The Stanley Brook Watershed Survey Report

Prepared by
The Mount Desert Island Water Quality Coalition
May 2006

The Stanley Brook Watershed Report
Seal Harbor, Maine
June-October 2005

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Executive Summary

The MDI Water Quality Coalition conducted a unique watershed survey in the Stanley Brook Watershed between June and October 2005. The goals of the watershed survey included identifying pollution sources impacting habitat integrity in Stanley Brook and locating pollution sources contributing to high bacteria levels at Seal Harbor Beach. The survey combined the best features of a sanitary shoreline survey, used most often to detect pollution sources impacting shellfish growing areas, and a watershed survey, used most often to identify the types of pollutants that are running off the land into a particular body of water. By combining these approaches, we have identified sources of pollution and defined the types of pollutants that are impacting water quality in the Stanley Brook watershed. We surveyed 210 properties in the village of Seal Harbor and in Acadia National Park. Of these, 52 had obvious pollution sources such as drains, ditches, broken sewer lines, eroding or chemically treated lawns, or compost piles situated in proximity to the brook. A total of 71 pollution sources on these 52 properties were identified. These were ranked as major, moderate, or minor in their impact on water quality based on three criteria: the area over which the pollutant was distributed, the potential for pollutants to be carried off site, and the size of the vegetative buffer between the pollution source and the brook or beach. Pollutant types included bacteria, nutrient, sediment, toxic, or thermal pollution or a combination of these types. As a result of this survey, recommendations are made to mitigate pollution. The recommendations are for individual property owners, neighborhood groups, the town of Mt. Desert, local contractors and developers, and Acadia National Park. These include re-directing runoff, preventing erosion, moving compost piles, limiting fertilizer and pesticide use, repairing private sewer lines, installing and maintaining silt fences at construction sites, and implementing Best Management Practices throughout the Stanley Brook watershed.

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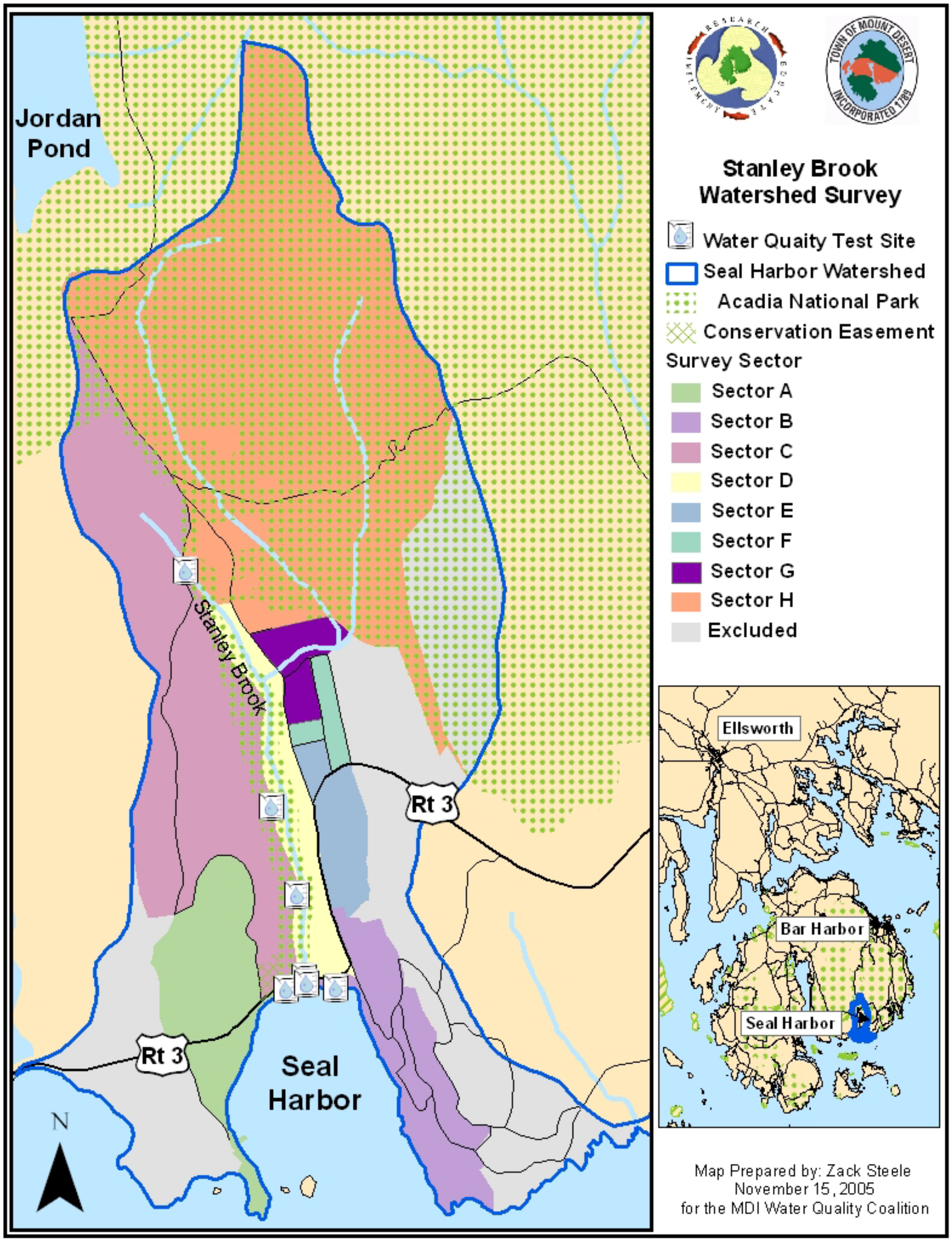

Stanley Brook Watershed Survey Base Map: The watershed boundary is outlined in dark blue. Each of the eight survey sectors are designated by color, gray areas were excluded from survey.

Introduction

Where is the Stanley Brook Watershed?

The Stanley Brook Watershed contains 935 acres, and is located in Acadia National Park and the village of Seal Harbor on Mount Desert Island, Maine. The headwaters of Stanley Brook begin on Day Mountain. Including its tributaries, Stanley Brook is 3.7 miles in total length, meandering through Acadia National Park before it empties into the ocean at Seal Harbor Beach.

What is the History of Stanley Brook?

The Stanley Brook area has a rich history. In 1936 John D. Rockefeller, Jr. completed construction of a road along Stanley Brook with seven bridges. He then deeded the land to the federal government. At the top of the road, Stanley Brook passes under one of the three arch stone bridges that are part of the carriage road system in the park. Frederick Olmsted, Jr., a well-known landscape architect in the early 20th century, designed Stanley Brook Road in such a way that Stanley Brook continued to flow, for the most part, on its natural course through the mossy boreal forest terrain (**Figure 1**). Stanley Brook Road with its associated bridges is an architectural wonder and is eligible for listing on the National Register of Historic Places.

Beaver activity has changed the flow of the water near the mouth of the brook over the years. In the past, beaver dams forced the stream to back up, facilitating growth of alder trees. Removal of beavers and their dam by the Department of Transportation in the 1990s allowed the stream to flow freely under busy Route 3 in Seal Harbor before flowing onto the beach. This is how the stream remains today (**Figure 2**).

Figure 1. Stanley Brook Bridge: Stanley Brook as it flows under one of the seven bridges along Stanley Brook Road in Acadia National Park, March 2005

Figure 2. Stanley Brook after Removal of the Beaver Dam: Stanley Brook on its way to the ocean. This view is upstream from Rte. 3, August 2005.

Why is protecting Stanley Brook important?

Stanley Brook is a rich habitat for local flora and fauna. Native brook trout (*Salvelinus fontinalis*) breed on the pebble bottom (**Figure 3**). Numerous juvenile fish can be seen in the shade of the bridges. There is some speculation by local residents that there may be anadromous (sea-run) brook trout in Stanley Brook; there is evidence that these unusual brook trout are breeding in nearby watersheds. Brook trout can survive only in the coldest and cleanest water. Vibrant brook trout populations indicate that a watershed is still intact. Brook trout are declining in the Eastern United States but are still thriving in Maine[1]. Yet even on Mt. Desert Island, which many people consider to be a pristine island, there is an example of the collapse of a local brook trout population. Eddie Brook in Bar Harbor faced many of the same threats as Stanley Brook in the last several decades. Long time residents of the Eddie Brook watershed remember when brook trout inhabited the little stream that flows through their back yards[2]. Brook trout do not live in Eddie Brook anymore.

The area around Stanley Brook is also full of beautiful native species of plants. Some of them are restricted to wetlands, like Jack-in-the-pulpit, which can be found growing along the banks of the stream (**Figure 4**).

The shady banks of Stanley Brook provide a cool respite from summer heat and a place for quiet reflection in a busy summer for residents and visitors to Acadia National Park. Stanley Brook empties onto Seal Harbor Beach, providing a warm mix of fresh and salt water. This area is popular with beach goers. A 2001 survey of beach users revealed that Seal Harbor Beach is the second most popular swim area on Mount Desert Island. An estimated 5,000 people use the beach every summer. The quality of water flowing from Stanley Brook onto Seal Harbor Beach directly affects the quality of water at the beach.

Figure 4. Native plants in Stanley Brook: Native plants abound in the Stanley Brook watershed, like this Jack-in-the-pulpit found growing in the streambed, summer 2004.

Figure 3. Stanley Brook Habitat: Some areas of Stanley Brook still have intact pebble bottom habitat that is essential for brook trout spawning. Juvenile brook trout have been seen darting in and out from under this bridge. This picture was taken in summer 2004.

What are the threats to the ecosystem integrity of Stanley Brook?

Stormwater runoff may be the greatest threat to the integrity of the Stanley Brook ecosystem. Runoff from roads in the Stanley Brook watershed enters the brook carrying **non-point source pollution**. Non-point source pollution can include nutrients, bacteria, toxic substances and sediments. Sediments may be comprised of soil from eroding stream banks as well as road sand and gravel. When the sediment fills in the spaces between pebbles, brook trout spawning habitat is ruined (**Figure 5**). In August 2004, one of two Acadia National Park macroinvertebrate monitoring sites on Stanley Brook was heavily covered with sediment, making it impossible to obtain sample insects during the monitoring event (Bill Gawley, personal communication).

Sediments also bring nutrients. Nutrients can cause algal blooms along the length of the stream and at the beach. The green macroalga *Enteromorpha intestinalis* has appeared in abundance at Seal Harbor Beach over the past several summers (**Figure 6**). *Enteromorpha* is considered a bioindicator of nutrient pollution[3]. Algal blooms can lead to declines in dissolved oxygen levels. When algae dies, it becomes food for decomposers that can quickly use up the oxygen in an aquatic system, killing aquatic animals.

Several of the storm drains on the Jordan Pond Road are major contributors to sedimentation of Stanley Brook. The pipe leading from the storm drain at the intersection of Jordan Pond Road and McKenzies Hill Road runs straight out of the bank and erodes huge swaths of soil, which flow into the stream during heavy rain events and hydrant flushing (Bill Gawley, personal communication).

Figure 5: Sedimentation in Stanley Brook: Where storm water has flushed sediments into the brook, freshwater algae begins to grow. This photograph was taken during the summer of 2004.

Figure 6: *Enteromorpha* on Seal Harbor Beach: *Enteromorpha*, a type of algae considered to be an indicator of pollution, grows at mid-beach in Seal Harbor. This photograph was taken during the summer of 2005.

What are the threats to public health at the mouth of Stanley Brook and at Seal Harbor Beach?

There is a history of high bacterial levels at the mouth of Stanley Brook and at Seal Harbor Beach. Students at MDI High School began studying water quality at Seal Harbor Beach and in Stanley Brook in 1993. At that time, students were testing for general fecal coliform bacteria in the water, a type of bacteria that is normally found in the gut of warm-blooded animals. They found elevated levels under the Rte. 3 bridge where Stanley Brook flows onto Seal Harbor Beach (**Figure 7**). Fecal coliform bacteria are no longer the preferred indicator for sewage pollution in a swim area. *Enterococcus* bacteria are better correlated with the potential for swimming illness. Swimming illness is caused by contact with contaminated water. There are different types of swimming illness including gastroenteritis (stomach upset) conjunctivitis (pink eye) and skin rashes.

Figure 7. Stanley Brook Culvert: In the mid-1990s, responding to fecal coliform data collected by MDI High School students, the Town of Mt. Desert painted *Keep Out* under the bridge to dissuade people from coming in contact with contaminated water.

Figure 8. Public Notification: Signs provided through the Maine Healthy Coastal Beaches Program were placed at Seal Harbor Beach to inform the public about the safety of water contact, summer 2004.

In summer of 2003, five cases of swimming illness linked to water contact at the mouth of Stanley Brook were reported to the health officer in Mt. Desert. This is the summer that the MDI Water Quality Coalition joined the Maine Healthy Coastal Beaches Program and began running tests for *Enterococcus*. The town of Mt. Desert signed onto the program, agreeing to post signs on the beach (**Figure 8**). Since 2003, The Maine Healthy Coastal Beaches Program has provided training, water quality testing equipment and supplies, and oversight of the beach-monitoring program in Seal Harbor. In 2004, the town of Mt. Desert got involved in testing for *Enterococcus* as well, and made beach management decisions based on its own data.

The MDI Water Quality Coalition conducted bacterial studies on water samples taken from Stanley Brook and Seal Harbor between 2003-2005 at the sample sites indicated on the map in **Figure 9** (see full data set, **Appendix A**). The results of these studies revealed that bacterial levels are always highest at the mouth of the brook (Site 63.2), and these levels consistently rise in late July and early August (**Figure 10 and Appendix A**). This is the period with the highest seasonal village population and the greatest use of the beach by swimmers. Interestingly, though bacterial counts in the upstream sites (Sites 63.4, 63.6, 63.8) are sometimes fairly high in the summer, these variations usually do not correlate with high values at the mouth of the brook. This suggests that there is an unknown source of fecal pollution active in the summer that affects only that one site. Bacteria from the mouth of the brook probably account for some of the high counts detected at the beach (Sites 63, 63.1, and 64).

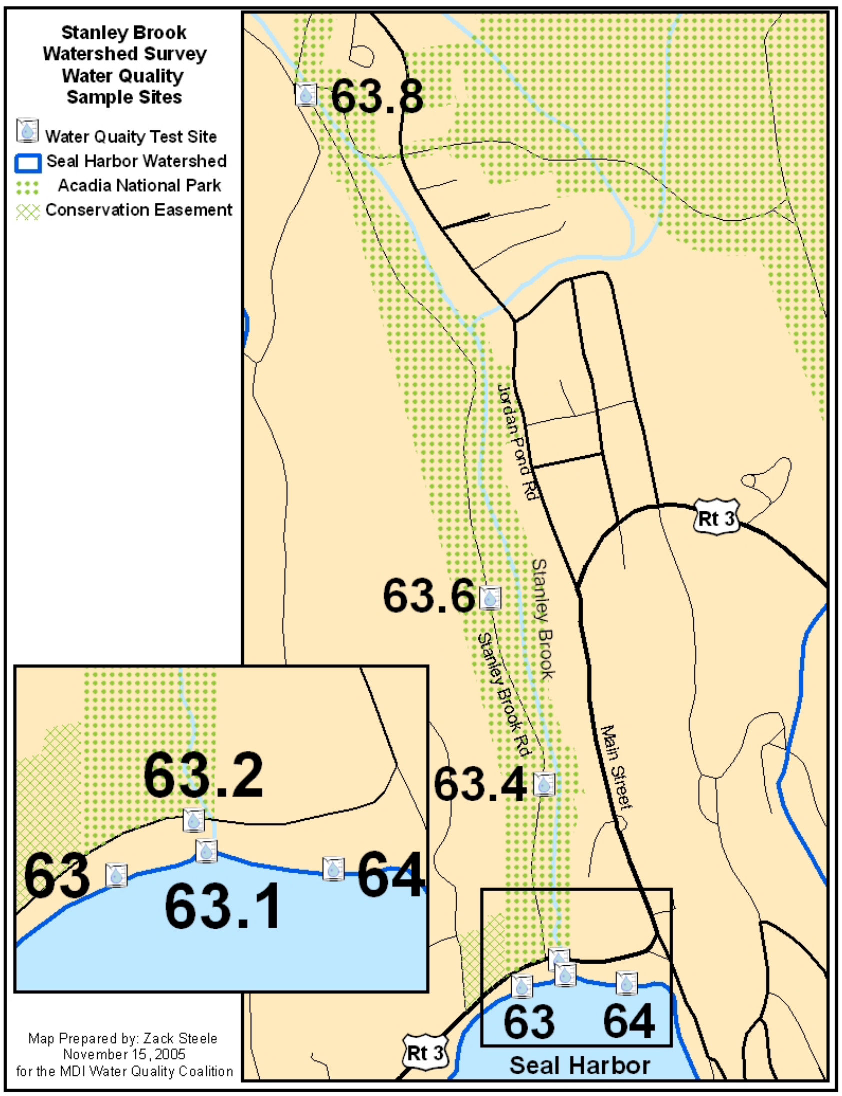

Figure 9. Water Quality Sample Sites in the Stanley Brook Watershed: Site 63.8 is located at the three-arch stone bridge at the top of Stanley Brook Road. Site 63.6 is located above a wooden footbridge near a gravel pull-out on the road. Site 63.4 is located downstream from storm water input. Site 63.2 is under the bridge at Rte. 3. Site 63 is considered the right side of the beach looking out over the harbor; Site 64 is considered the left side of the beach. Site 63.1 is where freshwater from the stream meets saltwater in Seal Harbor.

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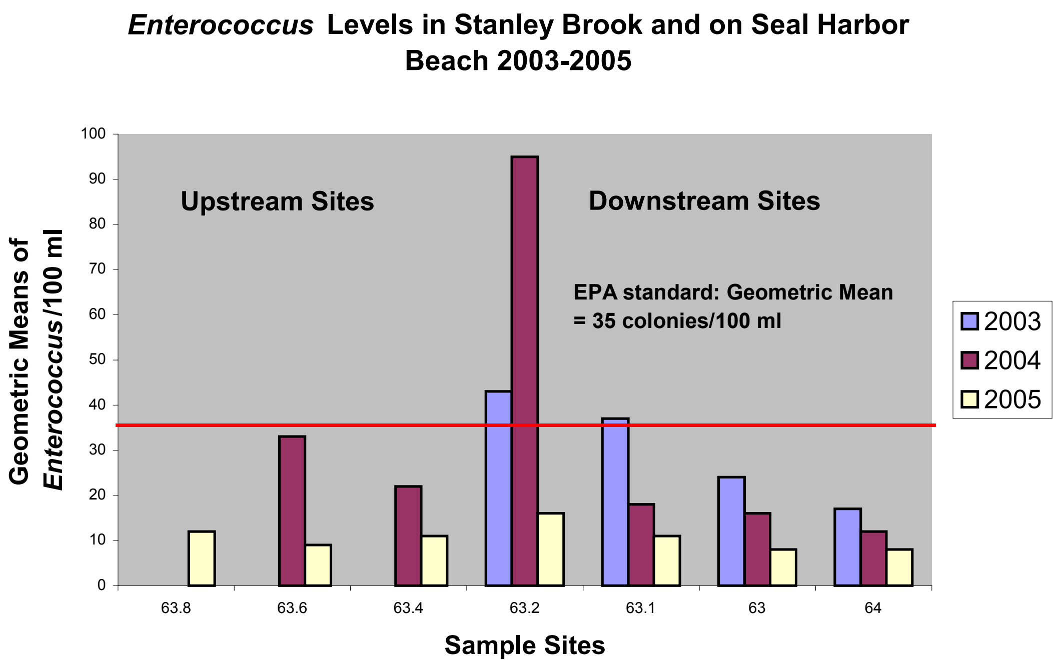

Figure 10. ***Enterococcus* Levels in Stanley Brook and on Seal Harbor Beach (MDI Water Quality Coalition Data):** Levels of *Enterococcus* are lower upstream (Sites 63.8, 63.6, and 63.4) than they are downstream (Site 63.2). Enterococcus levels on the beach are lower than upstream at Site 63.2*.

Where is Enterococcus coming from in the Stanley Brook Watershed?

Enterococcus may be coming from many sources in the Stanley Brook Watershed. Sampling of water from upstream sites did not reveal a clear and consistent source of the bacteria that is detected at the mouth of Stanley Brook each summer. In order to discern whether the bacteria was from an animal or human source, the MDI Water Quality Coalition worked with students from Mt. Desert Elementary School to conduct optical brightener studies in 2005. Optical brighteners are dyes found in laundry detergents and are associated with sewage pipes or septic tank failure. We used a method that involved attaching unbleached fabric swatches to the end of PVC pipes[4]. The devices were weighted down with bricks at all water quality test sites in Stanley Brook. Optical brighteners were not detected in Stanley Brook between May and August of 2005, even when bacterial levels were high (**Appendix B**). The absence of optical brighteners in the water may indicate that the bacterial source is non-human in nature or the amount of optical brightener was below the level of detection.

* The geometric mean reduces the influence of very high and very low numbers on the data set. Geometric means should be based on at least 5 samples over a 30-day period of time. For the data in Figure 10, geometric means are based on 7-19 samples over at least 30 sampling days in 2003 and 2004. Geometric means are based on 10-23 samples over 90 sampling days in 2005.

The wastewater treatment facility in Seal Harbor is in close proximity to the brook and releases treated effluent into the harbor in the summer. It may appear to be a likely source of bacterial pollution. We have no evidence that the source of pollution in Stanley Brook is from the sewage treatment plant or sewer lines in proximity to the sewage treatment plant. Between 2004 and 2005, the Mt. Desert public works department used cameras to investigate whether sewer lines that run near or under Stanley Brook could possibly be leaking. No cracks were observed in any pipes. There was no evidence of infiltration of the pipes with ground water or water from the stream. Data on the bacterial levels in effluent from the wastewater treatment plant reveal that the levels did not exceed permit discharge limitations (**Appendix C**).

Figure 11: Seeking broken sewer lines: Mt. Desert public works personnel send a camera into the sewer line running beneath Stanley Brook, October 2005

What has the Stanley Brook Watershed Survey Revealed?

The Stanley Brook Watershed Survey was conducted between June and October 2005 in order to track down pollution sources in Stanley Brook that were not evident through water testing or sewer line inspection. The watershed survey involved inspection of properties that might contribute runoff to the brook. Survey volunteers visited properties looking for signs and sources of pollution, including running pipes and drains, malfunctioning septic systems, and broken sewer lines. Survey volunteers categorized the type of pollutant coming from a pollution source as bacterial, nutrient, sediment, toxic, thermal, or a combination of these types. Over a third of the properties surveyed had one or more pollution sources. A quarter of these properties were categorized as contributing bacterial pollution to the watershed. These properties may be contributing to the bacterial levels detected in Stanley Brook and at Seal Harbor Beach over the last several years.

Purpose and Scope of the Stanley Brook Watershed Survey

The Stanley Brook Watershed Survey was designed to:

- ✓ Engage citizens of all ages in preserving and improving water quality through meaningful environmental research and community education.
- ✓ Develop a comprehensive coastal watershed survey procedure for Maine.
- ✓ Identify impacts to the water quality of Stanley Brook and Seal Harbor watersheds and to recommend reasonable solutions to the community.

The purpose of the watershed survey was NOT to point fingers or place blame. The purpose was to provide information that could help with individual and community level decision making. For this reason, there are no property lines on pollution source or pollutant summary maps. This report can be used as a guide for improving water quality in the Stanley Brook watershed.

Citizens were engaged through volunteer training sessions, public presentations, and door-to-door surveys. Letters explaining the watershed survey process were sent to residents. Press releases about the project were published in local papers. Two volunteer training sessions were held to inform and train individuals interested in participating in the Stanley Brook Watershed Survey; fifteen citizen volunteers participated in the survey as a result. Informational presentations were held for the Town of Mount Desert Selectmen, Seal Harbor Village Improvement Society, and Seal Harbor Summer Residents Association. Volunteers provided an informational flyer at each home that was visited and interviewed residents who were home.

The Stanley Brook Watershed Survey was specifically designed to address the issues affecting the health of the Stanley Brook watershed and public health issues at Seal Harbor Beach (**Appendix D**). This novel watershed survey utilized key components of the Maine Department of Environmental Protection (DEP) watershed survey targeting non-point source pollution[5] and the Maine Department of Marine Resources (DMR) sanitary shoreline survey targeting bacterial pollution[6].

The Stanley Brook and Seal Harbor watersheds were identified using GIS (Geographic Information Systems) and data available from the Maine Office of GIS. A mailing was sent to property owners of the watershed notifying them of the watershed survey and volunteer opportunities. Volunteers were invited to participate by mail, poster, and at public presentations. However, only a few Seal Harbor residents were able to commit time to the survey process. Additional volunteers were recruited from the MDI Water Quality Coalition and the MDI Biological Laboratory, including interns from the Community Environmental Health Laboratory, a research and education collaborative of the MDI Water Quality Coalition and MDI Biological Laboratory. Volunteers received training including a presentation on the need for a watershed survey and an introduction to survey methodology. Each volunteer completed a volunteer training evaluation form (**Appendix E**).

When surveying properties, volunteers documented the current land use, number of residences, and type of waste system on a property data sheet (**Appendix F**). When a problem was found, a picture was taken and a problem data sheet was completed to categorize the source of the problem and information about its size, severity, location, and distance to water body (**Appendix G**). After the properties in a sector were surveyed, data were entered into a database and checked for errors (**Appendix H**).

In order to identify the impacts of pollution problems, the pollution sources and pollutant types were recorded. Each problem had only one source, but could have included any combination of the five pollutant types: bacteria, nutrients, sediment, toxics or thermal. Each type of pollutant has specific impacts in a watershed:

Fecal Bacteria indicate that there might be a health risk. Pathogenic organisms, such as disease causing bacteria, viruses, and parasites, can be associated with fecal bacteria. The presence of indicator bacteria may lead to closures of swimming areas and shellfish beds. Bacterial pollutants can affect both surface and ground water. Surveyors noted a bacterial pollution problem when they saw dog or other animal feces in proximity to the brook or when they saw a broken above ground sewer line.

Nutrients such as phosphates and nitrates are essential to life. However, when an ecosystem has more than the plants can use and the soil can hold, the excess nutrients can end up in stormwater runoff. Common sources of excess nutrients are fertilizer, soil erosion, animal waste, and residential wastewater. Phosphorus is the major pollutant in freshwater ecosystems while nitrogen is the major pollutant in saltwater ecosystems. Excess nutrients encourage overproduction of algae, which may result in oxygen depletion when algae dies and rots. Surveyors noted a nutrient pollution problem when they observed a bacterial or sediment problem. They also noted a nutrient pollution problem when they observed fertilizer use on a property.

Sediments are a very serious pollution threat to water quality in Maine. Sand and silt particles can damage fish gills, smother fish and insect eggs, fill habitat, and block sunlight. Sediments may have nutrients and toxics associated with them. Surveyors noted a sediment pollution problem when they saw erosion near the brook or beach, ditches without vegetation leading directly to storm drain catch basins, or construction areas with loose soil near impervious surfaces or without proper **silt barriers**.

Toxics include: pesticides, herbicides, petroleum products, heavy metals, and household chemicals. They are a serious environmental and health concern because they persist in the environment, build up in the food chain, and many cause cancer, reproductive problems, or impair function or survival of plants or animals. Surveyors noted a toxic pollution problem when they saw a broken sewer line since all household cleaning products end up in the sewer, or when they saw evidence of pesticide use on lawns. The fountain in Seal Harbor is also a toxic problem, since chlorinated water drains directly into the ocean, killing seaweed and sea creatures.

Thermal pollution or increased water temperature may be caused by water running off hot unnatural surfaces like pavement, roofs, or **riprap** and by the removal of plants that provide shade. Increased water temperature reduces the amount of oxygen water can hold and has a severe impact on aquatic ecosystems. Surveyors noted a thermal pollution problem when it was clear that water would run over asphalt before entering a storm drain catch basin, directly entering the brook or harbor. Properties with fire hydrants were scored as having thermal pollution sources, since hydrants are flushed onto roads in Seal Harbor.

Survey Results

Volunteers surveyed 210 properties in the Stanley Brook watershed between June and October 2005. Of these, 52 properties had obvious pollution sources such as drains, ditches, broken sewer lines, eroding or chemically treated lawns, or compost piles situated in proximity to the brook. A total of 71 potential pollution problems were identified on these 52 properties. Pollution problems were categorized in two ways: the source of the problem and the types of pollutant. A property may have had more than one problem but each problem had only one pollution source.

Pollution Sources

Pollution sources in the Stanley Brook watershed fell into fourteen categories (Figure 12). Drains carrying stormwater (for example, gutter drains, basement drains, and land drains) were the most common source of pollution in the watershed. Drains accounted for 56% of the problems in the watershed. Erosion along roads and ditches accounted for another 21% of the problems identified during the survey. Construction site and yard-related pollution sources as well as stream bank erosion accounted for an additional 15% of pollution sources. Above ground broken sewer lines accounted for 6% of the pollution sources. The distribution of these pollution sources in the Stanley Brook watershed is shown on the map in **Figure 13**.

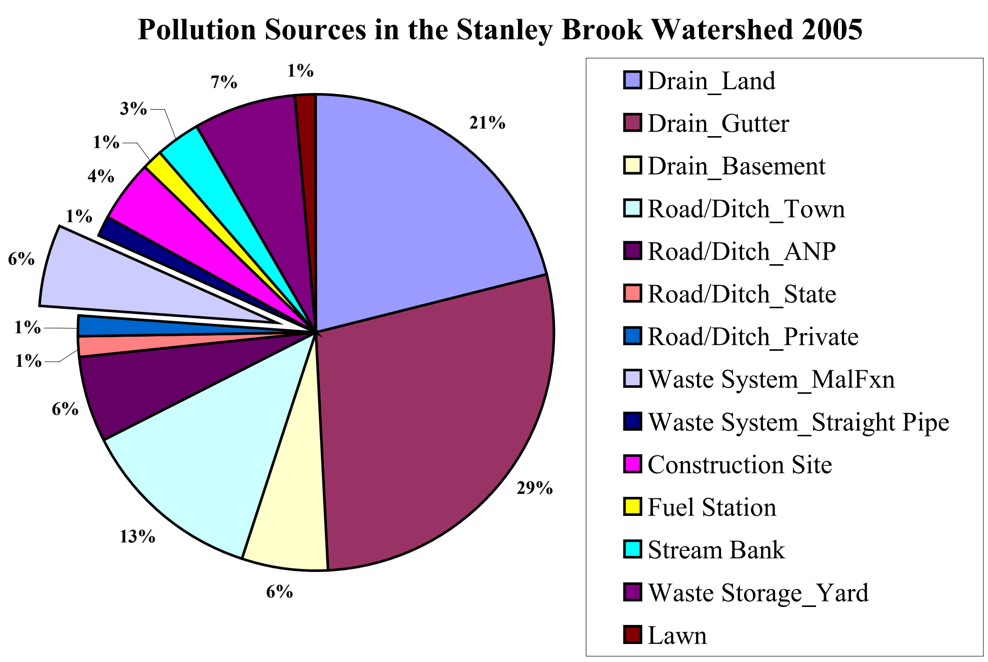

Figure 12. Summary of pollution sources by type: Stormwater drains account for over 50% of the pollution sources in the watershed. Road related erosion problems account for an additional 21% the pollution sources. Although waste system malfunctions (above ground broken sewer lines) account for only 6% of the pollution sources in the Stanley Brook watershed, these have great potential to affect public health.

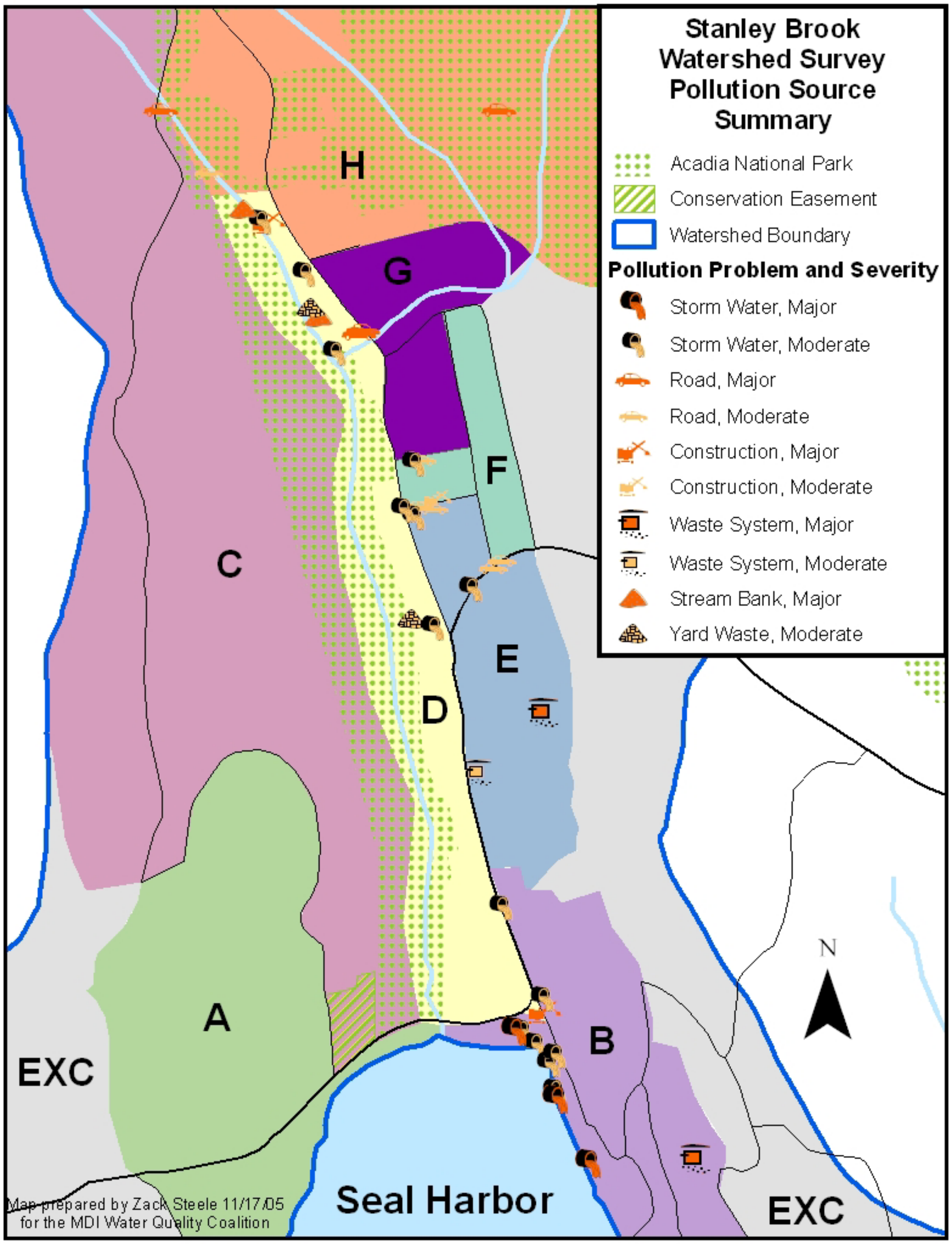

Figure 13. Distribution of representative pollution problems in the Stanley Brook watershed: Problems were ranked by size, frequency, and whether pollutants were carried off site. Major problems are red and indicate either a large or frequent problem that leaves the site with direct flow to a water body. Moderate problems are indicated in orange and are medium in size or occur intermittently and if transported off site, flow through a buffer. Minor problems are not shown on this map.

Pollution Types

All pollution types were observed in the Stanley Brook watershed: bacterial, nutrient, sediment, toxic, and thermal. Depending on the source, the pollutants were identified in different combinations (**Table 1**). For example, pollutants from broken sewer lines were assumed to be a mix of bacterial, nutrient, and toxic pollutants. The distribution of pollution types in the watershed is shown on the map in **Figure 14**. Sediment and nutrient pollution types were each more than twice as common as the other pollutants. Bacterial pollution was associated with 25% of the pollution sources. Above ground broken sewer lines were the most obvious source of human sewage contamination in the watershed. In two instances, a property owner reported having recently fixed a problem on their property. One property owner in sector D had been discharging gray water from a washer and sink into Stanley Brook, but had hooked up to the town sewer line in the last year. Another property owner in Sector B reported that he had repaired an above ground broken sewer line during the time frame of the survey. These improvements in the watershed may account for lower bacterial levels in Stanley Brook and on Seal Harbor Beach in 2005 than in previous years (**Figure 10**).

Pollutants	**Problems**							
	Major		**Moderate**		**Minor**		**Total**	
	#	%	#	%	#	%	#	%
Nutrient	0	0	0	0	2	2.8	2	2.8
Thermal	0	0	3	4.2	6	8.4	9	12.7
Nutrient, Sediment	**8**	**11.3**	**15**	**21.1**	**5**	**7.1**	**28**	**39.5**
Nutrient, Toxic	0	0	0	0	1	1.4	1	1.4
Bacteria, Nutrient	1	1.4	1	1.4	1	1.4	3	4.2
Bacteria, Nutrient, Sediment	0	0	1	1.4	0	0	1	1.4
Bacteria, Nutrient, Toxic	1	1.4	0	0	3	4.2	4	5.6
Nutrient, Sediment, Toxic	1	1.4	0	0	0	0	1	1.4
Nutrient, Sediment, Thermal	1	1.4	5	7.1	5	7.1	11	15.5
Nutrient, Sediment, Toxic, Thermal	1	1.4	0	0	0	0	1	1.4
Bacteria, Nutrient, Sediment, Toxic, Thermal	4	5.6	5	7.1	1	1.4	10	14.1
Total Pollutants	**17**	**23.9**	**30**	**42.3**	**24**	**33.8**	**71**	**100.0**

Table 1 Frequency and relative abundance of pollutants by severity: The most frequently occurring pollutants are nutrients and sediments. Nearly one quarter of the 71 pollution problems in the watershed were scored as major problems. Nearly half of the pollution problems in the watershed were scored as moderate in severity. Nutrients and sediments pose the largest threat to the health of Stanley Brook. Bacteria pose the largest threat to the health of people coming into contact with polluted runoff or polluted recreational waters.

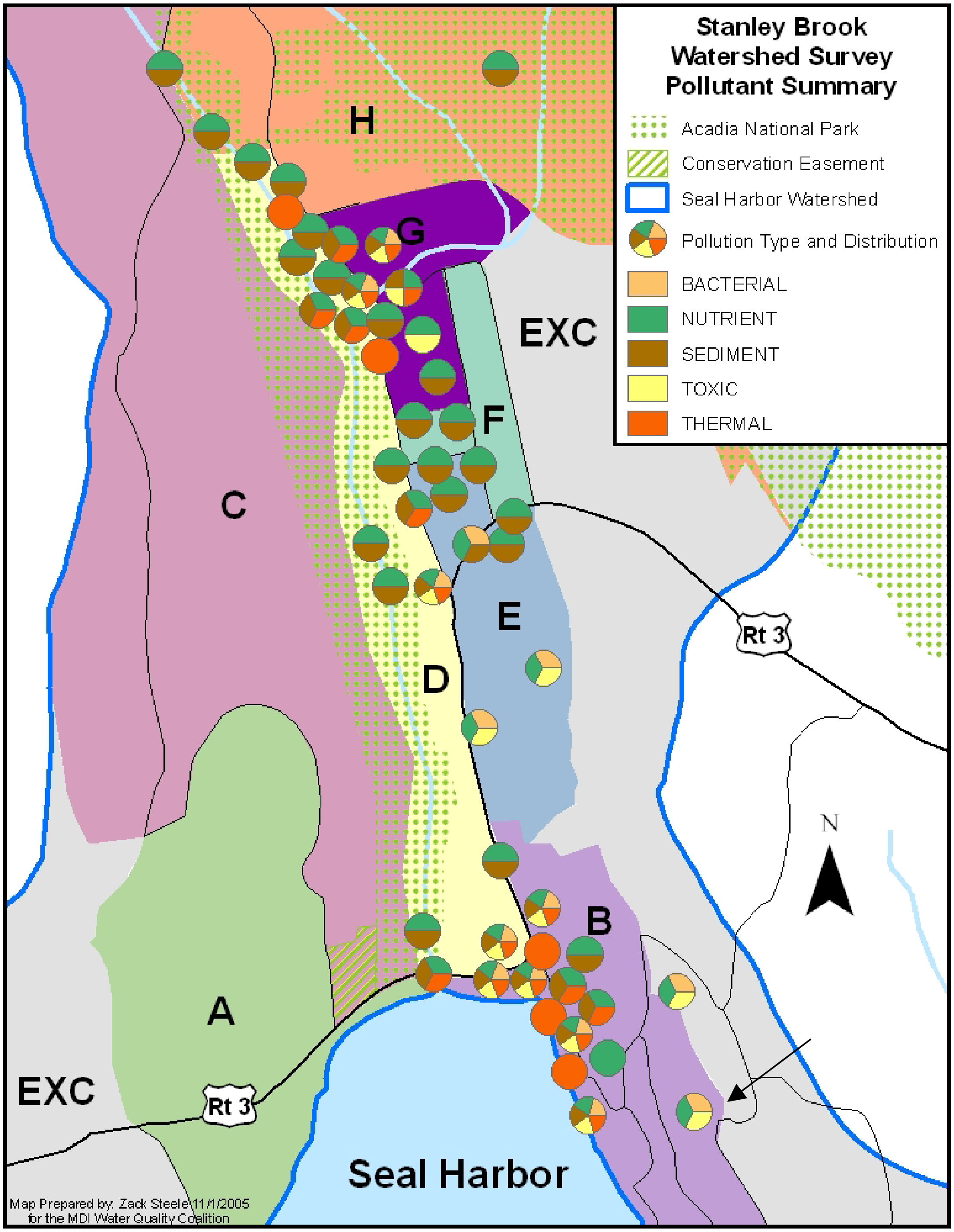

Figure 14. Distribution of pollution types at representative problem sites: Pollution types are represented in pie charts. One pollution source may contain any combination of five pollutant types. For example, a malfunctioning waste system (broken sewer line) in **Figure 13** is represented by a pie chart with green (nutrient), tan (bacteria), and yellow (toxic) pollution types on this map (indicated by an arrow).

Problems and Solutions

The water quality of a stream is related to the amount of development in the watershed. The more impervious surfaces such as houses, paved roads and parking areas in a watershed the greater the impact to water quality. Generally, streams become impacted when a watershed is covered by more than 10% impervious surfaces and impaired when more than 25% of the watershed is developed. If an ideal site is well designed, storm water problems can be minimized. However, sites are usually less than optimal or poorly designed and contribute to a series of cascading problems. Common problems include ditch and road shoulder erosion and storm drain outfalls. In order to consider where to begin addressing pollution problems in the Stanley Brook watershed, pollution sources and problems were grouped into five categories: I. Residential Pollution Sources; II. Neighborhood Pollution Sources; III. Municipal Pollution Sources; IV. Construction Sites as Pollution Sources; and V. Pollution Sources in Acadia National Park. Each of the following sections includes common problems and potential solutions with photographs taken in the Stanley Brook watershed at or around the time of the survey.

I. Residential Pollution Sources

Most residential problems are small scale, easily fixed, and can yield significant benefits. It is important to remember that each problem in a watershed combines with all the other problems to create a cumulative impact.

Impervious surfaces include roofs, roads, and driveways.

Impervious Surface
Increased run off is a problem because it causes unnaturally frequent flood events and soil erosion and decreases the amount of water entering the water table. Impervious surfaces decrease infiltration and increase the rate and temperature of storm water runoff. Gutters concentrate water and increase its velocity often directing storm water off site.

Failed PVC patch in private sewer line.

Sewer Lines Breaks
Cracked or broken private sewer lines are a major public health concern. In parts of the Stanley Brook watershed original connections to town sewer were made with iron sewer lines laid above ground due to the very thin soils on top of granite ledge, and limited summer use. Currently, private sewer lines are aged and prone to breaking. Many have repairs made with PVC, which commonly fail. Property owners bear the cost and responsibility of repair even if their sewer connection is below the break.

Residential Pollution Sources continued

Yard Waste and Debris

Dumping fill over the banks adjacent to Stanley Brook is a current and historic problem. Evidence of historic dumping includes household appliances and other items that can be found along the stream in proximity to multiple properties along Stanley Brook. Current practices include adding fill or dumping yard waste over the stream bank. Some yard waste may include residue from fertilizer and pesticide applications. When organic material washes into the brook, debris can carry both nutrient and toxic pollutants and can cause physical deterioration of aquatic habitat.

Yard waste and sand dumped near the edge of Stanley Brook.

Fertilizers

There was evidence of fertilizer use in the watershed. Fertilizers, when used in excess, can carry nutrients into the brook and onto the beach, resulting in unwanted algal blooms.

Discarded fertilizer bag in the Stanley Brook Watershed.

Grass seed applied to a lawn with fertilizer. This type of grass seed application has been observed in several locations in the watershed, including around the parking lot near the mouth of Stanley Brook.

Residential Solutions

Solutions To Runoff Problems

Disperse rainfall in a drip trench, **vegetative buffer**, **rain garden**, or store water in rain barrel for irrigation. Implement **Best Management Practices (BMPs)** to reduce the cumulative impact storm water has on Stanley Brook. Rain barrels, rain gardens, **retention trenches**, and grass **swales** are all effective BMPs to disperse rainfall and reduce storm water runoff. There are numerous BMPs outlined in *A Stormwater Management for Maine: Best Management Practices*, published by the Maine Department of Environmental Protection[7].

A rain barrel can be used to collect water for irrigation.

A rain garden will absorb roof runoff and slow the flow of water off of a property.

Solutions To Sewer Line Breaks

Inspect the length of both surface and buried sewer lines for breaks before each summer season. Create agreements among the users of shared private sewer lines. Short-term: patch and repair broken sewer lines. Long term: consider rerouting lines and replacing iron & PVC sewer lines with High Density Polyethylene (HDPE) sewer lines. (HDPE is a type of plastic with high tensile strength.)

Solutions To Yard Waste Accumulation and Fertilizers

Refrain from dumping yard waste and other debris near the brook. Stabilize existing stream banks by preserving or planting vegetative buffers. Chip or compost yard waste away from stream banks and use the organic matter to build the soils in a garden. Organic matter holds 20 times its weight in water and improves infiltration. Test soil before adding fertilizers. Seek out alternatives to pesticides. Carefully observe label recommendations for application rates to avoid overuse which is both harmful and costly.

II. Neighborhood Pollution Sources

One or two residents cannot easily resolve neighborhood pollution problems. Every property owner along a road may have to make similar changes to have a positive impact downstream. Neighbors might have to seek assistance in planning a larger engineering project to deal with the cumulative runoff from all of their properties.

Ditches and Road Edges

Stormwater that is directed through roadside ditches can cause erosion. Road shoulders in Seal Harbor are prone to erode because they lack vegetation, mulch, or rip rap that can hold soils in place. Stormwater carries eroding sediments into storm drains, which ultimate empty near the brook or on the beach.

Road shoulder erosion results in sediments flowing directly into storm drains.

Neighborhood Solutions

Solution to Ditches and Road Edges

Improve road shoulders and implement BMPs to reduce runoff velocity and trap sediments before they reach the storm drain. These may include **check dams** and rip rap. Discharges of water into a vegetative buffer or **detention basin** are some practices that can be implemented in a neighborhood. These practices decrease runoff velocity, increase infiltration, and reduce pollutant loads.

Private road shoulder covered with mulch to prevent shoulder erosion.

III. Municipal Pollution Sources

Some pollution problems have to be dealt with by the town; residents cannot solve problems on town property or that are the responsibility of the town. (However, they can communicate with town officials and participate in town government.)

Heavy rains in 2005 washed out the road adjacent to Seal Harbor Beach.

Road Washouts

When a road washes out near the brook or beach, pollutants, in particular sediments and nutrients contaminate the water. Road washouts can occur most easily in areas where there is no vegetation along the roadside holding sediments in place.

Land Drains

Land drains direct stormwater into Stanley Brook and onto Seal Harbor Beach, the second most popular coastal swim beach on Mt. Desert Island. Land drains can transport water from a considerable distance. They pose a bacterial, nutrient, sediment, and toxic threat to recreational users of the beach and harbor.

There are several land drains directing water onto Seal Harbor Beach.

Pavement around the Rte. 3 bridge directs stormwater into Stanley Brook.

Road Runoff

When it rains, polluted stormwater flows down many roads in the watershed. Much of the runoff in Seal Harbor is directed toward Stanley Brook or Seal Harbor Beach.

Curbing can prevent lawns from eroding…

However, this curbing is being used to direct runoff into Stanley Brook.

Municipal Solutions

Solutions to Road Washouts

Survey roads in town to determine which are susceptible to or have a history of washing out. Plant vegetative buffers and/or install curbing where road washouts have occurred or are anticipated.

Solutions to Land Drains

Redirect land drains or install **detention basins** below areas where water from land drains is flowing.

Solutions to Road Runoff

Reduce the amount of pollution that ends up in stormwater by encouraging BMPs among residents and distributing dog waste disposal stations throughout the watershed. Consider treatment of water that runs off of roads. Repair or re-engineer roads that permit stormwater to run directly into Stanley Brook without benefit of a buffer.

Seal Harbor has some pet waste disposal stations. Additional stations may help to reduce bacteria in stormwater runoff.

IV. Construction Sites as Pollution Sources

Construction sites can contribute significant amounts of sediment and nutrients to a water source if not well sited or if BMPs are not implemented.

Soil Erosion

Soil erosion is a problem on construction sites, especially on hills. Once soil is disturbed at a construction site, it is easily carried away by rainfall. Soils contain nutrients, such as nitrogen and phosphorus that can lead to **eutrophication** in a stream.

A tributary feeding Stanley Brook was diverted from its natural course at this new home site.

Poor Maintenance of Construction Sites

Plastic silt fences and hay bale barriers can prevent sediments from reaching sensitive wetland areas, but must be maintained throughout the life of the construction project. Construction sites can have considerable short term and long-term impacts in watersheds.

Work around this driveway has disturbed natural vegetation. Soil can be transported in rainwater over the impervious driveway surface.

Stream Diversion

Changing the direction and flow of streams is a common practice in urban watersheds where land is desired for human use. As land values increase people are willing to invest more in infrastructure to control water. This practice leads to degraded habitat and impacts on water quality.

Silt fence and bales of hay failed to contain sediments at this construction site near Stanley Brook.

Solutions To Construction Site Problems

Hire contractors who are trained in construction site BMPs including installation and maintenance of silt barriers. Consult the Hancock County Soil and Water Conservation District for advice. Maintain adequate buffers near construction sites. Encourage development in more suitable locations.

V. Pollution Sources in Acadia National Park

Shoulder erosion on roadsides was the only pollution problem observed in Acadia National Park. At the start of the watershed survey there were concerns about the impact from Wildwood Stables. There is a manure management protocol in place that appears to be working.

Shoulder erosion was observed along the road near Stanley Brook at several locations in Acadia National Park.

Solutions to Pollution Sources in Acadia National Park

Move stones closer to the edge of the road to discourage bicyclists from riding over vegetation and to discourage motorists from pulling over on the side of the road. Plant new vegetation that might serve the same function and stabilize soils that have been disturbed.

Next Steps for Stakeholders in the Future of Stanley Brook and Seal Harbor Beach (by 2007)

The next steps for mitigating pollution problems in the Stanley Brook Watershed will require some oversight by people who care about the future of Seal Harbor. A Watershed Action Plan Steering Committee, made up of members of the Stanley Brook Watershed Survey advisory committee, volunteer surveyors, residents, and other interested parties can make short-term decisions and begin long-term planning for the future of the Stanley Brook watershed. This group can oversee next steps, which should include:

- Developing a work plan with Hancock County Soil and Water Conservation District to prioritize problems, make decisions about projects to mitigate the impact of pollution in the watershed, seek funding sources, and educate the community.

- Designing a plan for inspections of all waste treatment systems and sewer lines before the start of each summer season.

- Initiating a storm event-monitoring project to identify which pollution sources are most severely impacting the stream and beach.

- Adopting responsible practices throughout the watershed. Everyone can do something.

Recommendations

After completing the Stanley Brook Watershed Survey, which was uniquely designed to address habitat degradation in Stanley Brook and public health issues at Seal Harbor Beach, we invite all stakeholders in the future of the watershed to consider what role they can play in preserving and improving water quality and promoting a healthy watershed.

What Can Residents Do?

- Voluntarily address issues on their own properties, the most important of which is fixing cracked and broken sewer lines and maintaining them every year. It cannot be ruled out that the public health issue at Seal Harbor Beach is in part related to broken sewer lines in the watershed. Although they appear to be far away from the brook and the beach, contaminated water can run underground and find its way to coastal waters.
- Assess what is possible in terms of reducing runoff from individual properties. If a gutter can be re-directed, or a garden or vegetative buffer can be installed to catch runoff from roofs, patios, walkways, driveways, or other impervious surfaces, every effort should be made to do so.
- Implement Best Management Practices on individual properties including limiting use of fertilizers and pesticides, picking up dog feces, maintaining gravel driveways, refraining from washing cars and lawn furniture where runoff will end up in storm drains or directly in the brook, and re-planting after erosion or loss of trees.

What Can Neighbors Do?

- Form neighborhood associations or action committees in communities with clusters of common problems to address collective issues. There is significant runoff from properties on Rte. 3, Main Street and Jordan Pond Road. Properties in these areas are contributing to the flow of pollutants to local storm drains. This is due to the fact that lot sizes are small with a significant percentage of lot coverage by impervious surfaces. In addition, many houses and garages are located very close to the road. Often, there is no place to re-direct runoff from gutters or roofs or to plant a garden or buffer. Neighbors in these areas should consider working with their town, the Hancock County Soil and Water Conservation District and Acadia National Park to identify community solutions such as a community detention pond or swale.

What Can The Town Do?

- Help neighborhoods form associations or action committees so that residents in these areas can address problems together that they cannot solve individually.
- Address roadway washouts immediately after they happen, especially those in close proximity to a storm water catch basin or next to the beach or brook. If the state has jurisdiction over a roadway, town officials need to advocate for road repairs in areas that are heavily impacting Stanley Brook (in particular, the area where the Rte. 3 crosses Stanley Brook).
- Prioritize road sand and gravel clean up before spring rains begin. These are major pollutants in storm water entering Stanley Brook.
- Direct flow from fire hydrants that are being flushed away from impervious surfaces and away from Stanley Brook or Seal Harbor Beach.
- Establish a working relationship with Acadia National Park to mitigate runoff impacts on Stanley Brook. The Town and Acadia National Park should consider a joint clean up of the landfill behind Main Street residences.
- Install more dog waste collection stations around town, especially at the Seal Harbor Beach parking lot.
- Support ongoing water quality studies in Stanley Brook, including research to determine which factors most influence the level of bacterial contamination during the summer months.
- Continue participation in Maine Healthy Coastal Beaches Program in order to keep the public informed of the status of water quality at Seal Harbor Beach.
- Require that developers use Best Management Practices. Be certain that these Best Management Practices are spelled out in the comprehensive plan. Up date land use ordinances to reflect the comprehensive plan. Inspect construction sites often. Take action when violations occur.
- Consider storm water management ordinances.
- Educate existing and new community members about the town's commitment to healthy watersheds.
- Support watershed-wide activities that will protect habitat and improve water quality in Stanley Brook at Seal Harbor Beach.

What Can Developers Do?

- Consider creative approaches to land use, minimizing the amount of impervious surface added to a site and preserving natural buffers.
- Plan to develop with the natural flow of Stanley Brook and its tributaries in mind.
- Minimize runoff from construction sites. Use Best Management Practices every day that a site is under construction, including mulching and seeding disturbed areas, installing silt fences and filtering water being drained off site.

What Can Acadia National Park Do?

- Maintain roadways near Stanley Brook. Minimize areas where cars can pull over near Stanley Brook.
- Continue Best Management Practices at Wildwood Stables.
- Reach out and offer resources to residents, neighborhood associations, and town officials to help initiate mitigation and restoration projects.
- Offer technical guidance and expertise to community members involved in water quality studies, stream and coastal clean-ups, habitat restoration, and storm water mitigation.

Glossary

Best Management Practice (BMP): Actions or structures that reduce or treat polluted runoff and improve water quality, such as those in *Stormwater Management for Maine:Best Management Practices* published by the Maine Department of Environmental Protection[7].

Check Dam: An earthen or log structure used to reduce water velocities, promote sediment deposition and enhance infiltration of water.

Detention Basin (Dry Pond): An impoundment designed to temporarily store runoff and release it at a controlled rate. It is designed for quantity control and can help with pollution and erosion problems

Eutrophication: Nutrient enrichment of water such that algae blooms occur and disrupt natural cycles.

Impervious Surface: any area that cannot adequately absorb rainfall.

Land Drain: a structure that conveys water including catch basins, culverts, and drain tiles.

Non-point Source Pollution: pollutants that are picked up by storm water including, bacteria, nutrients, sediments, toxics, and thermal.

Rain Garden: a garden planted with water tolerant species that collects rainwater and allows it to infiltrate the soil.

Retention Trench: a ditch or channel designed to hold runoff without release except by means of evaporation or infiltration

Rip Rap: Stones used to hold soils in place.

Silt Barrier: a structure, such as a plastic fence or hay bale, that prevents sediments from washing into a water body.

Swale: a broad shallow earthen channel with a dense stand of vegetation designed to promote infiltration of water through soil and trap pollutants by filtration through grass.

Vegetative Buffer: an area adjacent to a water body that reduces the impacts of pollutants by holding soil in place and absorbing nutrients and pollutants.

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Appendix A
Water Quality Data from Stanley Brook and Seal Harbor 2003-2005

SiteName	SiteID	Date	Rainfall	Rain (Inches)	Tide Stage	Water Temp (C)	Salinity ppt	Entero-coccus
Seal Harbor Center	63.1	6/27/2003	None	0	9	16	31	
Seal Harbor Center	63.1	6/30/2003	None	0	3	15	29	
Seal Harbor Center	63.1	7/5/2003	None	0	6	20	27	0
Seal Harbor Center	63.1	7/11/2003	Heavy	0	12	11	25	51
Seal Harbor Center	63.1	7/12/2003	Heavy	0.44	8	13	30	20
Seal Harbor Center	63.1	7/19/2003	Heavy	0.01	1	13	32	0
Seal Harbor Center	63.1	7/22/2003	Light	0	10	14.5	19	243
Seal Harbor Center	63.1	7/23/2003	Light	1.11	2		4.5	4352
Seal Harbor Center	63.1	7/26/2003	None	0	7	15	31	0
Seal Harbor Center	63.1	7/28/2003	Light	0.01	7	14	31.5	187
Seal Harbor Center	63.1	8/2/2003	Heavy	0.04	4	14.5	33	0
Seal Harbor Center	63.1	6/9/2004	None	0	1		32	0
Seal Harbor Center	63.1	6/23/2004	Light	0.24	3	16	26	0
Seal Harbor Center	63.1	6/29/2004	Medium	0.16	9	11	21	20
Seal Harbor Center	63.1	7/6/2004	Light	0.04	2	12.5		0
Seal Harbor Center	63.1	7/13/2004	None	0	8	15	28	10
Seal Harbor Center	63.1	7/20/2004	Light	0.29	10	17	32.5	10
Seal Harbor Center	63.1	7/26/2004	None	0	10	14	34	0
Seal Harbor Center	63.1	7/28/2004	Medium	0.5	2	14	33	30
Seal Harbor Center	63.1	8/2/2004	None	0	7	14.5	32.5	10
Seal Harbor Center	63.1	8/3/2004	None	0	6	18	31	41
Seal Harbor Center	63.1	8/9/2004	Light	0.08	11	15	25	110
Seal Harbor Center	63.1	8/14/2004	Heavy	3.61	8	14.5	10	425
Seal Harbor Center	63.1	8/24/2004	None	0	4	12.5	34	10
Seal Harbor Center	63.1	9/1/2004	None	0	5	13	34	10
Seal Harbor Center	63.1	3/29/2005	Heavy	3.75	2	3.5	13	61
Seal Harbor Center	63.1	3/29/2005	Heavy	3.75	7		0	3282
Seal Harbor Center	63.1	5/24/2005	Heavy	0.72	8			41
Seal Harbor Center	63.1	6/7/2005	Light	0	3	8	13	41
Seal Harbor Center	63.1	6/8/2005	None	0	4	11	30	0
Seal Harbor Center	63.1	6/9/2005	None	0	7	17	32	10
Seal Harbor Center	63.1	6/22/2005	Light	0.25	5	7	31	0
Seal Harbor Center	63.1	6/29/2005	None	0	1	16		0
Seal Harbor Center	63.1	7/6/2005	Light	0.01	6	13.5	28	0
Seal Harbor Center	63.1	7/13/2005	None	0	3	14	33	0
Seal Harbor Center	63.1	7/20/2005	None	0	7	13	33	10
Seal Harbor Center	63.1	7/26/2005	Light	0.5	11	13	34	0
Seal Harbor Center	63.1	7/26/2005	Light	0.5	10	11.5	35	10
Seal Harbor Center	63.1	7/26/2005	Light	0.5	9	11.5	32	41
Seal Harbor Center	63.1	7/27/2005	None	0	3	16	32	0
Seal Harbor Center	63.1	7/27/2005	None	0	9	13	34	0

SiteName	SiteID	Date	Rainfall	Rain (Inches)	Tide Stage	Water Temp (C)	Salinity ppt	Entero-coccus
Seal Harbor Center	63.1	7/27/2005	None	0	8	12	32	0
Seal Harbor Center	63.1	7/27/2005	None	0	10	12.5	32	10
Seal Harbor Center	63.1	7/28/2005	Light	0.16	8	12.5	33	0
Seal Harbor Center	63.1	7/28/2005	Light	0.16	9	11.5	33	0
Seal Harbor Center	63.1	7/28/2005	Light	0.16	10	12	32	0
Seal Harbor Center	63.1	8/3/2005	Light	0.17	10	12.5	32	10
Seal Harbor Center	63.1	8/10/2005	None	0	2	15		0
Seal Harbor Center	63.11	7/19/2003	Heavy	0.01	1	13	30	10
Seal Harbor Left	64	6/27/2003	None	0	9	15	33	
Seal Harbor Left	64	6/30/2003	None	0	3	16	30	
Seal Harbor Left	64	7/5/2003	None	0	6	17.5	32	0
Seal Harbor Left	64	7/11/2003	Heavy	0	12	11		0
Seal Harbor Left	64	7/19/2003	Heavy	0.01	1	14.5	29	0
Seal Harbor Left	64	7/22/2003	Light	0	10	14	21	30
Seal Harbor Left	64	7/23/2003	Light	1.11	2		27.5	1789
Seal Harbor Left	64	7/26/2003	None	0	7	17.5	31	0
Seal Harbor Left	64	7/28/2003	Light	0.01	7	14	33	0
Seal Harbor Left	64	8/2/2003	Heavy	0.04	4	15.5	33	41
Seal Harbor Left	64	6/9/2004	None	0	1	15	27	0
Seal Harbor Left	64	6/23/2004	Light	0.24	3	14	31	0
Seal Harbor Left	64	6/29/2004	Medium	0.16	9	19	32	0
Seal Harbor Left	64	7/6/2004	Light	0.04	2	14		0
Seal Harbor Left	64	7/13/2004	None	0	8	15.5	22	10
Seal Harbor Left	64	7/20/2004	Light	0.29	10	19	32.5	0
Seal Harbor Left	64	7/26/2004	None	0	10	15	31	0
Seal Harbor Left	64	7/28/2004	Medium	0.5	2	13	34.5	0
Seal Harbor Left	64	8/2/2004	None	0	7	15.5	32	20
Seal Harbor Left	64	8/3/2004	None	0	6	16	33	52
Seal Harbor Left	64	8/9/2004	Light	0.08	11	17	33	0
Seal Harbor Left	64	8/14/2004	Heavy	3.61	8	15	29	109
Seal Harbor Left	64	8/24/2004	None	0	4	12.5	33.5	10
Seal Harbor Left	64	9/1/2004	None	0	5	14	34	160
Seal Harbor Left	64	5/24/2005	Heavy	0.72	8			20
Seal Harbor Left	64	6/7/2005	Light	0	3	10	27	0
Seal Harbor Left	64	6/8/2005	None	0	4	10	31.5	0
Seal Harbor Left	64	6/9/2005	None	0	7	15	29	0
Seal Harbor Left	64	6/22/2005	Light	0.25	5	7	34	0
Seal Harbor Left	64	6/29/2005	None	0	1	16	32	0
Seal Harbor Left	64	7/6/2005	Light	0.01	6	14.5	29	41
Seal Harbor Left	64	7/13/2005	None	0	3	14	33	0
Seal Harbor Left	64	7/20/2005	None	0	7	14	34	31
Seal Harbor Left	64	7/26/2005	Light	0.5	9	11.5	34	10
Seal Harbor Left	64	7/26/2005	Light	0.5	11	12	34	0
Seal Harbor Left	64	7/26/2005	Light	0.5	10	11.5	35	20

SiteName	SiteID	Date	Rainfall	Rain (Inches)	Tide Stage	Water Temp (C)	Salinity ppt	Entero-coccus
Seal Harbor Left	64	7/27/2005	None	0	3	15	31	0
Seal Harbor Left	64	7/27/2005	None	0	9	13	30	41
Seal Harbor Left	64	7/27/2005	None	0	8	13	33	10
Seal Harbor Left	64	7/27/2005	None	0	10	14	34	0
Seal Harbor Left	64	7/28/2005	Light	0.16	9	12	33	0
Seal Harbor Left	64	7/28/2005	Light	0.16	7	11	32	0
Seal Harbor Left	64	7/28/2005	Light	0.16	8	11.5	32	0
Seal Harbor Left	64	8/3/2005	Light	0.17	10	13	34	0
Seal Harbor Left	64	8/10/2005	None	0	2	16		0
Seal Harbor Right	63	6/27/2003	None	0	9	16	31	
Seal Harbor Right	63	6/30/2003	None	0	3	15	24	
Seal Harbor Right	63	7/5/2003	None	0	6	17	33	10
Seal Harbor Right	63	7/11/2003	Heavy	0	12	11	33	0
Seal Harbor Right	63	7/19/2003	Heavy	0.01	1	13	32	30
Seal Harbor Right	63	7/22/2003	Light	0	10	14	31	0
Seal Harbor Right	63	7/23/2003	Light	1.11	2		22	2602
Seal Harbor Right	63	7/26/2003	None	0	7	16	32	0
Seal Harbor Right	63	7/28/2003	Light	0.01	7	14	34.5	132
Seal Harbor Right	63	8/2/2003	Heavy	0.04	4	13	35	10
Seal Harbor Right	63	6/9/2004	None	0	1	17	29	0
Seal Harbor Right	63	6/23/2004	Light	0.24	3	14	30	0
Seal Harbor Right	63	6/29/2004	Medium	0.16	9	10.5	34	0
Seal Harbor Right	63	7/6/2004	Light	0.04	2	13		10
Seal Harbor Right	63	7/13/2004	None	0	8	14	31	31
Seal Harbor Right	63	7/20/2004	Light	0.29	10	18	31	51
Seal Harbor Right	63	7/26/2004	None	0	10	16.5	33	10
Seal Harbor Right	63	7/28/2004	Medium	0.5	2	15	34	20
Seal Harbor Right	63	8/2/2004	None	0	7	16	33	20
Seal Harbor Right	63	8/3/2004	None	0	6	18	32	31
Seal Harbor Right	63	8/9/2004	Light	0.08	11	16	34	10
Seal Harbor Right	63	8/14/2004	Heavy	3.61	8	14.5	31	74
Seal Harbor Right	63	8/24/2004	None	0	4	14.5	34	0
Seal Harbor Right	63	9/1/2004	None	0	5	13	35	107
Seal Harbor Right	63	5/24/2005	Heavy	0.72	8			332
Seal Harbor Right	63	6/7/2005	Light	0	3	11	27	40
Seal Harbor Right	63	6/8/2005	None	0	4	13	32	0
Seal Harbor Right	63	6/9/2005	None	0	7	14	27.5	0
Seal Harbor Right	63	6/22/2005	Light	0.25	5	7	34	0
Seal Harbor Right	63	6/29/2005	None	0	1	16	29	0
Seal Harbor Right	63	7/6/2005	Light	0.01	6	14	30	0
Seal Harbor Right	63	7/13/2005	None	0	3	14	34	0
Seal Harbor Right	63	7/20/2005	None	0	7	14	34	10
Seal Harbor Right	63	7/26/2005	Light	0.5	11	14	33	10
Seal Harbor Right	63	7/26/2005	Light	0.5	10	11.5	34	10

SiteName	SiteID	Date	Rainfall	Rain (Inches)	Tide Stage	Water Temp (C)	Salinity ppt	Entero-coccus
Seal Harbor Right	63	7/26/2005	Light	0.5	9	11.5	34	0
Seal Harbor Right	63	7/27/2005	None	0	3		30	0
Seal Harbor Right	63	7/27/2005	None	0	8	12	32	0
Seal Harbor Right	63	7/27/2005	None	0	9	13	34	0
Seal Harbor Right	63	7/27/2005	None	0	10	14	34	0
Seal Harbor Right	63	7/28/2005	Light	0.16	10	12	32	0
Seal Harbor Right	63	7/28/2005	Light	0.15	9	11.5	33	10
Seal Harbor Right	63	7/28/2005	Light	0.16	9	11.5	33	0
Seal Harbor Right	63	8/3/2005	Light	0.17	10	12.5	34	0
Seal Harbor Right	63	8/10/2005	None	0	2	18	33	0
Sewage Pipe	63.22	8/10/2004	None	0	12			0
Stanley Brook	63.2	6/27/2003	None	0	9	16		
Stanley Brook	63.2	6/30/2003	None	0	3	13	0	
Stanley Brook	63.2	7/5/2003	None	0	6	17		
Stanley Brook	63.2	7/11/2003	Heavy	0	12	12	34	
Stanley Brook	63.2	7/12/2003	Heavy	0.44	8	13.5	0	
Stanley Brook	63.2	7/19/2003	Heavy	0.01	1			74
Stanley Brook	63.2	7/19/2003	Heavy	0.01	1	14.5		160
Stanley Brook	63.2	7/22/2003	None	0	10	16.5		20
Stanley Brook	63.2	7/23/2003	Light	1.11	2		0	2723
Stanley Brook	63.2	7/26/2003	None	0	7	16	0	187
Stanley Brook	63.2	7/28/2003	Light	0.01	7	14		216
Stanley Brook	63.2	8/2/2003	Heavy	0.04	4	15	0	537
Stanley Brook	63.2	6/9/2004	None	0	1	13	0	0
Stanley Brook	63.2	6/23/2004	Light	0.24	3	13	2.5	0
Stanley Brook	63.2	6/29/2004	Medium	0.16	9	11	1	0
Stanley Brook	63.2	7/6/2004	Light	0.04	2	12		63
Stanley Brook	63.2	7/13/2004	None	0	8	14.5	1	41
Stanley Brook	63.2	7/20/2004	Light	0.29	10	17	1	52
Stanley Brook	63.2	7/26/2004	None	0	10	14.5	0	354
Stanley Brook	63.2	7/28/2004	Medium	0.5	2	13	0	459
Stanley Brook	63.2	8/2/2004	None	0	7	19	0	231
Stanley Brook	63.2	8/3/2004	None	0	6	20	1	249
Stanley Brook	63.2	8/9/2004	Light	0.08	11	15	0	369
Stanley Brook	63.2	8/10/2004	None	0	12			487
Stanley Brook	63.2	8/12/2004	None	0	12	14.5		1334
Stanley Brook	63.2	8/14/2004	Heavy	3.61	8	16		354
Stanley Brook	63.2	8/19/2004	None	0	3	13.5		31
Stanley Brook	63.2	8/24/2004	None	0	4	14.5	1	97
Stanley Brook	63.2	9/1/2004	None	0	5	15	1	110
Stanley Brook	63.2	9/9/2004	Heavy	1.09	11	13	1	1678
Stanley Brook	63.2	10/5/2004	None	0	2	9		0
Stanley Brook	63.2	3/29/2005	Heavy	3.75	7	2	0	10
Stanley Brook	63.2	5/17/2005	Light	0.05	11	7		0

SiteName	SiteID	Date	Rainfall	Rain (Inches)	Tide Stage	Water Temp (C)	Salinity ppt	Entero-coccus
Stanley Brook	63.2	5/24/2005	Heavy	0.72	8	7		0
Stanley Brook	63.2	5/24/2005	Heavy	0.72	8	7		0
Stanley Brook	63.2	6/7/2005	Light	0	3	9	0	0
Stanley Brook	63.2	6/8/2005	None	0	4	13	0	0
Stanley Brook	63.2	6/9/2005	None	0	7	5	0	0
Stanley Brook	63.2	6/22/2005	Light	0.25	5	10	4	0
Stanley Brook	63.2	6/29/2005	None	0	1	16	1	0
Stanley Brook	63.2	7/6/2005	Light	0.01	6	12	0	0
Stanley Brook	63.2	7/13/2005	None	0	3	13	1	0
Stanley Brook	63.2	7/20/2005	None	0	7	15	2	0
Stanley Brook	63.2	7/26/2005	Light	0.5	9	14	2	146
Stanley Brook	63.2	7/26/2005	Light	0.5	11	14	2	85
Stanley Brook	63.2	7/27/2005	None	0	4	18	0	0
Stanley Brook	63.2	7/27/2005	None	0	8	15	0	98
Stanley Brook	63.2	7/27/2005	None	0	10	15	0	41
Stanley Brook	63.2	7/28/2005	Light	0.16	9	16	1	10
Stanley Brook	63.2	7/28/2005	Light	0.16	7	15	1	0
Stanley Brook	63.2	7/29/2005	None	0	11	14	1	10
Stanley Brook	63.2	8/3/2005	Light	0.17	8	16	2	41
Stanley Brook	63.2	8/3/2005	Light	0.17	10	17	2	74
Stanley Brook	63.2	8/10/2005	None	0	2	17	2	132
Stanley Brook	63.2	8/15/2005	Heavy	1.05	12	17.5	0	278
Stanley Brook	63.2	8/21/2005	None	0	7	16	17	199
Stanley Brook	63.21	8/19/2004	None	0	3	15.5		250
Stanley Brook	63.21	8/24/2004	None	0	4	15		85
Stanley Brook	63.21	9/1/2004	None	0	5	17	2	247
Stanley Brook	63.21	9/9/2004	Heavy	1.09	11	14		860
Stanley Brook	63.21	8/15/2005	Heavy	1.05	12			565
Stanley Brook	63.25	7/19/2003	Heavy	0.01	1			185
Stanley Brook	63.26	7/22/2003	Light	0	10	16.5		240
Stanley Brook	63.26	7/28/2003	Light	0.01	7	14		41
Stanley Brook	63.26	8/10/2004	None	0	12	15		73
Stanley Brook	63.27	7/22/2003	Light	0	10	16.5		156
Stanley Brook	63.27	7/26/2003	None	0	7	18	0	63
Stanley Brook	63.27	7/28/2003	Light	0.01	7	14		63
Stanley Brook	63.27	8/10/2004	None	0	12			86
Stanley Brook	63.39	8/12/2004	None	0	12	14		10
Stanley Brook	63.4	8/10/2004	None	0	12	15		41
Stanley Brook	63.4	8/12/2004	None	0	12	14.5		10
Stanley Brook	63.4	8/19/2004	None	0	3	13		10
Stanley Brook	63.4	8/24/2004	None	0	4	14		0
Stanley Brook	63.4	9/1/2004	None	0	5	14	0	20
Stanley Brook	63.4	9/9/2004	Heavy	1.09	11	13		1160
Stanley Brook	63.4	10/5/2004	None	0	2	8.5		0

SiteName	SiteID	Date	Rainfall	Rain (Inches)	Tide Stage	Water Temp (C)	Salinity ppt	Entero-coccus
Stanley Brook	63.4	3/29/2005	Heavy	3.75	7	1.5	0	0
Stanley Brook	63.4	3/29/2005	Heavy	3.75	7	1.5	0	41
Stanley Brook	63.4	5/17/2005	Light	0.05	11	6		0
Stanley Brook	63.4	5/17/2005	Light	0.05	11	7		0
Stanley Brook	63.4	5/24/2005	Heavy	0.72	8	5.5		0
Stanley Brook	63.4	5/24/2005	Heavy	0.72	8	6		10
Stanley Brook	63.4	6/29/2005	None	0	1	14	1	0
Stanley Brook	63.4	7/6/2005	Light	0.01	6	12.5	0	0
Stanley Brook	63.4	7/27/2005	None	0	11	16.5	0	20
Stanley Brook	63.4	8/3/2005	Light	0.17	8	16.5	1	31
Stanley Brook	63.4	8/15/2005	Heavy	1.05	12	17	0	148
Stanley Brook	63.4	8/21/2005	None	0	7	16	0	0
Stanley Brook	63.5	8/12/2004	None	0	12	14		31
Stanley Brook	63.5	8/19/2004	None	0	3	13		31
Stanley Brook	63.54	8/12/2004	None	0	12			108
Stanley Brook	63.55	8/12/2004	None	0	12	12		0
Stanley Brook	63.56	8/12/2004	None	0	12			0
Stanley Brook	63.6	7/12/2003	Heavy	0.44	8	11.5	0	
Stanley Brook	63.6	7/28/2003	Light	0.01	7	14		10
Stanley Brook	63.6	8/12/2004	None	0	12	14.5		10
Stanley Brook	63.6	8/14/2004	Heavy	3.61	8	16		256
Stanley Brook	63.6	8/19/2004	None	0	3	13		108
Stanley Brook	63.6	8/24/2004	None	0	4	14		10
Stanley Brook	63.6	9/1/2004	None	0	5	13.5	0	20
Stanley Brook	63.6	9/9/2004	Heavy	1.09	11	13		512
Stanley Brook	63.6	10/5/2004	None	0	2	8.5		0
Stanley Brook	63.6	3/29/2005	Heavy	3.75	7	0.5	0	30
Stanley Brook	63.6	5/17/2005	Light	0.05	11	5		0
Stanley Brook	63.6	5/17/2005	Light	0.05	11	6.5		0
Stanley Brook	63.6	5/24/2005	Heavy	0.72	8	6		0
Stanley Brook	63.6	5/24/2005	Heavy	0.72	8	5.5		0
Stanley Brook	63.6	6/29/2005	None	0	1	15	1	0
Stanley Brook	63.6	7/6/2005	Light	0.01	6	12	1	0
Stanley Brook	63.6	7/27/2005	None	0	4	18	0	20
Stanley Brook	63.6	8/3/2005	Light	0.17	8	16	1	0
Stanley Brook	63.6	8/15/2005	Heavy	1.05	12	16	0	108
Stanley Brook	63.6	8/21/2005	None	0	7	18	0	0
Stanley Brook	63.7	7/28/2003	Light	0.01	7	14		20
Stanley Brook	63.8	7/28/2003	Light	0.01	7	14		10
Stanley Brook	63.8	3/29/2005	Heavy	3.75	7	1.5	0	10
Stanley Brook	63.8	5/17/2005	Light	0.05	11	5		41
Stanley Brook	63.8	5/24/2005	Heavy	0.72	8	7		0
Stanley Brook	63.8	5/24/2005	Heavy	0.72	8	6		10
Stanley Brook	63.8	6/29/2005	None	0	1	12.5	1	0

SiteName	SiteID	Date	Rainfall	Rain (Inches)	Tide Stage	Water Temp (C)	Salinity ppt	Entero-coccus
Stanley Brook	63.8	7/6/2005	Light	0.01	6	11	1	10
Stanley Brook	63.8	7/27/2005	None	0	4	15.5	0	84
Stanley Brook	63.8	8/3/2005	Light	0.17	8	14	3	20
Stanley Brook	63.8	8/15/2005	Heavy	1.05	12	16	0	0
Stanley Brook	63.8	8/21/2005	None	0	7	17	0	10
Stanley Brook	63.81	7/28/2003	Light	0.01	7	14		10
Stanley Brook	63.82	7/28/2003	Light	0.01	7	14		10
Stanley Brook	63.83	7/28/2003	Light	0.01	7	14		0
Stanley Brook	63.9	7/28/2003	Light	0.01	7	14		0

All water quality data were collected as defined in the Quality Assurance Project Plan for the Maine Healthy Beaches Program. Summer student and teacher interns conducted water quality tests at the Community Environmental Health Laboratory, an outreach and education collaborative with the Mount Desert Island Biological Laboratory located in Salisbury Cove, Maine. Sample sites with four digits were located between regular sampling stations. These sites were tested when trying to establish the source of high bacterial counts in Stanley Brook. Rainfall and inches of rain are based on the previous 24 hours. The tide stage is calculated from low tide, which has a value of 1. *Enterococcus* was tested for using the Enterolert® system by Idexx and is reported as colonies per 100 ml. of water sample.

Appendix B

Results of Optical Brightener Studies on Stanley Brook

SiteName	Site #	Date	Time	Inches of Rain	Enterococcus	Optical Brighteners
Stanley Brook	63.8	5/17/2005	11:45	0.05	41	N/A
Stanley Brook	63.6	5/17/2005	10:40	0.5	0	N/A
Stanley Brook	63.6	5/17/2005	11:40	0.05	0	N/A
Stanley Brook	63.4	5/17/2005	10:50	0.05	0	N/A
Stanley Brook	63.4	5/17/2005	11:51	0.05	0	N/A
Stanley Brook	63.2	5/17/2005	10:58	0.05	0	N/A
Stanley Brook	63.8	5/24/2005	10:35	0.72	0	Negative
Stanley Brook	63.8	5/24/2005	11:45	0.72	10	Negative
Stanley Brook	63.6	5/24/2005	10:34	0.72	0	Negative
Stanley Brook	63.6	5/24/2005	11:42	0.72	0	Negative
Stanley Brook	63.4	5/24/2005	10:50	0.72	0	Negative
Stanley Brook	63.4	5/24/2005	11:45	0.72	10	Negative
Stanley Brook	63.2	5/24/2005	10:45	0.72	0	Negative
Stanley Brook	63.2	5/24/2005	11:37	0.72	0	Negative
Stanley Brook	63.8	6/29/2005	12:44	0	0	N/A
Stanley Brook	63.6	6/29/2005	12:52	0	0	N/A
Stanley Brook	63.4	6/29/2005	13:13	0	0	N/A
Stanley Brook	63.2	6/29/2005	13:27	0	0	N/A
Stanley Brook	63.8	7/6/2005	12:52	0.01	10	Negative
Stanley Brook	63.6	7/6/2005	13:06	0.01	0	Negative
Stanley Brook	63.4	7/6/2005	13:10	0.01	0	Negative
Stanley Brook	63.2	7/6/2005	13:18	0.01	0	Negative
Stanley Brook	63.8	7/27/2005	13:25	0	84	N/A
Stanley Brook	63.6	7/27/2005	13:40	0	20	N/A
Stanley Brook	63.4	7/27/2005	13:20	0	20	N/A
Stanley Brook	63.2	7/27/2005	6:24	0	98	N/A
Stanley Brook	63.2	7/27/2005	8:11	0	41	N/A
Stanley Brook	63.2	7/27/2005	13:35	0	0	N/A
Stanley Brook	63.8	8/3/2005	11:21	0.17	20	Negative
Stanley Brook	63.6	8/3/2005	11:42	0.17	0	Negative
Stanley Brook	63.4	8/3/2005	11:55	0.17	31	Negative
Stanley Brook	63.2	8/3/2005	12:03	0.17	41	Negative
Stanley Brook	63.8	8/15/2005	10:20	1.05	0	N/A
Stanley Brook	63.6	8/15/2005	10:30	1.05	108	N/A
Stanley Brook	63.4	8/15/2005	10:40	1.05	148	N/A
Stanley Brook	63.21	8/15/2005	10:50	1.05	565	N/A
Stanley Brook	63.2	8/15/2005	10:50	1.05	278	N/A
Stanley Brook	63.8	8/21/2005	11:15	0	10	Negative
Stanley Brook	63.6	8/21/2005	11:30	0	0	Negative
Stanley Brook	63.4	8/21/2005	11:45	0	0	Negative
Stanley Brook	63.2	8/21/2005	12:15	0	199	Negative

Mount Desert Elementary School students in Brian Cote's science classes collected data in May 2005. Summer student and teacher interns at the Community Environmental Health Laboratory collected all other data

Appendix C
Seal Harbor Wastewater Treatment Plant Effluent Data

Date	Max	Min	Geometric Mean
May-03	0.0	0.0	0.0
Jun-03	3.0	0.0	3.0
Jul-03	2.0	0.0	2.0
Aug-03	12.0	0.0	4.7
Sep-03	22.0	0.0	6.0
May-04	0.0	0.0	0.0
Jun-04	3.0	0.0	3.0
Jul-04	3.0	0.0	1.4
Aug-04	14.0	0.0	8.9
Sep-04	46.0	0.0	8.2
May-05	0.0	0.0	0.0
Jun-05	0.0	0.0	0.0
Jul-05	0.0	0.0	0.0
Aug-05	2.0	0.0	1.7
Sep-05	32.0	1.0	3.4
Permit Discharge Limitations	**50**		**15**
Violations	**0**	**0**	**0**

Maximum fecal bacterial levels in effluent from the Seal Harbor Wastewater Treatment Plant never exceed permit discharge limitations of 50 colonies per 100 ml between May 2003 and September 2005. The geometric mean never exceeds the permit discharge limitations of 15 colonies per 100 ml. in that same time period. John Merchant from the Mt. Desert public works department provided these data.

Appendix D

Stanley Brook Watershed Survey Method

Watershed Survey Protocol

Introduction

What is a watershed?

A watershed can be defined as the area of land from which runoff drains into a stream, river, lake, harbor, or other water body. Watersheds are threatened by the following basic sources of pollution: bacteria, nutrients, sediments, temperature, and toxins. Coastal waters are very sensitive to the effects of these contaminants, which threaten public health and can cause closures of beaches and shellfish beds.

What is a watershed survey?

A watershed survey is a comprehensive investigation of land uses and pollution sources that could possibly affect the water quality of a watershed. Fieldwork for a watershed survey includes visiting properties in the watershed, talking to property owners about their land, and taking water samples when necessary. The information gathered in the watershed survey is not for enforcement purposes.

Stanley Brook Watershed Survey

Purpose:

The purpose of the Stanley Brook Watershed Survey is to create a model coastal watershed survey that incorporates features of a Department of Marine Resources Sanitary Shoreline Survey and a Department of Environmental Protection Watershed Survey, make technical recommendations to reduce or eliminate pollution sources, work with landowners to find reasonable solutions, and ultimately protect water quality for current and future generations.

Objectives:

- Collect data indicating the locations and type of pollution problems
- Engage citizen volunteers in protecting local watersheds
- Educate citizen about the sources and effects of non point-source pollution
- Create a template for coastal watershed surveys that can be used by other groups interested in tracking down pollution sources in their coastal watersheds

Preparing the Watershed Survey

Advisory Board:

- o Assemble a project advisory board of 5-10 members of local citizen and professional resource experts.
- o Conduct a feasibility study to be sure there is sufficient stakeholder ownership to sustain a watershed survey.
- o Develop a list of potential volunteers to help with the project, which may include advisors.

Appendix D

Stanley Brook Watershed Survey Method

Data Collection for Mapping:

- Obtain an electronic copy of the current town(s) tax database (GIS shapefile is best) including property owner names & mailing addresses from the local tax assessors office.
- Obtain shapefiles from the Maine Office of GIS at http://apollo.ogis.state.me.us/catalog/ Political Boundaries = metwp24, Watershed Boundaries = medrdvd, Aerial Photos = ortho2f, Hydrology = hyd24, Roads = medotpub.

Property Owner Notification:

- Draft a letter to watershed property owners explaining the watershed survey process, notifying them of intent to survey their property, and providing them with the option for their property to be excluded from the survey. Submit to advisory board for approval.
- Use GIS to select properties located within the watershed by performing a spatial query of the tax map(s) shapefile by selecting the watershed from medrdvd shapefile and exporting the query to a data base file .dbf
- Create mailing labels for property owners tax mailing address using the data base file and mail merge function of your word processor.

Mapping:

- Create a base map of the watershed using appropriate scale metwp24, medrdvd, ortho2f, medotpub, hyd24, and local tax maps from town(s).
- Create survey sectors by splitting the watershed into polygons of 30 +\- 5 properties in developed areas or 2-8 acres in undeveloped areas using clear boundaries like roads and water.
- Make sector maps with labeled landmarks and road names, scale bars and North arrows.

Survey Data Management:

- Import the watershed property owner database file into the watershed survey database.
- Link the tax-map lot number in the database to the field in the table.

Volunteer Recruitment:

- The most effective form of recruitment for this type of project is targeted recruitment.
- Prepare a volunteer job description including dates and times of commitment.
- Approach potential volunteers one on one with a volunteer job description and invite them to a volunteer training session to learn more.

Appendix D

Stanley Brook Watershed Survey Method

Volunteer Training:

Volunteers attend a half day training session consisting of slide presentation reviewing the watershed survey process, instruction on how to interpret and fill out data sheets, a question and answer session, use of cameras, GPS units, and two hours of experiential practice in the field.

- Prepare a half-day watershed survey training session.
- Create a presentation including brief history, purpose, goals, process, and examples.
- Gather supplies.

Conducting the Watershed Survey

Equipment:

- Survey teams will need a sector binder, number board to identify each photo, camera (digital preferred), GPS unit, nametag, pencil and sturdy shoes. Additional items may include a water bottle, sunscreen, bug spray or rain gear. (One-time use digital cameras are now available at an economical price.)

Property Visit Protocol:

- Surveyors should follow the protocol outlined in A Typical Watershed Survey Visit. (**Appendix E: Volunteer Training Protocol**)
- In order speak with property owners it is best to time survey visits when residents are likely to be home and would welcome visitors. Weekdays between 3-7pm or weekends may provide more contacts. Avoid surveying in the morning.

Site Documentation:

- Property Forms: A Property data sheet (**Appendix F**) exists for each property in the survey and should be completed with as much information as is available.
- Problem Form: A separate form should be filled out for each problem identified on a property (**Appendix G**). Problem Severity and Buffer Quality can be determined using the Survey Tip Sheet in **Appendix E**.

Data Entry and Analysis

Data Entry:

Each data sheet is entered into the watershed survey database. Data should be entered according to the Data Entry Protocol (**Appendix H**). A second individual should review the data for quality assurance.

Data Analysis:

The database tables should be joined to the Shape file based on the common field "maplot"

Appendix E
Volunteer Training Protocol

Watershed Survey Volunteer Training Check List

- ❑ Sign in Sheet
- ❑ Name Tags
- ❑ Pencils
- ❑ Markers
- ❑ Easel w/ Agenda
- ❑ Signs for Event
- ❑ Refreshments
- ❑ Training Presentation
  - o Laptop
  - o PowerPoint
  - o Projector
  - o Laser Pointer
  - o Extension Cord
- ❑ Volunteer Packet
  - o Welcome Letter
  - o Organization Brochure
  - o Project Summary
  - o "Typical Watershed Survey Visit"
  - o Volunteer Application
  - o Liability Waiver
  - o Training Evaluation
  - o Volunteer Badge/Name Tag
- ❑ Survey Binders
  - o Survey Area Map
  - o Brochures/Flyers for Residents
  - o "Typical Watershed Survey Visit"
  - o Sector Maps (tax map & air photo)
  - o Copy of Letter to Residents
  - o Project Summary
  - o Pollutant Sources Tip Sheet
  - o Survey Tip Sheet
  - o GPS Quick Start Guide
  - o Survey Forms
- ❑ GPS Units (extra batteries)
- ❑ Digital Cameras (extra batteries)
- ❑ Picture ID Charts

Appendix E
Volunteer Training Protocol

A Typical Watershed Survey Visit

1. Approach the dwelling from the road

2. Look for an indication of the name of property owner or address. (mailbox, sign, etc.)

3. Knock on the door.

4. If someone is home introduce yourself:
   "Hi my name is ___________ I am a volunteer watershed surveyor for the MDI Water Quality Coalition. We are conducting a survey of the Stanley Brook Watershed to identify potential threats to water quality."

5. Ask if the residence is seasonal, when the arrival and departure dates are, and about the waste disposal system. (type, age, location, recent service, or problems)

6. Ask for permission to make a quick inspection of the property.

7. If no one is home leave an informational flyer at the door and approach the watershed by walking around the house without violating privacy.

8. Make observations about the property and fill out the *Property Form*. Note the presence of the Stink Pipes on any buildings and ground where a septic system or sewer line might be.

9. Make observations about Pollution Sources. Use your nose! If you find a problem fill out one *Problem Form* for each Pollution Source. Note the location with the GPS unit, mark the site on the sector map, and take pictures. (If you don't have a GPS unit draw a map of the problem on the back of the data sheet so that someone can revisit the site.)

Appendix E
Volunteer Training Protocol

Survey Tip Sheet

Problem Severity:

Major large size / frequent problem
pollution problem transported off site, w/ direct flow to water

Moderate medium size / intermittent problem
pollution problem w/ limited transport off site or to a buffer

Minor small size / rare problem
pollution problem is buffered w/ no transport off site

Buffer Effectiveness:

Poor vegetation limited, slope steep, or maintenance needed
pollution problem is significant

Fair vegetation inadequate or slope inappropriate
pollution problem is reduced

Good vegetation/buffer is adequate & appropriate
pollution problem is mitigated

Excellent vegetation/buffer is substantial & well maintained,
pollution problem is significantly mitigated

Glossary:

Buffer: gently sloping (<10°) area of undisturbed natural vegetation or graded and planted area that runoff water flows through before entering a stream, storm sewer, or other conduit. Proper buffer minimum width 100 feet—plus 2’ for every 1% slope (1’rise per 100’run)

Conduit: any channel that is conveying water e.g. land drain, storm drain, ditch, or stream.

Appendix E
Volunteer Training Protocol

Stanley Brook Watershed Survey
Volunteer Training Evaluation

Thank you for attending the volunteer training session. We appreciate the time you volunteered this morning. Please take a moment to provide your candid feedback; your honest assessment is important to the success of this project.

NAME____

- How would you rate your knowledge of this subject before and after the training session?

Before: **no knowledge 1 2 3 4 5 well-informed**

After: **no knowledge 1 2 3 4 5 well-informed**

- How would you rate the quality of the training that you received?

Poor 1 2 3 4 5 Excellent

Comments:

- Do you feel that the field training contributed to your knowledge or confidence as a surveyor?

- Is there anything from the training session that you feel unclear about? Please Explain.

- Will you continue to be involved with this project? Why or why not?

- What position(s) are you interested in volunteering for as part of the Stanley Brook Watershed Survey?

Watershed Surveyor Water Sampling Data Entry/Analysis
Media/Press Releases Report Writing Other_______________

- Other comments:

Appendix F

Property Form

Surveyor Name	Visit Date (mm/dd/yy)	Time (24hr)	Precipitation (inches)		
Property Owner Name	**Property Address**		**Map-Lot**		**Town**
Property Contact Name	**Distance to High Water Line**		**# Storm Drains**	**# Man Holes**	**# Sewer Lines**
	0-74 ft 75-249 ft 250+ ft				

Land Use
Agricultural Commercial Industrial Marine Recreational Residential Other

	Number	Stink Pipe (Y/N)	Occupancy	
			Arrive Date	Depart Date
Year Round Residences				
Seasonal Residences				
Buildings				

Waste System	Install Date	Problem/Maintenance	Prob/Maint Date
Septic & Leach Field Sewer Overboard Discharge Out House Other		Pump Tank Replace Tank Replace Leach Field Repair (describe) Other	

Comments

Appendix G
Problem Form

Surveyor Name	Visit Date (mm/dd/yy)	Time (24hr)	Map-Lot

Property Address / Land Marks	UTM X	UTM Y
	Picture Numbers	

Pollution Source (circle one)	Pollution Type	Problem Area Size	
Auto Maintenance Boat Maintenance Construction Site Drain (Basement/Gutter/Graywater/Land) Dump Farm (Animal/Vegetable/Fruit) Fuel Station Garden (Flower/Vegetable) Golf Course Lawn Parking Lot Pool Drain Road/Ditch (State/Town/Private/Driveway) Sewer Overflow Stream Bank Waste (Domestic, Livestock, Human, Wild) Waste, Storage (Compost/Yard waste/Manure) Waste System (Mal-fxn/Outhouse/Straight Pipe/OBD) Other (Specify in Comments)	Bacterial Nutrient Sediment Toxic Thermal	Length	Width
	Distance to Closest Conduit (feet)	**Problem Severity**	
		Major Moderate Minor	
	Buffer Type	**Buffer Size**	
	None Maintained Engineered Natural Other	Length	Width
	Buffer Effectiveness		
	Poor Fair Good Excellent		

Comments

Appendix H
Data Entry Protocol for Property and Problem Sheets

Data Entry Protocol
Property Data Sheet

Surveyor Name: Enter the first name of each surveyor listed

Visit Date: MM/DD/YYYY

Time: HH:MM

Property Contact Name: enter First, Last separate additional names with _ or
enter n for blank, none, no one home, etc.

Dist. to High Water Line: select range

 # Storm Drains: enter number or enter –9 for ? or –99 for additional comments

 # Man Holes: enter number or –9 for ? or –99 for additional comments

 # Sewer Lines: enter number or –9 for ? or –99 for additional comments

Landuse: Enter only the best description of the source refer to pictures if necessary place any additional selections in comments section

Waste System: Select type of system

Waste System Install Date: MM/DD/YYYY

Problem/Maintenance: Select type of Problem or Maintenance

Prob/Maint Date: MM/DD/YYYY

Comments: enter verbatim separate independent clauses with _,_

Initial and date top right corner of data sheet after entry is complete

Initial and date top left corner of data sheet after QA is complete

Appendix H
Data Entry Protocol for Property and Problem Sheets

Data Entry Protocol
Problem Data Sheet

Surveyor Name: Enter the first name of each surveyor listed separated by a comma and a space

Visit Date: MM/DD/YYYY
Time: HHMM
Map Lot: 000-000 or 000-000-000
Property Address Land Mark:
UTM X: 0000000
UTM Y: 0000000
Picture ID Number: L00
Pollution Source: Enter only the best description of the source; refer to pictures; if necessary, place any additional selections in comments section.

Pollution Type: Check all that apply
Problem Area Length: enter a single number; enter the average if a range is listed.
Problem Area Width: enter a single number; enter the average if a range is listed.
Distance to Conduit: enter a single number; enter the average if a range is listed.
Problem Severity: select problem severity
Buffer Type: select buffer type
Buffer Area Length: enter a single number; enter the average if a range is listed
Buffer Area Width: enter a single number; enter the average if a range is listed
Buffer Effectiveness: select buffer effectiveness
Initial and date top right corner of data sheet after entry is complete
Initial and date top left corner of data sheet after QA is complete.

The Stanley Brook Watershed Survey Report

Mount Desert Island Water Quality Coalition
P.O. Box 911
Mt. Desert, ME 04660

The MDI Water Quality Coalition engages citizens of all ages in improving and preserving the water quality of MDI through meaningful environmental research and community education.

www.mdiwqc.org