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New Meadows River Watershed and Shoreline Surveys

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New Meadows River
Watershed and Shoreline Surveys

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Town of Brunswick, Maine

As agent for

New Meadows River Watershed Project

Watershed and Shoreline Surveys Final Report

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Acknowledgment

This project would not have succeeded had it not been for the dedicated participation of the members of the New Meadows River Watershed Project Steering Committee. Over the course of this project the Committee included: Theo Holtwijk (Chairman), *Director of Planning and Development, Town of Brunswick*, Michael Feldman, *Brunswick Town Councilor*, Ralph Merry, *Town of West Bath Selectman*, William Rogers, *Town of West Bath Selectman*, David Chipman, *Town of Harpswell Selectman*, Robert Cummings, *Town of Phippsburg*, Walter Rosen, *Brunswick Conservation Commission*, David Guay, *Harpswell Conservation Commission/Bowdoin College*, Eric Butler, *Brunswick Marine Resources Committee*, Robert Wixted, *Brunswick Marine Resources Committee*, Arthur Dodge, *Harpswell Marine Resources Committee*, James Hennessey, *West Bath Marine Resources Committee*, James Upham, *City of Bath Planner*, George Pollard, *City of Bath Planning Board*, Edward Benedikt, Anne Hammond, *New Meadows Lakes Association*, Diane Gould, *U.S. Environmental Protection Agency (EPA)*, Katherine Groves, *Casco Bay Estuary Project (CBEP)*, Stephanie Watson and Todd Janeski, *Maine State Planning Office (SPO)*, Sherry Hanson and Laura Livingston, *Maine Department of Marine Resources (DMR)*, Lee Doggett and Donald Kale, *Maine Department of Environmental Protection (DEP)*, Dr. Edward Laine, Dr. Peter Lea, and Cathryn Field *Bowdoin College*, Alan Houston, *Town of Brunswick Natural Resources Planner*, Michael Doan and Peter Milholland, *Friends of Casco Bay (FOCB)*, Daniel Devereaux, *Town of Brunswick Marine Warden*, Jon Hentz, *Town of West Bath Shellfish Warden* and Helen Chabot and Sarah McNair, *AmeriCorps Volunteer with DEP*.

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Introduction

This report summarizes the activities of the New Meadows River Watershed Project (NMRWP) under its Non-point Source, Section 319(b) Project #2000P-13 grant awarded by the Maine Department of Environmental Protection in February, 2000.

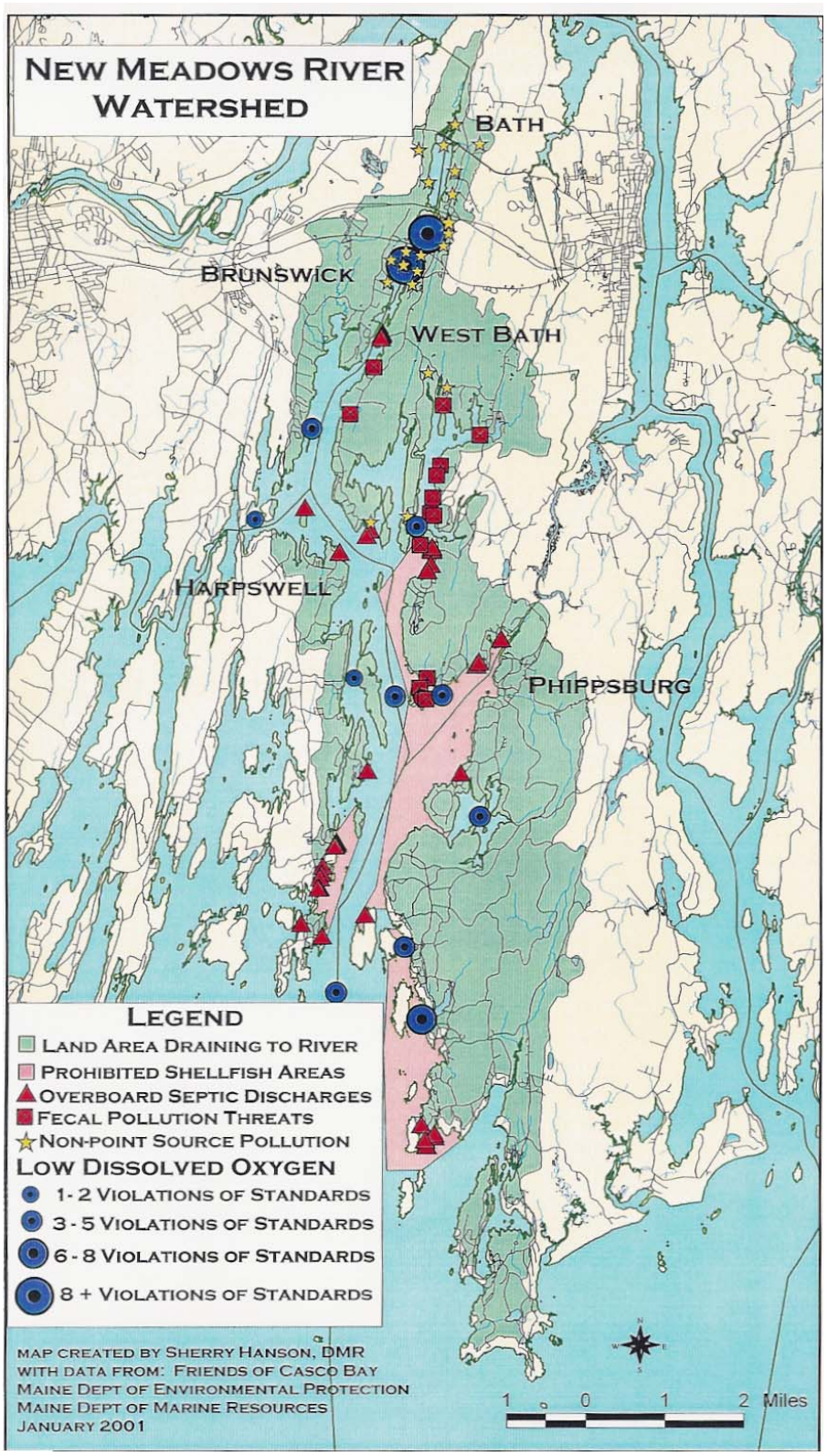
Background

The New Meadows River is located in the counties of Cumberland and Sagadahoc, in southwestern Maine. Its 23 square mile watershed lies within the Casco Bay Watershed that drains 985 square miles, encompasses 44 towns and is drained by 12 river and lake systems (hydrologic units). The Natural Resource Conservation Service (NRCS) has identified five sub-watersheds: Coastal, Fore River, Presumpscot River, Royal River, and Sebago Lake. The New Meadows River flows through and creates the most easterly boundary of the Coastal sub-watershed, which is the most southeasterly drainage region in the Casco Bay Watershed. About 10% of the State's 1.25 million people live in its towns. During the period 1970-1990, almost 80% of the total growth in Maine took place in towns such as Brunswick and Harpswell. The coastal towns of Brunswick and Harpswell comprise the western portion of the river watershed while the towns of Bath, West Bath and Phippsburg form the eastern boundary. A map showing the New Meadows River and surrounding watershed area and the known and potential pollution sources is shown in Figure 1 on the following page.

The New Meadows River is listed by the Maine Department of Environmental Protection as one of seventeen priority coastal waters to receive federal, state and local focus for non-point source (NPS) pollution abatement and prevention activities. The list gives preference in the selection of project proposals for funding that attempt to benefit those waters. Waters on the list have both water quality that is impaired or threatened to some degree by NPS pollution and have significant value from a Statewide perspective.

Water quality problems on the River include high fecal coliform counts, low dissolved oxygen levels, roughly 30 overboard discharge systems licensed by DEP in past years and unknown amounts of sediment and storm water runoff. The Department of Marine Resources prohibits shellfish harvesting from many of the clam flats in West Bath, Phippsburg, Harpswell, and Brunswick because of the overboard discharge systems and high bacterial counts from malfunctioning septic systems was well as other non-point sources. Some areas are conditionally approved on a seasonal basis and the upper "lake" is subject to rain closures. Low dissolved oxygen levels have been detected by the Friends of Casco Bay monitoring group and others in recent years. The New Meadows "lake" north of Route One, once fully tidal, now suffers from algal blooms due to limited tidal flushing caused by a dam. Eutrophication in the New Meadows "lake" has contributed to a serious foam problem in the upper River that, while not ecologically damaging, is a detriment to the attractiveness of it. This has affected a marina directly below the outlet of the "lake". Septic surveys have been completed. Additional work is needed to identify sources of soil erosion and the quantity and quality of storm water entering the River. There are no point discharges on the River other than the 30 remaining overboard discharge systems.

Figure 1. New Meadows River and surrounding watershed area



Project

The New Meadows River is a significant natural and economic resource to the region. Although localized problems do exist, it remains generally healthy and productive and supports extensive finfish, shellfish, and lobster fisheries along the shores of all surrounding communities. However, given the extent and degree of recent development within the watershed, and the expectation that such development will continue, it is vitally important that existing problems be identified and corrected promptly, that emerging problems be reversed, and that future potential problems be avoided through proper planning.

Responding to these needs, the New Meadows River Watershed Project (NMRWP) has been designed to meet five primary objectives: 1) establish an inter-municipality forum to discuss issues faced by the communities bordering the New Meadows River, 2) engage and inform residents along the shores and within the river's watershed, 3) conduct training of volunteers on the methods of conducting shoreline and watershed surveys, 4) develop preliminary information on the types and locations of non-point source pollution affecting the water and sediment quality of the river and the general health of the living resources of the river, and 5) build support for a watershed management plan. The activities of the NMRWP and guided and coordinated by a Steering Committee that includes representatives from the Towns of Brunswick, West Bath, Harpswell, Phippsburg, the City of Bath, the Maine State Planning Office, the Maine departments of Marine Resources and Environmental Protection, the U.S. Environmental Protection Agency, Casco Bay Estuary Project, Friends of Casco Bay, New Meadows Lake Association, Bowdoin College and MER Assessment Corporation. The full activities of the Steering Committee (SC) during 2000 are reported in the Final Report on the New Meadows River Watershed Project, March 30, 2001 (Revised May 11, 2001). This report covers only that portion of activities related specifically to the watershed and shoreline surveys.

The purpose of the shoreline and watershed surveys was to identify existing and potential sources of contamination or pollutants including pathogens, nutrients, toxics and sediments.

Pathogens are bacteria or viruses from sewage and animal wastes that are responsible for the closure of shellfish areas and swimming areas. Sewage enters coastal waters from malfunctioning septic systems, publicly owned treatment plants, overboard discharge systems, combined sewer overflows and discharges from boats. Pollution from animal wastes is primarily generated from agricultural activities, such as spreading manure to fertilize fields, but is also generated by pets and wildlife.

Nutrients include a number of different elements such as hydrogen, carbon, sulfur, nitrogen and phosphorous. While nutrients are needed by organisms to survive, too many nutrients can cause problems. One such problem is algae blooms, which can cause oxygen depletion leading to massive fish and shellfish kills, closure of shellfish beds, floating scums and foul odors. Nitrogen is generally the primary limiting nutrient for growth of algae in marine waters. In outer coastal areas nutrient-rich waters from the Gulf of Maine are the predominant source of nutrients. However, in the upper reaches of estuaries, coves, and embayments nitrogen enters marine waters primarily from agricultural sites, residential areas and wastewater and sewage.

Toxics are chemicals that can kill and severely limit the reproduction of marine organisms. Toxics in the marine environment include heavy metals like lead, mercury , arsenic, cadmium, silver, nickel, selenium, chromium, zinc, and copper. Metals can be transported into waterbodies by vehicle emissions, industrial processes and improper use and disposal of paints and pesticides. Metals also occur naturally in rocks and minerals and can leach into the environment over time. Soil disturbance can accelerate the release of metals into marine waters. Petroleum products, PCBs, chlorinated pesticides and dioxin are also found in Maine's marine environment, as well as elsewhere. Landfills and illegal disposal sites are primary sources of these contaminants. The contaminants accumulate in bottom sediments and are consumed by bottom feeding organisms, inhibiting their growth, reproduction and immune systems.

Sediments (sand, silt and other soil particles) suspended and transported in streams and estuarine waters are harmful in that they block sunlight, cover fish spawning areas and food supplies, raise water temperature, (reducing oxygen levels) clog the feeding apparatus of filter feeders (like clams and mussels) and damage fish gills.

Watershed and Shoreline Survey Training

The training session was exceptionally well organized and equally well received. The PowerPoint presentation by Brad Guay of CCSCS on watersheds and impacts to and the presentation and handout materials provided by DMR and DEP were very informative and comprehensive. Materials used in the training session are included as Appendix I.

The idea behind combining both the watershed and shoreline survey training into a single session was to maximize the time spent by the volunteers and to expose them to both survey methodologies. In retrospect, however, a single hour of classroom-style explanation may be inadequate to fully explain these methodologies. Furthermore, a single afternoon is not sufficient to allow for hands-on field exposure to both watershed and shoreline survey. The concept of a morning classroom session followed by an afternoon field session appears to be a very effective and efficient way of conducting training. However, a more reasonable approach to future training efforts might devote a single day to each type of survey using the morning classroom and afternoon field sessions as a model.

Watershed and Shoreline Field Surveys

Due to the size of the watershed area involved and the differences between the DMR shoreline survey and DEP watershed survey methodologies, the in-field training on May 20th was focused primarily on the watershed with only limited emphasis on the shoreline survey.

The watershed survey covered the areas from Woodward Point, Brunswick to Foster Point, West Bath, including the "Lakes" area. The area was divided into four (4) sectors and a team deployed into each sector. Each team was headed by a DMR or DEP technical leader to oversee the volunteers on the team: Sector 1, Lee Doggett (DEP) and Sherry Hanson (DMR); Sector 2, Mary Ellen Dennis, (DEP); Sector 3, Brad Guay (Cumberland County Soil Conservation District); Sector 4, Don Kale (DEP) and Peter Lea (Bowdoin College). Emphasis was placed on soil erosion.

Shoreline surveys were conducted from King's Point to Sabino along the West Bath shoreline, including Williams Island, over the period of June 8th through July 19th, 2000. Sherry Hanson and Laura Livingston, Water Quality Specialist, also at DMR, carried out these surveys with limited volunteer participation. Laura Livingston subsequently conducted an additional shoreline survey along the Bald Head, Bald Head Beach and Hermit Island area of Small Point, Phippsburg on 16 October 2000.

Survey Results

Watershed Survey

The survey resulted in the identification of twenty-six (26) actual or potential non-point pollution sources at twenty-two (22) sites, the raw data and accompanying maps for which is included in Appendix II, and include erosion and/or sedimentation in the following categories:

- seven (7) on town roads
- five (5) on state roads
- four (4) on private roads
- one (1) at a town boat ramp
- five (5) on residential property
- three (3) on commercial property
- one (1) on agricultural property

The location of each of these identified problems is shown on the Geographic Information System (GIS) map on the following page. Table 1 provides a tabulation of these results which are also summarized graphically on the following pages, first as percentage of identified problems by type, second by land use categories in which they are found, and third by point of impact.

Figure 2. New Meadows River watershed and shoreline survey area and potential non-point source pollution source locations

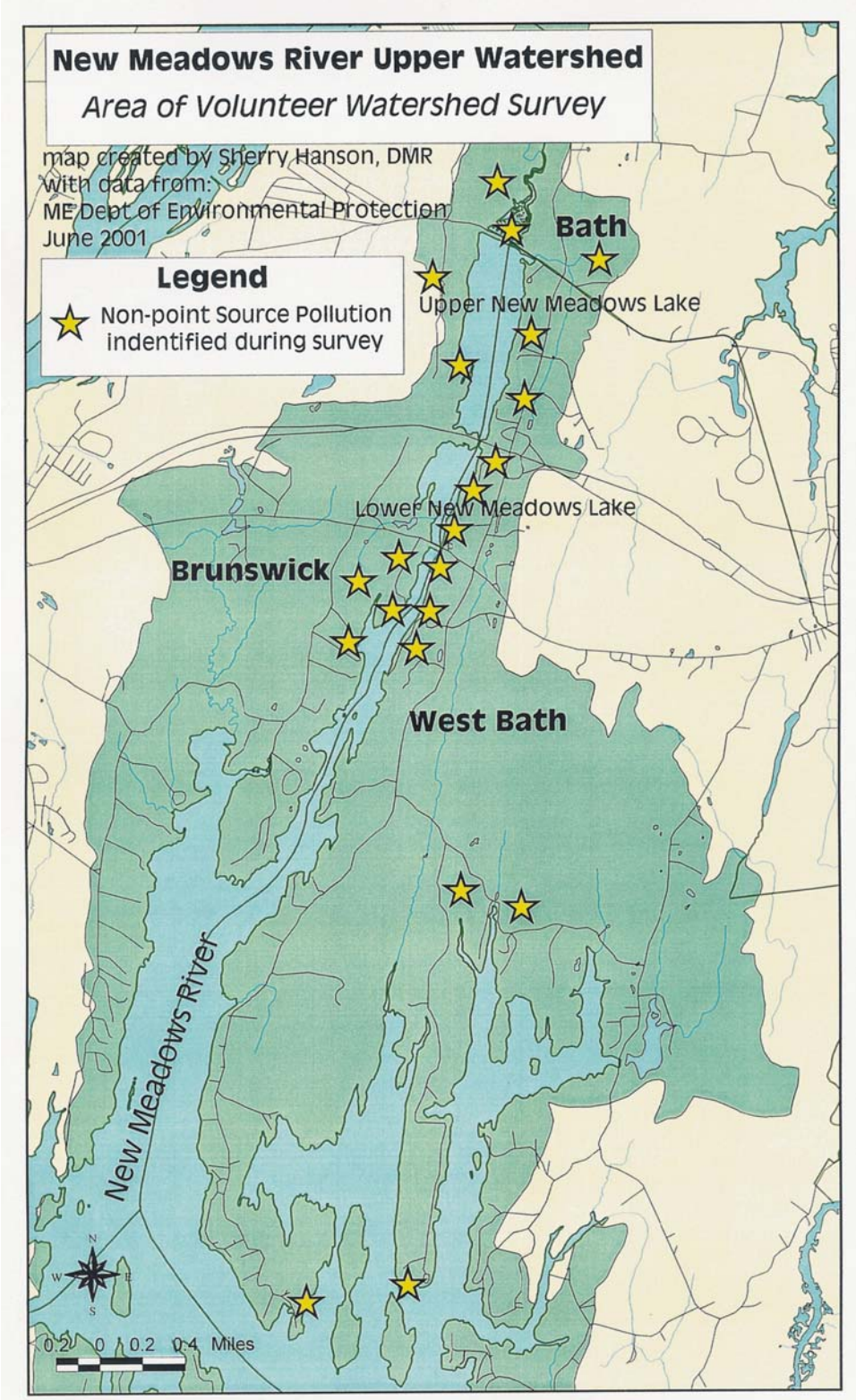


Table 1. Summary of Observation by Site

Sector	Site	Location	Type of Problem	Impact Level	Priority Level
1	**1**	State owned bridge crossing lake at Old, Old Bath Road.	State or town road with moderate shoulder erosion with direct flow to New Meadows Lake; all road runoff discharges directly to Lakes.	Low	Low
	2	Residential property; tan ranch-style house.	Bare yard, but relatively flat; slight surface erosion.	Low	Low
	3	Town-owned residential property across from golf course.	Severe ditch and shoulder erosion over a few hundred yards distance; discharge flows into wetland.	**Medium**	**Medium**
	4	State-owned Old, Old Bath Road.	Slight to moderate ditch erosion along left side of road, northbound; direct flow to river.	Low	Low
	5	Off New Meadows Road	Residential property with moderate to severe ditch erosion, bare soil, and unstable construction site; direct flow to tributary.	Medium	Low
	6	Peterson Lane, gray trailer	Residential property with bare soil, unstable construction site; random excavations, yard dug up.	Medium	Low
	7	Peterson Lane	Agricultural property with stockpiled soil; farm pond with soil mound in center; potential for livestock in stream although no direct evidence, no obvious erosion, but potential exists	Undetermined	Undetermined
2	**1**	New Meadows Road	State-assisted town road with slight shoulder erosion, ditch erosion and poor shaping.	**Medium**	**Medium**
	2	Bisson Moving Company, New Meadows Road	Commercial property with large parking area; debris, gravel from paved area; direct flow to river.	**Medium**	**Medium**
	3	Sanford Lane private road)	Slight surface erosion, unstable culvert I/O, poor shaping; direct flow to tributary.	Low	Low
	4	Old Route 1 at New Meadows Super Stop, corner of old Rt. 1 and New Meadows Rd.	Severe ditch erosion, moderate surface erosion; direct flow to river.	**Medium**	**Medium**

Table 1. Summary of Observation by Site (Continued)

Sector	Site	Location	Type of Problem	Impact Level	Priority Level
3	**1**	Bull Rock Landing	Unstable town-owned boat ramp, boat access.	Low	Low
	2	Bull Rock Road	Town/private road with slight surface erosion, moderate shoulder erosion, slight ditch erosion, poor shaping; direct flow to river.	**High**	**High**
	3	Foster's Point Road	Town/private road with slight surface and ditch erosion; eroding culvert.	Low	Low
	4	Old Rt. 1 and New Meadows River	Town road with direct culvert discharge to river.	Undetermined	Undetermined
	5	Mountain Road (at north end)	Town road with six (6) unstable, clogged I/O culverts or direct run-off.	Low	Low
	6	Hill Road (embayment)	Town road with slight ditch erosion; sandy discharge direct to river.	Low	Low
	7	Long Cove Road (end)	Residential property with slight shoulder erosion; direct discharge to river.	Low	Low
4	**1**	Bull Rock Road (far end)	Private road with moderate surface erosion discharging directly to river.	**High**	**High**
	2	Skilling's Greenhouse, Rt. 1	Commercial property with storm water detention pond towards top of gully; unstable construction site with lack of buffer; direct flow to tributary.	**High**	**High**
	3	Bath Road (in front of Skilling's, across stream crossing)	State road with moderate shoulder erosion; direct discharge to tributary.	**High**	**High**
	4	Bath Road (heading north between Skillings and boat launch road at salt marsh)	State road with moderate shoulder erosion; direct discharge to tributary.	**Medium**	**Medium**

Figure 3.

Percentage of Problems by Land Use

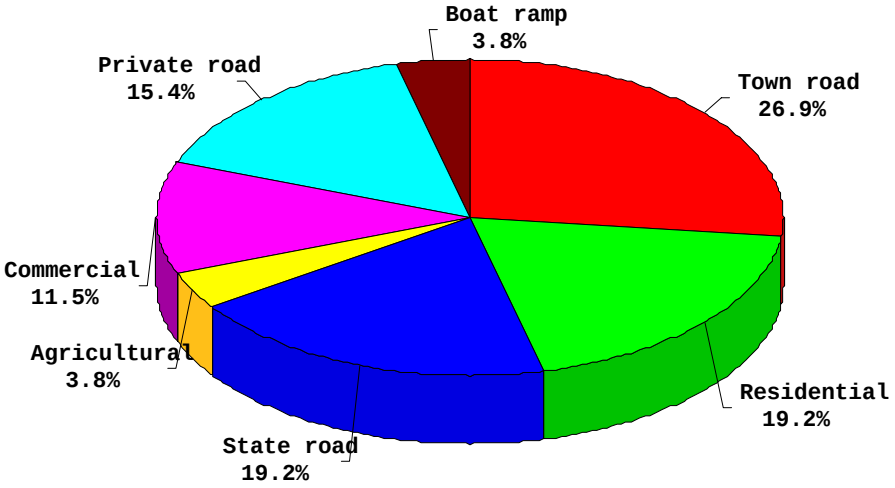


Figure 4.

Percentage of Problems by Type

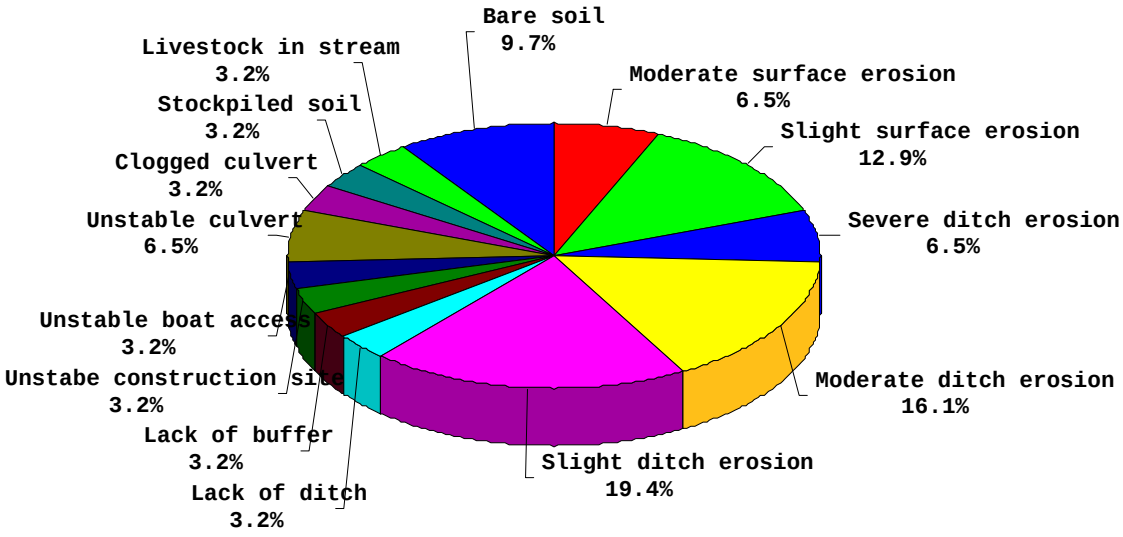
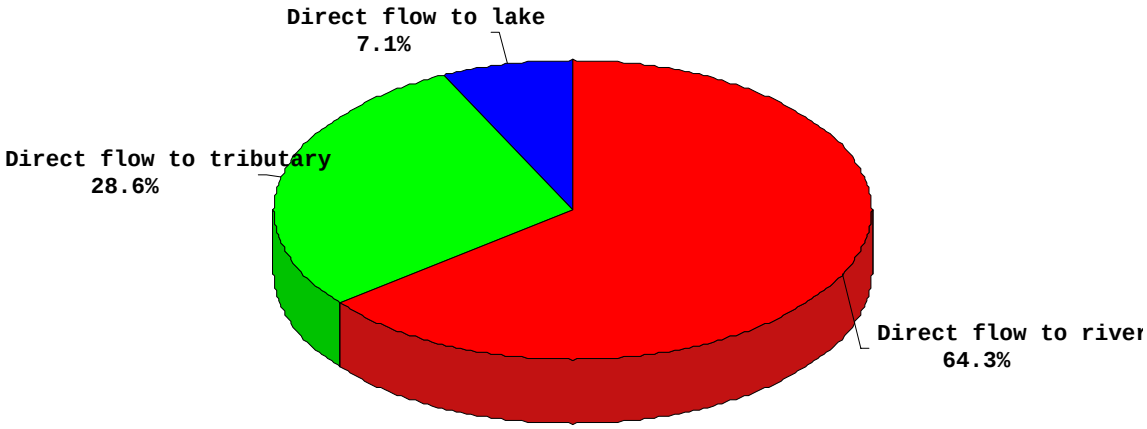


Figure 5.

Percentage of Problems by Point of Impact



It is interesting to note that 61.5% of the erosion sites found in the watershed survey are located on state, local or private roads. This is typical of many other watersheds across the state. Fortunately, most of the problems identified during the survey are of either low or moderate impact. Unfortunately, some of the problematic sites drain directly into the River. Many low impact erosion sources, when added together, can cause as much of a problem as one high-impact site, so all sites need to be fixed at some point. Problems found typically include road shoulder, ditch and surface erosion. Simple best management practices, that is, conservation measures that stop or prevent non-point source pollution or polluted runoff, can be used to correct the soil erosion problems the volunteers found. They include such simple activities as: seeding and mulching the sides of ditches, re-shaping road surfaces and ditches, stabilizing culvert inlets and outlets, armoring the steep slopes with heavy rock. More complicated problems would require more complex solutions, but we are fortunate that most problems found so far do not require expensive solutions. It is hoped that the Steering Committee will be able obtain additional funds in the next few years to assist in the correction of existing problems as well as conduct education at the town and individual level on the need for proper road construction and maintenance to prevent or minimize new ones.

All of the remaining 35.8% of problem sites appear to be fixable with the most basic best management practices: seeding or re-vegetating, or by simply not removing more vegetation. To a large degree simply getting grass, trees or shrubs to grow on areas of bare soil will stop the soil from eroding. This re-vegetation is especially important in areas within 250 feet of a stream or the River. The simplest solution is to let a shoreline area revert back to its natural state by merely not mowing or cutting. In many cases simply understanding and complying with the local shoreland zoning ordinance or consulting with the local Code Enforcement Officer before cutting trees and vegetation near the water can prevent problems from the outset.

Shoreline Survey

Fifteen (15) actual or potential sources of fecal coliform pollution were identified during these surveys, a list and details of which is included in Appendix V, and include:

- four (4) outhouses
- five (5) gray water pipes to shore
- one (1) failing septic system
- three (3) licensed overboard discharges
- two (2) year-round residences with undetermined waste disposal system

The Town of West Bath was sent a list of the identified potential problems on 14 August 2000 for review by the West Bath Shellfish Committee. Following additional on-site reviews and discussion with DMR staff, a letter was sent to the Towns of West Bath and Phippsburg on 18 January 2001 again listing the potential non-point pollution sources identified during the June 8th through July 19th, 2000 and outlining the steps that would have to be taken by the town municipal officers in order to have the areas reviewed for final determination of classification change. A second letter was sent to the Town of Phippsburg on 19 January 2001 summarizing water quality data for the Mill Pond area at Parker Head on the Kennebec River. Although this latter area is outside of the New Meadows River watershed, it is mentioned here simply because review and focus on this area was a direct result of interest expressed for closed shellfish flats in other areas of the town; the NMRWP effort served as motivation to review other areas of the municipality. The DMR continues to work with the towns to assist them in removing these sources.

Recommendation

Since qualified DEP and agency staff accompanied each of the volunteer survey team, no follow-up visits to the problematic sites was deemed necessary. With respect to specific actions taken on the identified problems, with only a few exceptions, all are of relatively limited severity and the towns have been informally made aware of the problems; none of the observed problems constitute violations of state law and consequently do not require enforcement action. Nevertheless, the towns, through community as well as individual efforts, should consider implementing best management practices to correct the problems to prevent their becoming more serious.

Table 2., on the following page(s), provides some suggested remedies to these observed problems and rates the remedies on the basis of both technical difficulty and cost. The NMRWP town-coordinators may wish to review these tables with the appropriate officials in their respective towns to determine the best course of action.

Table 2. Suggested remedies and level of technical difficulty and cost

Sector	Site	Type of Problem	Remedies	Technical Level	Cost
1	**1**	State or town road with moderate shoulder erosion with direct flow to New Meadows Lake; runoff discharges directly to Lakes.	Maintenance, new culvert, stabilize with rip-rap and re-shape edge of causeway.	Medium	Medium
	2	Bare yard, but relatively flat; slight surface erosion.	Vegetate bare ground.	Low	Low
	3	Severe ditch and shoulder erosion over a few hundred yards distance; discharge flows into wetland.	Erosion controls, re-shape road and/or ditch, waterbar, re-ditch.	Medium	High
	4	Slight to moderate ditch erosion along left side of road, northbound; direct flow to river.	Erosion controls, re-shape road and/or ditch, waterbar, re-ditch.	Medium	Medium
	5	Residential property with moderate to severe ditch erosion, bare soil, and unstable construction site; direct flow to tributary.	Re-shape road and ditch; seed and mulch.	Medium	High
	6	Residential property with bare soil, unstable construction site; random excavations.	Vegetate bare ground; seed and mulch.	Low	Medium
	7	Agricultural property with stockpiled soil; farm pond with soil mound in center; potential for livestock in stream although no direct evidence, no obvious erosion, but potential exists	Other: agricultural Best Management Practices (BMPs)	Undetermined	Undetermined
2	**1**	State-assisted town road with slight shoulder erosion, ditch erosion and poor shaping.	Seed and mulch; re-ditch.	Medium	Medium
	2	Commercial property with large parking area; debris, gravel from paved area; direct flow to river.	Maintenance.	Low	Low
	3	Slight surface erosion, unstable culvert I/O, poor shaping; direct flow to tributary.	Stabilize culvert I/O; new surface material, re-shape road and/or ditch.	Medium	Low
	4	Severe ditch erosion, moderate surface erosion; direct flow to river.	Seed and mulch; rip-rap and gravel parking area.	Medium	Medium

Table 2. Suggested remedies and level of technical difficulty and cost (Continued)

Sector	Site	Type of Problem	Remedies	Technical Level	Cost
3	**1**	Unstable town-owned boat ramp, boat access.	Pave boat ramp.	Medium	High
	2	Town/private road with slight surface erosion, moderate shoulder erosion, slight ditch erosion, poor shaping; direct flow to river.	Pave; new surface material.	High	High
	3	Town/private road with slight surface and ditch erosion; eroding culvert.	Maintenance; stabilize culvert I/O.	Medium	Low
	4	Town road with direct culvert discharge to river.	Test for fecal coliform and VOCs.	Undetermined	Undetermined
	5	Town road with six (6) unstable, clogged I/O culverts or direct run-off.	Maintenance and erosion controls; new culvert.	Low	Low
	6	Town road with slight ditch erosion; sandy discharge direct to river.	Street sweeping.	Low	Low
	7	Residential property with slight shoulder erosion; direct discharge to river.	Maintenance and erosion controls, hay bails; rip-rap; new culvert.	Low	Low
4	**1**	Private road with moderate surface erosion discharging directly to river.	New surface material, waterbar, diversion, box culvert.	Medium	High
	2	Commercial property with storm water detention pond towards top of gully; unstable construction site with lack of buffer; direct flow to tributary.	Vegetate bare ground; rip-rap, seed and mulch; new slope.	High	High
	3	State road with moderate shoulder erosion; direct discharge to tributary.	Install sedimentation basin; rip-rap.	High	High
	4	State road with moderate shoulder erosion; direct discharge to tributary.	Rip-rap.	Medium	Medium

Discussion and Project Evaluation

The identification of forty-one (41) potential non-point pollution sources within the limited watershed and shoreline area covered by the surveys within a very brief period of time suggests that such efforts can be extremely effective may be worth pursuing and expanding in the future. However, several problems were identified that would need to be corrected before the training-survey process can be truly effective.

First, recruitment of volunteers proved far more difficult than initially anticipated. As mentioned earlier, this may be simply related to the level of commitment of the town organizer/coordinator and the amount of time that is devoted to recruitment. Nevertheless, recruiting volunteers and ensuring their continued interest in the project is time-intensive. In our case, the recruiting effort was successful in only one community. Yet despite the initial success with recruiting and strong participation in the training sessions, attempts to involve volunteers in surveys subsequent to the initial training surveys proved essentially impossible. As a result, no other shoreline surveys were conducted in either West Bath or any other NMRWP municipality. Although advertised as survey opportunities, the shoreline surveys along the West Bath and Phippsburg shores were conducted solely by DMR staff with the exception of two occasions, one when two volunteers accompanied the DMR staff and a second when a volunteer provided transportation out to Williams Island. In both of these cases it became clear that more than one field training session is needed to adequately prepare volunteers for shoreline surveying. The volunteers need more experience in order to overcome 1) their lack of confidence in understanding exactly what is being observed, 2) their apprehension about trespassing onto private property, and 3) the fact that in many cases community volunteers know property owners personally and do not wish to be placed in the position of having to report on their neighbors' potential problems or violations.

The first of these would be relatively easy to solve through additional training and in-field experience, however, the other two may be far more difficult to resolve. Certain agents or officers of the state have the advantage of both authority and impartiality. Authority to cross private property might be granted to volunteers or other state agents through official delegation by the elected body within the municipality in the same way contractors working on behalf of a municipality, *e.g.* wetlands delineation and natural resource inventories, are granted such authority in pursuit of their work. Indeed, experience with volunteer watershed surveys elsewhere in the state has shown that only 1% to 2% of landowners object to having volunteers on their property. Nevertheless, even when granted authority, volunteers may still be reluctant to cross private property out of respect to their neighbors and/or friends. But these problems aside, there are inherent differences between the shoreline and watershed surveys that raise questions regarding the rationale for and appropriateness of involving volunteers in these processes.

DMR shoreline surveys are conducted in fulfillment of the compliance requirements of the FDA-administered National Shellfish Sanitation Program (NSSP) that has been developed to protect the public against the risks of shellfish-borne diseases. Although water quality sampling is often believed to be the centerpiece of the program, the shoreline surveys are equally important, for they reveal potential pollution sources that may remain undetected by water sampling alone. As a consequence, the DMR relies heavily on the accuracy of the shoreline surveys to meet its obligation to the NSSP and protect public health. Therefore, when a volunteer survey of an area is conducted, the DMR feels the need to have a member of its staff either present during the survey or revisit the area covered by a solely volunteer survey. In view of the responsibility carried by DMR, this verification step certainly seems reasonable, but the need for verification appears to diminish the value of volunteer shoreline surveys. Despite this, there are undeniable indirect benefits to volunteer participation in DMR shoreline surveys and there are other opportunities for volunteers to contribute, such as gathering background information from town records.

First, volunteers bring local knowledge of their shoreline areas to the survey process that saves the DMR staff time in the field. There is also the potential for future volunteers to be trained to gather data such as tax maps and property addresses at their town offices that will be extremely valuable to DMR staff. Second, volunteers become educated on the potential public health risks posed by non-point source pollution, particularly human and animal waste, and why correction of existing problems is so vitally important. The volunteers, thus, represent a core of informed individuals within the community who can disseminate information to the larger community, respond to questions raised within the community, and apply necessary pressure on elected officials to pursue pollution avoidance and abatement. Third, the formation of a core of volunteers signals interest on the part of the community and therefore draws the attention of DMR, often bringing DMR staff into the community. This, in turn, tends to elevate the priority of the community in a nearly overwhelming workload for DMR, thereby improving the likelihood of a timely response by DMR.

Watershed surveys, while equally important, tend to focus principally on environmental, *i.e.* ecological, impacts rather than public health risks. This is certainly not to say that environmental impacts do not carry public health risks, for obviously they do, however, these usually tend to be less immediate and consequently less urgent. Although accuracy and completeness are still necessary, the immediate implications of the results of a watershed survey, *e.g.* identification of potential or existing sedimentation or nutrient loading, are generally less severe than those of a shoreline survey. Furthermore, watershed survey observations require less technical training than detection of subtle evidence of failed septic systems, hidden “straight pipes, or gray water discharges. In view of this, the watershed survey appears to be the more appropriate effort in which to encourage volunteer participation. As already stated, perhaps the most important indirect benefits of volunteer participation in watershed and shoreline surveys is the opportunity offered to participants to become educated on existing and potential problems and the threats these pose.

On-going Efforts

The NMRWP has recently been awarded a second grant to continue the work of the NMRWP SC and develop a State of the River report that will serve as a baseline document to summarize current conditions along the river and assist in the identification of existing and potential problem , *i.e.* susceptible, areas. This report is scheduled for completion in December 2001. The NMRWP has also applied for a third grant to continue and complete the watershed and shoreline surveys along the entire New Meadows River estuary.

In addition, the NMRWP has also been awarded other grants to further the developments of its long-term Strategic Plan and improve communication between the SC and the individual participating towns and the watershed community. Indeed, the highest priority of the NMRWP Steering Committee's long-term strategic plan is to educate both the members of the SC and the public on these issues.

Educating the public about the state of the river should be an ongoing concern of the Steering Committee (SC) and of other groups with an interest in the quality of the river and its environment. There should be a continuing focus on the need to reduce/eliminate both point and
non-point sources of pollution, and on best practices for their control and/or prevention. . To these ends the SC should:

- Continually update, expand and promote the NMR web site;
- Sponsor annual (or more frequent) community events, such as the "Chowder Fest" held in l999 at the New Meadows Inn to inform the public of NMRWP activities;
- Provide the local press with releases describing NMR activities;
- Make recommendations to the towns' Conservation Commissions and other appropriate committees and commissions and request their public endorsement of NMRWP recommendations. This might include endorsement of pending town statutes (such as the recent Town of Brunswick's Commission's vote on revision of the Costal Protection Ordinance);
- Create materials for broadcast on community cable TV channels;
- Develop a large scale relief map of the watershed, as proposed by the SC's Education Task Force, for use in schools and at community events;
- Produce a State of the River report, with annual up-dates, for distribution at places frequented by tourists (motels, B&Bs, marinas, restaurants, etc);
- Develop programs for the schools (essay contests, science fair awards, field trips, demonstrations, e.g. relief map) to involve children from an early age.

In the interest of meeting the dual objectives of increased public education and participation in watershed management, the SC may wish to entertain the idea of sponsoring a Watershed Remediation Day during which volunteers could participate in correcting those problems requiring low technical expertise and cost, *e.g.* seeding and mulching areas of erosion. Such an event would allow for hands-on involvement of the public in problem resolution and offer the opportunity to broaden understanding of contamination and pollution sources and their consequences. Cost of such an event should be minimal since most of the tools and materials necessary for such work are readily available and inexpensive; any specialized tools might be provide by the respective towns in which the work was being conducted.