



## TMDL Assessment Summary

# Kennedy Brook

### Watershed Description

This **TMDL** assessment summary applies to a 0.87-mile section of Kennedy Brook, located in the City of Augusta, Maine. The Kennedy Brook watershed begins near the intersection of Western Avenue (Route 202) and Orchard Avenue. The impaired segment of Kennedy Brook begins near the center of the watershed, in a forested area south of Capitol Street. The stream flows southeast, flowing parallel to Brooklawn Avenue. After it crosses Route 201, the stream is no longer listed as impaired. This section of the stream follows Jackson Avenue, before emptying into the Kennebec River. The Kennedy Brook watershed covers 582 acres in the City of Augusta.

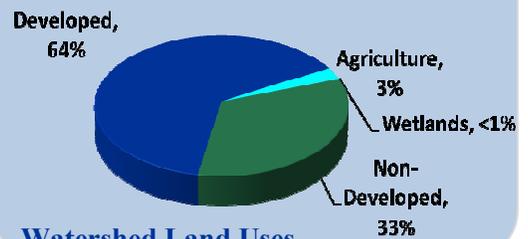
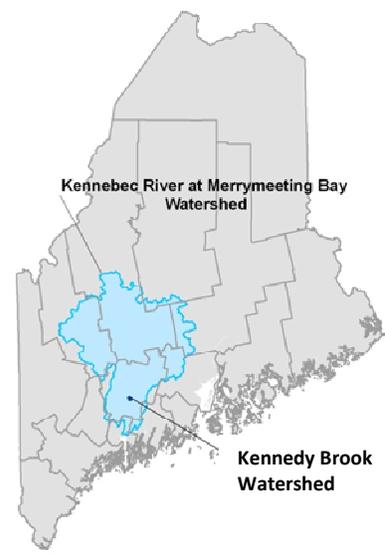
- Stormwater runoff from **impervious cover (IC)**, particularly in the developed area in the northern portion of the watershed, is likely the largest source of pollution to Kennedy Brook. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- The Kennedy Brook watershed is highly developed (67%), characterized by high intensity development. The watershed is 30% impervious.
- The central portion of the watershed is characterized by forest regeneration. This re-growing woodland area within the watershed will absorb and filter stormwater pollutants, and help protect both water quality in the stream and stream channel stability.
- Kennedy Brook is on to the list of Maine's Urban Impaired Streams (DEP, 2010).

### 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:**  
ME0103000312\_333R03
- **City:** Augusta, ME
- **County:** Kennebec
- **Impaired Segment Length:** 0.87 miles
- **Classification:** Class B
- **Direct Watershed:** 0.91 mi<sup>2</sup> (582 acres)
- **Watershed Impervious Cover:** 29%
- **Major Drainage Basin:**  
Kennebec River at Merrymeeting Bay Watershed



Watershed Land Uses

### Why is a TMDL Assessment Needed?

Kennedy 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.

The impervious cover TMDL assessment for Kennedy Brook addresses the water quality impairments to aquatic life use (benthic-macroinvertebrate 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.



*Kennedy Brook upstream of Station 620  
(Photo: DEP Biomonitoring Program)*

### Sampling Results & Pollutant Sources

Sampling Station	Sample Date	Statutory Class	Model Results
S-620	8/10/2004	B	NA
S-620	8/9/2007	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).

Kennedy Brook impairment is based on data collected by DEP in 2002, 2004, and 2007 at a sampling station located downstream of Route 11/27 and upstream of the wastewater treatment plant (S-620). The most recent data collected at this station indicate Class B Kennedy 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 Kennedy 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 Kennedy Brook watershed has an impervious surface area of **29%** (Figure 1). DEP has

*8% IC represents an approximate **72% reduction** in stormwater runoff volume and associated pollutants when compared to existing pollutant loads.*

found that in order to support Class B aquatic life use, the Kennedy 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

### 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.*

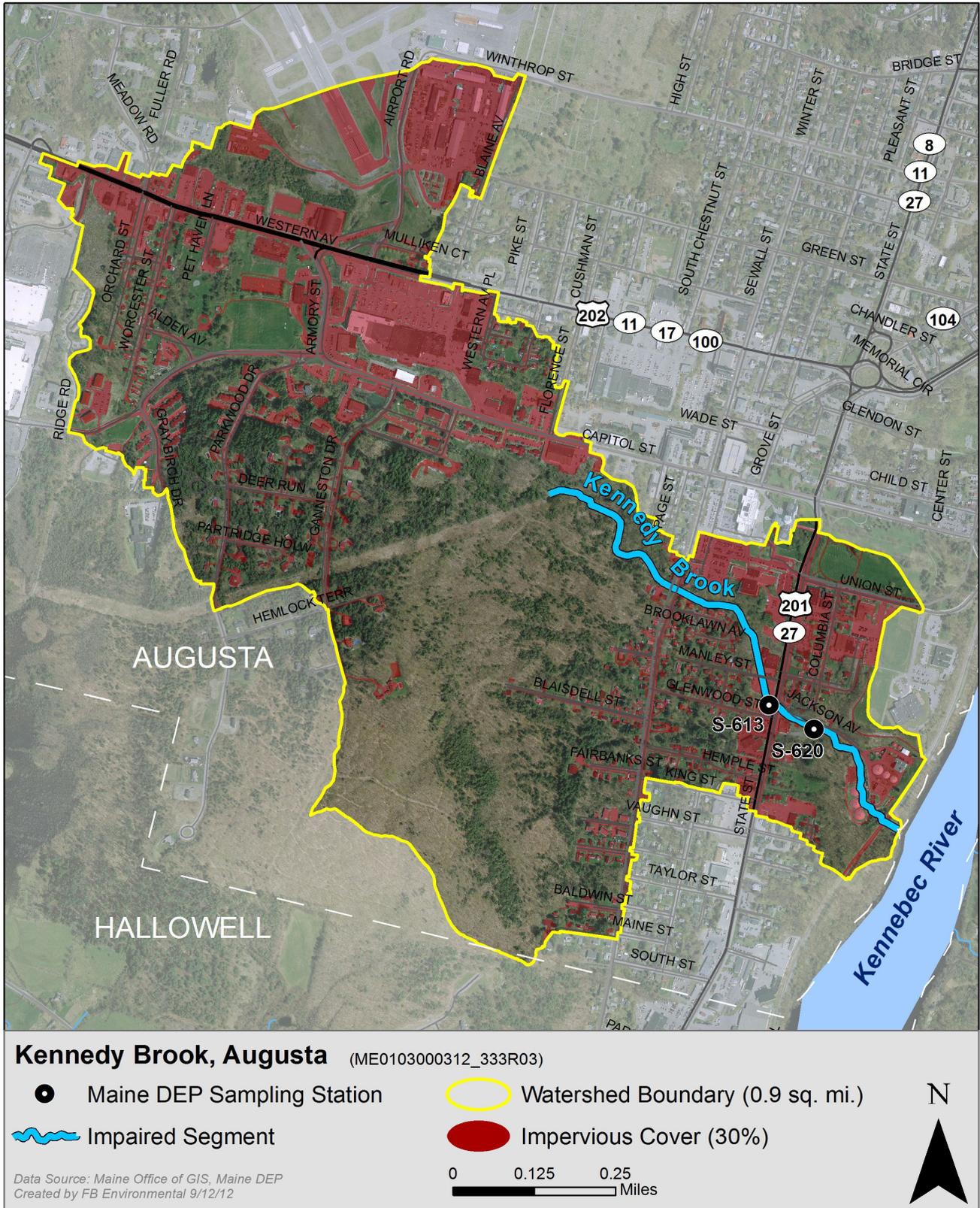
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surfaces. Ultimate success of the TMDL will be Kennedy Brook's compliance with Maine's water quality criteria for aquatic life.

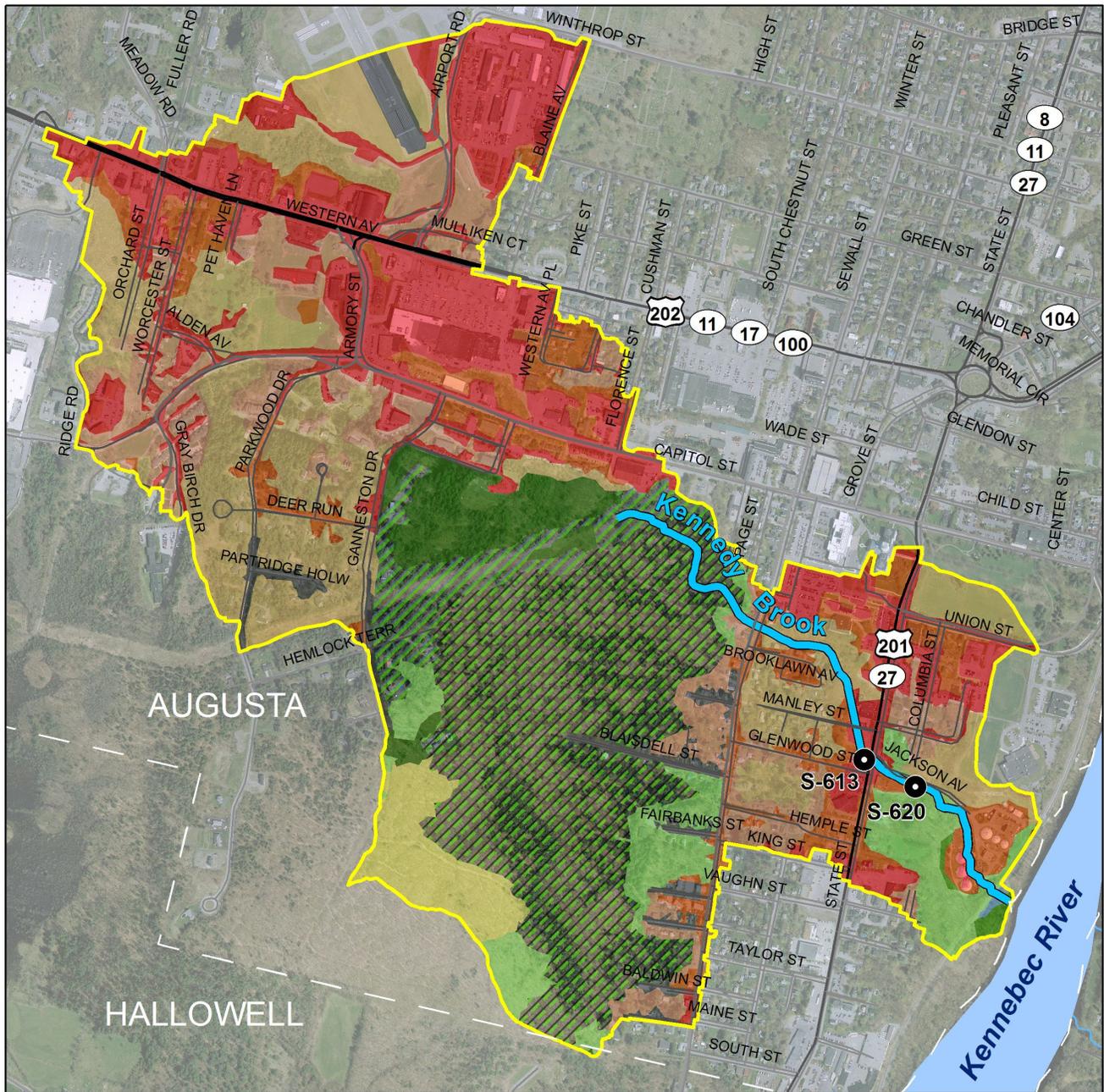
### Next Steps

Because Kennedy Brook is an impaired water, stormwater runoff in the watershed should be considered during the development of a watershed management plan to:

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



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



**Kennedy Brook, Augusta**

(ME0103000312\_333R03)

- Maine DEP Sample Station
- Impaired Segment
- Watershed Boundary (0.9 sq. mi.)
- High Intensity Development (23%)
- Medium Intensity Development (9%)
- Low Intensity Development (11%)
- Developed Open Space (19%)
- Cultivated Land (3%)
- Deciduous Forest (6%)
- Evergreen Forest (<1%)
- Mixed Forest (4%)
- Roads/Runway (2%)
- Open Water (<1%)
- Light Partial Cut (4%)
- Forest Regeneration (19%)

Data Source: Maine Office of GIS, Maine DEP  
Created by FB Environmental 9/12/12

0 0.125 0.25 Miles



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

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### 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). 2010. Assessment Database Detail Report for Kennedy Brook. Bureau of Land and Water Quality, Augusta, ME.