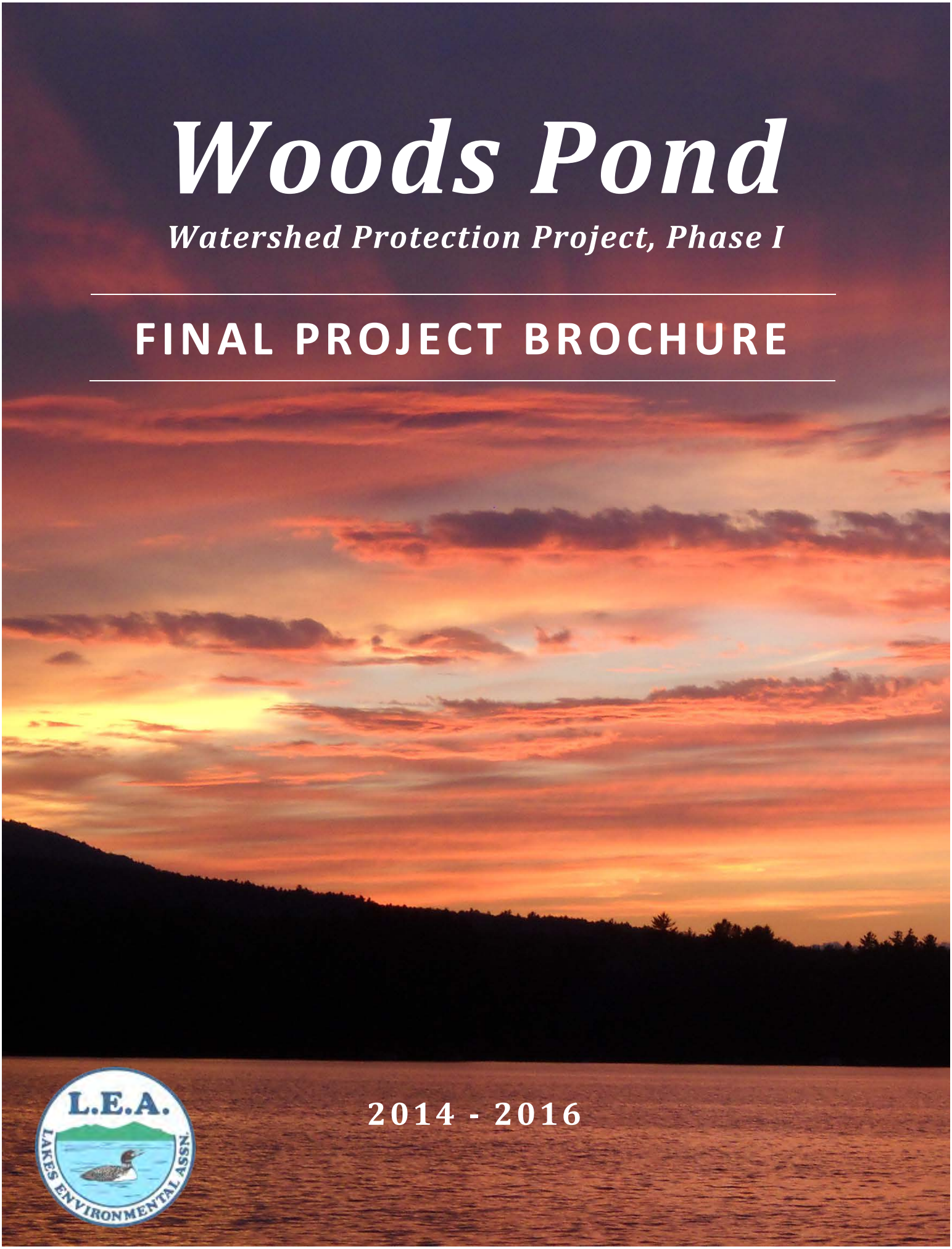
Woods Pond

Watershed Protection Project, Phase I

FINAL PROJECT BROCHURE

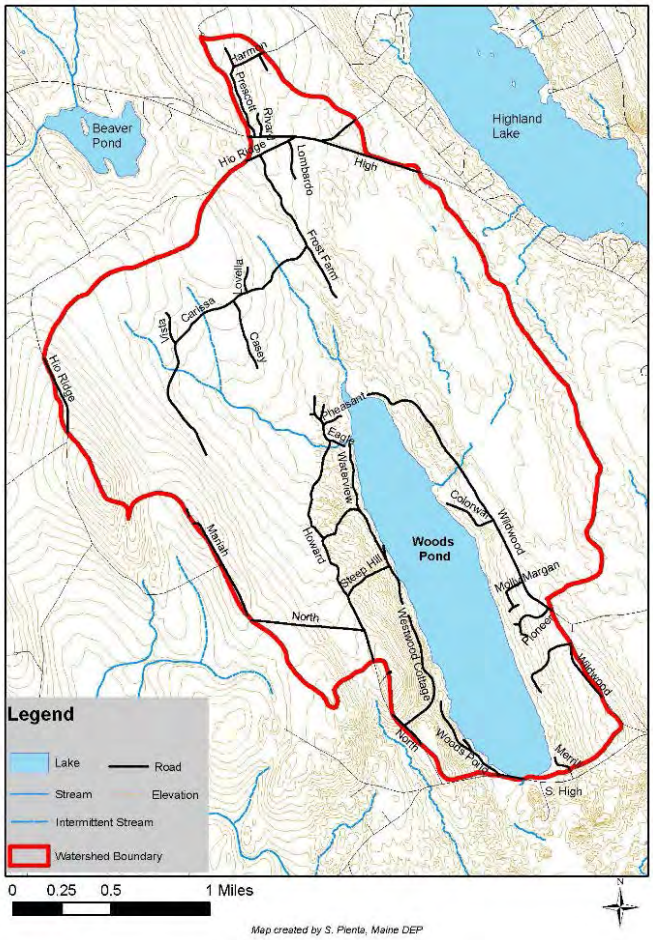


2014 - 2016

INTRODUCTION

Colin Holme/LEA

From 2014 to 2016, Lakes Environmental Association (LEA) led the *Woods Pond Watershed Protection Project, Phase I*. The goal was to reduce the amount of soil erosion that washes into the lake. The project was made possible by a grant from the Maine Department of Environmental Protection (DEP) with funding provided, in part, from the U.S. Environmental Protection Agency. Partners included the Town of Bridgton, Woods Pond Water Quality Association, Portland Water District, Woods Lake Association, Wildwood Road Association, Frost Farm Road Association, Woods Pond Drive Association, Cumberland County Soil & Water Conservation District, Camps Wildwood and Kingswood, Portland Water District, and Fiddlehead Environmental Consulting.



Woods Pond Watershed *– The red line shows the Woods Pond watershed, or the area of land that drains water into the lake. Activities on the land within this boundary can impact the health of the lake.*

Phosphorus is a common nutrient in our soils and is essential for plants to grow on land. When phosphorus gets into our water through soil erosion and polluted runoff, the nutrient can fertilize the plants in the water and lead to an explosive growth of algae. These algal blooms can transform a clear, blue lake into a slimy green mess.

Far-fetched? Algal blooms have already occurred in lakes in central Maine. Once a bloom happens, it ruins water quality, wildlife habitat, swimming, fishing, and boating. Large blooms can even reduce shoreline property values. DEP has identified soil erosion as the biggest threat to the health of Maine lakes.

Front cover photo credit: Jeff Stern, FEC

Woods Pond's water quality is generally good, but long-term testing reveals worrisome trends. During the past decade Woods Pond has been inundated by soil erosion from the surrounding land during storms.

In 2012, the Woods Pond Water Quality Association led the coordination of a survey to document erosion sources in Bridgton. Seventy-nine sites that contribute soil erosion to the lake were found. Following the survey, LEA applied for, and received, a grant from DEP (funded through Section 319 of the Clean Water Act) to share the costs of erosion control projects with various partners and to educate the public. This brochure highlights work completed through the project.

Project Highlights

- Seventeen large, cost-sharing projects reduced erosion washing into Woods Pond by an estimated 38 tons each year. (Some of these projects are described on pages 4-7.)
- Ten "Residential Matching Grants" awarded to property owners to share the cost of fixing small residential erosion problems reduced erosion into Woods Pond by an additional estimated 10 tons per year (see page 7).
- Twenty-nine technical assistance visits provided landowners with recommendations for controlling erosion.
- Two hands-on workshops and one "house meeting" informed residents of the benefits of buffers, the importance of road maintenance, and Bridgton's shoreland zoning regulations.
- News articles; web postings; and presentations at road association annual meetings, community events, and Bridgton Select Board meetings informed the public about project activities and progress.

Three Simple Rules for Erosion Control

There are a variety of techniques to control erosion from the land, but it all boils down to these three simple rules:

1) **Cover bare areas** – The power of a single drop of rain to impact bare soil is amazing. Multiply this by the millions of drops that can fall during a rain event that dislodge and move tons of bare soil. Unfortunately, all this soil can end up in the lake. Cover bare soil with vegetation, stone, or erosion control mulch.

The Power of Water *– A drop of water dislodging soil particles.*

2) **Plant a buffer** – Vegetative buffers are a lake's best friend! Buffers trap nutrients that run off the land, attract wildlife, and enhance the owner's privacy. Their roots form an underground network that holds soil in place and prevents erosion. Low-growing plants can be recommended to maintain a view of the water and that are appropriate for the property's growing conditions.

CCSWCD

Living Shorelines *– Plants at the water's edge hold soil in place.*

3) **Get water off gravel roads, driveways, and paths as soon as possible** – When runoff flows down gravel roads and driveways it can form ruts that turn into gullies and become a major erosion issue. Install diverters across your road or driveway that direct runoff into vegetation. Rubber razor bars and open-top culverts are effective for seasonal properties. Even paths, if not protected with a water bar or two, can become significant conduits for runoff into a lake.

CCSWCD

***Water Diverters** – Rubber razor bars direct water off this boat launch.*

Vegetative Buffers

CCSWCD

Vegetative buffers trap and absorb soil and sediment that erodes off the surrounding land, and they require relatively little maintenance.

In the example shown below, erosion was documented in the 2012 watershed survey at this summer camp site off Wildwood Road. Planting a buffer was an important part of the erosion control plan for the site. First, the steepness of the beach was reduced with the installation of boulders above the high water line. A buffer was then planted to trap erosion caused by runoff and foot traffic. Plants used included Bayberry, Oxeye Daisy, Hyssop Skullcap, Blackeyed Susan, Switchgrass and Common Juniper. Special planting techniques were used because beach sand cannot support plant growth. Over time, the plants will fill in to create a vegetative "wall" that cuts erosion, enhances scenic beauty, overspreads the shoreline boulders, and attracts wildlife. The grant paid for half of the cost of the buffer planting, and the camp owner paid for the other half.

Jeff Stern, FEC

Jeff Stern, FEC

***Stable Shoreline** – Boulders and plants were used at this site to hold soil in place to prevent it from washing into the lake.*

Kingswood Camp

Jeff Stern, FEC

Jeff Stern, FEC

***Path to Clean Water** – The grant worked with Kingswood Camp to improve a path that was contributing sediment to a stream and Woods Pond.*

Kingswood Camp is one of two youth summer camps on Woods Pond. (Camp Wildwood is the other one.) Kingswood attracts hundreds of campers each summer. This site was identified as 4-C in the 2012 watershed survey.

A brook runs through the heart of the camp. There is a heavily-used footpath leading to a small bridge that crosses the brook. Over the years, foot traffic had created a significant erosion issue. Sediment from the path washed into the brook and into Woods Pond. A large sediment delta in the brook shows how much material washed off the trail.

The camp worked with the grant to share the costs of an erosion control project to improve the trail. The solution included sloping the footpath toward a wooded buffer and away from the brook. The path was re-surfaced with ¾-inch gravel, which is less likely to erode. Two turnouts were built across the footpath as an added measure to direct runoff away from the brook and into the buffer. Finally, bare areas were seeded and mulched.

CCSWCD

WATERVIEW TRAIL

Jeff Stern, FEC

Jeff Stern, FEC

Improved Flow *– One undersized culvert was replaced by two larger culverts at this site on Waterview Trail. The new culverts allow more water to flow through the pipes during storms to reduce erosion impacting Woods Pond.*

Waterview Trail is a gravel road that is heavily used during the summer. It is at the base of very steep terrain on the west side of Woods Pond; consequently, the steep brooks that spill off this side of the watershed flow very rapidly into the pond. One such brook crossing just north of the junction of Steep Hill and Waterview Trails had an undersized culvert. As a result, water would back up and occasionally overtop the road during intense storms, creating massive erosion that washed into Woods Pond. The culvert itself was rusty and failing. In addition, the culvert was too short to stabilize its inlet and outlet with angular stone rip-rap, an important measure to reduce erosion.

The solution included removing a collapsing stone buttress that sat above the culvert. The old, rusty and undersized culvert was removed and replaced with two new plastic culverts. Each of the new culverts measure 24 inches in diameter, which increases the capacity to pass flows during storms. The new culverts measure up to 10 feet longer than the original 20-footer, allowing the contractor to armor the inlets and outlets with rip-rap.

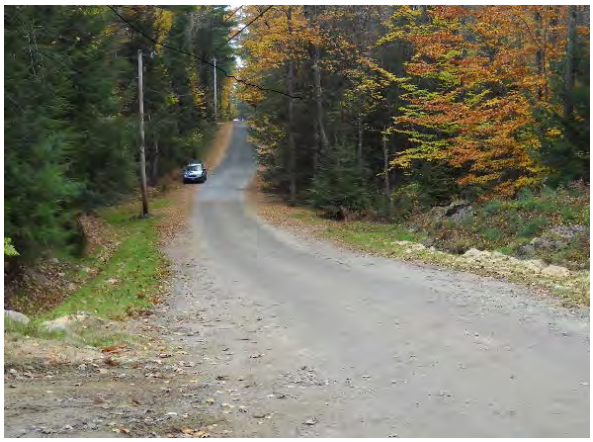
In addition, a sediment pool was created on the south side of the brook to capture runoff from Steep Hill Trail before it entered the brook and flowed to Woods Pond.

The photographs above show the inlet before and after construction. A major source of erosion was eliminated. There are similar undersized culvert crossings throughout the Woods Pond watershed with erosion problems similar to this one. The *Woods Pond Watershed Protection Project, Phase I*, fixed many, but not all, of them. It is hoped that this work will demonstrate how to fix the rest.

CCSWCD

Wildwood Road

Jeff Stern, FEC



Jeff Stern, FEC

***Collaborating for Clean Water** – The Wildwood Road Association and Town of Bridgton worked with the grant to address drainage challenges to reduce sediment washing into Woods Pond.*

Wildwood Road at the Sucker Brook crossing was the most severe erosion problem documented in the Woods Pond Watershed Survey. Here, the road makes a sharp dip down to the brook from both the north and south approaches. This site was unique because the paved, south approach is managed by the Town of Bridgton, while the gravel, north approach is a private road maintained by the Wildwood Road Association. This section highlights improvements that were made on the private portion of the road.

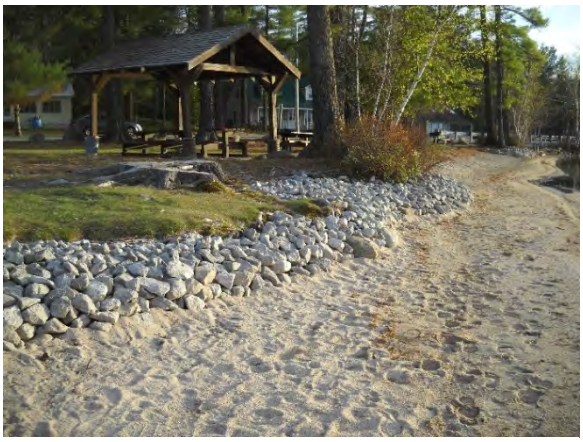
The gravel road was poorly shaped; it was "bowl" shaped rather than crowned, or raised, in the middle, which resulted in runoff being unable to flow into the ditches on either side of the road. Instead, water ran down the road and washed sediment into the brook, which flows a short distance to Woods Pond. The ditches themselves were poorly shaped and filled so that if runoff had made it to them it is doubtful they could have handled the load. To its credit, the road association hadcreated a turnout at the lower end of the ditch on the west side of the road; however, this this turnout had filled over time.

An engineer (paid for by the grant) designed the solution for this complicated site, which included adding material to the road and properly crowning it in the middle, which allows runoff to flow to the sides rather than running down the middle of the road. The berms on the road shoulders were removed. The ditches were re-shaped and deepened. The bottom of the west ditch was lined with erosion control matting and seeded. The turnout was enlarged and angular rocks were added at its outlet. A damaged culvert at the location of the town snowplow turnaround (which is on the private road) was replaced and properly armored. In addition, a sediment pool was created at the outlet of the ditch on the east side of the road.

The Town of Bridgton did its part to deal with this serious erosion problem. Their work included reshaping and repaving the town portion of the road, and installing rock-lined ditches and turnouts. This site is an excellent example of how collaboration can solve clean water challenges!

Woods Pond Town Beach

Jeff Stern, FEC



Jeff Stern, FEC

***Beach Cleanup** – Improvements at the Woods Pond town beach include placing fabric and stone in undercut areas to hold soil in place.*

Woods Pond town beach is a popular place during the summer. Hundreds of people are drawn to it for swimming, kayaking, fishing, and sunbathing.

The beach is on the receiving end of the prevailing northwesterly winds that roll down the lake, generating huge waves. Consequently, wave action led to severe undercutting of the bank, which was documented in the 2012 watershed survey and worsened in the years before the start of the *Woods Pond Watershed Improvement Project, Phase I*. In addition, heavy foot traffic from the picnic area down to the beach had created surface erosion as evidenced by exposed roots.

Working with the Town of Bridgton and the Woods Pond Water Quality Association, erosion control measures were recommended and implemented through the grant. The solution included filling the undercut bank with geotextile fabric and crushed stone, then armoring it with angular rock rip-rap. Materials were provided by the town. Members of the Woods Pond Water Quality Association provided the muscle to put the fabric and rocks in place.

The result of this collaboration was a successful erosion control project in a highly visible area. The initial work took place in 2014, and a buffer planting the following year (also through the grant) will further stabilize and beautify the beach!

Residential Matching Grants

The 2012 watershed survey documented 26 residential sites that contributed erosion to Woods Pond, 33% of all erosion sites found. When combined, residential sites contributed an estimated 10 tons of soil to Woods Pond each year. Because of the cumulative impact of these sites, LEA believed a special outreach effort and cost-sharing program was needed to correct residential problems.

LEA offered 10 “Residential Matching Grants” (RMGs), which were chosen according to severity of impact as determined in the watershed survey and the probability of landowner cooperation. The grant provided up to $400 to address erosion issues on residential properties, which was matched (at a minimum) by a $400 contribution from the landowner. Cash, labor, or donated equipment and supplies all counted as landowner match.

This $800 per site may not sound like much, but the sites that were eligible for the RMG program required relatively simple erosion control measures, such as installing runoff diverters across driveways and dripline trenches to capture roof runoff, planting vegetation to enhance or establish buffers, creating paths, stabilizing the shoreline, or covering bare areas with erosion control mulch.

Pictured below are "Before" and "After" photos from two Residential Matching Grants. LEA thanks the landowners who participated in the RMG program and worked hard to make their land more "lake-friendly"!

Jeff Stern, FEC

Jeff Stern, FEC

Runoff at this property carried soil into Woods Pond at the landowner's canoe/kayak put-in. Vegetation, such as grass and shrubs couldn't gain a foothold in this shady, high-foot -traffic area. The solution was simple: cover the bare soil with erosion control mulch, which is heavier and stays in place better than traditional mulch. Now, runoff will be trapped and absorbed in the mulch before it washes into Woods Pond.

Jeff Stern, FEC

Jeff Stern, FEC

At this site, runoff carried eroded material down a driveway and spilled out on to Waterview Trail, a gravel road. Runoff then flowed downhill – picking up more soil and sediment on the way – and dumped into a brook, which flowed a short distance to Woods Pond. The owner installed an open-top culvert across the driveway. Now, runoff from the driveway will drop into the open-top culvert and flow to the road ditch, instead of on to the road itself.

Public Education

Jeff Stern, FEC

Twenty-five people (from Woods Pond and other lakes in surrounding towns) attended a grant-sponsored workshop at Camp Wildwood May 30, 2015. Lucia Terry, owner of Perennial Point of View, provided instruction in planting a buffer at a tough beach site – steep, sandy and windy. Participants then got their hands dirty planting a variety of shrubs.

Public education played an important role in the *Woods Pond Watershed Protection Project, Phase I*. From the beginning of the project in March 2014, LEA sought to involve and engage the public every step of the way. A summary of education activities carried out under this project is provided below.

- Numerous press releases were distributed to area newspapers and radio stations advertising grant-sponsored events and updating the public about project progress.
- Articles appeared in *LEA Lake News*, LEA's quarterly newsletter and updates were posted on the LEA website.
- Several presentations were provided to the Bridgton Select Board. The Town of Bridgton was a partner on critical projects to control erosion along the town portion of Wildwood Road at Sucker Brook and at the town beach. It was important to keep the Select Board informed.
- Two grant-sponsored workshops were provided for residents and others interested in lake protection. One workshop was a hands-on demonstration of planting techniques at a challenging beach site. The other workshop featured a "walking tour" on Woods Pond Drive that showcased simple erosion control techniques that landowners can implement at their properties. Many of these measures were installed through the *Woods Pond Watershed Protection Project, Phase I*.
- A public meeting in August 2015 discussed shoreland zoning regulations with Robert Baker, Bridgton Code Enforcement Officer. The meeting featured a lively question and answer session to clarify what is and is not allowed in Bridgton's shoreland zone.
- Presentations were made at the road association annual meetings around Woods Pond and at LEA's annual meetings.

Maintenance is Critical

Many of the erosion control measures discussed in this brochure will require maintenance so they continue to prevent erosion in future years. Periodic maintenance is more cost-effective than fixing a site after a major erosion event. The *Gravel Road Maintenance Manual* (April 2016), a guidebook produced by DEP, estimates $1 spent on routine road maintenance saves $15 in capital repairs. Road and driveway maintenance includes periodically cleaning out plunge pools, sediment basins and ditches, unplugging clogged culverts, and maintaining the proper crown on gravel roads and driveways. Sediment that accumulates behind rubber razor bars will need to be cleaned occasionally, and buffer plants should be monitored to ensure they remain healthy and well-watered.

Colin Holme/LEA

Thank You to Our Partners

Town of Bridgton | Woods Pond Water Quality Association
Woods Lake Association | Wildwood Road Association
Frost Farm Road Association | Woods Pond Drive Association
Portland Water District | Cumberland County Soil & Water Conservation District
Camp Wildwood | Kingswood Camp | Fiddlehead Environmental Consulting
Maine Department of Environmental Protection | Watershed Residents

For More Information

Lakes Environmental Association
230 Main Street | Bridgton, Maine 04009
lakes@leamaine.org | 207.647.8580 | www.mainelakes.org

Funding for this project, in part, was provided by the U.S. Environmental Protection Agency under Section 319 of the Clean Water Act. Section 319 grants are administered by the Maine Department of Environmental Protection in partnership with EPA. Printed on recycled paper.

Barry DeNofrio