# Tannery Brook
# Watershed Survey Report

**Prepared by**

**Cumberland County Soil and Water Conservation District**

**June 2005**

# Acknowledgments

The following people were instrumental in the Tannery Brook Watershed Survey Project and deserve special recognition for their efforts:

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# Introduction

The outside red line indicates the watershed boundary.

Tannery Brook is a perennial stream in the Presumpscot River Watershed. It is a tributary of the Little River and flows through the Town of Gorham, Maine. The watershed covers approximately 2.8 square miles, includes the downtown village area and lies entirely within the Town of Gorham. Gorham, labeled as one of the fastest growing towns in Southern Maine, has seen a large increase in the development of residential and commercial uses. Thus, the watershed supports the largest density of residential and commercial development in the Town of Gorham and has a relatively high impervious area.

The headwaters of the brook originate on state university land and most of the Gorham campus of the University of Southern Maine is in the watershed. The stream corridor acts as an important wintering area for wild turkey and deer. Gorham Trails and Gorham Sno-Goers maintain approximately three miles of recreational trails that are utilized for walking, biking, cross country skiing and snowmobiling.

### Is there a water quality problem in Tannery Brook?

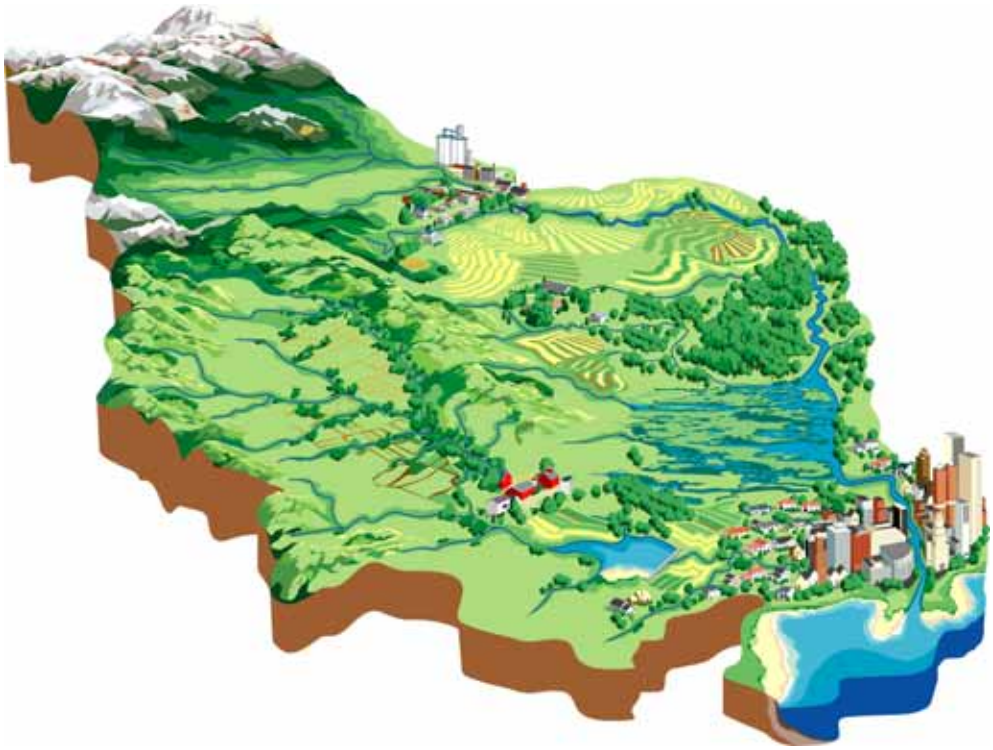
Trained volunteers from the Presumpscot River Watch (PRW) and staff from the University of Southern Maine have monitored water quality in Tannery Brook since 1999.

Biological and chemical data indicate that the stream is quite pristine at the headwaters, but changes to a stream that does not meet its state classification once there are inputs of polluted runoff. In particular, conductivity (a measure of pollutant load) generally exceeded the range typical for unimpacted Maine streams. The conductivity levels in the storm water tributaries were higher than in the main stem of the stream, which signifies that urban runoff is having a considerable effect on the overall levels of pollutants in the stream system.

In addition, for most of the water quality data collected, there was a more pronounced difference between sampling events versus between sampling sites. This indicates that once pollutants enter the system, the impact is shown in the water quality data taken at points all along the stream. Because of this sensitivity of Tannery Brook, an effective management plan would need to focus on both preserving localized areas and proactively assessing potential impacts of future development in the watershed.

## Why is it important to protect Tannery Brook's water quality?

- Tannery Brook contains valuable habitat for fish, birds and other wildlife.
- Tannery Brook outlets into the Little River, then to the Presumpscot River and ultimately Casco Bay
- The brook provides recreational opportunities to local residents and visitors alike.
- Maine's Biennial Water Quality Assessment Report identifies polluted runoff as the sole cause of failure of Maine streams to meet their designated uses, such as fishing and swimming (Maine DEP, 1999) The U.S. Environmental Protection Agency estimates that 60 percent of all remaining water pollution in the U.S. comes from polluted runoff.



## What is being done to protect Tannery Brook?

Water quality data for Tannery Brook has been collected by Presumpscot River Watch volunteers and by University of Southern Maine staff since 1999. During the spring and summer of 2004, the Town of Gorham, the Cumberland County Soil & Water Conservation District and MDEP took the next step in protecting the brook by conducting a watershed survey. Volunteer watershed surveys have been found to be one of the most effective ways to protect water quality by getting local residents involved in identifying existing and potential sources of polluted runoff.

This report contains a summary of the survey findings and recommendations. Hopefully, this information will spur the watershed community to take further action that will protect the quality of Tannery Brook for future generations to enjoy.

# 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 Tannery Brook Watershed. However, it was equally important to:

- Raise awareness about the connection between land use and water quality, and the impacts of polluted runoff.
- Make general recommendations to landowners for fixing erosion problems.
- Inspire people to become active stewards of land and water resources.
- Use the information gathered as one component of a long term stream protection strategy.

Local citizen participation was essential in completing the watershed survey and will be even more important in upcoming years. With the guidance from the Cumberland County Soil & Water Conservation District and assistance from groups and agencies concerned with stream water quality, the opportunities for watershed stewardship and education are numerous.

Bare soil, unstable culvert outlet

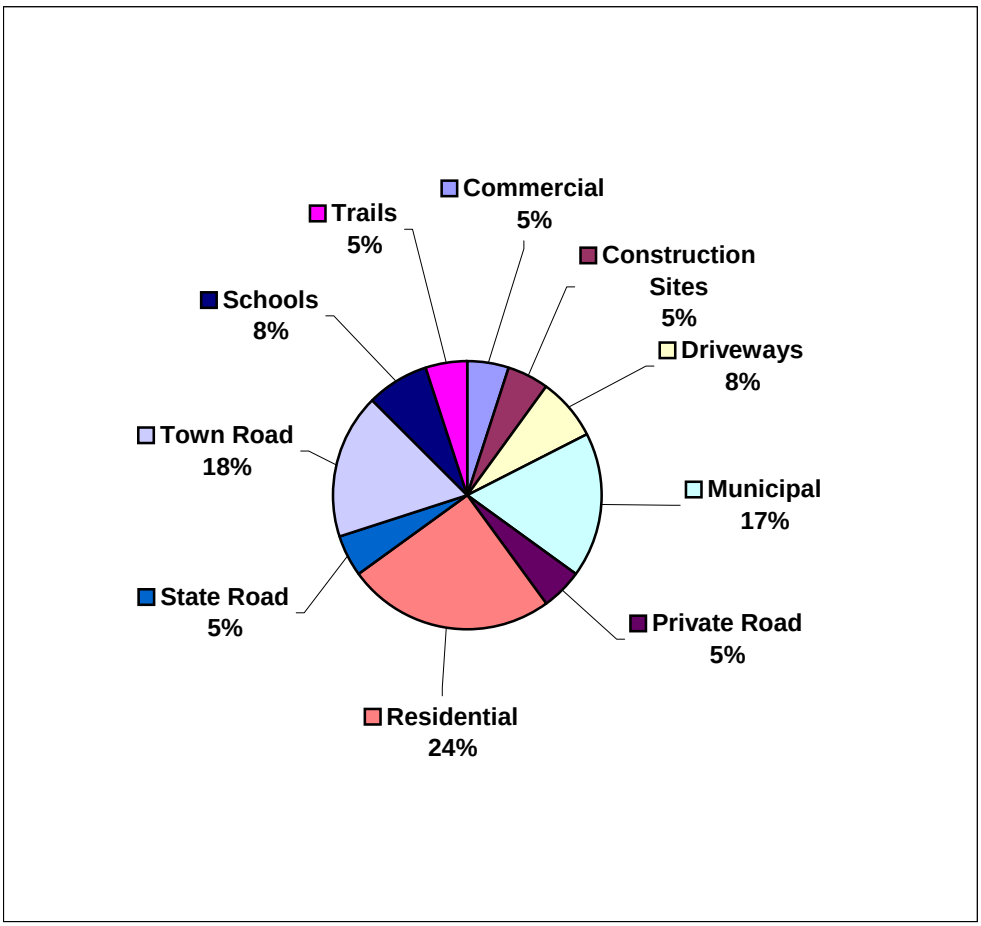
Volunteers documented areas of active soil erosion. Signs of soil erosion include bare soil, rills or gullies (channels carved in the soil), exposed roots, road ruts, sediment deltas and unstable culvert inlet and outlets.

**Above:** An example of a sediment delta in Tannery Brook.

**At right:** Stream bank erosion caused by ATV's.

# Summary of Watershed Survey Findings

Volunteers and technical staff identified 35 sites that were impacting or have the potential to impact water quality in Tannery Brook.
A total of ten land use types were associated with the identified sites. The largest number of problems were associated with residential areas, town roads and municipal land. There were also construction sites, school grounds and trails identified.



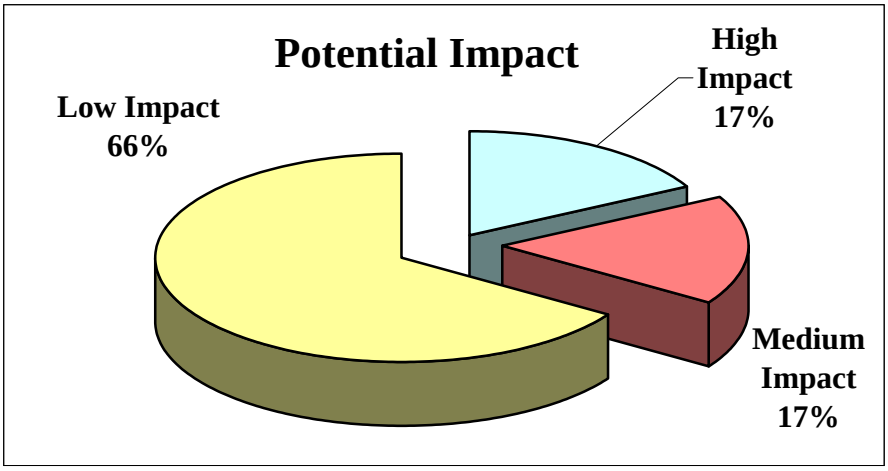

## Key Findings:

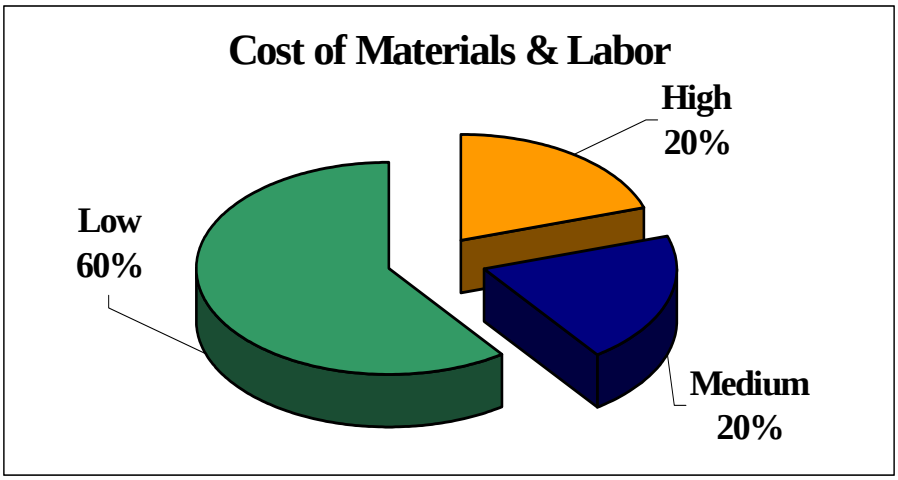
- There is a manageable number of problems—only 35 in total.
- Most of the problems were found on residential properties, town roads and municipal land.
- About $^{2}/_{3}$ of the problems may be causing a significant impact to the brook.
- Most of the problems can be fixed with little expense or technical expertise.

**Potential Impact of Problems**

There were similar numbers of sites with medium and high impacts. The majority of the sites were rated as having a low impact to the brook. 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.

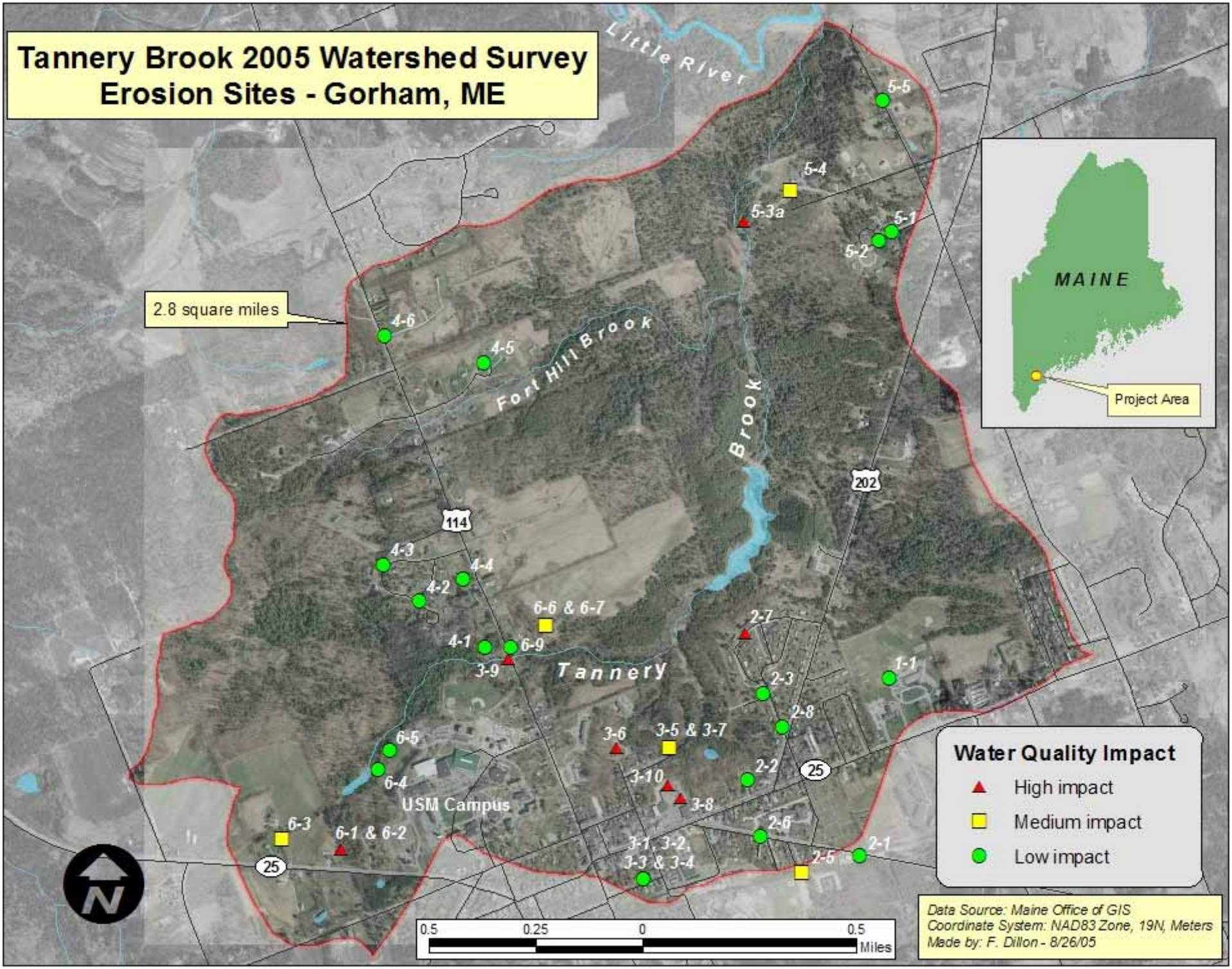
- **Low**– eroding site with limited transport off site, or small site with not evidence of rills or gullies
- **Medium**– sediment transported off site but does not reach high magnitude
- **High**– large area with significant erosion and direct flow to stream




**Cost of Materials and Labor to Implement recommendations**

- **Low** - Less than $500
- **Medium** - $500 to $2500
- **High** - More than $2500


Tannery Brook 2005 Watershed Survey
Erosion Sites - Gorham, ME
Little River
2.8 square miles
Fort Hill Brook
Brook
Tannery
USM Campus
MAINE
Project Area
202
114
25
5-5
5-4
5-3a
5-1
5-2
4-6
4-5
4-3
4-4
4-2
4-1
6-6 & 6-7
6-9
3-9
2-7
1-1
2-3
2-8
3-6
3-5 & 3-7
6-5
6-4
3-10
3-8
2-2
6-3
6-1 & 6-2
2-6
3-1, 3-2,
3-3 & 3-4
2-5
2-1
Water Quality Impact
High impact
Medium impact
Low impact
0.5
0.25
0
0.5
Miles
Data Source: Maine Office of GIS
Coordinate System: NAD83 Zone, 19N, Meters
Made by: F. Dillon - 8/26/05

# Residential Sites

Of the 11 sites associated with residential and driveway areas, 9 were low impact, and 2 were high impact. 9 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
- Evidence of chemical lawn fertilizers
- Direct flow of runoff to tributary/stream
- Streambank/footpath erosion
- Pet waste
- Driveway surface erosion

**Recommended Solutions:**

- Seed and mulch bare soil
- Establish or enhance streambank vegetation
- Limit foot traffic in eroding areas
- Install open-top culvert or other diverter
- Clean up and bury or throw away pet waste

**Problems:**

- Surface erosion/pet waste
- Footpath/stream bank erosion
- Evidence of chemical lawn fertilizers

**Solutions:**

- Install water diverters/dispose of pet waste properly
- Restrict foot traffic to defined area away from stream bank
- Use Phosphorus free fertilizer

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

# Town Roads & State Roads

Seven town road and three state road problems were identified. Of these, 3 were medium impact and 7 were low impact. The problems tended to be slightly more expensive to fix and would require some technical assistance.

**Common Problems Identified:**

- Moderate to severe erosion
- Shoulder and ditch erosion
- Winter sand build-up
- Unstable culvert inlet and outlet
- Direct flow to stream

**Recommended Solutions:**

- Install ditches
- Maintain ditches
- Install new culverts and armor ends with stone
- Remove winter sand to allow proper drainage
- Install plunge pool or detention basin to trap sediment


**Problems:**

- Winter sand build up
- Shoulder and ditch erosion
- Settling basin gully erosion

**Solutions:**

- Remove excess winter sand
- Stabilize shoulders and ditches with stone, or seed and hay
- Stone line settling basin walls and inlets and outlets

# Stormwater Outfalls

Six stormwater outfalls were identified while one has been mitigated since the date of the watershed survey. Of these, 5 were high impact, 1 was low impact. The problems tended to be more expensive to fix and would require technical assistance and engineering designs.

### Common Problems Identified:

- Moderate to severe erosion
- Streambank erosion
- Direct flow of stormwater to stream
- Unstable culvert inlet and outlet

### Recommended Solutions:

- Armor inlet and outlets with stone
- Install plunge pool or detention basin to trap sediment
- Install check dams
- Stabilize stream bank with vegetation and or stone

**Unstable stormwater outfall**

**Unstable stormwater outfall**

**Trash and sediment in stream tributary**

**Stabilized stormwater outfall**

# Stormwater

### What is Stormwater Runoff?

**Stormwater runoff is the rain that hits the ground and flows off streets, rooftops and lawns. Stormwater runoff carries metals and sediments directly into our water bodies significantly reducing water quality.**

We all contribute to the stormwater pollution problem.

Here are a few things you can do to help:

- Clean up after your pets. (Pet waste contains nutrients and pathogens that contaminate surface water.)
- Recycle used oil and anti-freeze
- Participate in clean up activities in your neighborhood
- Plant a rain garden

www.thinkbluemaine.org

# Winter Sand & Salt

### Winter Salt Facts:

- The United States uses 8-12 million tons of sodium chloride per year.
- The State of Maine Department of Transportation uses 70-100K tons of sodium chloride per year depending on winter severity.
- The Town of Gorham uses approximately 1500 tons of sodium chloride per year.

### Salt Impacts Include:

- Reduces water absorption
- Reduces root growth
- Degrades soils
- Degrades vegetation
- Harms wildlife habitat
- Wildlife populations decline

### Sand and Sediment Impacts include:

- Damage to fish gills
- Smothers aquatic insect habitat
- Increases stream temperature
- Reduces channel capacity

***Care must be taken to use as little salt and sand as part of any winter road maintenance program.***

# Lawn Care & Fertilizers

## The Facts

Lawn chemicals are the fertilizers, herbicides and insecticides used in lawn and garden care.

When these chemicals are applied improperly they can run off into:

- streams and rivers
- harm fish and other animals
- contaminate our drinking water

These chemicals can also be absorbed through skin, swallowed or inhaled.

During application, chemicals can drift and settle on streams, ponds, lakes, laundry, toys, pools and furniture.

## Alternatives

- Test the soil for nutrient deficiencies before applying chemicals
- Use compost or organic fertilizers
- Landscape with native plants, grasses and flowers
- Most soils in Maine have enough phosphorus to keep a lawn healthy.
- Mow with the blades set at the highest setting
- Water when it counts-less often, water deeply to encourage root growth
- Leave lawn clippings on lawn (natural fertilizers exist in the clippings)

# Lawn Care Recipes

## Lawn Snack

1 can beer, 1 cup dishwashing liquid, Ammonia

Mix beer and dishwashing liquid in a 20 gallon hose end sprayer, filling the balance of the jar with ammonia. Best time to apply this solution is early in the morning. Good in the spring and fall, and when rapid root action and thatch breakdown is needed.

## Wipe out Weeds

1 Tbsp of gin
1 Tbsp of white vinegar
1 Tbsp of baby shampoo
1 qt warm water

Mix in a bucket, pour into a hand held sprayer. Drench each weed to the point of runoff. For stubborn weeds use apple cider vinegar instead of white vinegar.

# Where Do We Go From Here?

Fixing the erosion sites identified in this survey will require efforts by individuals, conservation organization, municipal officials and the Cumberland Co. Soil & Water Conservation District.

## Individual Citizens

- Prevent runoff from washing sediment into the stream. 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 and stream banks.
- Avoid exposing bare soil. Seed and mulch bare areas.
- Call the Gorham Code Enforcement Officer before cutting vegetation within 75' of streams.
- Maintain septic systems properly. Pump septic tanks (every 2-3 years for year round residences and 4-5 years for seasonal residences) and upgrade marginal systems.
- Support local conservation efforts.

## Local Conservation Organizations

- 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 stream issues and work cooperatively to find solutions.

## Municipal Officials

- Enforce shoreland zoning ordinance to assure full protection of Tannery Brook.
- Conduct regular maintenance on town roads in the watershed, and fix town road problems identified in this survey.
- Participate in and support long term watershed management projects.
- Promote training for road crews, planning boards and conservation commissions.

# Permitting ABC's

The protection of our natural resources is ensured through the good will of residents around lakes, ponds rivers and streams and through laws and ordinances created and enforced by the State and Town.

### How do you know when you need a permit?

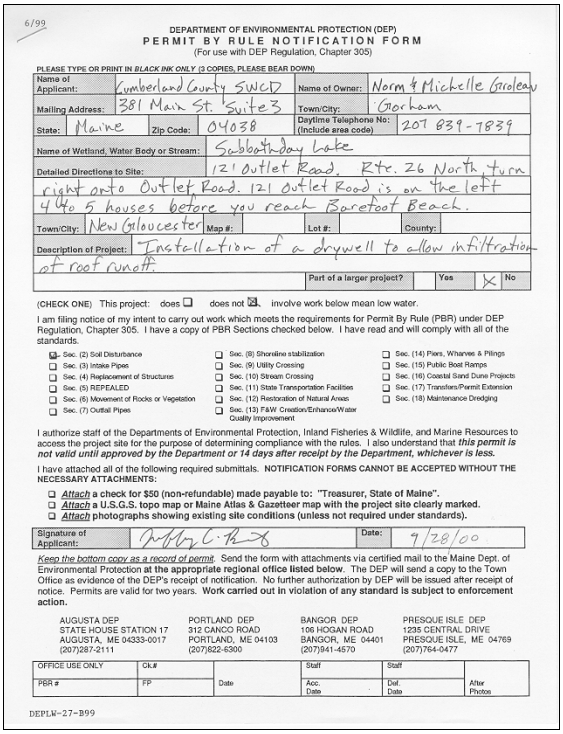
- Clearing of vegetation, construction and soil movement within 75 feet of a stream falls under the Shoreland Zoning Act, which is administered by the Town through the Code Enforcement Officer and the Planning Board.

- Soil disturbance within 75 feet of a stream also falls under the Natural Resources Protection Act, which is administered by the Maine 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 back 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 Girolemo |
| 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: | Sebbathday Lake | | |
| Detailed Directions to Site: | 121 Outlet Road. Rte. 26 North turn right onto Outlet Road. 121 Outlet Road is on the left 4 to 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: | [signature] | 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 office 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.

3. 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 A**

# Rapid Stream Habitat/Geomorphology Surveys Summary

Tannery Brook is an excellent recreation and wildlife resource in the Town of Gorham. However, rapid surveys of the stream indicate that it is being stressed, most likely due to nearby urban development (both existing & new) and associated stormwater and sediment problems it typically contributes. Figure 1 identifies site locations of the 2003 survey (1,2,3) and the remaining are survey locations of the 2004 survey.

The lower reaches of the stream near Queen Street are undergoing stress and exhibited severe channel adjustment. In addition, other reaches appeared to be moderately destabilized as well, likely due to local land use conditions.

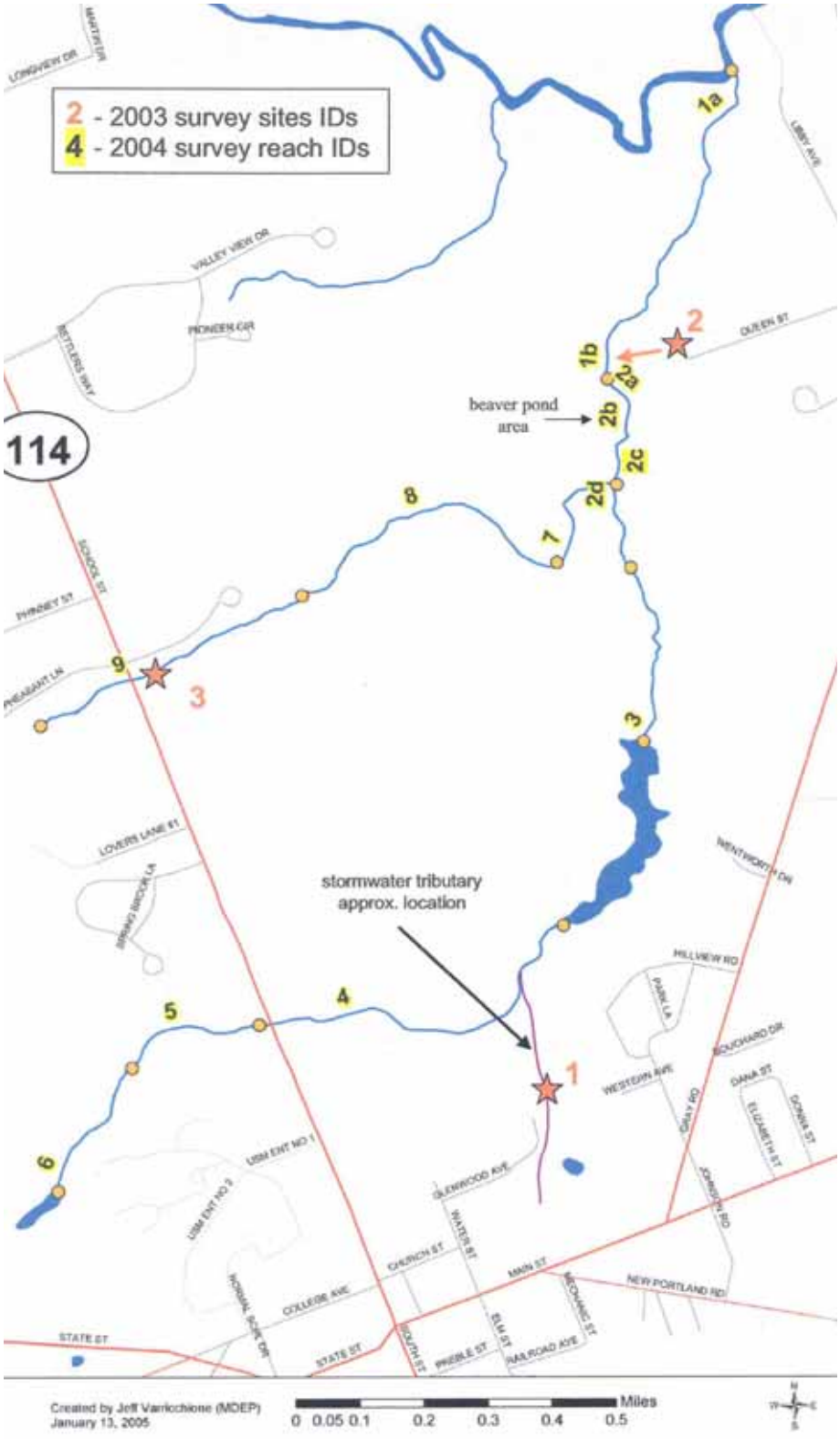
The Queen Street Extension and associated ATV snowmobile trail may be a significant source of sediment and excess stormwater to the lower reaches. This, in combination with increased stormwater and sediment problems making their way past Tannery Pond (dam) and the lower beaver pond, appear to be the cause of the problems in reaches 1a - 2a. (see Figure 1). Gorham Village, Route 114 and the University of Southern Maine likely are the main stressors of upper reaches of the stream.

While some reaches had significant amounts of coarse substrate, such as cobbles and gravels, the stream had many reaches that were predominantly fine sediments (sands and silts). This likely is a combination of inputs from manmade sources as well as local surficial geology controls. Further investigation likely is needed to determine the best stream bottom substrate possible for high value, coldwater fisheries.

Finally, Reach 2003-1 near the end is a stormwater tributary draining urban development in Gorham Village. This tributary is quite full of sediment and garbage, and may also be a conduit for high volumes of sediment. It is understood that some best management practices (BMP's) have been or will be constructed to deal with stormwater problems, however, follow-up investigations of stormwater tributary response to these BMP's is encouraged.

*Please see local library for full report*

**Figure 1. Stream reach coding used for rapid stream habitat / geomorphology survey of Tannery Brook**



***Riffle section***

A shallow rapids where the water flows swiftly over completely or partially submerged obstructions to produce surface agitation and provide oxygen.

***Sand bar***

Sand carried by the currents that is deposited along stream bank locations resulting in localized shallow areas.

***Over widened channel***

As evidenced by many fallen trees. It is important that fallen trees occur in streams for habitat diversity. However, in disturbed streams, sometimes there are too many.

***Tannery Brook sediment delta***

This area empties into the Little River

***Typical stream section***

This photo located in the area below the pond.

***ATV trail crossing***

Crossing through stream near Queen Street area.

| Sector | Site # | Land Use | Type of problem | Recommendations | Impact of Problems | Technical Level to Install | Material Cost | Labor Cost |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | School | chem lawn | organic fertilizer | L | L | L | L |
| 2 | 1 | Commercial | Bare soil/dirt parking lot | storage facility for used oil tanks | L | L | L | L |
| 2 | 2 | Residential | bare soil/field | Seed & Mulch | L | L | L | L |
| 2 | 3 | Residential | ChemLawn/Fertilizer Flags | Phosphorus Free fertilizer | L | L | L | L |
| 2 | 4 | Trail | unstabilized logging site | Erosion Controls/seed mulch | M | L | L | L |
| 2 | 5 | Town Road | under construction-culvert installation-site unfinished | stabilize inlet & outlet | M | L | L | L |
| 2 | 6 | Town Road | Road/Winter sand clogged storm drain | Remove winter sand | L | L | L | L |
| 2 | 7 | Municipal | Severe stormwater outfall erosion | install settling basins/check dams to treat and slow storm-water | H | M | M | M |
| 2 | 8 | Municipal | Stormwater outfall erosion | install setting basin | M | L | M | M |
| 3 | 1 | Driveway | Road Shoulder/ditch erosion | Add new surface material and reshape vege shoulder | L | L | L | L |
| 3 | 2 | Town Road | Road Shoulder/ditch erosion | Reshape veg shoulder/install curbing | L | M | M | M |
| 3 | 3 | Driveway | Road Shoulder/ditch erosion | Add new surface material and reshape vege shoulder | L | L | L | L |
| 3 | 4 | Driveway | Road Shoulder/ditch erosion | Add new surface material | L | L | L | L |
| 3 | 5 | Municipal | Streambank erosion | stabilize inlet-outlet, plant trees & shrubs, bank stabilization, re-store channel | H | H | H | H |
| 3 | 6 | Residential | Streambank erosion/unstable construction site | Extend buffer, plant trees & shrubs, seed and mulch bank stabilization | H | H | H | H |

| Sector | Site # | Land Use | Type of problem | Recommendations | Impact of Problems | Technical Level to Install | Material Cost | Labor Cost |
|---|---|---|---|---|---|---|---|---|
| 3 | 7 | Trail | bare soil, streambank erosion, chemlawn toxics? Old drums | prevent access, plant trees, seed & mulch stormwater controls | M | L | L | L |
| 3 | 9 | State Road | Road Shoulder/ditch erosion | install turnout, remove winter sand reshape/veg shoulder, seed & mulch | L | L | L | L |
| 3 | 10 | Municipal | Severe bank erosion | install settling basins/check dams to treat and slow stormwater | H | M | M | M |
| 4 | 1 | Residential | streambank erosion-footpath | Stabilize foot path-bank stabilization | L | L | L | L |
| 4 | 2 | Residential | stockpiled soil | Install erosion controls-seed & hay | L | L | L | L |
| 4 | 3 | Town Road | winter sand stockpile | Remove winter sand & stencil storm drain | L | L | L | L |
| 4 | 4 | Residential | pet waste | Ag waste management | L | L | L | L |
| 4 | 5 | Residential | suspended soil in stream | Low impact fertilizing | L | L | L | L |
| 4 | 6 | Town Road | unstable construction site | Stabilize inlet-outlet, armor ditch with stone or grass, pave road | L | M | H | H |
| 4 | 7 | Construction site | road shoulder and ditch erosion | Clena out culverts, install plunge pools, stabilize inlet/ outlet, armor ditch, erosion controls | L | M | H | H |
| 5 | 1 | Residential | unstable culvert inlet & outlet | Clean out culvert-stabilize | L | L | L | L |
| 5 | 2 | Residential | unstable culvert inlet outlet | Clean out culvert-stabilize | L | L | L | L |
| 5 | 3 | Town Road | unstable culvert inlet outlet | Clean out culvert-stabilize | L | L | L | L |
| 5 | 4 | Town Road | road shoulder-ditch erosion | install ditch/install turnout-regrade, reshape/veg shoulder | M | M | M | M |

| Sector | Site # | Land Use | Type of problem | Recommendations | Impact of Prob-lems | Techni-cal Level to Install | Material Cost | Labor Cost |
|---|---|---|---|---|---|---|---|---|
| 5 | 5 | Residential | unstable culvert inlet outlet | Clean out culvert-stabilize | L | L | L | L |
| 5 | 3A | Private Road | streambank erosion, road shoulder erosion, bank downcutting | Build up road, install turnouts, reshape & crown install runoff diverters, bank stabilization | H | H | H | H |
| 6 | 1 | Construction Site | Bare soil/fields/roads/ stockpiled soil, streambank erosion, unstable contruction | Stabilize inlet/outlet, reshape/ riprap/ erosion controls, add new surface material, re-shape& veg shoulder, install runoff diverter, bank stabiliza-tion, stormwater controls | H | H | H | H |
| 6 | 2 | Residential | bare soil, streambank ero-sion | establish buffer, bank stabiliza-tion | H | M | M | M |
| 6 | 3 | Driveway | unstable culvert inlet-outlet | clean out culvert-stabilize inlet - outlet | M | M | M | M |
| 6 | 4 | School | drainage from paved area & impoundment | install plunge pool-settling ba-sin/remove riprap from stream channel | L | M | M | M |
| 6 | 5 | School | stockpile soil, bare soil, streambank erosion, chem-lawn/fertilizer | Erosion Controls, reshape-veg shoulder, low impact fertilizing extend buffer | L | L | L | L |
| 6 | 6 | State Road | streambank erosion, road shoulder ditch erosion | erosion controls, reshape & veg shoulder bank stabilization | M | M | M | M |
| 6 | 7 | Town Road | unstable construction site | seed & mulch bare soil | M | M | M | M |
| 6 | 9 | Municipal | Direct flow of stormwater to stream | install setting basin | H | L | M | M |

# 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 surveys, 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.

**Town of Gorham**
270 Main Street
Gorham, Maine 04038
207-839-5037

**Town of Gorham Public Works Department**
Bob Burns
892-9062

**Maine Local Roads/MDOT**
Phil Curtis—Road Ranger
562-4228

**www.thinkbluemaine.org**

## 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.