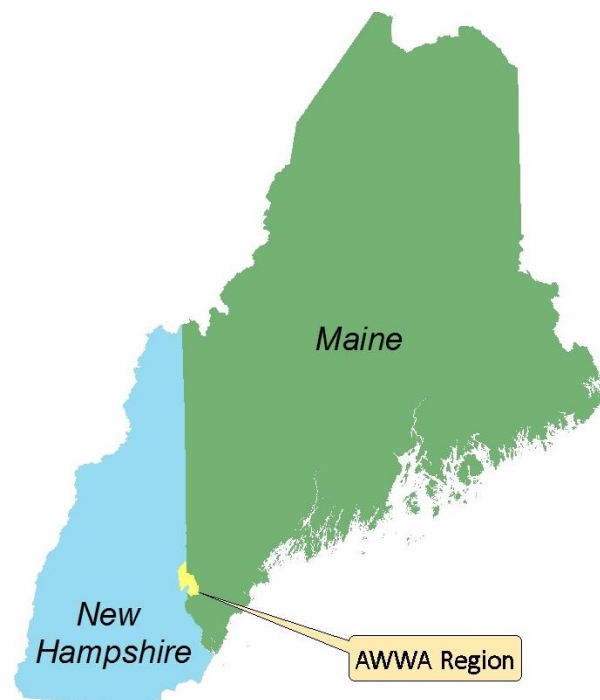
Mission

The mission of the Acton Wakefield Watersheds Alliance is to protect and restore water quality to maintain the social, economic, and environmental stability in our towns and in the region.

The members of AWWA include representatives of local lake associations, members of town committees including planning boards, and local residents. Our partners include UNH and UME Cooperative Extensions, Maine DEP, New Hampshire DES, York County Soil & Water Conservation District, and the local lake associations.

Watersheds

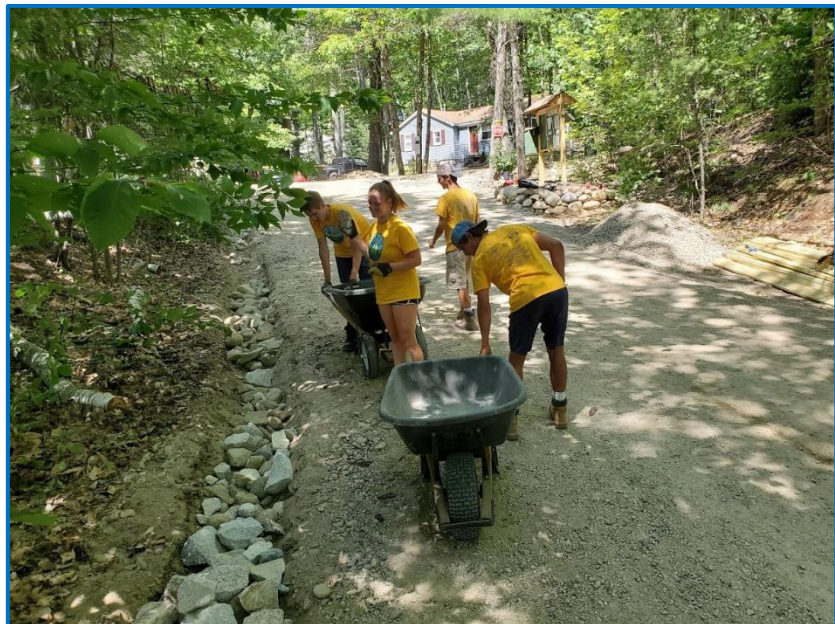
The AWWA Youth Conservation Corps (YCC) focuses its efforts on the Salmon Falls-Piscataqua and Saco River watersheds within the towns of Acton, Maine and Wakefield, New Hampshire. Within these watersheds AWWA currently services 10 water bodies – Balch Lake, Belleau Lake, Branch River, Horn Pond, Great East Lake, Lake Ivanhoe, Lovell Lake, Pine River Pond, Province Lake, and Wilson Lake.



Executive Summary

The Acton Wakefield Watersheds Alliance, a non-profit organization established in 2005, is dedicated to protecting and restoring the water quality of the lakes, ponds, rivers and streams of Wakefield, New Hampshire and the border region of Acton, Maine. AWWA staff members and volunteers work within the communities to strengthen the understanding that what happens on land determines the health of the local waters. Healthy waterbodies provide essential benefits to our communities as a natural resource, wildlife habitat, recreational opportunity and economic engine.

AWWA's Youth Conservation Corps (YCC) program was developed in 2006 to implement erosion control projects in our target region. The program is designed to reduce pollution caused by runoff from rain events and seasonal melt water that flows into our local lakes, rivers, and streams. The YCC tackles this through the installation of "Best Management Practices" (BMPs) or landscaped features that promote the infiltration of runoff or divert the runoff away from the lake toward vegetation where it can soak into the ground. Each project showcases solutions to environmental problems faced by waterfront properties that landowners can do themselves.



The process starts with a technical assistance visit between the homeowner and the AWWA program manager. During this initial meeting, the discussion centers on how the homeowners use their property, identifying areas with erosion, and going over potential fixes. The homeowners have the option to sign a pledge indicating they will install at least one of the recommendations within the next 12 months. If they sign the pledge they receive a free technical assistance packet that includes a site design, recommendations, local suppliers, and BMP fact sheets. At this point, homeowners have the option to apply to become a project host for our YCC program. The homeowner can also implement the recommendations themselves or hire a contractor. In addition to the landscape design provided to the homeowner, the program manager focuses on educating homeowners on why the design features were chosen, what they will accomplish, and how to maintain them. This process is important in raising stakeholder awareness of the relationship between land use and water quality. The AWWA board and staff also focus efforts on local outreach to highlight the conservation practices that can reduce pollution.

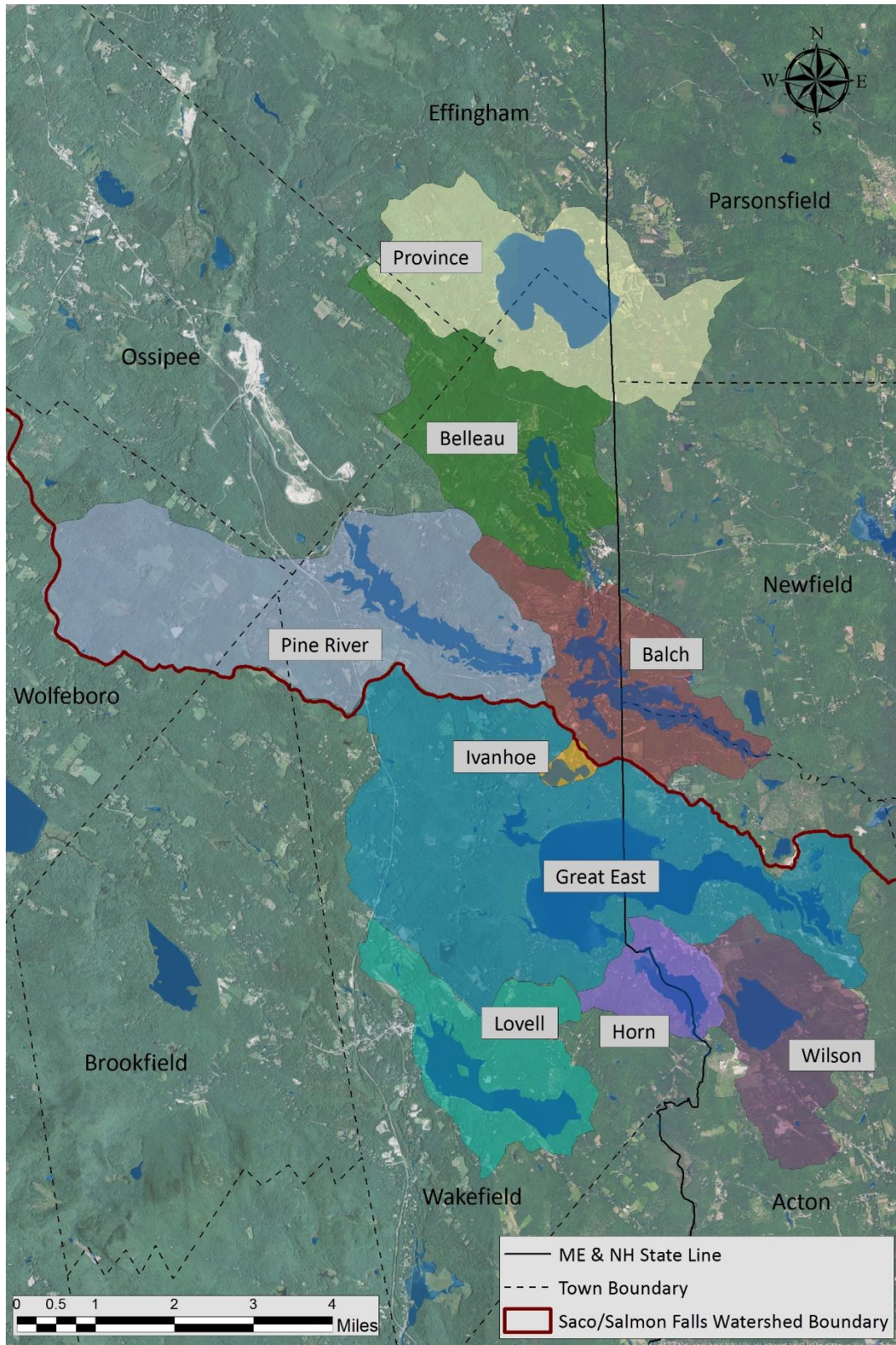
If the site is conducive to a YCC project, the homeowner will receive a second packet that outlines specifically what AWWA will do and what is expected of the homeowner. The YCC will then provide free labor to install the BMPs and the homeowner is responsible for buying the materials. Homeowners are also asked to make an optional donation of 20% of the cost of AWWA's labor. The labor of crew is funded by donations and grants, and the landowner provides all the necessary materials. Behind these projects is a crew of eager high school students supervised by a crew leader and the program manager. The YCC program gives its youth corps the opportunity to effect environmental solutions and empowers them to become the future stewards of our water resources. Since 2006, the AWWA YCC has completed 292 projects across 10 water bodies in the Wakefield, NH and Acton, ME region. These past successes set the bar high, but every year the YCC exceeds expectations and does fantastic work.

Jon Balanoff



AWWA Executive Director

Salmon Falls – Piscataqua River and Saco River Watersheds Map



2021 Technical Assistance (TA) Visits

Requests for technical assistance were received from residents on 11 lakes in the AWWA region. These requests were the result of recruitment efforts by AWWA at community events, social media outreach, presentations at lake association meetings, the display of AWWA signs at past project host sites, and word of mouth from neighbors. All of these efforts come together to further AWWA's message and grow AWWA's project host program.

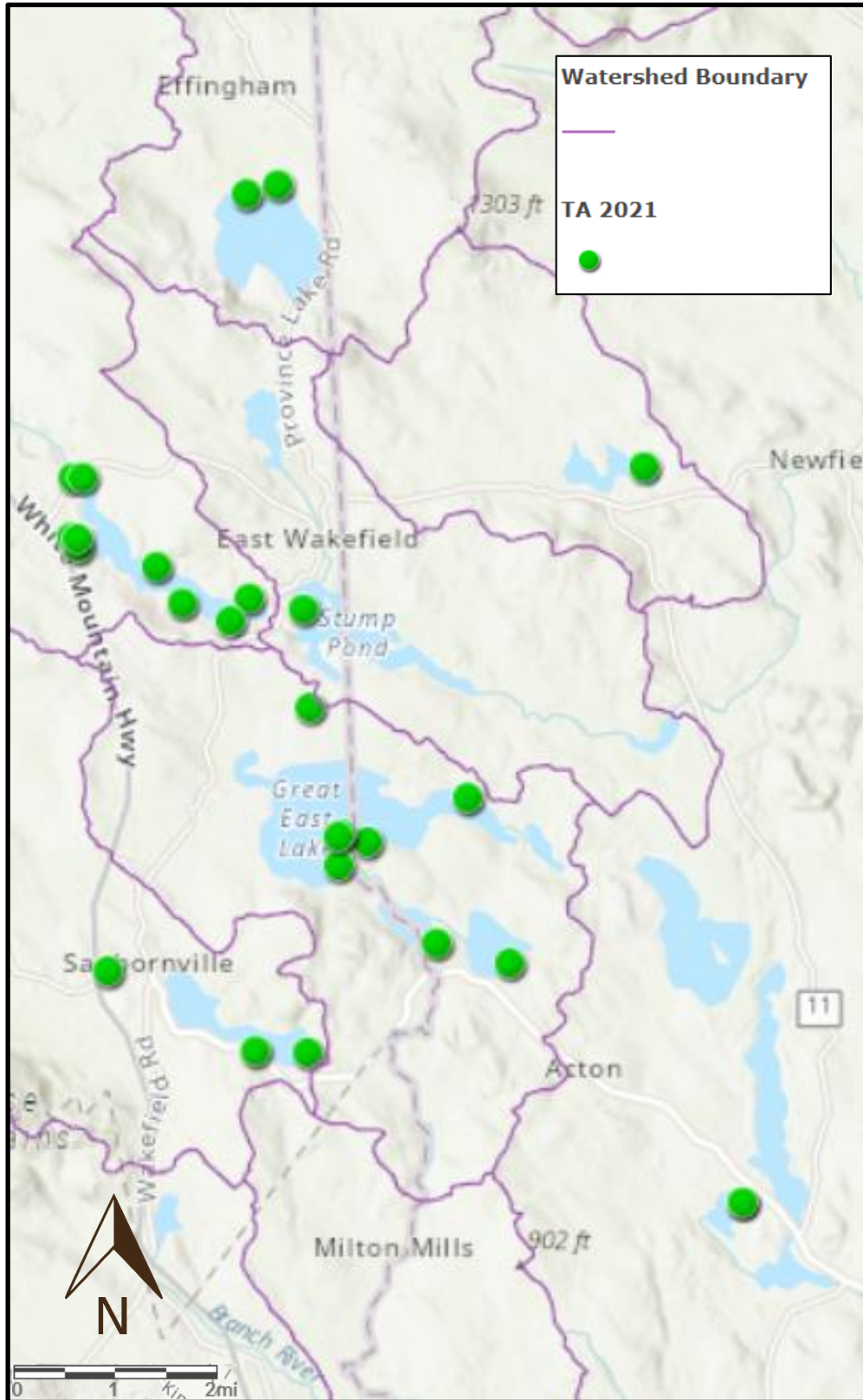
In 2021, AWWA received 32 TA requests from property owners who had erosion issues or wished to have their property assessed for issues that could be causing water quality issues, all of which warranted a site visit. Not every technical assistance visit results in a design delivered to property owners for use correcting erosion issues on their property. In some cases, TA visits result in a project being completed in the same year. In other cases, homeowners did not receive designs, as their properties were erosion free and in good shape. In additional cases, some problems require engineering solutions beyond the scale of a technical assistance visit.

The property owners that do receive design packets sign a pledge stating that they will perform at least one of the recommended designs in the packet within 12 months. Property owners can go about this in several ways. They can do the work themselves using the BMP fact sheets provided to them, they can hire a contractor to perform the work, or they can apply to be part of the AWWA project host program and have the YCC perform the work.

Every year AWWA contacts the previous year's TA clients and performs checks on their sites. This is in compliance with the pledge signed by the property owners and allows AWWA to pursue the property owner as a project host or to see if the owner needs a new design to fit their budget or landscaping. The technical assistance design packets include an introductory letter, an outline of the recommendations and an explanation of why those specific BMPs were chosen, a landscape design plan, a pledge sheet, a local suppliers list, and fact sheets for the recommend BMPs. The fact sheets outline the purpose, design, and instructions for constructing the BMP.

2021 Technical Assistance Visits by Lake			
Balch Lake			
1	Wendy Marchand	92 Thoreau Trail	East Wakefield
2	Marian Zeles	234 Cove Road	East Wakefield
Belleau Lake			
3	Allan Trombley	92 Gold Coast Drive	East Wakefield
Branch River			
4	Paul School		Sanbornville
Great East Lake			
5	Pam Dugas	96 Grand View Road	Acton
6	Jeff Elwell	323 Robinson Road	Acton
7	Les Swensen	191 Veazey Cove Road	East Wakefield
8	Mark Donahue	219 Veazey Point Road	East Wakefield
9	Rob Tozier	167 Veazey Cove Road	East Wakefield
10	Robert Kraft	149 Veazey Cove Road	East Wakefield
Horn Pond			
11	Mark Joncas	90 Martha Horn Road	Acton
Lake Ivanhoe			
12	Chris Roehl	776 Acton Ridge Road	East Wakefield
Loon Pond			
13	Ralph Ferraro	128 East Shore Drive	Acton
Lovell Lake			
14	Richard Chiasson	984 Lovell Lake Road	Sanbornville
15	Dave Jacobs	48 Spruce Drive	Sanbornville
Province Lake			
16	Karen Riek	124 Bailey Road	Effingham
17	Jonathan Towne	19 Oak Avenue	Effingham
18	Janine Kurth	35 Oak Ave	Effingham
19	Rodney Towne	23 Sunset Road	East Wakefield
20	Gary Seesman	98 remick road	Effingham
Pine River Pond			
21	Julie Cavanaugh	948 Lord Rd	Acton
22	Dan Maars	424 Pine River Pond Road	Sanbornville
23	Joe Deguglielmo	76 Ridge Road	East Wakefield
24	Al Doucet	70 Clearwater Lane	Sanbornville
25	Mylene Larsen	55 Heron Cove	Sanbornville
26	Linda Carey	177 Chandler Lane	East Wakefield
27	Jeff Smith	57 Blue Wave	Sanbornville
28	Robert Armata	499 Pinewood Shores	East Wakefield
29	Dana Nowell	15 Blue Wave	Sanbornville
Rock Haven			
30	Ed Jawski	45 Whipporwill Lane	Newfield
Wilson Lake			
31	Maureen Meyer	172 Hawk Road	Acton
32	John O'neil	38 Wren Road	Acton

2021 Technical Assistance Map



2021 Youth Conservation Corps (YCC) Overview

The 2021 AWWA YCC team consisted of the Executive Director Jon Balanoff, Crew Leader James Shimansky, and crew members, Bryce Stetson, Jaime Carlberg, Jaden Dussault, Ashley Barcroft, and Hannah Stewart. James was on the AWWA Crew for 3 years before becoming crew leader in 2020. This year the crew leader role was expanded upon and is now a YCC program coordinator. In this new role, James took on additional YCC responsibilities: assisting Jon with site designs, site visits, data management and reporting. James met these challenges successfully and has proven himself to be a capable leader.

This year, the YCC completed 20 projects. Which is the most it has done since 2017. This amounted to a total of 236 individual BMPs installed on 10 different lakes and adds up to a Phosphorus load reduction of 25.9 lbs/year. This year we got even more projects on lakes such as Pine River Pond and Balch, and we even started getting calls from lakes outside of our normal region. For this first time, the AWWA YCC did a project on Loon Pond, and we also conducted a technical assistance visit to Rock Haven Lake. We intend to continue expanding the YCC crew size and capacity, as funding allows, to meet the growing need for our services in the community. This will hopefully not only include expanding our presence in our current service area, but expanding out to other local lakes where we are needed.



The COVID-19 Pandemic was still a present threat during this season. Although it was less of an issue than the previous year. Though we did not create a formal policy, all AWWA staff had chosen to get vaccinated which, in combination with the outdoor nature of this work, created a low-risk environment for the crew. This, and maintaining social distance from project hosts was sufficient for us to continue the program with only minor changes. We were even able to have our YCC Tour again this summer, which had been cancelled the previous season. This gave community members, stakeholders, and the crew's family the opportunity to see the hard work our crew had done. Several of the projects this summer were partially funded by a 319 grant from NHDES for the Salmon Falls Headwater Lakes, and AWWA will continue to see funding from these grant programs and the communities of Wakefield and Acton to ensure the continuation of this amazing program. The crew's efforts would not be possible without support from the community and our friends at the state.

How to Count Best Management Practices for YCC programs

This list standardizes BMP types, which encourages continuity across YCC programs in New Hampshire & Maine. AWWA has adopted this method so that we are consistent with our fellow YCC programs. BMPs are grouped by type, and some types are split into size categories. Larger BMPs will control more pollutant loading from larger drainage areas and, therefore, count as more than one BMP in the “Type of BMP Installed” table. Categories are based on size or how much material is used for each project.

Three types of BMPs:

Infiltration includes trenches, drip edge drains, dry wells, erosion control berms, rain gardens, detention basins and infiltration steps.

Diversion includes rubber razors, water bars, culverts and turnouts.

Stabilization includes rip-rap, vegetative buffers, ECM, driveway stabilization, path stabilization.

Infiltration Standards

Type of BMP	Small (Counts as 1 BMP)	Medium (Counts as 2 BMPs)	Large (counts as 3 BMPs)
Infiltration trench	<10'	10-20'	20'+
Dripline Trench	<10'	10-20'	20'+
Dry well*	<5 cubic feet	5-10 cubic feet	10+ cubic feet
ECM berm	<10'	10-20'	20'+
Rain gardens	At least 9 sq. ft	9-25 square ft	> 25 square ft
Detention basins	<6' diameter	6-10' diameter	10' diameter
Infiltration steps	<5	5-10	10+

*dry well size refers to capacity to store water (if the structure is filled with crushed stone, divide your capacity by 2)

Diversion Standards

Type of BMP	Small (Counts as 1 BMP)	Medium (Counts as 2 BMPs)	Large (counts as 3 BMPs)
Rubber razors	<14'	14-28'	28'+
Water Bars	<10'	10-20'	20'
Culverts (metal or plastic)	<15" diameter pipe	15-24" diameter pipe	> 24" diameter
Turnouts	1 road/driveway turnout	2 road/driveway turnouts	3 road/driveway turnouts
Open Top Culverts	<14'	14-28'	28'+
Seed Bumps/ Drainage Swale	<14'	14-28'	28'+
Ditches	<100'	100-200'	200'+

Stabilization Standards

Type of BMP	Small (Counts as 1 BMP)	Medium (Counts as 2 BMPs)	Large (counts as 3 BMPs)
Rip-Rap	<25sq ft	25-50 sq ft	50+ sq ft
Vegetative Buffers	< 6 plants	6 -15 plants	15+ plants
ECM	<100 sq ft	100-400 sq ft	400+ sq ft
Driveway stabilization	<30 linear ft of driveway	30-60' linear ft	60+ linear ft
Path Stabilization	<50 linear ft	50-100 linear ft	100+ linear ft
Crown/Ramp Driveway	<30 linear ft of driveway	30-60' linear ft	60+ linear ft
Crown/Ramp Path	<50 linear ft	50-100 linear ft	100+ linear ft
Cover Path with Erosion Control Mulch	<50 linear ft	50-100 linear ft	100+ linear ft

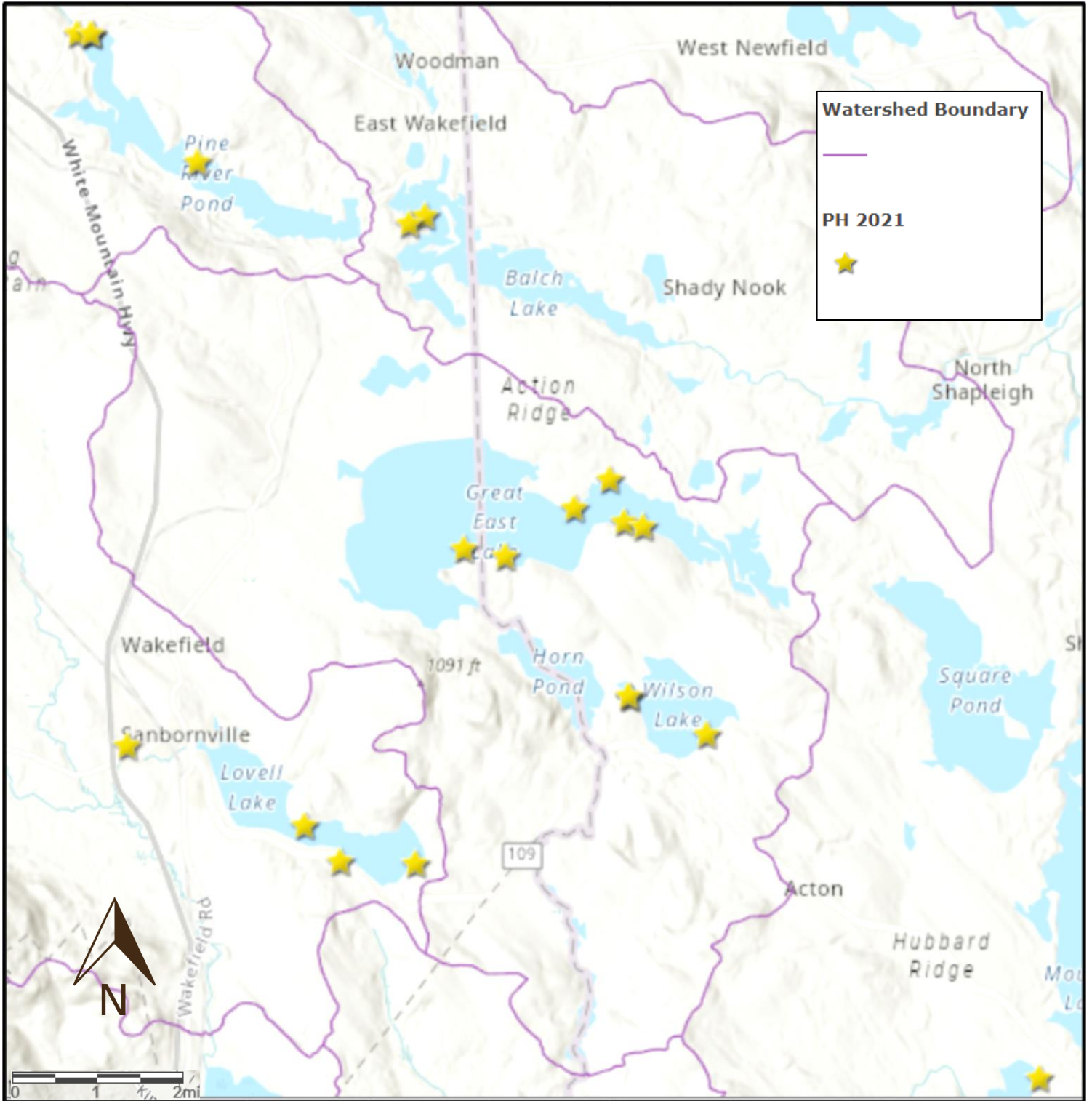


2021 Summary of Installed BMPs	
Best Management Practice (BMP)	Number Completed
Erosion Control Mulch	70
Vegetated Buffer	10
Dripline Trench	21
Waterbar	26
Infiltration Trench	14
Native Vegetation	23
Rubber Razor	13
Infiltration Pathway	18
Firehose Diverter	10
Rain Garden	3
Infiltration Steps	0
Detention Basin	0
Retrofit Infiltration Steps	13
Crushed Stone	0
Dry Well	15



2021 YCC Projects by Lake			
Balch Lake			
1.	Wendy Marchand	92 Thoreau Trail	East Wakefield
2.	Concord Point	Thoreau Trail	East Wakefield
Loon Pond			
3.	Ralph Ferraro	128 East Shore Drive	Acton
Great East Lake			
4.	Mary Sakellarios	38 Katy Lane	Acton
5.	Dave Savukinas	15 Rafferty Drive	Acton
6.	Stacy West	105 Stewart Drive	Acton
7.	Dabney Frake	322 Robinson Road	Acton
8.	Nancy Ginns	170 Wilkins Road	Acton
9.	Les Swensen	191 Veazey Cove Road	East Wakefield
Branch River			
10.	Paul School	60 Taylor Way	Sanbornville
Lovell Lake			
11.	Monette Cotreau	668 Brackett Road	Sanbornville
12.	Richard Chiasson	984 Lovell Lake Road	Sanbornville
13.	Dave Jacobs	48 Spruce Drive	Sanbornville
Wilson Lake			
14.	Pam Grignaffini	73 Hummingbird Road	Acton
15.	Hummingbird Road Association	Hummingbird Road	Acton
16.	Maureen Meyer	172 Hawk Road	Acton
Pine River Pond			
17.	Linda Doucette	66 Clearwater Lane	Sanbornville
18.	Julie Cavanaugh	948 Lord Road	Acton
19.	Al Doucet	70 Clearwater Lane	Sanbornville
20.	Dan Marrs	424 Pine River Pond Road	Sanbornville

2021 YCC Project Host Site Map



Julie Cavanaugh

Pine River Pond - Sanbornville, NH

This was our crews first site of the season. While still getting to know each other, the crew did a great job installing many different BMP's as well as a new one to even the more experienced crew members. The Cavanaugh's had sheet erosion on each side of their house as well as a massive bank erosion problem that needed addressing.

Our crew installed four waterbars and turned the area in between into a pathway filled with crushed rock that would allow runoff to infiltrate into the ground. Around the pathway we placed erosion control mulch to cover the rest of the bare soil. This mulch continued farther down the property and all along the front of their deck. This was important because it left no exposed soil anywhere on the lake side of the house. Along the edge of the slope the crew installed native plants to provide structure for the soil on the bank. Near the edge of the water, they had a massive bank erosion problem that had to be addressed. We installed an erosion control blanket over the bare slope and planted native grasses that will help to hold the soils on the slope together.





Total Number of BMPs	Approximate Cost to Landowner
16	\$1,907.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
4.1	4.1
Crew Hours	Crew Value
103.5	\$1,060.00
BMPs Installed	Materials Used
Erosion Control Mulch	Erosion Control Mulch – 8 yards
Native Vegetation	Crushed Stone – 1 yard
Waterbars	Pressure Treated Lumber - 16 feet
Infiltration Pathway	Erosion Control Blanket – 320 ft ²
Bank Stabilization	Plants - 20

Mary Sakellarios

Great East Lake - Acton, ME

The erosion problems on the Sakellarios' property were a great example of non-point source pollution, as their runoff came from many different places. They had a massive bare hill above their property as well as very little vegetation close to the water. This resulted in massive gullies being formed on their beach and surrounding yard. The crew did a great job installing BMP's that would help solve the problems they were having, all while getting baked by the scorching heat.

We started by installing three rubber razors on the driveway as it was where most of the water was channeling. The razors as well as the drywells installed next to them were the first line of defense against runoff. They also had water coming off their roof causing a dripline to form. Our solution was to install a dripline trench to catch the water and allow it to infiltrate in the ground. Around the trench we also laid down erosion control mulch to cover the rest of the bare soil. Near the edge of their house, they had a walking path down the slope that had begun to deteriorate. Here we installed eight waterbars ranging from one foot to six feet in length. The point of the waterbars was to add a block for water rushing down the slope. Around the waterbars we planted native vegetation and installed more erosion control mulch to cover the remaining bare soil and help keep the soil intact.





Total Number of BMPs	Approximate Cost to Landowner
22	\$1,096.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
3.9	3.2
Crew Hours	Crew Value
79	\$1,330.00
BMPs Installed and Maintained	Materials Used
Dripline Trench	Erosion Control Mulch - 10 yards
Native Plants	Rubber - 30 feet
Rubber Razor	Rebar - 18 feet
Infiltration Pathway w/waterbars	Crushed Stone - 2 yards
Erosion Control Mulch	Pressure Treated Lumber - 90 feet
Drywell	Rip Rap - 1 yard

Concord Point

Balch Lake – East Wakefield, NH

Concord Point was our first shared access property of the season. It had deep gullies caused by an enormous amount of runoff making its way down the long road and straight into the water. This caused the roadway to become impassable for people what wanted to launch their boats or even walk down to the water. The crew did an excellent job installing the BMP's at this site in a timely manner, as our day had to be cut short by the beginning of the rainy season that was this past July.

The project itself was a relatively simple project but in no way less important. The amount of runoff reaching the lake on this site made it one of our top priorities. The crew ended up installing three rubber razors spanning the width of the road. On the ends of each of the rubber razors they dug a very deep drywell to accommodate for the massive amounts of sediment that would be filling them. All in all, the project turned out great and since we had a site on the very same road later in the season we got to come back and look at how well the site was holding up.



Total Number of BMPs	Approximate Cost to Landowner
9	\$475.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1.9	1.6
Crew Hours	Crew Value
45.5	\$805.00
BMPs Installed and Maintained	Materials Used
Rubber Razors	Rubber - 75 feet
Drywells	Crushed Stone - 2 yards
	Pressure Treated Lumber 2x6 - 132 feet
	Nails - 1 Box
	Rip Rap - ½ Yard

Linda Doucette

Pine River Pond – Sanbornville, NH

The Doucette’s project was yet another simple fix for a large problem. They had a large amount of sediment washing down their road and eventually reaching the lake. The crew installed two open top culverts in the road to trap sediment and allow it to run into a drywell at the end. These are an alternative to rubber razors, that require more maintenance but are more plow friendly. Just like the last project, we were able to come back and get a good look at how the project was holding up by virtue of another next-door project later in the season. The crew was again able to get this more technical project done in only one day, which really set us ahead for the rest of the season.



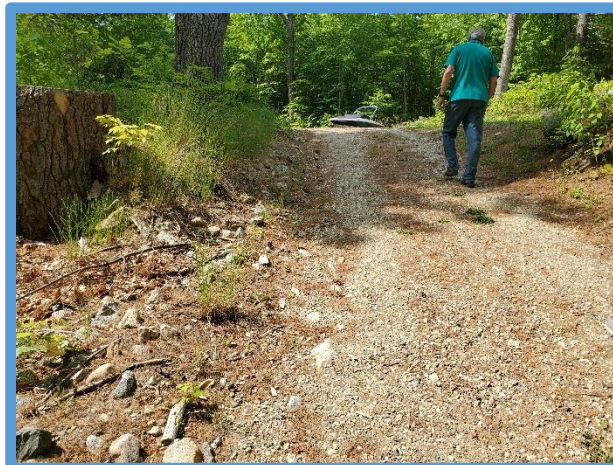
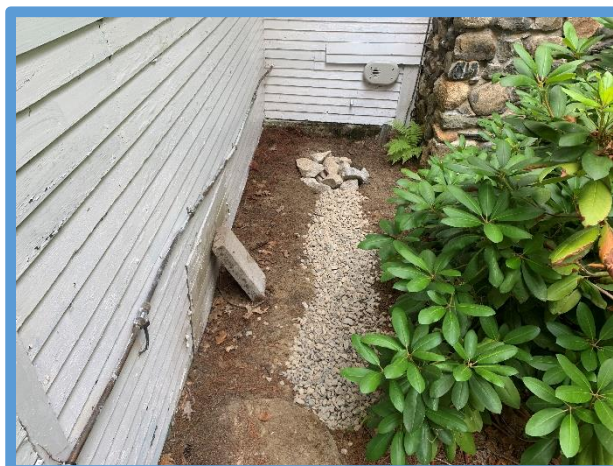
Total Number of BMPs	Approximate Cost to Landowner
10	\$419.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1.2	1.0
Crew Hours	Crew Value
54.5	\$955.00
BMPs Installed and Maintained	Materials Used
Open Top Culvert	Pressure Treated Lumber 2x8 – 30 feet
Drywell	Rip Rap – 1 yard
	Pressure Treated Lumber 2x6 – 60 feet

Dabney Frake

Great East Lake – Acton, ME

The Frake's property was another site that seemed to be having a lot of trouble with runoff. While we were there working, they showed us multiple videos of the extreme torrent of runoff that would come down their driveway and sometimes even flood the front of the house. We had to address erosion problems in many different places using many different methods to gain control over their runoff problem. This posed quite a challenge for the crew, but like always the crew succeeded and completed some of their best work.

At the Frake's we installed two rubber razors on a side road each with a drywell for the runoff to infiltrate into. The crew then installed four other drywells/small infiltration trenches to collect water coming from downspouts or off pathways. On one side of the property, we laid down erosion control mulch covering a large area of bare soil. On top of all of this we installed two firehoses to divert any runoff that would come down their driveway into a large area of vegetation. The vegetation would help trap water and runoff and allow it to naturally infiltrate into the ground. To finish off the project we planted native vegetation on an eroding slope up near the rubber razors. The plants will help keep the soil intact and prevent erosion.





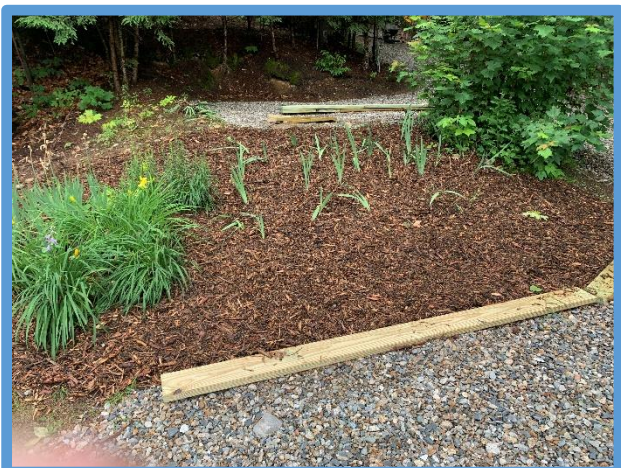
Total Number of BMPs	Approximate Cost to Landowner
14	\$1,362.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1.7	1.4
Crew Hours	Crew Value
69.5	\$1171.25
BMPs Installed and Maintained	Materials Used
Erosion Control Mulch	EMC – 15 yards
Infiltration Trench	Crushed Stone – 2 yards
Drywell	Plants – 10
Rubber Razors	Firehose – 18 feet
Firehose Diverters	Rip Rap – 1 yard
Native Vegetation	Pressure Treated Lumber – 64 feet
	Rubber – 32 feet

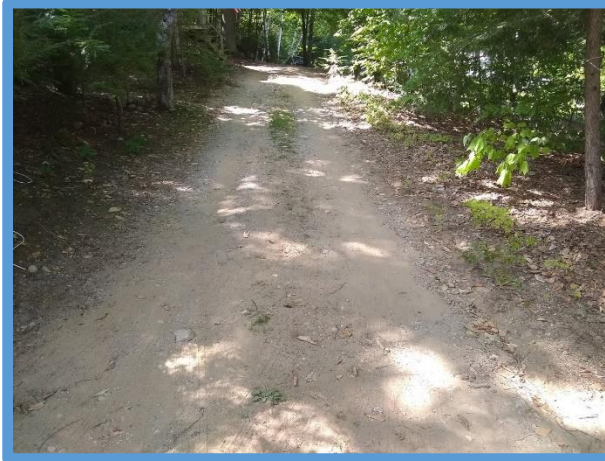
Stacy West

Great East Lake – Acton, ME

The West's property was another great site that needed attention. They had significant erosion coming down their driveway and continuing through the front yard and eventually ending up in the lake. The crew came in and did a great job installing the necessary BMP's to fix the property of its runoff issues.

First, we dug an infiltration pathway through the front yard to offer a massive amount of area for runoff to infiltrate into the ground. Then, they planted native plants purchased by the homeowner as well as transplanted plants from the property in areas where the soil needed to be supported by more root systems. Most of the area around the driveway was bare soil so erosion control mulch was laid down to act as cover and prevent sheet erosion. The last thing the crew did was install three rubber razors on their driveway coupled with drywells to trap any runoff that would be diverted.





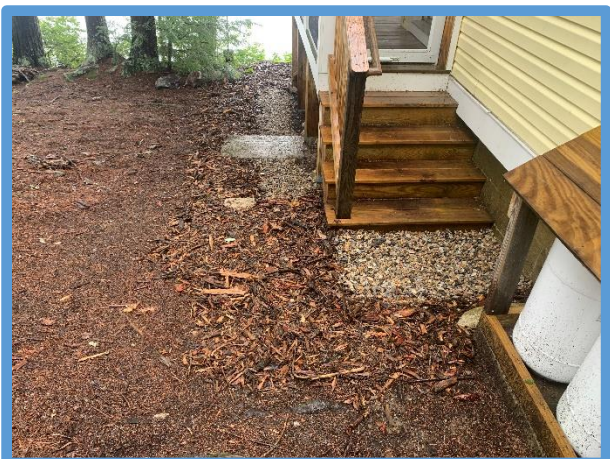
Total Number of BMPs	Approximate Cost to Landowner
15	\$1,035.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1.1	1.0
Crew Hours	Crew Value
71	\$1,280.00
BMPs Installed and Maintained	Materials Used
Erosion Control Mulch	EMC – 3 yards
Infiltration Pathway	Crushed Stone – 5 yards
Pavers	Rip Rap – 1 yards
Rubber Razor	2x6 Pressure Treated Lumber – 96 feet
Drywells	Rubber – 60 feet
Native Vegetation	Plants – 25

Dave Savukinas

Great East Lake – Acton, ME

This site, like many of the sites we had done so far, had erosion problems that could be fixed with simple remediation. The crew worked hard through tough conditions, such as heavy rain on both days we were there, and a bee's nest that needed careful avoidance. The crew started by mulching the side yard, covering all the bare soil that had been eroding into the lake. This was important because it blocked runoff from reaching the lake in a major runoff area. They then switched gears and installed the two waterbars, one at the beginning of the walkway, and one as a stopper for runoff at the top of the slope on the left side of the house. Next the crew installed a dripline/infiltration trench along the side of the house. This trench not only trapped water coming off the roof but was also placed so it would trap any water rushing down the slope above. More erosion control mulch was then laid down around the trenches to slow down the runoff and cover the bare soil around the trenches. The mulch then continued around the front of the house to cover the bare soil near the water. This was especially important because bare soil next to the water always has the potential to pollute the lake.







Total Number of BMPs	Approximate Cost to Landowner
10	\$979.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1.2	1.0
Crew Hours	Crew Value
97	\$1592.50
BMPs Installed and Maintained	Materials Used
Erosion Control Mulch	EMC – 10 yards
Dripline Trench	Crushed Stone – 2 yards
Waterbars	6x6 Pressure Treated Lumber – 28 feet
Native Vegetation	Plants – 10
	Rebar – 12 feet

Dave Jacobs

Lovell Lake – Sanbornville, NH

This project was the first project we did on Lovell Lake this year, so it was exciting to be back. Dave had just moved into his house and was made aware that he had severe erosion issues that needed to be addressed. He called AWWA in a panic expecting to have to pay lumps of money to remediate all his problems but was greatly relieved to hear that AWWA could solve his problems without the great expense. After a quick site visit a design was made and the crew got to work. We laid down erosion control mulch around the entire property including in front of the house, on the slope off the back deck, on the pathway down to the water, under the side deck where there were deep gullies from erosion, and down by the water on the edge of the existing patio. Throughout those places we planted native plants to help hold the soil together and prevent it from eroding further. On top of all of that we retrofitted an existing but well filled in dripline/infiltration trench that wrapped its way around almost the entire house. To finish off the project the crew installed two rubber razors in his driveway to divert any runoff that had been making its way down the road and onto his property. On the end of each of those two rubber razors a drywell was installed to contain the runoff and give it time to infiltrate into the ground.





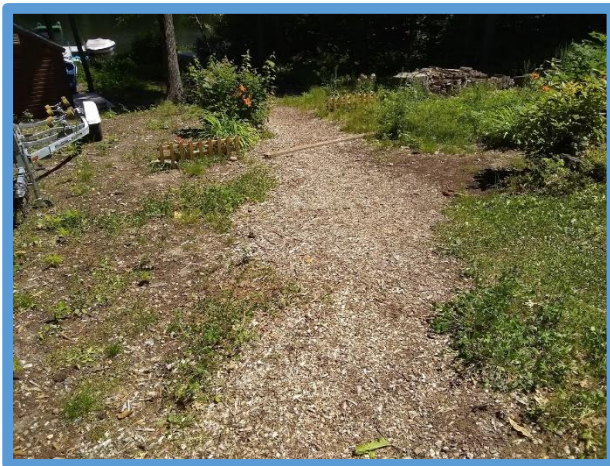
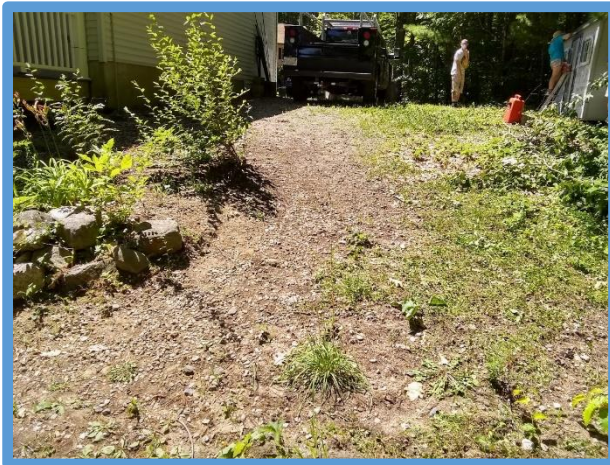


Total Number of BMPs	Approximate Cost to Landowner
19	\$1,420.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
4.2	3.6
Crew Hours	Crew Value
154	\$2,550.00
BMPs Installed and Maintained	Materials Used
Erosion Control Mulch	EMC – 30 yards
Native Vegetation	Plants - 30
Rubber Razors	Crushed Stone – 3 yards
Dripline Trench	Loam – 1 yard
Drywells	2x6 Pressure Treated Planks – 64 feet
	Nails – 1 Box
	Rubber – 30 feet

Pam Grignaffini

Wilson Lake – Acton, ME

The Grignaffini's site was the first site the crew had done this year that had a relatively small number of different BMP's. The crew worked hard over the course of two days to install fourteen waterbars spanning entire pathway down to the water. Beforehand, this pathway was a channel for runoff, but the crew converted it into an amazing infiltration pathway and then a long winding erosion control mulch pathway. About halfway down the slope next to a shed the crew also installed two drip line trenches to allow water coming off the roof to infiltrate into the ground. This was also lined with mulch. The project was altogether a very simple fix that was just made difficult due to the scale. The crew did a great job and the project looked great after completion.





Total Number of BMPs	Approximate Cost to Landowner
10	\$893.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
0.8	0.6
Crew Hours	Crew Value
70	\$1,165.00
BMPs Installed and Maintained	Materials Used
Erosion Control Mulch	EMC – 10 yards
Dripline Trench	Crushed Stone – 5 yards
Infiltration Pathway	6x6 Pressure Treated Lumber – 48 feet
Waterbars	Rebar – 56 feet

Hummingbird Road

Wilson Lake – Acton, ME

The Hummingbird Road project was our second and final shared project of the season. It was a simple half-day project where the crew installed two rubber razors and drywells on a boat launch. The project although small, was still a very important project for the crew to complete. The boat launch had been ripped apart by the past month's heavy rain and was in need for a fix up.



Total Number of BMPs	Approximate Cost to Landowner
4	\$311.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1	0.8
Crew Hours	Crew Value
19	\$370.00
BMPs Installed and Maintained	Materials Used
Rubber Razors	Rubber – 30 feet
Drywells	Crushed Stone – 1 yard
	2x6 Pressure Treated Lumber – 60 feet
	Rip Rap – ½ yard

Richard Chiasson

Lovell Lake – Sanbornville, NH

The Chiasson's was another great site for the crew this season. This was a less physically strenuous project that allowed the crew really put a lot of detail into their work. We installed six waterbars on a slope up by the main house that was seeing a healthy amount of runoff. The runoff would continue down the driveway and into a stream that eventually led into Lovell Lake, from this point. As well as the waterbars the homeowners themselves installed dripline trenches on the sides of their shed that were able to trap much of the runoff they were experiencing. The other aspect of this site was a bank stabilization effort. Along the shoreline of the lake, they were experiencing undercutting so the YCC crew planted fifteen native plants with good root systems to help hold the soil on the shoreline together. Then, they laid erosion control mulch throughout the plants to help cover the bare soil as well as provide new nutrient rich soil as the mulch breaks down.



Total Number of BMPs	Approximate Cost to Landowner
10	\$479.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
0.2	0.2
Crew Hours	Crew Value
30.5	\$523.75
BMPs Installed and Maintained	Materials Used
Waterbars	EMC – 1 yard
Erosion Control Mulch	Crushed Stone – 1/2 yard
Native Vegetation	6x6 Pressure Treated Lumber – 18 feet
	Rebar – 16 feet
	Plants – 15

Ralph Ferraro

Loon Pond – Acton, ME

The project at the Ferraro's was a first for AWWA. It was the first time the YCC had done a project on Loon Pond in Acton. Needless to say, everyone was excited to expand our region of projects and to really do a good job as well. For the project itself it was rather simple, there was a giant section of bare soil on the side of the house which continued around to the back patio. By the patio you could see exposed roots from trees and sheet erosion from the massive amounts of runoff coming off the patio. Our solution was to lay down erosion control mulch along the side of the house that continued around the front covering all the exposed soil and roots. Then we dug a long infiltration trench along the edge of the patio that would trap any water that would rush off. To finish up the project we installed a small infiltration pathway leading from the edge of the patio to the side shed. This area was also bare soil and exposed roots before our crew came in a did their work.





Total Number of BMPs	Approximate Cost to Landowner
6	\$362.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
0.5	0.4
Crew Hours	Crew Value
33	\$545.00
BMPs Installed and Maintained	Materials Used
Infiltration Trench	EMC – 9 yards
Erosion Control Mulch	Crushed Stone – 2 yards
Infiltration Pathway	

Dan MARRS

Pine River Pond – Sanbornville, NH

After two of the smaller projects, we moved onto the MARRS' project. Although the project itself was not anything the crew hadn't seen, the weather made it a tougher project. This project fell during one of the worst days of the aftermath of the wildfires out west. It took its toll on the kids and had us taking frequent breaks. But with some hard work and a tasty lunch from Dan, the kids were able to put together a project worth sharing with everyone and proudly shared our work during the YCC tour.

For the project itself the crew installed an infiltration pathway with a waterbar at the top and the bottom to help support an eroding access point to the water. They then edged the pathway with erosion control mulch and continued the mulch to cover the bare soil above the trench. This was very important as the whole area was slowly eroding into the lake. To finish up the project the crew planted native plants along the edge of the slope to help keep the soil from further eroding.





Total Number of BMPs	Approximate Cost to Landowner
8	\$398.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
0.5	0.4
Crew Hours	Crew Value
50.5	\$842.00
BMPs Installed and Maintained	Materials Used
Infiltration Pathway	ECM – 6 yards
Erosion Control Mulch	Crushed Stone – 3 yards
Native Vegetation	6x6 Pressure Treated Lumber – 12 feet
Waterbars	Rebar – 8 feet
	Plants – 5

Maureen Meyer

Wilson Lake – Acton, ME

Maureen Meyer was another great project host for the crew this season. She had a YCC project quite a few years back and the runoff had started to overwhelm the old project. The crew came in and added on to the existing infiltration pathway and made it over twice as long. On top of that they mulched around the pathway giving it aesthetic value as well as coving the bare soil in the area. Further down the side of the house the crew laid down more erosion control mulch in an area where runoff was gradually scraping away at the soil. Then, around the front of the house the crew installed a dripline trench spanning the length of the roofline. This would help trap any water that was coming off the roof and allow it to easily infiltrate into the ground instead of going directly into the lake. To finish up the project the crew installed a rubber razor in the road. The idea for the razor was to prevent runoff from coming down the road and entering her driveway and eventually making its way to the lake. At the end of the rubber razor the crew dug a massive drywell to hold the excessive amounts of runoff that were rushing down the road.





Total Number of BMPs	Approximate Cost to Landowner
13	\$315.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
0.5	0.4
Crew Hours	Crew Value
57.5	\$967.50
BMPs Installed and Maintained	Materials Used
Drywell	EMC – 5 yards
Rubber Razor	Rubber – 15 feet
Dripline Trench	2x6 Pressure Treated Lumber – 30 feet
Erosion Control Mulch	Crushed Stone – 3 yards
Infiltration Pathway	Rip Rap – 1 yard

Monette Cotreau

Lovell Lake – Sanbornville, NH

Monette was experiencing massive amounts of sediment making its way down her driveway and into the lake. It rained during our initial site visit, so we were able to see firsthand how bad the erosion problem was.

It took the crew a little over a day to install all the BMP's on the site. They started with a long infiltration pathway lined with pavers and native vegetation. The pathway's aim is to trap all the runoff coming down the driveway and prevent it from getting into the lake. Above the trench the crew installed three firehose diverters on the driveway. Much like rubber razors, firehose diverters divert water and sediment into drywells dug at the end of each one. This site was a little tricky because about three inches underneath the dirt layer was more pavement. The crew ended up changing the design of the drywell to have a small trench dug in between the end of the firehose and the beginning of the drywell. We found through testing that the trenches did a great job at helping the runoff reach the drywell. Around the side of the house the crew dug an infiltration trench underneath a downspout. This trench allowed water to infiltration into the ground instead of rushing down the side lawn and into the lake. As a final step the crew laid down erosion control mulch over a parking area at the top of the driveway. The area had recently been turned to dirt and needed protection from erosion.





Total Number of BMPs	Approximate Cost to Landowner
12	\$550.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
0.6	0.5
Crew Hours	Crew Value
70	\$1,167.50
BMPs Installed and Maintained	Materials Used
Infiltration Trench	EMC – 6 yards
Firehose Diverters	Firehose – 40 feet
Native Vegetation	Plants – 10
Erosion Control Mulch	Crushed Stone – 3 yards
Infiltration Pathway	Rip Rap – 1 yard

Paul School

Branch River – Sanbornville, NH

The Paul School project was unlike most sites the YCC has ever done as it was more of a community project. The aim was to provide the school with pathways that protect against erosion that led to the locations where they plan on making outdoor classrooms in the future. Our task was to design a path with good stabilization down a steep slope. The crew did a great job over the course of three days installing the pathway and lining it with a berm of erosion control mulch. The outcome looked great and since it rained while we were working on the project, we got to see that it would indeed stand up against runoff. Around the upper portion of the trail, we planted sixty juniper bushes to help hold the soil together and eventually spread to cover the entire slope.





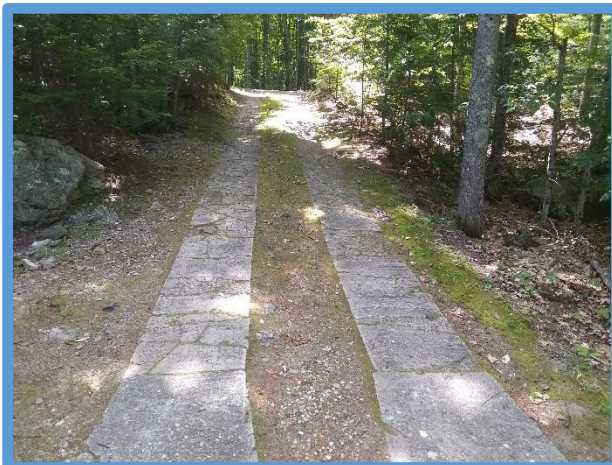
Total Number of BMPs	Approximate Cost to Landowner
12	\$1,170.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
NA	NA
Crew Hours	Crew Value
99.75	\$1,637.50
BMPs Installed and Maintained	Materials Used
Pathway	EMC – 10 yards
Erosion Control Mulch	Plants – 60
Native Vegetation	

Les Swensen

Great East Lake – East Wakefield, NH

The project at the Swensen's at first sight was expected to be rather simple, but after beginning the digging process the crew was proven wrong. The digging at this site was the most difficult we had faced this season, and we had a lot of it. Nevertheless, the crew once again excelled and got what turned into a more difficult site done in one day. For the project itself the crew installed a massive infiltration trench in front of a paved driveway. In the past, runoff would run directly down the driveway and into the lake, but with the new trench, water is only able to infiltrate into the ground in front of the driveway. Next the crew laid down erosion control mulch in areas next to the parking spots used by the homeowner. Runoff had previously been seen coming down the driveway and rushing through that spot. For further protection we decided that installing two firehose diverters would be imperative in reducing the amount of runoff coming down the driveway. This would ultimately put less stress on the BMP's further down the hill.





Total Number of BMPs	Approximate Cost to Landowner
14	\$354.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
0.5	0.4
Crew Hours	Crew Value
53.5	\$883.75.00
BMPs Installed and Maintained	Materials Used
Infiltration Trench	EMC – 5 yards
Erosion Control Mulch	Crushed Stone – 4 yards
Firehose Diverter	Firehose – 24 feet

Nancy Ginns

Great East Lake – Acton, ME

The Ginns project was special as it was the only project the crew did that included a rain garden. A rain garden requires extensive digging and is always one of harder BMP's to install. Nonetheless the crew did any amazing job digging it three feet deep and filling it in with crushed rock, loam, and erosion control mulch. A rain gardens main purpose is to provide a large area for water storage. This was especially important on the Ginns property because they have a large amount of rain falling on a very exposed section of their property. The crew also dug a long infiltration trench leading into the rain garden to act as a block for runoff. Any runoff traveling down the slope would be trapped by the trench and eventually end up in the bottom of the rain garden where it can get soaked up by the native vegetation that the crew planted. Even after the installing of the rain garden the project wasn't done, the crew went on to retrofit four existing waterbars with crushed rock as well as spreading eight yards of erosion control mulch around the property. To finish the site, the crew installed a vegetated buffer on the edge of the slope overlooking the waterbars. This buffer provided structure through root systems to the eroding slope as well as covering more bare soil. The crew did a great job with the difficult project and earned praise from the homeowners for their effort.





Total Number of BMPs	Approximate Cost to Landowner
14	\$684.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
2.7	2.3
Crew Hours	Crew Value
97	\$1,572.050
BMPs Installed and Maintained	Materials Used
Infiltration Trench	EMC – 8 yards
Erosion Control Mulch	Crushed Stone – 6 yards
Native Vegetation	Loam – 4 yards
Rain Garden	Plants – 10
Retrofit Infiltration Steps	

Wendy Marchand

Balch Pond – East Wakefield, NH

The Marchand's was our second to last site for the YCC season. It was simpler project that consisted of just two rubber razors, mulch, and plants. During this project we were missing one of our more senior crew members, but the crew was still able to get the project done in just one day. The Marchands had a poorly vegetated driveway that they used for launching their boat. This driveway allowed water to run directly into the water, so the crew installed two rubber razors to divert the rushing runoff. The runoff would then get trapped by a drywell and infiltrate into the ground. Next to the driveway they had an eroding slope that needed fixing. The crew laid down erosion control mulch and planted around fifteen native plants that would help hold the bank together better. These plants while spread out now, will overtime grow to cover the entire slope.

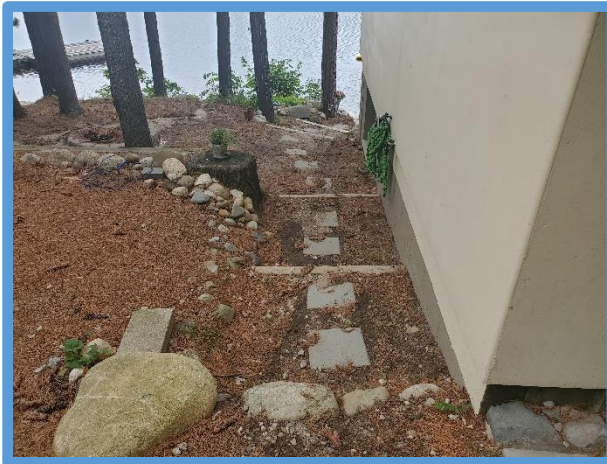


Total Number of BMPs	Approximate Cost to Landowner
10	\$753.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1.2	1.0
Crew Hours	Crew Value
39	\$660.00
BMPs Installed and Maintained	Materials Used
Rubber Razor	EMC – 5 yards
Drywell	Crushed Stone – 1 yard
Native Vegetation	Rubber – 35 feet
Erosion Control Mulch	2x6 Pressure Treated Lumber – 80 feet
	Plants – 12
	Rip Rap – 1 yard

Al Doucet

Pine River Pond – Sanbornville, NH

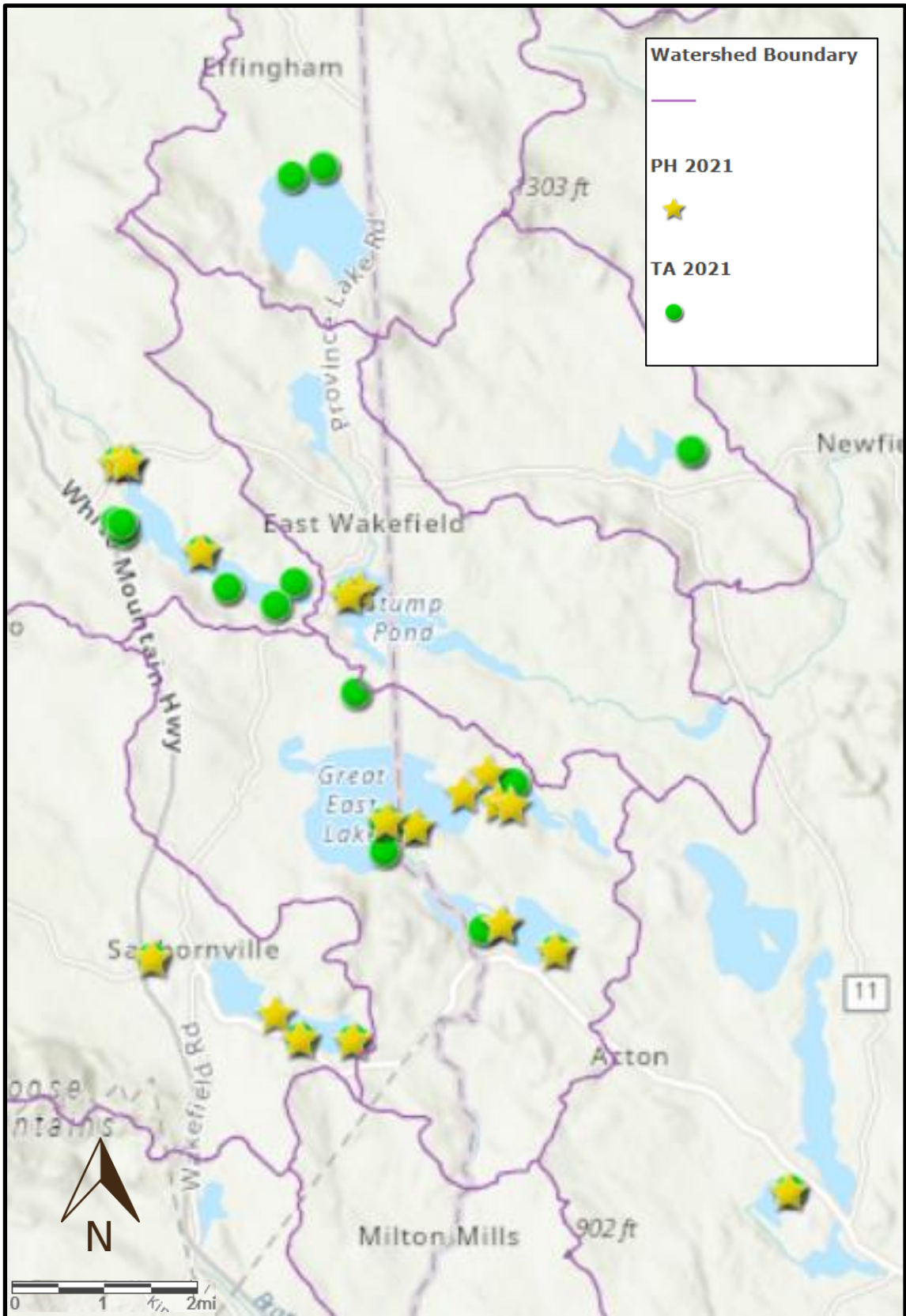
The Doucet's project was the last of the season for the YCC crew. Earlier in the season we did a project next door to the Doucet's, and this project was a continuation of the problem both properties were facing. The runoff was originally continuing past the first site and flowing through the Doucet's parking area and into the lake. Our solution was to dig a rip rap trench on the side of the road and continue it through the parking area. On top of the problems, they were having in that area they were also having problems with runoff rushing down the side of their house where they had existing infiltration steps. After identifying the problem, the crew got to work and in no time had dug an approximately 35-foot-long rip rap trench as well as retrofitted the five steps leading around the house. This project in combination with the previous project are sure to drastically reduce these erosion issues and help to eliminate one more entry point for polluted runoff into the lake.





Total Number of BMPs	Approximate Cost to Landowner
8	\$178.00
Tons of Sediment Reduced	Pounds of Phosphorus Reduced
1.2	2.0
Crew Hours	Crew Value
59.5	\$1,028.75
BMPs Installed and Maintained	Materials Used
Rip Rap Trench	Rip Rap – 4 yards
Retrofit Infiltration Trench	Crushed Stone – 1 yard

Appendix A – 2021 Technical Assistance and Project Host Sites Map



Appendix B – NH DES Pollutants Control Report

<p>NPS Projects - Pollutants Controlled Report New Hampshire Department of Environmental Services, Watershed Assistance Section</p>
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DES Project Number: HI-19-C-07 Date of Report: 12/10/2021

Project Title: Salmon Falls Headwaters Watershed Management Plan Implementation Project – Phase 3: Residential NPS Pollution Reduction and Community Outreach

Grantee: Acton Wakefield Watersheds Alliance

Table 1. Pollutant Load Reduction Estimates for NPS Sites Treated with BMPs

Waterbody Name	Nitrogen pounds per year	Phosphorus pounds per year	Sediment tons per year
Great East Lake	N/A	9.3	11.1
Lovell Lake	N/A	4.3	5.0
Totals	N/A	13.6	16.1

Table 2. Wetlands, Streambanks, Shoreline Protected / Restored During This Project

Resource	Planned acres	Actual acres	Planned linear feet	Actual linear feet
Wetlands restored			not applicable	not applicable
Wetlands created			not applicable	not applicable
Streambank /shoreline protected	not applicable	not applicable		
Stream channel stabilized	not applicable	not applicable		

The estimations in this report were determined using the appropriate estimation model(s) and applied according to the procedures prescribed for the model. To the best of my knowledge these are reasonable estimates using appropriate methods. Documentation is kept on file by the grantee and is available for review by NHDES and USEPA.

Submitted by (for Grantee):


Signature

Jon Balanoff
Printed Name

Date: 12/10/2021

Reviewed by (for DES):

Signature

Printed Name

Date:

NPS Projects - Pollutants Controlled Report

New Hampshire Department of Environmental Services, Watershed Assistance Section

DES Project Number: HI-19-C-07 Date of Report: 12/10/2021

Table 1. List of BMP Sites and Methods Used Lake: Great East Lake

Site ID (Name or # from site list)	Site Location Description	Latitude and Longitude (decimal degrees)	Brief BMP Description	Estimation Method / Sub-Method Used	Implementation Date	Pounds of Nitrogen Per Year	Pounds of Phosphorus Per Year	Tons of Sediment Per Year
Swensen	191 Veazey Cove Road, E. Wakefield	43.5787 -70.9768	Erosion Control Mulch, Infiltration Trench, Firehose Coverers, Drywells	Region 5	8/3/2021	N/A	0.4	0.5
Sakellarios	38 Katy Lane Acton, ME	43.587771 -70.95051	Native vegetation, Waterbars, rubber razors, dripline trench, erosion control mulch, drywell	Region 5	6/29/2021	N/A	3.2	3.9
Savukinas	15 Rafferty Drive Acton, ME	43.58222 -70.947859	Native vegetation, Waterbars, rubber razors, dripline trench, erosion control mulch, drywell	Region 5	7/13/2021	N/A	1.0	1.2
West	105 Stewart Drive, Acton ME	43.581606 -70.94446	Infiltration Path, Native vegetation, rubber razors, drywell, erosion control mulch.	Region 5	7/8/2021	N/A	1.0	1.1
Ginns	170 Wilkins Road, Acton, ME	43.583999 -70.956869	Erosion Control Much, Rain garden, Native vegetation, Infiltration trench, Retrofit steps.	Region 5	Region 5	N/A	2.3	2.7
Totals:						N/A	9.3	11.1

Table 6. List of BMP Sites and Methods Used Lake: Lovell Lake

Site ID (Name or # from site list)	Site Location Description	Latitude & Longitude (decimal degrees)	Brief BMP Description	Estimation Method / Sub Method Used	Implementati on Date	Pounds of Nitrogen Per Year	Pounds of Phosphorus Per Year	Tons of Sediment Per Year
Cotreau	668 Brackett Road Sanbornville, NH	43.54249 -71.00559	Firehose Diverters, Drywells, Infiltration Path, Infiltration Trench, Erosion Control Mulch	Region 5	7/29/2021	N/A	0.5	0.6
Chiasson	984 Brackett Road Sanbornville, NH	43.5378 -70.99915	Vegetated Buffer, Waterbars	Region 5	7/20/2021	N/A	0.2	0.2
Jacobs	48 Spruce Drive Sanbornville, NH	43.537528 -70.985537	Erosion Control Mulch, Vegetated buffer, Native vegetation, Dripline Trench	Region 5	7/22/2021	N/A	3.6	4.2
Totals:						N/A	4.3	5.0

Appendix C – ME DEP Pollutants Control Report



Pollutants Controlled Report
 Maine Department of Environmental Protection
 NPS Grants Program – Bureau of Land and Water Quality

YEAR: 2021

NPS Project ID#: 2017RR07

Project Title: Great East Lake Watershed Protection Project (Phase 3 Maine)

Grantee: Acton Wakefield Watersheds Alliance DEP Agreement Admin: Wendy Garland


TABLE 1. Pollutant Load Reduction Estimates for NPS Sites Treated with BMPs

Water Body Name	Sediment tons per year	Phosphorus pounds per year	Nitrogen pounds per year
Great East Lake	10.6	8.9	N/A
Loon Pond	0.5	0.4	N/A
Wilson Lake	2.3	1.8	N/A
Totals	5.2	4.4	N/A

TABLE 2. Wetlands, Streambanks, Shoreline Protected / Restored During This Project

Resource	Planned acres	Actual acres	Planned lineal feet	Actual lineal feet
Wetlands restored			Not applicable	Not applicable
Wetlands created			Not applicable	Not applicable
Streambank / shoreline protected	Not applicable	Not applicable		
Stream channel stabilized	Not applicable	Not applicable		

The estimations in this report were determined using the appropriate estimation model(s) and applied according to the procedures prescribed for the model. To the best of my knowledge these are reasonable estimates using appropriate methods. Documentation of the estimates is attached to this PCR for review by DEP / EPA.

Submitted by (for Grantee) Signature:  Printed Name: Jon Balanoff

Reviewed by DEP AA: _____ Printed Name: _____

Pollutants Controlled Report
 Maine Department of Environmental Protection
 NPS Grants Program – Bureau of Land and Water Quality

NPS Project ID#: 2017RR07 for the year 2021

TABLES 3 & 4. List NPS Sites, Methods Used, & Pollutants Controlled

Great East

Table ID (name or # from site list)	Brief Description NPS Site	Estimation Method/ Sub-Method Used	Sediment Tons / Yr	Phosphorus Pounds / Yr	Nitrogen Pounds / Yr
Sakellarios	Native vegetation, Waterbars, rubber razors, dripline trench, erosion control mulch, drywell	Region 5	3.9	3.2	N/A
Savukinas	Waterbars, erosion control mulch, dripline trench, native vegetation	Region 5	1.2	1.0	N/A
West	Infiltration Path, Native vegetation, rubber razors, drywell, erosion control mulch.	Region 5	1.1	1.0	N/A
Ginns	Erosion Control Much, Rain garden, Native vegetation, Infiltration trench, Retrofit steps.	Region 5	2.7	2.3	N/A
Totals for the Year:			10.6	8.9	N/A

Loon Pond

Table ID (name or # from site list)	Brief Description NPS Site	Estimation Method/ Sub-Method Used	Sediment Tons / Yr	Phosphorus Pounds / Yr	Nitrogen Pounds / Yr
Ferraro	Dripline Trench, Infiltration path, Erosion control mulch.	Region 5/GEE	0.5	0.4	N/A
Totals for the Year:			0.5	0.4	N/A

☒ Lake: Wilson Lake (Maine)

Site ID (Name or # from site list)	Site Location Description	Latitude and Longitude (decimal degrees)	Brief BMP Description	Estimation Method / Sub-Method Used	Implementation Date	Pounds of Nitrogen Per Year	Pounds of Phosphorus Per Year	Tons of Sediment Per Year
Meyer	172 Hawk Road Acton, ME		Infiltration Path, Dripline Trench, Erosion Control Mulch, Rubber Razor, Drywells.	Region 5	7/28/2021	N/A	0.4	0.5
Grignaffini	73 Hummingbird Lane Acton, ME		Infiltration path, Waterbars, Erosion Control Mulch, Dripline Trench	Region 5	7/19/2021	N/A	0.6	0.8
Hummingbird Boat Launch	Hummingbird Lane Acton, ME		Rubber Razor, Drywel	Region 5	7/20/2021	NA	0.4	0.5
Totals:						N/A	1.4	1.8

Pollutant Load Reduction Estimation Methods

1. Region 5 Model Refer to EPA website <http://it.tetrattech-ffx.com/stepl/> Go to the Region 5 Load Estimation Users Manual, “Michigan Method”.

Descriptors to use for Region 5 Model sub-methods:

R5 / GEE	Gulley Stabilization – uses Gulley Erosion Equation
R5 / CEE	Streambank / Ditchbank and Roadbank stabilization – uses Channel Erosion Equation
R5 / Fields	Agricultural Fields – uses Revised Universal Soil Loss Equation (RUSLE), sediment delivery ration and contributing drainage area.
R5 / Filter	Filter Strips – uses relative gross filter strip effectiveness
R5 / Feedlot	Feedlot Pollution Reduction – uses a 12 step method

2. WEPP Model Refer to USFS website <http://forest.moscowfl.wsu.edu/fswepp>
Water Erosion Prediction Project (WEPP) computer model