

*Panther Pond
Conservation Project
Phase I
2005 - 2008*



*Working together to protect and improve
the water quality of Panther Pond*

Acknowledgements

The following people and organizations were instrumental in the Panther Pond Conservation Project Phase I and deserve special recognition for their efforts.

Project Partners:

Maine Department of Environmental Protection (MDEP)
Panther Pond Association (PPA)
Portland Water District (PWD)
Raymond Waterways Protective Association (RWPA)
Town of Raymond

Project Staff :

Noralee Raymond, RWPA, Project Manager
John McKinnon, Watershed Solutions, Engineer
Wendy Garland, Maine DEP Grant Administrator

Panther Pond Conservation Project Phase I Steering Committee:

Phil Boissonneault	Ben Severn
Sharon Cox	Brian Walker
Wendy Garland, Maine DEP	Ginger Wallace
Noralee Raymond, RWPA	

Report Prepared by Noralee Raymond, RWPA

The Panther Pond Conservation Project Phase I was funded in part by the US 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 in order to prevent or reduce water pollution in Maine.



Loon photos throughout this publication provided by Ben Tripp of Watchic Lake.

Project Purpose

The primary purpose of this project was to significantly reduce erosion and export of sediment and phosphorus into Panther Pond. This was accomplished by installing conservation practices that reduce erosion and polluted run off at priority sites throughout the watershed. The project also aimed to raise awareness of watershed issues and promote long-term watershed stewardship.

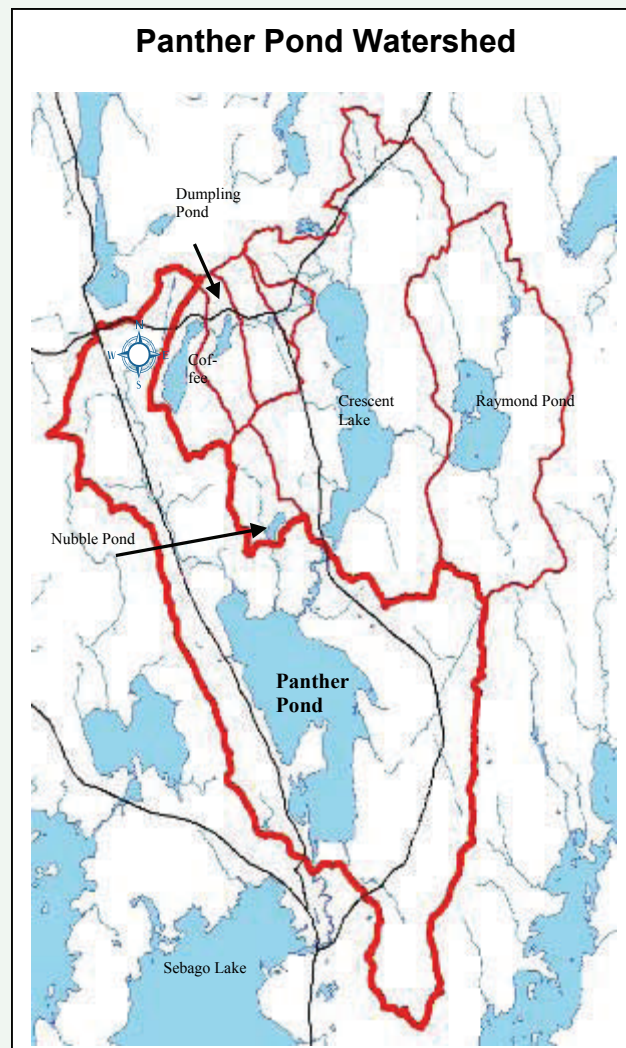
Lake and Watershed Description

Panther Pond is a 1439-acre lake with a total volume of 33,969 acre-feet and a surface area of two square miles. The lake is located in the Town of Raymond in central Cumberland County, Maine. It has maximum depth of 68 feet and an average depth of 26 feet. Panther Pond has nearly 14 miles of shoreline, most of which is privately owned. The shoreline is developed with over 300 seasonal and year-round homes, four youth summer camps, and an extensive network of unpaved camp roads.

The Panther Pond Watershed covers 12.3 square miles in Raymond and Casco. The larger watershed covers 25 square miles and includes Crescent Lake, Raymond Pond, and several other smaller ponds. Panther Pond empties into Sebago Lake and is part of the Casco Bay Watershed.

Panther Pond is highly valued by seasonal and year round residents for its clear waters and sense of wilderness while still providing the convenience of nearby Portland. Panther Pond has one private boat launch that is often used by the public. It is a popular lake for winter activities such as snowmobiling and ice fishing and summer activities such as boating, fishing, kayaking, and canoeing.

Panther Pond is well known for its wealth of wildlife. Six adult loons and two chicks were counted during the 2007 loon count. Residents of Panther Pond are also proud of their bald eagles. The Pond has excellent bass and trout fishing.



Panther Pond's Water Quality

Working with the Maine DEP staff, Charlie Turner and other volunteers from RWPA have tested water quality in Panther Pond for over 30 years. According to this data, Panther Pond's water quality is considered above average, and the potential for nuisance algae blooms low. The long-time average water clarity is about 20 feet - about 5 feet clearer than the average Maine lake. Despite these positive indicators, the bottom waters of the lake experience some oxygen depletion in the late summer months. This oxygen depletion may be an early warning sign that the pond is under stress, and if this worsens over time, the pond's coldwater fish habitat would be impaired.

As a result of the monitoring and the area's development trends, Panther Pond has been placed on the State's "Nonpoint Source Priority Watersheds" list, which means the lake is threatened or impaired by polluted runoff. In addition, MDEP has included Panther Pond on their list of "Lakes Most at Risk from Development" under the Maine Stormwater Law. Future development, unless done properly, will further degrade the water clarity and quality of Panther Pond.

Water quality problems can be attributed to polluted runoff that washes into the lake from its surrounding watershed. Phosphorus, which attaches to soil particles, poses the greatest threat to Panther Pond. Phosphorus spurs excess algae growth, causing declines in water clarity and oxygen levels. Ultimately, high inputs of phosphorus can lead to a degradation of fish habitat, development of nuisance algae blooms, and losses in lakefront property values.

2004 Panther Pond Watershed Survey

The Panther Pond Association, Raymond Waterways Protective Association, and MDEP organized an independent survey of the watershed. The primary purpose of the watershed survey was to identify and prioritize existing source of polluted runoff, raise the community awareness, and foster long-term lake protection. Volunteers identified 84 erosion sites. Surveys in much smaller watersheds in the area have identified well over 100 sites.

The results of the surveys were consistent with survey findings across southern Maine. Residential sites, including driveways and shorefronts, accounted approximately 70% of the problem sites and roads accounted for an additional 15% of the sites. Boat access, youth summer camps, and ATV trails were also identified as potential sources of polluted runoff to the lake.



The Panther Pond Watershed Survey report are available on the web at www.raymondmaine.org/committees/waterways

Conservation Project Partners

- **Panther Pond Association**
- **Portland Water District**
- **Maine Department of Environmental Protection**
- **Raymond Waterways Protective Association**
- **Town of Raymond**
- **US Environmental Protection Agency**



Conservation Project Timeline

2004	Panther Pond Watershed Survey - identified 84 sites
2005	\$43,945 of Federal grant money awarded to start implementing fixes at 42 identified sites
2006	An additional \$17,700 of State funds to enhance erosion control efforts at nine high to medium impact sites
2008	Panther Pond Conservation Project - Phase I complete. Fixed 46 sites, reduced identified pollutant load by 70%.
2008	\$63,289 of Federal grant money awarded to begin Phase II to continue addressing identified erosion sites
2009	Panther Pond Conservation Project, Phase II begins

How did we meet our goal to protect and improve the water quality of Panther Pond?

Education
Technical Assistance
On-the-Ground Fixes

Most erosion issues can be fixed by low cost and easy to install solutions, such as runoff diverters on a path or driveway, drip-line trenches along a roofline, infiltration steps on a steep slope, crushed rock, mulch or plants in bare soil areas.

Education

Project Goal:

- Hold two “Cruise the Buffers” educational tours
- Hold two Conservation Landscaping Workshops
- Create and distribute Project Fact Sheet and final Project Brochure
- Create and distribute outreach materials for watershed residents

Project Accomplishments:

- Held two “Cruise the Buffers” tours and one walking tour
Participation: 30 lake residents in August 2005, 26 lake residents in July 2006.
- Held two Driveway / Right of Way Maintenance workshops
20 residents learned how to install rubber diverters and infiltration steps.
- Held two Conservation Landscaping workshops
21 volunteers installed a rain garden, vegetated buffer, and lake friendly paths
- Developed an Initial Project Fact Sheet to introduce grant activities and provide tips for lake-friendly living and distributed to watershed households.
- Developed a Project Update Flyer to notify residents of completed projects and additional opportunities to address erosion sites.
- Created and distributed Final Project Brochure to all watershed households.
- Gave Presentations each year at the PPA and RWPA annual meetings
- Project updates provided over e-mail to Panther Pond Association members and the Town of Raymond officials.
- Articles published in *Raymond Road Runner* and updates provided on RWPA website.

Education - Cruise the Buffers

“Cruise the Buffers” workshop:
a new way to learn about the
importance of shoreline
vegetation!

Participants learned about:

- Value of native plants
- Privacy through buffers
- Winding paths for buffer protection
- Natural buffers
- Landscaped buffers

~ 25 people attend each year



You can have a view and a buffer too!

Right-of-Way Workshop

Volunteers participated in a workshop on Jordan Lane to improve a private boat launch on their road. The volunteers constructed two rubber runoff diverters (right) and installed them across the ROW (bottom).



Rubber diverters are used to direct water away from the lake into stable vegetated areas. Many of the techniques used to address erosion issues on right-of-ways can also be used on gravel driveways and seasonal gravel roads.



Before: Runoff causes eroded gully that washes sediment directly into Panther Pond



After: Rubber diverters direct runoff into stable vegetated areas and away from the lake

Vegetative Buffer & More Workshop

Twelve residents from the Panther Pond Watershed participated in a workshop at Plummerville to install a vegetated buffer and minimize the bare soil open area. The path was stabilized with erosion control mulch to reduce the sediment load to the lake. Crushed rock and timbers were used to define the parking area allowing for infiltration of water from the camp road. In addition, the road was graded to shed water away from the lake.



Rain Garden & Path Workshop

The landowner and volunteers attend a conservation landscaping workshop to install a rubber diverter and rain garden to collect stormwater runoff from the Plummerville boat launch. In addition, infiltration steps were installed on two camp paths.



Technical Assistance

Project Goal:

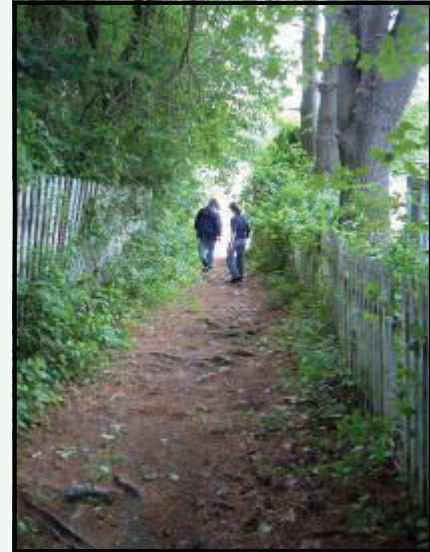
- Complete 42 technical assistance visits.

Project Accomplishments:

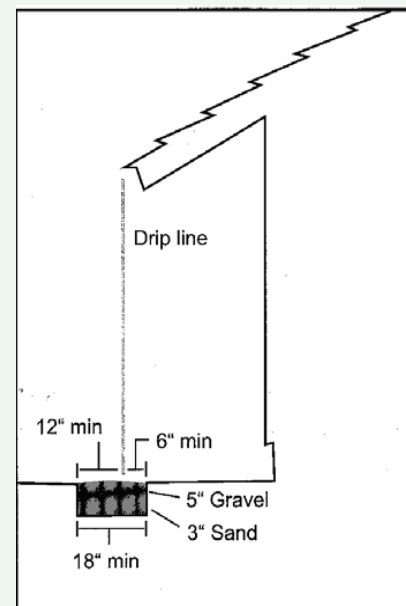
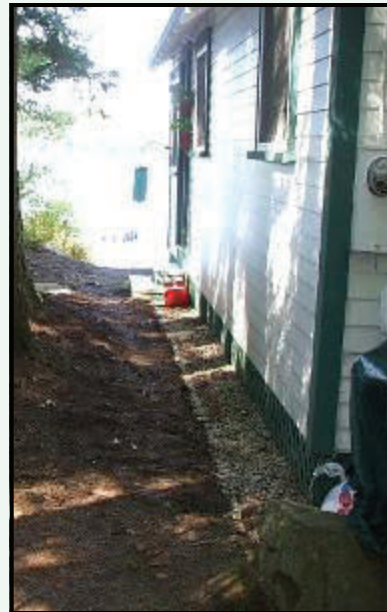
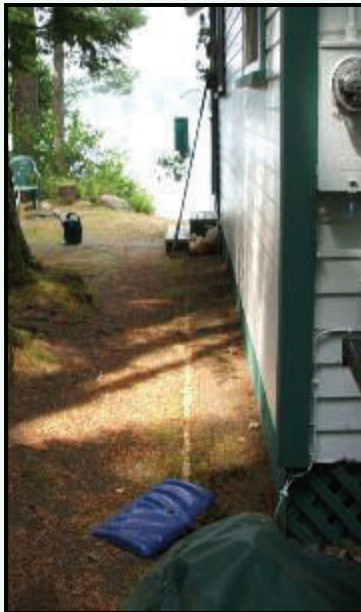
- 54 technical assistance visits completed.

What is technical assistance:

- Visits consist of an assessment of current site conditions and recommendations for improvement
- Specific recommendations are summarized in reports and sent to landowners
- Recommendations are voluntary.
- Free engineering recommendations and construction oversight provided, where appropriate



Noralee Raymond, RWPA and Wendy Garland, DEP, discuss how to repair the Maple Avenue ROW



Recommendations for this property included installing a dripline trench along the roofline to collect and infiltrate roof runoff and to cover the bare soil path with erosion control mulch

On-the-Ground Fixes

Project Goal: 42 sites

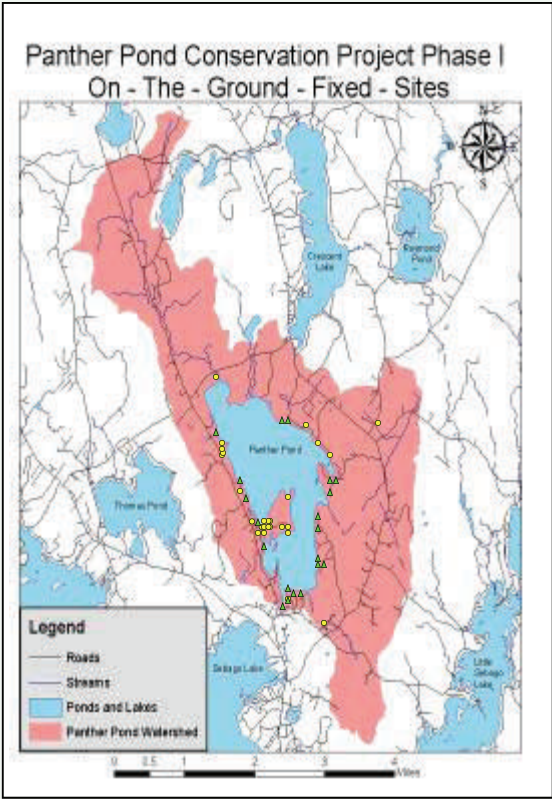
- 22 High/Medium Impact Sites
- 20 Conservation Matching Grant Sites

Project Accomplishments: 46 sites

- 26 NPS Sites Completed:

Camp Hawthorne (4)	Plummerville (7)
David Plummer Rd (2)	Plains Rd - Rolfe Brook
Jordan Lane (2)	Raymond Hill Rd
Lakeside Drive	River Road
Maple Avenue ROW	Residential Properties (5)
Hayden Brook Rd - Hayden Brook	
- 20 Conservation Grants Awarded

It is estimated that by completing the 26 construction sites, approximately 73 tons of sediment per year (62 pounds of phosphorus) has been kept out of Panther Pond.



- ▲ High/Med NPS Construction Sites
- Conservation Matching Grants

Hayden Brook Road

Several upstream culverts on the state road were increased in size rendering the size of the 36" private road culvert too small for the increase in stream flow. The culvert was washed downstream during an August 2008 rain storm (5" storm) washing 63 yards of gravel into Hayden Brook which outlets into Panther Pond. The Town of Raymond Public Works Department increased the culvert size to 48" and installed an overflow culvert to accommodate larger storms.



Plains Road - Rolfe Brook

This site was identified as a high impact site in the watershed survey. Stormwater runoff caused severe road shoulder erosion and created a large eroded gully above the stream culvert. Direct flow of sediment traveled into a stream that feeds Panther Pond. Redefined and vegetated ~120 of road shoulder and ditching, installed two turnouts in ditch to direct water into vegetation, stabilized bank above culvert outlet with stone rip rap. This project was cost-shared with the Town of Raymond.



Before: Severe erosion. Large eroded gully above culvert outlet.

After: Bank above culvert stabilized with stone rip rap.



After: Turnouts installed to direct runoff into vegetation before the brook crossing. Shoulder & ditch stabilized.

Raymond Hill Road

This site was identified as a high impact site in the watershed survey. Stormwater runoff traveled down the steep bank and caused severe erosion with direct flow of sediment to a stream that feeds Panther Pond. A culvert extension was added to the existing culvert, a proper slope was established, and the banks were properly stabilized with Geotextile fabric and stone rip rap. This project was cost-shared with the Town of Raymond.



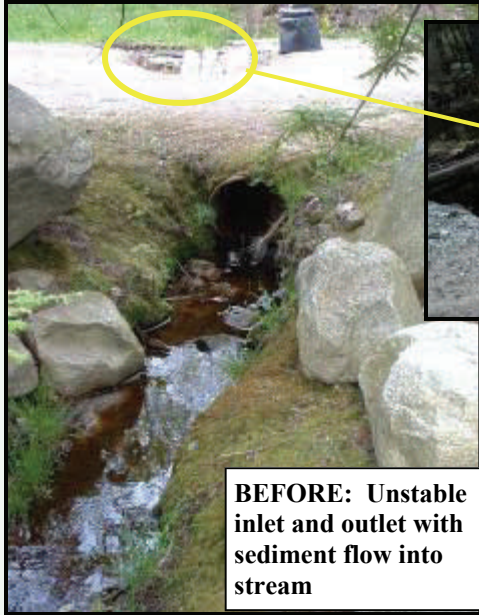
Before: Severe bank erosion



After: Riprap stabilizes bank

Lakeside Drive

This site had a rusted out metal culvert with an unstable and eroding inlet and outlet and direct flow of sediment into the stream. Additionally it was undersized and washed out during the Patriot's Day storm. The Town of Raymond assisted with material delivery and a contractor replaced the culvert with a smooth bore polymer culvert to increase the flow capacity and stabilized the inlet and outlet with crushed stone. Work at these sites was cost-shared with the Lakeside Drive 63A Association.



BEFORE: Unstable inlet and outlet with sediment flow into stream



BEFORE: undersized, eroded culvert washed out in the Patriot's Day storm



AFTER: Installed smooth bore polymer culvert. Stabilized inlet and outlet with stones (rip rap).

River Road

Erosion problems on this road included two rusted out metal culverts with unstable inlet and outlets and direct flow of sediment to springs that feed Panther Pond. The Town of Raymond assisted with material deliver and a contractor installed two polymer culverts, stabilizing the inlets and outlets with rip rap stone. Work at these sites was cost-shared with the River Road Association.



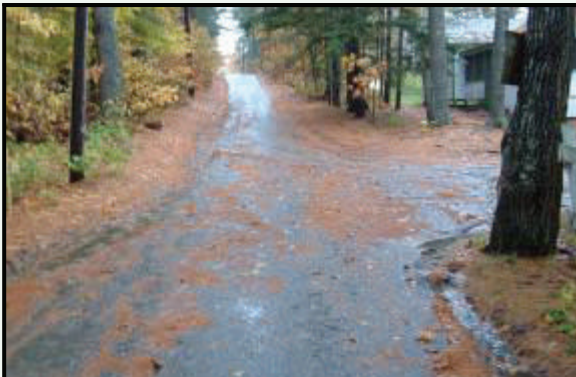
BEFORE: Unstable bare soil inlet/outlet



AFTER: new culvert, inlet & outlet stabilized with large stones (rip rap).

David Plummer Road, Stormwater Compensation Site

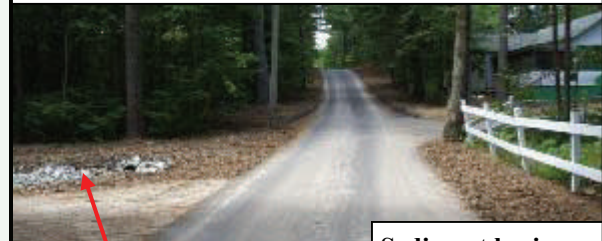
The Town-owned portion of David Plummer Road was a significant source of stormwater contributing runoff to **five medium impact and one high impact sites**. This steep, narrow, paved road with dirt shoulders did not have any stormwater management controls. Runoff washes directly from this road causing severe to moderate erosion on the road shoulders, private gravel road, two gravel driveways, several camp paths, boat launch and beach. The road was re-surfaced to allow for the installation of curbing to direct runoff to two catch basins which flow into a settling basin. This significantly reduced the volume of runoff to the private gravel road, paths and the lake. In addition to the federal grant, this project was funded by Maine DEP Stormwater Compensation Funds and cost-shared with the Town of Raymond.



Before: Runoff erodes shoulder and private road with direct flow down eroded paths into the lake



After: Curbing directs runoff into catch basins



Sediment basin captures overflow of runoff from catch basins



Installing the sediment basin



Contractors install curbing

Conservation Landscapes: Native Plants

Buffers are areas of trees, shrubs, groundcovers, and duff that help prevent sediment and nutrients from reaching the lake. It is important to maintain vegetation on all parts of properties to trap sediments, excess nutrients, and other pollutants; prevent erosion; and help stabilize sloped areas and the shoreline. Vegetation also adds beauty, enhances privacy, and provides wildlife habitat. Native plants are recommended because they are suited for Maine's growing conditions and thus require little or no fertilizers.

A manicured lawn lends virtually no aid to treating polluted runoff. If your property already has an existing lawn, maintaining it at a minimum of 3 inches is recommended, although allowing the area to naturalize is preferred.

Native plants to consider

Shrubs

- Blueberry
- Bearberry
- Sweet Fern
- Sheep Laurel
- Snowberry
- Blue Rug Juniper
- Buttonbush

Perennials

- Black Eyed Susan
- Cinnamon Fern
- Purple Coneflower
- Scarlet Bee Balm
- Solomon Seal
- Blue Flag Iris

Trees

- Balsam Fir
- Red Maple
- Pagoda Dogwood
- Black Spruce
- White Oak
- Black Willow
- Black Cherry
- Yellow Birch



Solomon Seal



Sheep Laurel



Bearberry



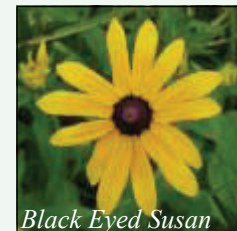
Blueberry



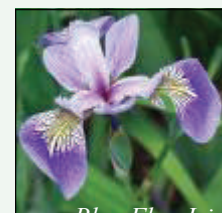
Red Maple



Purple Cone Flower



Black Eyed Susan



Blue Flag Iris



Snowberry



Buttonbush

Native plants are an excellent choice for your lake front property. They are adapted for the growing conditions in Maine, require no fertilizers, and are low-maintenance!

Vegetative Buffers



Shorefront Vegetative Buffers - The Last Line of Defense in Lake Protection

The natural vegetated buffer on this shorefront property had been completely removed. Native vegetation and erosion control mulch were installed along the shoreline. This buffer strip will be able to more effectively slow the running stormwater, which will give it time to infiltrate into the ground preventing nutrient filled runoff from reaching the lake.

“I loved the opportunity to begin the process of returning the waterfront area of our property to a more natural and less manicured state. I was able to walk my property with knowledgeable representatives of the RWPA and Panther Pond Conservation project. They offered strategies and ideas on how to best accomplish this goal for the betterment of the lake’s health and our property.” - Cathy Regios, Lakeside Drive



Upland Buffers - Creating Vegetated Areas to Capture & Infiltrate Runoff from Driveways, Paths & Open Areas

The Crilly family on Meadow Road installed a waterbar and upland vegetated buffer at the bottom of the driveway to filter runoff. Runoff from driveway washed across lawn, bare soil sitting area and path directly into Panther Pond. In addition to the upland buffer, the path and sitting area were covered with erosion control mulch and the plants added to their shoreline buffer.

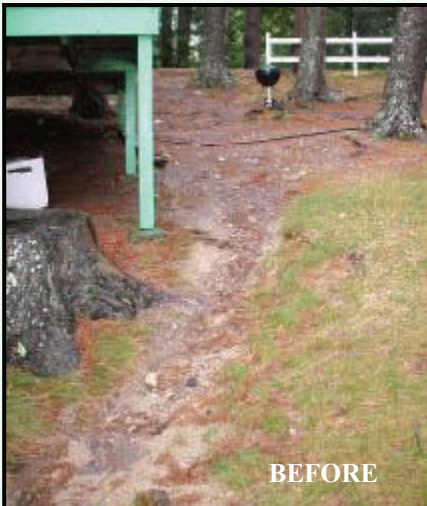
Vegetated buffers are not only for the shoreline. Vegetation can be strategically planted to capture runoff from driveways, open areas, and paths.

Conservation Landscaping - Paths

Properly designed paths absorb water, reduce the rate of flow, protect underlying soil and direct foot traffic. Path can also reduce the potential for erosion and minimize the amount of pollutants flowing from your property into Panther Pond. Ideally, paths should be meandering and no more than 3'- 4' wide. The walking surface should be covered with 3"- 4" of material such as Erosion Control mulch, crushed stone, wood chips, or other material. Strategic plantings can also help direct foot traffic.



A group of volunteers came together to assist the Snells of Sloan's Cove Road with fixing their eroded path to the lake. The path was covered with 3" of crushed rock and erosion control mulch was spread over bare soil on the path sides. Crushed rock and erosion control mulch prevent erosion, protect underlying soil and help slow down and infiltrate runoff.



Road runoff caused severe erosion on the Allen's path. The path was stabilized with 4" of Erosion Control mulch.

Erosion Control Mulch (ECM) is a specific kind of mulch that protects bare soil from erosion and retains moisture. ECM is made of composted bark, sand, gravel, stone, and wood fragments. It is heavier than other types of mulch and is good for walkways, recreational areas, and between plantings.

Infiltration Steps & Waterbars

Infiltration steps are steps built with timbers and backfilled with crushed stone or pea stone to help water soak into the ground. Infiltration steps are designed to infiltrate runoff, stabilize soil, and provide safe footing on slopes.



Ben Severn assists the Schramkos of Conifer Cove Road with installing infiltration steps on their steep eroded path to the lake.

Waterbars are timbers placed lengthwise into the ground and are stabilized with erosion control mulch or stone to help stabilize slopes. The timbers and stabilizing material help to hold soil in place. This works to stop erosion by diverting water and not allowing it to concentrate in one area to create an eroded gully.



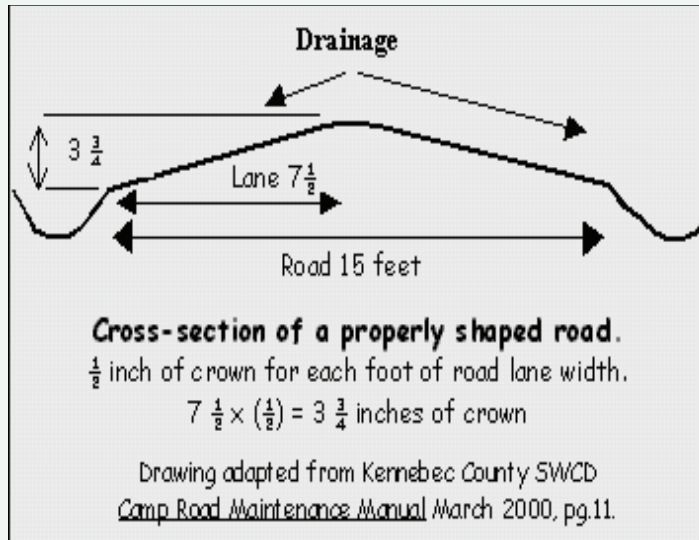
"We worked on a number of projects with Noralee, including several that were complex and took several years to complete. She not only did a great job of addressing our concerns, but also putting together creative solutions and then organizing the materials and help to implement them. The results have not only been effective, but also attractive with many positive comments from our guests." -David Allen, Plummerville Cottages

Driveways & Camp Roads

Rubber razors help to reduce erosion by diverting water into vegetated areas and off of roads, driveways or paths. The benefit of a rubber razor is that it allows for vehicle traffic as the rubber snaps back into place after the tires travel over it. Rubber Razors can significantly reduce erosion and sediment runoff into Panther Pond.



(Above) The Crillys of Meadow Road added hard packing material to the driveway surface to establish a crown. Three rubber diverters were installed to divert water off the driveway and into stable vegetated areas. (Below) Noralee Raymond and Ben Severn assist the Haydens of Meadow Road with installing a rubber diverter to prevent water coming from route 121 from washing down the driveway toward the lake.



Just like gravel roads, gravel driveways must drain properly to prevent water from channeling on the driveway causing erosion and sediment to wash into Panther Pond. Surface material needs to pack well, be durable, and shed water. Crowning the driveway will allow water to shed off the driveway quickly.

And the future?

*Lake protection never reaches an endpoint.
It requires a continual process of
education and routine maintenance.*

The Panther Pond Association will continue to take the lead in efforts to protect Panther Pond by:

- Monitoring the water quality of Panther Pond
- Partnering with the Raymond Waterways Protective Association on future projects to implement more on-the-ground fixes
- Spearheading educational efforts promoting the values of increased vegetation and routine road and septic system maintenance.



The Panther Pond Association and the Raymond Waterways Protective Association would like to thank the landowners and volunteers who helped make this project a success. Whether you were able to donate one afternoon helping your neighbor fix a path or joined in numerous volunteer projects, your time and effort made a difference. We would also like to thank the Town of Raymond for their tremendous support of the project.

Thank you!

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What Can You Do to Help?

- If you have an erosion problem on your property, contact Noralee Raymond, Panther Pond Association's 319 Project Manager, the Executive Director of RWPA, to schedule a free technical assistance visit.
- Join the Panther Pond Association and participate in volunteer projects. Contact PPA at ppa@raymondmaine.org or PPA, PO Box 68, Raymond, Maine 04071.
- Near the lakeshores, avoid clearing natural vegetation, and let the lawn and raked areas return to a natural state.
- Pump out septic systems every 2 to 3 years (4-5 for seasonal camps).
- If you must use fertilizer at all, use phosphorus free fertilizer (Raymond Aubuchon sells it).
- Contact the Town CEO (655-4742) and the Maine DEP (822-6300) if you plan to disturb soil within 250 feet of the lake.
- Visit the Portland Water District website to learn more on how to create lake friendly paths to protect the lake, prevent driveway erosion, installing waterbars, control roof runoff, plant vegetative buffers and more: <http://www.pwd.org/news/publications.php> and scroll down to the "Conservation Fact Sheets Series."