



## TMDL Assessment Summary

# Goosefare Brook

### Watershed Description

This **TMDL** assessment summary applies to a 5.54-mile segment length of Goosefare Brook, located in the City of Saco, Maine and the Town of Old Orchard Beach, Maine. Goosefare Brook begins in a low-intensity developed area just north of Interstate 95 near Boothbay Lane. The stream flows southeast across U.S. Route 195 where it flows through a small forested area and joins with Bear Brook at the Boston and Maine Springfield Terminal Railroad. Goosefare Brook continues through a wetland area, where it meets with Branch Brook before emptying into the Saco River just downstream of U.S. Route 9. The Goosefare Brook watershed covers approximately 4,480 acres in the City of Saco and 1,792 acres in the Town of Old Orchard Beach.

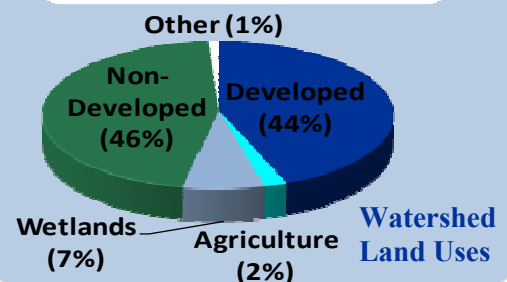
- Stormwater runoff from **impervious cover (IC)** is likely the largest source of pollution to Goosefare Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- A number of US Route 1 and ME Route 5 storm drains and catch basins, which are linked directly to Goosefare Brook, funnel runoff from these roads down to the stream.
- Wetlands and woodlands near the mouth of Goosefare Brook absorb and filter stormwater pollutants, and help protect both water quality in the stream and stream channel stability.
- Goosefare Brook is currently on Maine's list of Urban Impaired Streams (DEP, 2010a).

### Definitions

- **TMDL** is an acronym for **Total Maximum Daily Load**, representing the total amount of a pollutant that a water body can receive and still meet water quality standards.
- **Impervious cover** refers to landscape surfaces (e.g. roads, sidewalks, driveways, parking lots, and rooftops) that no longer absorb rain and may direct large volumes of stormwater runoff into the stream.

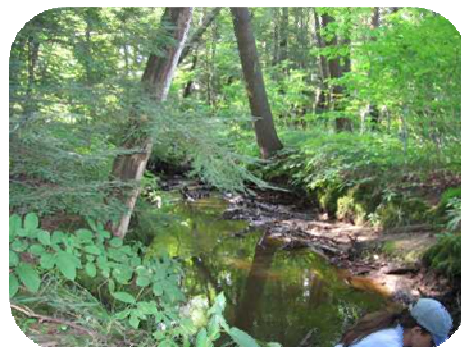
### Waterbody Facts

- **Segment ID:** ME0106000106\_612R01\_01
- **City:** Saco, ME; Old Orchard Beach, ME
- **County:** York
- **Impaired Segment Length:** 5.54 miles
- **Classification:** Class B
- **Direct Watershed:** 9.83 mi<sup>2</sup> (6,291 acres)
- **Watershed Impervious Cover:** 17%
- **Major Drainage Basin:** Saco River Watershed



### Why is a TMDL Assessment Needed?

Goosefare Brook, a Class B freshwater stream, has been assessed by DEP as not meeting water quality standards for metals and aquatic life use, and has been listed on the 303(d) list of impaired waters. The Clean Water Act requires that all 303(d)-listed waters undergo a TMDL assessment that describes the impairments and establishes a target to guide the measures needed to restore water quality. The goal is for all waterbodies to comply with state water quality standards.



**Goosefare Brook at Station 271.**  
(Photo: DEP Biomonitoring Program)

Toxicity impairments in Goosefare Brook have already been addressed by DEP's 2003 TMDL for Cadmium, Chromium, Copper, Iron, Nickel, Lead, and Zinc. The impervious cover TMDL assessment for Goosefare Brook addresses the remaining water quality impairments to aquatic life use (benthic-macroinvertebrate and stream habitat assessments). These impairments are associated with a variety of pollutants in urban stormwater as well as erosion, habitat loss and unstable stream banks caused by excessive amounts of runoff. DEP intends to list Goosefare Brook on the 2012 303(d) list.

### Sampling Results & Pollutant Sources

| Sampling Station | Sample Date | Statutory Class | Model Results |
|------------------|-------------|-----------------|---------------|
| S-48             | 8/22/1995   | B               | C             |
| S-48             | 8/6/2005    | B               | C             |
| S-48             | 8/24/2010   | B               | C             |
| S-49             | 8/29/1994   | B               | C             |
| S-49             | 8/22/1995   | B               | C             |
| S-271            | 8/22/1995   | B               | C             |
| S-271            | 8/17/1998   | B               | C             |
| S-271            | 8/22/2000   | B               | NA            |
| S-271            | 8/24/2010   | B               | I             |
| S-272            | 8/22/1995   | B               | C             |
| S-337            | 8/22/2000   | B               | NA            |
| S-339            | 8/17/1998   | B               | C             |

DEP makes aquatic life use determinations using a statistical model that incorporates 30 variables of data collected from rivers and streams, including the richness and abundance of streambed organisms, to determine the probability of a sample meeting Class A, B, or C conditions. Biologists use the model results and supporting information to determine if samples comply with standards of the class assigned to the stream or river (Davies and Tsomides, 2002).

Goosefare Brook impairment is based on data collected by DEP over five years (1994-2005) at six sampling stations (S-48, S-49, S-271, S-272, S-337, S-339). Data collected at these stations indicate Class B Goosefare Brook is attaining Class C criteria, or is "non-attaining" (NA), meaning it does not meet Class A, B, or C conditions, in different years at different sampling stations (DEP, 2010b).

### Impervious Cover Analysis

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because Goosefare Brook's impairment is not caused by a single pollutant, %IC is used for this TMDL to represent the mix of pollutants and other impacts associated with excessive stormwater runoff. The

**8% IC represents an approximate 53% reduction in stormwater runoff volume and associated pollutants when compared to existing pollutant loads.**

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Goosefare Brook watershed has an impervious surface area of **17%** (Figure 1). DEP has found that in order to support Class B aquatic life use, the Goosefare Brook watershed may require the characteristics of a watershed with **8%** impervious cover. This WLA & LA target is intended to guide the application of Best Management Practices (BMP) and Low Impact Development (LID) techniques to reduce the *impact* of impervious surfaces. Ultimate success of the TMDL will be Goosefare Brook's compliance with Maine's water quality criteria for aquatic life.

#### **Impervious Cover GIS Calculations**

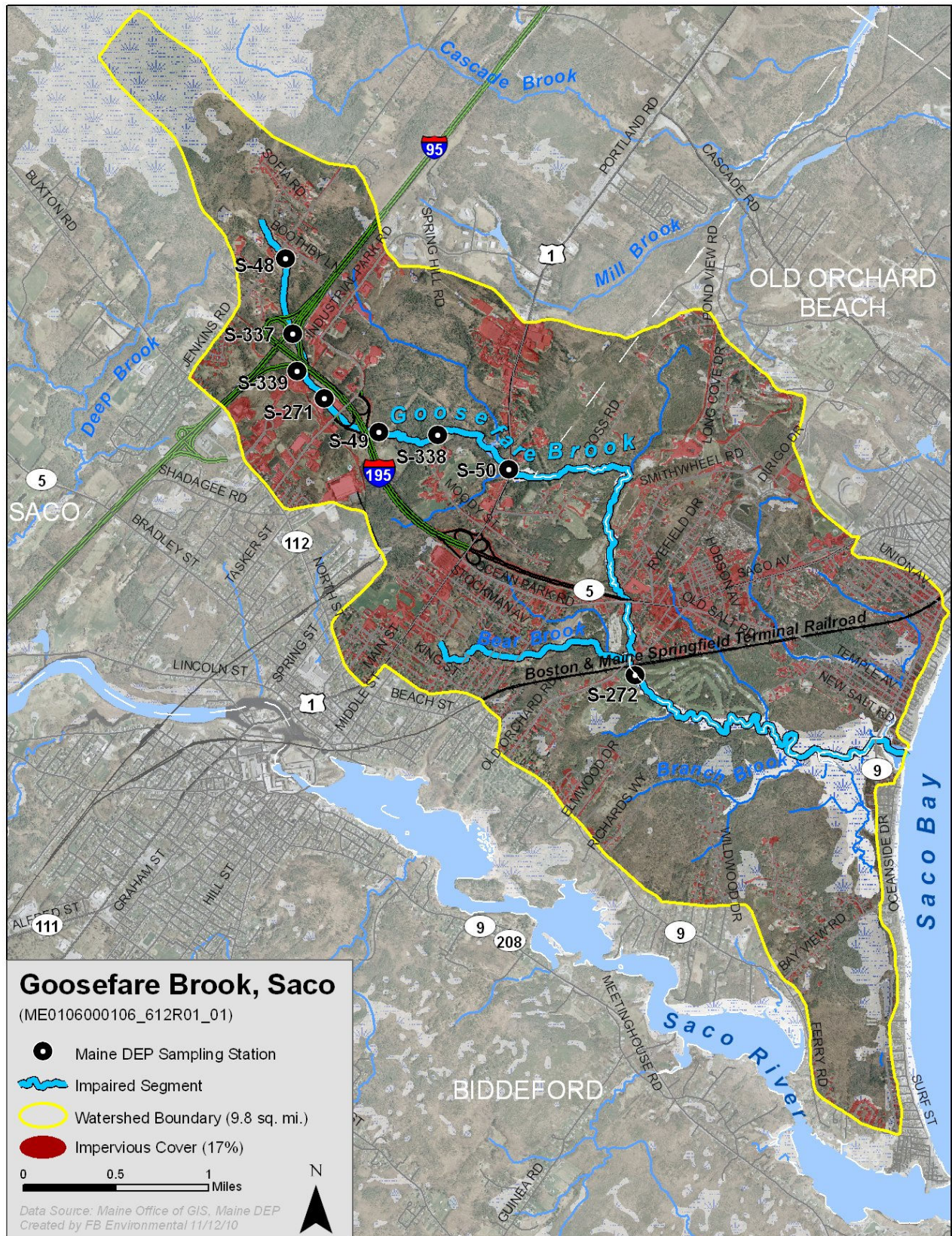
*The Impervious Cover Calculations are based on analysis of GIS coverage's presented in Figure 1. The impervious area is derived from 2004 1 meter satellite imagery and the watershed boundary is an estimation based on contours and digital elevation models.*

#### **Next Steps**

Because Goosefare Brook is an impaired water, specific sources of stormwater runoff in the watershed should be considered during the development of a watershed management plan to:

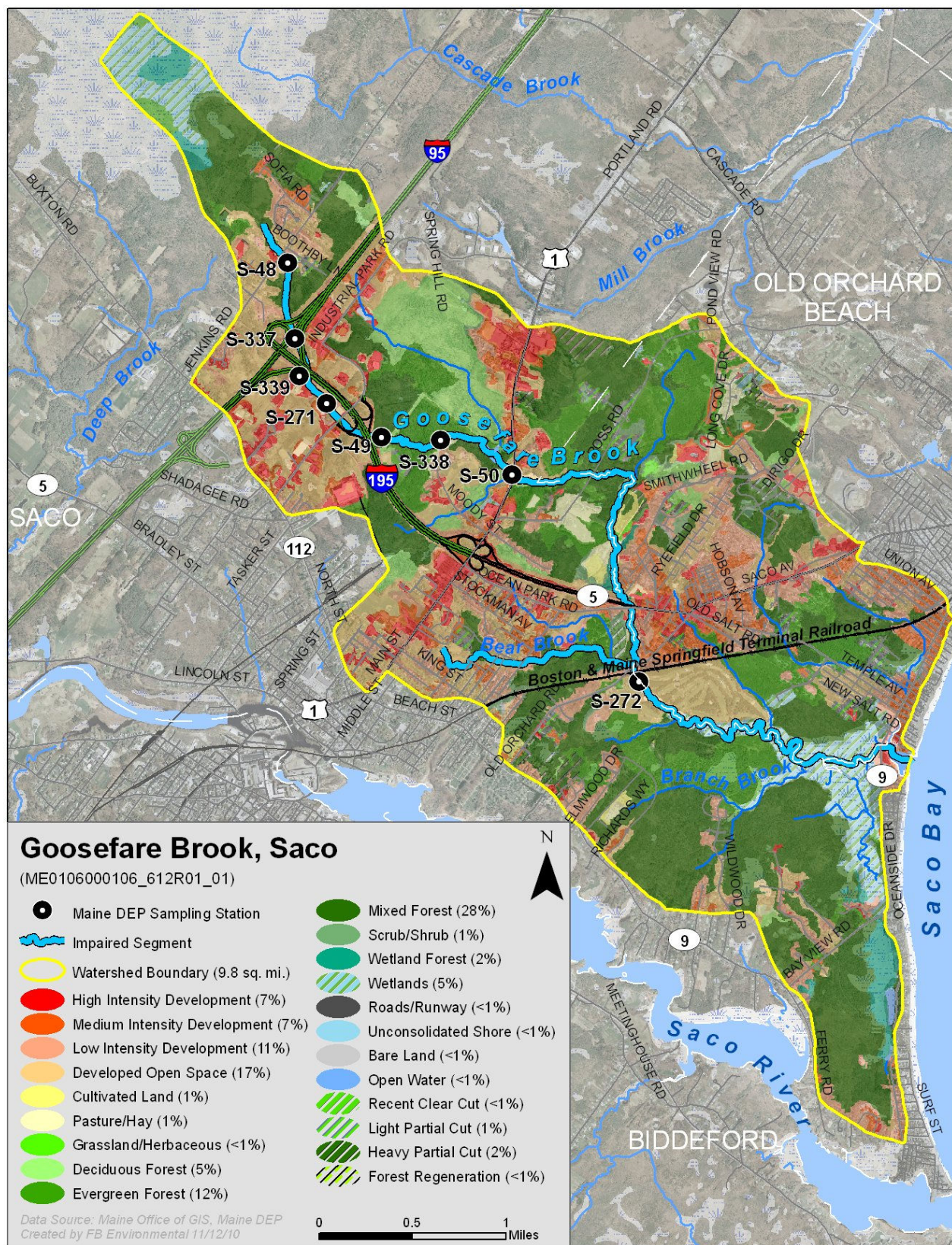
- Encourage greater citizen involvement through the development of a watershed coalition to ensure the long term protection of Goosefare Brook;
- Address existing stormwater problems in the Goosefare Brook watershed by installing structural and applying non-structural best management practices (BMPs); and
- Prevent future degradation of Goosefare Brook through the development and/or strengthening of local stormwater control ordinances.





**Figure1: Map of Goosefare Brook watershed impervious cover.**





**Figure 2:** Map of Goosefare Brook watershed land cover.

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### References

- Center for Watershed Protection (CWP). 2003. Impacts of Impervious Cover on Aquatic Systems. Watershed Protection Research Monograph No. 1. Center for Watershed Protection, Ellicott City, MD. 142 pp.
- Davies, Susan P. and Leonidas Tsomides. 2002. Methods for Biological Sampling and Analysis of Maine's Rivers and Streams. Maine Department of Environmental Protection. Revised August, 2002. DEP LW0387-B2002.
- Maine Department of Environmental Protection (DEP). 2010a. Proposed Changes to Chapter 502 – February 23, 2010: Changes to Appendix B: Urban Impaired Streams. Bureau of Land and Water Quality, Augusta, ME.
- Maine Department of Environmental Protection (DEP). 2010b. Assessment Database Detail Report for Goosefare Brook (Saco). Bureau of Land and Water Quality, Augusta, ME.