

2004

New Meadows River Watershed Management Plan

New Meadows River Watershed Project Steering Committee

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New Meadows River Watershed Management Plan



Prepared by:

New Meadows River Watershed Project Steering Committee

With assistance from:

Resource Services

Cumberland County Soil & Water Conservation District

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New Meadows River Watershed Project Steering Committee:

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The following groups provided comments and input during the creation of the plan:

Town of Bath Planning Board
Town of Brunswick Town Council
Town of Harpswell Selectmen
Town of Phippsburg Selectmen and Shellfish Commission
Town of West Bath Selectmen and Shellfish Commission

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THE NEW MEADOWS RIVER WATERSHED PROJECT

Founded in 1999, the New Meadows River Watershed Project is a collaborative effort of the municipalities of Bath, Brunswick, Harpswell, Phippsburg, and West Bath.

Other partners include:
ME State Planning Office
ME Dept. of Environmental Protection
ME Dept. of Marine Resources
U.S. Environmental Protection Agency
Casco Bay Estuary Project
Friends of Casco Bay
New Meadows Lake Association
Bowdoin College



http://academic.bowdoin.edu/new_meadows/

The mission of the New Meadows River Watershed Project is to protect, improve and maintain the vitality of the ecological and economic resources of the New Meadows River and its watershed.

INTRODUCTION

The New Meadows River Watershed Project was initiated in 1999 in order to conserve and protect the resources of the New Meadows River Watershed. Impetus for formation of the group came from two events. The first was a massive die off of menhaden (pogies) that occurred in the river in 1991. The low oxygen levels that triggered the kill raised concerns that excessive nutrients were leaching into the river. The second event was the proposed expansion of Brunswick's Coastal Protection Zone, limiting septic systems and other sources of nutrient pollution in the watershed of Middle and Maquoit Bays. In considering the application of such a



regulatory approach to the New Meadows, it was recognized that 1) it triggered an intense local debate, 2) there was little data on the structure, function and health of the New Meadows River on which to base such an effort (i.e. septic systems or nutrient pollution may not be the key issues in the New Meadows), and 3) a collaborative approach among the five communities making up the watershed was needed in order to afford meaningful protection to the New Meadows. As a result, the New Meadows River Watershed Project was launched.

Efforts to date have included an assessment of water quality, remediation of shellfish harvesting areas, surveys of nonpoint source pollution sites, and public outreach. In 2002, the Project Steering Committee completed a strategic plan to provide direction for project activities. The development of a watershed management plan was identified as a key action in the strategic plan.

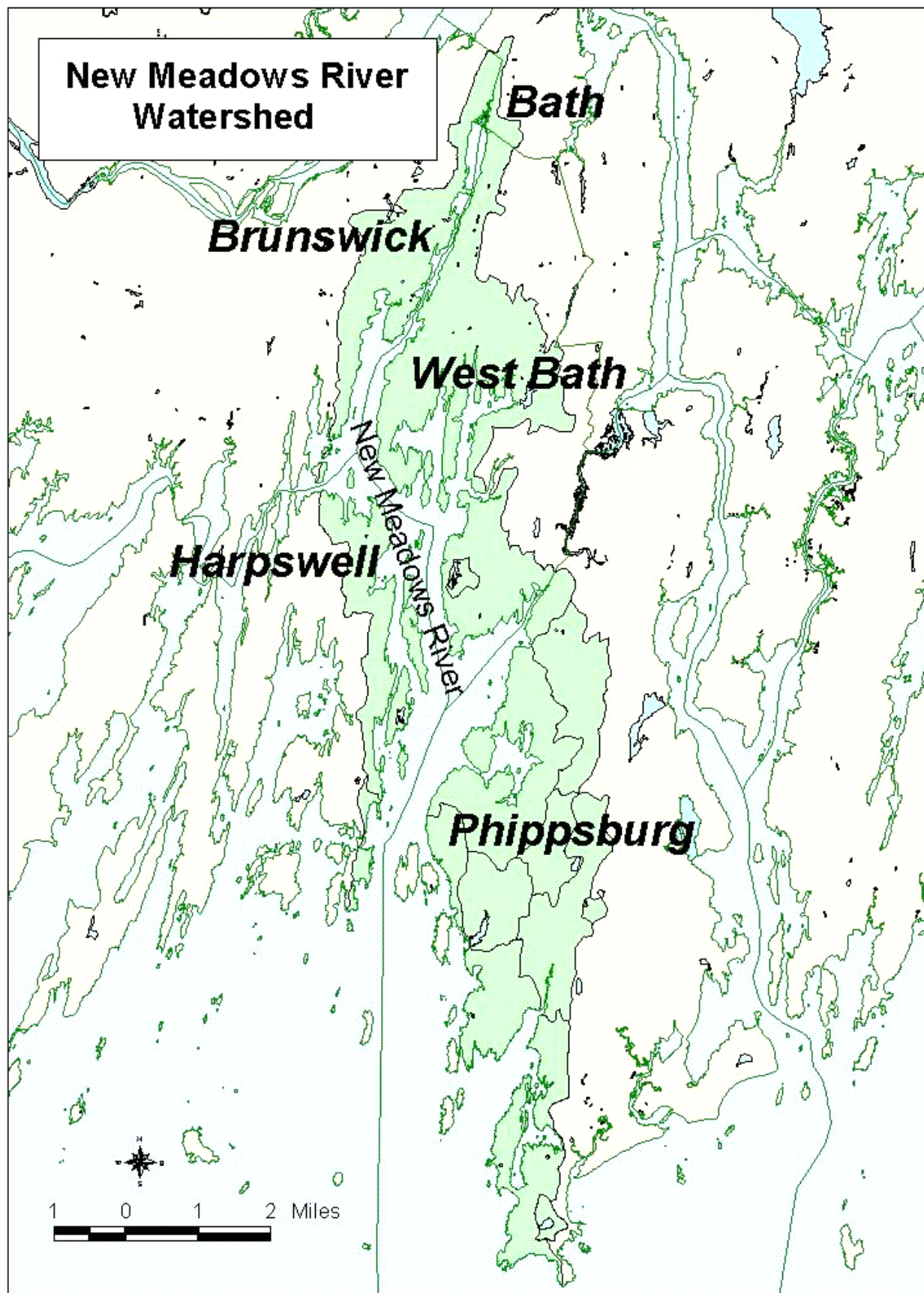
What is a Watershed Management Plan?

A watershed management plan describes a comprehensive approach to protecting the water quality of a lake, river or estuary. In Maine, watershed management plans are defined by statute and must address indicators of water quality, patterns of land use, existing sources of pollution, and tools for remediation in order to be accepted by the Maine Department of Environmental Protection. Watershed management plans are developed with the input of stakeholders in the area and require outreach to residents and landowners in the watershed. This management plan has been developed in collaboration by the partners of the New Meadows River Watershed Project to protect the invaluable resource of the New Meadows River.

WATERSHED

All the land that surrounds a waterbody that drains or sheds its water into the waterbody through streams, ditches, over the surface or through groundwater.

The New Meadows River Watershed covers 26 square miles.



THE WATERSHED

The New Meadows River watershed covers 26 square miles in Cumberland and Sagadahoc counties, and is located in the towns of Bath, Brunswick, Harpswell, Phippsburg, and West Bath. The New Meadows River drains south into Casco Bay. It is a significant recreational and economical resource to the region. A public boat launch and marina are two examples of public access to the River, and locations such as the Basin in Phippsburg are considered havens for boaters. The River supports extensive finfish, shellfish, and lobster fisheries. This high productivity is evident in the production from the New Meadows River flats which, over the past four years, accounted for 7.5% of the total soft-shell clam production for Maine.



In an earlier geological era, the New Meadows River was an outlet of the Androscoggin River. With the Androscoggin now flowing to the ocean via Merrymeeting Bay and the Kennebec River, the New Meadows has little fresh water input. Hence, it is an embayment of the ocean rather than an estuary or river. The rise of sea level since the last ice age has completed the transformation of the New Meadows from an estuary to a marine environment. Like the Kennebec, Damariscotta and Sheepscot Rivers, the New Meadows River is now considered a drowned river valley. The so-called "lakes" are extensions of the marine embayment, maintaining near oceanic salinities.

With very little freshwater inflow, the watershed of the New Meadows is limited to the land area generating local, surface run off. The watershed encompasses only 26 square miles, a small area for a waterbody of considerable size and importance. While the total population of the five municipalities surrounding the New Meadows is close to 40,000, the number living in the watershed of the New Meadows is probably less than two thousand. The relatively small size and undeveloped nature of the New Meadows River Watershed makes it an excellent candidate for environmental restoration and protection.

Town	% of Watershed
Bath	1%
Brunswick	11%
Harpswell	9%
Phippsburg	46%
West Bath	33%
Total	100%

The most significant man-made impact on the New Meadows River was the erection of a partial barrier to tidal flow at the point where Bath Road crosses the river at the boundary of West Bath and Brunswick. The barrier, in place since 1937, has limited tidal range in the lakes to inches instead of feet. The construction in the 1960s of the Route 1 causeway in the same two towns, creating two lakes from what had been one, was a second significant alteration of the waterbody. Although these water bodies are referred to as "lakes" and they have little tidal range, they exhibit salinities on a par with the ocean and are not true lakes.

The rocky shores of the river limited construction of in-ground septic systems for many shorefront houses. Overboard discharges, out-houses and straight pipes have caused hundreds of acres of shellfish habitat to be closed to harvesting. Today, continued development of the watershed poses the greatest threat to environmental quality in the New Meadows River and its lakes.

Both quahogs and soft-shelled clams are harvested commercially in the New Meadows River. In addition, American oysters are raised at two aquaculture sites. Two hundred twenty commercial diggers are licensed to harvest shellfish in the New Meadows River. The harvest of wild shellfish from the New Meadows River is estimated to account for approximately 8% of total shellfish landings in the state annually (the value of aquaculture in the New Meadows is unknown). The direct value to the diggers of this harvest is estimated to be \$1,340,000 annually. Considering post-harvest activities such as shucking, transportation, retail and restaurant sales, the total economic benefit to the area is estimated to be \$3,300,000 to \$4,000,000 annually.

The shellfish industry provides jobs and significant economic activity. A vibrant shellfish industry is viewed as an indicator of a healthy ecosystem. As a result, the Project has made restoration and maintenance of shellfish flats a high priority. The Project has promoted the removal of a number of pollution sources, resulting in the opening of several hundred acres of productive shellfish habitat. Of particular note, the Project facilitated a series of meetings with municipal officials and staff of the Departments of Environmental Protection and Marine Resources that paved the way for opening the Brigham's Cove shellfish flats, on the east shore of the river, in 2002. This area had been closed for many years; its reopening was a high priority for the communities of West Bath and Phippsburg. A significant amount of shellfish growing area remains closed or is conditionally open. Information describing the remaining closed areas in the New Meadows is included as Appendix 1.



WATERSHED MANAGEMENT PLANNING

The Planning Process

In 2002, the New Meadows River Watershed Project received a Non-Point Source 319(b) grant from the Maine Department of Environmental Protection for the purpose of developing a watershed management plan. Anne Hayden, of Resource Services and Mary Gilbertson, of the Cumberland County Soil and Water Conservation District were hired to manage the process.

As a first step, a number of model watershed management plans, recommended by the Maine Department of Environmental Protection and the U.S. Environmental Protection Agency, were reviewed to provide the New Meadows River Watershed Project Steering Committee with a sense of what a successful plan might look like. In January 2003, members of the steering committee participated in a workshop put on by the Maine Department of Environmental Protection regarding non-point source pollution control projects. The workshop covered watershed management planning as well as technical and financial assistance services provided by the Department. Another resource was a survey of environmental officials in New England, conducted by the U.S. Environmental Protection Agency, regarding their opinion of what makes a good watershed management plan.

Key Events in the Development of the Watershed Management Plan

1998	Casco Bay Estuary Project assessed impact of overboard discharges on shellfish harvesting areas
1999	New Meadows River Watershed Project initiated
2000	Upper Watershed Survey conducted
2002	<i>State of the New Meadows River</i> completed
2002	Strategic Plan finalized
2002	Lower Watershed Survey conducted
2002	Watershed Management Plan initiated
2003	Outreach conducted in five New Meadows towns
2003	Boat Tour held with municipal officials

Setting the Scope

To set the stage for the watershed management plan, a presentation was made to the Steering Committee in February 2003 regarding a description of what watershed management planning typically entails, state standards for watershed management plans, examples of plans, and a range of topics that a plan for the New Meadows River Watershed might encompass. The latter were drawn from discussions at Steering Committee and subcommittee meetings, as based on a review of meeting minutes. The Steering Committee set an ambitious scope for the Watershed Management Plan, choosing to address several issues in addition to those mandated by the state.

State requirements include:

- ⇒ Water quality assessment,
- ⇒ Inventory of land uses and non-point sources of pollution,
- ⇒ Evaluation of other sources of pollution,
- ⇒ Determination of Best Management Practices,
- ⇒ Implementation strategy,
- ⇒ Outreach to landowners, and
- ⇒ Evaluation and funding strategy.



The Steering Committee also chose to address:

- ⇒ Review of local and state nonpoint source programs,
- ⇒ Limiting nonpoint source pollution from future development,
- ⇒ Coordinating control of non-point source pollution with open space and comprehensive planning,
- ⇒ Review of restrictions to tidal flow,
- ⇒ Opportunities for inter-municipal coordination, and
- ⇒ Community outreach.

Local Outreach During Development of the Plan

The Steering Committee put a lot of emphasis on ensuring that input to the plan development process was received from the affected municipalities as well as other stakeholders and the general public. A Plan Development Outreach Strategy was initiated in April 2003. Most of the action items were completed by the end of June. They included:

- ⇒ Presentations to municipal officials in each of the five watershed communities. Input was requested, and received, regarding each community's interest in the project as well as suggestions for an effective watershed management plan.
- ⇒ A boat tour of the New Meadows River for municipal officials. Eight municipal officials participated along with two reporters and several members of the Steering Committee who provided commentaries regarding Project goals as well as achievements to date. The itinerary included several points of interest, including newly opened shellfish flats, several examples of nonpoint sources of pollution, the location of a failing septic system that is holding up reclassification of another shellfish area, and the site of a tidal restoration project at Dingley Island.
- ⇒ A new brochure for the project was produced by students from Bowdoin College. The brochure updates the insert prepared in 2002 for the Times Record.
- ⇒ The web site (http://academic.bowdoin.edu/new_meadows/) has been updated to include a description of the watershed management planning process.
- ⇒ Finally, the draft Watershed Management Plan was posted on the Project web site and public comments solicited.



During the process of drafting the Watershed Management Plan, the Steering Committee has discussed the plan at five meetings and various subcommittees have discussed the plan at a minimum of six meetings. These meetings have been an instrumental and effective means of ensuring that the plan is being developed with thoughtful input and disciplined oversight.

The watershed management plan encompasses the mission of the New Meadows River Watershed Project with five objectives and several specific actions:

MISSION

To protect, improve and maintain the vitality of the ecological and economic resources of the New Meadows River and its watershed.



Objectives

1. Eliminate or reduce existing sources of polluted runoff, and prevent future problems from occurring.
2. Improve the productivity of shellfish harvests in the New Meadows River by eliminating sources of pollution, including overboard discharges, pursuing reclassification of shellfish harvesting areas from closed to open, and promoting improved management practices.
3. Conduct research and monitoring to better understand the ecological and economic dynamics of the New Meadows River Watershed system, including the effect of tidal barriers.
4. Broaden public awareness of the New Meadows River and its watershed and expand involvement in the Project. Build consensus among the New Meadows River communities regarding watershed management and stewardship.
5. Promote the effectiveness of the New Meadows River Watershed Project by maintaining the collaboration among existing partner organizations and fostering new opportunities for growth.

ASSESSMENT OF ENVIRONMENTAL QUALITY

Water Quality Assessment

Chris Heinig, a marine scientist under contract to the New Meadows River Watershed Project, conducted a thorough review of the water quality data collected through 2001. Heinig's findings are included in *State of the New Meadows River*, a report completed in April 2002. This report, prepared with funding from a nonpoint source 319(b) grant from the Maine Department of Environmental Protection, served as the basis for development of the Watershed Management Plan. In short, *State of the New Meadows River* describes water quality as "good to excellent" throughout much of the lower river, but "significantly challenged" in parts of the upper river and lakes.

Data collected since 2001 provides further evidence that the upper reaches of the river, as well as the lakes, are severely eutrophic. In other words, these areas exhibit higher than expected levels of nutrients. Recent studies include long-term, unattended monitoring at a number of sites throughout the estuary, intensive data collection to assess dissolved oxygen levels in the "deep hole" of the lower lake and nutrient exchange between the lakes and the upper river (See Appendix 2 for sample sites), and two separate sediment analyses. The first of these sediment studies was undertaken in 2002, and included total organic carbon, along with organics and metals. During the summer of 2003, a study of sediment oxygen demand and total organic carbon was conducted by the U.S. Environmental Protection Agency.



The "deep hole" in the lower lake undergoes significant stratification. In other words, the warmer layer water does not mix with a deeper, colder layer. This stratification contributes to a complete loss of oxygen in the "deep hole." Nutrient levels are much higher than expected and may contribute to the extensive algal blooms that occur in these areas. As a sink for dead phytoplankton and other organic materials, and with little apparent flushing, the "deep hole" may generate its own low oxygen events. This is supported by the fact that the dominant form of nitrogen is ammonium, and not nitrate, suggesting a recycling of nutrients within the "deep hole." The upper river exhibits similar characteristics. Further down river, nutrient and chlorophyll concentrations are much lower, and nitrogen is found predominately as nitrate.

So, what is all this research telling us? The conditions found in the lower river are on par with many other regions of Casco Bay and are considered healthy. However, the levels of dissolved oxygen and nutrients and chlorophyll in the upper river and the lakes are indicative of an extremely challenged system. When compared to other regions in Casco Bay, as well as with other northeastern embayments, the upper New Meadows really stands out as a degraded area. More work is necessary to learn why this part of the New Meadows is so unhealthy. This is important because this region has experienced fish kills in the past, and these degraded conditions could potentially lead to additional kills or their adverse consequences.

Concentrations of toxic metals and chemicals in lobsters, mussels, and sediment are low in much of the river and lake, with the exception of one sediment study site in the lower lake. At this location, concentrations of both low and high molecular weight polycyclic aromatic hydrocarbons are higher than at almost all other sites in eastern Casco Bay. Although accumulation in sediments of toxic compounds has been documented, the effect of such contamination is unknown.

The *State of the New Meadows River* contains an assessment of shellfish flats in the area, a substantial portion of which is closed to harvesting due to bacterial contamination. The New Meadows River Watershed Project has focused attention on this issue and promoted the removal of a number of pollution sources, resulting in the opening of several hundred acres of productive shellfish habitat.



Land Use

Land use in the New Meadows River Watershed is described in the *State of the New Meadows River*. In general, land use in the area is low-density residential development, and open space, with small amounts of agriculture and commercial development. Larger developments include the Cook's Corner retail center, MidCoast Hospital, and the Bath Iron Works Harding Plant, all in Brunswick.

Sarah Fick, a Bowdoin College student, collected land use information in geographic information system (GIS) format. Two other volunteers added to the database during the summer of 2003. Additional information has been collected on other potential sources of GIS-based land use data.



Soils

The soil types and slopes in the watershed have important implications for water quality. Land areas with steep slopes (greater than 15-20%), or poorly drained soils, are less likely to absorb or retain polluted stormwater runoff from developed or disturbed areas before it reaches the New Meadows River. Steep slopes have a greater potential for soil erosion. Specific soil types and slopes are highly variable throughout the watershed. Planning decisions for development in the watershed should be based on site-specific soil and slope analysis. A description of local soils are described in detail in Appendix 3.

Inventory of Nonpoint Source Pollution Sources

The watershed was surveyed for nonpoint source (NPS) pollution. Sites were evaluated using a number of criteria, including size of the problem, proximity to a water body, topographic factors (slope, groundcover, etc). The individuals assessing each site used these criteria and professional judgment to determine the impact of each surveyed site on the New Meadows River.

In total, 92 discrete sites experiencing soil erosion problems were identified during the two watershed surveys. The upper river watershed (located in Bath, Brunswick, and West Bath) was surveyed in 2001 and 20 sites were identified. They are described in the survey report: *New Meadows River Watershed and Shoreline Surveys*. In 2002, the lower river watershed (located in Harpswell and Phippsburg) was surveyed; 72 sites were identified. They are described in the survey report: *New Meadows River Lower Watershed Survey Report*. The reports describe the individual sites and prioritize them. Furthermore, recommendations for appropriate conservation practices, as well as the level of technical expertise required to address the problem and an approximate cost for mitigation are included. Appendix 4 further describes this process.



NONPOINT SOURCE POLLUTION



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

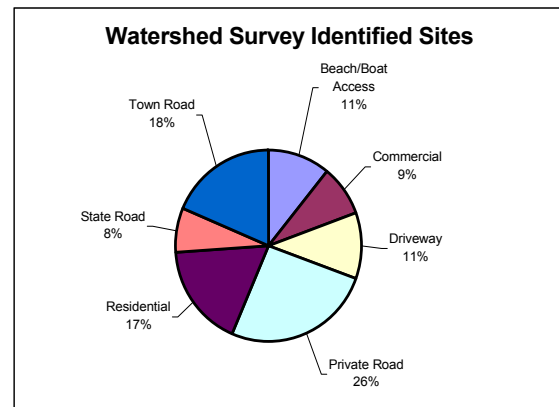
One way to visualize NPS pollution is to think of rain and snow melt as a giant broom that sweeps over the watershed, moving debris and soil into the river from the surrounding land and streams.

Determination of Best Management Practices

Best Management Practices were identified for each of the 92 non-point source sites described in the survey reports. A detailed listing of site-specific recommendations can be found in the two watershed survey reports, and condensed tables of recommendations are listed in Appendix 5. Figure 1 summarizes the types of problems that were identified in the two surveys.

FIGURE 1.

The contribution of roads to NPS problems, and to water quality pollution is well-documented. Unstable road surfaces, eroding ditches, and improperly stabilized and sized culverts create the potential for water quality pollution each time it rains. Just over half of the total problem sites (52%) identified through the watershed surveys were linked to road sites. Many existing road problems could be fixed by routine maintenance and the application of conservation practices.



The following categories describe the major types of NPS pollution found in the watershed:



TOWN AND STATE ROADS - The training of state and town road crews in conservation-friendly road maintenance and upkeep practices, along with consistent application of best management practices throughout the watershed can result in a considerable reduction on NPS loading to the New Meadows River.

PRIVATE ROADS - Private roads comprise approximately $\frac{1}{4}$ of the total sites identified in the watershed surveys. Problems were associated with the chronic issues of old, poorly maintained road surfaces and unstable drainage patterns. Very often residents on private roads rely on quick and inexpensive remedies for annual washouts and other recurring problems. Property owners on private roads should be encouraged to organize road associations and seek technical assistance for long-term solutions. Often times, a well-planned investment up front will reduce overall maintenance costs, and can lower the cumulative impact on the New Meadows River.





RESIDENTIAL/DRIVEWAYS— As with most of southern Maine, residential development in the New Meadows River watershed is a fast growing land use. Many of the sites identified by the surveys were ranked as medium or low impact sites. However, the cumulative impact of small problems can have a much larger impact on water quality than the more obvious, large problem. Furthermore, smaller sites are frequently overlooked with addressing NPS issues.

Often landowners need individualized attention to tailor Best Management Practices to meet their own needs. While this task may seem daunting, it is vital to educate landowners how their own actions may either harm or help maintain the resource of the New Meadows. Additionally, those living further away from the river may not realize how their actions also impact the River. It is critical that efforts be made to educate and inform property owners about the importance of stabilizing soils and maintaining buffers. The Maine DEP and local County Soil and Water Conservation Districts can be utilized as resources in developing and implementing educational efforts.

COMMERCIAL SITES - Commercial sites identified in the survey exhibited many similar problems to residential sites. Many sites experienced eroding ditches and unstable culverts. Simple steps can be taken to ensure a reduction in NPS pollution, including the addition of rip-rap at culvert inlets and outlets to minimize sloughing of soil. Additionally, the proper maintenance of roads and driveways can reduce the long-term cost of repair. Businesses who excel at good conservation practices could be recognized.



WATER ACCESS - The ten water access sites ranged in severity from bare soil and moderate shoulder erosion to severe surface and ditch erosion that discharged directly into the New Meadows River. As is the nature of boat and beach access, a direct path is often created for people, as well as polluted runoff, to enter the water. The key in this situation is to install diverters to move the majority of runoff into stable buffers or other areas to minimize soil movement. Additionally, the surface itself can be reinforced using a variety of methods, such as the installation of interlocking paving blocks.

In addition to the surveyed sites, numerous waterfront properties were observed to have little or no vegetated buffer at the water's edge. It is important to note that buffers of shrubs, trees, and groundcover do a much more effective job than bare ground or grass to keep NPS pollution from entering the New Meadows River. There are a few large tracts of undeveloped land remaining in the watershed. The value of these areas to water quality, as well as corridors for habitat, is tremendous.

VEGETATED BUFFER



Areas of vegetation, left undisturbed or planted between a developed area and a waterbody that are used to capture pollutants being transported in surface water. Buffer vegetation can include trees, shrubs, and ground cover plants that are planted, transplanted, or growing naturally.

Other Sources of Pollution

Although the surveys focused on soil erosion, other types of NPS pollutants may also result from developed land (as compared to undisturbed forested areas). Runoff from lawns, rooftops, driveways, and other features of developed landscapes also typically contain concentrations of other stormwater contaminants such as fertilizers, oil and gas residue, salts and biological pollutants.

Other potential or actual sources of pollution include sewage discharge from boats. In addition, concerns have been raised regarding contaminated run off from commercial sites on the east side of the lake. Although these sites have large areas of impervious surface, they do not have stormwater discharge permits. A proposal to build a fuel storage facility in West Bath has increased concerns regarding the need for more stringent siting requirements and effective enforcement of such commercial facilities.

Review of Local and State NPS Programs

At the state level, stormwater management is regulated under the Site Location of Development Law and the Stormwater Management Law. These laws regulate major projects that include 20,000 sq. ft. or more of impervious area or five acres or more of disturbed area in the direct watershed of a waterbody most at risk from new development. Elsewhere, projects of one acre or more of impervious area or five acres or more of disturbed area are regulated.

The New Meadows River has been designated by the Maine Department of Environmental Protection as a "coastal wetland most at risk from new development," so the more restrictive regulation applies. Development projects meeting the threshold are required to have stormwater management plans designed by registered engineers. Such plans must address both the quantity and quality of stormwater discharged from a site.



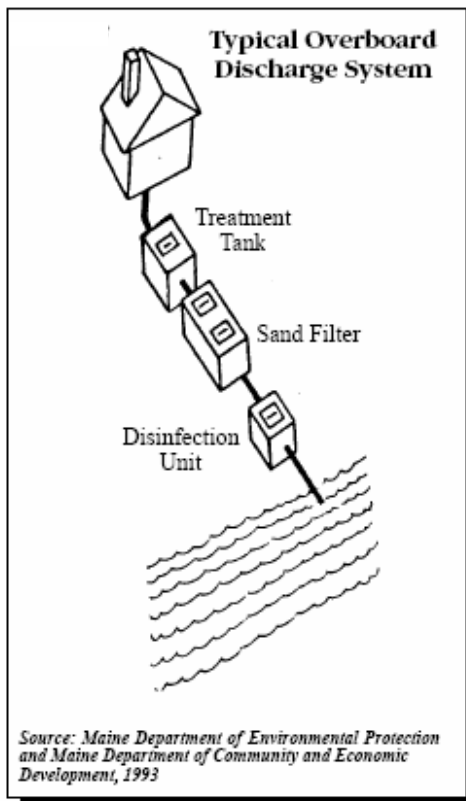
The Maine Department of Environmental Protection reviews these stormwater management plans to determine whether they will meet standards in the law for quantity control and pollutant removal, in order to minimize the impacts of stormwater on private and public property. An example of such a project within the New Meadows River watershed requiring a stormwater permit is the recently constructed MidCoast Hospital in Brunswick.

The federal government recently delegated authority for regulating stormwater to the State of Maine. The program is known as the Maine Pollutant Discharge Elimination System (MEPDES). The MEPDES regulates small construction activities that disturb between 1 and 5 acres of land. These small construction projects are addressed by a general permit which describes performance standards that are intended to provide a minimum set of standards for small projects. These standards are consistent with requirements that may be applied to larger projects under the Site Location of Development or Stormwater Management laws. This ensures that projects of any scale receive appropriate review.

Each of the five municipalities included in the New Meadows River Watershed have ordinances regulating the use and development of land within their communities. These ordinances include zoning, regulation of larger scale developments and subdivisions, and state-mandated shoreland zoning. In relation to non-point source pollution, these communities address stormwater run off, erosion and sedimentation. None of the five communities addresses nonpoint source pollution in the New Meadows on a watershed basis. Brunswick has a Coastal Protection Zone designed to limit nutrient loading, but it is limited to the watersheds of Middle Bay and Maquoit Bay. Although each community has ordinances addressing nonpoint source pollution, each takes its own approach. There is no collective effort to limit polluted runoff in the New Meadows River.

Removal of Overboard Discharges

Overboard discharges, permitted by DEP between 1974 and 1988 , are modified septic systems which were designed to replace straight pipes in areas with insufficient soils for a leach field. They partially treat wastewater prior to discharge to a receiving waterbody. In 1988, new overboard discharges were prohibited. Changes in the plumbing code, advances in wastewater technology, and the appropriation of state matching funds has allowed several overboard discharges in the New Meadows River to be removed.



Removal of overboard discharges that result in the closure of shellfish harvesting areas in the area, has been a focus of the project from its inception. The project has been successful in coordinating the efforts of municipalities, and the Maine Departments of Environmental Protection and Marine Resources, each of whom has an important role to play in effecting the removal of overboard discharges. The Casco Bay Estuary Project, with the help of Normandeau Associates and MER Corporation, identified 73 overboard discharges in the New Meadows River in Brunswick, Harpswell and West Bath. Of these, 32 were determined to affect productive shellfish areas. With the help of the Casco Bay Estuary Project, 27 of these systems have been replaced as of the end of 2003. Forty-six overboard discharges remain in the New Meadows; however, many of these discharge to non-shellfish areas and pose technical difficulties for removal. A map and summary of overboard discharges remaining in the New Meadows River Watershed are included in Appendix 1.

The new director of the State overboard discharge program met with members of the Steering Committee in June, 2003. Recent changes in the State's overboard discharge removal program, which took effect September 13, 2003, and state budget cuts will require a reconsideration of how best to pursue remediation of additional shellfish harvesting areas.

OVERBOARD DISCHARGE (OBD)

Modified septic system designed to replaced straight pipes in areas with insufficient soils for a leach field.

Regional Coordination

Coordination of municipal activities holds promise for increasing the effectiveness of environmental remediation and protection in the New Meadows River Watershed. Consistency in data collection will allow municipal data to be used in monitoring the status of environmental quality in the river and lake as well as in river-wide assessments of shellfish stocks. Coordination of municipal programs and regulations intended to protect environmental quality in the river will be more effective than continuing the existing piecemeal approach.



A preliminary meeting to discuss regional coordination was held in August, 2003. Municipal representatives from Brunswick, Bath, West Bath and Phippsburg discussed various approaches their communities take to protect water quality. They considered opportunities for improving efforts to restore and protect the New Meadows including development of a watershed district, review of single family home construction, requirement for review by Cumberland County Soil and Water Conservation District, contractor certification, limitations on lawns and impervious surface (such as in Brunswick's Coastal Protection Zone), consistent stormwater performance standards, joint workshops for road commissioners and public works employees, and joint funding of a New Meadows River Watershed Project Coordinator.

Coordination with Open Space, Habitat Protection and Comprehensive Planning

Non-point source Education for Municipal Officials (NEMO), a program designed to raise local awareness of stormwater, erosion and sedimentation issues, sponsored a presentation in Harpswell. More recently, a version of the NEMO presentation has been developed that focuses on coastal communities. Beginning with Habitat, a collaborative effort of state and federal agencies and environmental organizations to encourage habitat protection at the municipal level, sponsored presentations in Harpswell and West Bath. In all cases, efforts were made to tie the presentations to the goals of the New Meadows River Watershed Project.

Brunswick, West Bath, Phippsburg and Harpswell are all actively engaged in updating their comprehensive plans. Phippsburg and Harpswell have nearly completed their revisions. Brunswick and West Bath have just begun the process. Harpswell, well along in the revision of its comprehensive plan, has recently extended their efforts to allow for consideration of several issues, including the Liquid Natural Gas (LNG) plant. Only Brunswick has addressed open space planning. An open space plan was developed in 2002; implementation of the plan's goals, as they apply to the New Meadows River watershed, will further the goals of the Project.

Analysis/Management of River Flow

Thanks to the tremendous effort of Steering Committee member Elsa Martz, tidal flow was restored through the Dingley Island causeway in August, 2003 (see photos below). To assess the potential implications of restoring a greater degree of tidal flow between the upper river and the lakes at the barrier on Bath Road, the Army Corps of Engineers will conduct a comprehensive study beginning as early as spring 2004. The West Bath Shellfish Committee is also interested in restoration of flows between the river and Berry's Mill Pond in West Bath.



IMPLEMENTATION

Development of the Watershed Management Plan has included review of the Strategic Plan, adopted in August, 2002 by the Steering Committee. The goals and objectives of the Strategic Plan have been revised to reflect recommendations developed during the watershed management planning process. Some actions in the Strategic Plan have been completed and others deemed no longer relevant; these have been dropped. The revised objectives and the remaining actions items, some of which have also been revised, are incorporated in the Watershed Management Plan. The Watershed Management Plan will serve as the strategic plan for the New Meadows Watershed Project.

Outreach is the cornerstone of the New Meadows River Watershed Project, and is critical in building public awareness and a constituency for the Project's mission. Outreach efforts have included a Community Day event in 2000, production and distribution of an insert in the Times Record, and the creation of a web site.

With a successful boat trip for municipal officials in June, 2003, consistent reference in the Times Record, and publication of a new brochure, the Project has become adept at effective outreach. Future goals include reaching target audiences, such as the business community, school children, and recreational boaters.

Development of the Watershed Management Plan has lead to discussions by the Steering Committee of the need for ongoing staff support for the project. To date, the work of the New Meadows River Watershed Project has been accomplished by members of the Steering Committee, subcommittees, volunteers, municipal staff, and consultants hired on a grant-by-grant basis. Hiring an ongoing, part-time project coordinator or coordinating with a partner organization, such as Midcoast Council on Business Development and Planning, to provide program support will facilitate implementation of the Watershed Management Plan.

Performance Evaluation

The following performance measures will be used in evaluating the effectiveness of the Watershed Management Plan over the next 12 months:

- ⇒ There have been quantifiable improvements in water quality parameters, such as bacterial contamination.
- ⇒ Five (5) acres of shellfish areas have been reclassified to allow for increased harvesting.
- ⇒ Five (5) non-point source pollution sites have been remediated.
- ⇒ Two (2) overboard discharges have been removed.
- ⇒ At least 70% of steering committee members listed on stationary masthead participate at each steering committee meeting.
- ⇒ At least two (2) representatives from each municipality, one of whom is elected or appointed, have been active with the New Meadows River Watershed Project.
- ⇒ Each municipality is supporting the New Meadows River Watershed Project with annual financial contributions.
- ⇒ The New Meadows River Watershed Project has been referenced three (3) times in editorial or news content of the Times Record.
- ⇒ The New Meadows River Watershed Project has had a presence on local access television programming in Brunswick, Harpswell and Bath.
- ⇒ Progress has been made on all 16 high priority action items identified in the Watershed Management Plan.

Funding Strategy

Progress on the actions identified in the plan will be driven by the ability of volunteers to contribute time and energy to the project, the ability of the project to attract grant funds, and degree of coordination with partner organizations.

Databases of funding sources, such as that provided by the River Network (www.rivernetwork.org) should be analyzed for relevance to the implementation of the plan. In particular, the following programs should be considered as possible sources of funding. They include:

- ⇒ National Marine Fisheries Service's Community-based Restoration Program
- ⇒ NEMO grants program
- ⇒ Shore Stewards grants program
- ⇒ National Corporate Wetlands Restoration Partnership (a program of Coastal America)
- ⇒ Maine Department of Environmental Protection 319(b) grants program
- ⇒ Casco Bay Estuary Project grants
- ⇒ Municipal contributions

THE ACTION PLAN: **MISSION, OBJECTIVES, AND ACTIONS**

The action plan consists of a mission statement, five objectives, and specific actions for reaching each objective. Each action lists the subcommittees and/or partners that share the responsibility for carrying out each action. Priorities are assigned to the actions according to when they will be initiated.

Mission

To protect, improve and maintain the vitality of the ecological and economic resources of the New Meadows River and its watershed.

Objectives

1. Eliminate or reduce existing sources of polluted runoff, and prevent future problems from occurring.
2. Improve the productivity of shellfish harvests in the New Meadows River by eliminating sources of pollution, including overboard discharges, pursuing reclassification of shellfish harvesting areas from closed to open, and promoting improved management practices.
3. Conduct research and monitoring to better understand the ecological and economic dynamics of the New Meadows River Watershed system, including the effect of tidal barriers.
4. Broaden public awareness of the New Meadows River and its watershed and expand involvement in the Project. Build consensus among the New Meadows River communities regarding watershed management and stewardship.
5. Promote the effectiveness of the New Meadows River Watershed Project by maintaining the collaboration among existing partner organizations and fostering new opportunities for growth.

Action Plan

Objective 1: Eliminate or reduce existing sources of polluted runoff, and prevent future problems from occurring throughout the watershed.

Action	Schedule	Lead Organization	Partners/ Stakeholders	Cost Estimate
Priority: HIGH				
1. Prepare priority list of NPS sites and resubmit \$70,000 proposal for 319(b) funds to begin remediation of NPS sites. (\$46,000 match) <ul style="list-style-type: none"> • Approach towns to gauge interest in project. • Meet with DEP for guidance. • Update and resubmit proposal. 	2004/2005	Organization and Remediation Subcommittee, Town of Brunswick	Cumberland County SWCD, DEP, Bath, Brunswick, Harpswell, Phippsburg, West Bath	In kind services
2. Prepare analysis of municipal controls on stormwater, erosion and sedimentation, including recommendations for improving consistency and addressing gaps. Plan workshop for town administrators, planners and codes enforcement officers to consider proposals for regional coordination. <ul style="list-style-type: none"> • Inventory existing ordinances • Hold workshop to promote sharing of successful programs • Use Cumberland County Interlocal Stormwater Workgroup as example format. 	2004/2005	Town of Harpswell	Bowdoin College, University of Southern Maine, Bath, Brunswick, Harpswell, Phippsburg, West Bath	\$5,000
Priority: MEDIUM				
3. Work with the public works departments and volunteers on remediating selected local erosion/ flow obstructions.	2006/2007	Organization and Remediation Subcommittee		
4. Develop plan for remediation of pollution sources on private property.	2006/2007	Organization and Remediation Subcommittee		
5. Investigate actual or potential sources of pollution from existing commercial sites in West Bath (including sewage).	2006/2007	Organization and Remediation Subcommittee		

Objective 2: Improve the productivity of shellfish harvests in the NMR by eliminating sources of pollution, including overboard discharges, pursuing reclassification of shellfish harvesting areas from closed to open, and promoting improved management practices.

Action	Schedule	Lead Organization	Partners/ Stakeholders	Cost Estimate
Priority: HIGH				
1. Work with communities to review and identify local priorities for OBD removal based previous studies (Casco Bay Estuary Project, Normandeau Associates and DMR—Appendix 2).	2004/2005	NMRWP Steering Committee, Town of Brunswick	CBEP, FOCB, DMR, DEP, shellfish committees, Code Enforcement Officers, town representatives on the NMRWP steering committee	In kind services
2. Provide assistance to municipalities regarding state funding programs and procedures to expedite OBD removal. (Using Brigham's Cove effort as a model).	2004/2005	NMRWP Steering Committee, Town of Brunswick	Brunswick, Harpswell, Phippsburg, West Bath	In kind services
Priority: MEDIUM				
3. Establish and maintain pump out boat or float in the New Meadows River.	2006/2007	Town of Harpswell, Organization and Remediation Subcommittee		
4. Pursue reclassification of shellfish areas as identified in Appendix 4.	2006/2007	Organization and Remediation Subcommittee		
5. Standardize municipal monitoring of shellfish surveys.	2006/2007	Organization and Remediation Subcommittee		
Priority: LOW				
6. Work with Casco Bay Shellfish Commission to address regional issues.	Long term	Organization and Remediation Subcommittee		

Objective 3: Conduct research and monitoring to better understand the ecological and economical dynamics of the New Meadows River Watershed system, including the effect of tidal barriers.

Action	Schedule	Lead Organization	Partners/ Stakeholders	Cost Estimate
Priority: HIGH				
1. Conduct a 24 hour nutrient flux (nutrient concentration and water flow) study, spring and fall, of interaction between the lakes and upper river.	2004/2005	Data Subcommittee, Friends of Casco Bay	MER Assessment Corporation, UM School of Marine Sciences, CBEP Habitat Committee, Bowdoin College, GoMOOS	\$5,000
2. Continue collaboration with Friends of Casco Bay volunteers monitoring in the New Meadows River. Consider 1) increasing sampling from monthly to weekly; 2) expanding the number of sites to be monitored; 3) adding parameters to be monitored; and 4) confer with towns.	2004/2005	Friends of Casco Bay, Data Subcommittee	Friends of Casco Bay, Town of Brunswick, New Meadows Lake Association, local volunteers	In kind services
3. Assess the feasibility of increasing tidal exchange in the lakes.	2004/2005	Data Subcommittee, Organization and Remediation Subcommittee	Army Corps of Engineers	In kind services
4. Develop a water quality index for the New Meadows Lake and River. Parameters may include: dissolved inorganic nitrogen, dissolved oxygen, turbidity, pH, chlorophyll.	2004/2005	Data Subcommittee, Friends of Casco Bay	New Meadows Lake Association	In kind services
Priority: MEDIUM				
5. Utilize a consultant to add all available land use information to GIS database, prepare maps of watershed area within each community and of the watershed as a whole, and to create a three dimensional digital model of the watershed.	2006/2007	Organization and Remediation Subcommittee		
6. Determine the scope of the data to be collected to characterize economic resources and uses of the New Meadows River watershed. Explore funding opportunities for further study.	2006/2007	Organization and Remediation Subcommittee		

Objective 3 *continued*

Action	Schedule	Lead Organization	Partners/ Stakeholders	Cost Estimate
Priority: LOW				
7. Develop a long-range plan and identify funding to: 1) conduct study of currents of the New Meadows River; 2) determine extent to which Kennebec River and possible groundwater flows affect the exchange and circulation of the New Meadows River; and 3) create a mathematical circulation model for the New Meadows River.	Long term	Data Subcommittee		
8. Identify opportunity to conduct analysis of both organic and inorganic nutrients.	Long term	Data Subcommittee		

Objective 4: Broaden public awareness of the New Meadows River and its watershed and expand involvement in the Project. Build consensus among the New Meadows communities regarding watershed management and stewardship.

Action	Schedule	Lead Organization	Partners/ Stakeholders	Cost Estimate
Priority: HIGH				
1. With Midcoast Council on Business Development and Planning, conduct workshop on April 28, 2004 on road maintenance BMPs for road commissioners, public works employees, and private road contractors.	2004/2005	MCBDP, Androscoggin Valley SWCD, Cumberland County SWCD	Public Works Directors or Road Commissioners in Bath, Brunswick, Harpswell, Phippsburg, West Bath, local contractors	In kind services
2. Organize campaigns (such BayScaping) aimed at prevention of septic system failures and proper application of fertilizers.	2004/2005	Education and Outreach Subcommittee	Bath, Brunswick, Harpswell, Phippsburg, West Bath	\$1,000
3. Distribute an informational mailing to all residents of the NMR watershed.	2004/2005	Education and Outreach Subcommittee		\$1,000
4. Conduct boat tour for municipal officials.	Annually	Education and Outreach Subcommittee	Bath, Brunswick, Harpswell, Phippsburg, West Bath	\$500
5. Create a "What YOU can do to protect the New Meadows" brochure.	2004/2005	Education and Outreach Subcommittee	DEP, CBEP, FOCB	\$500
Priority: MEDIUM				
6. Create a press distribution list.	2006/2007	Education and Outreach Subcommittee		
7. Define distribution strategy for NMRWP brochures, such as realtors, businesses including Skillins and New Meadows Inn, table at farmers markets, libraries, town offices, CEOs, planning boards, and conservation committees.	2006/2007	Education and Outreach Subcommittee		

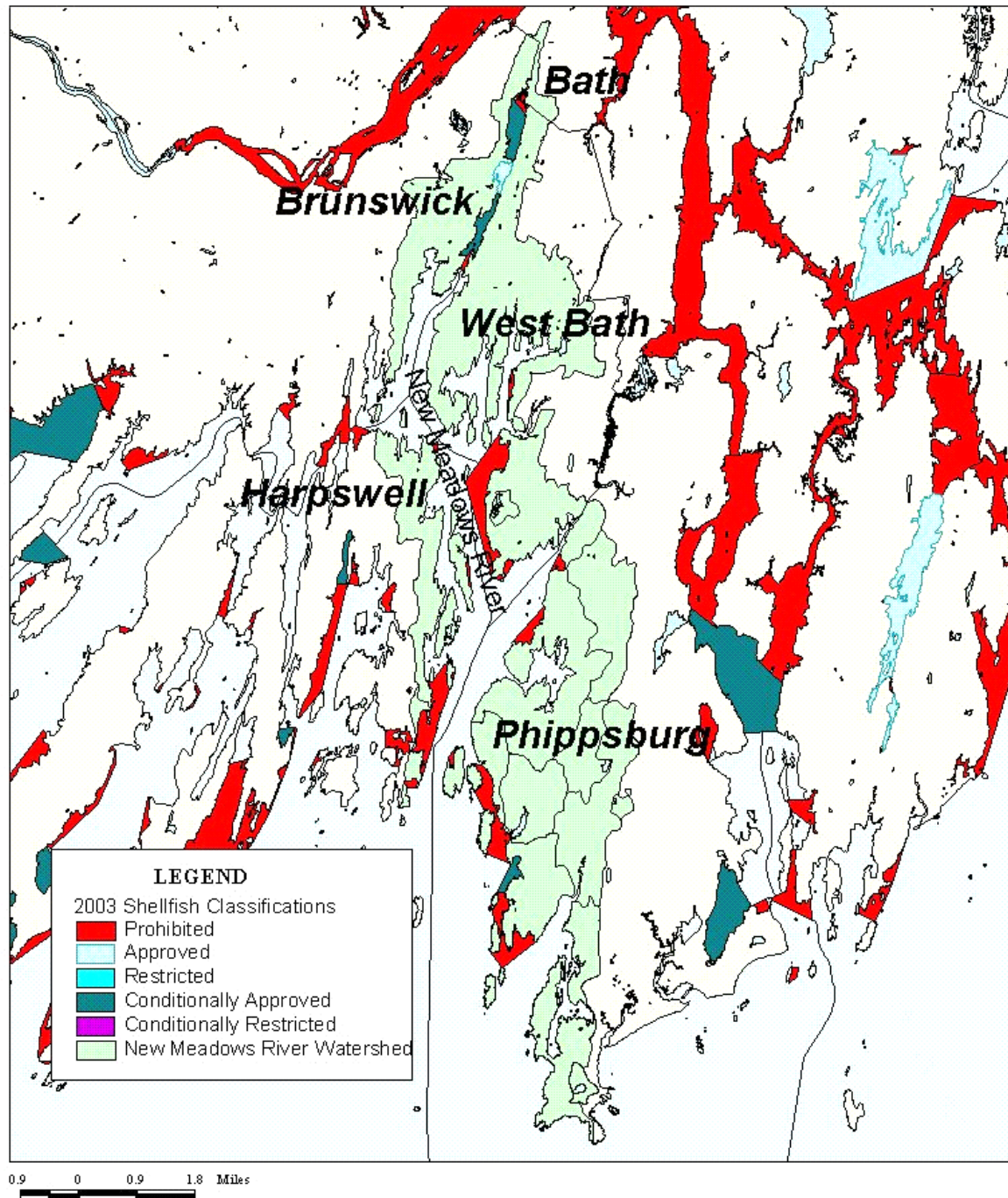
Objective 4 *continued*

Action	Schedule	Lead Organization	Partners/ Stakeholders	Cost Estimate
8. Develop a web site maintenance plan and identify timely changes in content.	2006/2007	Education and Outreach Subcommittee		
9. Customize NEMO presentations for the five New Meadows communities.	2006/2007	Education and Outreach Subcommittee		
10. Develop a logo for the NMRWP.	2006/2007	Education and Outreach Subcommittee		
11. Prepare occasional news releases in order to generate press coverage of the Project's accomplishments. Topics to include: release of WMP, road workshop, summary of scientific findings, NEMO/Beginning with Habitat presentations.	Ongoing, beginning in 2006/2007	Education and Outreach Subcommittee		
12. Conduct outreach to members of the business community on value of the watershed and opportunities for protecting water quality.	2006/2007	Education and Outreach Subcommittee		
Priority: LOW				
13. Develop curriculum for k-12 schools. Identify opportunities for funding outreach coordinator to work with teachers and make presentations.	Long term	Education and Outreach Subcommittee		

Objective 5: Promote the effectiveness of the NMRWP by maintaining the collaboration among existing partners and fostering new opportunities for growth.

Action	Schedule	Lead Organization	Partners/ Stakeholders	Cost Estimate
Priority: HIGH				
1. Participate in Midcoast Council for Business Development and Planning effort to develop regional coordination among midcoast communities. Meet with MCBDP leadership to identify areas of overlap and make them aware of NMR plan and seek integration with MCBDP planning efforts.	2004/2005	Organization and Remediation Subcommittee, Town of Brunswick	Bath, Brunswick, Harpswell, Phippsburg, West Bath	In kind services
2. Evaluate implementation of WMP and update as necessary.	Annually, beginning in 2004	Steering Committee		In kind services
3. Make presentations on opportunities for regional coordination to the comprehensive planning committee in West Bath.	2004/2005	Organization and Remediation Subcommittee	West Bath	In kind service
Priority: MEDIUM				
4. Explore opportunities for staffing the implementation of the management plan through regional entities.	2006/2007	Organization and Remediation Subcommittee		
5. Continue to recruit new NMRWP volunteers for specific activities and/ or participation on committees through the web site, press releases, and personal contacts.	Ongoing	Steering Committee		
6. Produce annual report for distribution to municipal officials. Content to include accomplishments and appreciation of support.	Ongoing	Steering Committee, Town of Brunswick		
7. Identify funding opportunities and pursue to fund implementation strategies.	Ongoing	Organization and Remediation Subcommittee		

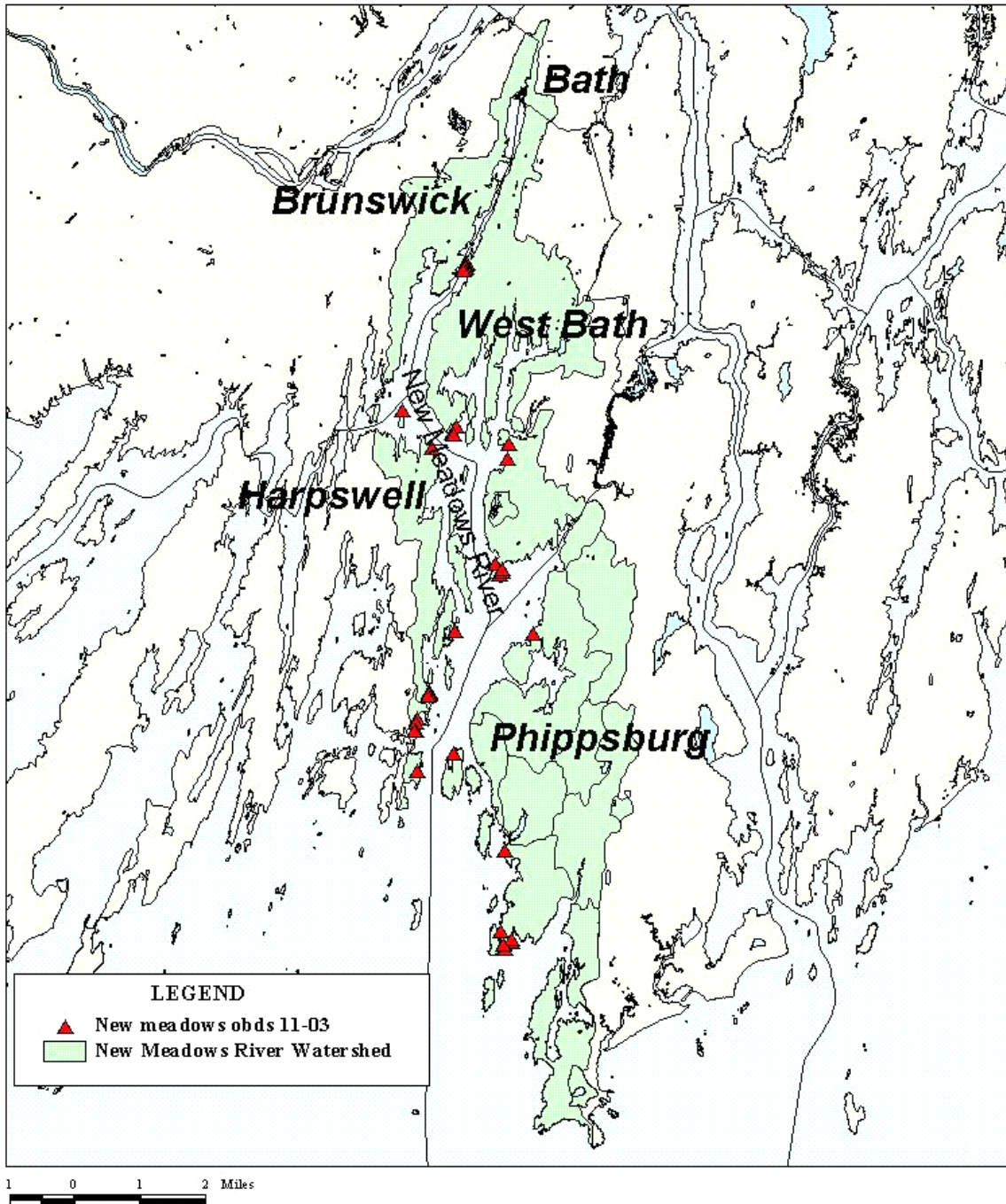
APPENDIX 1
Status of Shellfish Growing Areas
New Meadows River Watershed Project
2003 DMR Shellfish Growing Area Classifications
November 2003



New Meadows River Watershed Project

DEP-Licensed Overboard Discharge Systems (OBDs)

November 2003



Status of Shellfish Growing Areas in the New Meadows River:
Recommendations from Normandeau Associates
for pursuing reclassification to allow for harvesting

Bear Island, Phippsburg

- ⇒ This area is closed due to an overboard discharge. This discharge, # 2415, was licensed for 600 gallons per day, but it expired in 1988. The owner is Emily Nickerson.
- ⇒ This area has not been reviewed by the Phippsburg Shellfish Committee in quite a while because it has been closed. Dick Lemont, Chair of the Phippsburg Shellfish Committee commented that there probably wasn't much out there in the way of soft-shell clams; however, the Committee is pursuing removal of the overboard discharge. Normandeau has not reviewed the cove.

Recommendation: This is not a priority area. Low to moderate benefit.

Sebasco Estates to Malaga Island, Phippsburg

- ⇒ This area is closed due to an overboard discharge, # 1010. The amount of discharge has been reduced, but the OBD has not been removed. Al Frick, soil scientist, is working with the owners on system design.
- ⇒ Normandeau conducted a resource assessment survey April 30, 2003 and rated the resources low to moderate in this area.
- ⇒ Most of the shoreline from Round Pond to North end of Malaga Island is ledge, dotted with small sandy coves. One of the largest potential soft-shell habitats is the cove at Sebasco Estates at the outlet of the freshwater pond. This flat is less than one tenth of an acre with low to moderate resource. Soft-shell clam, quahog, and razor clam shells were present on the surface of the flat.
- ⇒ A second area of potential habitat is the cove at Brewer's boatyard off the north end of Harbor Island. The substrate in most of this cove is soft muck with abundant worms. Razor clams, quahogs, and oyster shells were common. Soft-shell clams were present, mostly in the outer cove on the River side of the ledges which enclose a good portion of the cove. Resources in this cove are also rated low to moderate.
- ⇒ Poor water quality in the summer reflects boat usage, summer cottages, and other uses. The overboard discharge is not the only issue in this area.

Recommendation: This is not a priority area, removal of the OBD should be pursued.

Hen Island and Hen Island Ledge, Phippsburg.

- ⇒ The size of this closed area was reduced in January of 2003.
- ⇒ Normandeau has not reviewed this area for soft-shell clam resources, no intertidal habitat shown on MER resource map (1997).
- ⇒ There is an overboard discharge in this area, # 7914, licensed for 450 gallons per day until 2006. According to (the late) Dave Achorn, the property has changed hands from John

Whitenburger to Ed Chiao and Sainah Rahardja.

Recommendation: This is not a priority area due to lack of habitat for soft-shell clams. The new owners should be approached regarding their interest in removing their overboard discharge; the Shellfish Committee could play a role.

Mill Cove in the vicinity of Treasure Island, West Bath.

- ⇒ Follow up on correction of illegal septic and gray water discharge (straight pipe on western shore).
- ⇒ Normandeau reviewed the closure area on May 6, 2003. As expected, the soft-shell clam resource rating along most of this shoreline is high. The shoreline is mostly ledge, grading to fine to coarse sand and/or to silt over soft clay in the lower intertidal. Blue mussels and periwinkles were common on the ledges, mud snails, and marine worms were abundant in the soft substrate areas. Quahog and oyster shells were sighted occasionally. South of Treasure Island, the intertidal zone narrows, but clams remain abundant in the sandy areas. Few spat clams were observed; most were 1 ½ inch or larger.

Recommendation: This is a high priority area, DMR has informed the Town that it needs to deny occupancy of this building until the illegal discharges are removed.

The Rosedale/Harvey area on KingsPoint-

- ⇒ This area is just north of and adjacent to the Kings Point South area and was reviewed for resources on May 6, 2003.

- ⇒ There are six OBDs in this mostly seasonal cottage community, as follows:

<u>OBD #</u>	<u>Name</u>	<u>Address</u>	<u>Lot #</u>
1133)	Michael Montgomery and Cupp)	32 Rosedale Rd.	#19
1246	James Wilson	42/44 Rosedale	#22 and 22A
1562	Stephen Kenyon	48 Rosedale Rd.	#23
1631	John Zocchi	20 Rosedale Rd.	#17
1940	Joseph Vaillencourt	36/38 Rosedale	#20 and 21
6773	Theresa Ciullo	69/71 Kings Point Road	#13 and 14

- ⇒ Dave Achorn had said that these were all on the DEP Priority List, and that Mr. Zocchi was in the process of removing his OBD, this may be complete. Four pipes were noted during this review, source nor status is known (by Normandeau), no discharge was observed, no occupants were present. .
- ⇒ Prior to the review, the resource was expected to be low in this area but soft-shell clams were abundant in some areas along the narrow intertidal zone on this shoreline. The width of the intertidal from the shoreline bank to the water at low tide ranged from about 20 to 50 feet. This area was mostly rockweed-covered ledge with pockets of sand and muck with clams, worms, and periwinkles. Clams were most common in the upper intertidal sandy areas. Considering the area of clam habitat compared with the length of the shoreline and total intertidal area, the rating for soft-shell clams would be moderate to low. There were no

spat (clams <1/2 inch) and few clams less than 1 inch observed during this review.

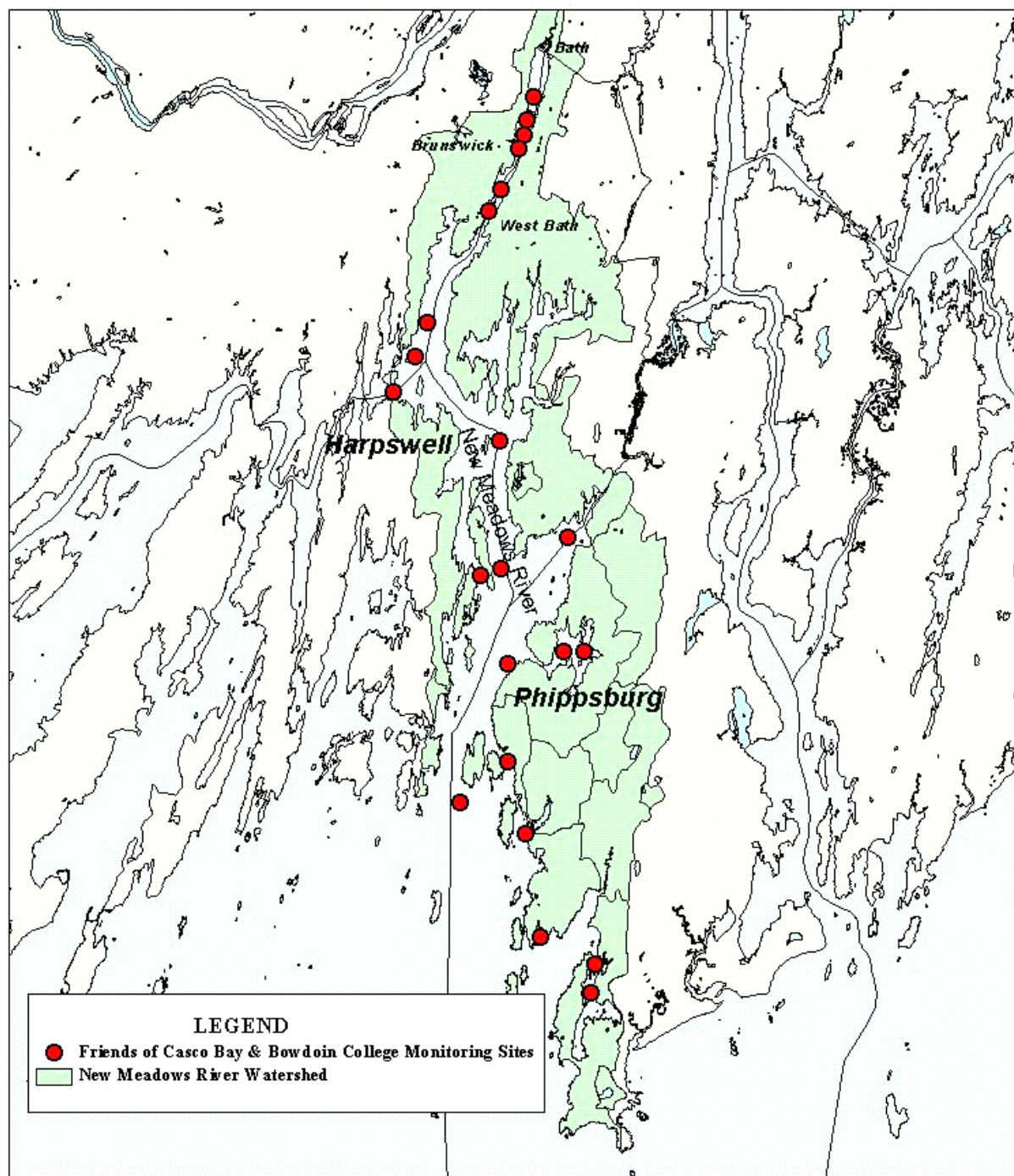
- ⇒ There are three lots (# 10, 11, and 12) that appear to have the potential, or physical space, for a community septic system, the locations of wells on these lots are not known. Tax map U-13, shows that the Town of West Bath owns a 150' x 100' triangular shaped lot on Kings Point Road. Its use is not known. Near the intersection of King's Point Road and Rosedale Road is a 5.5 ac lot, that is mostly grass field. This may also be a potential site for a community system.

Recommendation: The Town of West Bath had previously indicated that it has no interest in pursuing removal of overboard discharges in this area but may be interested now. Remediation for this area would likely be expensive with low to moderate benefit in terms of soft-shell clam harvests.

APPENDIX 2

New Meadows River Watershed Project Biological Monitoring Sites Sampled by Friends of Casco Bay & Bowdoin College

November 2003



0.9 0 0.9 1.8 Miles

APPENDIX 3

Soils in the New Meadow River Watershed

The soil types and slopes in the watershed have important implications for water quality. Land areas with steep slopes (greater than 15-20%), or poorly drained soils, are less likely to absorb or retain polluted stormwater runoff from developed or disturbed areas before it reaches the New Meadows River. Steep slopes have a greater potential for soil erosion.

*General soil associations for the portion of the watershed situated in Cumberland County
(Source: Soil Survey of Cumberland County Area, Maine; 1995, USDA, SCS)*

- ♦ Suffield-Buxton-Hollis: Deep, well drained to somewhat poorly drained, gently sloping to steep, medium-textured soils and ridges of shallow, somewhat excessively drained, moderately coarse textured soils.

*General soil associations for the portion of the watershed situated in Sagadahoc County
(Source: Soil Survey of Androscoggin and Sagadahoc Counties, Maine; 1974, USDA, SCS)*

- ♦ Hollis-Sutton-Buxton: Shallow to deep, medium-textured and moderately coarse textured, well drained and moderately well drained, nearly level to steep soils, generally on the tops of low hills and ridges.
- ♦ Buxton-Hartland-Belgrade: Deep, medium-textured, moderately well drained and well drained, nearly level to moderately steep soils.

These are general soil associations. Specific soil types and slopes are highly variable throughout the watershed. Planning decisions for development in the watershed should be based on site-specific soil and slope analysis.

APPENDIX 4

Examples of Report Format and Priority Ratings

The following are examples of the types of information gathered during the Upper and Lower New Meadows River Watershed Surveys. Typical examples of high, medium, and low impact sites are represented. Details about each site are available in the survey reports and on the individual site evaluation forms.

Map ID	Survey Site	Land Use	Site Description	Area	Recommendations	Impact	Technical Level	Cost
R-5	8-2	Residential	Roof runoff, bare soil, moderate surface erosion, unstable construction site, some runoff from driveway	100'x100'	Add erosion controls, waterbar, new surface materials, plant trees and shrubs, seed and mulch, infiltration trench	Low	Medium	Medium
PR-2	1-5	Private Road	Unstable culvert outlet, direct flow to stream, severe road shoulder erosion	20'x4'	Stabilize culvert outlet, seems like snow plow leaves piles at this low spot in road- need to find a better place	Medium	Medium	Medium
TR-8	6-3	Town Road	Direct flow to stream, 2 unstable culvert outlets (large one rusted out on bottom), bare soil on shoulder, severe road shoulder erosion, shoulder too steep	20'x50+' (goes into sector 5)	Install plunge pool on large culvert, replace large culvert, armor with stone, install ditch, install turnout, reshape or crown road	High	High	High



Distribution of NPS sites throughout the watershed

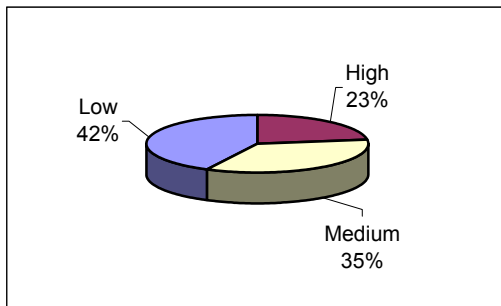
Land Use	West Bath	Bath	Brunswick	Harpswell	Phippsburg	Total
Beach/Boat Access	1	0	0	4	5	10
Commercial	2	0	1	0	5	8
Driveway	0	0	0	3	7	10
Private Road	1	0	1	9	13	24
Residential	1	1	2	3	9	16
State Road	0	1	3	1	2	7
Town Road	5	1	0	5	6	17
Total Sites	10	3	10	25	47	92

Key Findings from the NPS Surveys

- The problems are manageable—most can be fixed with low to medium technical experience and cost.
- Most of the problems were found on residential properties, driveways, and private roads.
- In addition to the surveyed sites, numerous waterfront properties were observed to have little or no vegetated buffer at the water's edge. It is important to note that buffers of shrubs and trees do a much more effective job than bare ground or grass to keep polluted runoff from entering the New Meadows River!

Potential Impact of Problems

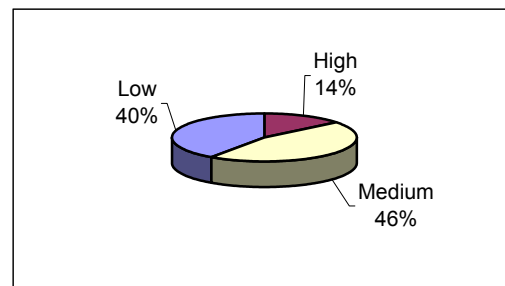
There were similar numbers of sites with low, medium and high impacts. Attention should be paid to the sites, since the **cumulative** impact causes water quality to decline.



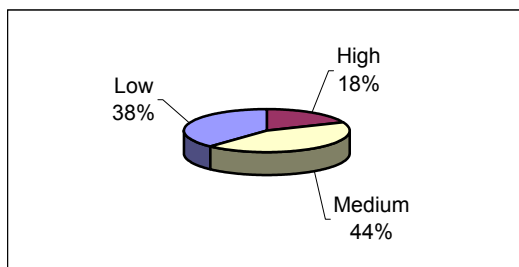
- Low—eroding site with limited transport off site, or small site with no evidence of rills or gullies
- Medium—sediment transported off site but does not reach high magnitude
- High—large area with significant erosion and direct flow to stream, ditch or river

Technical Level Needed to Correct Problem

- Low—property owner can accomplish the fix with or without proper reference materials
- Medium—technical person should visit the site & make recommendations
- High—site requires an engineered design



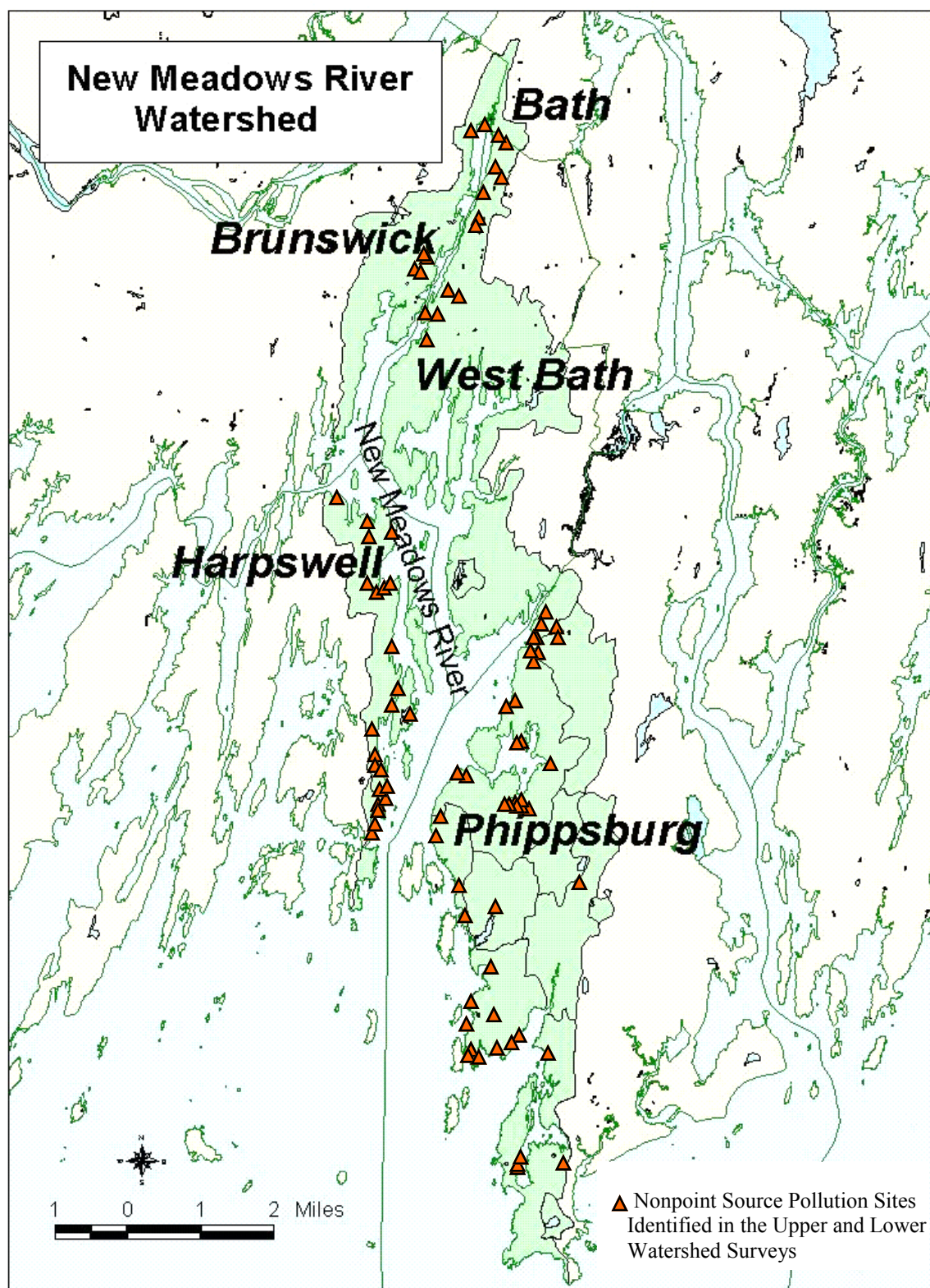
Cost to Implement Recommendations



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

APPENDIX 5

Upper (2001) and Lower (2003) Watershed Survey Sites



New Meadows River NPS sites

(sorted by town)

Town	Land Use	Location	Site Description	Area	Recommendations	Impact	Cost
Bath	residential	Off new Meadows Road	lack of ditch, bare soil, unstable construction site, direct flow to trib.		reshape road or ditch, seed and mulch	medium	high
Bath	state road	State owned Old Old Bath Road	slight ditch erosion, moderate ditch erosion, direct flow to river		erosion controls, reshape road or ditch, waterbar, reditch	low	medium
Bath	Town Road	Residential property across from golf course	severe shoulder erosion	200 yards	erosion controls, reshape road or ditch, waterbar, reditch	medium	high
Brunswick	commercial	Skilling's Greehouse, Rte 1	unstable construction site, lack of buffer, direct flow to trib.	10' x 75' / 150' x 20'	vegetate, rip rap, seed and mulch, new slope	high	high
Brunswick	private road	Bull Rock Road (far end)	moderate surface erosion, direct flow to river	14' x 300'	new surface material, waterbar, diversion, box culvert	high	high
Brunswick	residential	Residential property, Ridge Road	slight surface erosion, bare soil		vegetate	low	low
Brunswick	residential	Peterson Lane, gray trailer	bare soil, unstable construction site		vegetate, seed and mulch	medium	medium
Brunswick	state road	State owned bridge crossing at Old, Old Bath Road	moderate shoulder erosion, direct flow to lake		maintenance, new culvert, rip rap, reshape edge of causeway	low	medium
Brunswick	state road	Bath Road (in front of Skillings, across from stream crossing)	moderate shoulder erosion, direct flow to trib.	300' x 5'	sedimentation basin, rip rap	high	high
Brunswick	state road	bath Road (heading north btw Skillings and boat launch road at salt marsh)	moderate shoulder erosion, direct flow to river	5' x 300'	rip rap	medium	medium
Harpwell	Boat Access	Eggemoggin- Long Island North Assoc.	Direct flow to New Meadows River, Moderate Surface erosion	50'x25'	Install waterbar on path, add rip rap	Low	Low
Harpwell	Boat Access	End of Rand Road (at water)	Direct flow to New Meadows River, moderate surface erosion, unstable boat access	30'x10'	Install runoff diverters (open top culvert)	Low	Low
Harpwell	Boat Access	End of Sailor Way	Road material deposited too near shore, covering rip rap	22'x15'	Infiltration pavers (tri-lock blocks)	Low	Low

