



TMDL Assessment Summary

Shaw Brook

Watershed Description

This **TMDL** assessment summary applies to Shaw Brook, a 3.91-mile stream located in the City of Bangor and towns of Hermon and Hampden, Maine. Shaw Brook, a small tributary to Souadabscook Stream (a popular stream for whitewater canoeing and kayaking (RiverFacts.com)), begins in a forested area west of the Bangor International Airport runway. The brook flows south under Hammond Street in Bangor shortly before it crosses the town line into Hermon. Shaw Brook runs adjacent to a gravel pit then passes under Odlin Road in Hermon before it flows under I95 near exit 180. A small tributary enters Shaw Brook shortly after it crosses the town line into Hampden just east of Coldbrook Road. The brook then passes through some open pasture before it flows into Souadabscook Stream near Bryer Lane in Hampden. The Shaw Brook watershed covers 3,386 acres in the City of Bangor and the towns of Hermon and Hampden.

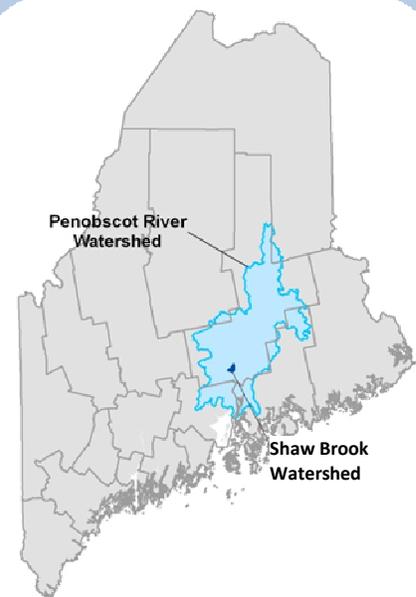
- Stormwater runoff from **impervious cover (IC)** is the largest source of pollution and stream channel alteration to Shaw Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- A number of Hammond Street storm drains, which are linked directly to Shaw Brook, funnel runoff from roads and parking lots down to the stream.
- Large areas of forest along Shaw Brook, just south of 195, are important for the absorption and filtration of stormwater. These areas protect both water quality in the stream and stream channel stability
- Shaw Brook has been placed on the 303d list of Urban Impaired Streams by DEP.

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:** ME0102000511_225R01_02
- **City/Towns:** Bangor/ Hermon, Hampden ME
- **County:** Penobscot
- **Impaired Segment Length:** 3.91 miles
- **Classification:** Class B
- **Direct Watershed:** 5.29 mi² (3,386 acres)
- **Watershed Impervious Cover:** 15%
- **Major Drainage Basin:** Penobscot River Watershed



Why is a TMDL Assessment Needed?

Shaw 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.



*Shaw Brook downstream of Station 480.
(Photo: DEP Biomonitoring Program)*

The impervious cover TMDL assessment for Shaw Brook addresses water quality impairments for 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-479	8/17/2001	B	NA
S-480	8/17/2001	B	C
S-480	8/9/2006	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).

Shaw Brook impairment is based on data collected by DEP in 2006 at the sampling station downstream of Odlin Road (S-480) (DEP, 2010b). Data collected at this station indicates Class B Shaw Brook is “non attaining” (NA), meaning it does not meet Class A, B, or C conditions. Shaw was also sampled in 2011 and those results will be available in 2012.

Impervious Cover Analysis

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because Shaw 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 Shaw Brook watershed has an impervious surface area of **15%** (Figure 1). DEP has found that in order to support Class B aquatic life use, the Shaw Brook watershed may require the characteristics of a watershed with **8%** impervious cover. This WLA & LA target is

*8% IC represents an approximate **47% 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 Shaw Brook's compliance with Maine's water quality criteria for dissolved oxygen and aquatic life.

Next Steps

Because Shaw 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 (i.e. through canoe and kayakers concerned with the water quality of Souadabscook Stream) to ensure the long term protection of Shaw Brook;
- Address existing stormwater problems in the Shaw Brook watershed by installing structural and applying non-structural best management practices (BMPs); and
- Prevent future degradation of Shaw Brook through the development and/or strengthening of local stormwater control ordinances.

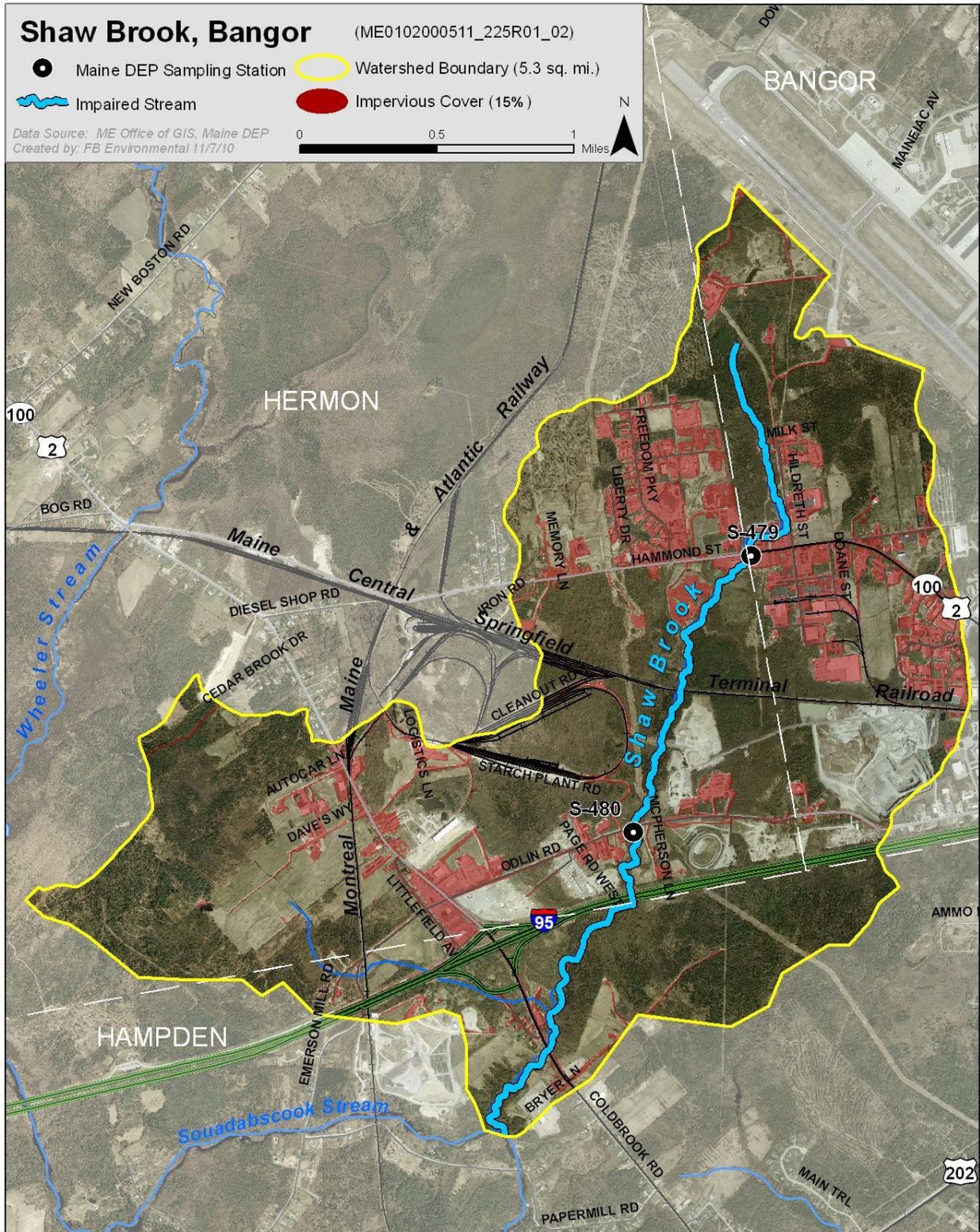


Figure 1: Map of Shaw Brook watershed impervious cover.

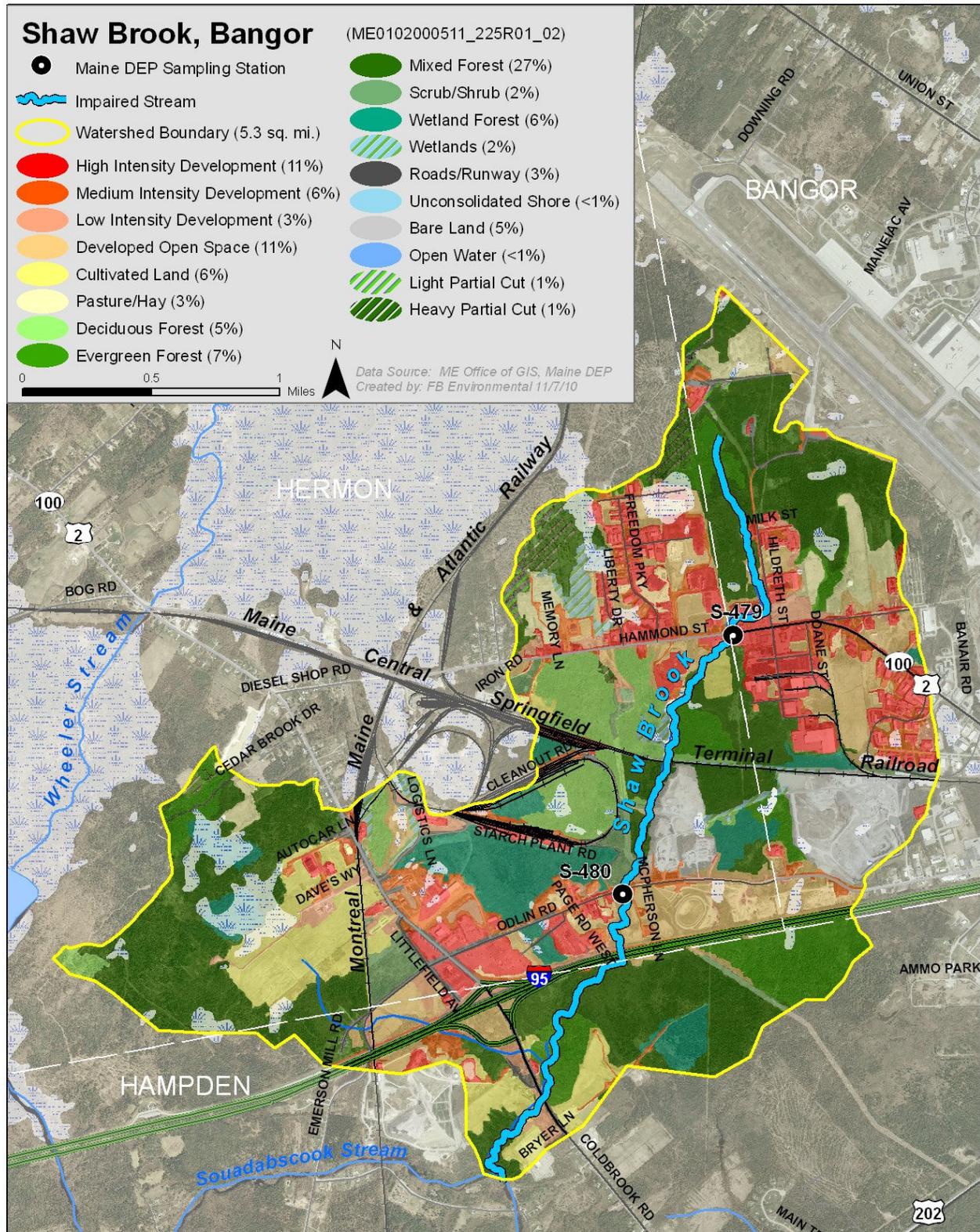


Figure 2: Map of Shaw Brook watershed land cover.

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. 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 Shaw Brook (Bangor, Hampden). Bureau of Land and Water Quality, Augusta, ME.
- RiverFacts.com, "Maine whitewater-Soudabscook Stream, Penobscot County," available online at: www.riverfacts.com/rivers/11435.html , accessed online on December 23, 2010