



**MAINE PUBLIC DRINKING WATER  
SOURCE WATER ASSESSMENT PROGRAM  
GREAT SALT BAY SANITARY DISTRICT  
LITTLE POND WATERSHED**

**MARCH 2003**

prepared for



**Source Water Assessment Program  
Drinking Water Program  
Maine Department of Human Services**

prepared by



**Drumlin Environmental, LLC  
Portland, Maine**

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11 State House Station  
Augusta, Maine 04333



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# **GREAT SALT BAY SANITARY DISTRICT LITTLE POND WATERSHED**

## **EXECUTIVE SUMMARY**

The Great Salt Bay Sanitary District provides drinking water to approximately 700 residential and commercial customers from Little Pond, which lies within a 424-acre watershed in the southwest part of the Town of Damariscotta. More than 95 percent of the watershed is currently undeveloped. Approximately 82 percent of the watershed is owned by the Great Salt Bay Sanitary District. Private land in the watershed is zoned as rural and can be developed for residential use on two-acre lots.

The reconnaissance of the watershed and shoreland areas did not identify any commercial facilities in the watershed that use petroleum and other materials that could pose a threat to the water quality of the pond. Access to Little Pond is limited to the gravel drive to the District pumping station (which the District keeps locked) or a foot trail from Biscay Road at the south end of the pond. There are unorganized trail networks in parts of the watershed. In the future, the District would like to develop an organized trail network, which would provide an opportunity for community recreation and education about watershed issues.

Soil along the shoreline of Little Pond has low to moderate erodibility and the District has not observed areas of significant erosion along the shoreline. The District currently has ownership of gravel pits north of the pond, which had historically been a source of turbid runoff to the pond. These pits are inactive and the District is monitoring the revegetation of these areas.

Summer recreational uses are permissible on Little Pond, but are limited because there is not vehicle access to the pond. Recreation is generally limited to canoeing and fishing. Fish stocks are supplemented by the Maine Department of Inland Fisheries and Wildlife. Stocking takes place in close proximity to the water supply intake. Therefore, the District has developed an agreement with the state on procedures to limit the potential effects of stocking. The state fishing regulations prohibit the use of live bait and all motorized watercraft on the pond.

In the 1970s, Little Pond experienced several algae blooms and had eutrophic water quality. Water quality data from the 1980s and 1990s show significant improvement due in part to increased ownership by the District and decreased activity in the watershed. Water quality in the early 1990s was adequate to support a filtration waiver and continues to be high.

The watershed is sparsely developed and future development is restricted by District ownership. Recreational uses are not limited on the pond but are monitored by District staff. Based on these factors, the overall susceptibility of the Little Pond water supply is considered to be low.

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## **1.0 INTRODUCTION**

The operation of public water systems in Maine is governed by the federal Safe Drinking Water Act (SDWA), which was first passed in the 1970s and later amended in 1986 and 1996. The federal government delegated authority for enforcing the SDWA to the state under the Maine Department of Human Services (DHS) Drinking Water Program (DWP). In 1998, the Source Water Protection Section was established in the DWP to implement the Maine Public Drinking Water Source Water Assessment Program (SWAP). The SWAP process is being conducted through a cooperative effort between the DWP staff, Great Salt Bay Sanitary District staff and Drumlin Environmental, LLC (Drumlin), the environmental consulting firm contracted through DHS to provide technical assistance for the project.

The purpose of the SWAP evaluation for the Great Salt Bay Sanitary District (District) is to assess the susceptibility of its drinking water supplies from Little Pond (PWSID 90410) to potential threats of contamination. The long-term goal is to protect the water supply source. To do this, the SWAP process has compiled information to assist the District in future planning that will help to control potential threats to the water quality of its source ponds.

This Report describes the SWAP for the Great Salt Bay Sanitary District and is organized as follows:

- **Section 2.0** summarizes the physical characteristics of the water supply at Little Pond;
- **Section 3.0** describes the variety of conditions and activities that could pose a threat to water quality;
- **Section 4.0** provides an assessment of the threats within the watershed of the pond; and,
- **Section 5.0** ranks the susceptibility of the water quality at the pond and provides recommendations for future protection of water quality.

## **2.0 WATER SUPPLY SOURCE**

### **2.1 Description**

The Great Salt Bay Sanitary District draws its source of supply from Little Pond in Damariscotta (see Figure 1). The components and description of the District water source are summarized in Table 1.

**TABLE 1**  
**LITTLE POND SUPPLY**

<b>Category</b>	<b>Description</b>
Water System Name:	Great Salt Bay Sanitary District
Surface Water Source:	Little Pond
Water System Type:	Non-transient, community system
Watershed Location:	Damariscotta, Maine
Source Surface Water Area:	80 Acres
Source Watershed Area:	424 Acres
Maximum & Average Depths	45 ft & 19 +/- ft
Water Volume in Storage	495 Million Gallons (est.)
Population Served (customers):	Services: 700
Type of Treatment:	Sodium Hypochlorite Disinfection
Filtration:	Filtration Waiver
Estimated Daily Water Use:	130,000 GPD = average 150,000 GPD = peak

Little Pond is located in the southeast part of Damariscotta and is approximately ¾-mile long and ¼-mile wide. The Great Salt Bay Sanitary District pumping station building is located near the midpoint of the western shore of the pond. The intake is located approximately 100 feet offshore, in 20 feet of water.

According to information compiled in the PEARL database, the maximum depth of the pond is 45 feet, with an average depth of approximately 19 feet. Based on a surface area of 80 acres and an average depth of 19 feet, Little Pond is calculated to hold almost 500 million gallons of water in storage.

## **2.2 Land Use**

Land in the Little Pond watershed is largely undeveloped. The District owns approximately 360 acres of land (approximately 82%) of the land in the watershed including the majority of the shoreline (see Figure 2). The District actively seeks opportunities to acquire land in the watershed. In 1999, the District purchased a large parcel with 400 feet of shoreline at the northern end of the pond. Also in 2001, the District purchased a 2-acre house lot with shore frontage on the south end of the pond. Short segments of the shoreline, totaling approximately 1,000 feet, are privately owned at the northeast and southwest ends of Little Pond. Private land within the watershed is zoned for rural development by the Town of Damariscotta. Residential development is permitted on 2-acre lots. Shoreline zoning further limits development within 250 feet of the pond.

More than 95 percent of the watershed areas surrounding Little Pond are forested and undeveloped. A map of the land use classifications for the watershed and surrounding area is shown in Figure 3. There is some limited residential development along Biscay Road near the

southern end of the pond. There are also several homes at the northeastern edge of the watershed, along Egypt Road.

In the past, significant gravel mining activity occurred northeast of the pond, which was believed to have caused substantial erosion. Since the 1980s, the District has acquired the majority of the former gravel pit land and will continue to reclaim the area and stabilize the soil.

The Great Salt Bay Sanitary District conducts periodic timber harvesting in the watershed. The District has developed a Timber Management Plan and retained a qualified forester to oversee all timber harvesting activities in the watershed.

According to the Maine Department of Inland Fisheries and Wildlife, ice fishing is prohibited on Little Pond, but a variety of summer recreational uses are permitted. Fishing and boating are permitted on Little Pond, however, this activity is limited in practice by the large amount of District ownership and limited access. The state fishing regulations prohibit the use of live bait and all motorized watercraft on the pond. There is no vehicle access to or boat launch on Little Pond. There are no beaches or camps on the pond and swimming is prohibited. The closest practical access is a foot trail off Biscay Road, near the south end of the pond. This trail is used to gain access to the pond for canoeing and fishing.

### **3.0 INVENTORY OF POTENTIAL WATER QUALITY CONCERNS**

#### **3.1 Background**

The Source Water Assessment Program (SWAP) is intended to assist water districts and suppliers in protecting the quality of their surface water supply by identifying potential threats to water quality. Two factors have been considered in identifying and assessing the potential risk posed by a threat: (a) location in relation to the intake and (b) the nature of a potential threat.

This SWAP assessment looks for potential threats to water quality in three zones:

1. The intake zone within 1,000 feet of the intake;
2. The shoreline zone, within 250 feet of the shoreline of the surface water body; and,
3. The watershed zone, extending to the limits of the surface watershed.

Activities in each of these zones have a different potential effect on the quality of water in the surface supply.

Within each of the three zones, the SWAP assessment examined a variety of conditions, land uses and practices that have a potential to influence water quality. These features generally fall into one of the following categories:

- Physical characteristics of the watershed, for example the presence of wetlands, steep topography or erodible soils;
- General land uses and development patterns, for example the percentage of developed versus undeveloped land and controls to guide future development; and,
- Specific activities that involve chemical handling or may release pathogens (e.g., fecal coliform) with the potential to degrade water quality.

The SWAP assessment also considered available water quality data from the surface supply as an indicator of existing conditions. Appendix A describes specific guidance used during the SWAP to inventory potential factors influencing water quality. Appendix A also lists specific activities included in the SWAP assessment. Table 2 lists general sources of information consulted during SWAP research.

**TABLE 2**  
**SOURCES OF SWAP INFORMATION**

<b>Information Type</b>	<b>Information Source</b>
Watershed Characteristics	US Geological Survey (Topography, Hydrology), Soil Conservation Service (Soils), Maine Geological Survey (Geology)
Raw Water Quality	District Monitoring, PEARL
Potential Contamination Sources	DEP Databases, District and Municipal Contacts
Land Use and Zoning	District and Municipal Records
Other Analyses	Other DEP Databases

### **3.2 Source Sensitivity to Land Use**

The key watershed features that define the sensitivity of the Little Pond water supply source to land uses are briefly described below:

- **Natural Features:** Little Pond is fairly small. The watershed is largely forested with interspersed wetland areas accounting for approximately five percent of the watershed area. The topography around the pond is dominated by gentle to moderate slopes.
- **Man-made Features:** There is minimal development in the Little Pond watershed. Development consists of low-density residential development around the periphery of the watershed along Biscay and Egypt Roads.
- **Specific Activities:** There are no commercial facilities in the watershed that are likely to handle petroleum and other chemicals on a regular basis. There is a horse farm/riding stable near the edge of the watershed along Egypt Road. There are also a series of man-made ponds held by small dams in the former gravel pit area, to the north of the pond.



## **4.0 ASSESSMENT OF LITTLE POND**

The Great Salt Bay Sanitary District has received a waiver from filtration for its Little Pond supply. Water supplied by the District is disinfected but otherwise untreated. In order to receive the waiver, the District has demonstrated that water from Little Pond has low turbidity and coliform counts and is generally of high quality.

### **4.1 Watershed**

Little Pond is fed by overland runoff, groundwater baseflow and a small stream that drains the northern end of the 424-acre watershed. The watershed is more than 95 percent undeveloped land. The majority of land in the watershed is accessible only on foot. Approximately 82 percent of the land in the watershed, including all but 1,000 feet of shoreline, is owned by the Great Salt Bay Sanitary District, which plans to acquire more land in the future. While future development pressure in Damariscotta is likely to be moderate to high, there is limited future development potential in the Little Pond watershed due to District ownership and town zoning. The District closely monitors all development activities within and near the watershed.

North of the pond, there are a series of former gravel pits and man-made impoundments behind small dams. It is believed that in the 1970s and 1980s, erosion from the gravel operations caused elevated source water turbidity. Currently these gravel pits are owned by the District and being allowed to naturally revegetate. District staff did express some concern about the integrity of the small dams controlling the various impoundments north of the pond. A sudden release of water from these impoundments would be likely to create a substantial influx of turbid water into Little Pond.

Access to Little Pond is limited by the large percentage of ownership held by the District. Recreational access to land in the watershed or to the pond is generally non-motorized. There is currently an unorganized trail network in the watershed. The District would like to develop an organized trail system in the future that would provide recreational and educational benefit to residents and would enable the watershed to be more closely managed by the District.

The Great Salt Bay Sanitary District actively manages timber harvesting in the watershed. This activity is monitored by a licensed professional forester under contract to the District.

Review of the DEP databases did not identify any regulated activities in the watershed. Field reconnaissance of the watershed during April 2001 did not identify businesses in the watershed that would handle petroleum and other chemicals and pose a threat to the water supply.

### **4.2 Shoreland**

There is currently no shoreline development around Little Pond except the District pumping station on the west shore. The District owns all of the shoreline except approximately 1,000 feet. Most of the shoreline is more than several thousand feet from the nearest road, which limits

shoreline activities. There is a foot trail from Biscay Road to the south end of the pond, but access via this trail requires an 800-foot hike.

According to the Soil Conservation Service maps, the soils that are present along the shoreline of Little Pond generally have low erosion potential. Some moderately erodible soils are mapped along the east shore, but there are no highly erodible soils along the Little Pond shoreline (see Figure 4). Soil erosion transports phosphorous into the pond, which has the potential to increase the rate of aging (eutrophication) of the pond and degrade water quality.

### **4.3 Intake**

The water supply intake is located near the middle of the west shore of Little Pond, approximately 100 feet offshore, in 20 feet of water. The pumping station is accessed by a gated gravel drive from Standpipe Road. All of the land around the intake is owned by the District. The District installs buoys 200 feet offshore, to mark the intake area as a “No Trespass Zone” and has installed an informational sign onshore near the pumping station.

The pond is stocked annually with brook trout by the Maine Department of Inland Fisheries and Wildlife. Stocking takes place approximately 100 feet northeast of the intake and pump station. This location is used for stocking because it is the only point of vehicle access to the pond; however, it has a potential to impact water quality at the intake. In order to minimize changes to water quality during stocking operations, the District and the state have developed a written stocking protocol that includes maintaining a 100 foot distance from the intake, manually releasing fish with a net, rather than discharging directly from the hatchery truck and conducting bacteriological testing before and after stocking.

Summer recreational uses are permitted on Little Pond, but are limited by access. According to the District there is some fishing and canoeing on Little Pond, but no swimming or motorized boating. As part of its routine operations, the District conducts weekly inspection tours around the pond by boat. These inspections monitor both human and biological activity, remove trash, etc.

Lakes and ponds normally experience an aging process known as eutrophication, which is caused by various natural and man-made influences. Phosphorus from runoff, fertilizers, sewage and other sources is a primary factor affecting eutrophication since phosphorus nourishes plant and algae growth in the pond. The amount of algae productivity in the pond is characterized in terms of three Trophic States: (1) Oligotrophic = low, (2) Mesotrophic = moderate, and (3) Eutrophic = high.

Little Pond has been classified by the state as Eutrophic, but has experienced important improvements in water quality since the 1970s. During the mid-1970s, the clarity of Little Pond measured by secchi disk readings averaged 4.5 meters or less. Since the early 1980s, the clarity has been between 7.2 to 8.2 meters. Similarly, dissolved oxygen data from the 1970s showed severe oxygen depletion (e.g., less than 1 ppm) below 6 meters. However, data from the 1990s shows high oxygen concentrations to depths of 9 to 12 meters. These water quality

improvements were initiated by several copper sulfate treatments to the pond in the 1970s and 1980s and have been sustained by changes in land use in the watershed and surrounding area.

## 5.0 SWAP RANKING AND RECOMMENDATIONS

### 5.1 Ranking of Susceptibility

The SWAP assessment factors indicate that overall susceptibility of the water quality in Little Pond is low. This conclusion is based on the general conditions observed, including the density of development and conservation ownership in the watershed, the absence of activities that handle chemicals in the watershed, the limited recreational uses of the water bodies and observed water quality improvements during the 1980s and 1990s. Specific factors considered in assessing the overall risk are summarized in Table 3.

**TABLE 3  
LITTLE POND SURFACE WATER ASSESSMENT**

<b>Zone</b>	<b>Measure</b>	<b>Findings</b>	<b>Risk Level</b>
Watershed	Ambient Water Quality	Class GPA: categorized as threatened, but has shown improvement.	Low-Moderate
	Existing Conditions	More than 95 percent of the watershed is undeveloped.	Low
	Future Development	Development pressure in the region is moderate to high. However, 82 percent of the watershed is owned by the District.	Low
	Overall		Low
Shoreland	Pond Classification	Eutrophic (recent data show improved quality).	Low-Moderate
	Soils	Shoreline soils have low to moderate erodibility, no erosion problem reported. Past erosion from gravel pits has been mitigated.	Low
	Activities Posing a Threat	Shoreline is undeveloped and protected by Shoreland Zoning.	Low
	Potential for Future Threats	Future shoreline development restricted by ownership.	Low
	Overall		Low

Intake	Raw Water Quality	Pond water quality has shown improvement. Water quality supported filtration waiver.	Low
	Ownership/Control	Extensive District ownership.	Low
	Activities Posing a Threat	Intake is well protected from recreational activities. Stocking of fish near the intake poses potential threat.	Moderate
	Potential for Future Threats	District ownership prevents future development.	Low
	Overall		Low-Moderate
<b>Overall</b>			<b>Low</b>

## 5.2 Recommendations

The overall ranking for the susceptibility of Little Pond is low, as a result of the pro-active efforts of the District to purchase land and improve past land use practices in the watershed. There are several additional actions that could be considered by the Great Salt Bay Sanitary District and the Town of Damariscotta to provide added protection to source water quality.

- The District should work closely with the town on strong watershed protection zoning and enforcement support from town officials. Little Pond has experienced significant water quality improvements in the 1980s and 1990s. However, poor water quality in the past demonstrates that Little Pond can be adversely impacted by incompatible land uses. Continued high water quality of Little Pond is also critical to preserving the District's filtration waiver.
- Fish stocking by the Maine Department of Inland Fisheries and Wildlife in close proximity to the intake poses a threat to the water supply by increasing potential source water turbidity and bacterial contamination. The District and the state may want to reevaluate the role of fish stocking in Little Pond to determine whether less frequent stocking or the natural fish population can support the limited fishing pressure on the pond.
- The District should continue its efforts to ensure that the gravel pits to the north of the pond are stabilized with vegetation as rapidly as possible, to prevent soil erosion and phosphate accumulation in the pond. The District should also evaluate the integrity of the impoundment dams and repair these as necessary, to prevent the inadvertent release of water.
- The District may want to post an informational sign along the access trail from Biscay Road to the pond to notify public users of the pond.

## **APPENDIX A**

### **SWAP ASSESSMENT GUIDELINES**

**MAINE PUBLIC DRINKING WATER  
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LITTLE POND WATERSHED**

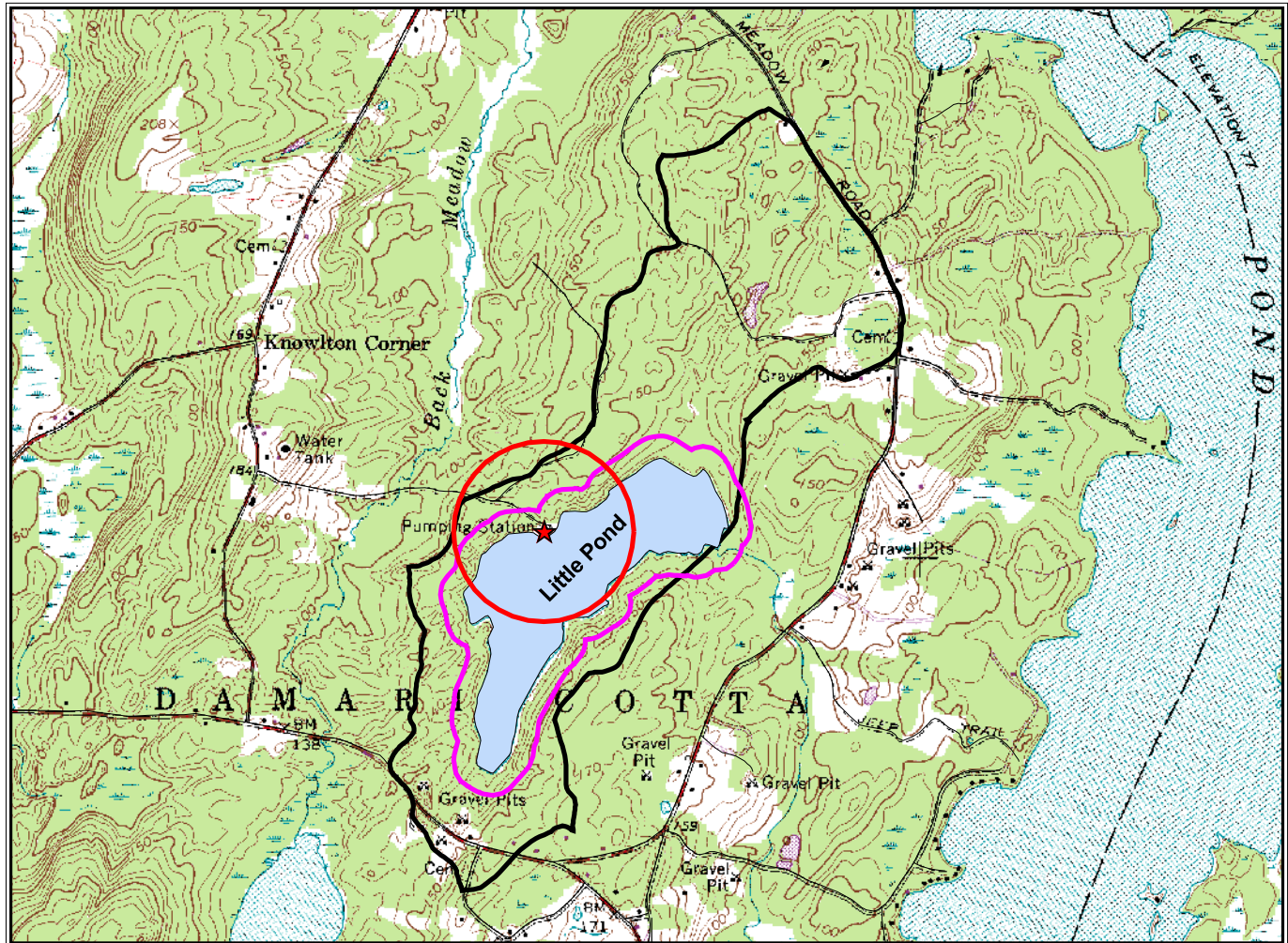
**APPENDIX A  
ASSESSMENT GUIDELINES**

<b>Assessment Item/Threat</b>	<b>Low</b>	<b>Moderate</b>	<b>Significant</b>
Physical Characteristics of the Watershed			
Watershed boundary, area	Smaller	>>	larger
Area of water body	Smaller	>>	larger
Tributaries	Few	>>	many
Watershed topography	Low	moderate	steep, rugged
Wetlands	Many	>>	few
Water body depth	Deep	>>	shallow
Sand and gravel aquifers	Few	some	many
Soil types (erodibility and slope)	Low	moderate	high
Raw Water Quality			
Secchi Disk Transparency	> 8 M	4-8 M	< 4 M
Turbidity	< 1 NTU	< 5 NTU	> 5 NTU
pH	6.5-8.5	N/A	< 6.5 or > 8.5
Phosphorus	< 10 ppb	< 20 ppb	> 30 ppb
Pesticides and herbicides	ND	N/A	detected
Color	< 5	5-15	> 15
Total Coliform and E Coli	> 29/100 ml	occasional	> 142/100 ml
Dissolved Oxygen	>7 mg/L	5-7 mg/L	< 5 mg/L
Temperature	ambient		> 10° C ambient
VOCs	absent	N/A	detected
Chlorophyll-a	< 2 ppb	2-6 ppb	> 6 ppb
Total Organic Carbon	< 4 mg/L	4-8 mg/L	> 8 mg/L
Potential Contamination Source Inventory			
UST/AST leak sites	Absent from Watershed or	Present in watershed, some	Present and unmonitored
Municipal/Comm/Special Landfill	Actively monitored and	operational deficiencies	and/or unremediated.
Compost sites	monitored and controlled or	and/or remediation is	
Demolition debris sites	fully remediated.	underway.	
Ash/septage storage/utilization			
Superfund site			
Sand/salt storage sites			
Petroleum spill sites			
Hazardous waste sites			
Wastewater treatment facilities			
Food residuals utilization sites			
Uncontrolled hazardous sites			
Tank farms			
Industrial complexes			

<b>Assessment Item/Threat</b>	<b>Low</b>	<b>Moderate</b>	<b>Significant</b>
Potential Contamination Source Inventory Non-point pollution sources Transfer stations Sludge utilization sites Automobile graveyards Engineered subsurface systems Woodyards Underground injection wells Surface impoundments Mining/mineral processing sites Overboard discharges to rivers Active UST sites Roadways Railroads Utility Rights-of-way Boat launches Commercial farms CAFOs Commercial forest operations Private septic systems Home heating oil tanks Airports Bathing beaches Combined sewage overflows	If present, at low density, properly installed and operated. In compliance with applicable local, state and federal regulations.	>>>>	High density, little evidence of active management, documented incidence of problems and failures.
Land Uses and Zoning Residential density Percent of watershed Owned by PWS Public lands or conservation Forested With protective zoning Agricultural Impervious cover Industrial/commercial Waterbody uses: Restricted areas Ice fishing Boating Swimming Recreational vehicles	> 2 Ac/lot  total > 80% for all protected uses  < 20 % total < 20 % total < 20 % total  large, posted  limited to absent	1-2 Ac/lot  intake and shoreland protected, others developed 20-30% total 20-30% total 20-30% total  intake zone  moderate, well-managed	< 1 Ac/lot  critical areas (intake, shoreland) unprotected or developed > 30% total of 3 > 30% total of 3 > 30% total of 3  small to none  prevalent, uncontrolled
Other Analyses Trophic State Index Vulnerability Index Build-out Analysis	< 25 low fully developed	25-60 moderate >>>	> 60 high high potential for development



# Damariscotta Public Water Supply & Surrounding Watershed

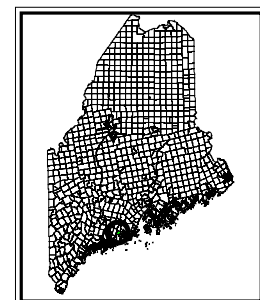


2000 0 2000 4000 Feet



## Legend

- |   |                        |   |                          |
|---|------------------------|---|--------------------------|
| ★ | Intake Location        | ○ | 250 ft. Shoreline Buffer |
| ○ | 1000 ft. Intake Buffer | ○ | Watershed Boundary       |
| ○ | Little Pond            | ~ | Public Roads             |



- 1) Base data layers are from the Maine Office of GIS.
- 2) Watershed boundary, intake and buffer locations are from the Maine Drinking Water Program.
- 3) Data are for planning purposes only.

**Figure 1**

Scale 1:24,000  
1 inch = 2,000 feet

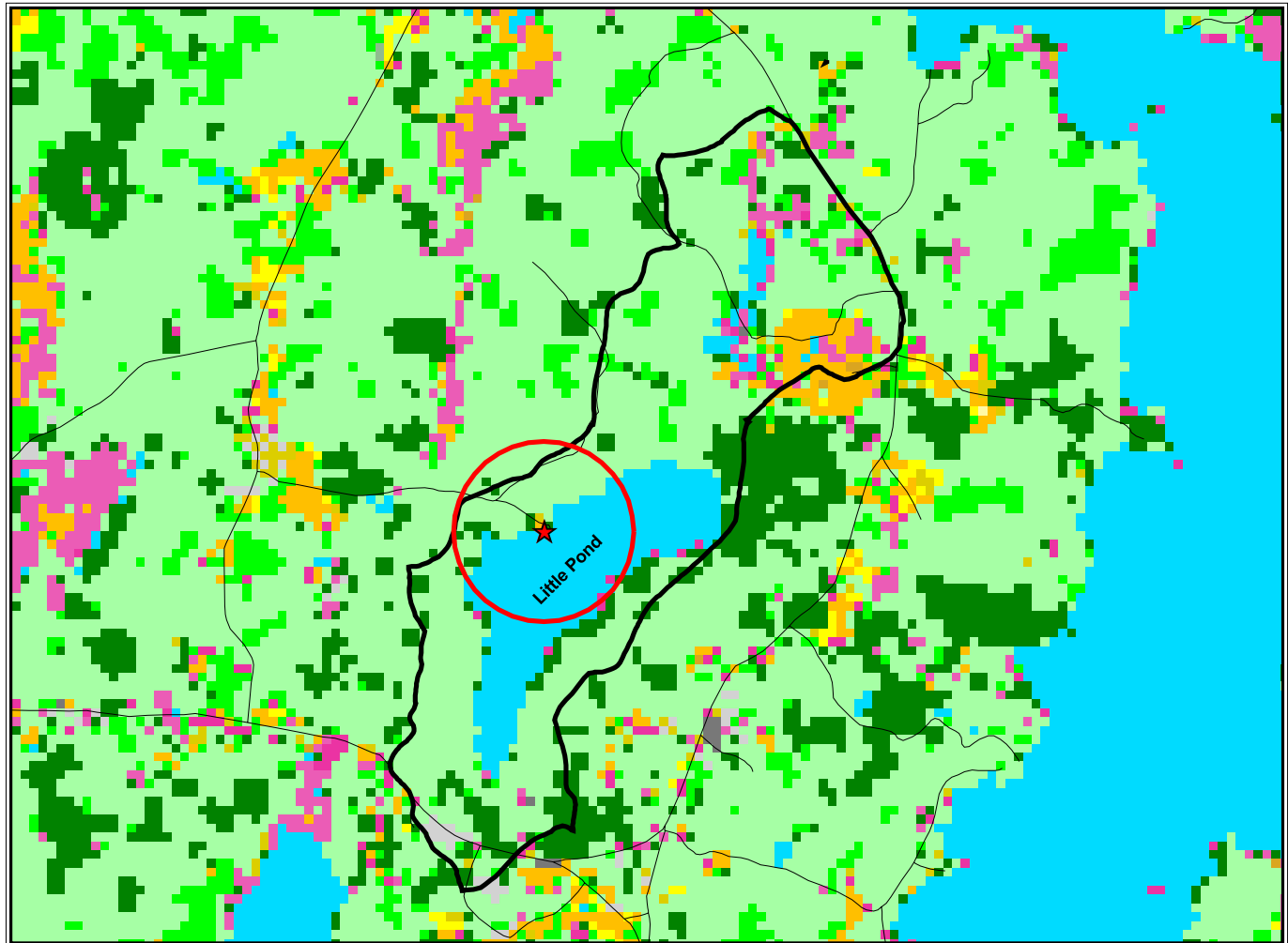
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# Damariscotta Public Water Supply & Multi-resolution Land Characterization

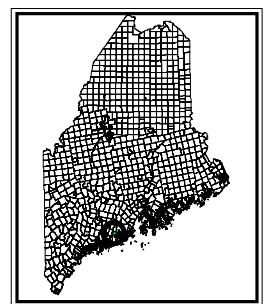


2000 0 2000 4000 Feet



## Legend

★ Intake Location	Commercial/Ind/Trans	Pasture/Hay
1000 ft. Intake Buffer	Bare Rock/Sand/Clay	Row Crops
Watershed Boundary	Quarries/Strip Mines/Gravel Pits	Small Grains
Public Roads	Transitional	Urban/Recreational Grasses
Multi-resolution Land Characterization	Deciduous Forest	Woody Wetlands
Open Water	Coniferous Forest	Emergent Herbaceous Wetlands
Low Intensity Residential	Mixed Forest	No Data
High Intensity Residential	Deciduous Shrubland	
	Orchards/Vineyards/Other	



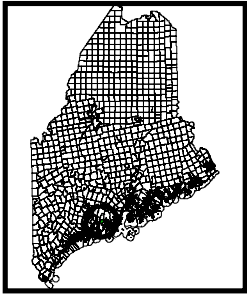
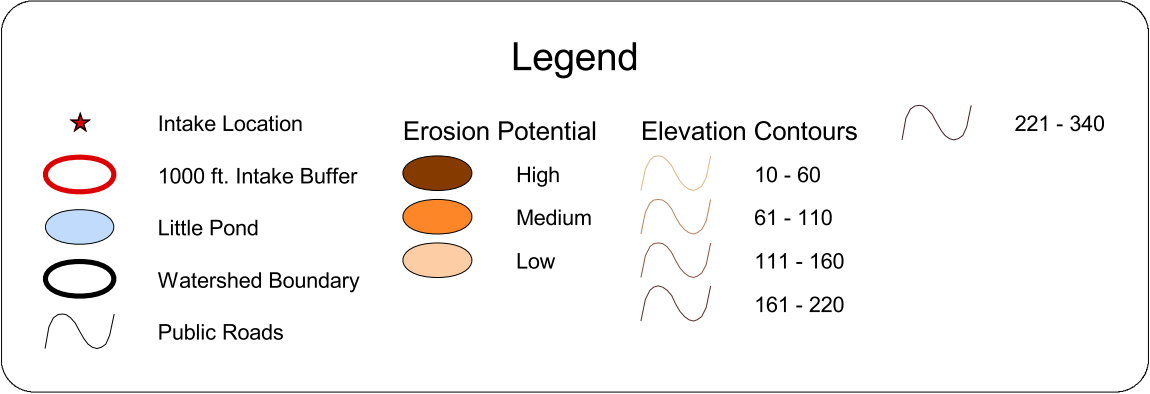
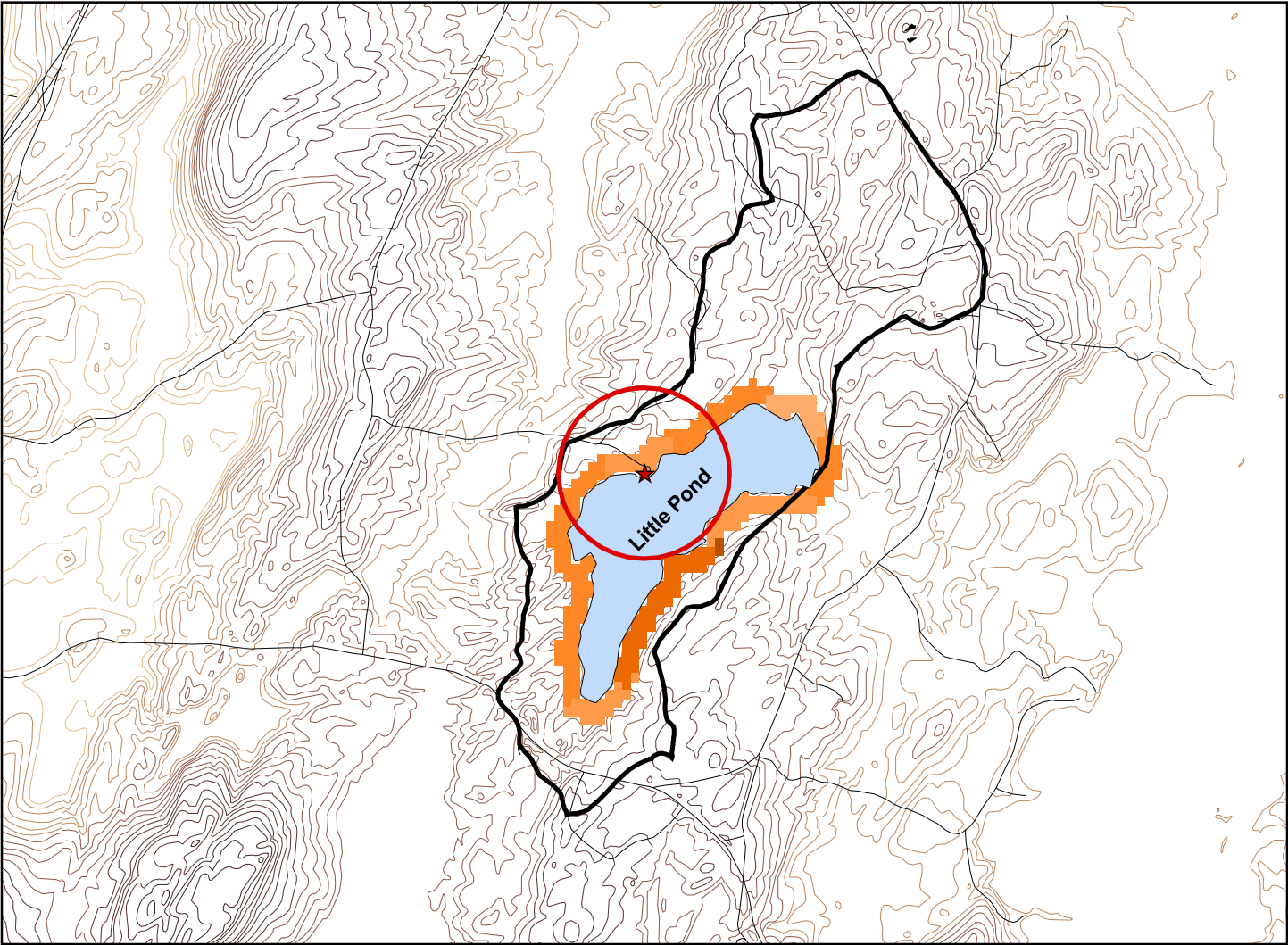
**Figure 3**

Scale 1:24,000  
1 inch = 2,000 feet  
3/3/03

- 1) Base data layers are from the Maine Office of GIS.
- 2) Watershed boundary, intake and buffer locations are from the Maine Drinking Water Program.
- 3) Land cover data from the U.S. Geological Survey & the U.S. Environmental Protection Agency.
- 4) Data are for planning purposes only.



# Damariscotta Public Water Supply Elevation Contours & Potential Erodible Soils



**Figure 4**

- 1) Base data layers are from the Maine Office of GIS.
- 2) Watershed boundary, intake and buffer locations are from the Maine Drinking Water Program.
- 3) Data are for planning purposes only.

Scale 1:24,000  
1 Inch = 2,000 feet  
3/3/03