



TMDL Assessment Summary

Unnamed Tributary to Bond Brook

Watershed Description

This **TMDL** assessment summary applies to a 1.34-mile section of an Unnamed Tributary to Bond Brook, located in the City of Augusta, Maine. The Unnamed Tributary to Bond Brook watershed begins in Hallowell, Maine near Balsam Drive. The main branch of the Unnamed Tributary to Bond Brook begins near the intersection of Interstate 95 and Old Winthrop Road in Augusta. The stream flows northeast through a forested area where it joins with another small tributary. This second tributary begins in a forested area near the Augusta State Airport. The Unnamed Tributary to Bond Brook then flows through a small developed area before entering Bond Brook. The Unnamed Tributary to Bond Brook watershed covers 1,088 acres in the City of Augusta and 64 acres in the City of Hallowell, Maine.

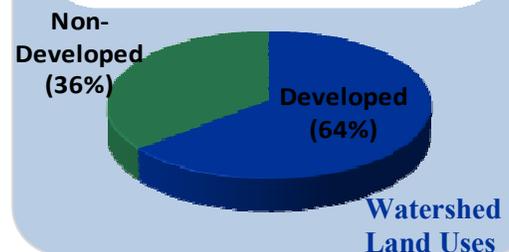
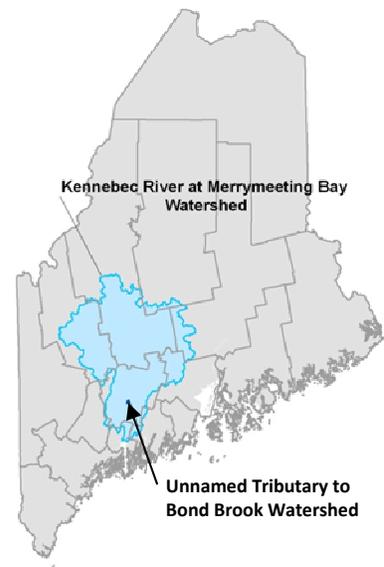
- Stormwater runoff from **impervious cover (IC)** is likely the largest source of pollution to the Unnamed Tributary to Bond Brook. Stormwater falling on IC in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- The Unnamed Tributary to Bond Brook watershed is predominately developed (64%), characterized by high intensity and open space development.
- Most of the land surrounding the impaired stream is forested. Woodland areas absorb and filter stormwater pollutants, and help protect both water quality in the stream and stream channel stability.
- The Unnamed Tributary to Bond Brook is on the list of Maine's Urban Impaired Streams (DEP, 2010).

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:** ME0103000312_333R04
- **City:** Augusta, ME
- **County:** Kennebec
- **Impaired Segment Length:** 1.34 miles
- **Classification:** Class B
- **Direct Watershed:** 1.7 mi² (1,088 acres)
- **Watershed Impervious Cover:** 20%
- **Major Drainage Basin:** Kennebec River at Merrymeeting Bay Watershed



Why is a TMDL Assessment Needed?

The Unnamed Tributary to Bond Brook, a Class B freshwater stream, has been assessed by DEP as not meeting water quality standards for 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.



Unnamed Tributary to Bond Brook
(Photo: DEP Biomonitoring Program)

The impervious cover TMDL assessment for the Unnamed Tributary to Bond Brook addresses the water quality impairments to aquatic life use (benthic-macroinvertebrate, stream habitat, and nutrient/eutrophication 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.

Sampling Results & Pollutant Sources

| Sampling Station | Sample Date | Statutory Class | Model Results |
|------------------|-------------|-----------------|---------------|
| S-489 | 8/22/2001 | B | NA |
| S-489 | 8/20/2002 | B | NA |
| S-489 | 8/8/2007 | B | NA |
| S-490 | 8/22/2001 | B | C |
| S-491 | 8/22/2001 | B | NA |

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).

The Unnamed Tributary to Bond Brook impairment is based on data collected by DEP in 2001, 2002, and 2007 at three sampling stations (489, 490, and 491). The most recent data indicate the Class B Unnamed Tributary is “non attaining” (NA), meaning it does not meet Class A, B, or C conditions.

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Impervious Cover Analysis

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because the Unnamed Tributary to Bond 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 Unnamed Tributary to Bond Brook watershed has an impervious surface area of **20%** (Figure 1). DEP has found that in order to support Class B aquatic life use, the Unnamed Tributary watershed may require the characteristics of a watershed with **8%** impervious cover. This WLA & LA target is

*8% IC represents an approximate **60% reduction** in stormwater runoff volume and associated pollutants when compared to existing pollutant loads.*

Impervious Cover GIS Calculations

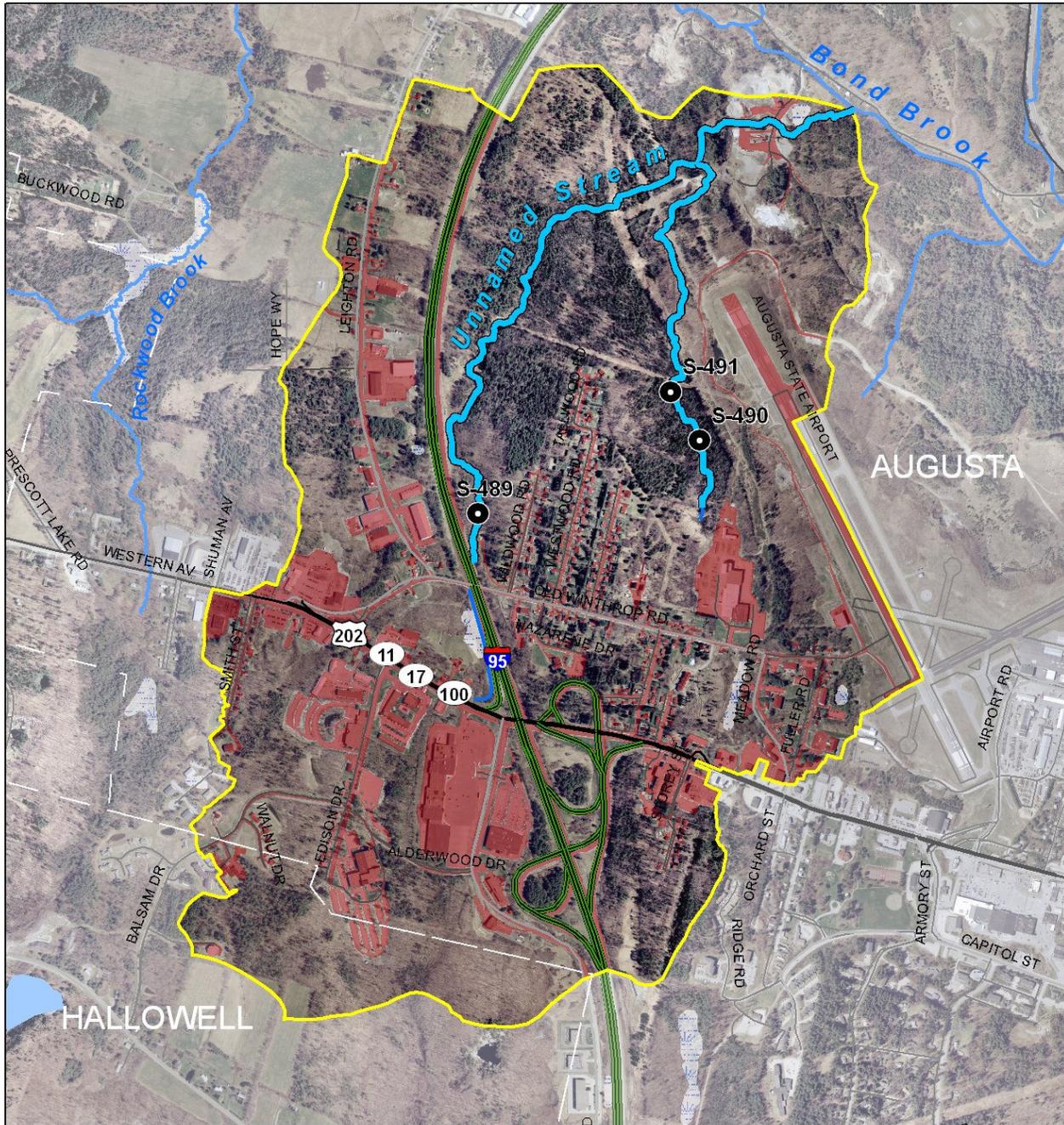
The Impervious Cover Calculations are based on analysis of GIS coverage’s presented in Figure 1. The impervious area is derived from 2007 1 meter satellite imagery and the watershed boundary is an estimation based on contours and digital elevation models.

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 the Unnamed Tributary to Bond Brook's compliance with Maine's water quality criteria for aquatic life.

Next Steps

Because Unnamed Tributary to Bond 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 the Unnamed Tributary to Bond Brook;
- Address existing stormwater problems in the Unnamed Tributary to Bond Brook watershed by installing structural and applying non-structural best management practices (BMPs); and
- Prevent future degradation of Unnamed Tributary to Bond Brook through the development and/or strengthening of local stormwater control ordinances.



Unnamed Tributary to Bond Brook (entering below I-95), Augusta

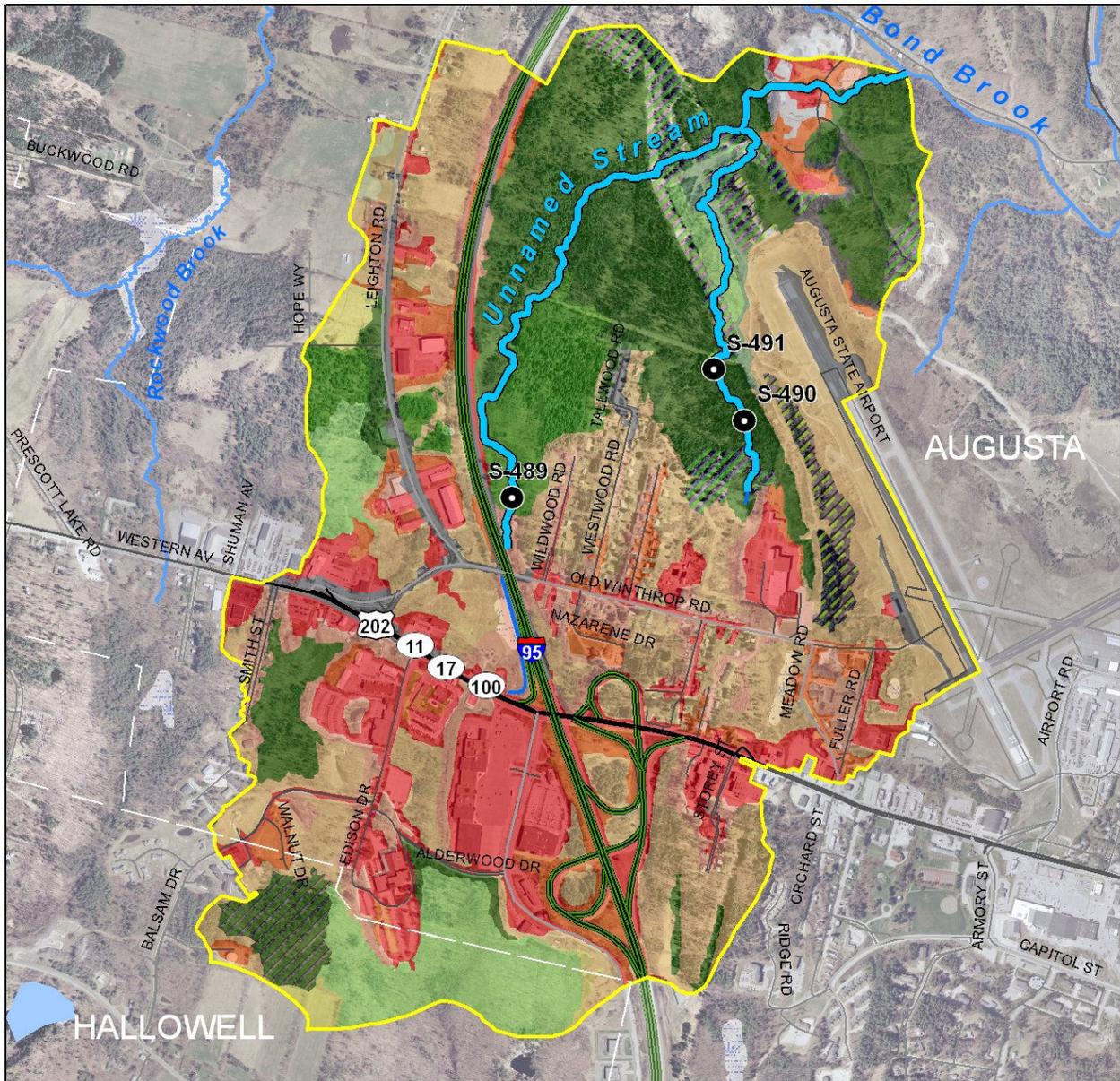
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- Maine DEP Sample Station
- Watershed Boundary (1.7 sq. mi.)
- ~ Impaired Segment
- Impervious Cover (20%)

Data Source: Maine Office of GIS, Maine DEP
Created by FB Environmental 10/27/10



Figure 1: Map of the Unnamed Tributary to Bond Brook watershed impervious cover.



Unnamed Tributary to Bond Brook (entering below I-95), Augusta

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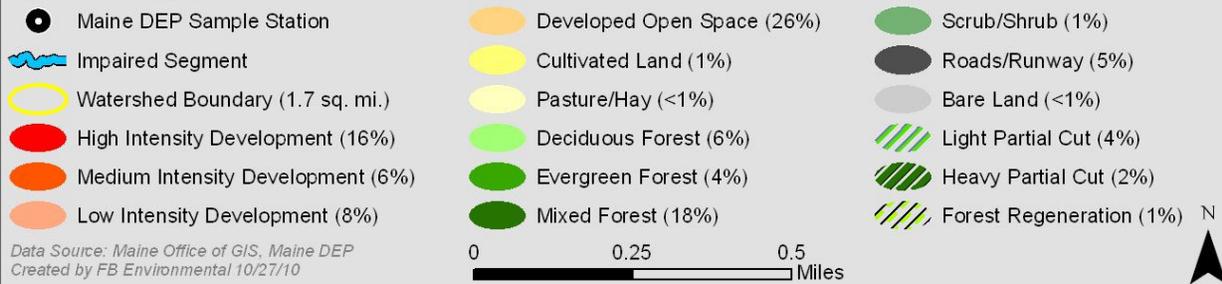


Figure 2: Map of the Unnamed Tributary to Bond Brook watershed land cover.

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). 2010. Assessment Database Detail Report for the Unnamed Tributary to Bond Brook. Bureau of Land and Water Quality, Augusta, ME.