



## TMDL Assessment Summary

# Concord Gully

### Watershed Description

This **TMDL** assessment summary applies to Concord Gully, a 2.47-mile stream located in the City of Freeport, Maine. Concord Gully begins near Stagecoach Road. The stream flows northeast, parallel to Route 1A through a mostly forested area. Just downstream of where it crosses Varney Road, Concord Gully joins with two other streams. The stream continues through a predominately forested area, and flows southeast parallel to Saltbrook Road, before flowing into the Harraseeket River just below Cove Road. The Concord Gully watershed covers 704 acres in the City of Freeport.

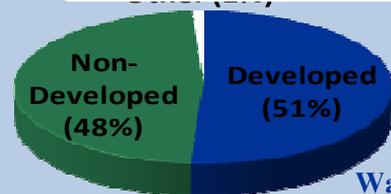
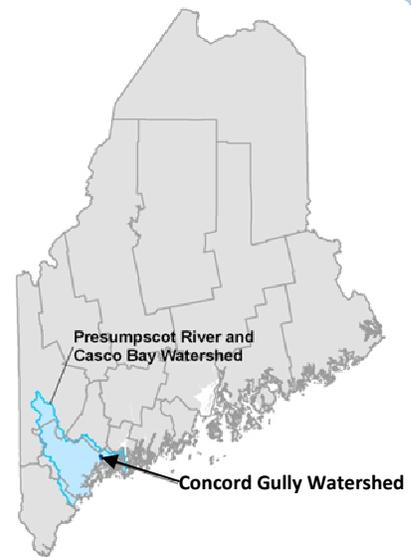
- Stormwater runoff from **impervious cover (IC)**, particularly in the developed area in the upper portion of the watershed, is likely the largest source of pollution to Concord Gully. Stormwater falling on roads, roofs and parking lots in developed areas flows quickly off impervious surfaces, carrying dirt, oils, metals, and other pollutants, and sending high volumes of flow to the nearest section of the stream.
- The Concord Gully watershed is predominately developed (51%), particularly near the upper portion of the watershed. This area is characterized by low intensity development.
- Approximately 48% of the watershed is non-developed. Most of Concord Gully flows through a large forested area. This area absorbs and filters stormwater pollutants, and helps protect both water quality in the stream and stream channel stability.
- Concord Gully is on 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:**  
ME0106000106\_602R03
- **City:** Freeport, ME
- **County:** Cumberland
- **Impaired Segment Length:** 2.47 miles
- **Classification:** Class B
- **Direct Watershed:** 1.1 mi<sup>2</sup> (704 acres)
- **Watershed Impervious Cover:** 22%
- **Major Drainage Basin:**  
Presumpscot River and Casco Bay Watershed



Watershed Land Uses

### Why is a TMDL Assessment Needed?

Concord Gully, a Class B freshwater stream, has been assessed by Maine 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.



*Concord Gully downstream of Station 496.  
(Photo: DEP Biomonitoring Program)*

Concord Gully has also been listed as impaired for bacteria since 2008. The impervious cover TMDL assessment for Concord Gully addresses the water quality impairments to aquatic life use (benthic-macroinvertebrate, stream habitat, and nutrient/eutrophication assessments) and dissolved oxygen. 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-496	8/24/2001	B	I
S-497	8/24/2001	B	I
S-498	8/24/2001	B	I
S-498	8/11/2010	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).

Concord Gully impairment is based on data collected by DEP in 2001 and 2010 at three sampling stations (496, 497, and 498) near its confluence with two other small streams. Data collected at these stations in 2001 indicated Class B Concord Gully status was “indeterminate” (I), meaning too few organisms were collected to meet the minimum needed to statistically determine classification. Analysis of data collected in 2010 indicate that Concord Gully is “non attaining” (NA), meaning it does not meet Class B or C standards and water quality problems continue to persist.

### Impervious Cover Analysis

Increasing the percentage of impervious cover (%IC) in a watershed is linked to decreasing stream health (CWP, 2003). Because Concord Gully’s impairment is not caused by a single pollutant, %IC is used for

*8% IC represents an approximate 64% reduction in stormwater runoff volume and associated pollutants when compared to existing pollutant loads.*

this TMDL to represent the mix of pollutants and other impacts associated with excessive stormwater runoff. The Concord Gully watershed has an estimated impervious surface area of **22%** (Figure 1), which is based on available public information. DEP has found that in order to support Class B

#### 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.*

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aquatic life use, the Concord Gully 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. These estimates may be refined in the future based on new information that becomes available either through the development of a watershed management plan or other watershed studies. Ultimate success of the TMDL will be Concord Gully's compliance with Maine's water quality criteria for dissolved oxygen and aquatic life.

Since 2005, all commercial development in Freeport has been required to comply with the LID practices specified in the Maine Chapter 500 Stormwater Management Rules, even on sites smaller than 20,000 square feet of impervious area. In addition, many of the commercial projects built prior to 2005 included stormwater management features that reduced the impact of stormwater on Concord Gully.

### Next Steps

Because Concord Gully 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 through the development of a watershed coalition to ensure the long term protection of Concord Gully;
- Address existing stormwater problems in the Concord Gully watershed by installing structural and applying non-structural best management practices (BMPs); and
- Prevent future degradation of Concord Gully through the implementation and enforcement of Freeport's special local stormwater control ordinances.

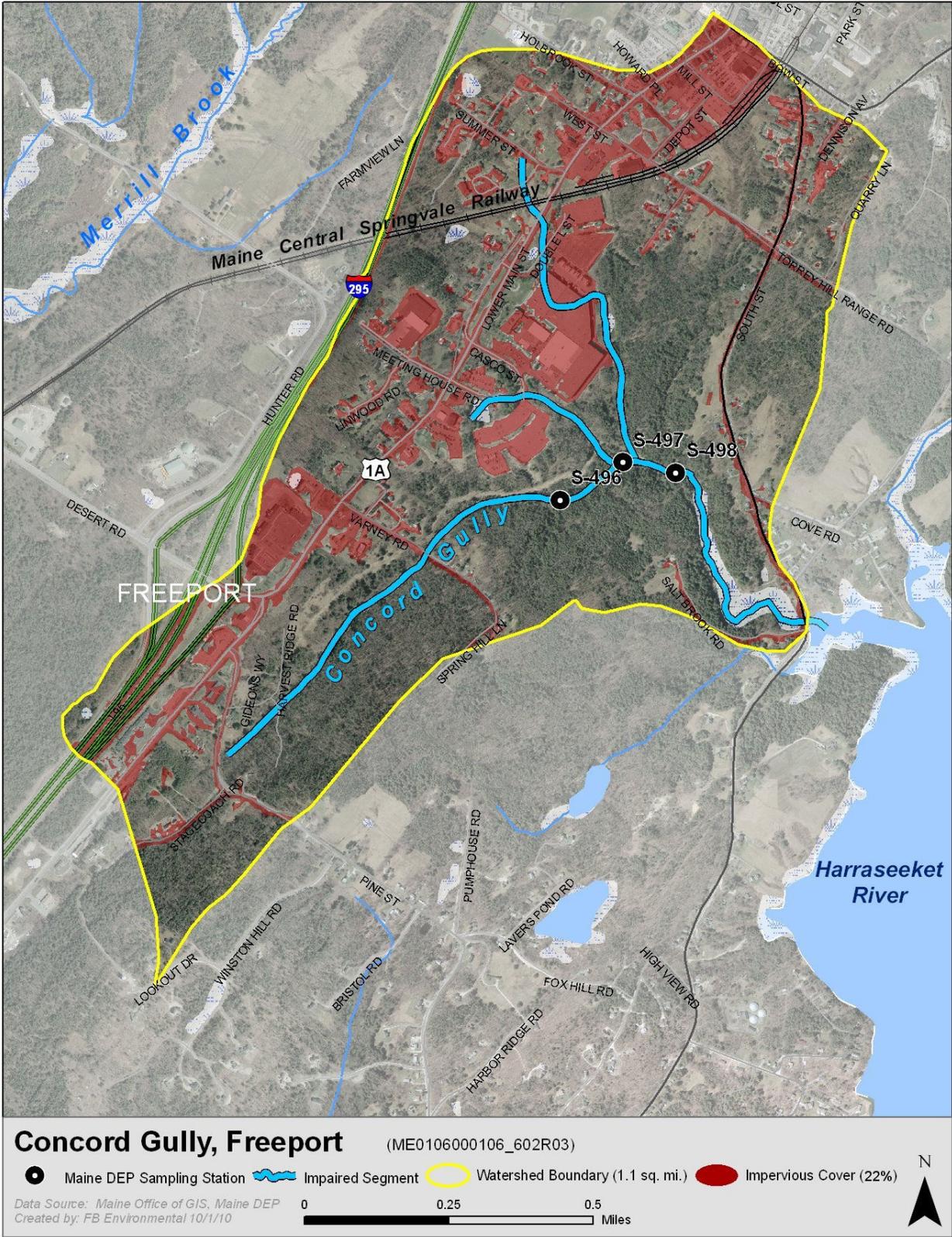


Figure 1: Map of Concord Gully watershed impervious cover.

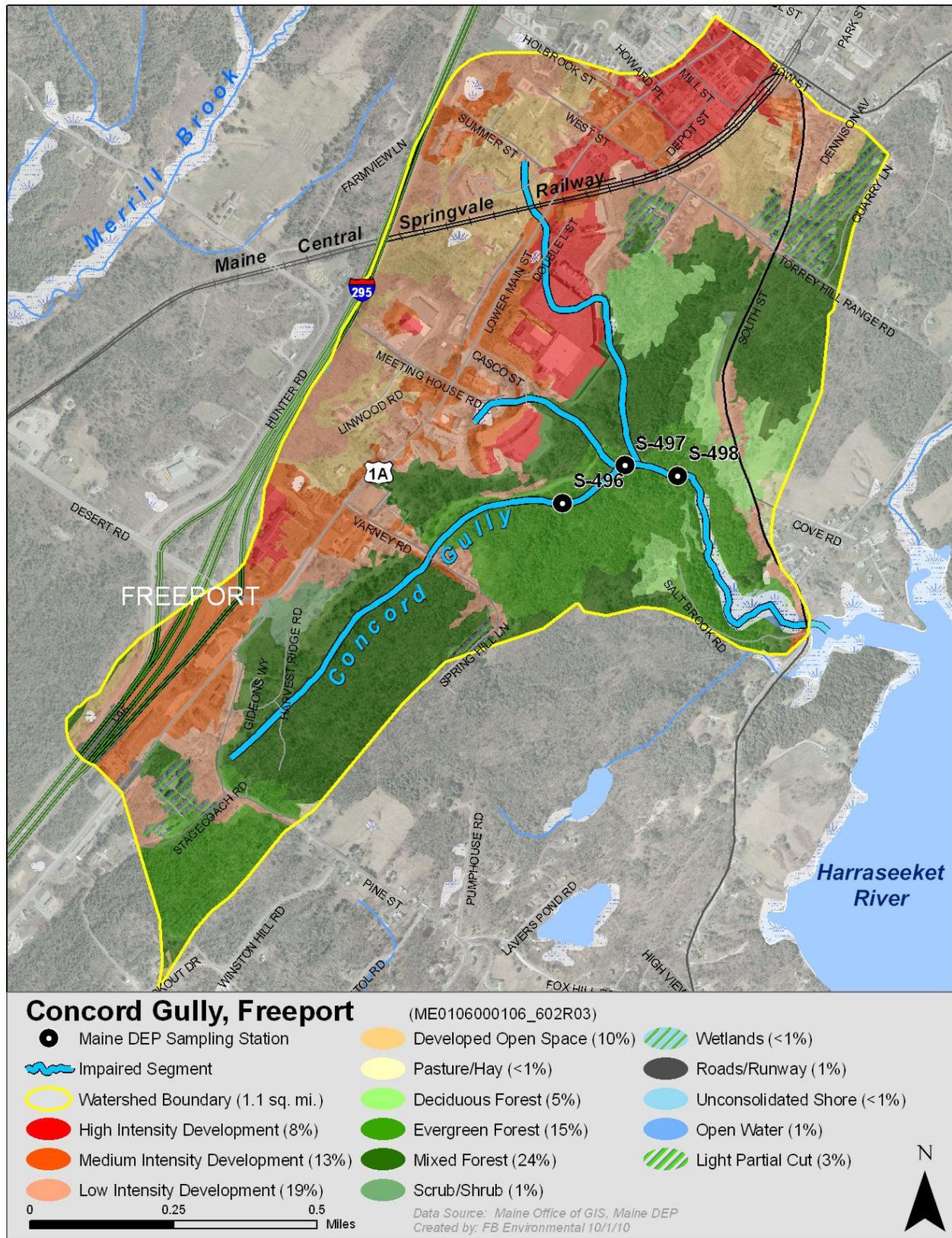


Figure 2: Map of Concord Gully watershed land cover.

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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 Concord Gully. Bureau of Land and Water Quality, Augusta, ME.