Forest Lake
Watershed Survey Report

Cumberland County Soil and Water Conservation District
Forest Lake Association
Maine Department of Environmental Protection

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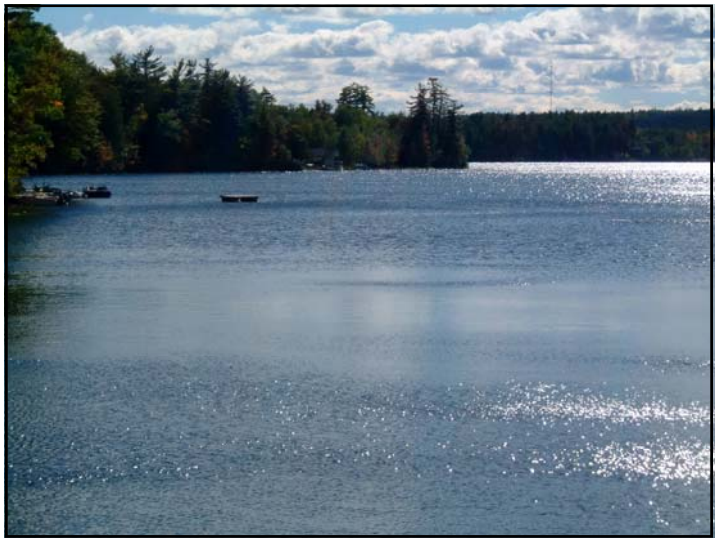


Introduction

Is there a water quality problem in the Forest Lake Watershed?

The Forest Lake Association has tested water quality in Forest Lake for more than 25 years. This testing has found the lake's water quality to be slightly above average based on secchi disk transparency, total phosphorus and chlorophyll-a measurements.

As a result of development trends in the area and the water quality conditions Forest Lake has been placed on the Maine Department of Environmental Protection (DEP) list of *Priority Watersheds* and the State's list lakes *Most at Risk from New Development* under the Maine Stormwater Law.

However, recent dissolved oxygen profiles show moderate oxygen depletion in deep areas of the lake to levels that pose a moderate risk of phosphorus recycling problems. Based on observations at other Maine lakes, these trends indicate that the lake is under stress.

WATERSHED

All the land surrounding a lake that drains or sheds its water into the lake through streams, ditches, directly over the ground surface or through ground water.

The Forest Lake Watershed covers 3 square miles (1913 acres**) (Fig. 1).**

NONPOINT SOURCE POLLUTION

Also called NPS or polluted runoff. Pollution that can not be traced back to a discharge from a particular direct source (e.g., an industrial outfall pipe).

One way to visualize NPS pollution is to think of rain and snow melt as a giant broom that sweeps over the watershed, moving debris and soil into the lake from the surrounding land and streams.

What is polluting Forest Lake?

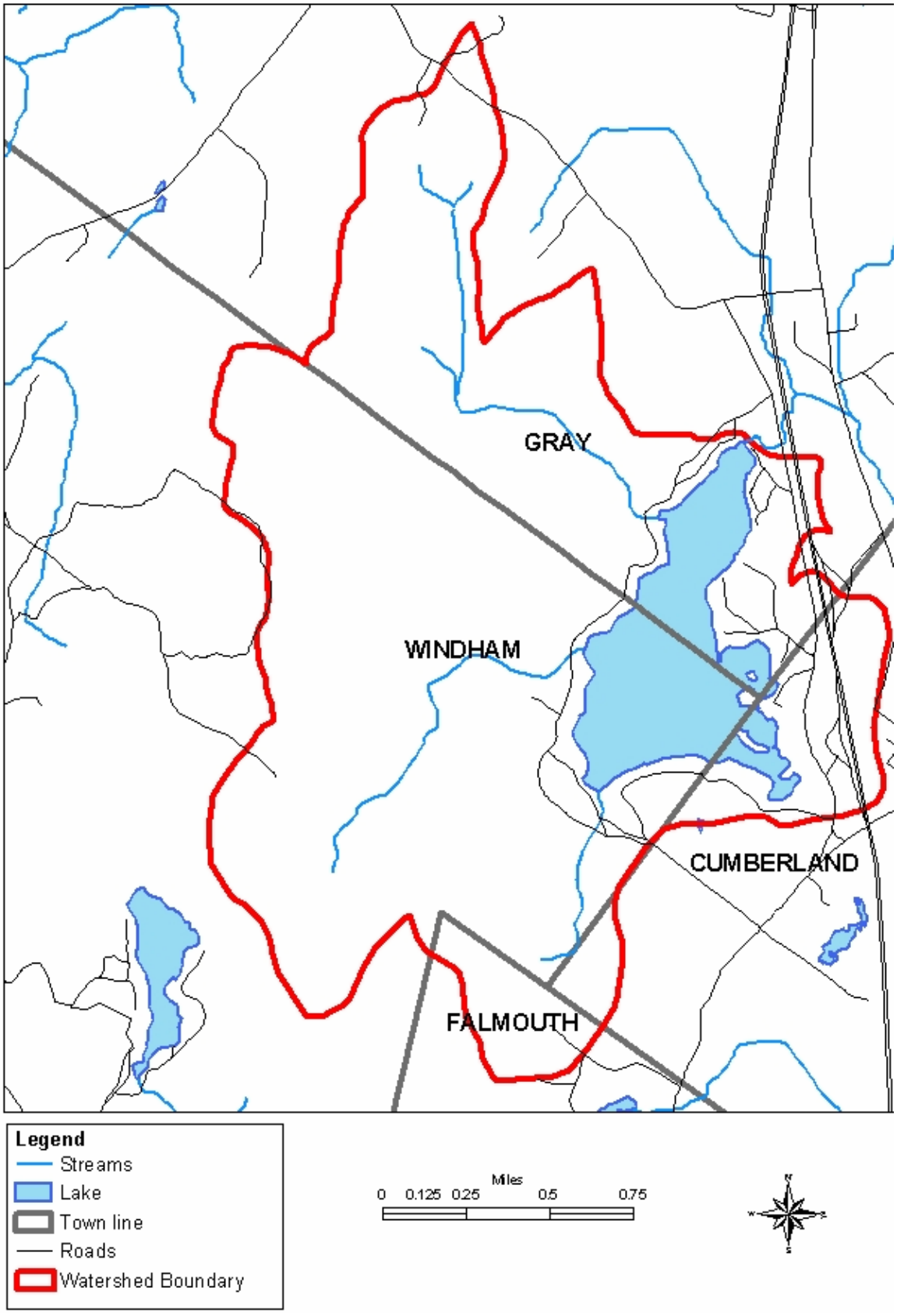
Declining water quality may be a result of the concentrated development around the lake and extensive network of gravel roads to reach these homes. The biggest pollution culprit in Maine's lakes is **nonpoint source (NPS) pollution** found in the runoff from rain and snowmelt. During and after storms, soil, and nutrients like phosphorus and nitrogen, wash into lakes from the surrounding landscape by streams and overland flow.

In an undeveloped, forested watershed, storm water runoff is slowed and filtered by trees, shrubs and other vegetation. It then soaks into the uneven forest floor. In a developed watershed, storm water velocity increases on impervious surfaces like rooftops, compacted soil, gravel camp roads and pavement, and does not always receive the filtering treatment the forest once provided.

The nutrients in storm water runoff can be bad news for lakes. **Phosphorus**, a nutrient that is common on land, is a primary food for all plants, including **algae**. In natural conditions, the scarcity of phosphorus in a lake limits algae growth. However, when a lake receives extra phosphorus from the watershed, algae growth increases dramatically. Sometimes this growth causes choking blooms, but more often it results in small, insidious changes in water quality that, over time, damage the ecology, aesthetics and economy of lakes.

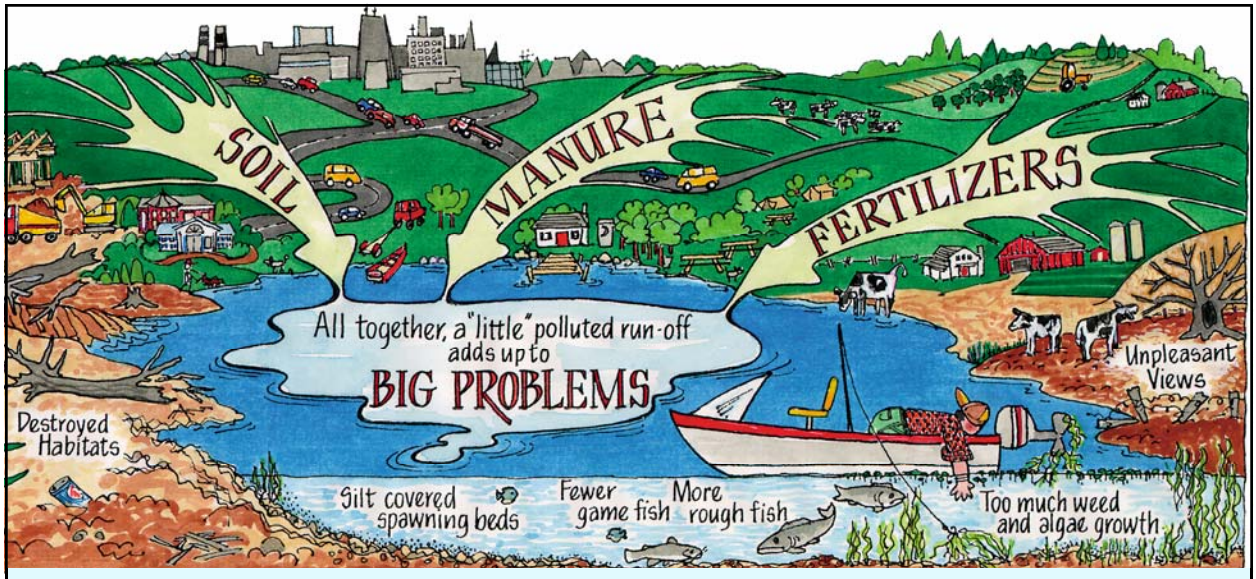
Excess **phosphorus** can "fertilize" a lake and lead to nuisance **algal blooms**.

Forest Lake Watershed



Why is it important to protect Forest Lake's water quality?

- Forest Lake contains valuable habitat for fish, birds and other wildlife.
- Forest Lake serves as the headwaters to the Piscataqua River, which then flows into the Presumpscot River and Casco Bay.
- A 1996 University of Maine study demonstrated that lake water quality affects property values. For every meter (3 ft) decline in water clarity, shorefront property values can decline as much as 10 to 20 percent! Declining property values affect individual landowners as well as the economics of the entire community.
- Once a lake has declined, it can be difficult or impossible to restore.



Forest Lake's water quality is directly impacted by the land uses in its surrounding watershed. The most effective way to manage lake water quality is by managing land uses within the watershed.

What is being done to protect the Forest Lake Watershed?

The Forest Lake Association (FLA) tests water quality in Forest Lake as part of the Maine Volunteer Lake Monitoring Program. FLA also works with agencies and watershed residents to promote environmental stewardship.

Volunteer watershed surveys have been found to be one of the most effective ways to protect lake water quality by getting citizens involved in identifying existing and potential sources of polluted runoff. During the summer and fall of 2002, the Forest Lake Association and the Cumberland County SWCD and DEP conducted a watershed survey. In addition, a Septic Survey was conducted to assess the condition of septic systems near the lake and a Shoreline Survey was carried out as well to assess the composition of vegetated buffers around the lake.

This report is specifically designed for citizens living in the Forest Lake Watershed. It contains a summary of the survey findings and recommendations to protect the health of the lake.

Purpose of the Watershed Survey

The primary purpose of the watershed survey was to identify and prioritize **existing** sources of polluted runoff, particularly soil erosion sites, in the Forest Lake Watershed. However, of equal importance was to:

- Raise public awareness of the connection between land use and water quality, and the impact of polluted runoff on Forest Lake.
- Inspire people to become active stewards of the watershed.
- Use the information gathered to help develop the Forest Lake Management Plan.
- Make general recommendations to landowners for fixing erosion problems on their properties.

Local citizen participation was essential in completing the watershed survey and will be even more important in upcoming years. Through the leadership of the Forest Lake Association, and with assistance from groups and agencies concerned with lake water quality, the opportunities for stewardship are limitless!

Numerous lakeshore properties were observed to have little or no **vegetated buffer** at the water's edge. These sites were not included in the survey results but it is important to note that buffers of shrubs and trees do a much more effective job than bare ground or grass at keeping polluted runoff from entering lakes. The deep roots of shrubs and trees also help stabilize the shoreline.

Buffers can be installed inexpensively. You can stop mowing and raking at the water's edge and let plants grow up naturally. Or you can plant the area with native trees and shrubs.

Buffers enhance the appearance of shorefront property and attract birds and other wildlife without ruining the landowner's view.

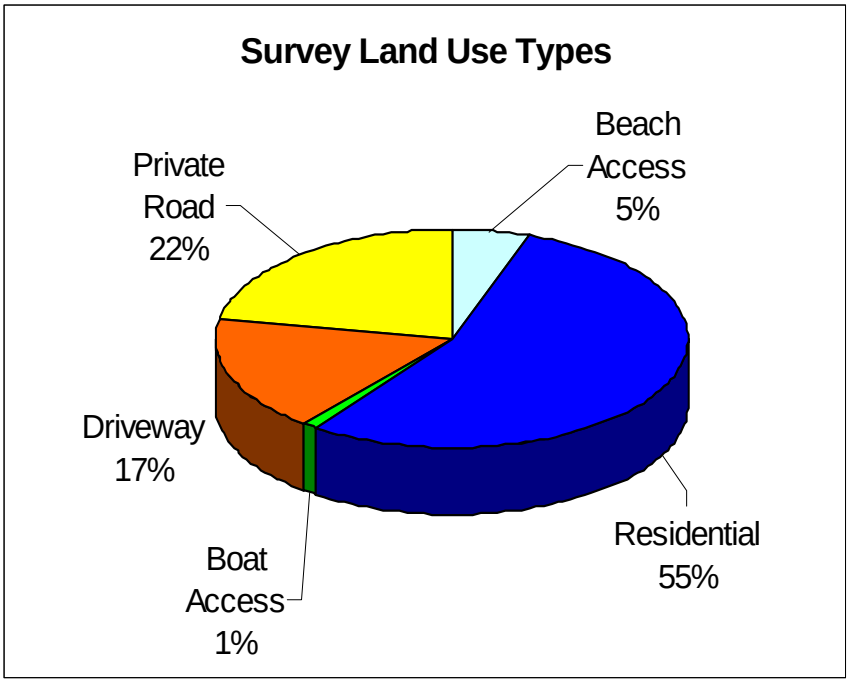
Summary of Watershed Survey Findings

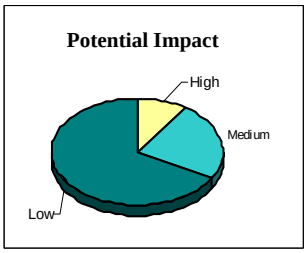
Volunteers and technical staff identified 112 sites that are currently impacting or have the potential to impact water quality in the Forest Lake Watershed.

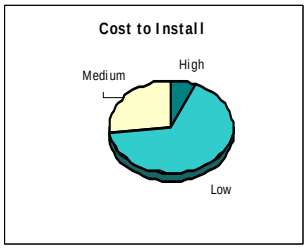
A total of five land use types were associated with the identified sites. The largest number of problems were associated with residential areas, driveways, and private roads. Detailed descriptions of these sites are on the following pages.

Key Findings:

- Most of the problems were found on residential
- Most of the problems can be fixed with little expense or technical expertise. Plants, mulch and other simple solutions can go a long way towards protecting the lake.
- About 2/3 of the problems may be causing significant impact to the lake







Potential Impact of Problems

There were similar numbers of sites with low, medium and high impacts. Attention should be paid to all of the sites, since it's the cumulative impact of **all** the sites that causes water quality to decline.

- Low– eroding site with limited transport off site, or small site with no evidence of rills or gullies
- Medium—sediment transported off site but does not reach high magnitude
- High– Large area with significant erosion and direct flow to stream, ditch or lake

Cost to Implement Recommendations

- Low—less than $500
- Medium—$500 to $2,500
- High—more than $2,500

Residential

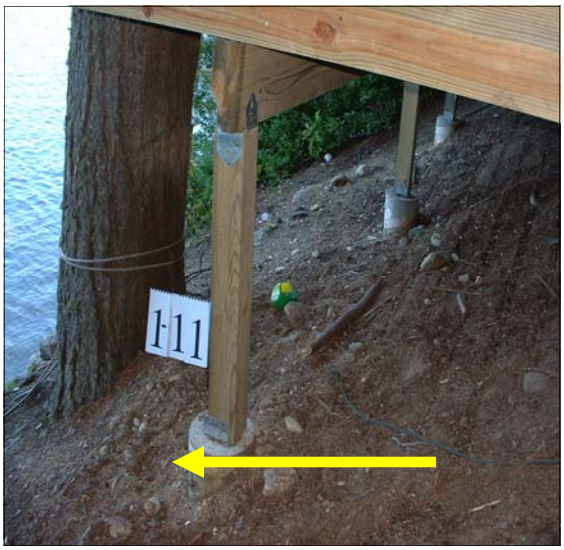
Of the 61 sites associated with residential areas, 44 were low impact, 14 were medium impact, and three were high impact. Over half of the sites can be fixed with little technical expertise and low cost.

Common Problems Identified:

- Slight or moderate surface erosion
- Bare and sparsely vegetated soil
- Lack of vegetated buffer along shoreline
- Direct flow of runoff to lake
- Roof runoff causing erosion
- Stockpiled soil
- No erosion controls at construction sites

Recommended Solutions:

- Seed and mulch bare soil
- Establish or enhance vegetated buffer
- Limit foot traffic in eroding areas
- Install dripline trench to catch roof runoff
- Install silt fence around construction sites
- Install waterbar, open-top culvert, rubber razor or other runoff diverter
- Place mulch or stone on footpaths



Problems:

- Lack of silt fence
- Bare soil with direct flow to lake
- Lack of vegetated buffer

Solutions:

- Properly install and maintain silt fence
- Seed and mulch bare areas
- Remove stockpiled soil
- Establish vegetated buffer along shoreline

Residential areas were associated with 55% of the identified sources of polluted runoff to Forest Lake. These problems pose a significant threat to lake water quality. Fortunately, most of these sites can be corrected with easy, low cost fixes.

It's the cumulative impact of all the sites that causes water quality to decline.

Driveways

Of the 19 driveways, 12 were low impact, five were medium impact, and two were high impact. Most of the sites could be fixed with low to medium cost and technical expertise.

Common Problems Identified:

- Slight to moderate surface erosion
- Direct flow to lake or ditch
- Poor shaping
- Poor (too sandy) surface material

Recommended Solutions:

- Crown driveway so that water flows to either side
- Install diverters such as waterbars, open top culverts or rubber razors to get water off road
- Install turnouts to direct water into wooded depressions

Problems

- Poor driveway shaping and ruts cause water to concentrate and erode the surface
- Direct flow of sediment to lake

Solutions

- Add new surface material
- Reshape and crown driveway so water moves quickly from the surface
- Install diverters such as waterbars, open top culverts or rubber razors to get water off driveway

Preserve water quality and save time, money, and wear and tear on your vehicle by having a well crowned driveway. Use adequate surface material and add diversions to direct runoff into buffers.

It's great for watershed residents and it's great for the lakes!

Private Roads

Of the 25 private road sites, 17 were low impact, four were medium impact and four were high impact. The problems are more expensive to fix and would require technical assistance.

Common Problems Identified:

- Slight to moderate surface erosion
- Direct flow to lake or stream
- Slight to moderate ditch erosion
- Undersized ditches
- Poor (too sandy) surface material
- Unstable culvert inlet and outlet
- Clogged ditches and culverts

Recommended Solutions:

- Crown and reshape road to get water off road
- Install diverters such as waterbars, open top culverts or rubber razors to get water off road
- Build up road with cohesive surface material
- Clean out culverts
- Clean, reshape and armor ditches with stone rip rap or plant grass
- Remove grader berms and winter sand to allow proper drainage
- Install culverts and stabilize ends with stone

Problems:

- Lack of ditches
- Moderate surface erosion
- Poor surface material

Solutions:

- Build up road with cohesive surface material
- Reshape and crown
- Install proper ditching

Unpaved roads are one of the biggest sources of pollution to Maine lakes.

While a one time fix may cost more up front, it will reduce lake pollution and reduce maintenance costs on your road, ditches and vehicle.

Boat & Beach Access

Of the six beach sites and one boat site, two were low impact, three were medium impact and two were high impact. Over half of the problems can be fixed with low technical expertise and low cost.

Common Problems Identified:

- Slight to moderate surface erosion
- Bare soil
- Direct flow of sediment to stream or lake
- Shoreline degradation
- Unstable beach access

Recommended Solutions:

- Seed and mulch
- Plant or enhance buffer
- Install runoff diverters; i.e. water bars
- Define path for foot traffic
- Tri-lock blocks to create swale for boat access

Problems:

- Severe erosion
- Direct flow of sediment and winter sand into lake

Solutions:

- Install tri-lock blocks to create swale
- Install rubber razor blade
- Install runoff diverter at top of boat access to trap sediment before it reaches the lake

With a few exceptions, virtually all of the sites identified in the survey are significant to one degree or another. The cumulative effect of many "low" and "medium" impact sites can exceed that of any one "high" impact site. This should be considered when a strategy is developed to address problems in the watershed.

Next Steps ~ Where Do We Go From Here?

Fixing the erosion sites identified in this survey will require efforts by individuals, the Forest Lake Association, road associations and municipal officials.

Individual Citizens

- Prevent runoff from washing sediment into the lakes. Detain runoff in depressions or divert flow to vegetated areas. Call the Cumberland County SWCD or DEP for free technical assistance.
- Minimize the amount of cleared land and road surfaces on your property.
- Stop mowing and raking, and let lawn and raked areas revert back to natural plants. Deep shrub and tree roots help hold the shoreline.
- Avoid exposing bare soil. Seed and mulch bare areas.
- Don't bring in sand or rebuild beaches without permits and technical assistance.
- Call the Town Code Enforcement Officer before cutting vegetation within 250' of the shore.
- Maintain septic systems properly. Pump septic tanks (every 2 to 3 years for year round residences; 4-5 years if seasonal) and upgrade marginal systems.

Forest Lake Association

- Develop an active membership, help implement the Forest Lake Management Plan and provide educational materials and guidance to members of the Forest Lake watershed community.
- Organize workshops and volunteer "work parties" to start fixing identified erosion problems and teach citizens how to fix similar problems on their own properties.
- Educate municipal officials about lake issues and work cooperatively to find solutions.

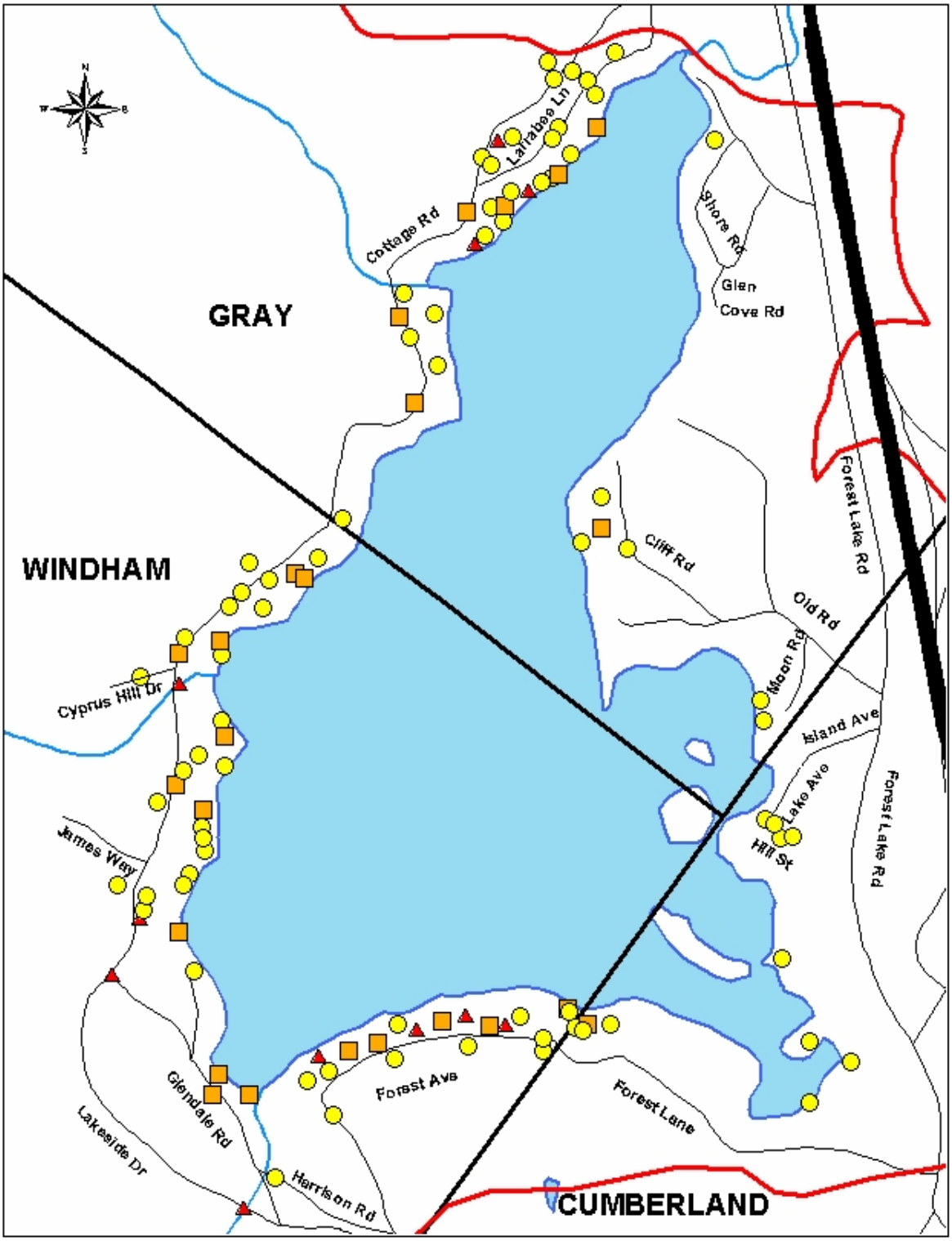
Road Associations (or private roads without associations)

- Minimize road runoff by doing regular, comprehensive maintenance. Form a road association if one does not already exist.
- Get a copy of "Camp Road Maintenance Manual – A Guide for Landowners." This reference is a must for anyone managing a gravel road. (Call the DEP at 822-6300 to order a free copy.)
- For more extensive problems, seek free technical help. Contact the Cumberland County SWCD or DEP to request technical assistance and inquire about the free Loan of the Frontrunner Program.

Municipal Officials

- Enforce shoreland zoning ordinance to assure full protection of Forest Lake.
- Conduct regular maintenance on town roads in the watershed.
- Participate in and support the implementation of the Forest Lake Watershed Management plan.
- Promote training for road crews, planning boards and conservation commissions.

Forest Lake Watershed Survey
Erosion Sites



Feet
0 200 400 800 1,200 1,600

Legend

Site Impact to Lake
- High
- Medium
- Low

- Watershed Boundary
- Roads
- Streams
- Towns
- Lake

Figure 3: Forest Lake Erosion Sites

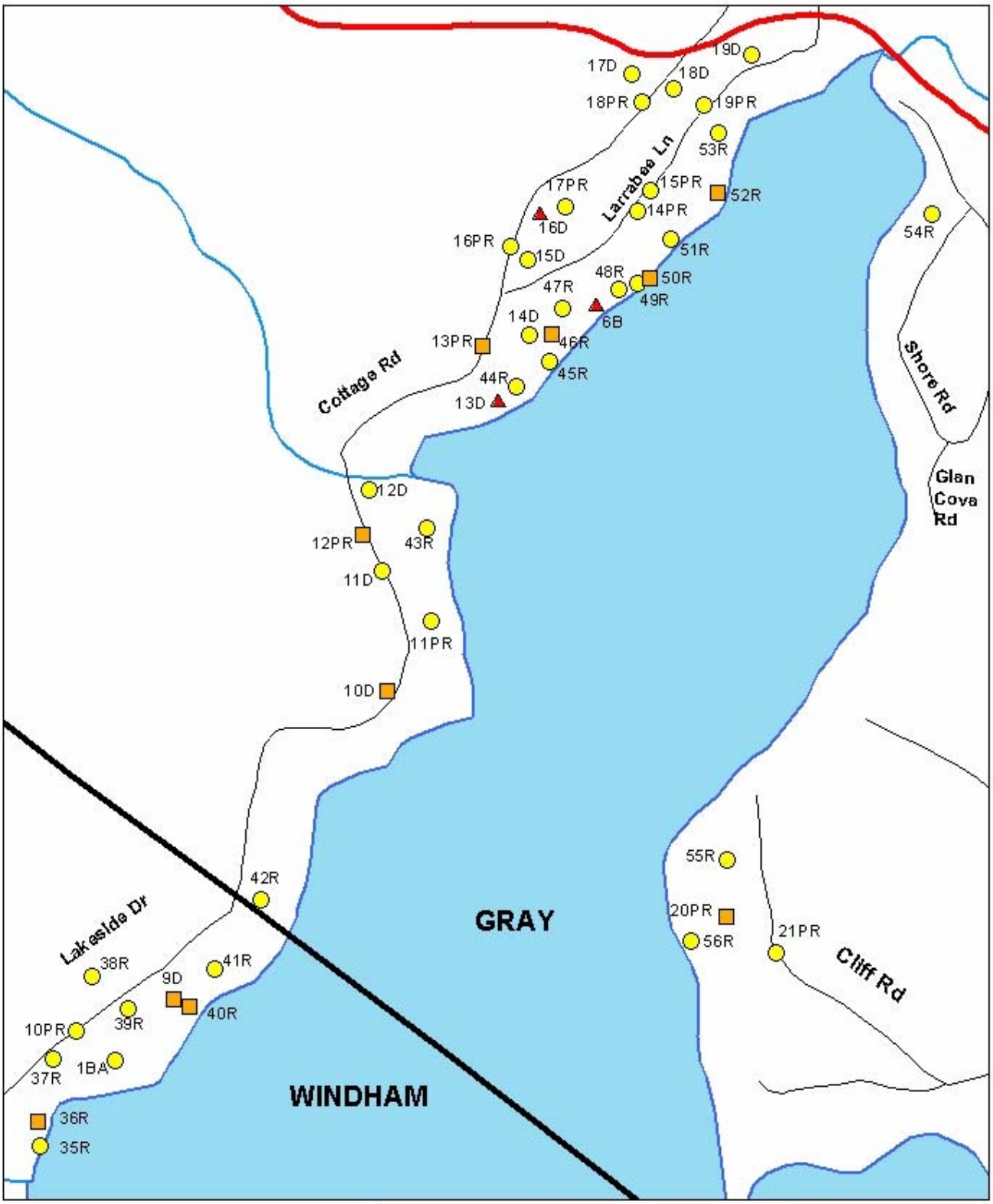


Figure 4: Forest Lake Erosion Sites

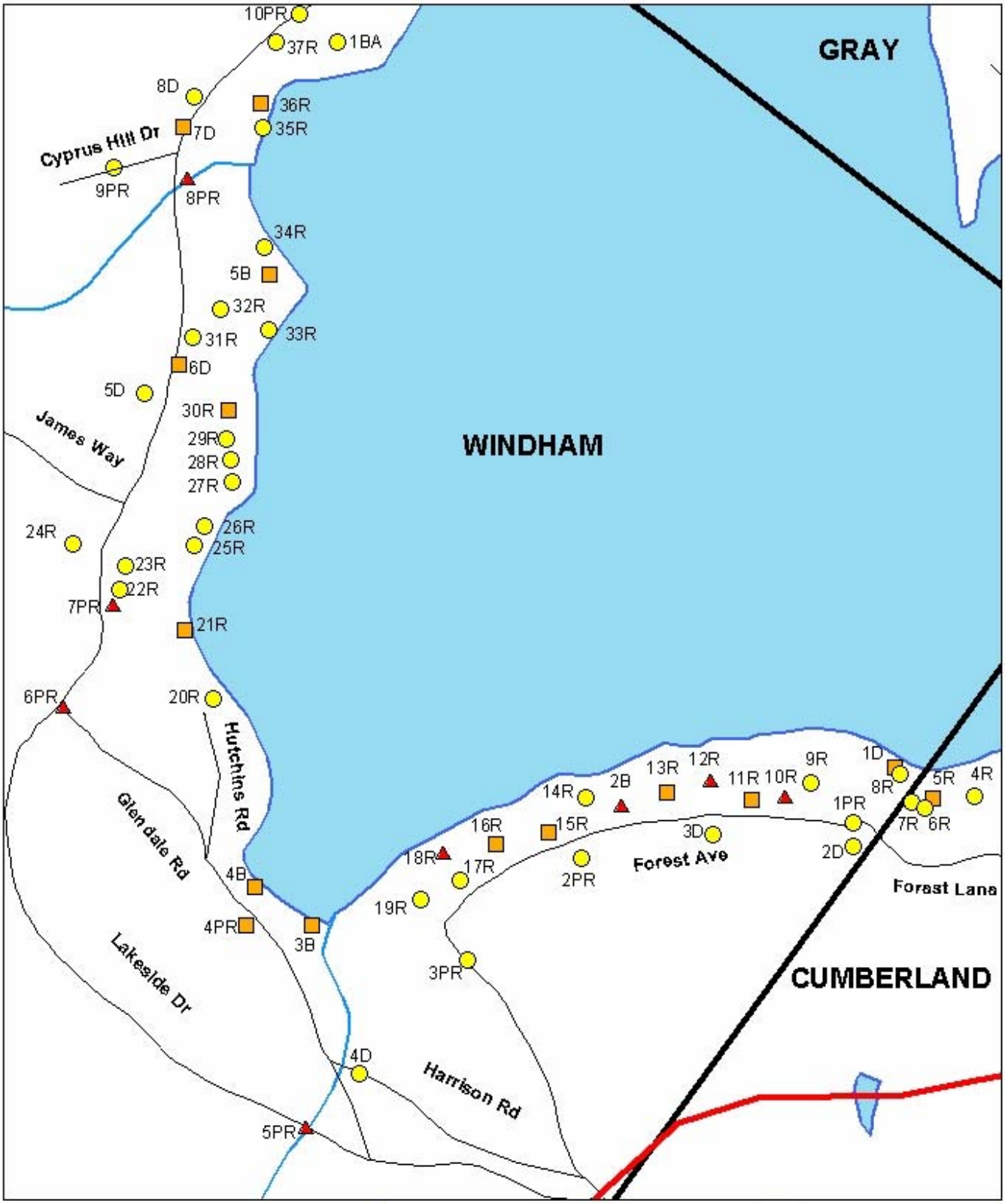
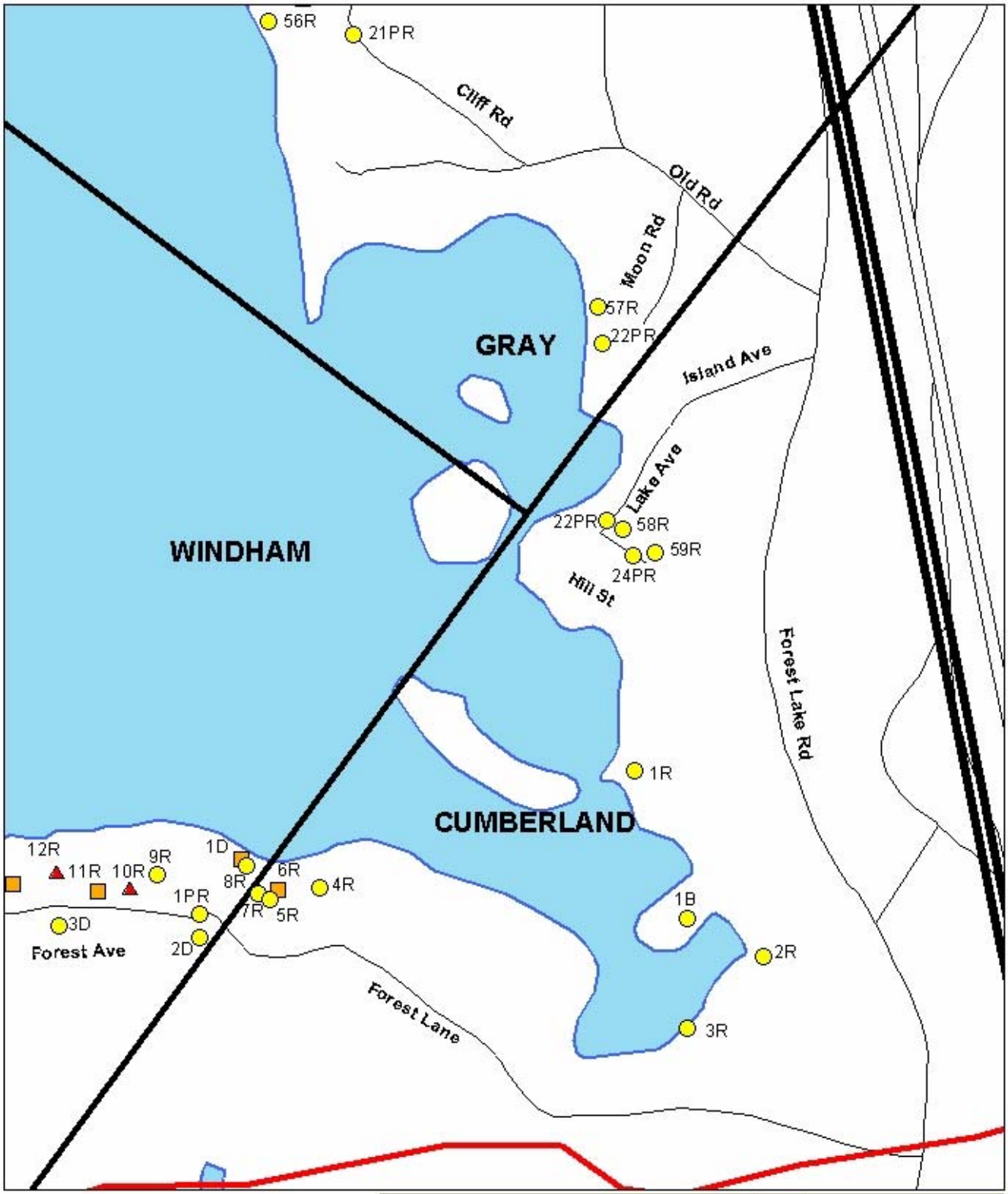


Figure 5: Forest Lake Erosion Sites



Appendix A: Forest Lake Water Quality Information

Information in this Appendix is abstracted from the Forest Lake Water Quality Report provided by the Volunteer Lake Monitoring Program. Water quality monitoring data for Forest Lake has been collected since 1974. There are several "missing" years until 1991. Since that time data has been collected every year. Data has been collected for Secchi disk transparency, total phosphorus, and Chlorophyll-a, dissolved oxygen, pH and alkalinity.

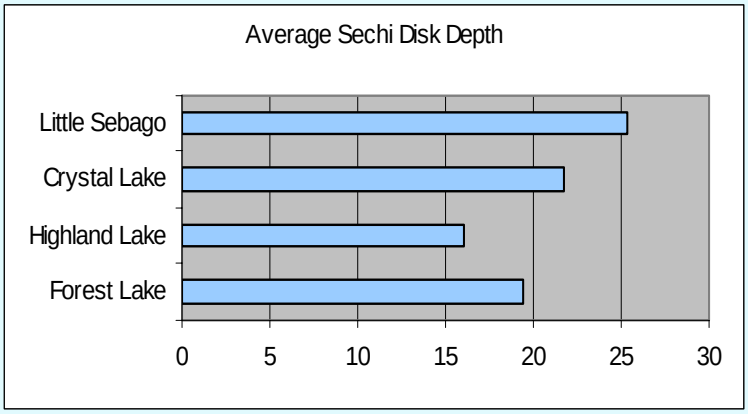
Water Clarity

No single feature of lakes affects people's enjoyment of the resource more than water clarity. Mainers and visitors alike enjoy green forest and not green lakes!

Factors that affect water clarity include:

- **Algal growth:** as the growth of the algae increases, water clarity decreases. As algal growth continues, green mats can form that will affect clarity, property values, odor and overall enjoyment of the resource.
- **Solids:** any particles floating in the water, most commonly soil and plant material.
- **Color:** most Maine lakes have a yellow-brown color, but for Forest Lake color is not an appreciable factor since it is a non-colored lake.

Water clarity by comparison:



In Maine, about 17% of lakes averaged 9-13 feet, 25% averaged 13-16.5 feet and 16% averaged 16.5-20 feet. Lesser percentages occurred on either side of these ranges as reported during 2002. The average Secchi disk reading for Forest Lake is 4.9 meters (16 feet) over a ten year period. The trend over recent years is to be modestly clearer.

Dissolved Oxygen The amount of Dissolved oxygen (D.O.) in the water is an indicator of water quality and the level of life a waterbody can support. Recent dissolved oxygen profiles show moderate DO depletion in the deep areas of the lake. Oxygen levels below 5 parts per million stresses certain cold water fisheries. Forest Lake is considered a warm water fishery; with a state record-sized small mouth bass landed in 1998.

Map ID	DB ID #	Sector & Site #	Land Use	Type of problem	Area Affected	Recommendations	Impact of Problems	Technical Level to Install
1PR	349	1 #1	Private Road	Moderate surface erosion, direct flow to lake	75 x 4	Build up road and crown; install turnouts	Low	Low
15R	361	1 #10	Residential	Moderate surface erosion and direct flow to lake		install series of check dams; seed and mulch	Medium	Medium
2PR	363	1 #10a	Private Road	Moderate surface erosion with direct flow to lake	70 x 5	Install turnouts and detention basin	Low	Medium
16R	364	1 #11	Residential	Bare soil with lack of buffer at shoreline; moderate surface erosion	20 x 50	buffer below deck to water; mulch under deck; install dry wells, 1 by new deck walkway and the other at front left corner.	Medium	Medium
18R	365	1 #12	Residential	Shoreline erosion with severe surface erosion; failed retaining wall	10 x 40	Replace failed retaining wall and install erosion controls; install dripline trench	High	High
17R	366	1 #13	Residential	Lack of buffer at shoreline with moderate surface erosion	50 x 50	Establish buffer ; seed and mulch; define path for foot traffic with infiltration steps	Low	Medium
19R	367	1 #13a	Residential	Side house-roof runoff; baresoil; lack of buffer at shoreline with moderate surface erosion	40 x 10	Install stone filled dripline trench and drywell at gutter downspout; establish buffer and install runoff diverters	Low	Low
3PR	368	1 #13b	Private Road	Moderate ditch erosion and slight surface erosion	160 x 3	Reshape/redefine ditch, stall turnout and remove winter sand; install detention basin	Low	Medium
4D	369	1 #14	Driveway	Direct flow to stream with severe surface erosion	55 x 10	Discontinue use of as driveway, can utilize Harrison Road; install Rubber Razor Blade	Low	Low
3B	370	1 #15	Beach Access	Severe shoreline and surface erosion with direct flow to lake	10 x 10	Recommend installing tri-lock blocks to create swale	Medium	Medium
4PR	371	1 #16	Private Road	Moderate surface erosion with direct flow to lake	170' x 12	Add new surface material; build up and crown road and install turnouts near abandon building	Medium	Medium
4B	373	1 #17	Beach Access	Shoreline erosion with severe surface erosion with direct flow to lake	12 X 4	need engineered solution - erosion seems to be due to underlay of clay soils.	Medium	High
20R	374	1 #18	Residential	Baresoil/fields with slight surface erosion with direct flow to lake	35 X 12	install stone filled dripline trench; establish buffer; seed and mulch	Low	Low
8R	350	1 #2	Residential	bare soil with slight surface erosion with direct flow to lake	10 x 4	Install waterbar, catch basin and direct gutter downspout into drywell	Low	Low

1D	351	1 #3	Driveway	Moderate surface erosion at bottom of driveway and roof runoff	175 x 10	Install catch basin at bottom of driveway; install dry well at gutter downspout	Medium	Medium	Medium
2D	352	1 #4	Driveway	Slight surface erosion with direct flow to lake	15 x 40 +	Enhance depression at bottom of driveway; reshape driveway and surface material; install waterbar/runoff diverter	Low	Low	Low
9R	353	1 #6	Residential	Slight ditch erosion, direct flow to lake	30 x 15	Install dry well at base of house closest to lake and replace steps; enhance buffer	Low	Low	Low
10R	354	1 #7	Residential	Direst flow to lake; stockpiled soil; shoreline erosion and slight surface erosion	4 x 20	Replace riprap along shoreline and replace steps with infiltration steps. Seed and mulch ditch.	High	Low	Low
11R	355	1 #8	Residential	Roof runoff; baresoil with moderate surface erosion	50 x 8	use stairs, not steep bank next to stairs; large infiltration step at base of steps before lower deck.	Medium	Low	Low
12R	356	1 #8a	Residential	Roof sunoff with severe shoreline erosion	75 x 20	replace/install retaining wall; define path for foot traffic; extend buffer and install stone filled dripline trench	High	Medium	Low
3D	357	1 #8b	Driveway	Moderate surface erosion	30 x 15	Add new surface material and reshape & crown driveway	Low	Low	Low
13R	358	1 #8c	Residential	Roof runoff; baresoil ; no buffer at shoreline moderate to slight surface erosion	50 x 50	Establish buffer at shoreline; seed and mulch, no raking define path for foot traffic; install stone filled dripline trench	Medium	Low	Low
2B	359	1 #9	Beach Access	Direct flow to lake; baresoil with moderate to severe surface erosion	125 x 4	Construct infiltration steps and mulch along steps to shore near deck; detention basin; plant trees and shrubs	High	Medium	Medium
14R	360	1 #9a	Residential	Direct flow to lake; baresoil with slight surface erosion (nice shrub plantings)	20 x 10	Cover area with curlex and seed	Low	Low	Low
1R	375	2 #1	Residential	Direct flow to wetland, baresoil and slight surface erosion	10 X 90	Plant trees and shrubs; seed and mulch	Low	Low	Low
1B	376	2 #2	Beach Access	Unstable beach access, slight surface erosion with direct flow to lake	90 X 90	Install log barrier and terracing	Low	Medium	Low
2R	377	2 #3	Residential	Lack of buffer at shoreline, all lawn	90 X 60	Establish buffer	Low	Medium	Low

3R	378	2 #4	Residential	Roof runoff; bare soil with slight surface erosion	6 X 15	Install stone filled dripline trench and mulch	Low	Low	Low
4R	379	2 #5	Residential	Roof runoff with slight surface erosion	60 X 6	Plant trees and shrubs on terraced slope; install infiltration trench @ edge of patio and extend existing drywell and no raking	Low	Low	Low
5R	380	2 #6	Residential	bare soil due to construction projects; lack of buffer and slight surface erosion	20 x 10	Establish buffer; install waterbar and define path for foot traffic and restrict foot traffic from bank	Low	Low	Low
6R	381	2 #7	Residential	Roof runoff;baresoil; stockpiled soil and lack of buffer	35 x 10	Establish buffer; seed and mulch; no raking andf establish steps to water; refill trench with stockpile soil and reset landscape timbers to hold soil	Medium	Low	Low
7R	382	2 #8	Residential	Roof runoff with slight surface erosion and bare soil	6 x 15	Extend buffer and install infiltration steps to lake; install stone filled dripline trench	Low	Low	Low
24PR	383	3 #1	Private Road	Slight surface erosion of road with direct flow to lake	67 x 11.4	Add new surface material; build up and crown road	Low	Low	Low
54R	395	3 #10	Residential	Compacted bare soil and lack of shoreline buffer	30 x 10	Establish buffer; mulch and define path for foot traffic	Low	Low	Low
59R	384	3 #2	Residential	Bare soil on banking with direct flow to lake	39 x 12	Seed and mulch	Low	Low	Low
23PR	385	3 #3	Private Road	Moderate surface erosion with direct flow to lake	200 x 11	Add new surface material and extend buffer	Low	Low	Low
58R	386	3 #3a	Residential	Bare soil and unstable contruction site	40 x 10	Install erosion controls; seed and mulch	Low	Low	Low
22PR	387	3 #4	Private Road	Slight surface erosion with direct flow to lake	127 x 10	Add new surface material; reshape and crown road; install waterbar and establish buffer	Low	Low	Medium
57R	389	3 #5	Residential	bare soil with slight surface erosion with direct flow to lake	15' x 35'	Establish buffer and seed mulch	Low	Low	Low
3 #6		Residential	Bare soil with moderate surface erosion	71 x 32	Plant trees and shrubs and terrace		Low	Low	Low
3 #7		Private Road	Moderate surface erosion with direct flow to lake	203 X 12	Will need engineered solution		Medium	High	High
3 #8		Private Road	Slight surface erosion with direct flow to lake	220 X 12	Install ditch and turnout; add new surface material		Low	Medium	Medium
3 #9		Residential	Bare soil with lack of buffer at shoreline	100 X 40	Establish buffer; seed mulch; no raking define path for foot traffic		Low	Low	Low
4 #10		Residential	Roof runoff with baresoil; lack of buffer	1 x 20	Establish buffer and install dry well at gutter down spout		Low	Low	Low

		4 #11	Beach Access	Unstable beach access with severe surface erosion ; lack of buffer and shoreline erosion	15 x 200	Install runoff diverter; rubber razor blade; establish buffer; infiltration steps; define path for foot traffic	High	Medium	Medium
		4 #11a	Residential	Roof runoff with slight surface erosion and lack of buffer	80 x 8	Establish buffer; mulch, define path for foot traffic; install waterbar and install stone filled dripline trench	Low	Low	Low
		4 #12	Residential	Unstable beach access with slight surface erosion and lack of buffer; unstable culvert	6 x 1	Armor culvert inlet/outlet with stone; establish buffer	Low	Low	Low
		4 #13	Private Road	Clogged cluvert with moderate ditch erosion	80 x 4	Clean out culvert, stabilize inlet and outlet; install ditch; build up road; reshape and vegetate shoulder; plant trees and shrubs	Low	Medium	Medium
		4 #13a	Residential	Bare soil with direct flow to lake		Extend buffer; no raking; seed and mulch	Medium	Low	Low
		4 #14	Residential	Bare soil and stockpiled soil on construction site	20 x 20	install erosion controls (construction finished)	Low	Low	Low
		4 #15	Private Road	Unstable culvert inlet/ outlet with stockpiled soil, slight ditch erosion and ditch capability exceeded	75 x 8	Clen out culvert; stabilize inlet and outlet; install and reshape ditch	Low	Medium	Medium
		4 #16	Residential	Roof runoff; bare soil; shoreline erosion; lack of buffer with slight surface erosion	60 x 100	Install drywell at gutter spout at base of garage; no raking; establish buffer; seed and mulch	Medium	Low	Low
		4 #17	Residential	Roof runoff with moderate surface erosion	45 x 10	Establish buffer; mulch; no raking; define path for foot traffic and install stone filled dripline trench	Low	Low	Low
		4 #18	Private Road	Unstable culvert inlet and outlet; slight ditch erosion with direct flow to lake	5 x 20	Clean out culvert; stabilize inlet and outlet; armor ditch with stone or curlex; seed and mulch	Low	Low	Low
		4 #18a	Driveway	Moderate surface erosion		Add new surface material; remove winter sand; reshape and crown; install drywell at gutter spout.	Low	Low	Low
12PR	422	4 #19	Private Road	Slight Road shoulder erosion with moderate surface erosion on side slopes	3 x 250	Add new surface material; install ditch; build up road and enhance turnout and level spreader	Medium	Medium	Medium
18PR	397	4 #2	Private Road	Direct flow to ditch; stockpiled soil and moderate surface erosion	100 X 6	Build up, and crown road; install turnouts, reshape and vegetate shoulder; seed & mulch soil pile	Low	Low	Medium
12D	423	4 #20	Driveway	Moderate surface erosion	12 x 30	add new surface material and close off and vegetate steep end	Low	Low	Low
43R	424	4 #20a	Residential	Roof runoff with slight surface erosion	5 x 26 5 x 30	Intall stonefilled dripline trench; establish buffer; define path for foot traffic	Low	Low	Low
11D	425	4 #20b	Driveway	Roof runoff with slight surface erosion	12 x 20	Install drywell at gutter spout; install rubber razor blade or waterbar; plant tress and shrubs on bank	Low	Low	Low

11PR	426	4 #21	Private Road	Unstable culvert inlet and outlet	4 x 5	Clen out culvert install plunge pool and stabilize inlet & outlet	Low	Low	Low
10D	427	4 #22	Driveway	Moderate road shoulder erosion with severe surface erosion	10 x 80	Add new surface material; build up road and reshape and crown road; runoff diverter	Medium	Medium	Medium
41R	428	4 #24	Residential	Roof runoff; lack of buffer	3 x 65	Extend buffer, mulching on high use areas; build up road and install stone filled dripline trench	Low	Low	Medium
17D	398	4 #2a	Driveway	Direct flow to ditch with moderate surface erosion	40 x 15	Add new surface material and reshape or crown road	Low	Low	Low
18D	399	4 #2b	Driveway	Direct flow to ditch with moderate surface erosion	50 x 3	Add new surface material and reshape or crown road; install waterbar	Low	Low	Low
17PR	400	4 #3	Private Road	Unstable culvert inlet/ outlet with direct flow to ditch and slight surface erosion and moderate shoulder erosion	600 x 15	Clean out culvert; install plunge pool lengthen and stabilize inlet & outlet; install turnout; build up road and crown; install detention basin	Low	High	High
16D	401	4 #4	Driveway	Moderate shoulder erosion with severe surface erosion	15 x 50	Waterbar or french drain or close off and revegetate first section	High	Low	Low
16PR	402	4 #5	Private Road	Moderate ditch erosion and ditch capability exceeded	200 x 5	Install ditch; build up road; install turnouts and remove grader berms	Low	Low	Medium
15D	403	4 #5a	Driveway	Severe surface erosion	30 x 15	Add new surface material and reshape road; take care of road problems 4#5	Low	Low	Low
13PR	404	4 #6	Private Road	Slight surface erosion with direct flow to lake	100 x 15	Reshape ditch; and install turnout; rehsape and vegetate shoulder	Medium	Medium	Medium
13D	405	4 #6a	Driveway	Shoreline erosion; lack of buffer with moderate surface erosion		Install turnout; establish buffer; install rubber razor blade and waterbar at top of driveway and seed & mulch	High	Low	Low
44R	406	4 #7	Residential	Lack of buffer with slight surface erosion		Establish buffer and no raking	Low	Low	Low
45R	407	4 #8	Residential	Roof runoff with shoreline erosion; lack of buffer at shoreline with moderate surface erosion	20 x 20	Install drywell at gutter spout; add new surface material; establish buffer and seed and mulch	Low	Low	Low
14D	408	4 #8a	Driveway	Moderate surface erosion	30 x 15	Add new surface material or pave driveway	Low	Low	Medium
46R	409	4 #9	Residential	Roof runoff with baresoil; lack of buffer and moderate surface erosion	65 x 3	Establish buffer; install stone filled dripline trench and drywell at gutter spout; no raking; define path for foot traffic	Medium	Low	Low
5PR	429	5 #0	Private Road	Direct flow to stream with slight road shoulder erosion; large sediment delta in stream	300 x 8	Install several turnouts either side of stream bridge	High	Low	Low

6PR	430	5 #1	Private Road	Direct flow to stream; moderate to severe surface erosion	30 x 62	Install plunge pool and culvert; install ditch and rubber razor balde including detention basin	High	High	High
28R	439	5 #10	Residential	Roof runoff; bare soil with moderate sruface erosion	120 x 20	Install drywell at gutter down spout; seed and mulch; install stone filled dripline trench	Low	Low	Low
8PR	440	5 #11	Private Road	Moderate to severe surface erosion	20 x600	Install culvert; install ditching, cut back bank to ease slope; remove berms; install basin with check dams	High	Medium	High
5B	441	5 #12	Beach Access	Moderate to severe sruface erosion	5 x 5	Add bed of crushed stone and perforated pipe to spring area; stabilize bank and base of tree	Medium	Low	Low
33R	442	5 #13	Residential	Shoreline erosion; lack of buffer	80 x 5	Establish and extend buffer; install riprap; possible no mow zone	Low	Low	Low
32R	443	5 #14	Residential	Slight surface erosion	20 x 10	install end of driveway barrier/waterbar; remove berm	Low	Low	Low
31R	444	5 #15	Residential	Lack of buffer with moderate surface erosion	5 x 4	turnout before driveway, plant bearberry and fragrant sumac	Low	Low	Low
30R	445	5 #16	Residential	Lack of buffer with moderate surface erosion at shoreline; driveway has moderate surface erosion	140 x 30 60 x 12	Establish buffer; seed and mulch; no raking; install rubber razor blade in driveway and mulch high use areas	Medium	Low	Low
6D	446	5 #16a	Driveway		60 x 12	better define low area for pooling	Medium	Medium	Low
5D	447	5 #17	Driveway	Moderate surface erosion	30 x 30	Natural depression exists at left of drive entrance can send H2O there.	Low	Medium	Medium
29R	448	5 #18	Residential	Bare soil with slight surface erosion	40 x 10	Plant trees and shrubs on bank; mulch; define path for foot traffic and install waterbar	Low	Low	Low
21R	431	5 #2	Residential	Unstable stream-ditch bank with moderate surface erosion	3 x 15	Reshape and armor ditch with stone or curlex; seed and mulch	Medium	Medium	Low
34R	449	5 #21	Residential	Lack of buffer with severe surface erosion may be due to natural spring	10 x 10	add water loving plants to suck up water. Gullied area seems like poor access to lake. Change foot traffic area	Low	Low	Low
7D	450	5 #23	Driveway	Clogged cluvert with severe ditch erosion	80 x 20	Clean out culvert or replace culvert; add new surface material; extend broken pavement	Medium	Medium	Medium

9PR	451	5 #23a	Private Road	Ditch capability exceeded at top of road with slight surface erosion and direct flow to stream	25 x 4	Top portion of road to lake (install ditch) Install paved speed bump to divert water.	Low	Medium	Medium
8D	452	5 #23b	Driveway	Moderate surface erosion	50 x 10	close off & vegetate upper driveway; install waterbar	Low	Low	Low
35R	453	5 #25	Residential	Bare soil; lack of buffer and shoreline erosion	8 x 5	Extend buffer, establish new slope and define path for foot traffic	Low	Low	Low
36R	454	5 #26	Residential	Roof runoff with shoreline erosin under stairs; lack of buffer with moderate surface erosion	65 x 6	Establish new slope; mulch; no raking; hand place riprap under stairs and define path for foot traffic	Medium	Low	Low
37R	455	5 #28	Residential	Lack of buffer with slight surface erosion; odd crib wall behind beach has washed out	15 x 15	Establish buffer; remove sand; remove crib wall and establish vegetation on bank of intermittent stream	Low	Low	Low
7PR		5 #3	Private Road	Direct flow to stream with slight surface erosion and moderate road shoulder erosion	210 x 20	Install ditch; build up road; reshape and crown road and install detention basin	Medium	High	High
10PR	457	5 #30	Private Road	Ditch capability exceeded	300 x 6	remove large rock in ditch and install ditch; remove grader berms	Low	Medium	Medium
1BA	458	5 #31	Boat Access	Lack of buffer with slight to moderate surface erosion ; slightly unstable boat access	50 x 10	Install runoff diverter at top of boat launch - reshape boat launch area. Close boat access and diverter at top and establish buffer at left of access.	Low	Medium	Medium
38R	459	5 #32	Residential	Roof runoff with slight surface erosion	35 x 100	Establish buffer; install drywell at gutter spout	Low	Medium	Medium
39R	460	5 #33	Residential	Bare soil; Lack of buffer with slight sruface erosion	50 x 15	Establish buffer and mulch play area; define path for foot traffic; need to determine where to direct water	Low	Low	Low
40R	461	5 #33a	Residential	Bare soil with direct flow to lake	50 x 30	Establish buffer; seed mulch; no raking; define path for foot traffic	Medium	Low	Low
9D	462	5 #33b	Driveway	Bare soil with moderate surface erosion	150 x 60	Add new surface material; no raking; mulch; restrict cars to defined area	Medium	Low	Low
41R	463	5 #34	Residential	Bare soil with shoreline erosion and slight surface erosion	40 x 15	replace landscape timbers; establish buffer and seed and mulch	Low	Low	Low
23R	433	5 #4	Residential	Moderate to severe surface erosion with direct flow to stream	90 x 5	Establish buffer; seed and mulch	Low	Low	Low
22R	434	5 #5	Residential	Moderate surface erosion	5 x 10	Plant trees and shrubs	Low	Low	Low

24D	435	5 #6	Driveway	Moderate surface erosion	80 x 12	Add new surface material	Low	Low	Medium
26R	436	5 #7	Residential	Roof runoff; slight surface erosion with bare soil	500 sq.ft.	Install stone filled dripline trench; establish buffer; seed and mulch	Low	Low	Low
25R	437	5 #8	Driveway	Slight surface erosion	12 x 80	Add new surface material and reshape & vegetate shoulder	Low	Low	Medium
27R	438	5 #9	Residential	Slight surface erosion	80 x 45	Establish buffer; seed and mulch and armor side ditche with stone	Low	Low	Low

Appendix B: Permitting ABC's

Protection of the Forest Lake Watershed is ensured through the good will of residents around the lakes and through laws and ordinances created and enforced by the State and Towns.

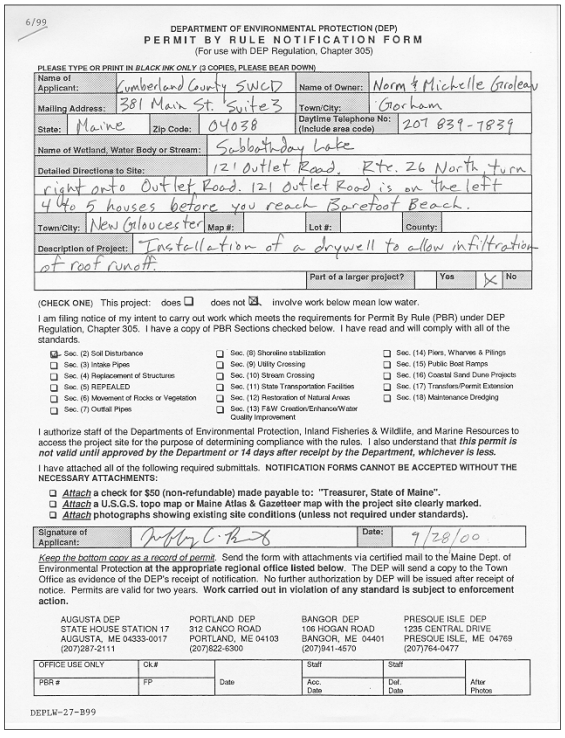
How do you know when you need a permit?

- Construction, clearing of vegetation and soil movement within 250 feet of the lake shore falls under the Shoreland Zoning Act, which is administered by the Towns through the Code Enforcement Officer and the Planning Board.
- Soil disturbance within 75 feet of waterbodies also falls under the Natural Resources Protection Act, which is administered by the DEP.

  To ensure that permits for projects that will not result in significant disturbance are processed swiftly, the DEP has established a streamlined permit process called **Permit by Rule**. These one page forms (shown below) are simple to fill out and allow the DEP to quickly review the project.

> The Natural Resources Protection Act seeks to establish reasonable regulation in order to assure responsible development that does not harm Maine's precious natural systems.
> ~from Protecting Maine's Natural Resources~Volume 1, DEP 1996

The project partners encourage you to contact the DEP and Town Code Enforcement Officer if you have any plans to construct or relocate a structure, clear vegetation, create a new path or driveway, stabilize a shoreline or otherwise disturb the soil on your property. Even if projects are planned with the intent of enhancing the environment—such as installing some of the practices mentioned in this report –contact the DEP and Town to be sure. See last page for contact information.



6/99

DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP)
PERMIT BY RULE NOTIFICATION FORM
(For use with DEP Regulation, Chapter 305)

PLEASE TYPE OR PRINT IN *BLACK INK ONLY* (3 COPIES, PLEASE BEAR DOWN)

Name of Applicant:	Cumberland County SWCD	Name of Owner:	Norm & Michelle Groleau
Mailing Address:	381 Main St. Suite 3	Town/City:	Gorham
State: Maine	Zip Code: 04038	Daytime Telephone No: (include area code)	207 839-7839
Name of Wetland, Water Body or Stream:	Sabbathday Lake		
Detailed Directions to Site:	121 Outlet Road. Rte. 26 North turn right onto Outlet Road. 121 Outlet Road is on the left 4/10 5 houses before you reach Barefoot Beach.		
Town/City: New Gloucester	Map #:	Lot #:	County:
Description of Project:	Installation of a drywell to allow infiltration of roof runoff.		
		Part of a larger project?	Yes ☐ No ☒

(CHECK ONE) This project: does ☐ does not ☒ involve work below mean low water.

I am filing notice of my intent to carry out work which meets the requirements for Permit By Rule (PBR) under DEP Regulation, Chapter 305. I have a copy of PBR Sections checked below. I have read and will comply with all of the standards.

- ☐ Sec. (2) Soil Disturbance
- ☐ Sec. (3) Intake Pipes
- ☐ Sec. (4) Replacement of Structures
- ☐ Sec. (5) REPEALED
- ☐ Sec. (6) Movement of Rocks or Vegetation
- ☐ Sec. (7) Outfall Pipes
- ☐ Sec. (8) Shoreline stabilization
- ☐ Sec. (9) Utility Crossing
- ☐ Sec. (10) Stream Crossing
- ☐ Sec. (11) State Transportation Facilities
- ☐ Sec. (12) Restoration of Natural Areas
- ☐ Sec. (13) F&W Creation/Enhance/Water Quality Improvement
- ☐ Sec. (14) Piers, Wharves & Pilings
- ☐ Sec. (15) Public Boat Ramps
- ☐ Sec. (16) Coastal Sand Dune Projects
- ☐ Sec. (17) Transfers/Permit Extension
- ☐ Sec. (18) Maintenance Dredging

I authorize staff of the Departments of Environmental Protection, Inland Fisheries & Wildlife, and Marine Resources to access the project site for the purpose of determining compliance with the rules. I also understand that ***this permit is not valid until approved by the Department or 14 days after receipt by the Department, whichever is less.***

I have attached all of the following required submittals. **NOTIFICATION FORMS CANNOT BE ACCEPTED WITHOUT THE NECESSARY ATTACHMENTS:**

- ☐ ***Attach*** **a check for $50 (non-refundable) made payable to: "Treasurer, State of Maine".**
- ☐ ***Attach*** **a U.S.G.S. topo map or Maine Atlas & Gazetteer map with the project site clearly marked.**
- ☐ ***Attach*** **photographs showing existing site conditions (unless not required under standards).**

Signature of Applicant:	Date: 9/28/00

Keep the bottom copy as a record of permit. Send the form with attachments via certified mail to the Maine Dept. of Environmental Protection **at the appropriate regional office listed below.** The DEP will send a copy to the Town Office as evidence of the DEP's receipt of notification. No further authorization by DEP will be issued after receipt of notice. Permits are valid for two years. **Work carried out in violation of any standard is subject to enforcement action.**

AUGUSTA DEP	PORTLAND DEP	BANGOR DEP	PRESQUE ISLE DEP
STATE HOUSE STATION 17	312 CANCO ROAD	106 HOGAN ROAD	1235 CENTRAL DRIVE
AUGUSTA, ME 04333-0017	PORTLAND, ME 04103	BANGOR, ME 04401	PRESQUE ISLE, ME 04769
(207)287-2111	(207)822-6300	(207)941-4570	(207)764-0477

OFFICE USE ONLY	Ck.#		Staff	Staff	
PBR #	FP	Date	Acc. Date	Del. Date	After Photos

DEPLW-27-B99

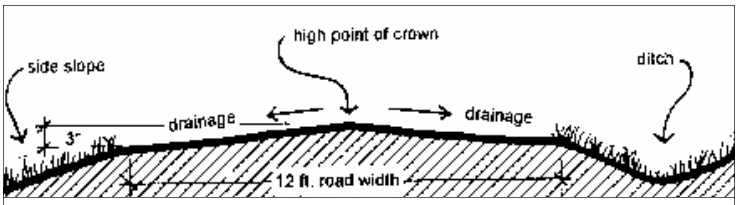
How to apply for Permit by Rule with DEP:

1. Fill out a notification form. Forms are available from your town code enforcement officer or the Maine DEP offices in Portland or Augusta.

2. Permit by Rule requires that you follow certain standards such as installing silt fence. It is important that you obtain a copy of the standards so you will be familiar with the law's requirements.

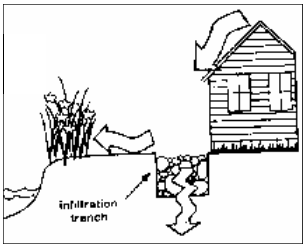
The permit will be reviewed within 14 days. If you do not hear from DEP within 14 days, you can assume your permit is valid. If you bring the permit directly to a DEP office, you may be able to get your permit approved immediately.

Appendix C
Glossary of Common Conservation Measures



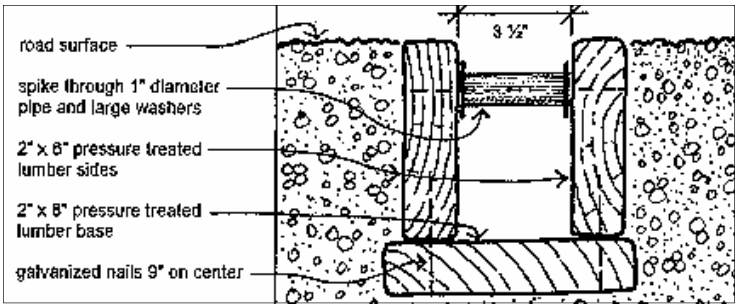
Crown profile: 1/4" of crown per foot of road width (e.g., 1/4" x 12' road—3' crown)

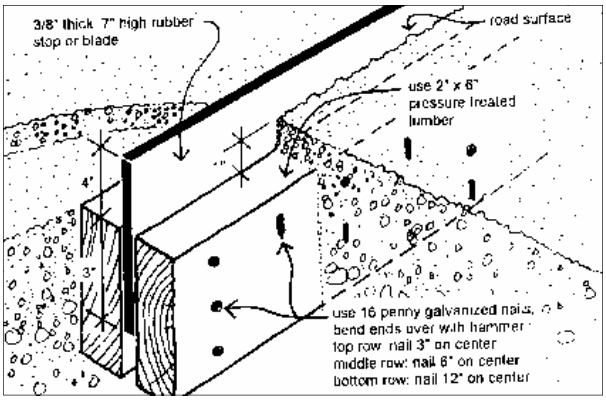
Crown—High point that runs lengthwise along the center of a road or driveway. The high point slopes gently away from the center toward the outer edge of the road, allowing water to drain off the road and preventing erosion of the road surface.



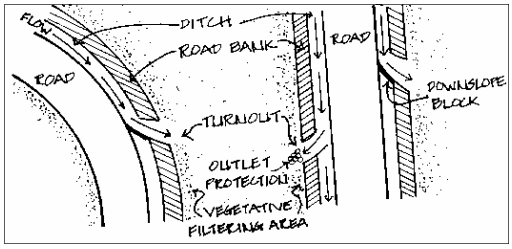
Dripline Trench—Rock-filled trench beneath the roof edge dripline that collects and stores roof runoff until it soaks into the ground. Helps control erosion and reduce wear on the house by preventing backsplash. A typical trench is 6-8" deep and 12-18" wide and filled with 3/4" stone. Can also be used along the edges of driveways to encourage infiltration of runoff.

Open Top Culvert—Box-like structure that collects and diverts road surface runoff away from a sloped driveway or camp road. They are seldom recommended for year-round roads due to the likelihood of plow damage. Install at a 30º angle to the road and direct the outlet into a stable buffer. Clean out leaves and debris periodically.

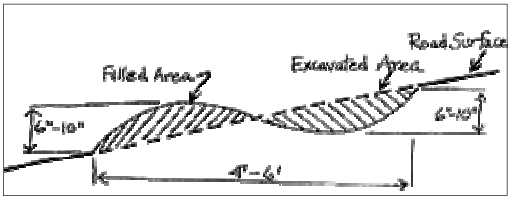




Rubber Bar—Structure that protrudes above the road surface high enough to intercept and collect water, while allowing traffic to pass over it. It is generally used on seasonal roads and driveways because of the likelihood of plow damage. Install at a 30º angle to the road and direct the outlet into a stable buffer. The rubber conveyor belts can be purchased at some hardware stores or Augusta Rubber (582-6200).



Turnout—A conservation practice used to direct runoff from a ditch (or road ruts) into a vegetated buffer. The turnout should have a flared end section that is level and lined with rock to spread out the flow.



Waterbar—Ridge (like a speed bump) that runs diagonally across a road, driveway or path, typically at a 30º angle. Stops water from running down the road and diverts it to the side. Easy to construct and most appropriate for roads with low traffic volume. Needs to be rebuilt periodically.

Where Do I Get More Information?

Contacts

Cumberland County Soil and Water Conservation District
201 Main Street, Suite 6
Westbrook, Maine 04092
(207) 856-2777

Offers assistance with watershed planning and survey work, environmental education, engineering support, seminars and training sessions, and education on the use of conservation practices.

Maine Department of Environmental Protection
312 Canco Road, Portland, ME 04103
Toll Free (888) 769-1036 or (207) 822-6300

17 State House Station, Augusta, ME 04333
Toll Free (800) 452-1942 or (207) 287-7688

Provides permit applications and assistance, numerous reference materials, technical assistance, environmental education, project funding opportunities, and stewardship activities for lakes.

Publications

Androscoggin Valley SWCD and Lake and Watershed Resources Management Associates. 1998. *The Buffer Handbook: A Guide to Creating Vegetated Buffers for Lakefront Properties.* 20 pgs. plus inserts.

Kennebec County SWCD and Maine DEP. June, 2000. *Camp Road Maintenance Manual: A Guide for Landowners.* 54 pgs.

Maine DEP. December, 1997. *A Homeowner's Guide to Environmental Laws Affecting Shorefront Property in Maine's Organized Towns.* DEPLW-38-B98. 28 pgs.

Maine DEP. 1999. *Maine Shoreland Zoning—A Handbook for Shoreland Owners.* DEPLW 1999-2. 34 pgs.

University of Maine Cooperative Extension. *Gardening to Conserve Maine's Native Landscape: Plants to Use and to Avoid.* Bulletin #2500. June, 1999. Folded leaflet.

Remember, the long term health of the watershed depends on <u>you</u>!