TMDL Assessment Summary

Capisic Brook

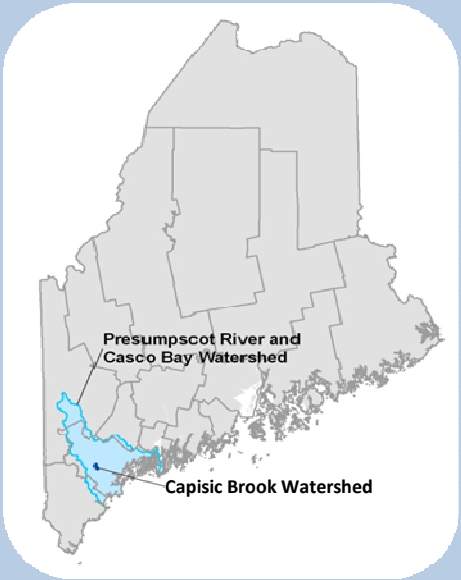
Watershed Description

This **TMDL** assessment summary applies to Capisic Brook, a 4.1-mile stream located in the City of Portland, Maine. Capisic Brook, a small tributary to the Fore River, and consists of several branches, with headwaters located east of Forest Avenue near the intersection with Allen Avenue (Rt. 100), in Evergreen Cemetery off of Stevens Avenue (Rt. 9), and just east of I-95 near the intersection with Warren Avenue. The mainstem of Capisic Brook originates in a wooded area within Evergreen Cemetery. The northern branch, which originates east of Forest Avenue, flows through a residential and a commercial-industrial area before joining the mainstem just below Evergreen Cemetery. The stream then flows through a residential area and is joined by the western branch, which originates near I-95, ~1,000 m downstream below the mainstem – northern branch confluence. The western branch receives a significant amount of runoff from I-95 and development located along the highway, especially west of I-95 Exit 8. From this second confluence, Capisic Brook continues to flow through a residential area down to Capisic Pond, which is created by the Capisic Pond dam just below Capisic Street. The Capisic Brook watershed covers 1,418 acres within the cities of Portland and Westbrook.

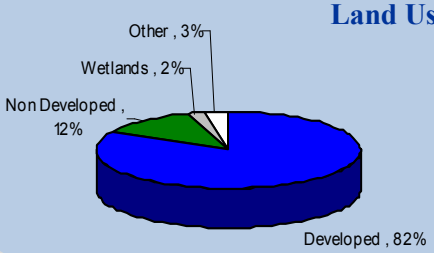
- Stormwater runoff from impervious cover (IC) is a major source of pollution to Capisic Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- The presence of two Combined Sewer Overflows (CSOs) is a major source of pollution to Capisic Brook. Sewage discharge affects biota indirectly by elevating nutrient levels which promotes excessive algal growth and results in the depletion of dissolved oxygen. There may also be direct effects of sewage discharges in the form of toxic contaminants.
- In addition to the pollution stressors, the intense urbanization surrounding Capisic Brook has created non-pollutant stressors to aquatic life in the form of

Waterbody Facts

- **Segment ID:** ME0106000105_610R01
  ME0106000105_610R01_W023
- **City:** Portland and Westbrook, ME
- **County:** Cumberland
- **Impaired Segment Length:** 4.1 miles
- **Classification:** Class C
- **Direct Watershed:** 2.21mi² (1,418 acres)
- **Watershed Impervious Cover: 31%**
- **Major Drainage Basin:** Presumpscot River and Casco Bay Watershed



Watershed Land Uses



alterations in channel morphology and the flow regime, and/or elimination of the riparian buffer.

- The woods in Evergreen Cemetery in the upper portion of the Capisic Brook watershed absorb and filter stormwater pollutants, and help protect both water quality in the stream and stream channel stability.

Capisic Brook below Lucas Street.
(Photo: MDEP)

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.*
- ***Combined Sewer Overflows*** *refers to a collection system that consists of both sewage and stormwater. During dry weather the system brings both to a sewagetreatment plant, where they are treated and then discharged. During periods of heavey rainfall or snowmelt the water volume in the system exceed the capacity of the system and is directly discharged to nearby waterbodies untreated.*

Why is a TMDL Assessment Needed?

Capisic Brook, a Class C freshwater stream, has been assessed by DEP as not meeting standards for habitat assessment, 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.

Sampling Station	Sample Date	Statutory Class	Model Results
Stream Sites			
S-256	2003	C	A
S-257	2009	C	NA
S-931	2009	C	NA
S-932	2009	C	NA
S-933	2009	C	NA
S-934	2009	C	NA
Wetland Sites			
W-023	2000	C	C
W-023	2003	C	NA

The impervious cover TMDL assessment for Capisic Brook addresses water quality impairments for dissolved oxygen, and aquatic life (benthic macroinvertebrate, 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

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). Biomonitoring was

conducted at various sampling stations in five different years between 1995 and 2009. Data indicate that Class C Capisic Brook is "non attaining" (NA), meaning it does not meet Class A, B, or C conditions at five key stations, and Class A at the remaining station.

Additionally, in the 2010 list of Impaired Waters, DEP also listed a wetland site, Capisic Pond Inlet, as impaired for aquatic life using wetland specifc sampling and analysis criteria.

Impervious Cover Analysis

***14% IC** represents an approximate **55% reduction** in stormwater runoff volume and associated pollutants when compared to existing pollutant loads.*

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because Capisic 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 Capisic Brook watershed has an impervious surface area of **31%** (Figure 1). DEP has found that in order to support Class C aquatic life use, the Capisic Brook watershed may require the characteristics of a watershed with **14%** impervious cover. This TMDL 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 Capisic Brook's compliance with Maine's criteria for habitat assessment.

Impervious Cover GIS Calculations

The Impervious Cover Calculations are based on analysis of GIS coverage's presented in Figure 1. In Capisic Brook these maps were derived from a detailed field assessment conducted by DEP Staff, as described in the TMDL.

Next Steps

Because Capisic Brook is an impaired water, municipal officials and landowners in Portland are developing a Watershed Management Plan for Capisic Brook. The plan objectives are:

- Determine watershed restoration needs through a review of existing studies and resources;
- Identify and engage key conveners and regional and watershed stakeholders in the planning process;
- Utilize community social marketing research to develop a targeted marketing strategy to overcome obstacles to voluntary implementation of stormwater pollution prevention;
- Enhance conditions along the Capisic Brook corridor to allow the brook to reach its high potential for a variety of uses including recreation and community space;
- Work with City planning staff to evaluate planning policy changes necessary for long-term watershed improvement;
- Identify specific structural and non-structural stormwater improvement projects within the watershed that can provide a basis for watershed restoration costs and an analysis of benefits;
- Work with City finance staff to determine the appropriate financing for implementation of a Capisic Brook restoration plan;
- Meet Class C water quality standards for fresh surface waters, as MaineDEP has designated for Capisic Brook.

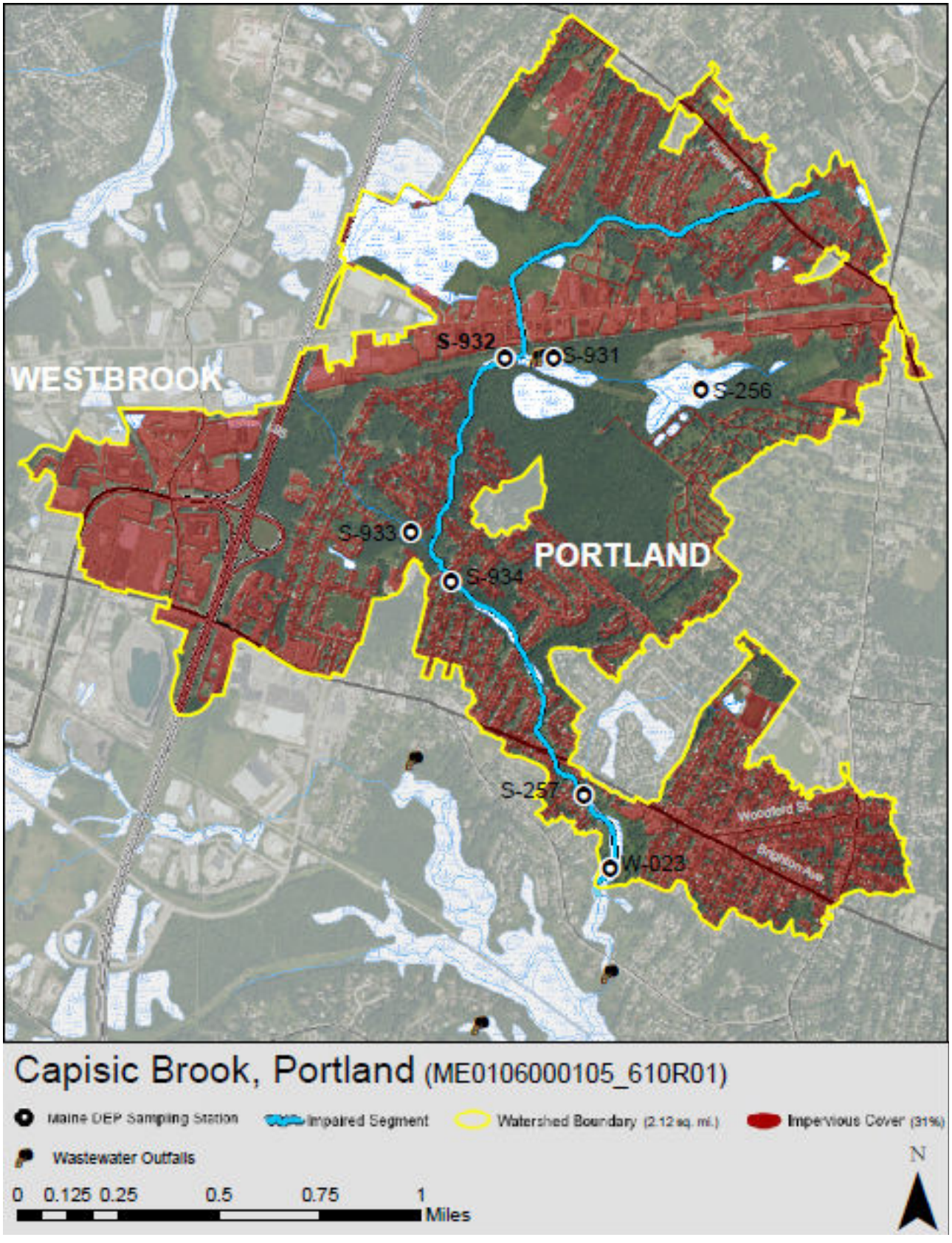


Figure 1: *Map of Capisic Brook watershed impervious cover.*

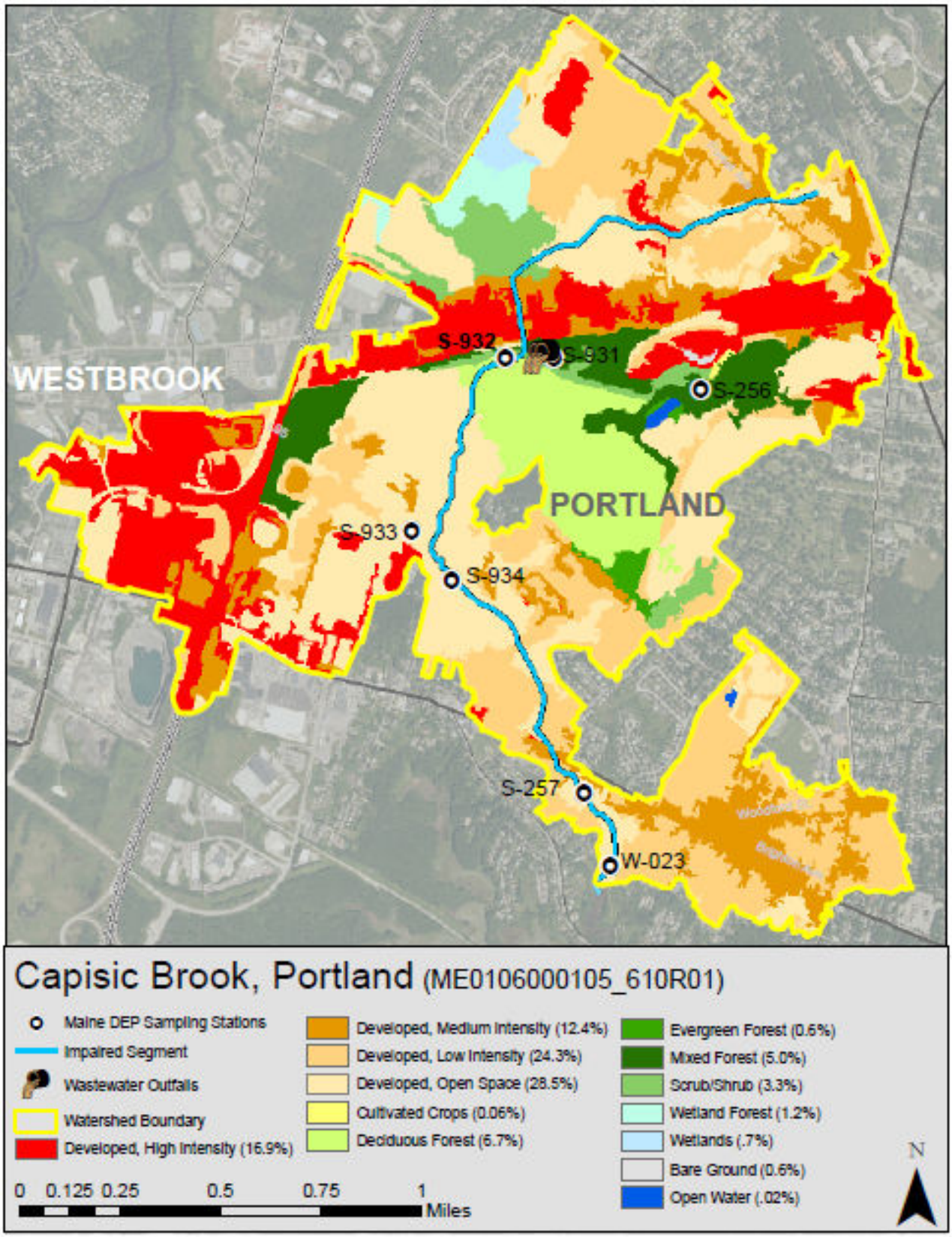


Figure 2: *Map of Capisic Brook watershed land cover.*

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 if Environmental Protection. Revised August, 2002. DEP LW0387-B2002.

Meidel, Susanne. and Melissa Evers. 2005. Capisic Brook Total Maximum Daily Load (TMDL) Draft Report. DEP LW0713.

Maine Department of Environmental Protection (DEP). 2010a. Draft 2010 Integrated Water Quality Monitoring and Assessment Report. Bureau of Land and Water Quality, Augusta, ME. DEPLW-1187.

Maine Department of Environmental Protection (DEP). 2010b. Assessment Database Detail Report for Capisic Brook (Portland). Bureau of Land and Water Quality, Augusta, ME.

Woodard and Curran. 2010. Capisic Brook Watershed Management Plan, Draft. Portland, ME