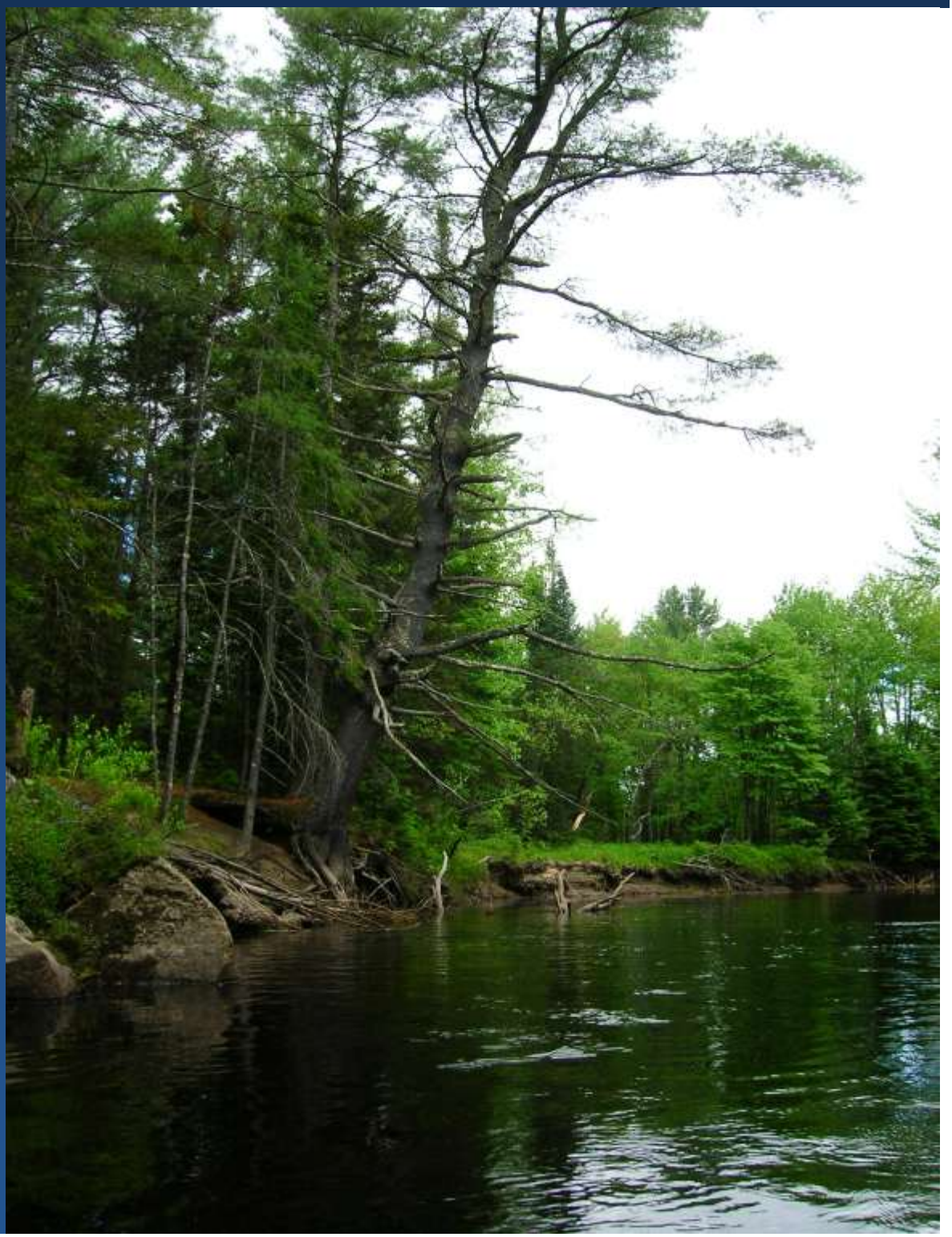
Crooked River

Watershed Survey



Cumberland County Soil & Water Conservation District

Betty Williams

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Acknowledgments

The following people and organizations were instrumental in the Crooked River Watershed Survey Project and deserve special recognition for their efforts:

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Portland Water District
The Towns of Bethel, Albany, Waterford, Norway, Otisfield,
Harrison, Casco and Naples
Lakes Environmental Association
Cumberland County Soil & Water Conservation District
Oxford County Soil & Water Conservation District
Sebago Chapter of Trout Unlimited
Sebago Lake Anglers Association
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Table of Contents

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1. Introduction

Watershed

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

The Crooked River **watershed** report is intended to provide community members with specific strategies for helping to improve this important local resource. The report is based on a traditional "land-based" watershed survey and a Riparian Corridor inventory that were conducted in May and June of 2011. The land-based watershed survey teams traveled throughout the watershed documenting polluted runoff from roads, parking areas, fields, stream banks and footpaths using hand-held global positioning systems (GPS), cameras and the standardized field data sheets. The Riparian corridor inventory was completed via canoe and or kayak by staff and experienced volunteers who documented existing riparian conditions and problem sites.

Polluted Runoff

Also known as nonpoint source (NPS) pollution - comes from many diffuse sources and is transported by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human made pollutants, finally collecting in lakes, rivers, wetlands and coastal waters.

Local volunteers and technical staff from various governmental agencies and nonprofit organizations identified 164 sites from the land-based survey and 20 problem sites from the Riparian Corridor Inventory. All sites fall within the Crooked River watershed and are potential contributors of **polluted runoff**. Given the increase of residential development in the watershed (Figure 1), it is likely that the Crooked River and its tributaries have been degraded by polluted runoff. The lower portion of the watershed is more densely developed and is in a high growth area.

This runoff can contain:

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- Oil, grease, and toxic chemicals from runoff;
- Soil erosion from improperly managed construction sites, crop and forest lands, roads and eroding stream banks; and
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

The Crooked River watershed is part of the larger Sebago Lake watershed and has been named a Nonpoint Source Priority Watershed by the Maine Department of Environmental Protection (MDEP). MDEP designated certain watersheds as high priority in order to enable the focusing of resources to help restore waterbodies not meeting standards or protect waterbodies considered threatened with not meeting water quality standards in the future.

Figure 1

2. Watershed Survey Purpose

The primary purpose of the Crooked River watershed survey was to identify and prioritize nonpoint source (NPS) pollution sites in the watershed for eventual remediation. Additionally, the Crooked River Watershed survey will capitalize on the existing efforts in the watershed and further collaborative relationships with local municipal officials and landowners, who can help resolve the water quality issues identified by the survey.

Runoff from the paved road concentrates around this culvert to contribute significant sediment to a Crooked River tributary.

3. General Watershed Characteristics

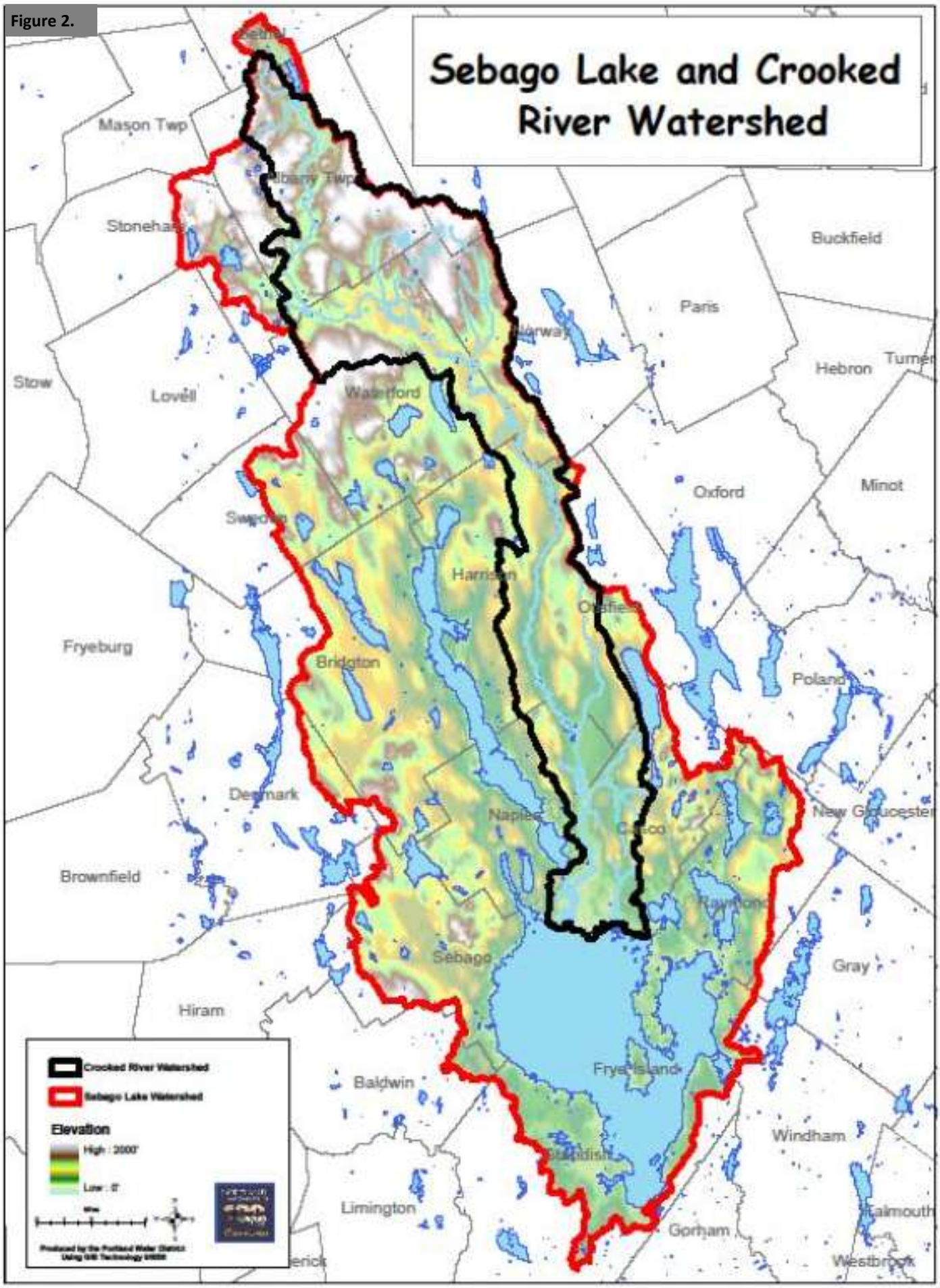
The Crooked River Watershed is located in the towns of Bethel, Greenwood, Stoneham, Albany, Waterford, Norway, Harrison, Otisfield, Naples and Casco and has a drainage area of approximately 120 square miles (see Figure 2 on next page). The Crooked River flows in a southeasterly direction and receives numerous small tributary inputs along the way before joining with the Songo River just before flowing into Sebago Lake (also listed as a Nonpoint Source Priority Watershed), which then flows into Casco Bay. The **land cover** in the watershed is dominated by forest lands at approximately 85% while approximately 10% is developed and includes residential, commercial, industrial, highways/roads and open urban land uses. Almost all of the residentially developed land is located in the southern portion of the watershed nearest to Sebago Lake and in the Towns of Casco and Naples. Agricultural land use accounts for approximately 4.5% of the watershed and much of this is hayfield and fallow lands.

Crooked River Water Quality

Portland Water District (PWD) has monitored water quality on the Crooked River for over 25 years as part of their Crooked River Monitoring Program. The River is currently monitored at seven sites on a quarterly basis from the Sebago Lake State Park in Naples to the bridge on Route 35 in Albany. The southern most site has been monitored for the longest period of time and highest frequency.

Water quality monitoring data collected from the Crooked River by the Portland Water District (PWD) over the past several years are indicative of excessive pollutant loadings. The 2008/09 Crooked River water quality report is based on data gathered from the southern most sampling site at the State Park and therefore may not represent all seven sampling sites. Phosphorus levels are generally higher in flowing tributaries than in a lake. In 2010, total phosphorus concentrations ranged from 9 ppb to 25 ppb.

Figure 2.


Sebago Lake and Crooked River Watershed
Mason Twp
Stoneham
Buckfield
Paris
Hebron
Stow
Lovell
Waterford
Oxford
Minot
Harrison
Fryeburg
Bridgton
Poland
Denmark
Naples
Casco
New Gloucester
Brownfield
Raymond
Sebago
Gray
Hiram
Baldwin
Windham
Limington
Gorham
Falmouth
Westbrook
Crooked River Watershed
Sebago Lake Watershed
Elevation
High : 2000'
Low : 0'

In addition, PWD has established fecal coliform bacteria levels at 235 mpn/100 mL as the action level, and anything above this reading is investigated and re-sampled. In 2010, fecal coliform levels ranged from 6 mpn/100mL to 79 mpn/100mL. *(for more detailed water quality information please visit www.pwd.org)*

Why is the Water Quality at Risk?

Nonpoint source (NPS) pollution is the most common type of pollution impacting water bodies in the state. NPS is found in storm water runoff from rain and snowmelt. During and after storms and snowmelt, soil (and hitch-hiking nutrients like phosphorus and nitrogen) washes into rivers and lakes from the surrounding landscape by streams and overland flow.

The signs of stress exhibited by the Crooked River are likely the result of polluted runoff that flows into the river from its surrounding watershed. The rising development pressure throughout the watershed is an anticipated source of this stress. This comprehensive survey of the watershed is the best way to identify and prioritize sources of pollution impacting the Crooked River in order to ensure future remediation.

Why should we protect the Crooked River?

The Crooked River supplies over 40% of the surface inflow to Sebago Lake, which is the reservoir for the PWD, a utility that supplies drinking water to 200,000 customers in 11 Maine communities. As Sebago Lake's largest tributary, the Crooked River supports one of only four known indigenous populations of landlocked Atlantic salmon in Maine. The river habitat supports virtually all of Sebago's wild salmon production. Unique genetics and the allure of

Nate Whalen, from Portland Water District retrieving a rock bag. These are placed and left in the river for four weeks. When retrieved, macroinvertebrates types and numbers are documented.

angling for wild landlocked salmon in their indigenous water has brought international acclaim to Sebago and the Crooked River from anglers seeking this type of fishing experience.

4. Land Based Watershed Survey Methodology

Prior to the surveys, notification news articles were published in several local newspapers: Lakes Region Weekly, The Bridgton News, Advertiser Democrat and the Lewiston Sun Journal. Town and partner websites were utilized and announcements were also published in newsletters of Western Foothills Land Trust, Loon Echo Land Trust , Sebago Lake Watershed News and the LEA Lake News. This provided an education opportunity for landowners and the option to exclude their property from the survey. The Crooked River watershed was divided into 9 sectors (Figure 3 on page 10) to provide an approximately equal number of potential polluted runoff sites in each sector.

The land-based survey methods followed those outlined in MDEP's publication, *A Citizen's Guide to Basic Watershed, Habitat and Geomorphology Surveys in Stream and River Watersheds, Volume 1.*

Volunteers were an instrumental part of the watershed survey and were contacted by Steering Committee members and technical staff. Prior to the watershed survey, volunteers received two hours of classroom training on field survey techniques to identify various sources of polluted runoff.

On May 7, 2011, survey teams traveled throughout the watershed documenting polluted runoff from roads, parking areas, fields, stream banks and footpaths using hand-held global positioning systems (GPS), cameras and the standardized field data sheets. To ensure accurate data collection, technical staff members served as leaders for each team. In all, 164 polluted runoff sites were identified by the survey teams.

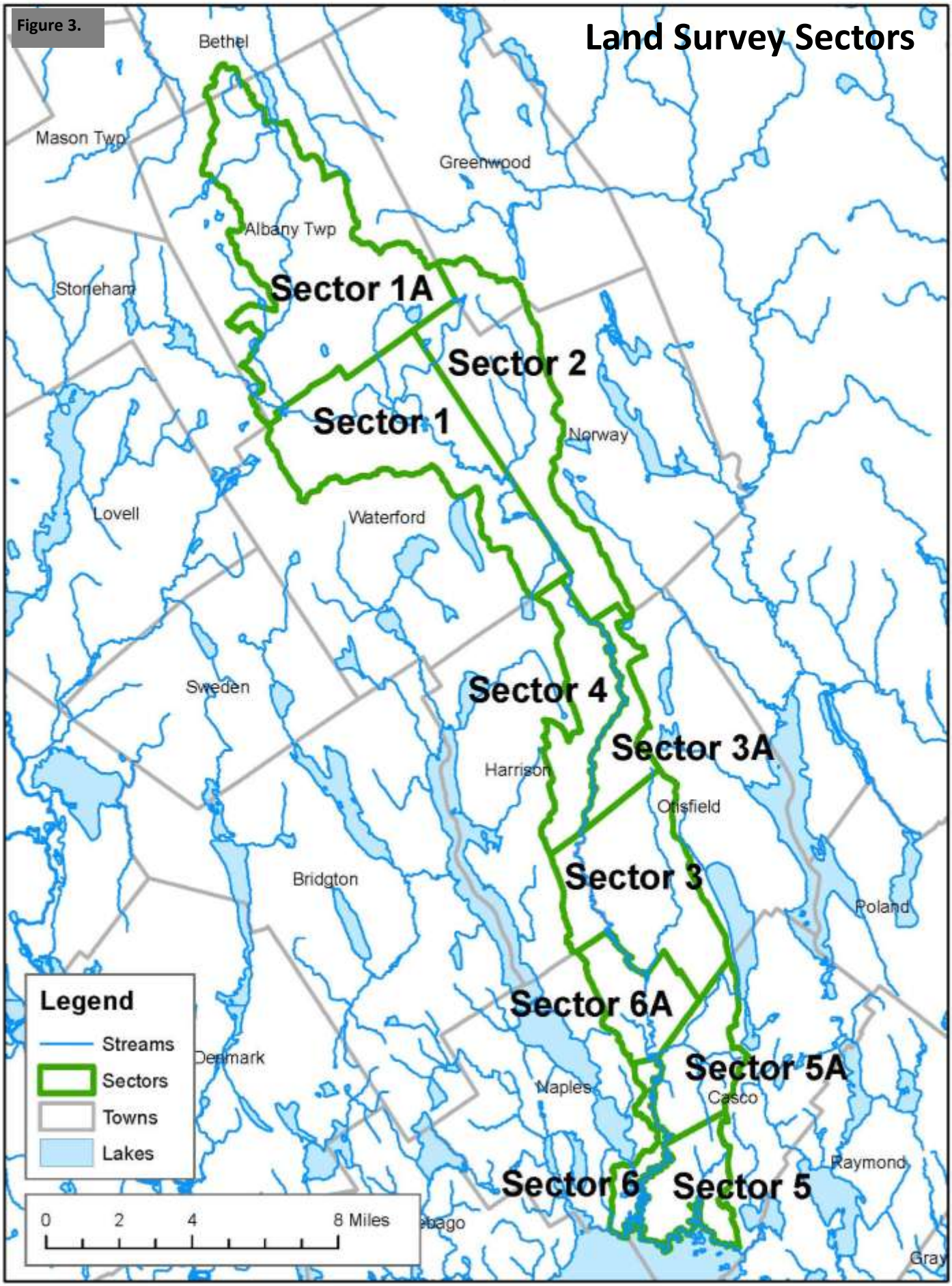
5. Riparian Corridor Inventory Methodology

The Riparian Inventory methods followed those outlined in the publication, *Sheepscot River West Branch Riparian Inventory, August 2000*, produced by the Sheepscot River Watershed Council. The survey assessed problem sites that included buffer issues, problem sites, shoreline erosion. Also documented were existing riparian conditions including vegetation type, percent of shade over the river, land use and site characterization in order to establish baseline data for future management efforts.

The inventory was completed via canoe and/or kayak by staff and experienced volunteer members from the Sebago Chapter of Trout Unlimited, Hidell's Guide Service, Sebago Lake Anglers Association and Mollyockett Chapter of Trout Unlimited. The river was divided into nine sections or reaches (Figure 4) and on June 3, 2011, volunteers began the inventory at the river crossing on Route 118 in Waterford and continued southerly to Sebago Lake in Naples and Casco. A total of 20 problem sites were documented.

The data collected were entered into a excel database, and documented problem sites were plotted on maps. The sites were also divided into land use categories (driveways, roads, private residences, etc.) and rated based on their impact on the river. The following section of this report gives a description of identified sites and associated ratings. Maps are located in Appendix C and the data collected are located in Appendix D.

Figure 3.


Land Survey Sectors
Bethel
Mason Twp
Greenwood
Albany Twp
Stoneham
Sector 1A
Sector 2
Sector 1
Norway
Lovell
Waterford
Sweden
Sector 4
Sector 3A
Harrison
Otisfield
Bridgton
Sector 3
Poland
Sector 6A
Denmark
Sector 5A
Naples
Casco
Raymond
Sector 6
Sector 5
Gray
Legend
Streams
Sectors
Towns
Lakes
0
2
4
8 Miles

Summary of Watershed Survey Findings

Volunteers and technical staff identified 164 erosions sites from the **land-based survey** in the Crooked River Watershed that are currently impacting or have the potential to impact water quality. Of the 164 sites identified, 72 were actual erosion sites and 92 were considered problem sites. Survey teams documented problem sites which consisted of degraded buffers and lack of stream shading, trash dumping, sites, fish passage barriers and drainage from roads, parking lots and other paved areas that drain directly into the river.

A total of 20 sites were identified in the **riparian corridor inventory** that likely have a negative impact to the river. Problem sites identified include areas along the immediate shore that had been cleared and had no vegetation, evidence of vehicular traffic in and out of the river, log jams, trash, slumping banks, and actively eroding sites.

Key Findings:

- ◊ Most of the problems were found to be associated with roads
- ◊ About 1/2 of the problems may be causing significant impact to the river
- ◊ Most problems can be fixed with minimal to moderate expense and or expertise

Riparian Corridor Survey Sectors

Figure 4.

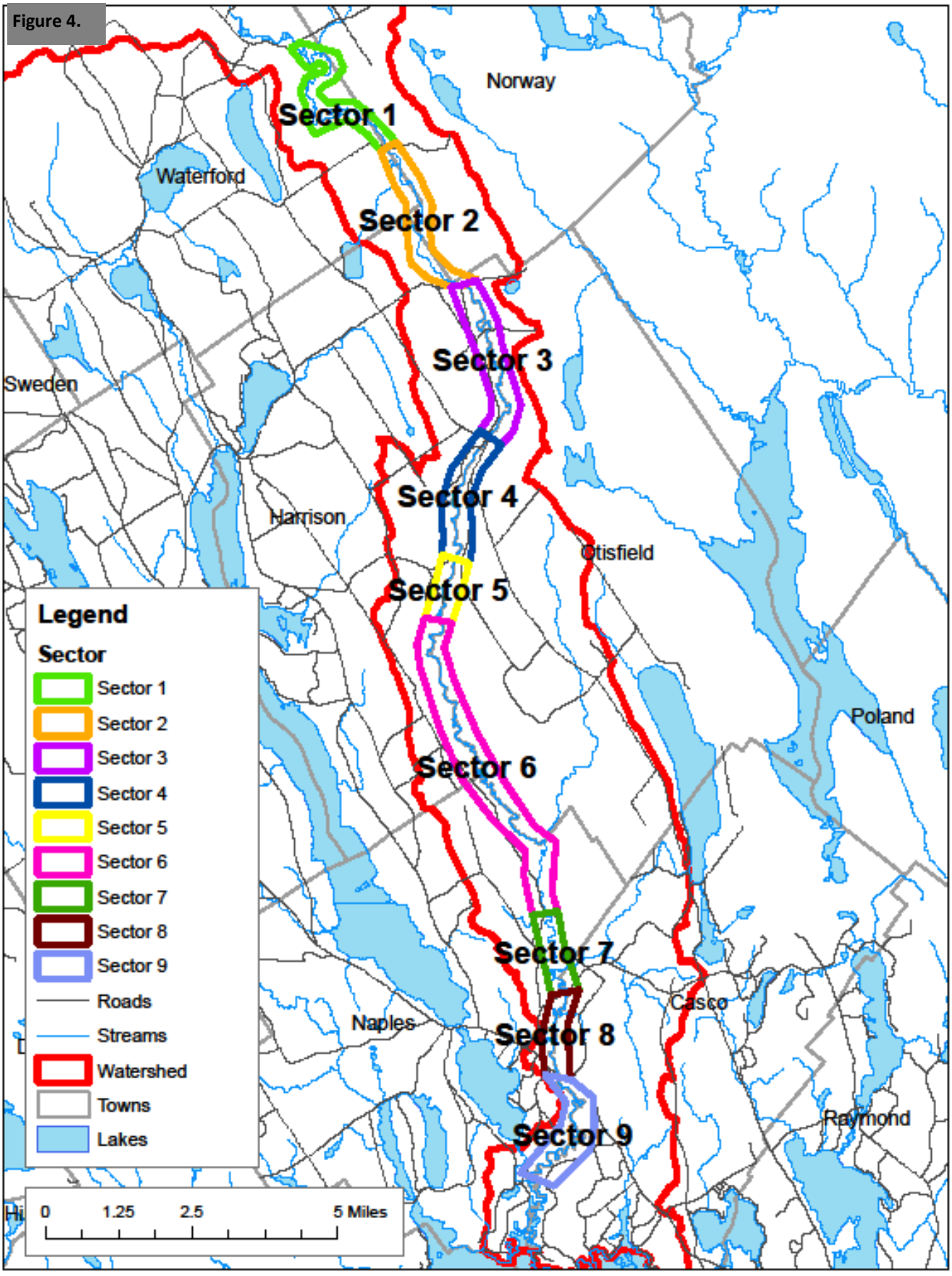


Table 1 represents sites in each land use category as well as their impact rating. Most sites were determined to have a medium impact to the river (113 total), but it is important to remember that the cumulative impact of all sites is what can cause water quality to decline. The different levels of impact are defined in the following pages.

Table 1

Land Use	High Impact	Medium Impact	Low Impact	Total
Agriculture	1			**1**
Beach & Boat Access	1	3	1	**5**
Commercial	3	2		**5**
Construction		2		**2**
Driveway		4	2	**6**
Gravel Pit & Mining	2			**2**
Logging			1	**1**
Municipal/public	1	1		**2**
Power/Pipe line	1	1		**2**
Private Road	5	20		**25**
Recreational	1	7		**8**
Residential	9	9		**18**
State Road	3	8		**11**
Stream Channel	2	5	1	**8**
Town Road	6	45	7	**58**
Trail/Path/ATV	4	6		**10**
Total	**39**	**113**	**12**	**164**

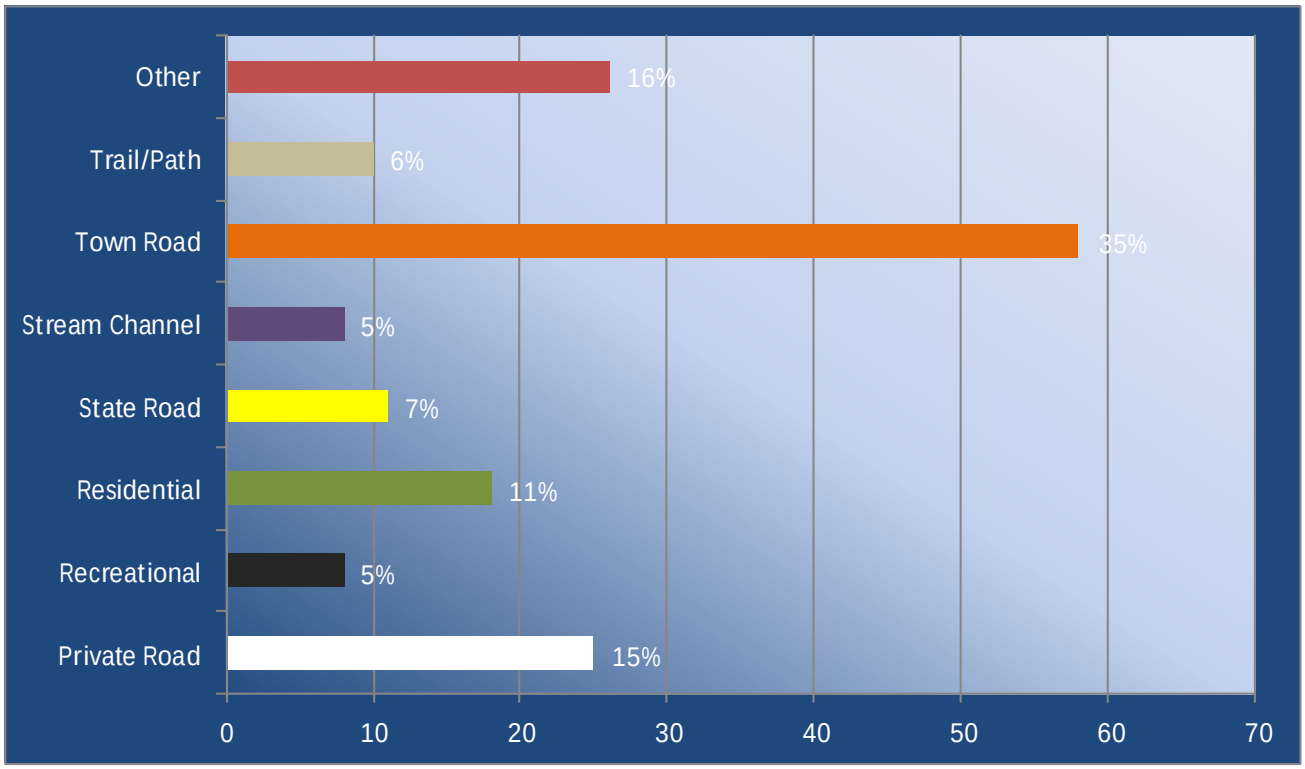
CMP Power Lines bank erosion

Runoff from ATV Trail

Yard waste dumping

The bar chart in Figure 5 depicts the percentage of problem sites documented in each land use category. More than half of the sites identified were associated with town and private roads. A map of all documented sites can be found in Appendix B.

Figure 5.



Other: Agriculture-1, Beach/Boat-5, Commercial-5,Construction-2,Driveway-6, Gravel Pit-2, Logging-1 Municipal/public-2,Power/ Pipe Line-2

Potential Impact of Problems

Sites were rated with a high, medium or low ranking according to the size of the problem. Pollutants were ranked on the presence of single or multiple pollutants. The transport of pollutants was ranked on whether it had limited or direct flow to the river. (Table 2)

One ranking was chosen from each section and then totaled to provide an overall ranking for each site.

Table 2. **Potential Impacts of Problems**

Size of Problem			Pollutants Present		Transport to River	
Small	1	less than 25'	Single	1	Limited	1
Medium	2	25'-100'	Multiple	2	Direct Flow	2
Large	3	more than 100'				

Town Roads

Of the 58 sites associated with town roads, 6 were high impact, 45 were medium impact and 7 were low impact. Most of the problems identified could be fixed with some expertise and will have a moderate cost associated with them.

Common Problems Identified:

◊ Unstable culvert inlets/outlets

◊ Road shoulder erosion

◊ Unstable ditching/erosion

◊ Clogged or rusted culverts

◊ Road surface erosion

◊ Buildup of winter sand

◊ Undersized culverts

Recommended Solutions:

◊ Clean out culverts and armor inlets/outlets with rip rap

◊ Re-grade, vegetate to stabilize shoulders

◊ Clean, re-shape and stabilize ditches

◊ Clean out and/or replace

◊ Grade, shape and stabilize surface with quality material

◊ Remove winter sand build up

◊ Replace with larger size culvert and stabilize

Private Roads

Of the 25 sites associated with private roads, 5 were high impact, 20 were medium impact. Most of the problems identified could be fixed with some expertise and will have a low to moderate cost associated with them.

Common Problems Identified:

◊ Unstable culvert inlets/outlets

◊ Road shoulder/ditch erosion

◊ Clogged or rusted culverts

◊ Road surface erosion

◊ Buildup of winter sand/grader berms

◊ Undersized culverts

Recommended Solutions:

◊ Clean out culverts and armor inlets/outlets with rip rap

◊ Re-grade, vegetate and re-shape ditches/stabilize shoulders

◊ Clean out and/or replace

◊ Grade, shape and stabilize surface with quality material

◊ Remove winter sand and grader berm build up

◊ Replace with larger culvert and stabilize

Unpaved roads are one of the largest sources of pollution to Maine lakes and rivers.

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

Residential

Of the 18 sites associated with residential sites, 9 were high impact, 9 were medium impact. Most of the problems identified could be fixed with some expertise and will have a low to moderate cost associated with them.

Common Problems Identified:

- ◊ Slight or moderate surface erosion
- ◊ Bare or sparsely vegetated soil
- ◊ Lack of vegetated buffer along shoreline
- ◊ Direct flow to the river
- ◊ Roof runoff causing erosion
- ◊ Trash

Recommended Solutions:

- ◊ Seed and mulch bare soil
- ◊ Establish or enhance vegetated buffer
- ◊ Limit foot traffic-define paths and stabilize
- ◊ Install drip line trench to catch roof runoff
- ◊ Install water diverters
- ◊ Remove trash

Residential areas were associated with 11% of the identified sources of polluted runoff to the Crooked River. These problems pose a significant threat to water quality and fortunately, most sites can be corrected with easy, and low to moderate cost fixes.

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

State Roads

Of the 11 sites associated with state roads, 3 were high impact, 8 were medium impact. Most of the problems identified could be fixed with some expertise and will have a low to moderate cost associated with them.

Common Problems Identified:

- ◊ Slight or moderate surface erosion
- ◊ Unstable or eroding shoulders and ditches
- ◊ Unstable culverts
- ◊ Direct flow to the river
- ◊ Inadequate vegetated buffers

Recommended Solutions:

- ◊ Seed and mulch bare soil
- ◊ Reshape and stabilize with stone or curlex
- ◊ Stabilize and or replace if necessary
- ◊ Plant vegetated buffers
- ◊ Divert flow away from river and or treat or detain stormwater

The Maine Department of Transportation has responded to efforts such as this in a positive and prompt way while addressing the most egregious sites immediately. Most issues identified are minor to moderate problem sites and can usually be taken care of through maintenance.

Other Sites

Volunteers also identified other sites that included 1 agricultural site, 5 Beach/Boat access, 5 Commercial sites, 2 Construction sites, 6 Driveway sites, 2 Gravel Pit sites, 1 Logging, 2 Municipal/public and 2 Power/ Pipe Line sites.

Crooked River Dams

Scribner's Mill in Harrison, Maine was in operation in 1847 through 1962 and the dam furnished water power to run the sawmill. In 1972, the dam at Scribner's Mill was removed. Three years later the site was acquired by Scribner's Mill Preservation, Inc. Their goal has been to restore the mill as an educational exhibition of the water powered industrial technology that pre-dates fossil fuels. An application to MDEP to rebuild the dam was filed in 2002. In 2007, a revised application was filed. It called for reconstruction of the dam with a rock ramp fishway, and an 11 acre impoundment extending upstream for a mile. The application was denied, but a revised plan and application have been submitted and is currently under review. After the removal of Scribner's Dam, a fishway was installed at the next upstream barrier at **Bolster's Mill** dam in 1974. In 1987-1988 Bolster's Mill dam was partially removed, and fish passage were improved.

"The Crooked River was identified in the 1982 Maine Rivers Study as one of only seven rivers in Maine that are "the state's most significant inland fishery rivers." It is the only one in the southern part of the state. The 1983 Rivers Act designated the Crooked River as worthy of special protection because of its value as a fishery resource." Making Waves, Spring 2010, Maine Rivers Newsletter. For more information visit www.scribnersmill.org and http://mainerivers.org/projects/crooked-river/

It is the policy of the District not to recommend or appear to advocate or prescribe a particular course of action relating to dam removal.

Other Sites Con't

Volunteers identified ATV/Jeep vehicle trails and crossings at numerous locations. ATV operators are required to have landowner permission to traverse lands unless it is a designated ATV trail. The best option to avoid damaging streams and rivers along with wildlife habitat is not to travel through them. Visit the State of Maine Inland Fish & Wildlife webpage for more information and what you can do.

http://www.maine.gov/ifw/laws_rules/atvlaws.htm

Riparian Corridor Survey

The main purpose for the riparian survey was to establish baseline data regarding existing riparian conditions. Photographs were taken to document specific problem sites and to characterize the river and the riparian community along the entire inventory route. GPS coordinates were logged to help identify problem locations, to mark changes in riparian character and to measure distances when necessary.

The river was divided into 9 reaches beginning at the river crossing on Route 118, in Waterford and continuing in a southerly direction. The river area north of the Route 118 crossing is 85% forested and was surveyed utilizing Google Earth geographic information and topographic maps. The section in Albany Township was surveyed via canoe and no problem sites were identified.

Common Problems Identified:

- **Blow downs**— naturally occurring and sometimes a result of high wind/rain events. If debris is large enough and numerous, it can create obstructions for water flow, and for fish and wildlife.
- **Land clearing**—Likely for buildable lots and photo below indicates most vegetation removed up to river's edge.
- **Bank failure/slump**—sometimes naturally occurring, while others are human induced due to land use activity.

Riparian Corridor Survey

Types of data collected:

- Approximate width of the river
- Vegetation Type
- Type of land use
- Wildlife present
- Boat Launch present
- Approximate percentage of shade over river

What's so important about shade, you might ask?

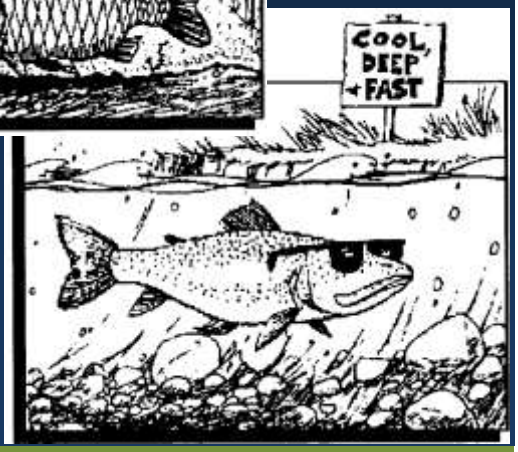
Trees not only provide shade but nutrients and organic material for small organisms to eat. Trees also stabilize the soil along the banks and provide wildlife habitat. Shade trees also help keep water temperatures cooler and protect water quality by acting as natural filters. The photos on this page are examples of shade cover. For a river or stream to be fully shaded it would also need to be very narrow as the two bottom photos show. For more detailed data see Appendix D.

It's all connected…

Lack of *Buffers* - Buffers help keep polluted runoff from entering the river and the varied root systems keep soils in place. Groundcover plants and the duff layer (leaves, pine needles, etc.) help slow runoff, trap sediments and recycle nutrients.

***Wildlife Habitat*:** A variety of mammals, birds, reptiles and amphibians find food, cover and protection in riparian forest buffers. A healthy riparian forest buffer provides leaf litter for the aquatic food chain. Overhanging tree branches shade the river, maintaining cooler water temperatures.

***Sediments*:** Excess sediments (soil erosion) cause the water to become cloudy making it difficult for fish
to see and feed properly. Sediments can also damage fish gills and impair the feeding and breathing processes in aquatic insects or fish food. Sediment deposits cause streams and rivers to become shallower and wider - increasing flooding problems. Shallow water is also heated by the sun which causes temperatures to rise and in time cold water fish like trout will die off.



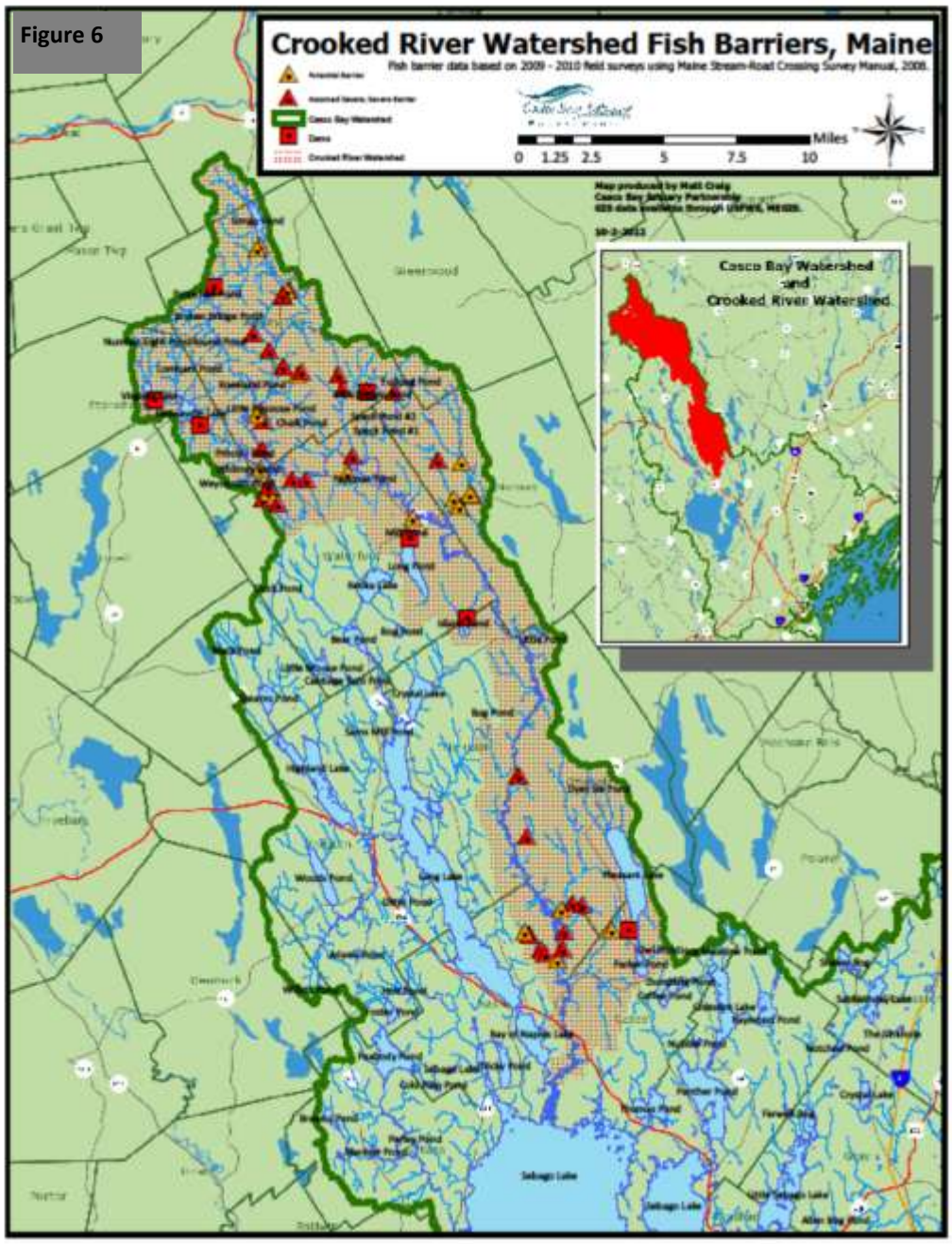
Around the Watershed…

In addition to the watershed survey and riparian survey, there are numerous watershed efforts underway. The value of this resource has truly energized the community and a recent fish passage barrier survey has been conducted, various education and outreach programs, land trusts efforts at conserving open space, and forestry initiatives are in progress.

Fish Passage Barrier Survey

In 2009, Trout Unlimited, in collaboration with Casco Bay Estuary Partnership, began a *Fish Passage Barrier Survey* in the Casco Bay Watershed. Culverts at road-stream crossings have the potential to limit the movement of fish just as much as dams, and both can have a significant impact on natural processes. Fish passage barriers also fragment habitat for native coldwater fish, reducing the ability of local streams to support wild populations. The survey identified and documented over 275 potential problem passages in the Crooked River Watershed. (Figure 6) at right depicts the most severe barriers.

Figure 6



Land Trusts

Western Foothills Land Trust (WFLT) was founded in 1987 by citizens committed to land and natural resource protection in the greater Oxford Hills area of Western Maine. WFLT and other local land trusts (Loon Echo Land Trust) are also part of the Upland Headwaters Alliance, a collaboration of area land trusts who work with the Portland Water District to protect the Crooked River watershed through outreach and education.

The Crooked River Initiative

In 2009, the WFLT was awarded a grant from the Maine Community

Foundation's Fund for Maine Land Conservation for a collaborative project aimed at protecting resources in the Crooked River Watershed. *The Crooked River Initiative* focused on community outreach with a series of community meetings about the watershed. Topics ranged from land use as it relates to water quality, geological history and other historical information, fisheries, recreational opportunities and conservation options for land owners within the corridor.

Conservation Innovation Grant

Most recently, WFLT, in collaboration with the American Forest Foundation, the Hubbard Brook Research Foundation and the White River Partnership were awarded a $500,000 Conservation Innovation Grant from USDA-NRCS to develop an innovative and replicable market based model to incentivize private forest landowners to restore, enhance and protect aquatic resources in the Crooked River Watershed and the Upper Connecticut Watershed in Vermont and New Hampshire.

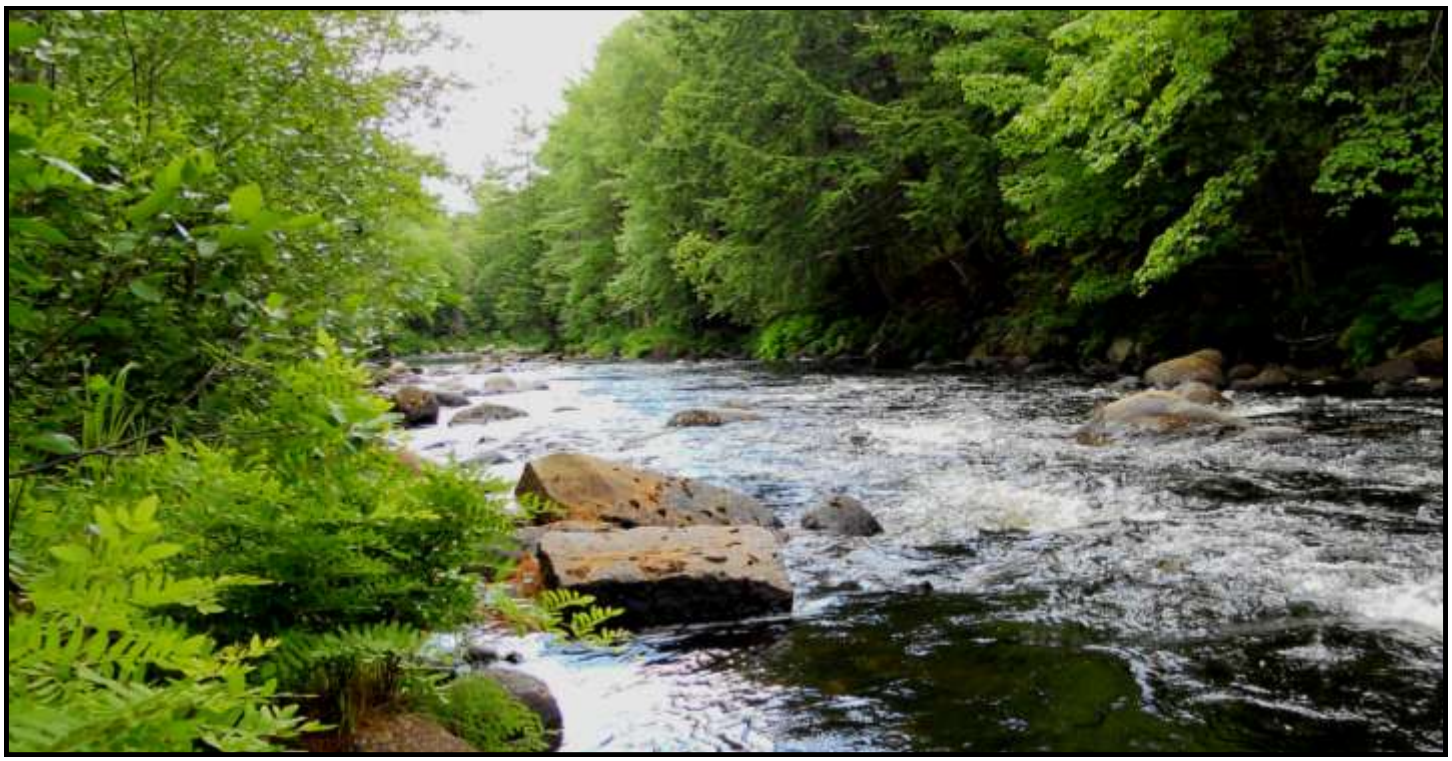
Department of Inland Fish & Wildlife

The Department is currently working on developing a report that will combine all the known Crooked River related data into one report. The report would include river history, physical characteristics, water quality, biological data, fisheries information, and recommendations for future fishery management.

Sebago and Mollyockett Chapters of Trout Unlimited

In 2011, the Trout Unlimited chapters completed a restoration project at the Swett Brook Bridge on Bisbee Town Road in Waterford that restored access from the brook to the main stem of the Crooked River. The Maine Department of Transportation and the Casco Bay Estuary Partnership provided generous support for this TU Embrace-a- Stream (EAS) project.

The chapters then applied for a 2012 grant to remove a small dam on the brook three miles upstream from the bridge. The grant has been fully funded by Trout Unlimited, and the project is on track to be executed during the summer of 2012. The Casco Bay Estuary Partnership and the U.S. Fish and Wildlife Service have pledged additional support. MDIFW Region A is providing guidance and fish passage monitoring for both projects.



Next Steps ~ Where do we go from here

Fixing the sites identified in these surveys will require efforts by the Western Foothills Land Trust, Loon Echo Land Trust, the towns of Casco, Naples, Harrison, Otisfield, Norway, Waterford, Albany Township, watershed residents, Portland Water District and road associations. Below are suggestions for next steps.

Western Foothills Land Trust

⇒ Work with Cumberland County Soil and Water Conservation District (CCSWCD), Portland Water District (PWD) and Oxford County Soil & Water Conservation District (OCSWCD) to apply for grant funding to address the highest water quality impact sites. (Spring 2012)

⇒ Explore education and outreach opportunities for watershed residents on the impacts to water quality and basic conservation practices that can be implemented. (Ongoing)

⇒ Promote training for town boards, commissions, and other decision-makers.

⇒ Maintain list of watershed problem sites by adding new sites as they are found and removing sites as they get fixed. (Ongoing)

⇒ Conduct follow up riparian survey every 3-5 years to monitor conditions documented in the original Riparian Corridor Survey.

Towns

⇒ Conduct regular maintenance on town roads in the watershed, and fix town road problems identified in this survey. (Ongoing)

⇒ Remove excess winter sand from roadways promptly. (Spring/Fall/Annually)

⇒ Promote training for road crews. (Ongoing)

⇒ Continue strong enforcement of Shoreland Zoning Ordinances and the Erosion and Sediment Control Law to ensure protection of the Crooked River (Ongoing)

Individual Citizens

⇒ Prevent polluted runoff from washing into the river. Collect runoff in depressions or divert flow to vegetated areas for infiltration. Call CCSWCD, PWD, OCSWCD, LEA or Maine DEP for free advice.

⇒ Minimize the amount of cleared land and road surfaces on your property.

⇒ Establish no mow zones, reduce raking and encourage native plants.

⇒ Vegetate and mulch bare areas.

⇒ Check with your local Code Enforcement Office before cutting vegetation within 250 feet of the shore.

⇒ Maintain septic systems. Pump septic tanks (every 2-3 years/year round; 4-5 years if seasonal), and upgrade marginal systems.

Road Associations (or private roads without associations)

⇒ Minimize road runoff by doing regular, comprehensive maintenance. Consider organizing "work parties" with neighbors to ensure regular maintenance is done.

⇒ Form a road association if one does not already exist. Information on forming road associations and obtaining a guide book can be found at *http://www.maine.gov/dep/land/watershed/road_association_guide.pdf*

⇒ Obtain a copy of *Gravel Road Maintenance Manual – A Guide for Landowners* and share it with contractors working on and/or plowing the road. This reference is a "must-have" for anyone managing a gravel road. Copies can be downloaded at *www.maine.gov/dep/blwq/docwatershed/roads/gravel_road_manual.pdf*

⇒ Contact the CCSWCD, PWD, OCSWCD, LEA or Maine DEP to get help for extensive problems.

Permitting ABC's

Protection of the Crooked River Watershed is ensured through the good will of residents around the river and through laws and ordinances created and enforced by the State and Towns.

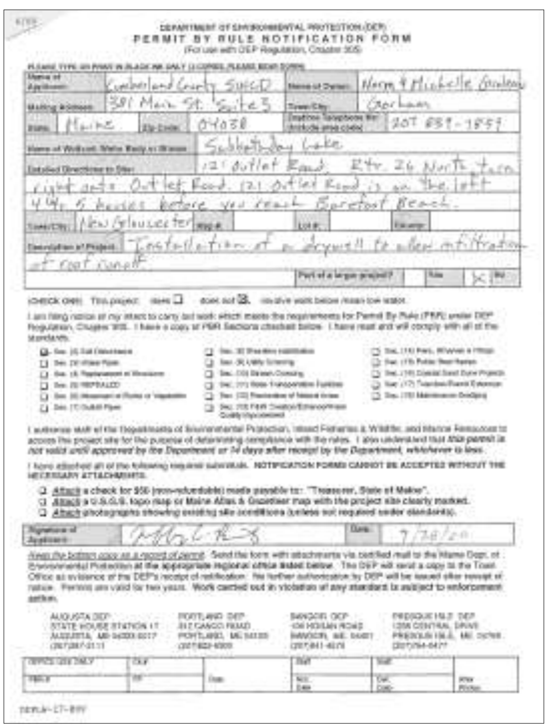
How do you know when you need a permit?

- Construction, clearing of vegetation and soil movement within 250 feet of a river 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 the lake, river or stream 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**. Only certain types of projects will qualify for a Permit by Rule and if the criteria is not met, then an individual permit will be needed. 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 the last page of this report for contact information.


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

How to apply for Permit by Rule with DEP:

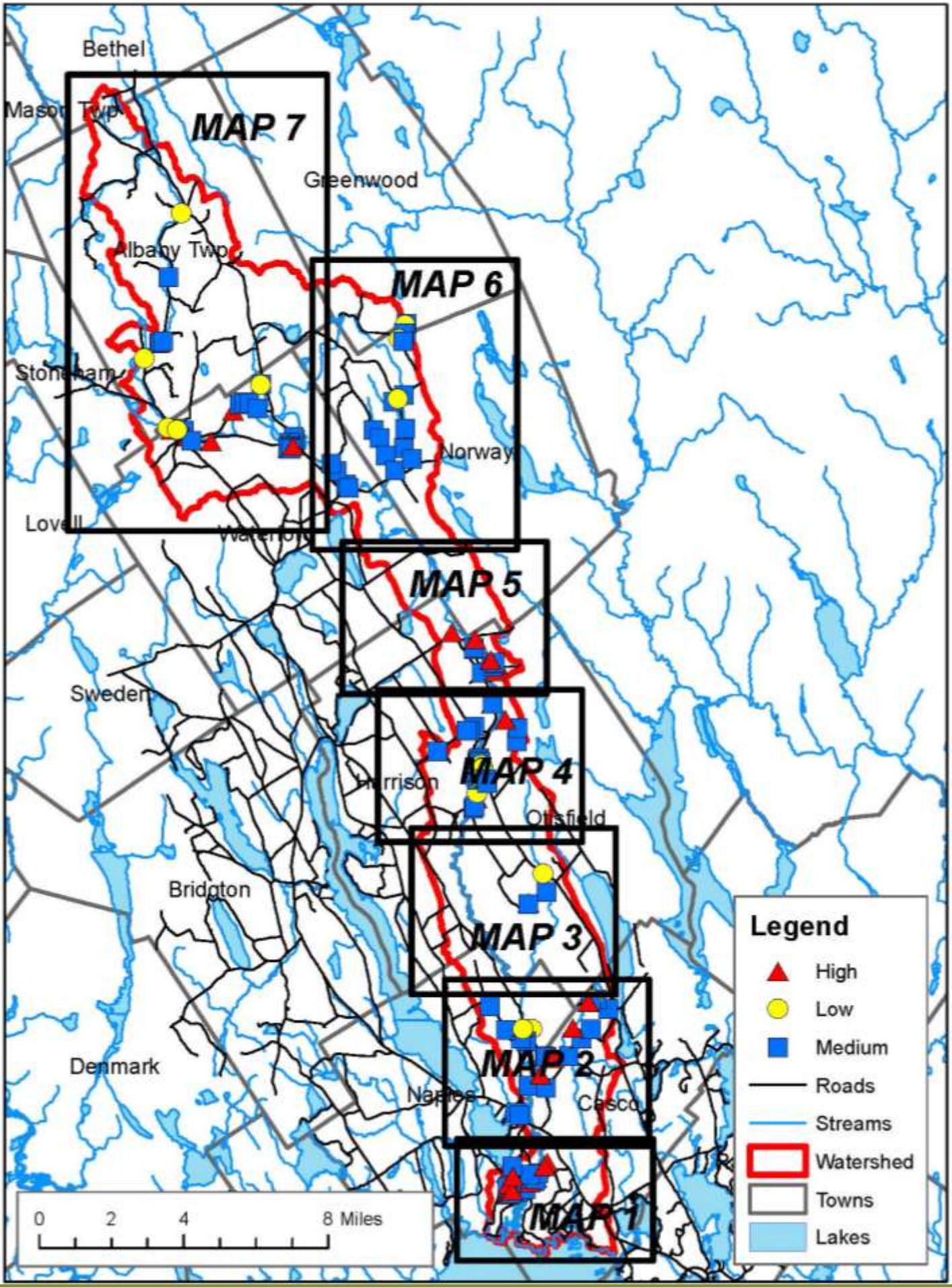
1. Fill out a notification form before completing any work on the ground. Forms are available from your town code enforcement officer or the Maine DEP offices in Portland or Augusta.

2. The permit will be reviewed by DEP within 14 days. If you do not hear from DEP within 14 days, you can assume your permit is approved and you can proceed with work on the project. If you bring the permit directly to a DEP office, you could get your permit approved immediately.

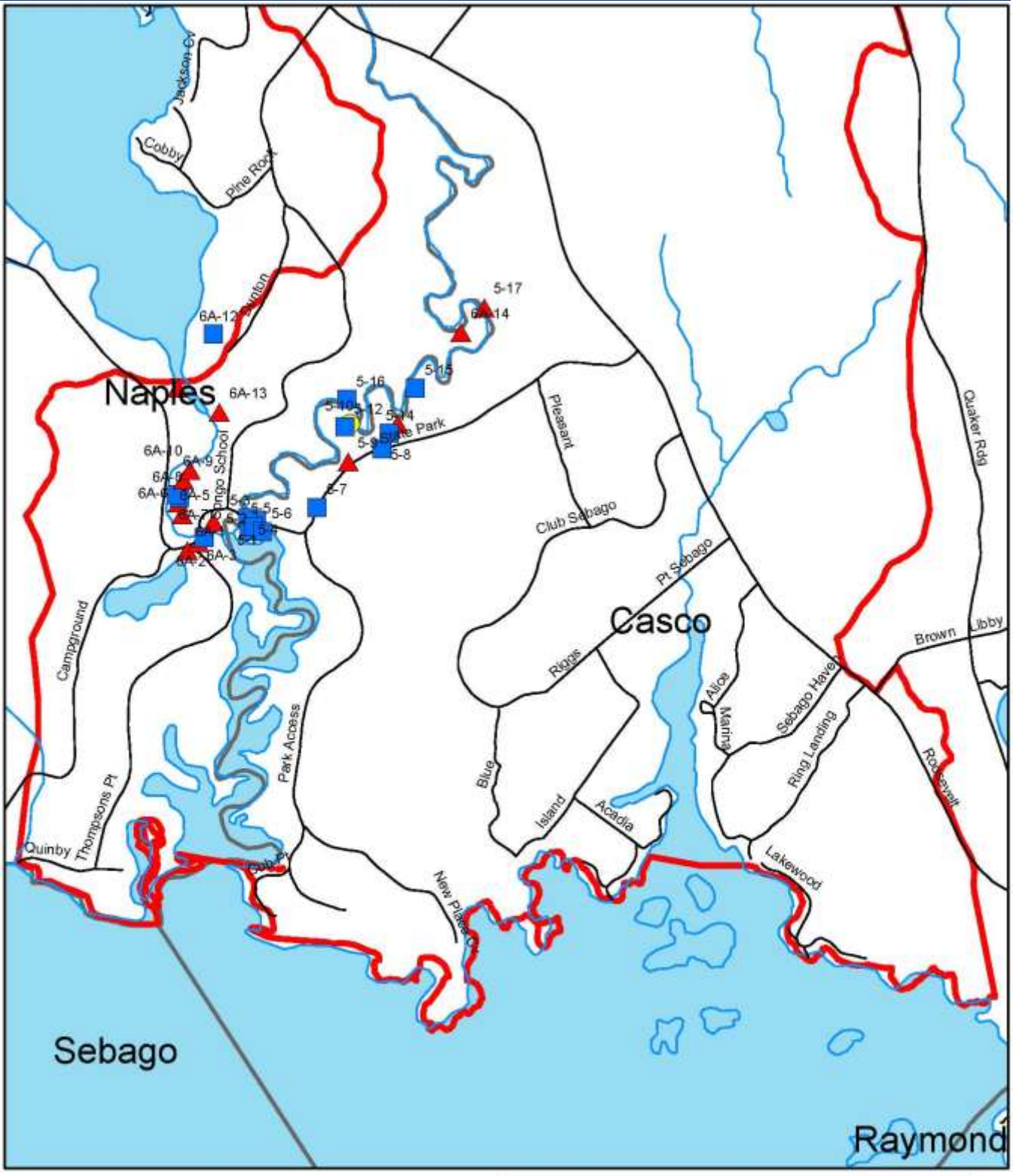
3. Follow the proper standards for keeping soil erosion to a minimum during construction, such as installing silt fence. It is important that you obtain a copy of the standards so you will be familiar with the law's requirements.

Appendix A

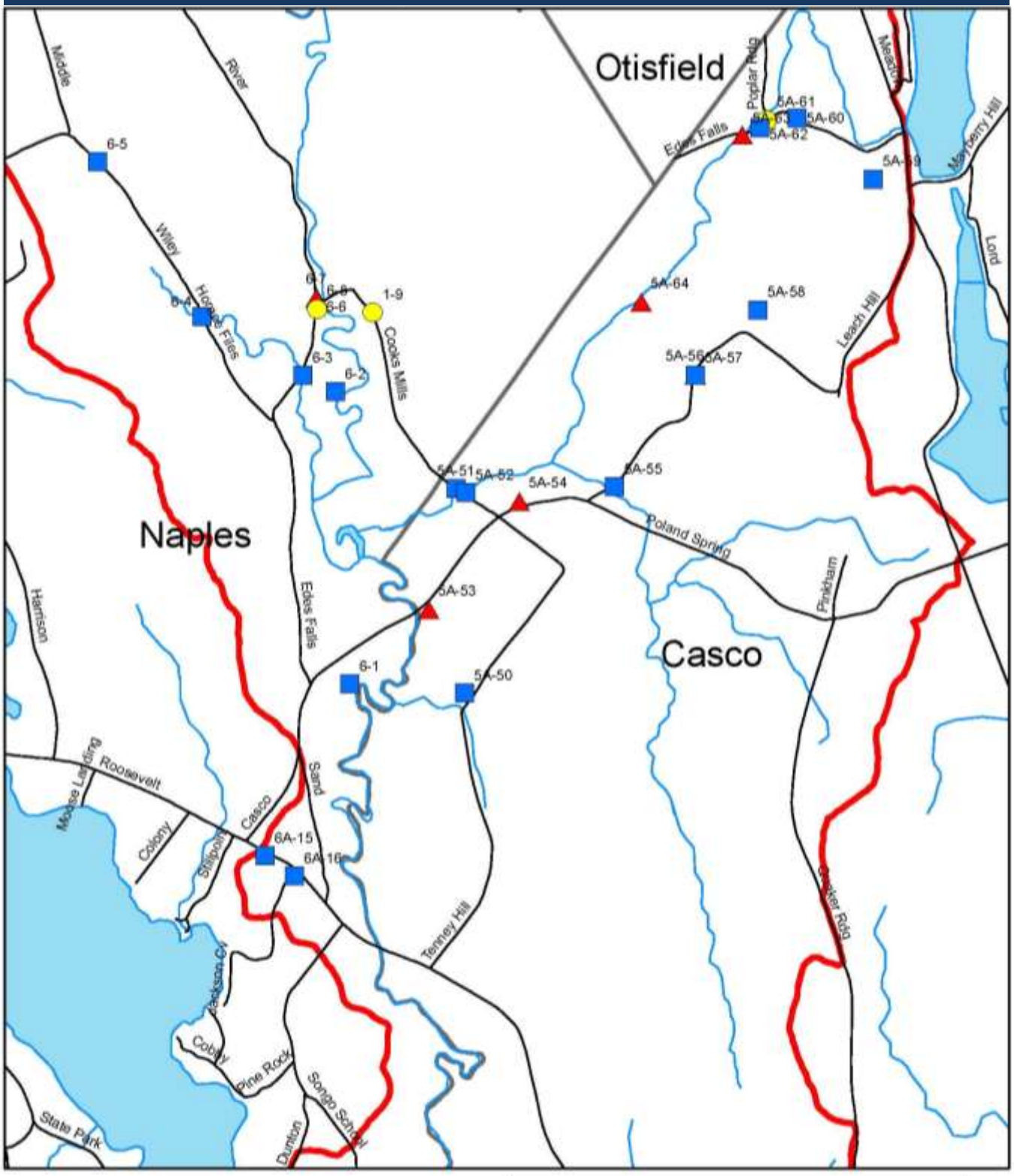
Key to Detailed Maps



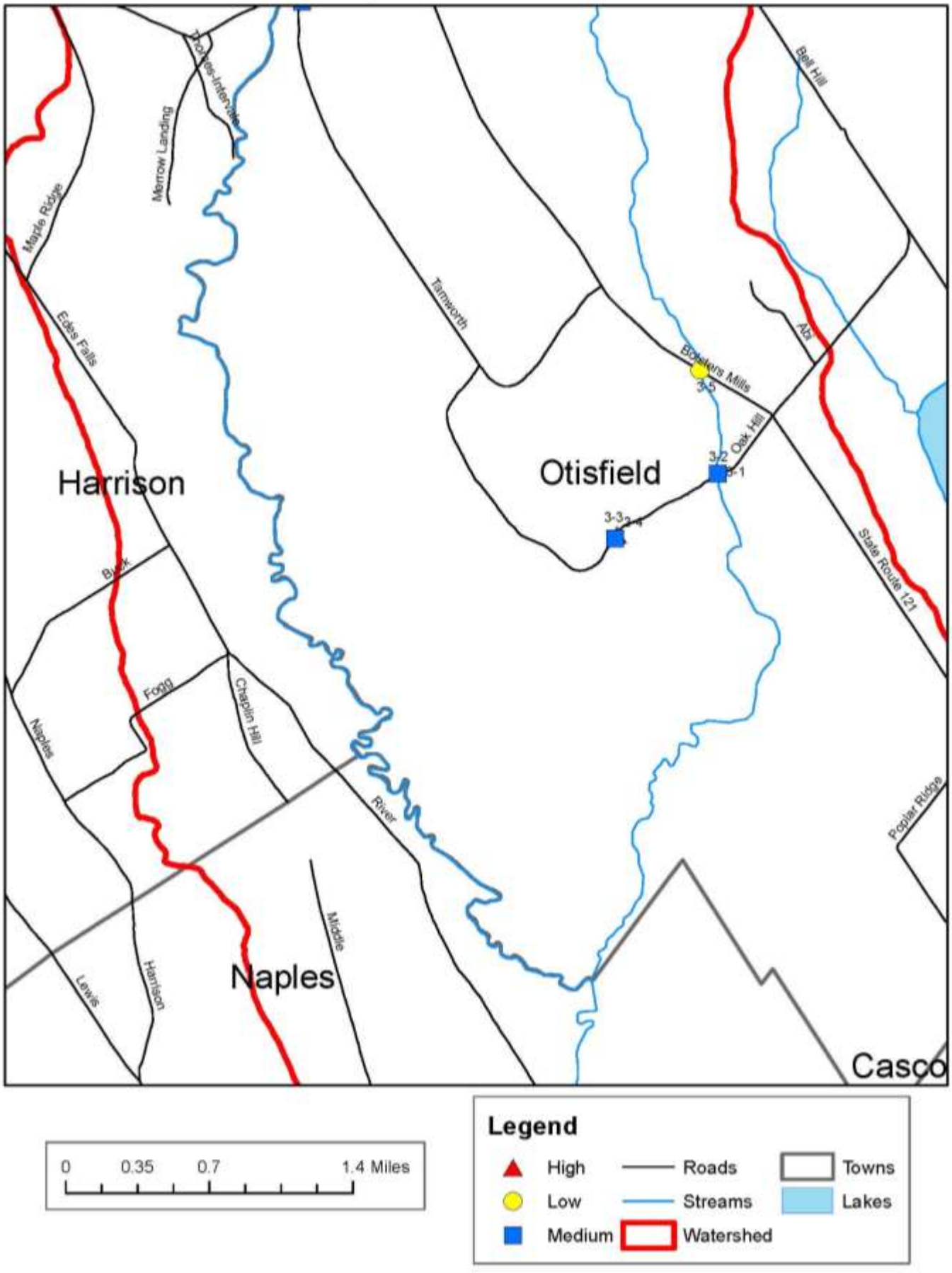
Map 1— Problem sites - Casco and Naples/Southern section



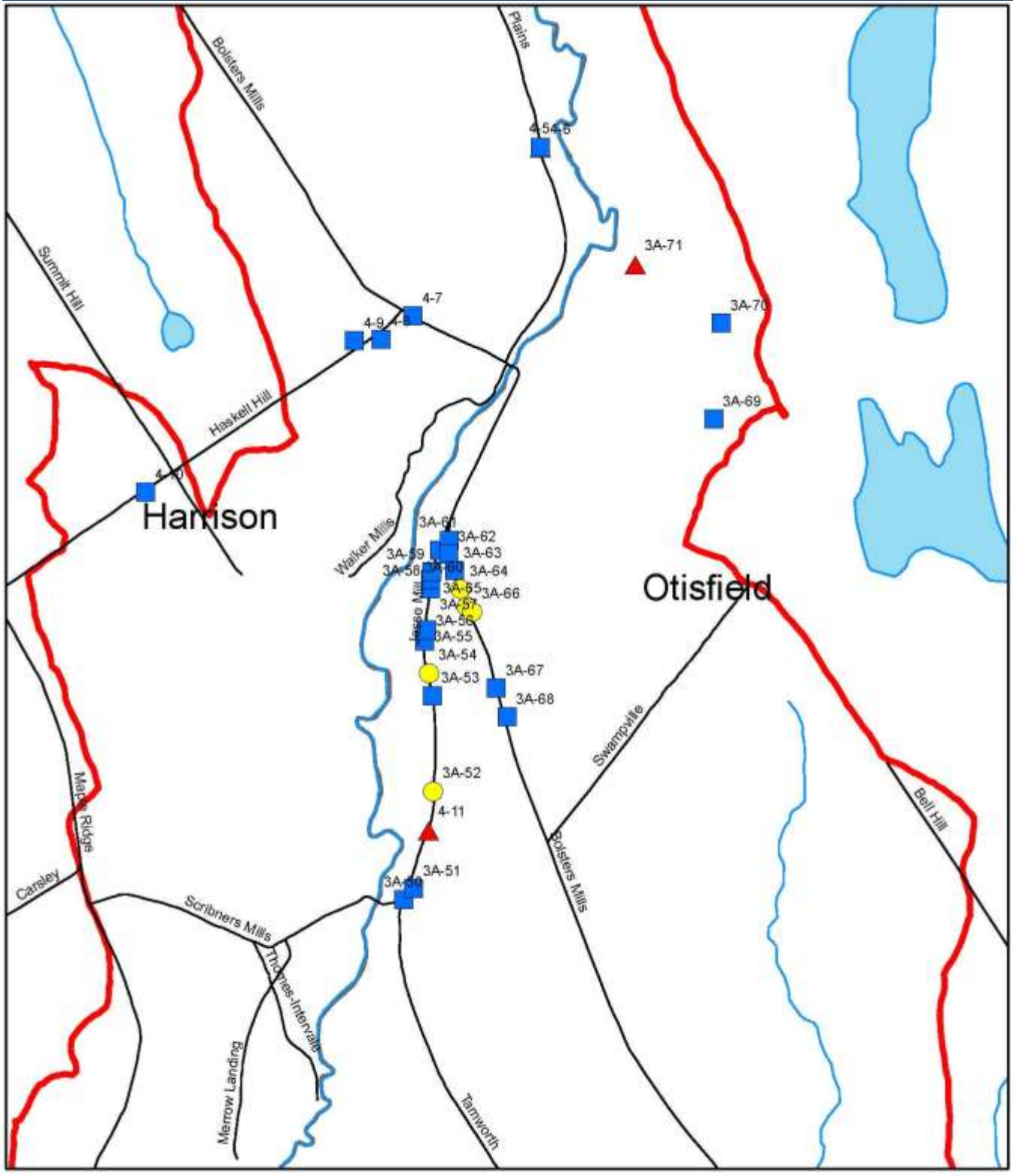
Map 2— Problem sites - Casco and Naples/Northern sec-



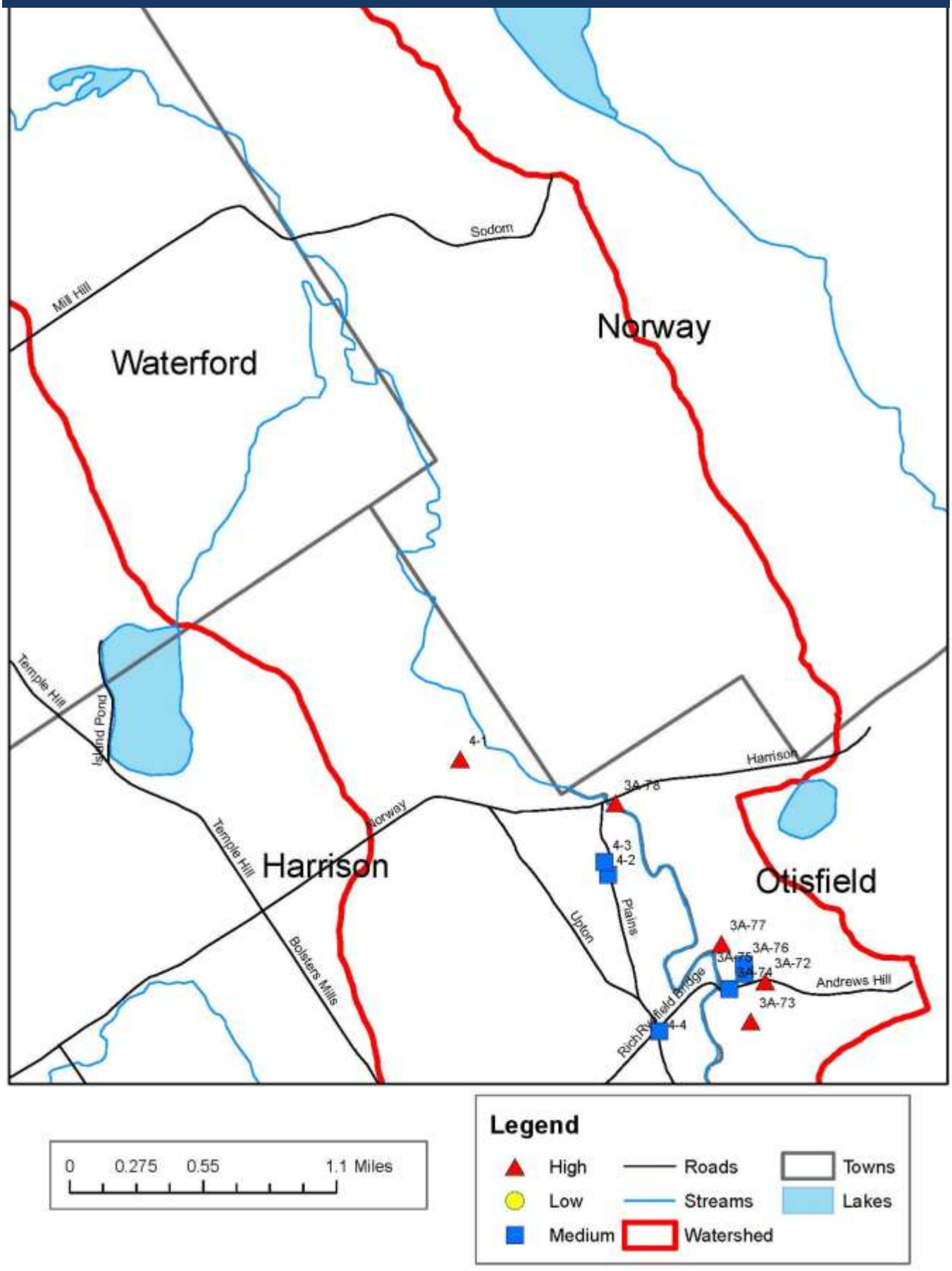
Map 3— Problem sites - Harrison/Otisfield Southern section



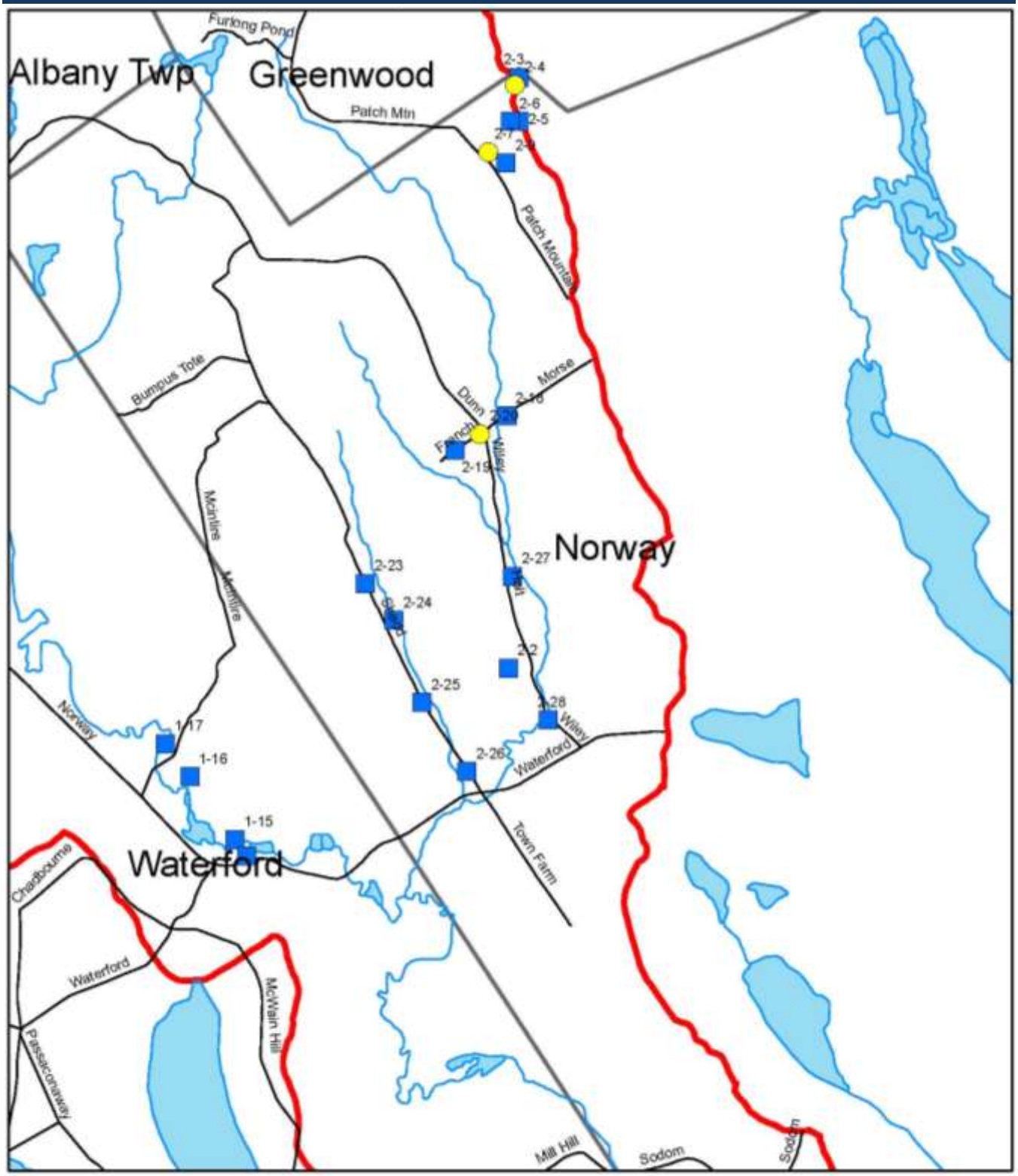
Map 4— Problem sites - Harrison/Otisfield/middle section



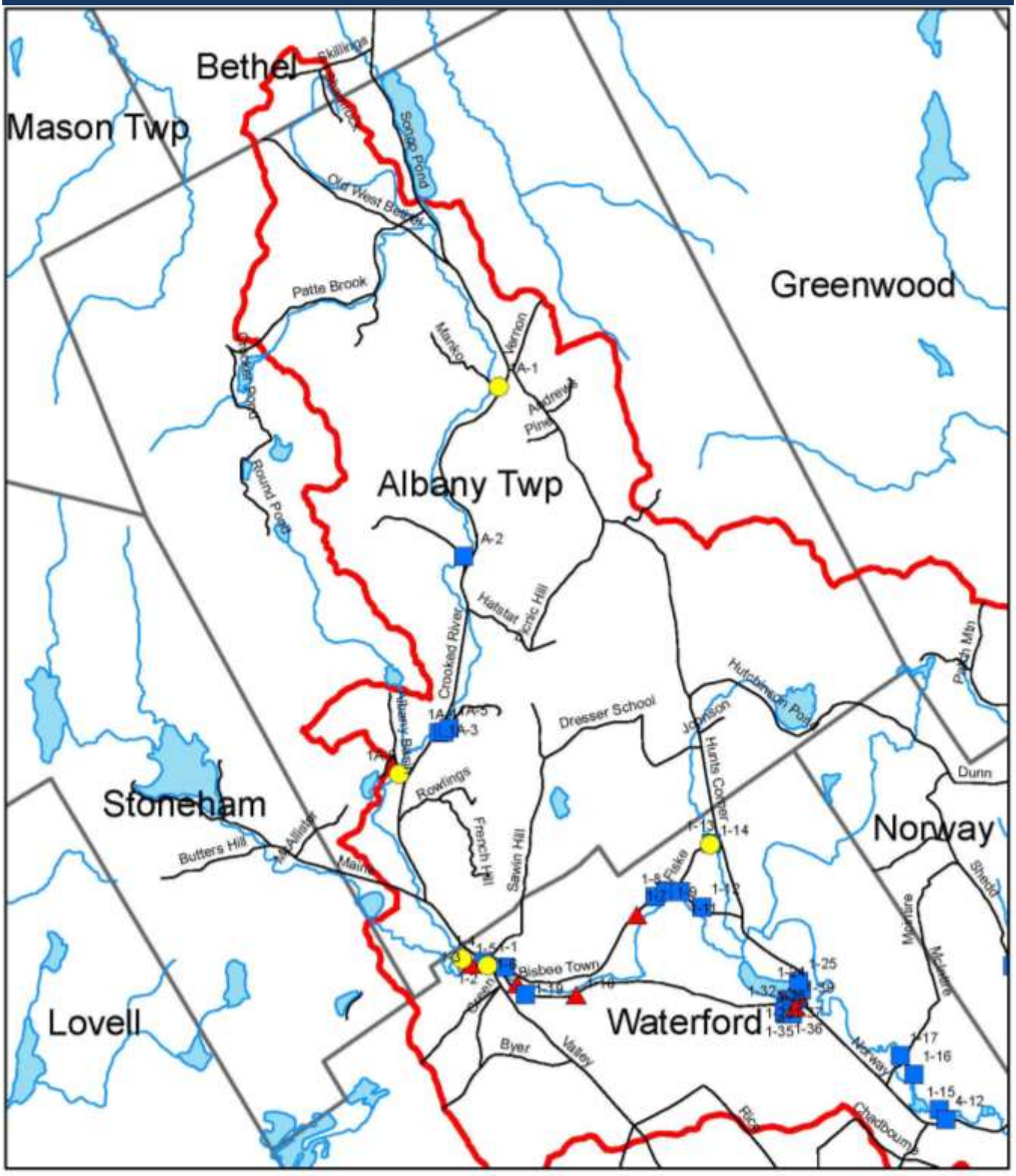
Map 5— Problem sites - Harrison/Otisfield north section



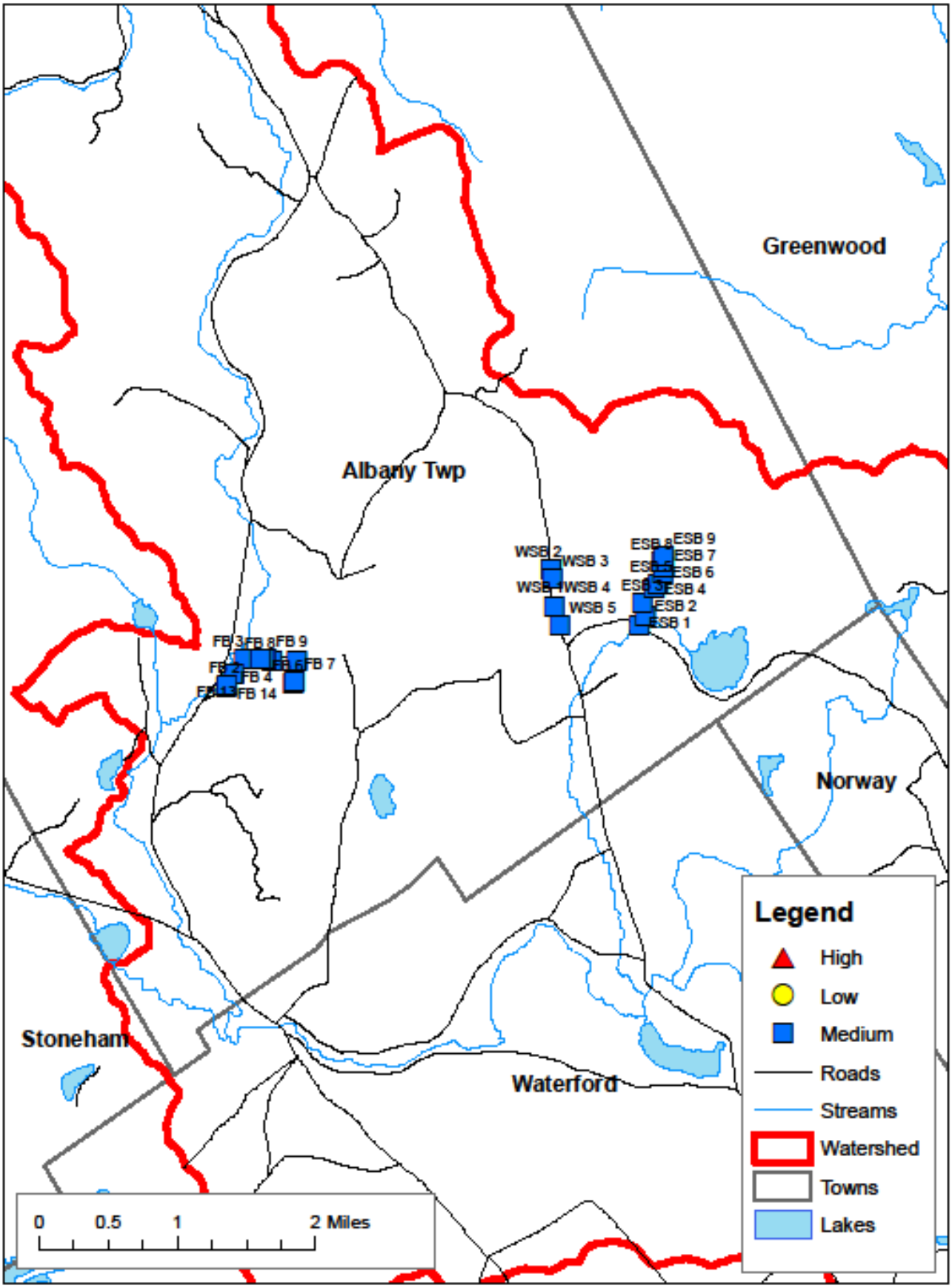
Map 6— Problem sites - Norway/ East Waterford section



Map 7— Problem sites - West Waterford/Albany section



Flint Brook and Swett Brook



Appendix B

Sector	Site #	Tax Map	Tax Lot	City	Description of Problem(s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
1A	2	N/A	N/A	Albany	Unstable Construction, Road Shoulder/Ditch, Stream bank erosion/failure	Private Road	2	1	2	5
1A	3	N/A	N/A	Albany	Inadequate buffer, Poor/degraded buffer, Stream bank erosion/failure, Sediment build-up	Stream Channel	2	1	2	5
1A	4	N/A	N/A	Albany	Road Shoulder/ditch, Unstable Culvert, Misaligned, Hanging--no fish passage	Private Road	2	1	2	5
1A	5	N/A	N/A	Albany	Bare soil/fields, Inadequate Buffer	Recreational	1	1	2	4
1A	6	N/A	N/A	Albany	Stream bank erosion/failure, Poor/ degraded buffer	Stream Channel	n/a	1	2	3
1A	0+1	N/A	N/A	Albany	Unstable Construction, Road Surface Erosion, Road Shoulder/Ditch, Inadequate Buffer	Private Road	3 (springtime)	1	2	3
1	1	75013	3	Waterford	Road surface erosion, road shoulder/ditch, parking lot drainage, drainage from paved area	Boat Access	1	1	1	3
1	2	74	29	Waterford	Road surface erosion, road shoulder/ditch. Drainage from paved area	State Road	2	1	1	4
1	3	75	N/A	Waterford	Stockpiled sawdust at stream, commercial activities, inadequate buffer, floodplain filled in	Commercial	3	2	2	7
1	4	75	N/A	Waterford	Industrial/Commercial activities, trash	commercial	1	1	1	3
1	5	75	36	Waterford	Bare soil/fields, unstable construction, inadequate buffer, trash	Residential	1	2	2	5
1	6	75	N/A	Waterford	Bare soil, poor degraded buffer, lack of stream shading, drainage from paved area, stream bank erosion	Commercial	3	1	2	6
1	7	76	N/A	Waterford	Road surface erosion, unstable standpipe	Town road	3	1	2	6
1	8	77	N/A	Waterford	Road surface erosion, impacts to stream temperature, stream channel	Town road	2	1	2	5
1	9	77	N/A	Waterford	Unstable culvert, blockage to stream	Driveway	2	1	2	5
1	10	77	N/A	Waterford	Road surface erosion, road shoulder/ditch, unstable culvert, drainage from paved area, hanging culvert, stream bank erosion/failure, sediment build up	Town road	2	1	2	5
1	11	67	N/A	Waterford	Road surface erosion, road shoulder/ditch, drainage from paved area	Town road	2	1	2	5
1	12	77	N/A	Waterford	Road Shoulder/Ditch, Drainage from paved area, Stream bank erosion/failure semi, floodplain filled in.	Driveway	2	1	2	5
1	13	77	N/A	Waterford	road shoulder/ditch, sediment build up	Town Road	2	1	2	5

Sec-tor	Site #	Tax Map	Tax Lot	City	Description of Problem (s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
1	14	77	N/A	Waterford	road surface erosion, unstable culvert?, misalignment?	Driveway	1	1	1	3
1	15	52	N/A	Waterford	Bare soil, road surface erosion, poor/degraded buffer	Trail or Path	2		2	4
1	16	52	N/A	Waterford	Bare soil/fields, road surface erosion, poor/degraded buffer, lack of stream shading, sediment build up	Trail or Path	2	1	2	5
1	17	52	N/A	Waterford	Bare soil/fields, Poor/degraded buffer, Lack of stream shading, stream bank erosion/failure	Trail or Path	1	1	2	4
1	18	63	N/A	Waterford	Road shoulder/ditch, inadequate buffer, drainage from paved area	State Road	3	1	2	6
1	19	63	N/A	Waterford	Unstable culvert, drainage from paved area	State Road	1	1	2	4
1	20	53	6	Waterford	Bare soil/fields, road surface erosion, inadequate buffer	Recreational	2	1	2	5
1	21	53	6	Waterford	Bare soil/fields, road surface erosion, inadequate buffer	Recreational	2	1	2	5
1	22	53	6	Waterford	Bare soil/fields, road surface erosion, inadequate buffer	Recreational	2	1	2	5
1	23	53	6	Waterford	Bare soil/fields, inadequate buffer	Beach/Boat Ac-cess	3	1	2	6
1	24	53	6	Waterford	Road surface erosion, road shoulder/ditch, inadequate buffer	Private Road	2	1	2	5
1	25	53	6	Waterford	Bare soil/field, inadequate buffer	Beach/Boat Ac-cess	2	1	2	5
1	26	53	6	Waterford	Bare soil/fields, road surface erosion, inadequate buffer	Recreational	2	1	2	5
1	27	53	6	Waterford	Road surface erosion, road shoulder/ditch	Private Road	2	1	2	5
1	28	53	6	Waterford	Bare soil/fields, road surface erosion, inadequate buffer	Recreational	1	1	2	4
1	29	53	5	Waterford	Poor/degraded buffer, bank/channel downcutting, sediment buildup	Stream Channel	3	1	2	6
1	30	53	N/A	Waterford	road shoulder/ditch	State Road	3	1	2	6
1	31	53	N/A	Waterford	road shoulder/ditch, unstable culvert	State Road	2	1	2	5
1	32	53	6	Waterford	Road surface erosion, road shoulder/ditch	Private Road	2	1	2	5
1	33	53	6	Waterford	unstable construction, road surface erosion, road shoulder/ditch, unstable culvert, stream bank erosion, sediment buildup	Private Road	3	1	2	6
1	34	53	5	Waterford	Inadequate buffer, Poor/degraded buffer, Stream bank erosion/ failure, Sediment build-up, bank/channel downcutting	Stream Channel	3	1	2	6
1	35	53	6	Waterford	road surface erosion, road shoulder/ditch, unstable culvert, stream bank erosion, sediment buildup, bank/channel downcutting	Private Road	2	1	2	5

Sector	Site #	Tax Map	Tax Lot	City	Description of Problem(s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
1	36	53	6	Waterford	Unstable culvert, blockage	Private Road	1	1	2	4
1	37	53	6	Waterford	Bare soil/fields, unstable construction, road surface erosion, road shoulder/ditch, stream bank erosion, sediment buildup	Trail or Path	1	1	2	4
1	38	53	6	Waterford	Bare soil/fields, unstable culvert, road surface erosion, road shoulder/ditch, poor/degraded buffer, sediment buildup	Private Road	1	1	2	4
1	39	53	6	Waterford	Road shoulder/ditch, parking lot drainage	State Road	3	1	2	6
2	2	11	002-00B	Norway	Driveway Surface Erosion	Driveway	2	1	2	5
2	3	N/A	N/A	Norway	Road Surface Erosion, Road Shoulder/Ditch	Town Road	2	1	1	4
2	4	11	2	Norway	Bare Soil	Logging	1	1	1	3
2	5	11	3	Norway	Road Surface Erosion, Unstable Culvert, Sediment build up	Driveway	2	1	2	5
2	6	N/A	N/A	Norway	Unstable construction, Road Surface Erosion, Unstable Culvert, Sediment build up (on inlet side)	Town Road	2	1	1	4
2	7	11	5	Norway	Bare Soil/Fields	Driveway	1	1	1	3
2	9	N/A	N/A	Norway	Road Surface Erosion, Road Shoulder/Ditch	Town Road	2	1	2	5
2	18	10	35?	Norway	Road Shoulder/Ditch @ culvert inlet	Town Road	2	1	2	5
2	19	10	24?	Norway	Road Shoulder/ditch, Unstable Culvert (inlet), Sediment build up	Private Road	1	1	2	4
2	20	10	37	Norway	Road Surface Erosion, Road Shoulder/ditch, Trash in stream channel	Private Road	1	1	1	3
2	22	9	157	Norway	Road Shoulder, Unstable Culvert, Drainage from paved area, Inlet Erosion, Mild Surface Erosion on outlet side	State Road	2	1	2	5
2	23	9	148outlet/155inlet	Norway	Road shoulder, Unstable Culvert, No trees on outlet side, Lack of stream shading, Drainage from paved area, 2 rusted out culverts, Sediment build up	Town Road	1	1	2	4
2	24	10	003inlet/002outlet	Norway	Road Shoulder, Unstable Culvert	Town Road	1	1	2	4
2	25	N/A	N/A	Norway	Road Shoulder, Unstable Culvert-Stone Bridge, Outlet Erosion, Sediment build-up	Town Road	1	1	2	4
2	26	10	3	Norway	Road Shoulder erosion at inlet and outlet, Unstable culvert, Sediment in stream channel	Town Road	1	1	2	4
2	27	N/A	N/A	Norway	Unstable Culvert	Town Road	2	1	2	5
2	28	N/A	N/A	Norway	Unstable Culvert	Trail or Path	2	1	1	4

Sector	Site #	Tax Map	Tax Lot	City	Description of Problem(s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
3	1	11	N/A	Otisfield	Road Shoulder/Ditch	Town Road	1	1	2	4
3	2	11	N/A	Otisfield	Road Shoulder/Ditch, Access to stream, Poor/Degraded buffer, Drainage from paved area	Town Road	n/a	n/a	n/a	0
3	3	11	N/A	Otisfield	Unstable Construction, Collapsed/Unstable Culvert, Sediment Build-up	Town Road	2	2	2	6
3	4	11	N/A	Otisfield	Road Surface Erosion, Road shoulder/Ditch*	Town Road	1	1	2	4
3	5	11	N/A	Otisfield	Road Shoulder/Ditch, Drainage from paved area, Stream bank erosion/failure, Sediment build-up	Town Road	n/a	1	2	3
3A	50	11	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	2	5
3A	5113	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	2	5
3A	52	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	1	1	1	3
3A	53	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert, Hanging-No fish passage	Town Road	2	1	2	5
3A	54	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	1	1	1	3
3A	55	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	2	5
3A	56	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	2	5
3A	57	7	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	1	1	2	4
3A	58	7	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	1	4
3A	59	7	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	2	5
3A	60	7	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	1	4
3A	61	7	N/A	Otisfield	Road Shoulder	Town Road	2	1	1	4
3A	62	7	N/A	Otisfield	Road Shoulder/ditch	Town Road	2	1	2	5
3A	63	7	N/A	Otisfield	Road Shoulder	Town Road	2	1	2	5
3A	64	7	N/A	Otisfield	Road Shoulder	Town Road	1	1	1	3
3A	65	7	N/A	Otisfield	Sediment build up (winter sand)	Town Road	1	1	1	3
3A	66	7	N/A	Otisfield	Trash, Sediment build up (winter sand)	Town Road	1	1	1	3

Sector	Site #	Tax Map	Tax Lot	City	Description of Problem(s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
3A	67	13	N/A	Otisfield	Road shoulder/ditch	Town Road	1	1	2	4
3A	68	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Town Road	2	1	1	4
3A	69	13	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Private Road	2	1	1	4
3A	70	7	N/A	Otisfield	Road surface erosion, Road shoulder, Unstable culvert	Private Road	2	1	2	5
3A	71	7	N/A	Otisfield	Severe road surface erosion, road shoulder/ditch	Gravel Pit/ mining	3	1	2	6
3A	72	7	N/A	Otisfield	Severe road shoulder/ditch, stream bank erosion/failure, sediment build up	Town Road	3	1	2	6
3A	73	6	N/A	Otisfield	Bare soil/fields, unstable construction, Road shoulder/ditch, channel straightened, bank/channel downcutting, stream bank erosion/failure, sediment build up	Gravel Pit/ mining	3	1	2	6
3A	74	6	N/A	Otisfield	Road Shoulder/ditch	Town Road	3	1	1	5
3A	75	18	N/A	Otisfield	Road Surface Erosion, Road shoulder/ditch	Private Road	1	1	2	4
3A	76	18	N/A	Otisfield	Road Shoulder/ditch, Unstable Culvert	Private Road	2	1	2	5
3A	77	18	N/A	Otisfield	Road Surface Erosion, Road shoulder/ditch, Unstable Culvert	Private Road	3	1	2	6
3A	78	6	N/A	Otisfield	Road Surface Erosion, Stream bank erosion/failure, Trash	Recreational	3	1	2	6
4	1	51	0002B/0003	Harrison	Road Surface Erosion, Stream bank erosion/failure	Trail or Path	3	1	2	6
4	2	50	0030?	Harrison	Unstable Culvert	Town Road	1	1	2	4
4	3	50	14	Harrison	Road shoulder, Unstable Culvert, no fish passage	Town Road	1	1	2	4
4	4	40	16	Harrison	Road Surface Erosion, Road shoulder/ditch	Town Road	2	1	2	5
4	5	25	008?	Harrison	Bare soil/fields, unstable construction, trail surface erosion	Trail or Path	3	1	2	6
4	6	25	8	Harrison	Road Shoulder/ditch	Town Road	2	1	2	5
4	7	26	0030A	Harrison	Road Shoulder/ditch, Trash in stream channel	State Road	2	1	2	5
4	8	26	31	Harrison	Road Shoulder/ditch, Trash in stream channel	Town Road	2	1	2	5
4	9	28	0001F	Harrison	Road Shoulder/ditch, Trash in stream channel	Private Road	2	1	2	5

Sec-tor	Site #	Tax Map	Tax Lot	City	Description of Problem(s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
4	10	29	1	Harrison	Road Shoulder/ditch, unstable culvert, no fish passage, trash	Town Road	1	1	2	4
4	11 (PL1)	N/A	N/A	Harrison	Bare soil/fields, Poor/degraded buffer, Lack of stream shading	Powerline	3	1	2	6
4	12 (PL2)	N/A	N/A	Harrison	Bare soil/fields, Poor/degraded buffer	Powerline	2	1	2	5
5	1	1	N/A	Casco	Bare soil/fields, Road Shoulder/ditch, Inadequate Buffer, Drainage from paved area	State Road	1	1	2	4
5	2	1	N/A	Casco	Bare soil/fields,Inadequate Buffer, Drainage from paved area	State Road	2	1	2	5
5	3	1	N/A	Casco	Bare soil/fields,Inadequate Buffer, Drainage from paved area	State Road	2	1	2	5
5	4	1	N/A	Casco	Inadequate buffer, Bank/channel downcutting, Stream bank erosion/failure	Stream Channel	1	1	2	4
5	5	1	N/A	Casco	Inadequate buffer, Drainage from paved area, Bank/ channel downcutting, Stream bank erosion/failure	Stream Channel	2	1	2	5
5	6	1	N/A	Casco	Bare soil/fields, Inadequate Buffer, Drainage from paved area	Stream Channel	2	1	2	5
5	7	1	N/A	Casco	Trash in stream channel	Residential	1	1	1	3
5	8	1	N/A	Casco	Road Shoulder/ditch, Industrial/Commercial activities	Commercial	1	1	1	3
5	9	1	N/A	Casco	Inadequate buffer, Stream bank erosion/failure, sediment build up	Residential	3	1	2	6
5	10	1	N/A	Casco	Inadequate buffer, Poor/degraded buffer, Stream bank erosion/failure, Sediment build-up	Residential	3	n/a	n/a	3
5	12	28	N/A	Casco	Stream bank erosion/failure, Sediment build up	Residential	2	1	2	5
5	13	28	N/A	Casco	Inadequate buffer, Stream bank erosion/failure, sediment build up	Residential	3	1	2	6
5	14	28	N/A	Casco	Trash in stream channel	Residential	1	1	1	3
5	15	29	N/A	Casco	Road Surface Erosion, Trash	Beach/Boat Access	1	1	1	3
5	16	29	N/A	Casco	N/A	Private Road	1	1	2	4
5	17	3	N/A	Casco	Bare soil/fields, Inadequate buffer, Sediment build up	Beach/Boat Access	2	1	2	5

Sector	Site #	Tax Map	Tax Lot	City	Description of Problem(s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
5A	50	5	N/A	Casco	Road Shoulder/ditch, Unstable Culvert	Town Road	1	1	2	4
5A	51	007	0001	Casco	Road Shoulder/ditch (erosion up to broadway), road sand entering river, inadequate buffer, lack of stream shading, riprap on stream banks, stream bank erosion/failure.	Residential	2	2	1	5
5A	52	8	N/A	Casco	Road surface erosion, Trash	Recreational	1	2	2	5
5A	53	8	N/A	Casco	Road surface erosion, Road shoulder/ditch, Trash	Private Road	2	2	2	6
5A	54	8	N/A	Casco	Road surface erosion, Road shoulder/ditch, Trash	Private Road	2	2	2	6
5A	55	8	N/A	Casco	Road shoulder/ditch, Trash	Town Road	2	1	1	4
5A	56	8	N/A	Casco	Road Shoulder/ditch, Unstable Culvert, Livestock access to the stream, Livestock manure, Inadequate buffer	Agriculture	2	2	2	6
5A	57	8	N/A	Casco	Road shoulder/ditch, Unstable culvert	Town Road	1	1	2	4
5A	58	8	N/A	Casco	Road surface erosion, Road shoulder/ditch, unstable culvert, Hanging Culvert	Private Road				0
5A	59	8	N/A	Casco	Road surface erosion, unstable culvert, Hanging Culvert-bottom has rusted out	Private Road	1	1	2	4
5A	60	8	N/A	Casco	Road surface erosion, Road shoulder/ditch, Invasive species present, Hanging Culvert	Private Road	1	1	2	4
5A	61	8	N/A	Casco	Road surface erosion	Private Road		1	2	3
5A	62	8	N/A	Casco	Trail surface erosion, inadequate buffer	Trail or Path	2	1	2	5
5A	63	8	N/A	Casco	Trail surface erosion	Trail or Path	3	1	2	6
5A	64	8	N/A	Casco	Trail surface erosion	Trail or Path	3	1	2	6
6	1		N/A	Naples	Trash	Private Road	2	1	2	5
6	2		N/A	Naples	Bank/channel downcutting, Stream bank erosion/failure	Stream Channel	2	1	2	5
6	3		N/A	Naples	Road shoulder/ditch	Town Road	2	1	2	5
6	4		N/A	Naples	Road shoulder/ditch, Hanging culvert-no fish passage	Town Road	1	1	2	4
6	5		N/A	Naples	Road shoulder/ditch	Town Road	1	1	2	4
6	6		N/A	Naples	Road shoulder/ditch, Trash	Town Road	3	2	2	7

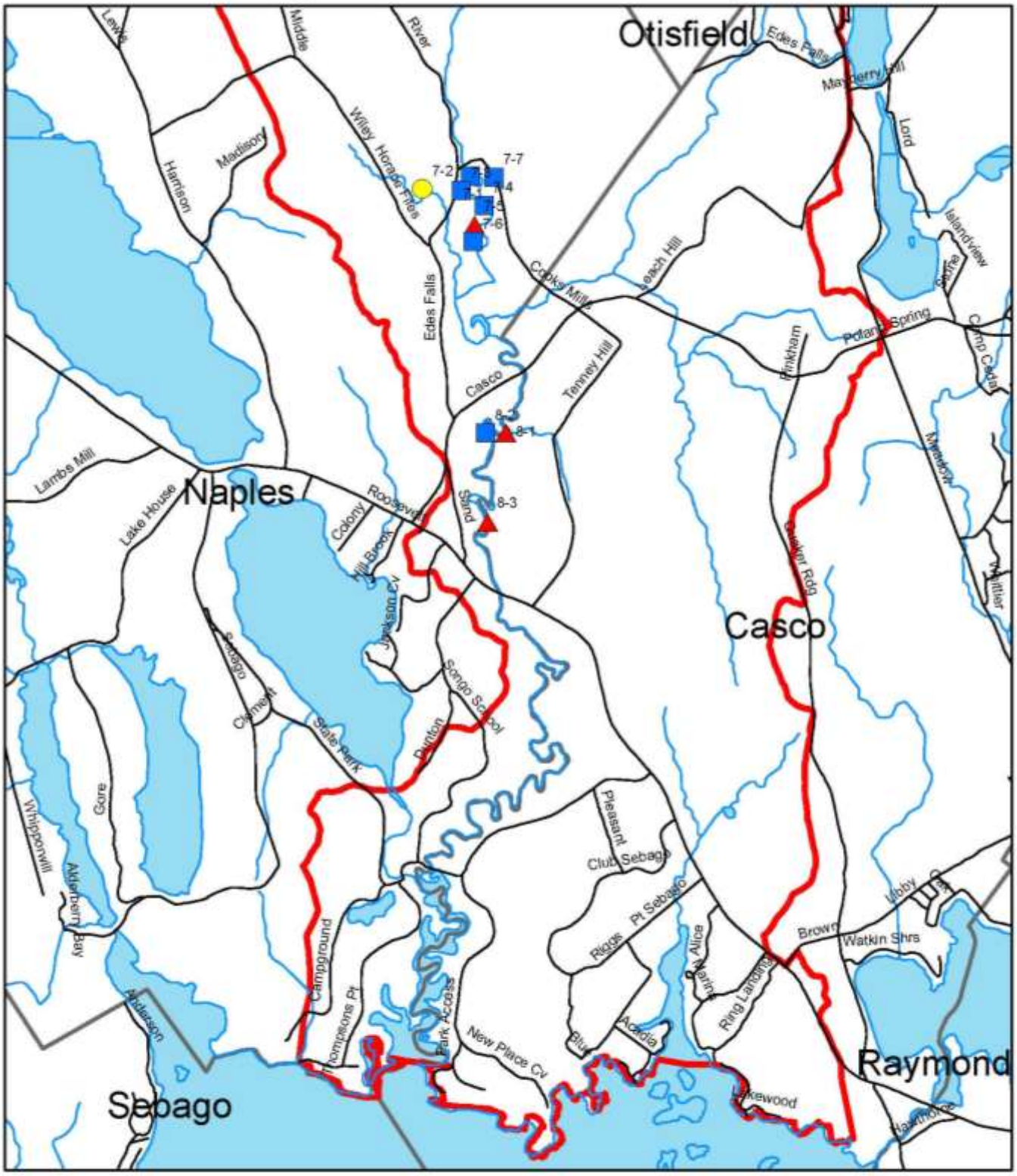
Sector	Site #	Tax Map	Tax Lot	City	Description of Problem(s)	Land Use	Est. Size of Impact Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
6	7	N/A	N/A	Naples	Stockpiled soil (sand piles on outside of gravel pit), road shoulder/ditch	Commercial	3	1	2	6
6	8	N/A	N/A	Naples	Road shoulder/ditch	Town Road	1	1	1	3
6	9	N/A	N/A	Naples	Road shoulder/ditch, Hanging culvert-no fish passage, culvert too small	Town Road	1	1	0	2
6A	1	N/A	N/A	Naples	Road Shoulder	Town Road	3	1	2	6
6A	2	N/A	N/A	Naples	Road Shoulder and bank, Inadequate Buffer	Town Road	3	1	2	6
6A	3	N/A	N/A	Naples	Road surface erosion, Road Shoulder and bank, Inadequate buffer	Town Road	2	1	2	5
6A	4	N/A	N/A	Naples	Inadequate Buffer	Residential	3	1	2	6
6A	5	N/A	N/A	Naples	Inadequate Buffer	Residential	3	1	2	6
6A	6	N/A	N/A	Naples	Bare soil, Inadequate buffer	Residential	2	2	2	6
6A	7	N/A	N/A	Naples	Bare soil	Residential	2	1	2	5
6A	8	N/A	N/A	Naples	Bare soil, Inadequate buffer, riprap shoreline	Residential	1	2	2	5
6A	9	N/A	N/A	Naples	Inadequate buffer	Residential	3	1	2	6
6A	10	N/A	N/A	Naples	Inadequate buffer at beach	Residential	2	2	2	6
6A	11	N/A	N/A	Naples	Inadequate buffer, Bank downcutting, stream bank erosion	Municipal/ Public	3	2	2	7
6A	12	N/A	N/A	Naples	Road surface erosion	Municipal/ Public	2	1	2	5
6A	13	N/A	N/A	Naples	Inadequate buffer	Residential	3	1	2	6
6A	14	N/A	N/A	Naples	Inadequate buffer, Trash	Residential	3	2	2	7
6A	15	N/A	N/A	Naples	Bare soil, Unstable construction	Construction Site	3	1	1	5
6A	16	N/A	N/A	Naples	Bare soil, Road shoulder/ditch	Construction Site	2	1	1	4

Sec-tor	Site #		Location	City	Description of Problem	Land Use	Impact Size Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
PL	1		Power/Pipe line	Casco	Bare soil, Road surface erosion	Recreational	3	1	1	5
PL	3		Power/Pipe line	Naples	Bare soil, Road surface erosion	Recreational	1	1	1	3
PL	4		Power/Pipe line	Naples	Road surface erosion, Unstable culvert	Recreational	1	1	1	3
PL	5		Power/Pipe line	Naples	Road surface erosion, Unstable culvert	Recreational	1	1	1	3
PL	6		Power/Pipe line	Otisfield	Road surface erosion	Recreational	1	1	1	3
PL	7		Power/Pipe line	Naples	Road surface erosion	Recreational	1	1	1	3
PL	8		Power/Pipe line	Otisfield	Inadequate buffer, Poor/degraded buffer	Commercial	3	1	2	6
PL	9		Power/Pipe line	Harrison	Bare soil	Commercial	1	1	1	3
FB	1		Flint Brook	North Waterford	Road surface erosion, Misaligned, undersized culvert	Town Road	1	1	2	4
FB	2		Flint Brook	North Waterford	Road surface erosion, Misaligned, undersized culvert	Town Road	2	1	2	5
FB	3		Flint Brook	North Waterford	Road surface erosion, Streambank erosion, failure	Recreational	2	1	1	4
FB	4		Flint Brook	North Waterford	Road surface erosion	Town Road	2	1	1	4
FB	5		Flint Brook	North Waterford	Bare soil, Unstable construction, Road surface erosion	Driveway	2	1	1	4
FB	6		Flint Brook	North Waterford	Road surface erosion	Town Road	3	1	1	5
FB	7		Flint Brook	North Waterford	Road surface erosion	Town Road	3	1	1	5
FB	8		Flint Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5
FB	9		Flint Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5
FB	10		Flint Brook	North Waterford	Road surface erosion	Town Road	3	1	1	5
FB	11		Flint Brook	North Waterford	Road surface erosion	Town Road	3	1	1	5
FB	12		Flint Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5
FB	13		Flint Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5
FB	14		Flint Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5

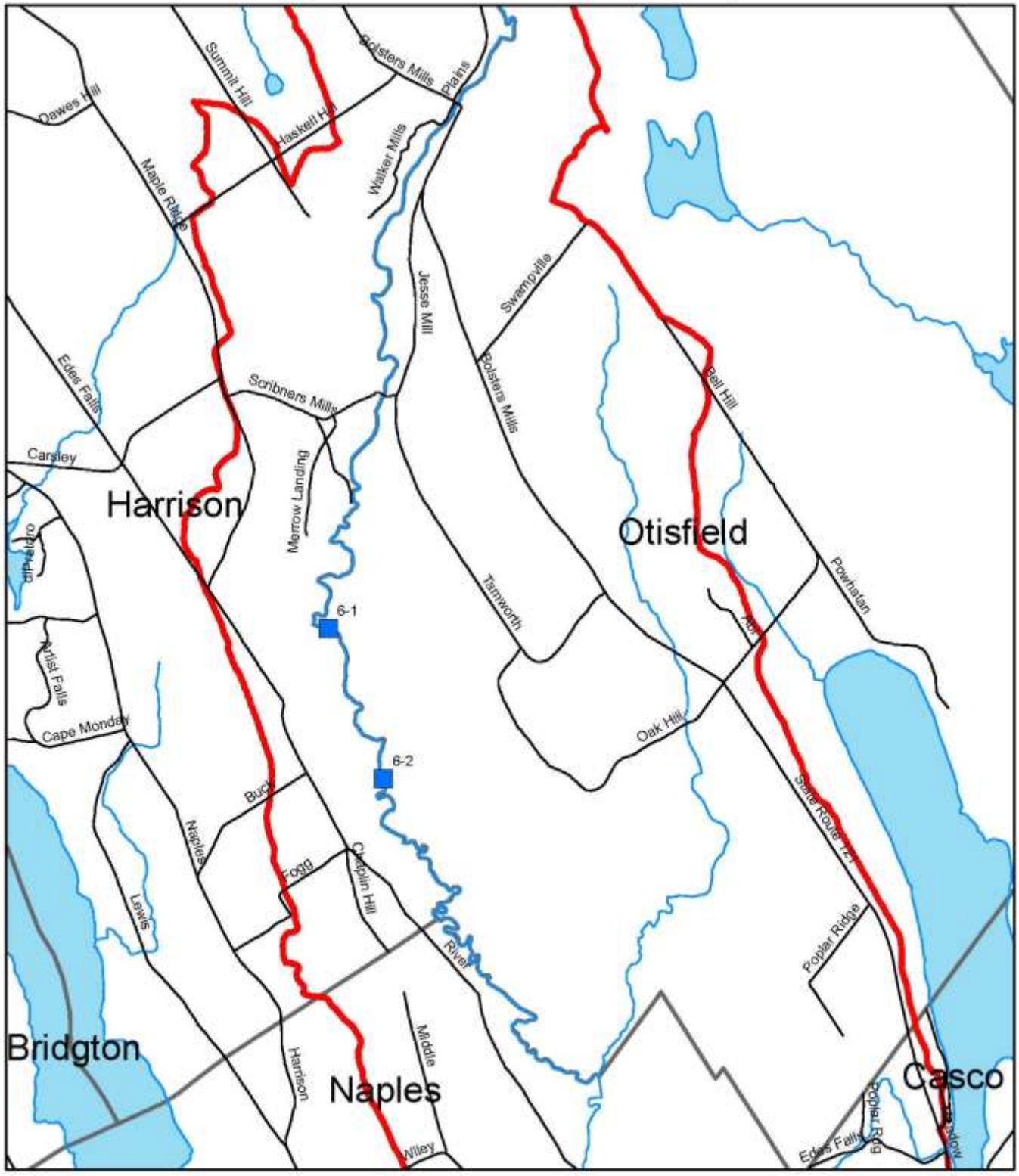
Sec-tor	Site #		Location	City	Description of Problem	Land Use	Impact Size Small=1 Medium=2 Large=3	Number of Pollutants Single=1 Multiple=2	Transport to River Limited=1 Direct=2	Impact Score
ESB	1		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Lack of stream shading	Logging	3	1	1	5
ESB	2		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Lack of stream shading	Logging	3	1	1	5
ESB	3		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Lack of stream shading	Logging	3	1	1	5
ESB	4		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Lack of stream shading	Logging	3	1	1	5
ESB	5		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Lack of stream shading	Logging	3	1	1	5
ESB	6		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Lack of stream shading	Logging	3	1	1	5
ESB	7		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Stream-bank erosion	Logging	3	1	1	5
ESB	8		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Lack of stream shading	Logging	3	1	1	5
ESB	9		East Trib-Swett Brook	North Waterford	Bare soil, Poor, degraded buffer, Stream-bank erosion	Logging	3	1	1	5
WSB	1		West Trib-Swett Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5
WSB	2		West Trib-Swett Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5
WSB	3		West Trib-Swett Brook	North Waterford	Inadequate buffer, Lack of stream shading, Drainage from paved areas	Town Road	3	1	1	5
WSB	4		West Trib-Swett Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5
WSB	5		West Trib-Swett Brook	North Waterford	Road shoulder/ditch	Town Road	3	1	1	5

Appendix C

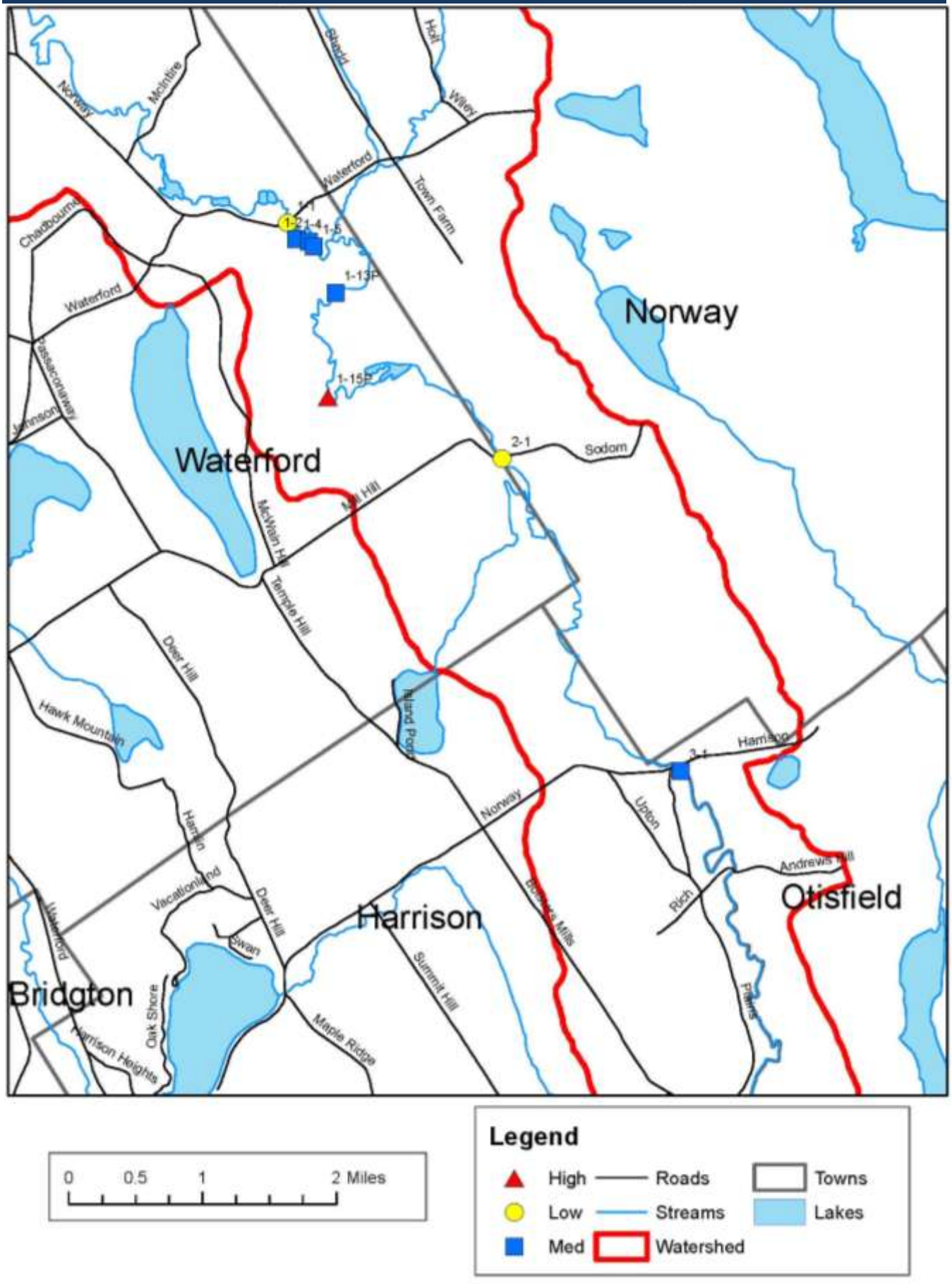
Map 1 — Riparian Problem sites



Map 2 — Riparian Problem sites



Map 3 — Riparian Problem sites



Riparian Corridor Survey Data

Sector	Site #	Approx. River Width	Length of Problem Area	Width of Riparian Buffer	Vegetation Type	Approx. %Shade Over River	Land Use potentially causing degradation	Land Use/Site Characterization	Description of Problem	Evidence of Wildlife?	Est. Degree of Concern High, Med, Low
1	1	50'	30'	>50'	Shrubs, Trees	10-25%	Paved Road	Road	Bridge	Yes-White-tailed Deer	Low
1	2	30'	150'	0-10'	Lawn	0-10%	Residential/Lawn	Year-round residential	Immediate shore cleared of vegetaion/recovoring naturally or replanted	Yes-Beaver nearby	Med
1	4	25'	75'	11-25'	Lawn	0-10%	Residential/Lawn	Year-round residential	Human activity impacting bank (including lawn, year, waste, trash dumping, construction debris)	n/a	Med
1	5	n/a	100'	0-10'	Lawn, Trees	50-75%	Residential/Lawn	Year-round residential	Immediate shore cleared of vegetaion/recovoring naturally or replanted	Yes-Beaver	Med
1	13P	40'	100'	0-10'	Lawn, Tress	25-50%	Residential/Lawn	Year-round residential	Immediate shore cleared of vegetaion/recovoring naturally or replanted	n/a	Med
1	15P	30'	200'	26-50'	Herbaceous, Shrubs, Trees, Wild Grasses	25-50%	Multiple Use Trail, CMP/Oil/Gas corridor	n/a	ATV trail, Jeep/Truck trail. Drainage ditch cut to river, potential for sig sedimentation.	n/a	High
2	1	60	25	>50'	Wild grasses, herbacaeous, shrubs, trees	25-50%	Natural	Boat launch (canoe, kayak)	Active erosion/ sedimentation occuring on banks, Human activity impacting bank, some natural due to high water levels	no	Low
3	1	70	50	26-50'	Trees	25-50%	High sandy bank w/ trees adjoining boat launch/picnic area, undercut by erosion	Boat launch	Immediate shore cleared of vegetaion/recovoring naturally or replanted, active erosion, human activity, Bank failure or slumping	Yes	Med
6	1	40	30	26-50'	wild grass, lawn	0-10%	trees absent, signs, benches	seasonal camp	immediate shore cleared of vegetation/naturally recovering or replanted, human activity	Yes	Med

Appendix D

Riparian Corridor Survey Data

Sector	Site #	Approx. River Width	Length of Problem Area	Width of Riparian Buffer	Vegetation Type	Approx. %Shade Over River	Land Use potentially causing degradation	Land Use/Site Characterization	Description of Problem	Evidence of Wildlife?	Est. Degree of Concern High, Med, Low
6	2	40	50	11-25'	wild grass, shrubs, trees	0-10%	natural log jam	forest land	log jam-natural, possible fish passage problem?	n/a	Med
7	1	80	75	25'	shrubs, trees	50-75%	Bank erosion, looks like old road	forest land	immediate shore cleared/ recoving naturally or replanted, bank failure or slumping	No	Med
7	2	75	5	11-25'	Trees	75-100%	Natural, Barrel in river	forest land	Barrel in river	n/a	low
7	3	75	15	26-50'	Trees	75-100%	Natural-Blow down-bank erosion	forest land	Bank failureor slumping	n/a	Med
7	4	75	150	0-10'	trees	50-75%	Natural, General bank erosion typical of this section of river	forest land	active erosion/sedimentation, bank failure or slumping	n/a	Med
7	5	75	200	0-10'	n/a	25-50%	Natural, Sand bank, were told there is a gravel pit above this	forest land	immediate shore cleared of vegetation/no regrowth/exposed soils, Bank failure or slumping	n/a	High
7	6	75	50	11-25'	Wild grasses, trees	50-75%	Natural, Blow down blocking river, Portage	forest land	Blow Down	n/a	Med
7	7	75	200	11-25'	Wild grasses, trees	25-50%	Campsite on left bank, major blow down blocking river	forest land, seasonal camp	Campsite, blowdown	Yes	Med
8	1	75	25	11-25'	Wild grasses, trees	50-75%	Natural, Left bank breakdown	forest land	erosion	n/a	High
8	2	50	75	11-25'	Wild grasses, trees	50-75%	Natural, Lots of rubish in blow downs	forest land	blow downs, trash	n/a	Med
8	3	50	75	26-50'	Trees	50-75%	Multiple blow downs blocking river, difficult portage	forest land	Multiple blow downs blocking river, difficult portage	n/a	High