Green Infrastructure Analysis for the Taunton River Watershed, Massachusetts

manomet

Prepared by Eric Walberg & Jennifer Hushaw July 2017

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BACKGROUND

This analysis was conducted as part of a United States Environmental Protection Agency, Region I, New England 2015 Healthy Communities Grant. The resulting maps were used to inform municipal officials in a series of workshops on climate change adaptation. These workshops were held in communities throughout the Taunton River watershed with partners from the Southeastern Regional Planning and Economic Development District, MassAudubon, and The Nature Conservancy (TNC).



The overarching goal of Manomet's green infrastructure analysis was the identification of a network of protected and restored lands within the watershed that provide multiple benefits including:

- Minimizing biodiversity loss,
- Maximizing ecosystem resiliency to climate change,
- Limiting vulnerability of citizens and the built environment to enhanced storm surge and freshwater flooding associated with climate change,
- Minimizing nonpoint source water pollution,
- Minimizing water deficit issues associated with drinking water supply,
- Limiting tax burden associated with gray infrastructure solutions to flooding and nonpoint source pollution that will be required if intact natural systems currently providing these services are removed from the watershed.

The green infrastructure network includes lands around surface waters and wetlands that protect against nonpoint source water pollution and limit human vulnerability to freshwater and storm surge flooding, as well as areas that contribute to ecosystem integrity by providing important habitat or resilience in the face of climate change.

METHODS

The green infrastructure network was developed by combining the following components in a Geographic Information System (ArcGIS 10.4):

- Resilient Areas
 - Areas of "above average" resilience (>= 0.5 standard deviation) according to The Nature Conservancy's Resilient Landscapes dataset (specifically, a higher-resolution 90m version generated by TNC for MassAudubon)

• Important Habitat

- BioMap2 Core & Critical Natural Landscape areas
- Riparian Buffers
 - Areas within 100ft of surface waters and wetlands (based on features in National Wetlands Inventory V2)
 - Areas within 100ft of 100-year flood areas and high risk coastal flood areas (as defined by the National Flood Hazard Layer)
- Areas Vulnerable to Sea Level Rise
 - Areas </= 4m elevation

There is also a companion version of the green infrastructure network that excludes lands that are already developed or permanently protected. The undeveloped and unprotected areas have important benefits for people and nature, and they are still "in play" in terms of the potential for restoration or conservation. In this case, the following criteria were used to define "developed" and "protected" lands:

- Developed Land
 - Areas categorized as "Commercial/Industrial/High Density Residential" or "Low Density Residential" in a 2013 MassAudubon land use/land cover layer
- Protected Land
 - Areas in the MassGIS Open Space layer where Protection Level = In Perpetuity

DATA SOURCES

Map Layer Name	Original Data Source	Data generated by:	Obtained from:	Vintage	Downloaded on:
Desilianas		The Network Orig		0015	05/05/0016
Resilience	The Nature Conserv- ancy's Downscaled Regional Resilience Analysis for Massa- chusetts – Resilience Scores (90m) strati- fied by 30m Geophys- ical Settings	The Nature Con- servancy	The Nature Conservancy / MassAudubon	2015	05/25/2016
BioMap2 Core & Critical Natural Landscape		Massachusetts Nat- ural Heritage & En- dangered Species Program and The Nature Conservan- cy's Massachusetts Program	<u>MassGIS</u>	February 2011	04/25/16
100-year and High Risk Coastal Flood Areas	National Flood Haz- ard Layer	Federal Emergency Management Agen- cy	<u>MassGIS</u>	November 2014	04/25/16
Area < or = to 4m elevation	Digital Elevation Mod- el (1:5,000)	MassGIS	<u>MassGIS</u>	February 2015	07/11/2016
Surface Waters & Wetlands	National Wetlands Inventory V2	U.S. Fish & Wildlife Service	USFWS Wetlands Mapper V2	May 2016	07/25/2016
Protected Lands	Protected and Recre- ational OpenSpace		MassGIS	March 2016	04/25/16
Land Use/Land Cover		Boston University Dept. of Earth & En- vironment	MassAudubon	2014	04/27/2016

NETWORK COMPONENTS

Surface Waters, Wetlands, and Flood BioMap2 Core & Critical Areas of Above Average Zones; Areas </= 4m elevation Resilience Natural Landscape (vulnerable to sea level rise) HINGHAM BRAINTREE SCITUATE NORWOOD RANDOLPH MEDFIELD VEYMOUTH CANTON MILLIS NORWELL WALPOLE HANOVER NORFOLK PEMBROKE

Areas within 100ft of







GREEN INFRASTRUCTURE NETWORK

Risk Coastal Flood

Areas

44% of the Taunton watershed is within the GI Network



Major Streams

Freshwater

Wetland

Other

UNDEVELOPED & UNPROTECTED GREEN INFRASTRUCTURE NETWORK

Risk Coastal Flood

Areas

64% of the GI Network is currently undeveloped and unprotected. This represents 30% of the entire watershed.



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Major Streams

Freshwater

Wetland

Other

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The results of this analysis, including a high-resolution map of the green infrastructure network and the spatial data (in both shapefile and kml format), are available for download at:

ftp://ftp.manomet.org/climateservices/Taunton_GreenInfrastructure/