



TMDL Assessment Summary

Whitney Brook

Watershed Description

This **TMDL** assessment summary applies to a 1.82-mile section of Whitney Brook, located in the City of Augusta, Maine. Whitney Brook begins in a low to medium-intensity developed area near Piggery Road. The stream flows north across U.S. Route 17 where it meets another small stream that flows into Whitney Brook. The impaired segment of Whitney Brook begins downstream of this point. Whitney Brook continues through a predominately forested area, and then reaches a heavily developed area just below U.S. Route 202 before flowing into the Kennebec River just downstream of U.S. Route 201. The Whitney Brook watershed covers 1,056 acres in the City of Augusta.

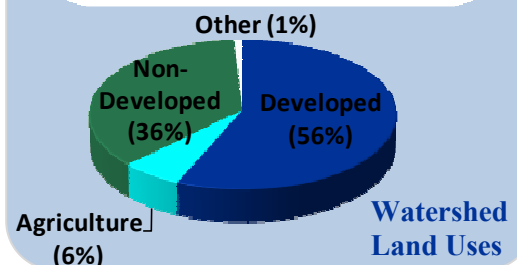
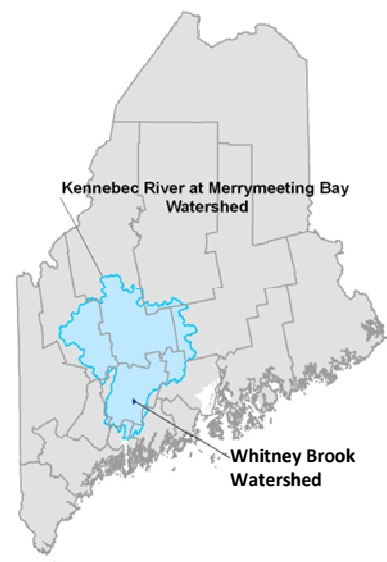
- Stormwater runoff from **impervious cover (IC)**, particularly in the heavily developed area near the mouth of the brook, is likely the largest source of pollution to Whitney Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- The Whitney Brook watershed is predominately developed (56%), particularly near the mouth of brook, north of where it passes under U.S. Route 105.
- Woodlands in a large portion of the central Whitney Brook watershed absorb and filter stormwater pollutants, and help protect both water quality in the stream and stream channel stability.
- Whitney Brook has recently been added to the list of Urban Impaired Streams because of failure to meet the Aquatic Life Standards for Class B waters based on a 2007 sampling of macroinvertebrates (DEP, 2010a, b).

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_333R02
- **City:** Augusta, ME
- **County:** Kennebec
- **Impaired Segment Length:** 1.82 miles
- **Classification:** Class B
- **Direct Watershed:** 1.65 mi² (1,056 acres)
- **Watershed Impervious Cover:** 18%
- **Major Drainage Basin:** Kennebec River at Merrymeeting Bay Watershed



Why is a TMDL Assessment Needed?

Whitney Brook, a Class B freshwater stream, has been assessed by DEP as not meeting water quality standards for recreational and aquatic life uses (including nutrient/eutrophication biological indicators) 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.



Whitney Brook at Station 601.
(Photo: DEP Biomonitoring Program)

Recreational impairments in Whitney Brook have already been addressed in DEP's 2009 statewide bacteria TMDL [<http://www.maine.gov/dep/blwq/docmonitoring/TMDL/2009/report.pdf>]. The impervious cover TMDL assessment for Whitney Brook addresses the remaining water quality impairments to aquatic life use (benthic-macroinvertebrate, 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. A separate nutrient TMDL is required to address impairments for nutrient/eutrophication biological indicators.

Sampling Results & Pollutant Sources

Sampling Station	Sample Date	Statutory Class	Model Results
S-601	8/8/2007	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).

Whitney Brook impairment is based on data collected by DEP in 2007 at one sampling station (S-601) near the mouth of brook where it empties into the Kennebec River (DEP, 2010a). Data collected at this station indicate Class B Whitney Brook is "non attaining" (NA), meaning it does not meet Class A, B, or C conditions.

8% IC represents an approximate **56% reduction** in stormwater runoff volume and associated pollutants when compared to existing pollutant loads.

Impervious Cover Analysis

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because Whitney 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 Whitney Brook watershed has an impervious surface area of **18%** (Figure 1). DEP has found that in order to support Class B aquatic life use, the Whitney

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.

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 Whitney Brook's compliance with Maine's water quality criteria for bacteria and aquatic life.

Next Steps

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

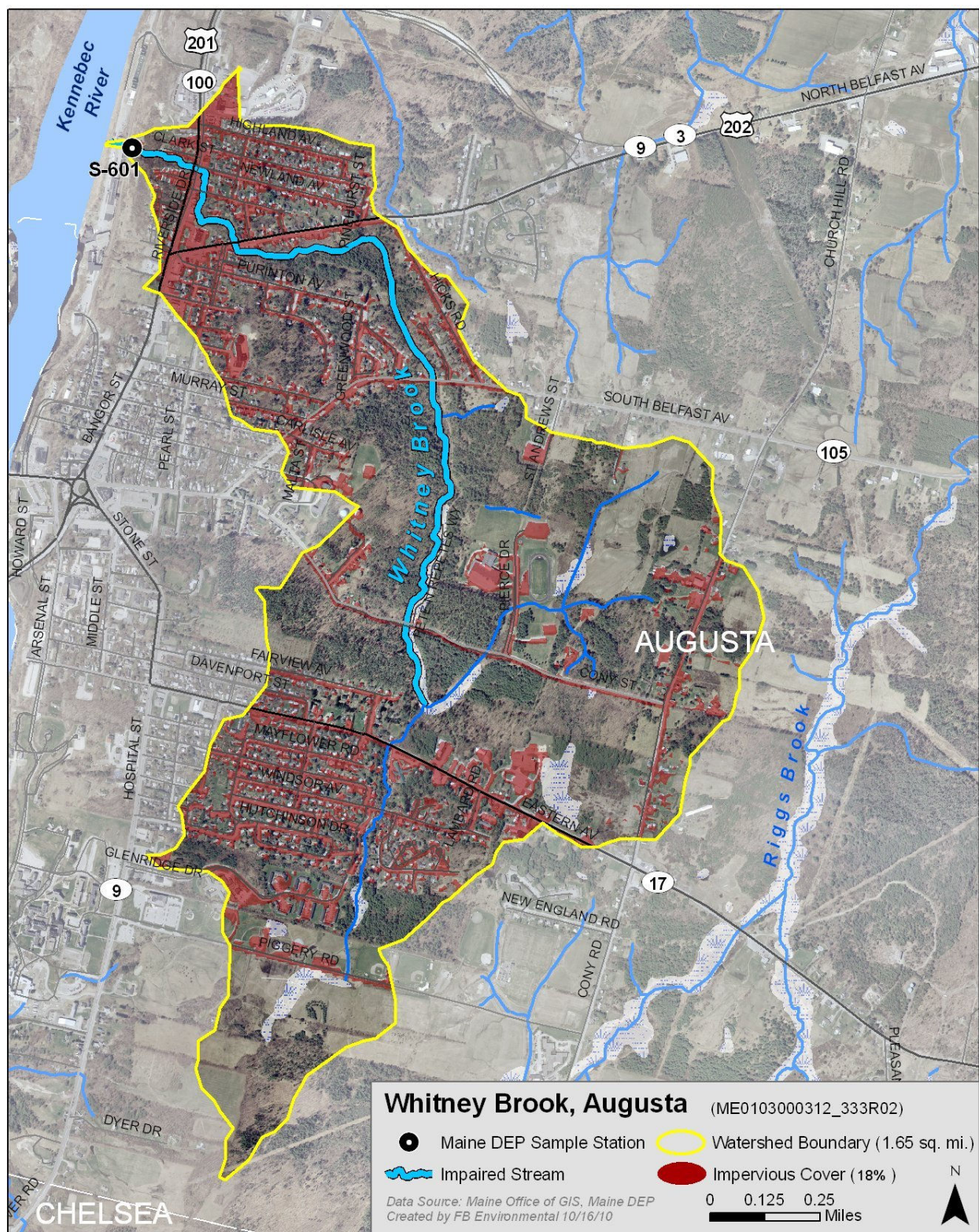


Figure 1: Map of Whitney Brook watershed impervious cover.

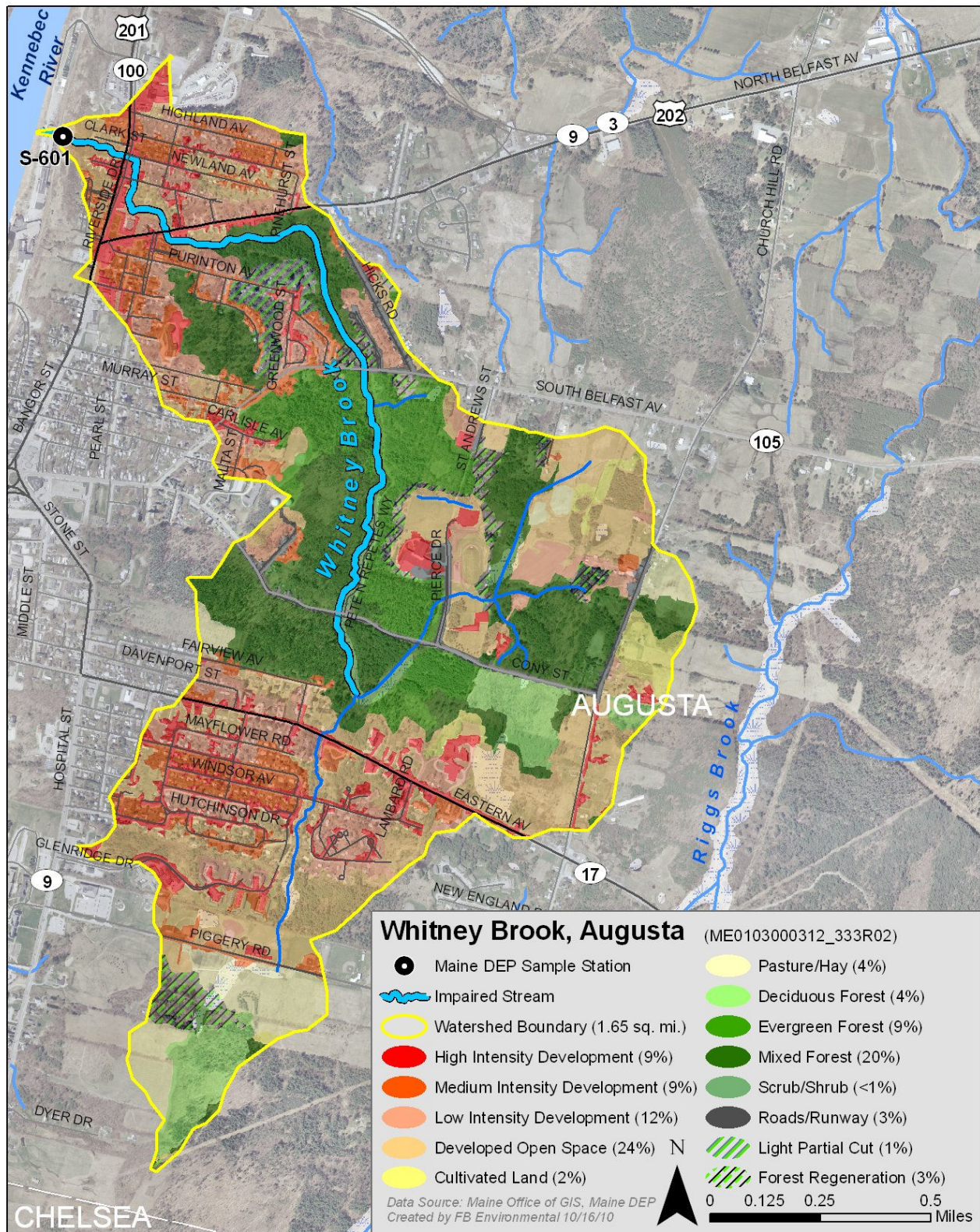


Figure 2: Map of Whitney Brook watershed land cover.

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). 2010a. Assessment Database Detail Report for Whitney Brook. Bureau of Land and Water Quality, Augusta, ME.
- Maine Department of Environmental Protection (DEP). 2010b. Proposed Changes to Chapter 502 – February 23, 2010: Changes to Appendix B: Urban Impaired Streams. Bureau of Land and Water Quality, Augusta, ME.