



TMDL Assessment Summary

Thatcher Brook

Watershed Description

This **TMDL** assessment summary applies to a 5.67-mile section of Thatcher Brook, located in the City of Biddeford and Town of Arundel, Maine. Thatcher Brook, a small tributary to the Saco River, begins in a wetland area west of Andrews Road in Biddeford. The stream flows south across Route 111 into the Town of Arundel. It then passes under the Maine Turnpike before heading west back into Biddeford. Three small tributary streams to Thatcher Brook begin in wetland areas in the south eastern portion of the watershed. These streams meet to form an unnamed tributary that flows into Thatcher Brook before it passes back under the Maine Turnpike near Exit 32. Thatcher Brook finally passes under Main Street near Biddeford High School before joining the Saco River. The Thatcher Brook watershed covers 4,525 acres in the City of Biddeford and the town of Arundel.

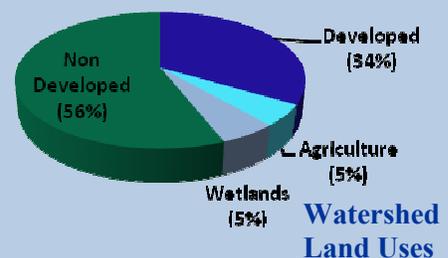
- Stormwater runoff from **impervious cover (IC)** is the largest likely source of pollution and stream channel alteration to Thatcher Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, and when untreated, can carry dirt, oils, metals, and other pollutants. When natural infiltration does not occur, high volumes of flow to the nearest section of the stream.
- Commercial development has expanded rapidly in the watershed over the last 10 years. Adding acres of impervious cover which can increase the stress on the stream.
- Wetland and woodlands in the center of Thatcher Brook watershed absorb and filter stormwater pollutants, and help protect both water quality in the stream and stream channel stability.

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:**
ME0106000211_616R05
ME0106000211_616R05
- **City:** Biddeford, ME
- **County:** York
- **Impaired Segment Length:** 5.67 miles
- **Classification:** Class B
- **Direct Watershed:** 7.07 mi² (4,525 acres)
- **Watershed Impervious Cover:** 13%
- **Major Drainage Basin:**
Saco River Watershed



Why is a TMDL Assessment Needed?

Thatcher Brook, a Class B freshwater stream, has been assessed by DEP as not meeting water quality standards for recreational and aquatic life uses, 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.

Recreational impairments in Thatcher 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 Thatcher Brook addresses the remaining water quality impairment to aquatic life use (benthic-macroinvertebrate assessments). This impairment is 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.



Lower Thatcher Brook

(Photo: DEP Biomonitoring Program)

Sampling Station	Sample Date	Statutory Class	Model Results
S-451	8/30/2000	B	B
S-451	8/15/2005	B	B
S-451	8/24/2010	B	B
S-746	8/12/2004	B	NA
W-043	6/14/2001	B	NA
W-043	6/13/2005	B	NA

2010b). Data collected at this station indicated Class B Thatcher Brook is “non attaining” (NA), meaning it does not meet Class A, B, or C conditions. Sampling results from station 451 show that the brook consistently attains water quality standards in the lower section with high gradient flow.

In the 2010 list of Impaired Waters, DEP also listed a wetland site in the Thatcher Brook watershed as impaired for aquatic life using wetland specific sampling and analysis criteria.

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).

Thatcher Brook impairment is based on data collected by DEP in 2004 at sampling station 746, located 250 meters downstream of the Maine Turnpike and behind the Kohl's Parking lot, off of ME Route 111 in Biddeford (DEP,

Impervious Cover Analysis

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because Thatcher 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 stormwater runoff. The Thatcher Brook watershed has an impervious surface area of **13%** (Figure 1). DEP has found that in order to support Class B aquatic life use, the Thatcher 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 Thatcher Brook's compliance with Maine's water quality criteria for aquatic life.

*8% IC represents an approximate **38% 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 2. In Thatcher Brook these maps were derived from a detailed field assessment conducted by DEP Staff, as described in the TMDL.

Next Steps

Because Thatcher Brook is a 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 and stakeholder (such as the Maine Turnpike Authority) involvement to ensure the long term protection of Thatcher Brook;
- Address existing stormwater problems in the Thatcher Brook watershed by installing structural and applying non-structural best management practices (BMPs); and
- Prevent future degradation of Thatcher Brook through the development and/or strengthening of local stormwater control ordinances.

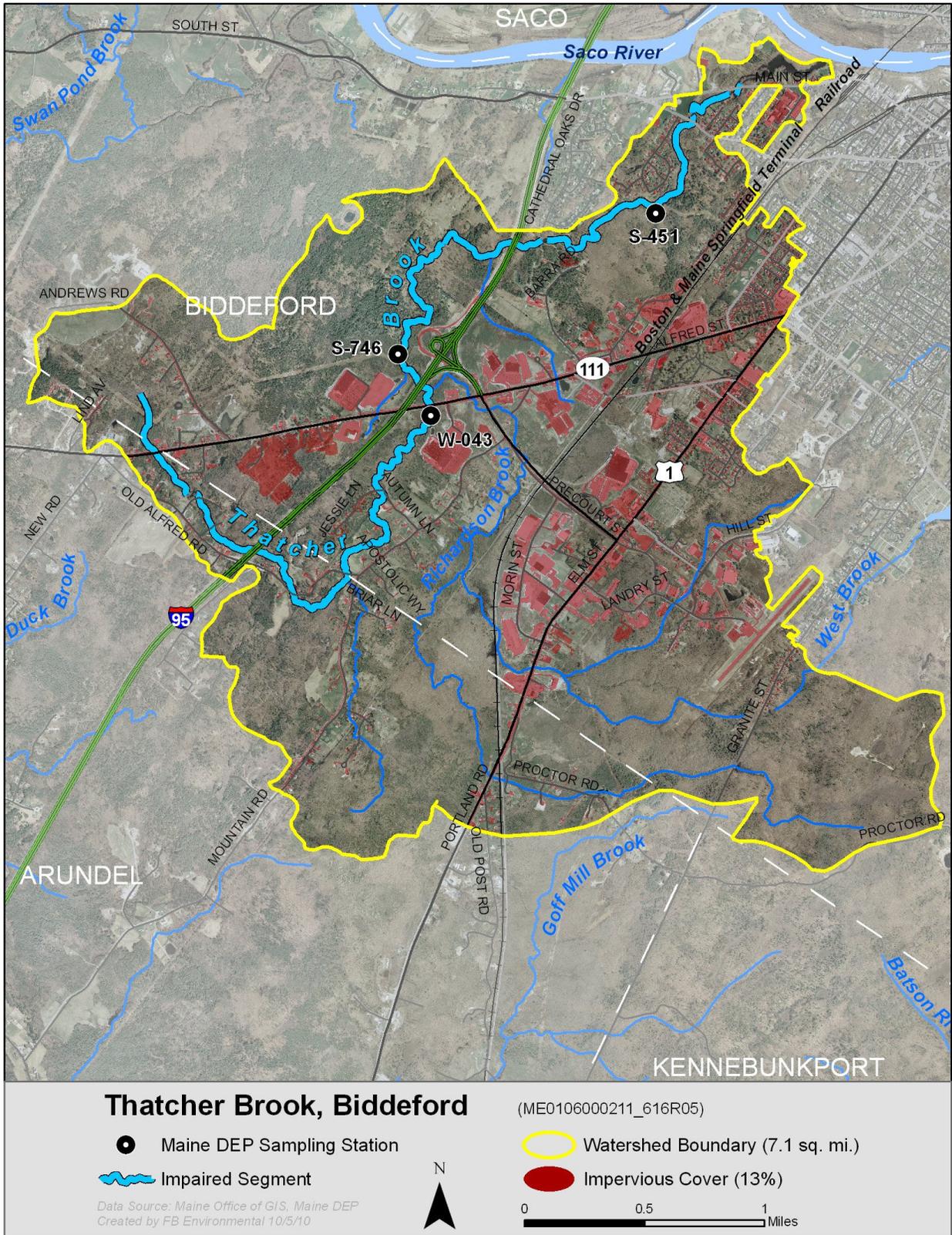
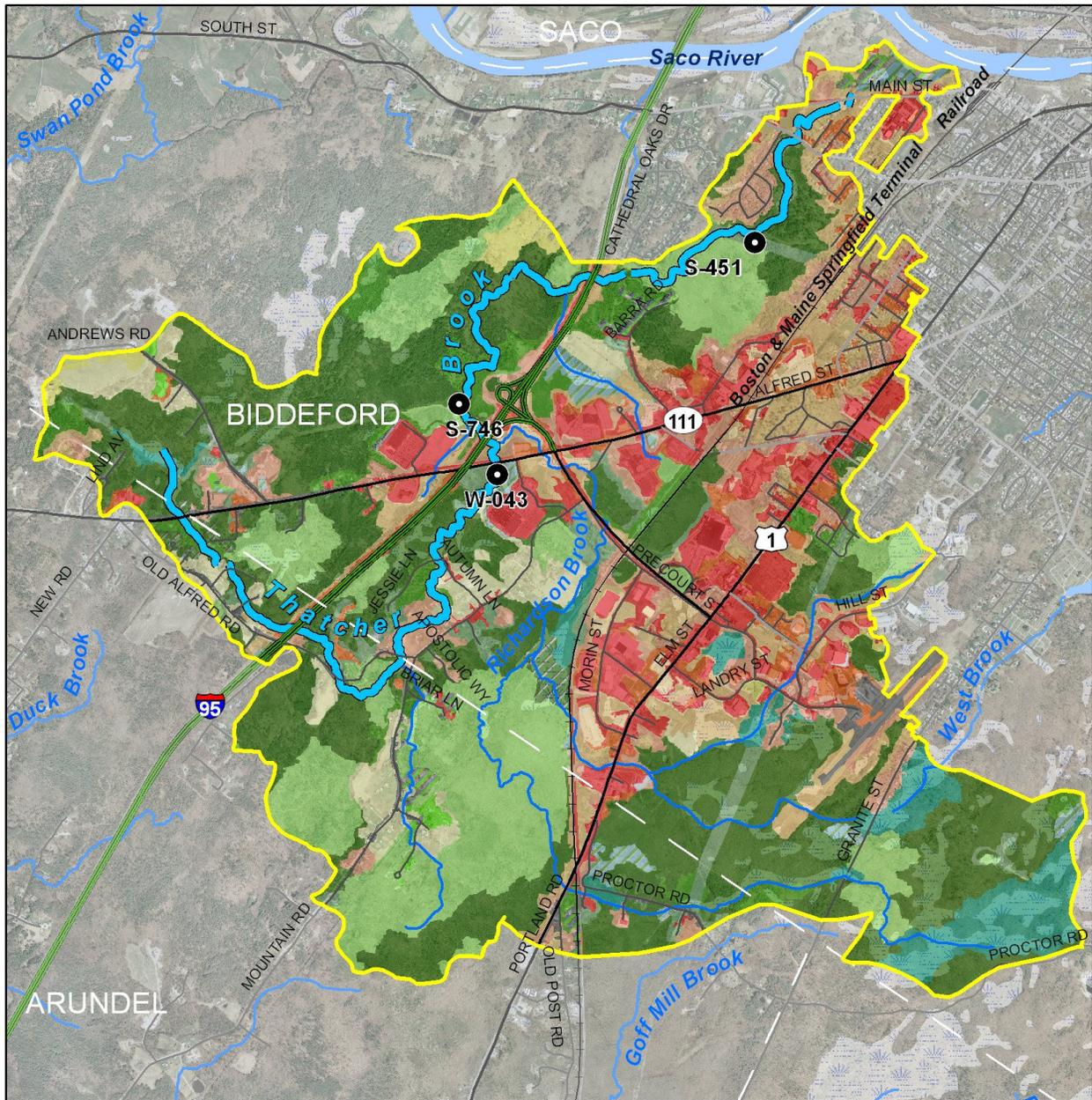


Figure 1: Map of Thatcher Brook watershed impervious cover.



Thatcher Brook, Biddeford (ME0106000211_616R05)

- Maine DEP Sampling Station
- ~ Impaired Segment
- Watershed Boundary (7.1 sq. mi.)
- High Intensity Development (10%)
- Medium Intensity Development (4%)
- Low Intensity Development (8%)
- Developed Open Space (10%)
- Cultivated Land (1%)
- Pasture/Hay (4%)
- Grassland/Herbaceous (<1%)
- Deciduous Forest (15%)
- Evergreen Forest (4%)
- Mixed Forest (31%)
- Scrub/Shrub (3%)
- Wetland Forest (4%)
- Wetlands (1%)
- Roads/Runway (2%)
- Unconsolidated Shore (<1%)
- Bare Land (<1%)
- Light Partial Cut (1%)
- Heavy Partial Cut (1%)

Data Source: Maine Office of GIS, Maine DEP
Created by FB Environmental 10/5/10



Figure 2: Map of Thatcher 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 Card Brook (Ellsworth). Bureau of Land and Water Quality, Augusta, ME.