

Site Feasibility For Stormwater Infiltration BMPs

In the Mystic River Watershed

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Sources: MassGIS, SSURGO, USGS, US EPA
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Objective: Find the best spot for BMPs

The goal of this feasibility map is to inform the siting of stormwater infiltration BMPs within the Mystic River Watershed. Limited economic resources and sites of varying feasibility for infiltrating stormwater make it desirable to identify the areas that are most suitable for installing a BMP.

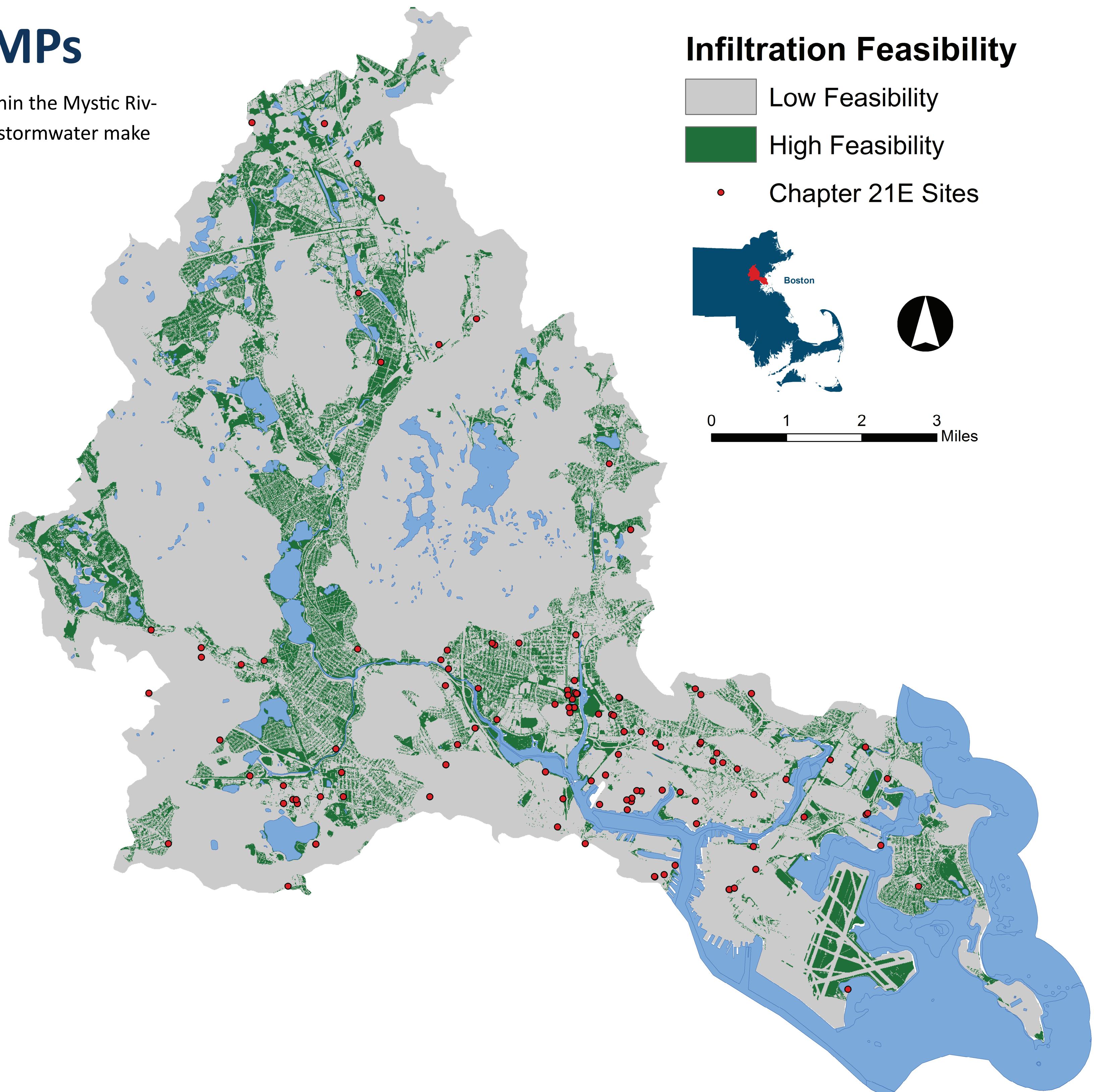
By the way....What's a BMP?

A Stormwater BMP (Best Management Practice) can be defined as a technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of stormwater runoff in the most cost effective manner.

Infiltration BMPs are those which allow stormwater to infiltrate the ground surface and hopefully recharge to the water table. A rain garden is a common example.



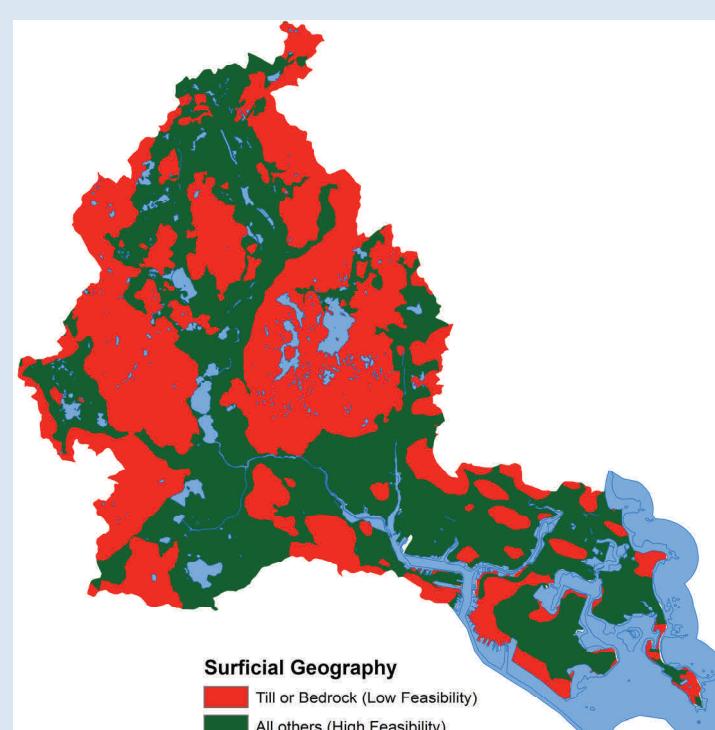
A rain garden, installed at Tufts University's Medford-Somerville Campus in 2013.



Surficial Geography

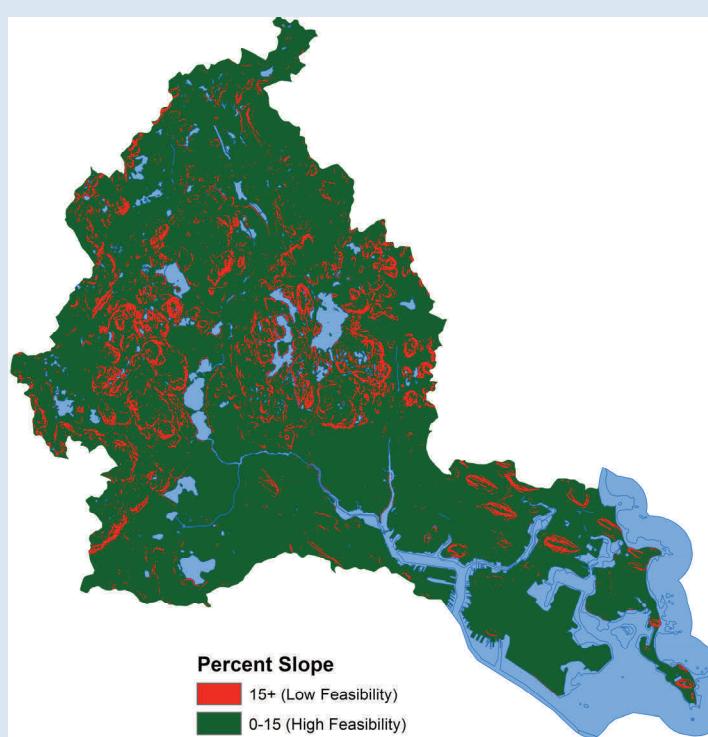
Four categories of surficial geology compose the Mystic River Watershed: sand and gravel deposits, till or bedrock, fine-grained deposits, and floodplain alluvium.

Till or Bedrock is considered to be infeasible here, while the other three values are feasible.



Percent Slope

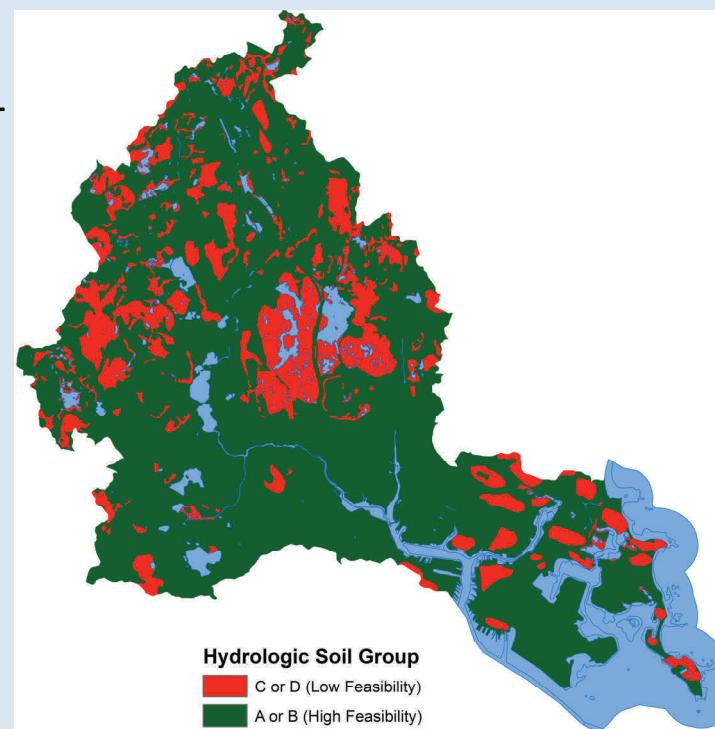
A review of relevant literature reveals that a five-percent slope is most desirable when siting infiltration BMPs, though up to 20% is considered feasible.



Given the highly developed condition of this watershed, it was determined to loosen some of the criterion. In this case, slope of fifteen-percent or less is considered feasible - everything above that value is considered infeasible.

Hydrologic Soil Group

Hydrologic Soil types A and B are considered feasible in this model while C and D soils are considered less feasible.

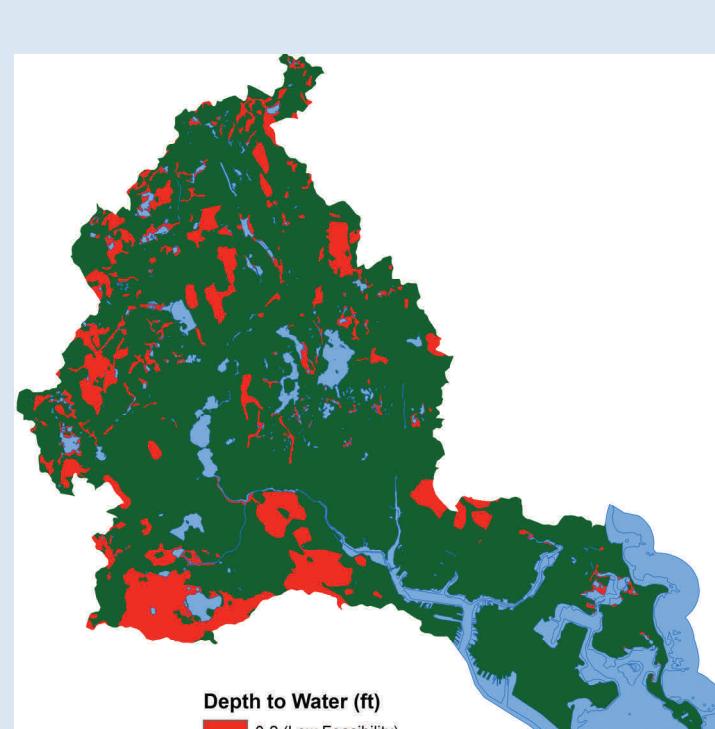


Depth to Groundwater

The Massachusetts stormwater handbook prescribes a separation of two feet between the lowest point of infiltration BMPs and the seasonal high water mark in the soil.

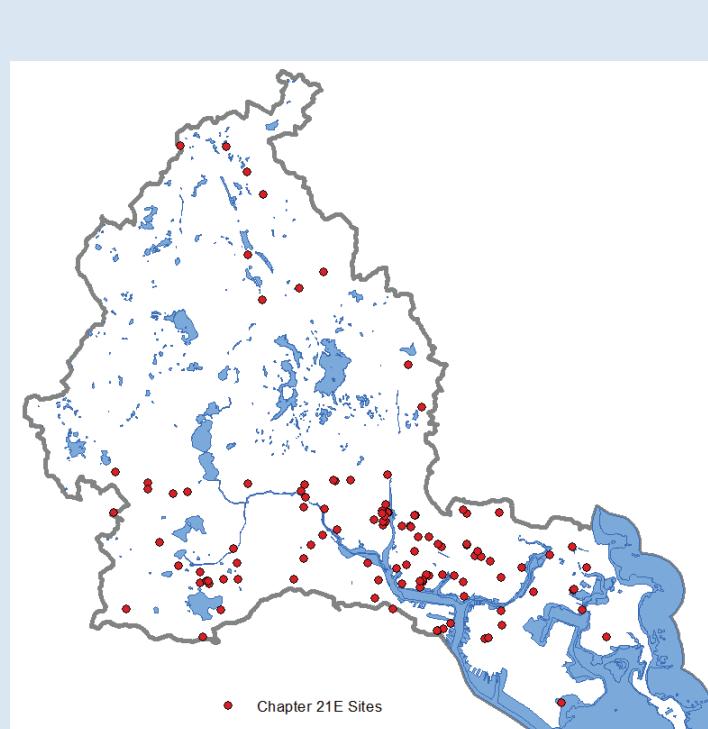
This presents a challenge in a watershed such as the Mystic River because the water table is often very shallow.

For this reason, any area with an estimated Depth to Groundwater of two feet is considered feasible.



Chapter 21E

There are 122 sites within the Mystic River Watershed that are designated as Chapter 21E. These represent sites in which sediments are heavily contaminated and could leach into underground aquifers with increased infiltration. Infiltration BMPs should not be sited near these locations.



Methodology

The primary criterion for determining site suitability considers five physical characteristics: Surficial Geography, Hydrologic Soil Group, Depth to Groundwater, Percent Ground Slope, and Surface Cover. For each physical characteristic, a value of 1 or 0 is assigned to show that it is feasible or infeasible, respectively. For example, if the Hydrologic Soil type across an area consists of A or B soils, it is assigned a one since it presents a high feasibility for stormwater infiltration. Areas consisting mostly of C and D soils are given a zero, indicating low feasibility. In this way, every point on the map receives a binary score of one or zero for each data layer. The scores assigned to each data layer can then be multiplied to create a binary feasibility index. Additional criteria for consideration is Chapter 21E. These sites have been designated as contaminated by Massachusetts Department of Environmental Protection. Surface water that infiltrates in these areas poses a threat to local water quality.

Criteria

BMP Placement Requirements

Surficial Geology	Sand/Gravel/Alluvium (High Feasibility) Till/Bedrock (Low Feasibility)
Hydrologic Soil Group	Class A or B (High Feasibility) Class C or D (Low Feasibility)
Depth to Groundwater	Bottom of BMP must be two feet or more from seasonal high water mark.
Percent Slope	Ground slope at potential installation areas must be between 0-15%
Impervious Surface	Cannot be placed on paved areas
Chapter 21E Sites	Cannot be placed at C21E Site