TMDL Assessment Summary

Nasons Brook

Watershed Description

This **TMDL** assessment summary applies to Nasons Brook, a 2.8-mile stream located in the Cities of Portland and Westbrook, Maine. Nasons Brook, a small tributary to the Fore River, begins in a man-made stormwater detention pond north of Westbrook Arterial and east of Forest Street in Westbrook. The stream flows parallel to the heavy development along Saunders Way. It then travels through a narrow wetland area after it passes under Westbrook Arterial (ME Route 25) and Larrabee Road. Shortly thereafter it crosses the town line into Portland. A small unnamed tributary to Nasons Brook enters right before the stream flows under the Maine Turnpike. The brook is then bordered on both sides by high intensity development. Shortly after the brook passes under Rowe Avenue in Portland, it flows into the Fore River. The Nasons Brook watershed covers 723 acres in the Cities of Portland and Westbrook.

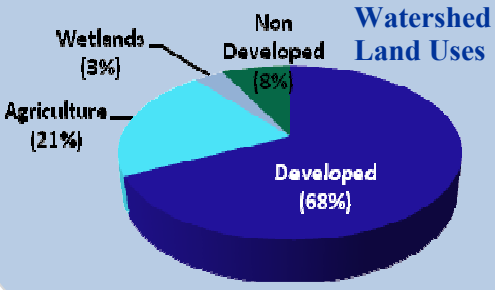
- Stormwater runoff from **impervious cover (IC)** is the largest source of pollution and stream channel alteration to Nasons Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- A considerable amount of impervious surface from commercial development within the watershed is connected directly to Nasons Brook via stormdrains and ditching, funneling runoff directly to the stream.
- There are several areas within the watershed that were once wetlands that filtered stormwater pollutants, that over the years have been filled in to make space for development.
- Nasons Brook has been placed on the Chapter 502 Urban Impaired Stream list 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:** ME0106000105_607R11_01 and _02
- ME0106000105_607R11_W127 and _W172
- **City:** Portland and Westbrook, ME
- **County:** Cumberland
- **Impaired Segment Length:** 2.0 miles _01; 0.8 miles _02
- **Classification:** Class C _01 and Class B _02
- **Direct Watershed:** 1.13 mi² (723 acres)
- **Watershed Impervious Cover:** 29%
- **Major Drainage Basin:** Presumpscot River and Casco Bay Watershed



Why is a TMDL Assessment Needed?

Nasons Brook has a Class B freshwater stream segment in Westbrook, and a Class C freshwater stream segment in Portland. Nasons Brook has been assessed by DEP as not meeting water quality standards for dissolved oxygen and aquatic life use (benthic macroinvertebrates (streams and wetlands) and nutrient/eutrophication assessments), 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.

Nasons Brook downstream of Rowe Avenue.
(Photo: FB Environmental)

The degradation of Nasons Brook's water quality is linked to the large areas of impervious cover within its watershed. There are areas of commercial and industrial development very close to, and directly draining to the brook. The impervious cover TMDL assessment for Nasons Brook addresses water quality impairments to dissolved oxygen and aquatic life use. 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 Station	Sample Date	Statutory Class	Model Results
Stream			
S-638	8/28/2002	B, C	NA
S-638	8/25/2003	B, C	NA
Wetland			
W-127	2005	C	NA
W-172	2008	B	NA

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).

Nasons Brook impairment is based on data collected by DEP in 2002 and 2003 at the sampling station downstream of Rowe Avenue (S-638) (DEP, 2010b). Data collected at this station indicated Class C Nasons Brook is "non attaining" (NA), meaning it does not meet Class A, B, or C conditions.

Additionally, in 2005 and 2008 wetlands were sampled and did not attain aquatic life standards using wetland specifc sampling and analysis criteria. These sites are included in 2012 303d list of Impaired Waters

***8% and 14% IC** represent an approximate **72% and 52% reduction** (respectively to Class B and C segments) 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 Nasons 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 Nasons Brook watershed has an impervious surface area of **29%** (Figure 1). DEP has found that in order to support Class B aquatic life use in Westbrook, the Nasons Brook watershed may require the characteristics of a watershed with **8%** impervious cover. In order to support Class C aquatic life use in Portland, the Nasons Brook watershed needs to have the characteristics of a watershed with **14%** impervious cover. These WLA & LA targets are 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 Nasons 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 2007 1 meter satellite imagery and the watershed boundary is derived from a detailed field assessment conducted by DEP Staff, as described in the TMDL.

Next Steps

Because Nasons 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 (e.g. through the Friends of Casco Bay & Casco Bay Estuary Partnership) to ensure the long term protection of Nasons Brook;
- Address existing stormwater problems in the Nasons Brook watershed by installing structural and applying non-structural best management practices (BMPs); and
- Prevent future degradation of Nasons Brook through the development and/or strengthening of local stormwater control ordinances.

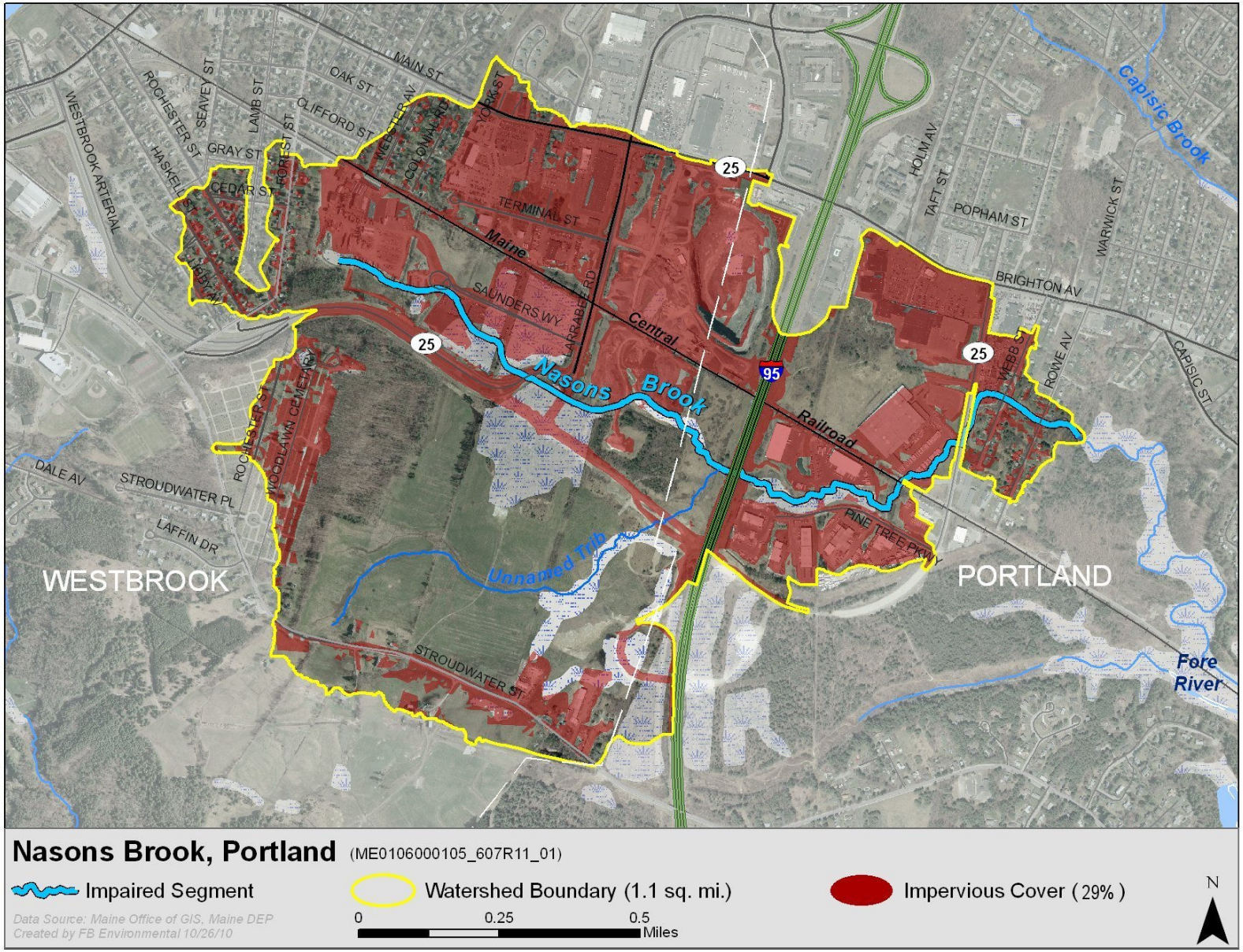


Figure 1: *Map of Nasons Brook watershed impervious cover.*

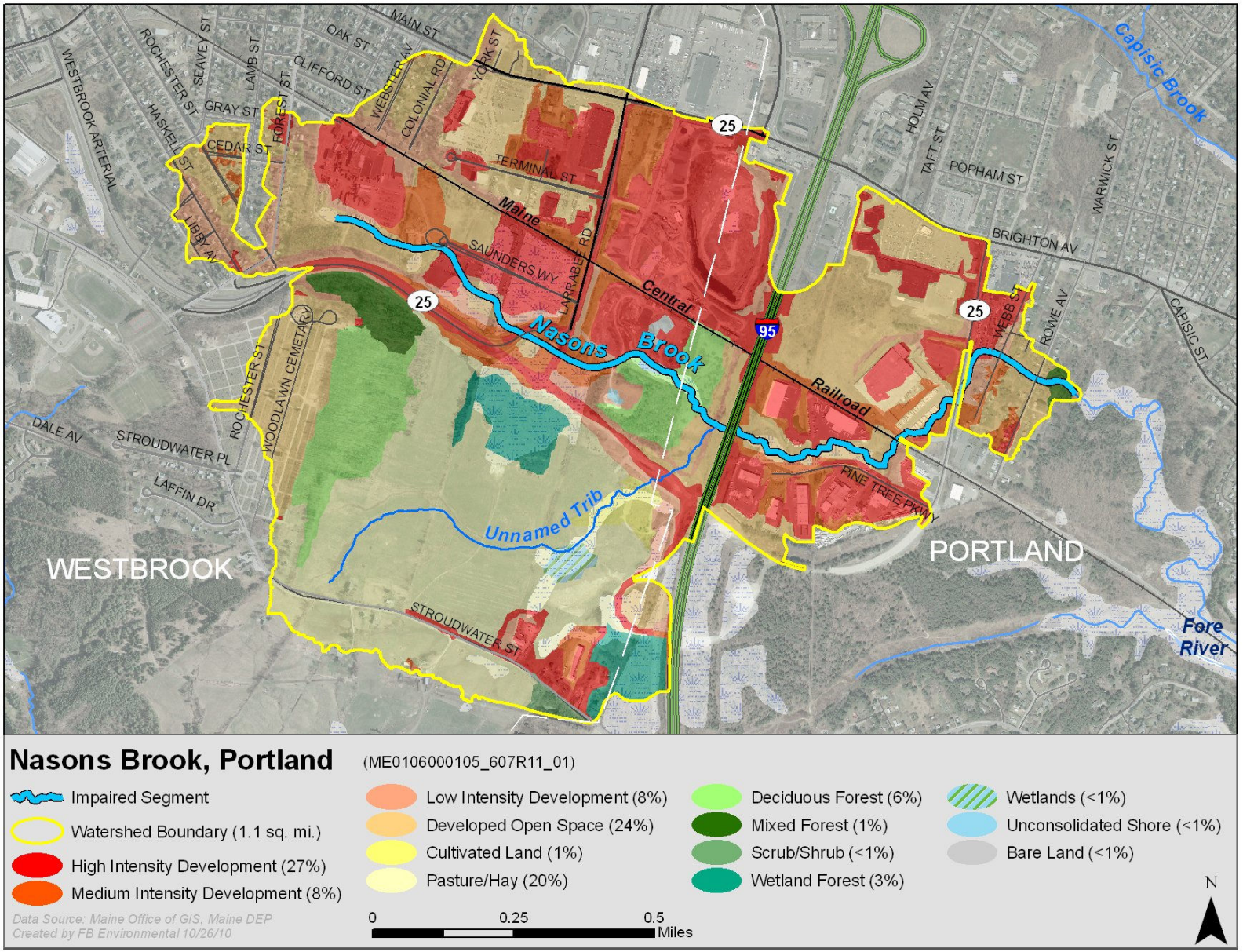


Figure 2: *Map of Nasons Brook watershed land cover.*

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.

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 Nasons Brook (Portland). Bureau of Land and Water Quality, Augusta, ME.