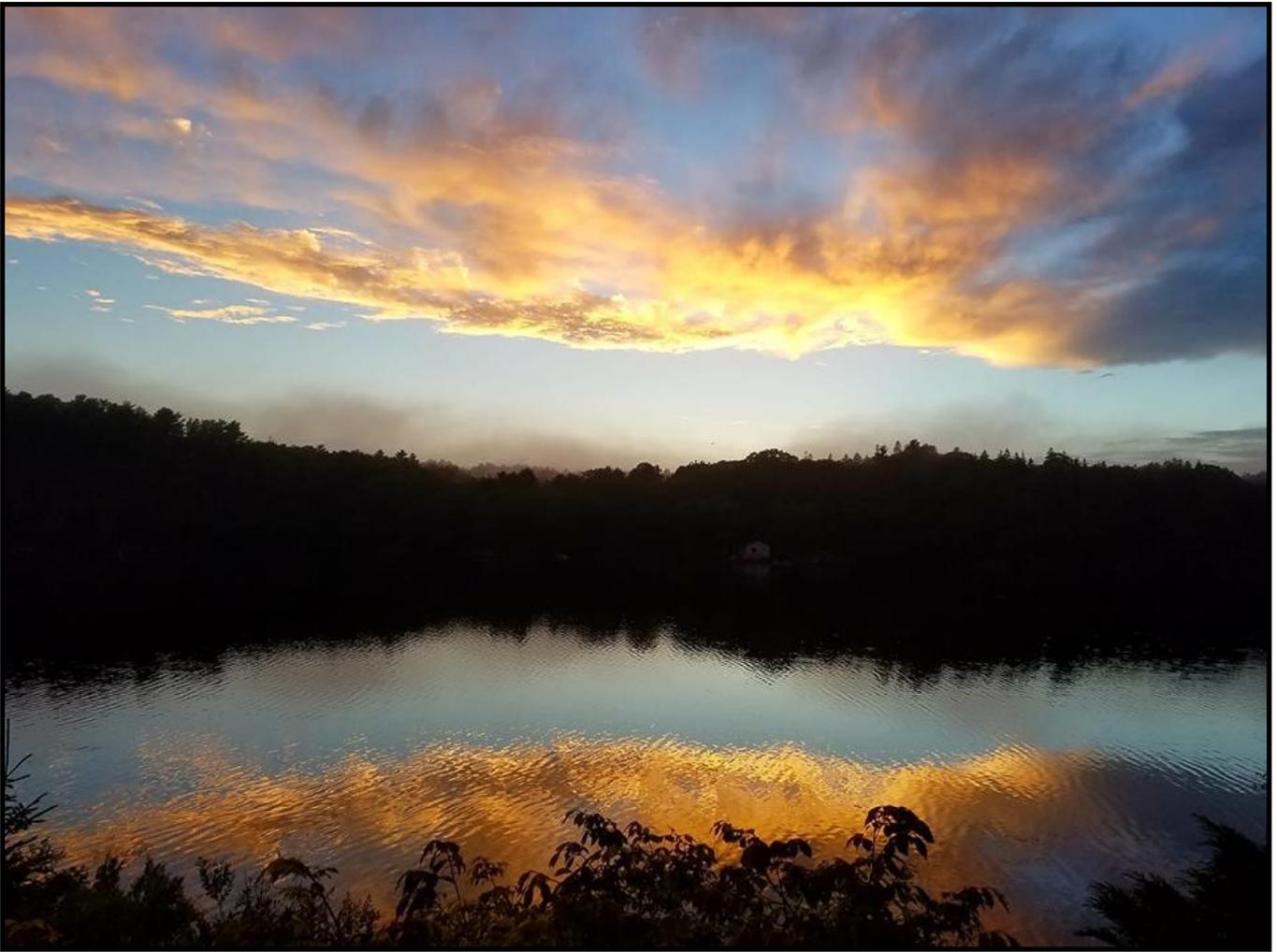


West Harbor Pond Watershed Survey Report



June 2018

West Harbor Pond Watershed Association

www.westharborpond.org

Acknowledgements

The West Harbor Pond Watershed Survey was conducted by the West Harbor Pond Watershed Association with support from the following:

Partners

Maine Department of Environmental Protection
Town of Boothbay Harbor
Boothbay Region Water District
Knox-Lincoln Soil & Water Conservation District
Boothbay Harbor Sewer District
Boothbay Harbor Yacht Club
Boothbay Region Land Trust
Knickerbocker Lake Association
Lake Stewards of Maine (VLMP)

Steering Committee

| | |
|-------------------|--|
| Charles Barclay | Boothbay Harbor Yacht Club |
| Merritt Blakeslee | West Harbor Pond Watershed Association |
| Kristin Feindel | Maine DEP |
| Susan Mello | Boothbay Region Water District |
| Michael Tomko | Boothbay Harbor Selectman |
| Leslie Volpe | West Harbor Pond Watershed Association |

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Ron Reinhart

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The West Harbor Pond Watershed Survey was made possible through a generous grant from Lake Stewards of Maine (Maine Volunteer Lake Monitoring Program). Thank you.

Introduction

On June 6, 2018, the West Harbor Pond Watershed Association, with the support of its partners and additional volunteers, conducted a watershed survey of West Harbor Pond. The survey was conducted to protect and improve the water quality of the pond by identifying sources of erosion and runoff that are or could be damaging to water quality, and recommending solutions to fix the problems. For the purposes of this survey, the West Harbor Pond Watershed was mapped out to be approximately 1 square mile, and includes Campbell Stream, which feeds into the Pond.

Trained volunteers and technical leaders surveyed the developed area of the West Harbor Pond Watershed and identified 20 erosion sites that are impacting or have the potential to impact water quality. This report provides the results and analysis of the survey, along with information about how landowners can obtain technical guidance and, in some cases, financial support in addressing erosion issues on their properties. It is designed specifically for citizens living in the West Harbor Pond Watershed, and residents of the towns of Boothbay Harbor and Boothbay.



WHAT IS A WATERSHED?

A watershed is all the land that surrounds a pond that drains, or sheds, its water into the pond through streams, ditches, directly over the ground surface or through ground water. It includes everything within its borders – the land, air, plants, animals, towns, farms and people. Activities in this entire area – not just the shoreline areas – eventually impact the pond's water quality, for better or worse.

Threats to Water Quality

The biggest pollution threat to West Harbor Pond, and other Maine ponds, is polluted stormwater runoff or nonpoint source (NPS) pollution. Storm water runoff from rain and snowmelt picks up soil, nutrients and other pollutants as it flows across the land and washes into the Pond.

In an undeveloped, forested watershed, storm water runoff is slowed and filtered by tree and shrub roots, grasses, leaves, and other natural debris on the forest floor. It then soaks into the uneven forest floor and filters through the soil.

In a developed watershed, however, stormwater does not receive the filtering treatment the forest once provided. Rainwater picks up speed as it flows across impervious surfaces like rooftops, compacted soil, gravel camp roads and pavement, and it becomes a destructive erosive force washing soil, nutrients and other pollutants directly into the ponds or their feeder streams.



West Harbor Pond



West Harbor Pond is an 84-acre freshwater lake located in Boothbay Harbor, Maine. The Pond was created in 1880 when a dam was constructed across the mouth of Campbell Cove where it enters Boothbay Harbor. A passive siphon was installed during the dam's construction which worked to draw deoxygenated saltwater from the lower depths of the pond. A road constructed along the top of the dam eventually became State Route 27.

Along with residential properties on its shore, West Harbor Pond is home to the Beach-cove Waterfront Inn, a seasonal resort offering boating, swimming and fishing for its guests from late May to mid-October. The Boothbay Harbor Yacht Club owns shorefront property at the southern end of the Pond which includes a house, post office, tennis courts and parking area.

Designated and protected by the state as a Great Pond with a 9.9hp limit for watercraft, West Harbor Pond is home to an abundance of fish and wildlife. As part of the watershed connecting Knickerbocker Lake to Boothbay Harbor's inner harbor and the Gulf of Maine, West Harbor Pond is a pathway for migrating alewives and glass eels. The pond also hosts populations of white perch and large- and small-mouth bass. There are regular sightings of bald eagles, osprey, owls, blue heron, loons, and white egrets on West Harbor Pond. It is home to kingfishers, cormorant, and an ever-changing population of ducks including buffleheads, mallards, wood ducks, and other migratory waterfowl. Along its shores, deer, wild turkey, fox, and mink are plentiful. Turtles and beaver also make their home in the Pond.

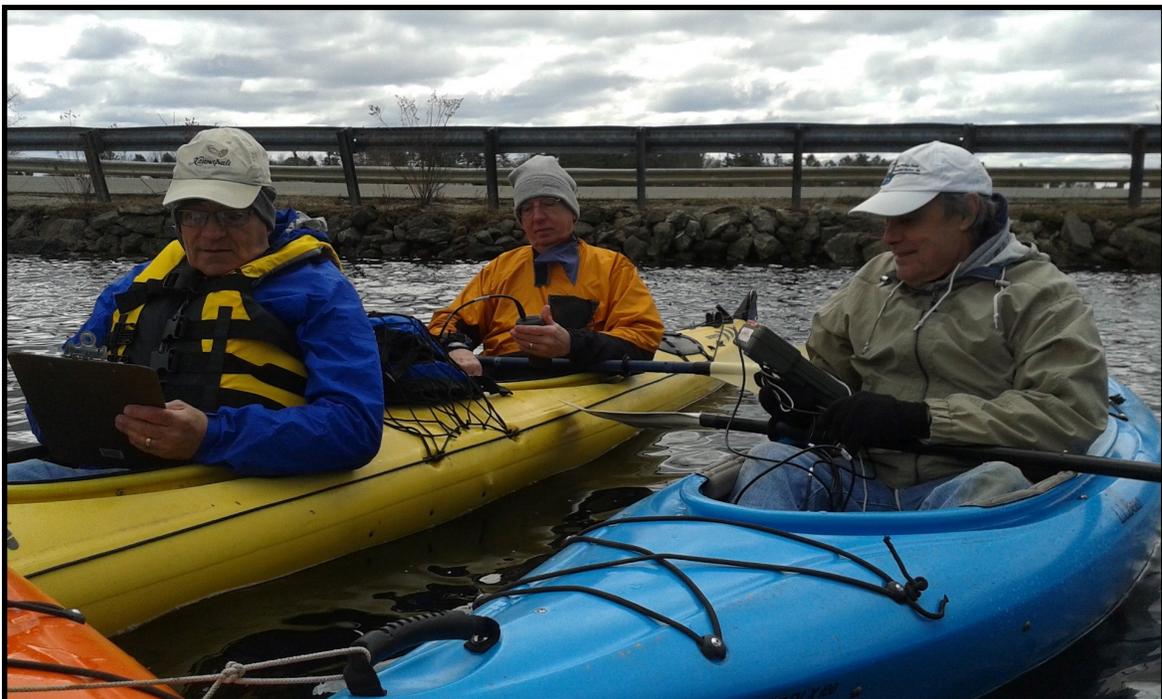
Water Quality

The WHPWA takes Secchi disk clarity readings twice monthly from May through October in collaboration with Lake stewards of Maine (LSM). Water clarity is affected by algal growth and other suspended matter in the water, and the Secchi disk, which measures clarity, is a reliable tool for quickly and inexpensively assessing lake water quality. Collecting Secchi transparency data over time permits LSM to identify and track long-term water quality trends in the Pond.

With the support and equipment of the Boothbay Harbor Sewer District, the WHPWA also regularly collects and tests the water column at two locations (mid-pond and near the dam). Dissolved oxygen and conductivity are key metrics that provide valuable information about the Pond's health.

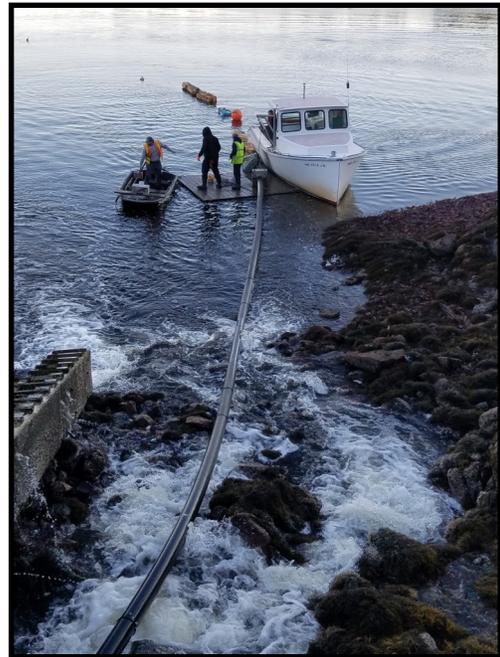
Conductivity is a measure of the ability of water to conduct an electrical current and is affected by the presence of inorganic dissolved solids such as sodium. Measuring conductivity is a way to monitor the salinity levels in the Pond.

Dissolved Oxygen (DO) is a measure of how much oxygen is dissolved in the water. It is needed by fish to survive. DO is reduced by bacteria in the water that consume oxygen from decaying organic matter such as algae.



Siphon Replacement

In early December 2018 work began to install the new West Harbor Pond siphon that will once again remove deoxygenated saltwater from the lower depths of the Pond after the failure of the original 1880 siphon. It is anticipated that work will conclude in spring 2019. Water Quality testing will continue monthly to monitor conductivity and dissolved oxygen levels.



Purpose of the Watershed Survey

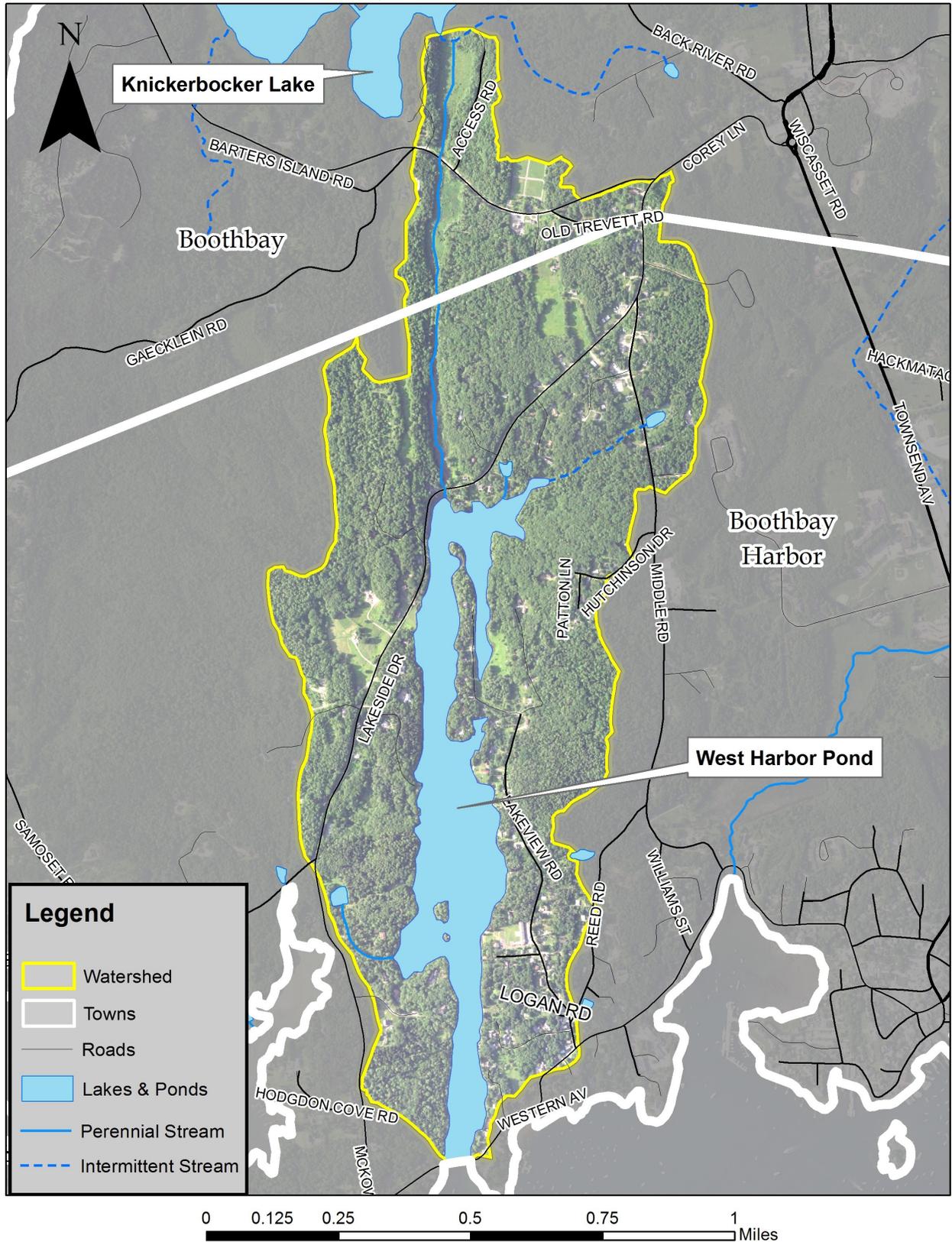
The primary goals of the 2018 West Harbor Pond Watershed Survey are to:

- Identify existing sources of soil erosion sites in the West Harbor Pond Watershed
- Raise public awareness about the connection between land use and water quality, and the impact of soil erosion on West Harbor Pond
- Inspire people to become active watershed stewards
- Make general recommendations to landowners for fixing erosion problems on their properties



West Harbor Pond Watershed

Boothbay & Boothbay Harbor, Maine



Summary of Watershed Survey Findings

Volunteers and technical leaders identified 20 erosion sites in the West Harbor Pond watershed that are currently impacting or have the potential to impact water quality in West Harbor Pond.

Volunteer surveyors documented the type, size and severity of each erosion site.

Low impact: shows limited runoff of sediment reaching the pond

Moderate Impact: shows a higher amount of runoff carrying sediment to the pond

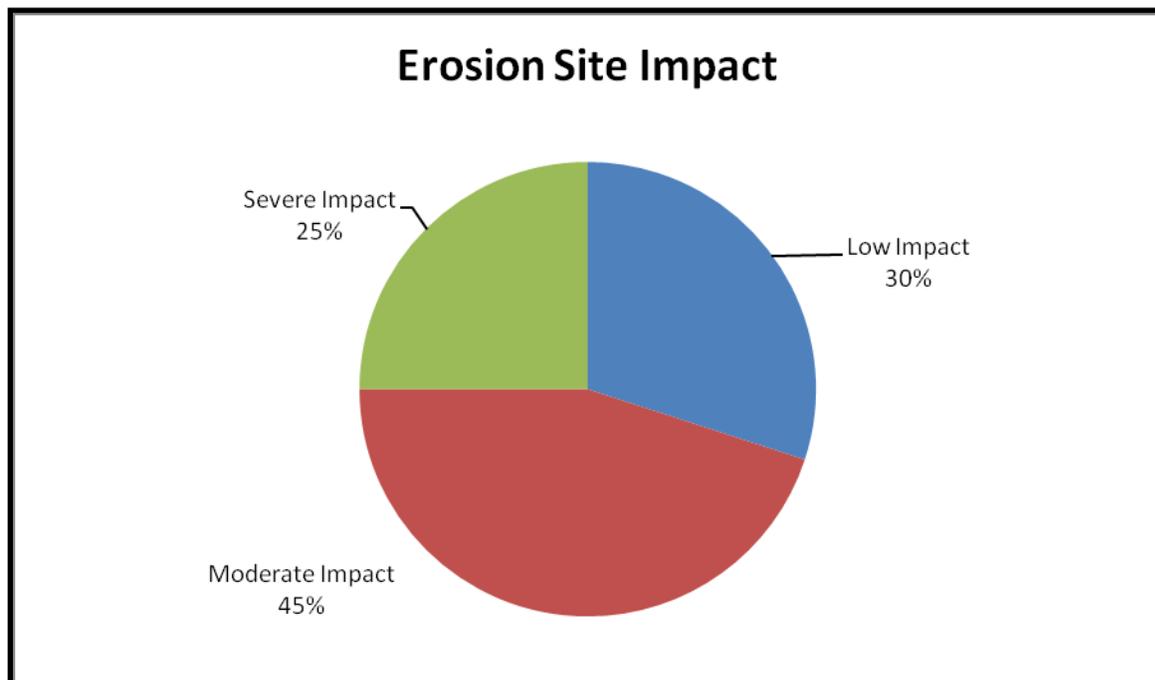
Severe impact: shows a significant amount of runoff carrying sediment into the pond

Of the twenty sites identified:

Six sites were documented as having **Low Impact**

Nine sites were documented as having **Moderate Impact**

Five sites were documented as having **Severe Impact**



Cost to Fix Erosion Sites

Each erosion site was also evaluated by its estimated cost to be remediated and how much technical help may be required. Surveyors found that a majority of the sites fit into the low-to-medium cost/technical help range.

eight sites were **Low Cost**

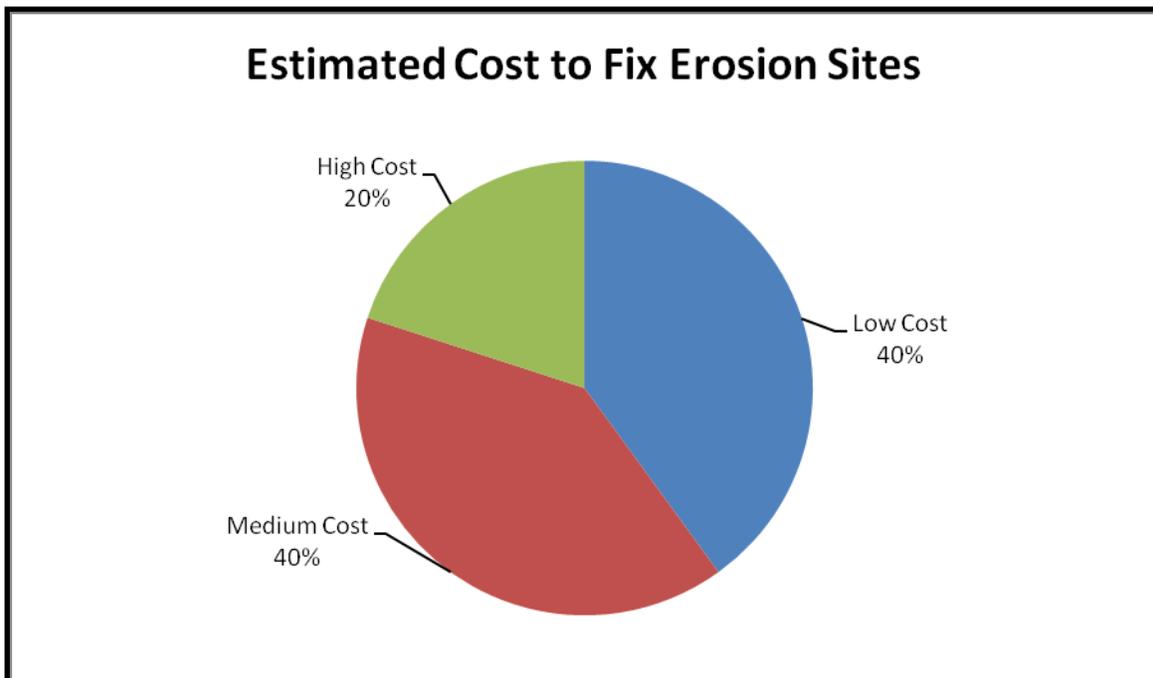
eight sites were **Medium Cost**

four sites were **High Cost**

Low cost: less than \$500 to fix; the property owner can accomplish the remediation with reference materials and/or technical advice

Medium cost: \$500-\$2500 to fix; recommendations from a trained technical adviser may be necessary for the property owner to remediate the problem

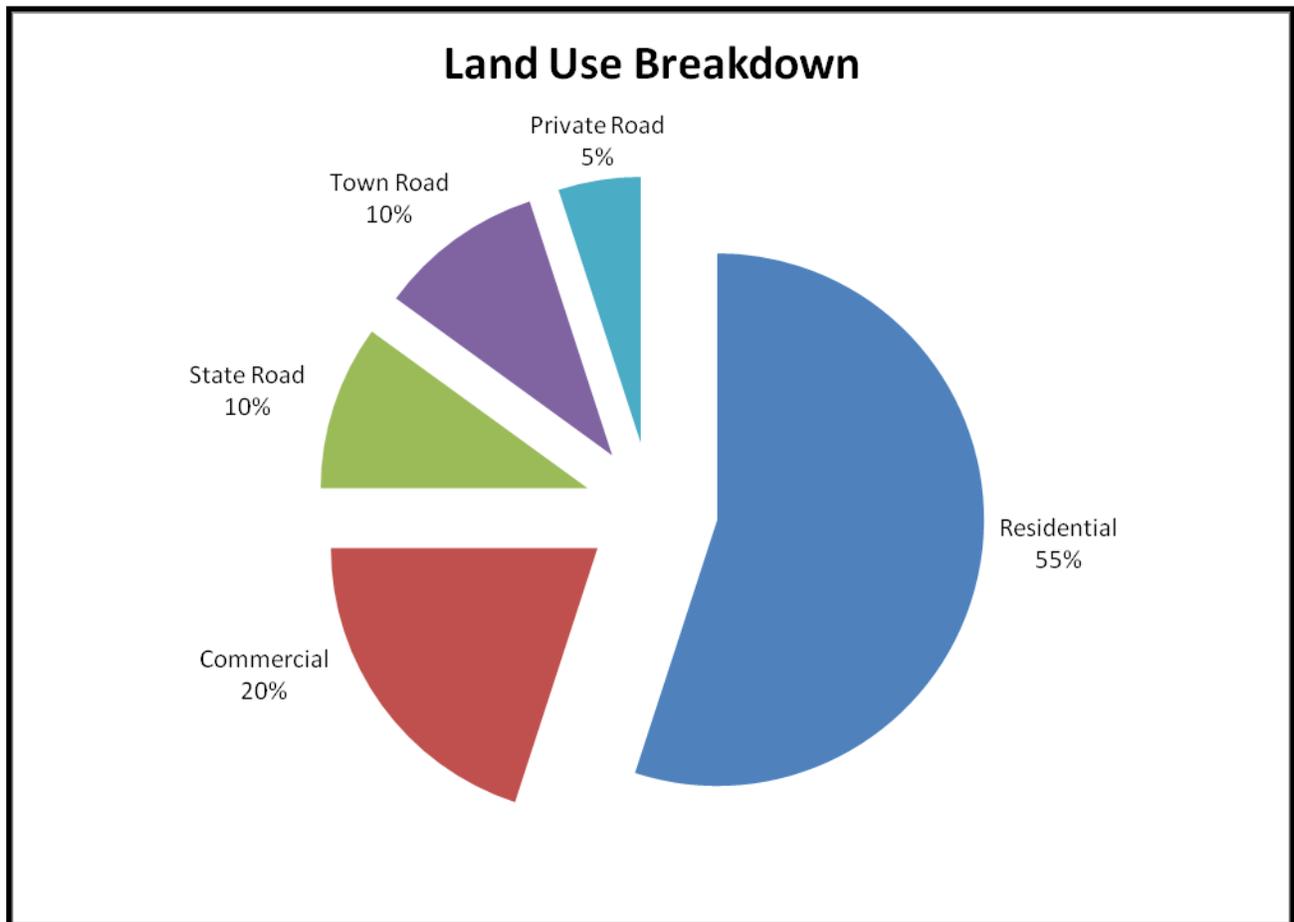
High cost: \$2500 or more to fix; a trained technical adviser should visit and make recommendations for remediation to the property owner



Land Use Breakdown

The 20 erosion sites identified by surveyors can be further broken down by their land use:

- 11 Residential
- 4 Commercial
- 2 State Roads
- 2 Town Roads
- 1 Private Road



RESIDENTIAL/COMMERCIAL

Of the 20 sites, more than half were on residential properties; 5 are low impact sites, 5 are moderate impact, and 1 is a severe impact site. Of the 4 commercial properties with erosion sites, 3 are severe impact, and 1 is a moderate impact site.

12 of these sites have easy, relatively low-cost fixes.

RESIDENTIAL/COMMERCIAL

Of the 20 sites, more than half were on residential properties; 5 are low impact sites, 5 are moderate impact, and 1 is a severe impact site. Of the 4 commercial properties with erosion sites, 3 are severe impact, and 1 is a moderate impact



Recommended Solutions:

- Seed and mulch bare soil
- Establish or enhance buffer
- Limit foot traffic in eroding areas
- Install dripline trench to catch roof runoff
- Install silt fence around construction sites
- Place mulch or stone on footpaths and boat storage areas
- Define a meandering footpath to dock and shoreline

Common Erosion Problems



Roof Run-off can cause serious soil erosion around building foundations.

- Installation of gutters and rain barrels can make a big impact by capturing rain water or directing it to a vegetated area.
- Installation of a dripline trench (6-8" deep, 12-18" wide) which is filled with crushed stone allows water to be absorbed into the ground; it eliminates back-splash onto the building foundation and siding.

Bare Soil surfaces directly affect runoff rates, which increase because there is nothing to absorb the rain water and the nutrients it carries.

- Plant a buffer along the shoreline; vegetation allows for greater infiltration because the roots in the plants absorb the water and pulls it into the ground.
- Seed bare soil or cover it with Erosion Control Mulch.



ROADS

Five of the erosion sites identified by volunteers are due to roads:

2 are town road sites (1 low impact, 1 medium impact)

2 are state road sites (1 low, 1 medium impact)

1 is a private road site (medium impact)



Note: Lakeview Road was repaved a few months after the survey; the Route 27 causeway has had work done by DOT over the winter. Erosion sites identified with these roads will be re-assessed in the spring or early summer to see if erosion issues have been remediated.

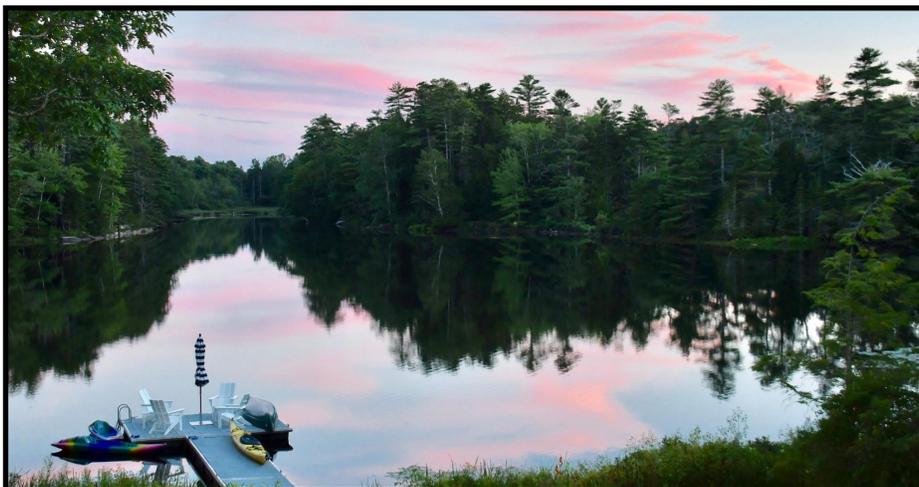
What you can do to help preserve and protect West Harbor Pond

There are many things you can do right at home, on your own property to help...

- Walk around your property looking for bare soil that can be mulched or seeded to stop erosion
- Increase the depth of the vegetated buffer between your house and the pond
- Reduce the size of your lawn to discourage Canada geese from making their home on the pond; their presence contributes to higher nutrient levels in the water
- Don't fertilize, but if you must, use lake friendly products that are phosphorus free
- Clean up after pets
- Establish a well-defined path that meanders to the dock or shoreline
- Keep up regular maintenance on your septic system
- Retire your rake! Allow leaves and pine duff to stay in place to slow down runoff and protects bare soil from erosion
- Install gutters, rain barrels and/or a drip-line trench to control roof runoff
- Contact the WHPWA and sign up for a LakeSmart visit
- Keep driveways and/or private roads appropriately crowned and ditched to reduce runoff from carrying sediment to the Pond

When everyone chips in and does their part to improve erosion issues on their property, it adds up to a BIG impact on the Pond!

Thank you for your efforts to preserve and protect West Harbor Pond!



Resources

West Harbor Pond Watershed Association

PO Box 443

West Boothbay Harbor, Maine 04575

207-633-0557 www.westharborpond.org

Educational materials; direction to individuals to appropriate agencies/technical assistance.

Knox-Lincoln Soil and Water Conservation District

893 West Street

Rockport, Maine 04856

207-596-2040 ... www.knox-lincoln.org

Technical assistance with watershed landscaping, environmental education, native plants, seminars and training sessions.

Maine Department of Environmental Protection

17 State House Station

Augusta, Maine 04333

800-452-1942 ... www.maine.gov/dep

Technical assistance, permitting, reference materials, stewardship education.

