



TMDL Assessment Summary

Kimball Brook

Watershed Description

This **TMDL** assessment summary applies to Kimball Brook, a 1.55-mile stream in the City of South Portland, Maine. Kimball Brook is a small tributary to Trout Brook (Mill Creek), which empties into Casco Bay in South Portland. Kimball Brook begins in a wetland area just south of Highland Avenue in South Portland. The stream flows parallel to Highland Avenue through several narrow wetland areas. Shortly after it passes under Stillman Street, Kimball Brook flows into one of two consecutive small impoundments. After the second impoundment, Kimball Brook continues under Ocean House Road (ME Route 77) before flowing into Trout Brook near Mill Creek Park in downtown South Portland. The Kimball Brook watershed covers 346 acres in the City of South Portland and the Town of Cape Elizabeth.

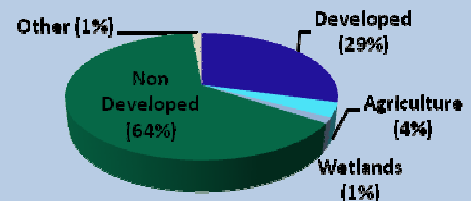
- Stormwater runoff from **impervious cover (IC)** is the largest source of pollution and stream channel alteration to Kimball Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- A number of Ocean House Road (ME Route 77) storm drains, which are linked directly to Kimball Brook, funnel runoff from the road down to the stream.
- Wetland and woodlands surrounding the stream in the center of the watershed absorb and filter stormwater pollutants, and help protect both water quality in the stream and stream channel stability.
- Kimball Brook has been placed on the Chapter 500 Urban

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_610R06
- **City:** South Portland, ME
- **County:** Cumberland
- **Impaired Segment Length:** 1.55 miles
- **Classification:** Class C
- **Direct Watershed:** 0.54 mi² (346 acres)
- **Watershed Impervious Cover:** 7%
- **Major Drainage Basin:** Presumpscot River and Casco Bay Watershed



Watershed Land Uses

Impaired Stream list by DEP.

Why is a TMDL Assessment Needed?

Kimball Brook, a Class C 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.

The impervious cover TMDL assessment for Kimball Brook addresses water quality impairments for aquatic life use (benthic-macroinvertebrate and stream habitat 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.



*Kimball Brook upstream of Station 795.
(Photo: FB Environmental)*

Sampling Results & Pollutant Sources

Sampling Station	Sample Date	Statutory Class	Model Results
S-301	9/8/1997	C	NA
S-795	8/9/2005	C	NA
S-795	8/13/2010	C	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).

Kimball Brook impairment is based on data collected by DEP in 2005 at the sampling station upstream of Ocean Street (S-795) (DEP, 2010b). Data collected at this station indicated Class C Kimball Brook is “non attaining” (NA), meaning it does not meet Class A, B, or C conditions.

Impervious Cover Analysis

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because Kimball 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 Kimball Brook watershed has an impervious surface area of **7%** (Figure 1). DEP has found that in order to support Class B aquatic life use, the Kimball Brook watershed may require the characteristics of a watershed with **4%** impervious cover. The target for Kimball Brook is lower than the target recommended for Class C streams the IC Guidance (Appendix 2), of the TMDL report. Not all watersheds are created equally and the guidance does include the option to apply Best Professional Judgment when choosing streams’ targets. The development is distributed throughout the watershed and is below the target, but development is likely responsible for some portion of the impairment. This segment does exhibit some characteristics associated with impairment due to stormwater runoff, such as extreme low flow in the summer. Another problem is the

*4% IC represents an approximate **43% reduction** in stormwater runoff volume and associated pollutants when compared to existing pollutant loads.*

presence of iron which coats the stream in unusually high amounts of orange colored iron bacteria flocculent. The contribution of these problems in relationship to the impervious cover in the watershed is not clear, but the IC TMDL prescribes an investigation of problem sources to develop a comprehensive Watershed Based Plan. The TMDL implementation recommendations are the logical next step to achieve water quality classification in Kimball, therefore a reasonable target was chosen.

Impervious Cover GIS Calculations

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

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 Kimball Brook's compliance with Maine's water quality criteria for aquatic life and the criteria for habitat assessment.

Next Steps

Because Kimball Brook is an impaired water, specific sources of stormwater runoff in the watershed should be considered during the development of a watershed management plan. This process has already been started by South Portland with a grant from DEP and partnerships with Cape Elizabeth, Cape Elizabeth Land Trust, Friends of Casco Bay, Casco Bay Estuary Partnership, and the Maine Board of Pesticide Control. (Kim, 2010). The management plan should:

- Encourage greater citizen involvement to ensure the long term protection of Kimball Brook;
- Address existing stormwater problems in the Kimball Brook watershed by installing structural and applying non-structural best management practices (BMPs); and
- Prevent future degradation of Kimball Brook through the development and/or strengthening of local stormwater control ordinances.

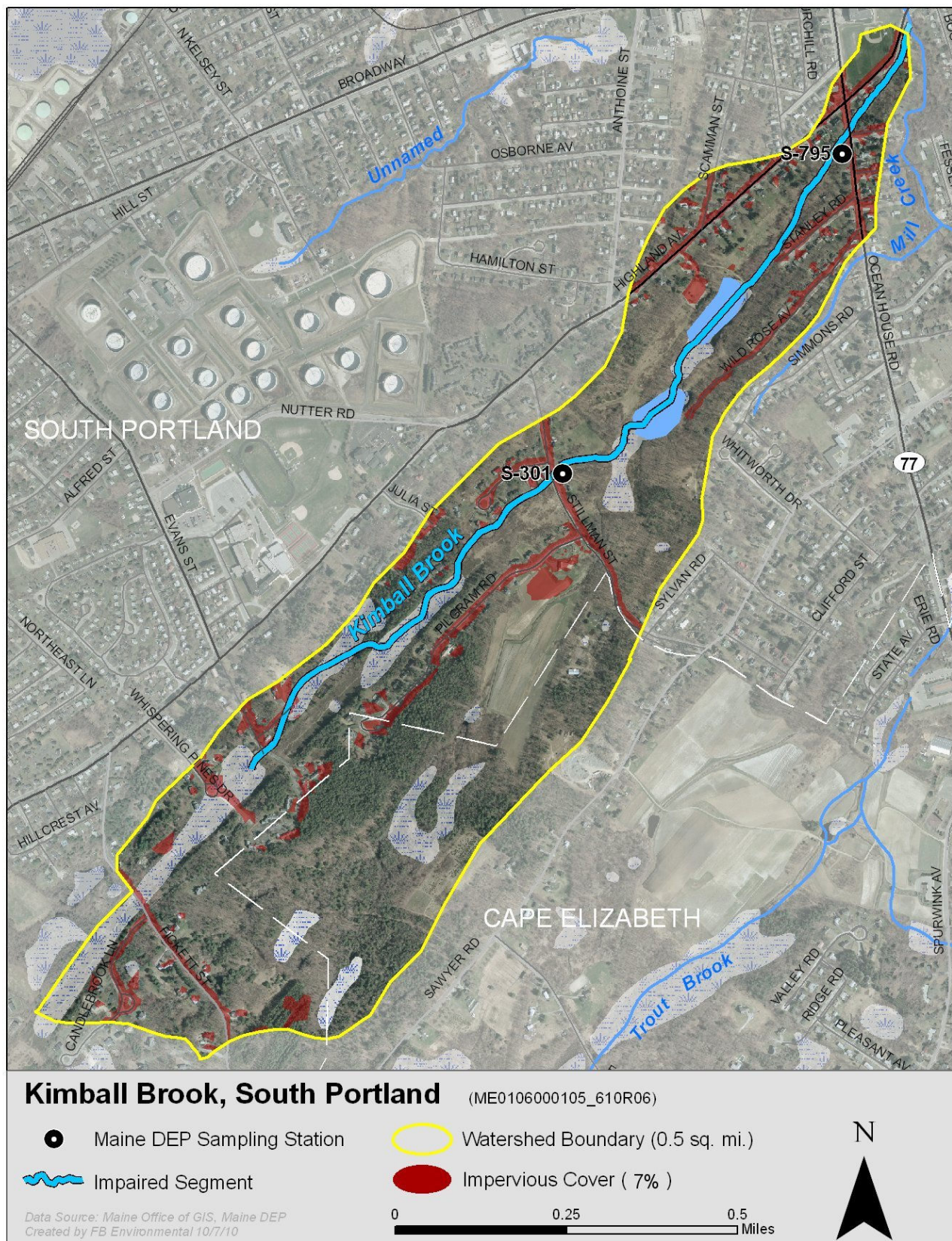


Figure 1: Map of Kimball Brook watershed impervious cover.

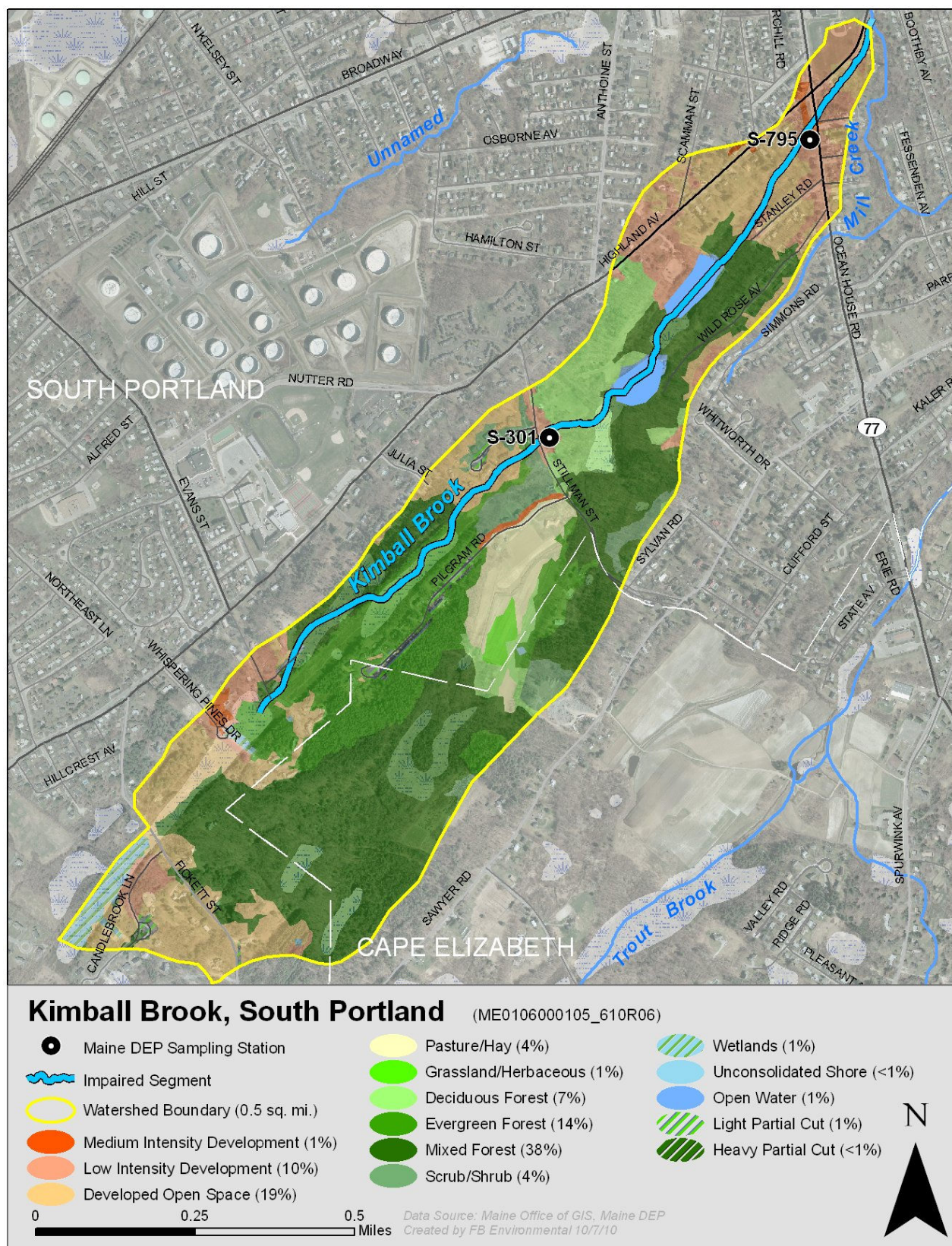


Figure 2: Map of Kimball Brook watershed land cover.

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.
- Kim, Ann S., "Grant advances South Portland's watershed protection effort," Portland Press Herald, November 19, 2010. Available online at: www.pressherald.com/news/grant-advances-citys-watershed-protection-effort_2010-11-19.html accessed online on 12/20/2010.
- 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 Kimball Brook (South Portland). Bureau of Land and Water Quality, Augusta, ME.