

MANCHESTER WESTERN WOODS STUDY

Completed by Cape Ann Trail Stewards
Fall 2018

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Introduction:

The Town of Manchester-by-the-Sea is in the process of identifying the ownership and location of land parcels in the undeveloped woods of western Manchester. The research is revealing that a number of the “owner and location unknown” parcels belong to the municipality, haven been gifted or abandoned and subsequently acquired by the Town due to unpaid tax liabilities. To date around 30 parcels totaling over 70 acres have been identified as Town-owned.

This study looks to provide information on land conditions including natural and recreational resources, and development potential and constraints to support the Town in determining potential uses for the parcels. With a number of municipal projects requiring town-owned land, a goal to protect the town’s drinking water supply, interest in supporting biodiversity, a goal to enhance recreational opportunities and recognizing the need to increase Town revenues, the careful consideration of how these lands may meet the community’s needs is vitally important. Understanding the lands’ values and challenges is a critical first step to managing these newly found town assets.

STUDY AREA DESCRIPTION

The West Manchester Woods lie to the west of Pine Street, south of Route 128 and east of the town boundary with Wenham and Beverly. Much of the eastern portion of this area is included in the Wyman Hill, Christian Hill and Great Hill Conservation Area, the Brookwood Conservation Area and Owl's Nest Woodland. This area is generally upland forest with numerous rocky outcrops. Many foot paths and abandoned dirt roads provide for hiking in this area.

The area further to the west is privately and town-owned and development is curtailed by lack of access from town roads. Much of the northwestern portion lies within the watershed to Gravelly Pond and Round Pond, the town's primary water source. The entire area provides wildlife habitat, flood control and recreational possibilities.

The 2014 Manchester-by-the-Sea Open Space and Recreation Plan recommends protecting land significant to drinking water protection. Land targeted for protection includes unprotected parcels within the Round Pond and Gravelly Pond watersheds, such as town owned land in the Western Woods study area.

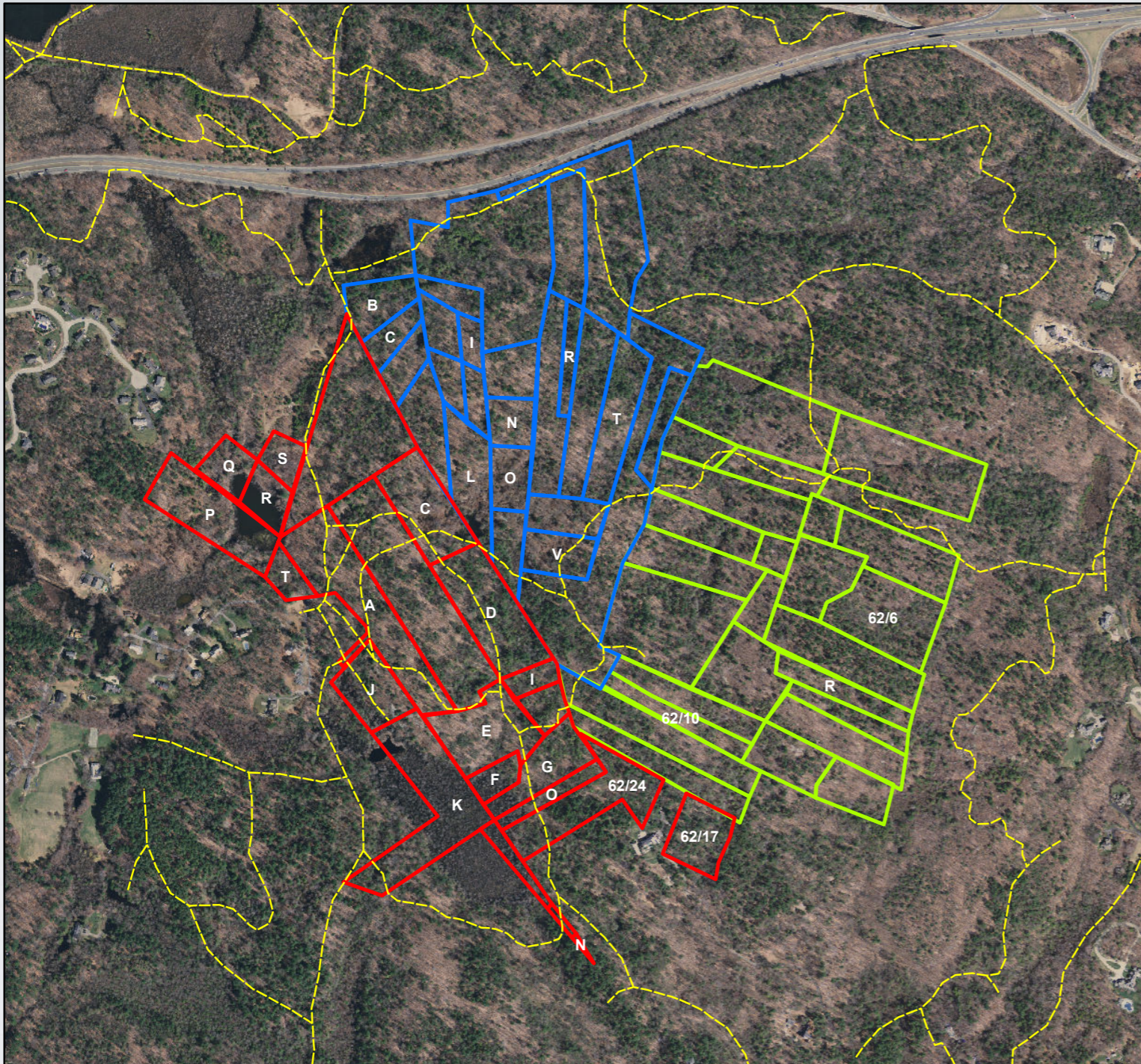
MANCHESTER WESTERN WOODS STUDY AREA

- The study area has been divided into three areas corresponding with title research efforts with over 30 town-owned parcels (many parcels have unknown boundaries and ownership).
- The area contains over 100 acres of town owned land
- The area consists of mostly wooded lots, and some wetland areas typical to this area
- The area has approximately 6 miles of trails with two main access points: Preston Place and Crooked Lane.
- The area includes geographically significant areas including Christian Hill and Great Hill.

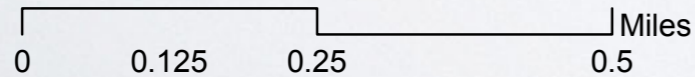


ORTHOPHOTO (TAKEN SPRING 2013)

This map provides a general overview of the study area, including neighborhoods to the west and Route 128. The trail network shown here shows the importance of the trails within these parcels in relation to the larger trail network, offering significant recreational opportunities.



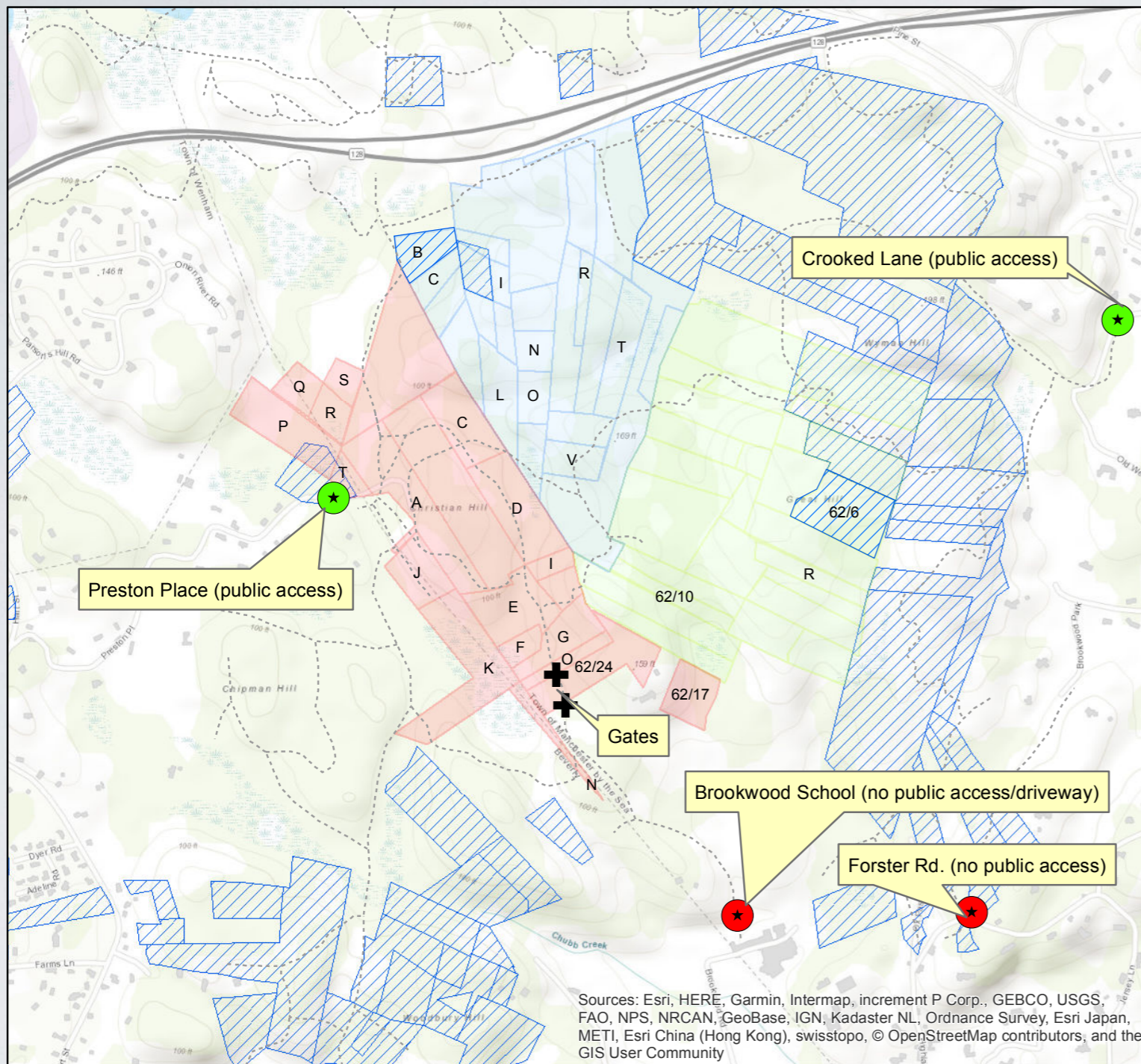
1:10,000



Legend

-  Trails
-  Area A Parcels
-  Area B Parcels
-  Area C Parcels

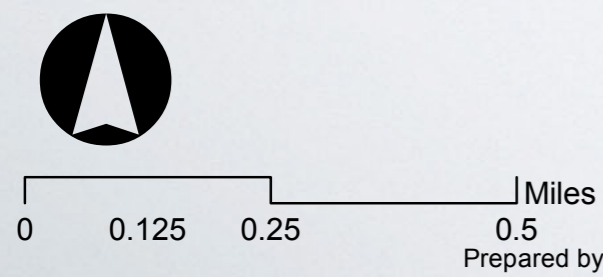
TRAIL ACCESS: ROADS AND TRAILS



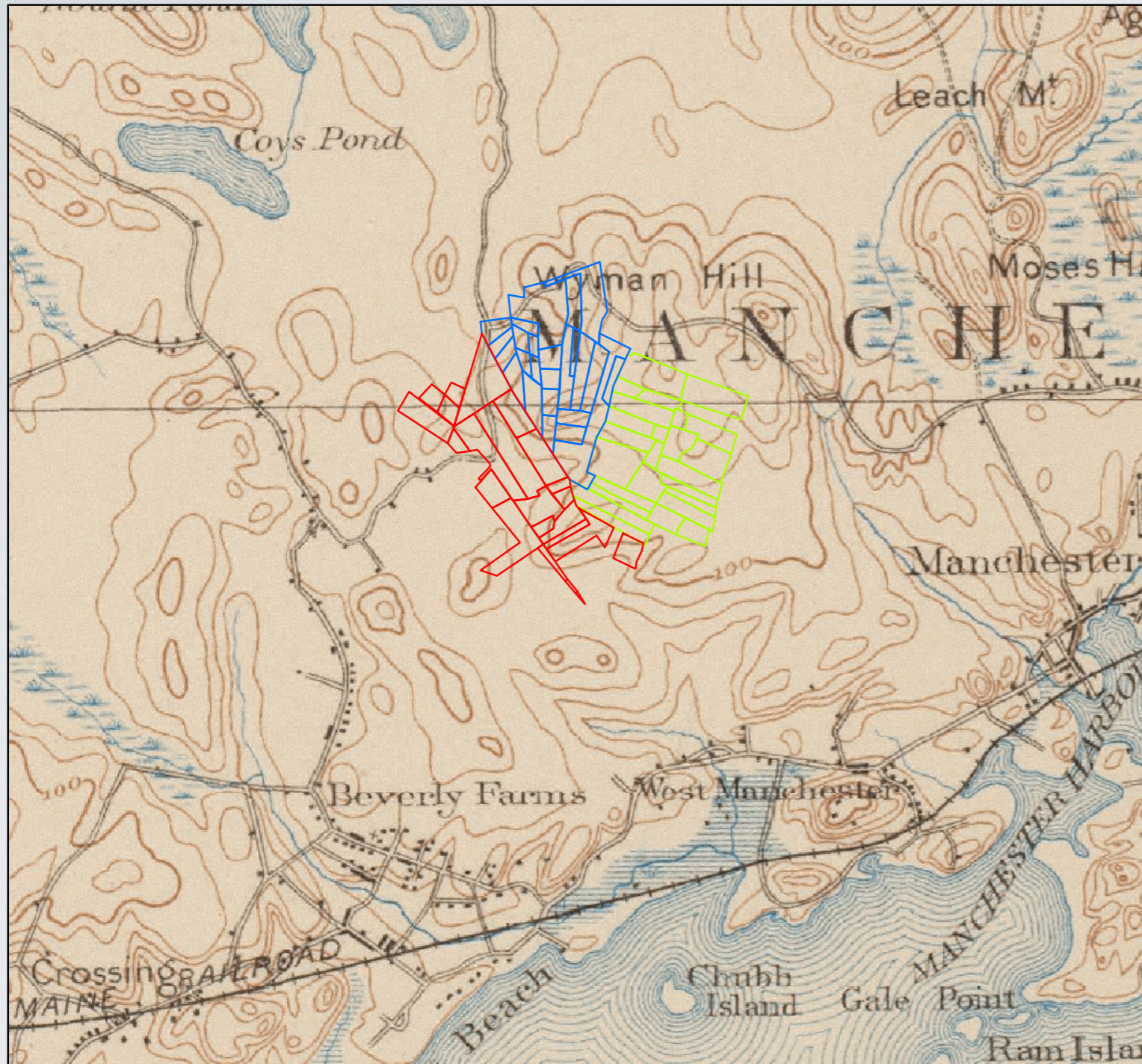
The study area has two main access points for recreational users, with potential for other access points including the Brookwood School to the south and conceivably via the trail network to the north where Pine Street goes under I28.

These are trails compiled by the Cape Ann Trail Stewards from various trail users and conservation organizations. Users include hikers and mountain bikers. The compiled data was edited to eliminate duplications, and reviewed against recent aerial photographs for accuracy.

- Legend**
- Trails
 - Area A Parcels
 - Area B Parcels
 - Area C Parcels
 - Permanently Protected Conservation Land



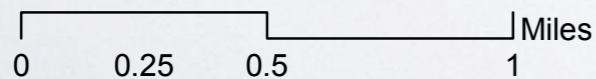
HISTORIC TOPOGRAPHICAL MAP



Historically speaking, this property is believed to have never been cultivated. There are, however, many large stump-sprout trees that are evidence of harvesting for firewood or lumber. The network of gravel roads was probably created for multiple purposes included harvesting, the piggery (said to have been near the current 128), fire control and access to the gravel pit in the same area and construction of Route 128.

Legend

- Area A Parcels
- Area B Parcels
- Area C Parcels



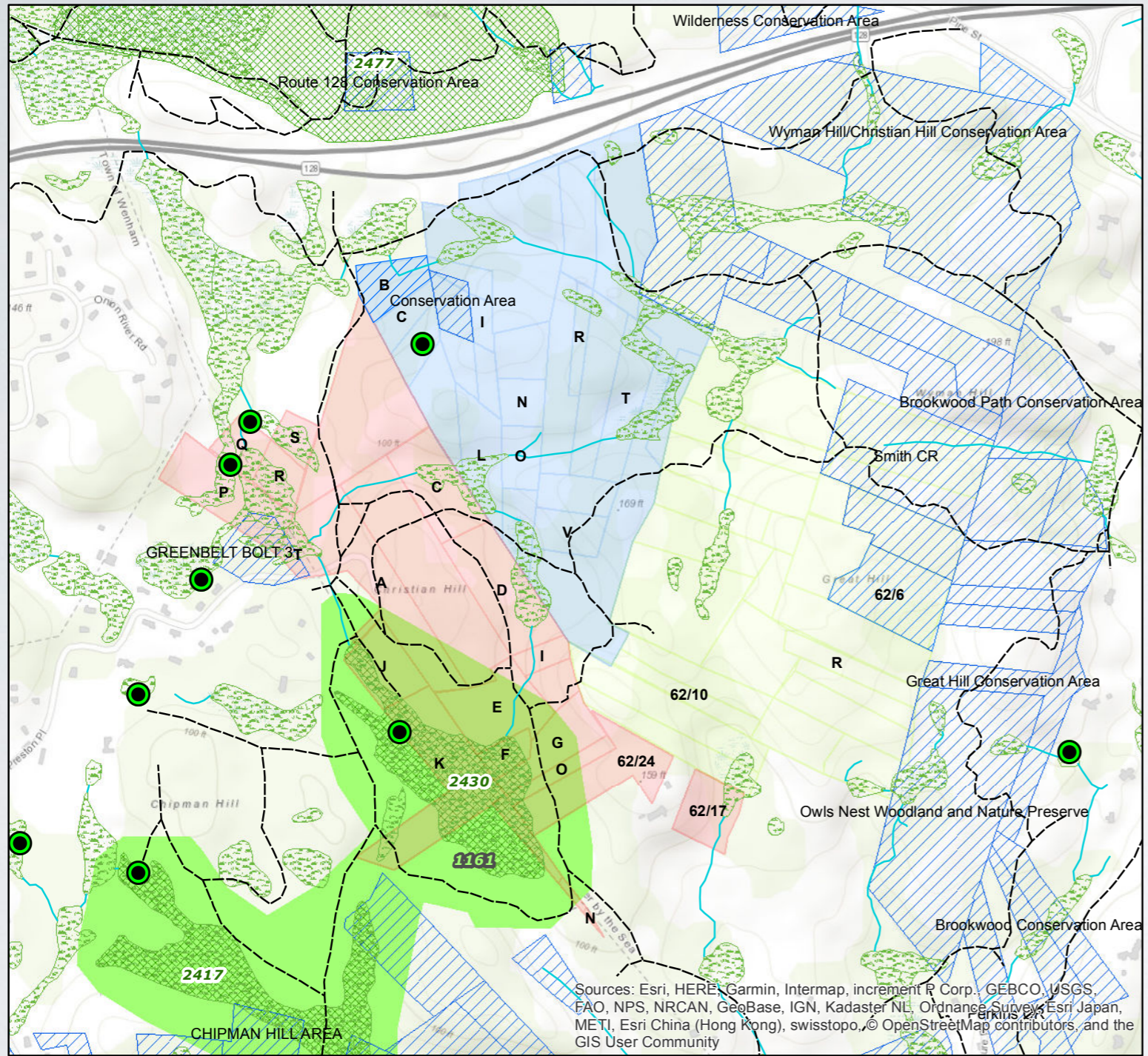
LATE 19TH TO EARLY 20TH CENTURY

Prepared by Cape Ann Trail Stewards. Source: MassGIS

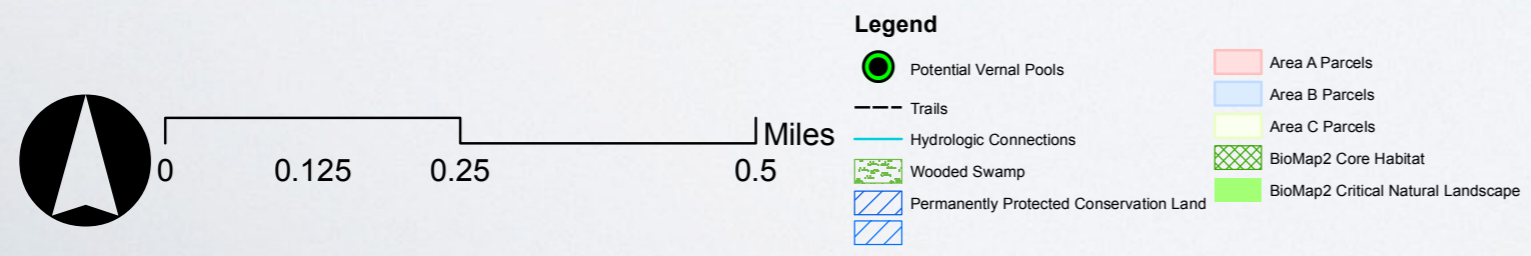
CONSERVATION VALUES

- The study area includes lands important for water protection and biodiversity.
- The study area includes 4 identified sites on town-owned land for potential vernal pools, which are significant for preserving biodiversity.
- Many of the parcels abut adjacent conservation land and many include trails.
- The Critical Natural Landscape and Core Habitat designations identify intact landscapes that have potential to support biodiversity.

CONSERVATION MAP: TRAILS, BIOMAP, WETLANDS & CONSERVATION LAND



The study area includes a number of significant wetland features in addition to the BioMap Core Habitat and Critical Natural Landscape. There are a number of potential vernal pools shown on the map as well as significant hydrologic connections between wetlands. Additionally there is a significant network of already protected conservation land in the surrounding area, increasing the likelihood of preserving biodiversity and native habitat. (see page 12 for more information on the Biomap datalayer.)



ABOUT BIOMAP 2

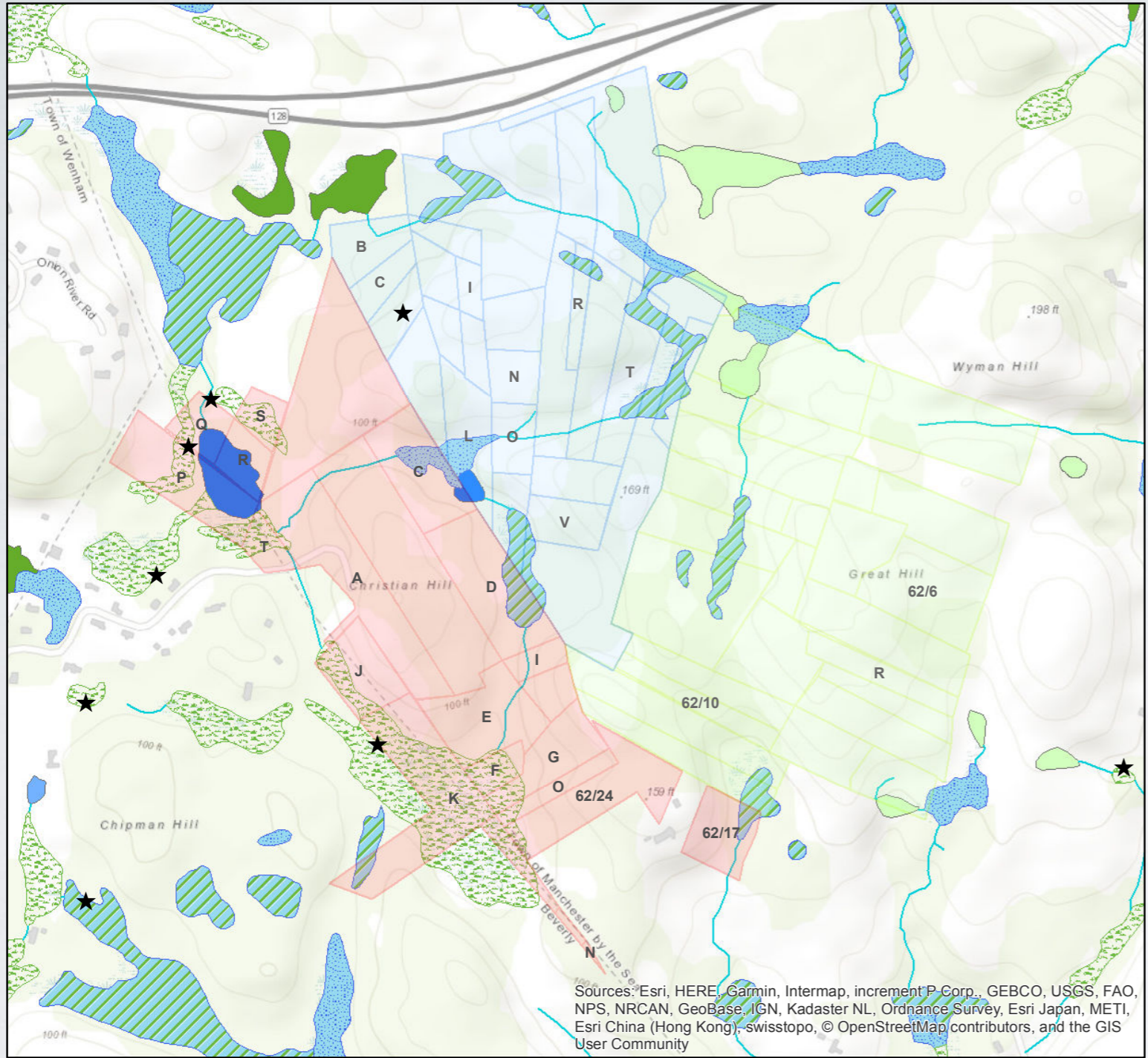
The Massachusetts Natural Heritage & Endangered Species Program and The Nature Conservancy's Massachusetts Program developed BioMap2 in 2010 as a conservation plan to protect the state's biodiversity. BioMap2 is designed to guide strategic biodiversity conservation in Massachusetts over the next decade by focusing land protection and stewardship on the areas that are most critical for ensuring the long-term persistence of rare and other native species and their habitats, exemplary natural communities, and a diversity of ecosystems.

BioMap2 Core Habitat identifies specific areas necessary to promote the long-term persistence of Species of Conservation Concern (those listed under the Massachusetts Endangered Species Act as well as additional species identified in the State Wildlife Action Plan), exemplary natural communities, and intact ecosystems.

BioMap2 Critical Natural Landscape was created to identify and prioritize intact landscapes in Massachusetts that are better able to support ecological processes and disturbance regimes, and a wide array of species and habitats over long time frames.

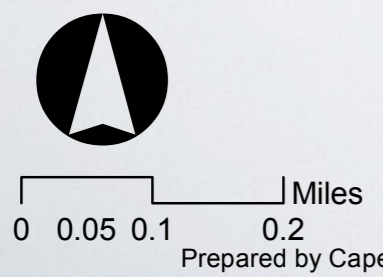
BioMap2 uses specific data and sophisticated mapping and analysis tools to spatially define each of these components, calling on the latest research and understanding of species biology, conservation biology, and landscape ecology.

HYDROLOGY: NORTH COAST WATERSHED, NORTH COASTAL MAJOR BASIN



The Western Woods Study Area contains a wide variety of types of wetlands, often connected by streams. (see page 14 for more information about Potential Vernal Pools datalayer).

- Legend**
- Area A Parcels
 - Area B Parcels
 - Area C Parcels
 - Potential Vernal Pools
 - Hydrologic Connections
 - BOG
 - DEEP MARSH
 - OPEN WATER
 - SHALLOW MARSH MEADOW OR FEN
 - SHRUB SWAMP
 - WOODED SWAMP CONIFEROUS
 - WOODED SWAMP DECIDUOUS
 - WOODED SWAMP MIXED TREES

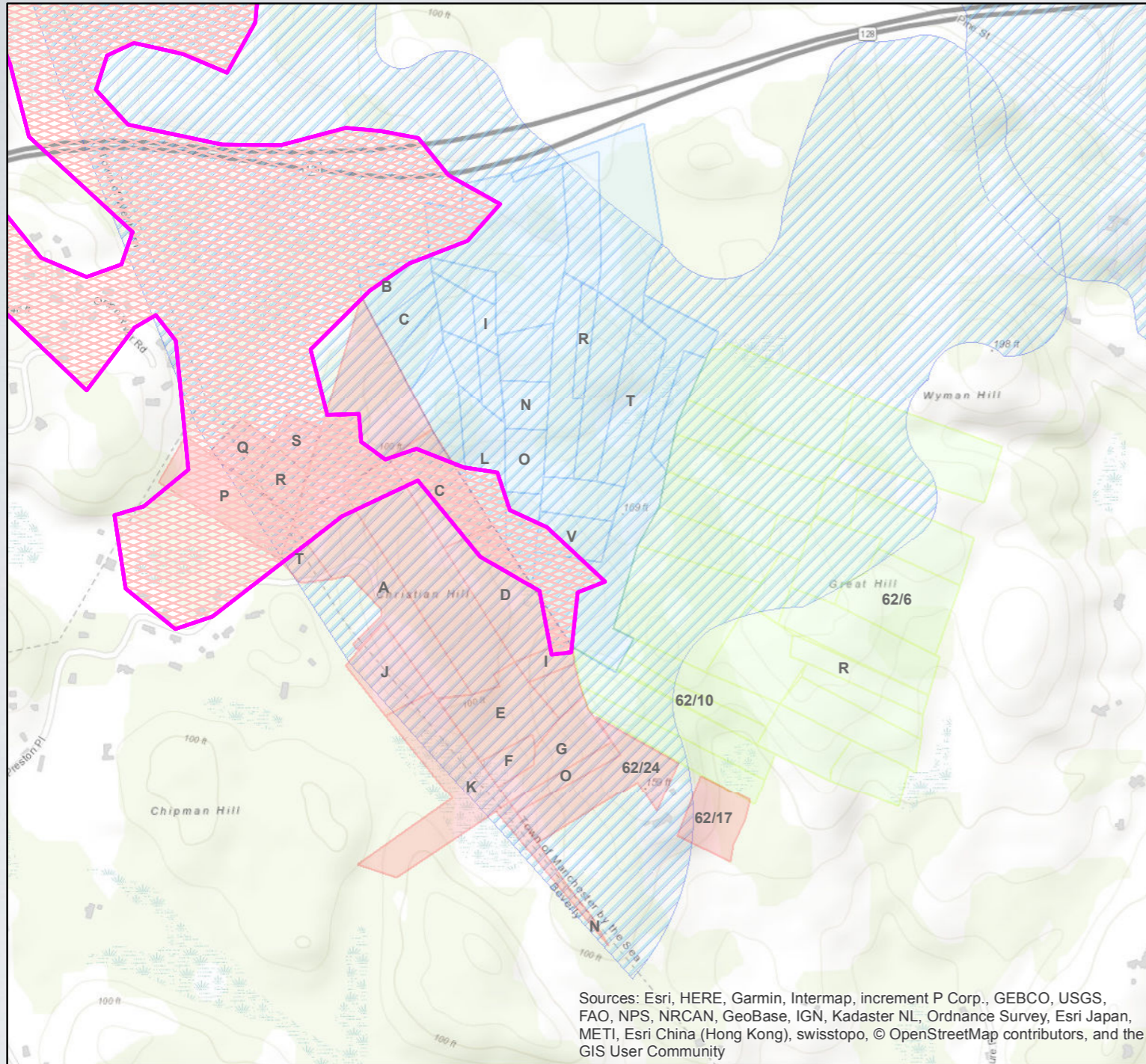


ABOUT POTENTIAL VERNAL POOLS

This MassGIS datalayer identifies the locations of potential, unverified, vernal pool habitats. Vernal pools are small, shallow ponds characterized by a lack of fish and annual or semi-annual periods of dryness. Vernal pool habitats are extremely important to a variety of wildlife species, including some amphibians that breed exclusively in vernal pools, and other organisms such as fairy shrimp which spend their entire life cycles confined to such locales.

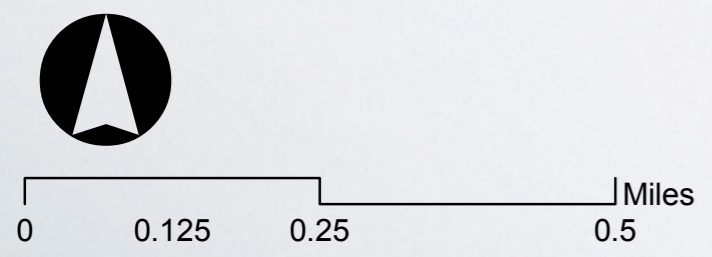
Potential vernal pools visible on aerial photographs were interpreted and included in this layer. However, this datalayer does not include every vernal pool in Massachusetts. Many vernal pools have not been identified due to unfavorable conditions in the landscape topography, pool physiography and/or photograph quality. Furthermore, vernal pool habitats occur in a wide variety of landscape settings, including forested swamps, bogs, and other wetlands. Vernal pools within these settings were not typically interpreted, but are nonetheless legitimate and valuable vernal pools.

WATER RESOURCES: WELLHEAD PROTECTION & WATER DISTRICT



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

- Legend**
- Area A Parcels
 - Area B Parcels
 - Area C Parcels
 - WaterDistrict
 - DEP Approved Zone II Wellhead Protection



Wellhead protection areas are important for protecting the recharge area around public water supply groundwater sources.

A Zone II is a wellhead protection area that has been determined by hydro-geologic modeling and approved by the Department of Environmental Protection's Drinking Water Program. Certain land uses may be either prohibited or restricted in wellhead protection areas.

An Approved Zone II Wellhead Protection Area is "That area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation). (see page 16 for more information on Water District datalayer).

ABOUT WATER DISTRICTS

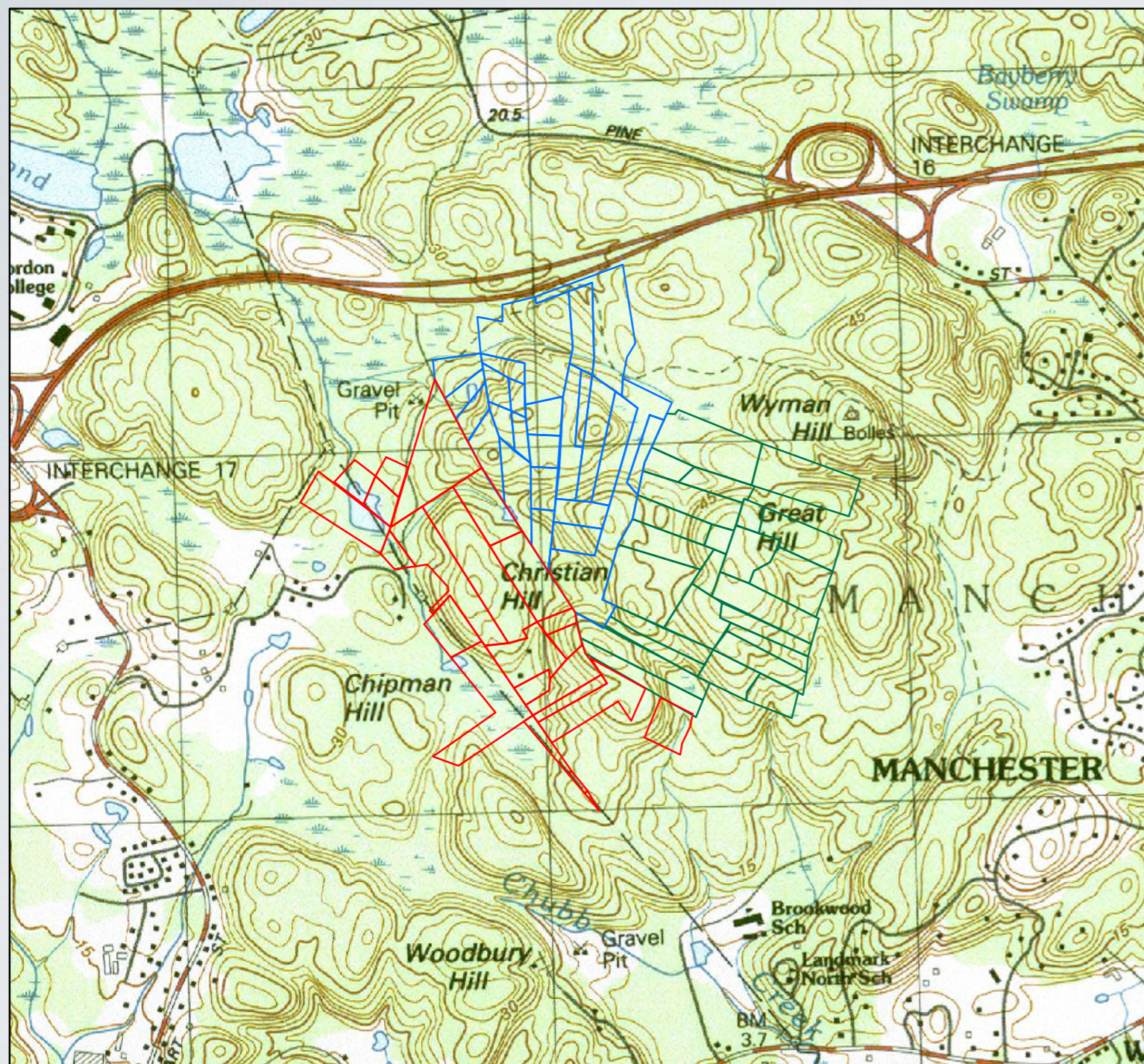
From the Zoning By Laws: Ground and Surface Water Resource Overlay Protection Districts 4.9.1 Findings: The Town of Manchester-by-the-Sea finds that: (a) The groundwater underlying the Town is a major source of its existing and future water supply, including drinking water. (b) The aquifer system supplying Manchester-by-the-Sea with its groundwater supply is integrally connected with numerous surface waters, lakes, and streams. (c) The surface water supplies of Gravelly and Round Ponds supplement the Town's groundwater resource, and are similarly considered an indispensable natural resource. (d) Accidental spills and discharges of toxic and hazardous materials have threatened the quality of such water supplies posing public health and safety hazards. (e) Unless preventive measures are adopted to control the discharge and storage of toxic and hazardous materials within the Town, further spills and discharges of such materials will predictably occur and with greater frequency and degree of hazard by reason of increasing land development, population and vehicular traffic within Manchester-by-the-Sea.

Purpose: to protect the public health, safety, and welfare through the preservation of the Town's water resources to ensure a future supply of safe and healthful drinking water for the residents and employees of the Town of Manchester-by-the-Sea and the general public. The designation of the Ground and Surface Water Resource Overlay Protection Districts and careful regulation of development activities within these districts can reduce the potential for ground and surface water contamination.

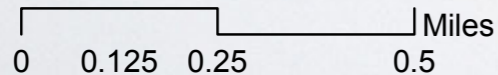
DEVELOPMENT CONSTRAINTS

- The study area includes significant topographical areas, including Christian and Great Hill.
- Steep slopes, and granite outcroppings may be considerable development constraints.
- Streams, wetlands and swamps are common landscape features within the Western woods that also may be development constraints.




USGS TOPOGRAPHICAL MAP



This map shows the study area with contours and topographic locations. The study area includes some significant features, including Christian and Great Hill. While steep slopes are considered to be a development constraint, a data layer that shows steepness of the slope (or slope grade) does not exist.



Legend

-  Area A Parcels
-  Area B Parcels
-  Area C Parcels

SURFICIAL GEOLOGY

Surficial Geology indicates the make up of the ground's surface & has implications for development.

This data layer is part of a comprehensive study by the U.S. Geological Survey to produce a statewide digital map of the surficial geology at a 1:24,000-scale. This compilation of surficial geologic materials defines the areas of exposed bedrock, and the boundaries between glacial till, glacial stratified deposits, and overlying early-postglacial and postglacial deposits.

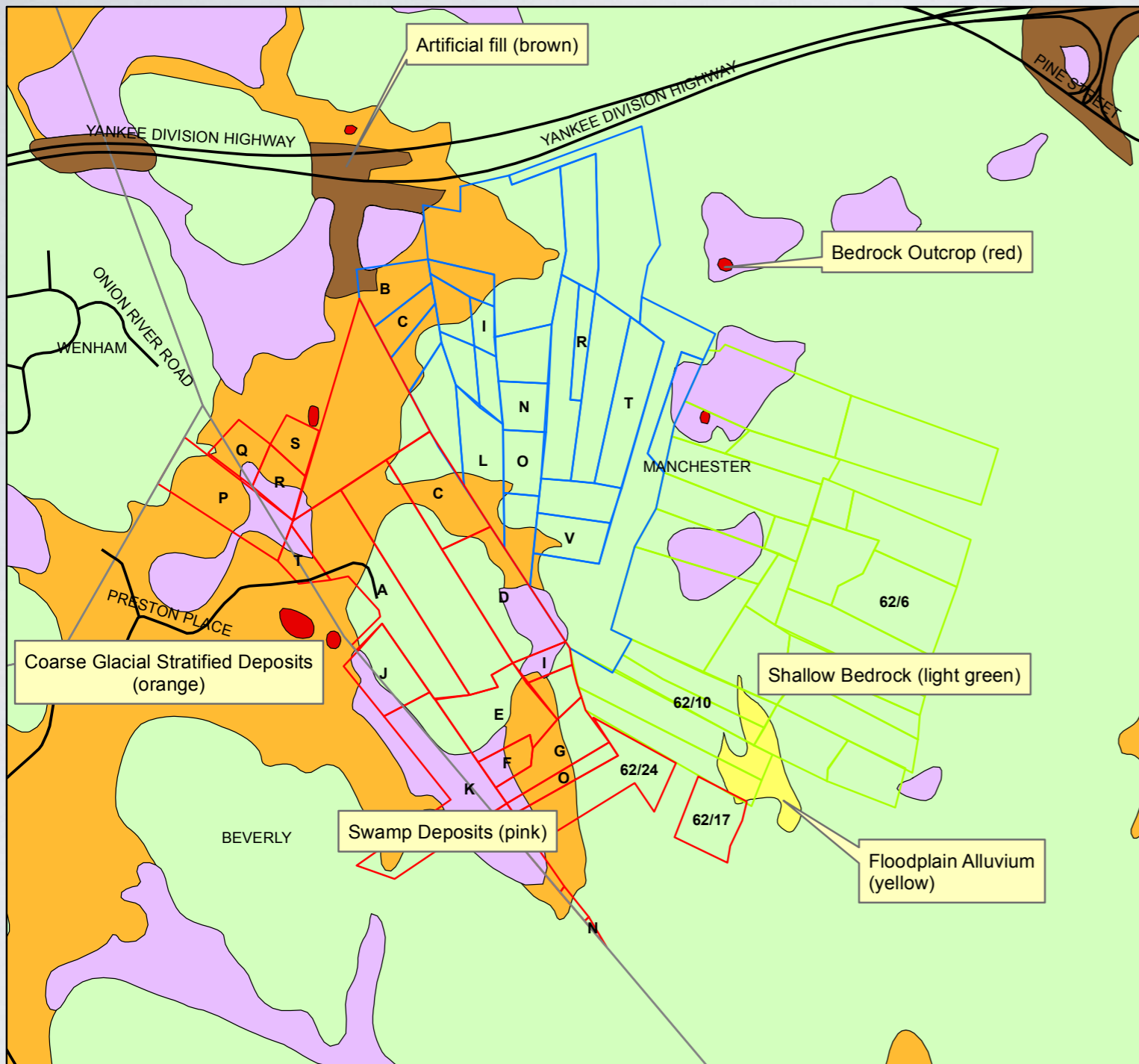
Bedrock outcrop: exposed rock with no soil cover, difficult for development

Shallow bedrock: light soil cover

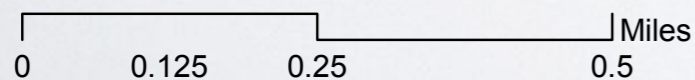
Swamp deposits: high organic content

Coarse Glacial Stratified Deposits: coarse grained sand, gravel, or other sediment types; depth of deposits varies

Floodplain Alluvium: fine-grained



1:10,000

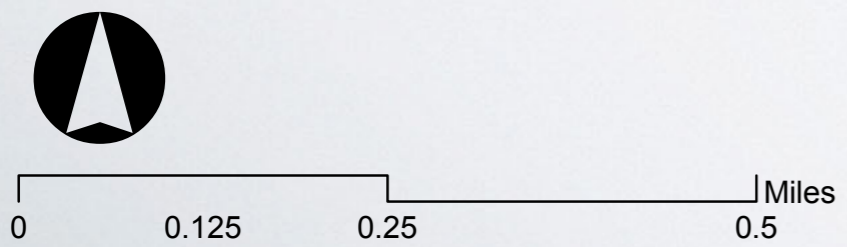
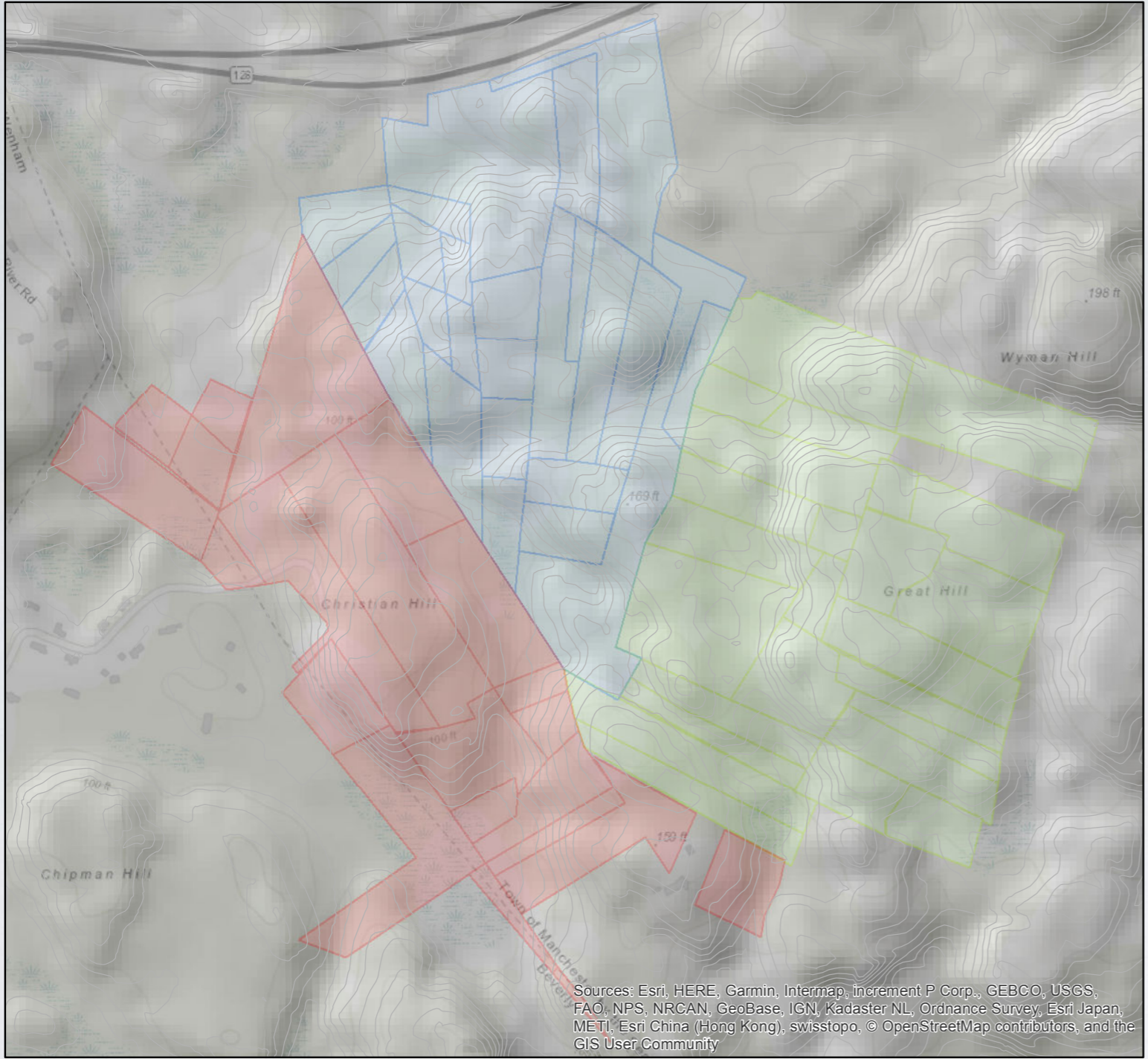


Legend

- Area A Parcels
- Area B Parcels
- Area C Parcels
- Town Boundaries
- Roads

SHADED RELIEF & CONTOURS: 1:5,000

Shaded relief with an overlay of contours, provides a 3-dimensional perspective on elevation gains and losses and is useful for evaluating an area for potential uses.



- Legend**
- Area A Parcels
 - Area B Parcels
 - Area C Parcels

1830'S FOREST

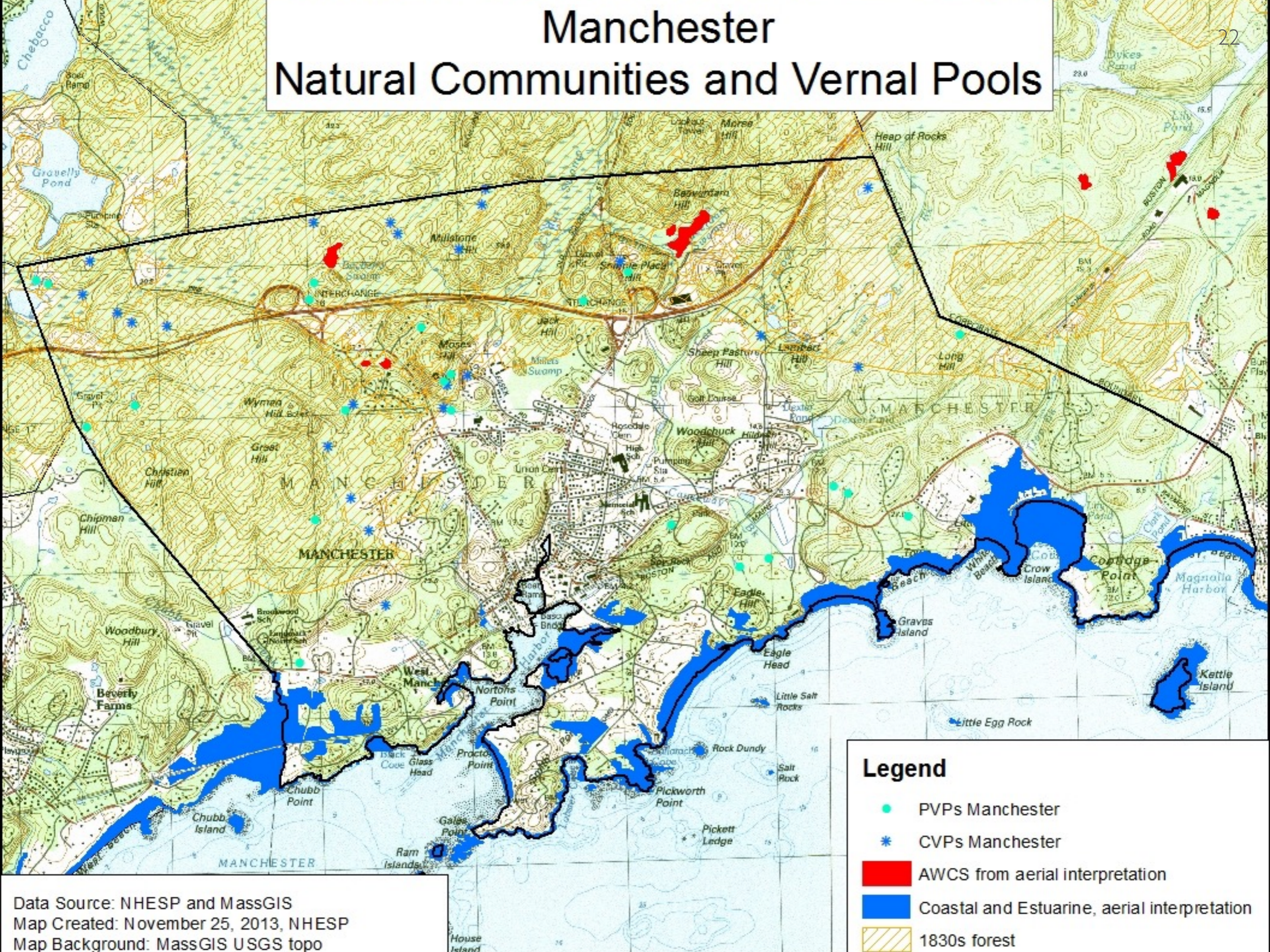
The Western Woods Study Area falls into the 1830's Forest Cover data layer, a tool used to evaluate the potential for biodiversity. According to information pertinent to Open Space Planning from Patricia Swain, Ecologist with the Natural Heritage & Endangered Species Program, Manchester is one of the towns in Massachusetts with maps showing areas forested in the 1830s and untilled woodlots and wooded pastures that are areas of possible Primary Forest. These are not "Old Growth" forests, as they have been harvested and pastured, but the ground may never have been tilled.

The importance of primary forest sites is that they retain more native biodiversity than sites that have been tilled. Soil fauna and flora — microorganisms and plants that reproduce primarily vegetatively—contribute to the higher biodiversity. In addition, there are species of wildflowers that are more common in untilled forests than previously tilled lands.

In Manchester, the areas of possible primary forest are away from the coast and town center, in the western hilly area and northern and eastern areas as shown on the accompanying map on page 22. Generally rugged topography with near surface or exposed bedrock makes site preparation more expensive and difficult here. Surface conditions, characterized by abundant glacial till and erratics, poor soil conditions and steep terrain substantially limited agricultural use.

Manchester

Natural Communities and Vernal Pools



Legend

- PVPs Manchester
- ★ CVPs Manchester
- AWCS from aerial interpretation
- Coastal and Estuarine, aerial interpretation
- 1830s forest

Data Source: NHESP and MassGIS
Map Created: November 25, 2013, NHESP
Map Background: MassGIS USGS topo

Town of Manchester Parcel Analysis

	Study Parcel	Acres	Map-Lot	BioMap 2	Trails	Adjacent OS	Wellhead Zone II	Surficial Geology				PVP	1830's Forest	Water District	Development Constraints*	Conservation Values**	
								Bedrock	Swamp	Wetlands							
AREA A																	
	A	8		x	x			partial		stream		x	x	medium	medium		
	C	6			x		x	partial		partial		x	x	medium	medium		
	D	6			x			partial	partial	partial		x	x	high	low		
	E	3.8		x	x			partial	partial	partial		x	x	high	medium		
	F	1		x					partial	partial		x	x	medium	low		
	G	3.8		x	x			partial	partial	partial		x	x	high	medium		
	I	2.5						partial	partial	stream		x	x	high	none		
	J	2.1		x	x			partial	partial	partial		x	x	high	medium		
	K	8		x				partial	partial	partial	x	x	x	high	low		
	N			x	x			partial				x	x	low	medium		
	O	1		x	x			partial	partial	partial		x	x	high	medium		
	P	2.8				x	x	partial	partial	partial	x	x	x	high	medium		
	Q	1.7					x		partial	partial	x	x	x	medium	low		
	R	1.7					x		partial	partial		x	x	medium	low		
	S	1					x			partial		x	x	low	low		
	62-17		62-17					entire		partial				medium	none		
	62-24		62-24	x	x			partial	partial	partial				high	medium		
AREA B																	
	C	2	63-34			x						x	x	none	low		
	I	1				x		partial				x	x	low	low		
	L	3.8						partial		partial		x	x	med	none		
	N	2						entire				x	x	low	none		
	O	2						partial		partial		x	x	med	none		
	R	2						entire		partial		x	x	med	none		
	T	5						entire		partial		x	x	med	none		
	V	2.5			x			partial		partial		x	x	med	low		
AREA C																	
	R	2				x		entire				x	x	low	low	*based on bedrock swamp & wetlands	
	62-10	2.6	62-10					partial				x	x	low	low	** based on OSP, Biomap, Trails, OS & Wellhead low = once occurrence medium = two high = 3	

SUMMARY TABLE DESCRIPTION²⁴

This table identifies the known conservation values and development constraints for each study parcel. Conservation values are rated by the occurrence of BioMap 2 lands, trails, adjacent protected open space, and wellhead Zone II. Development Constraints are rated based on the occurrence of bedrock, swamps, streams and wetlands. Steep slopes while considered to be a development constraint, are not mapped as a data layer does not exist.

For each study parcel a “low” rating is applied for the single occurrence of a value or constraint, a “medium” rating is applied for the occurrence of two values or constraints and a “high” rating is for the occurrence of three values or constrains.

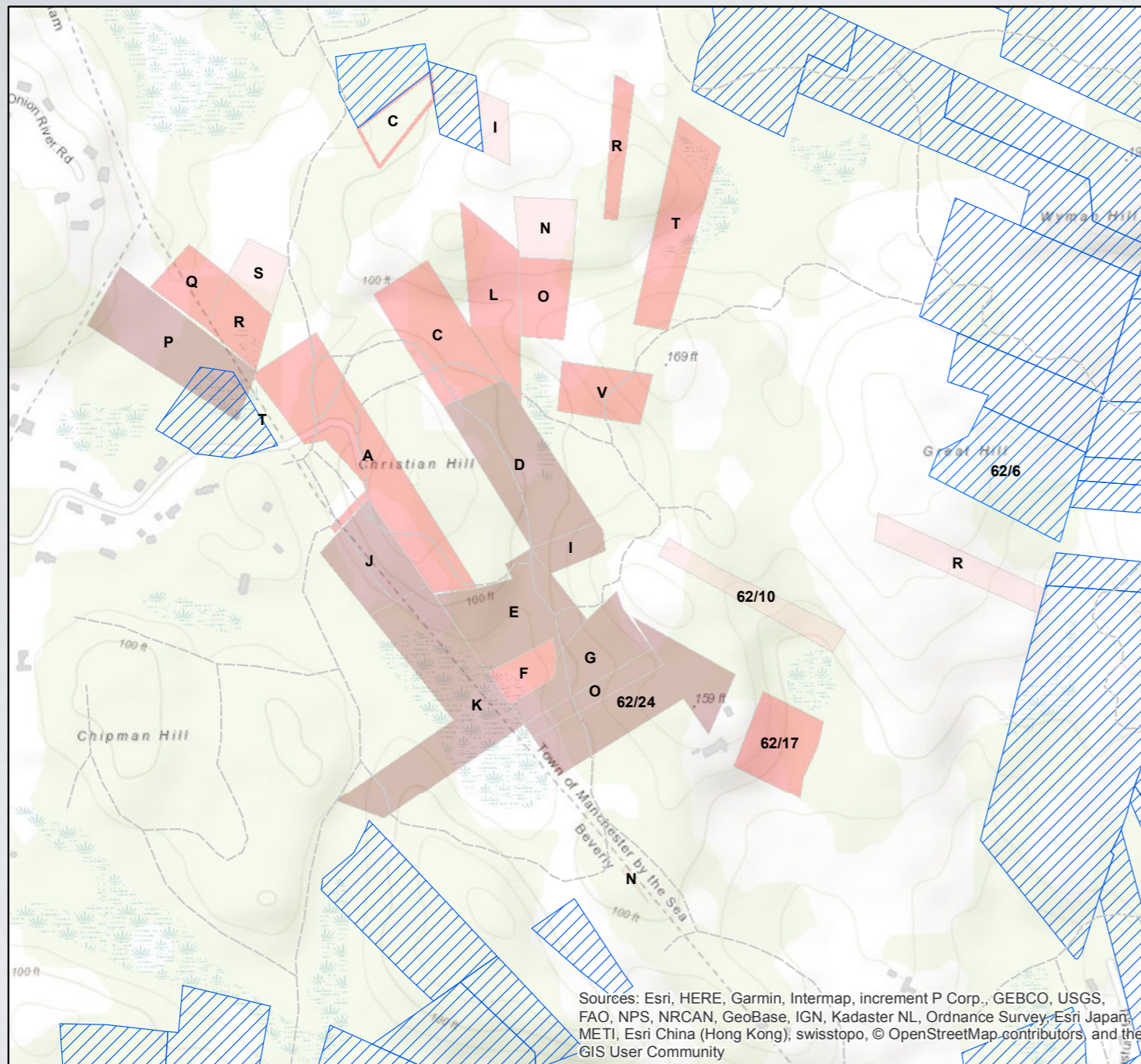
For example Study Parcel A in Area A has two conservation values within its boundaries: Biomap 2 lands and Trails, so the parcel receives a “medium” conservation value rating.

Study Parcel A in Area A also has two development constraints within its boundaries: bedrock and a stream, so it also has a “medium” development constraints rating.

Area A, Parcel D in contrast has a “low” conservation rating as it has a single conservation value (trails), however it has a “high development constraints rating due to occurrences of bedrock, swamps and wetlands representing three development constraints.

Note that since all parcels in the study area are within the water district, an area where toxic and hazardous materials could threaten the Town’s drinking water, and all also may have untilled soils (called 1830 Forest), no rating is given for the occurrence of these.

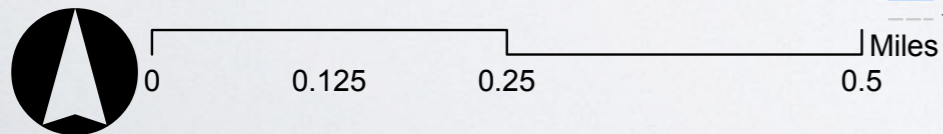
WESTERN WOODS EVALUATION MAP: DEVELOPMENT CONSTRAINTS



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

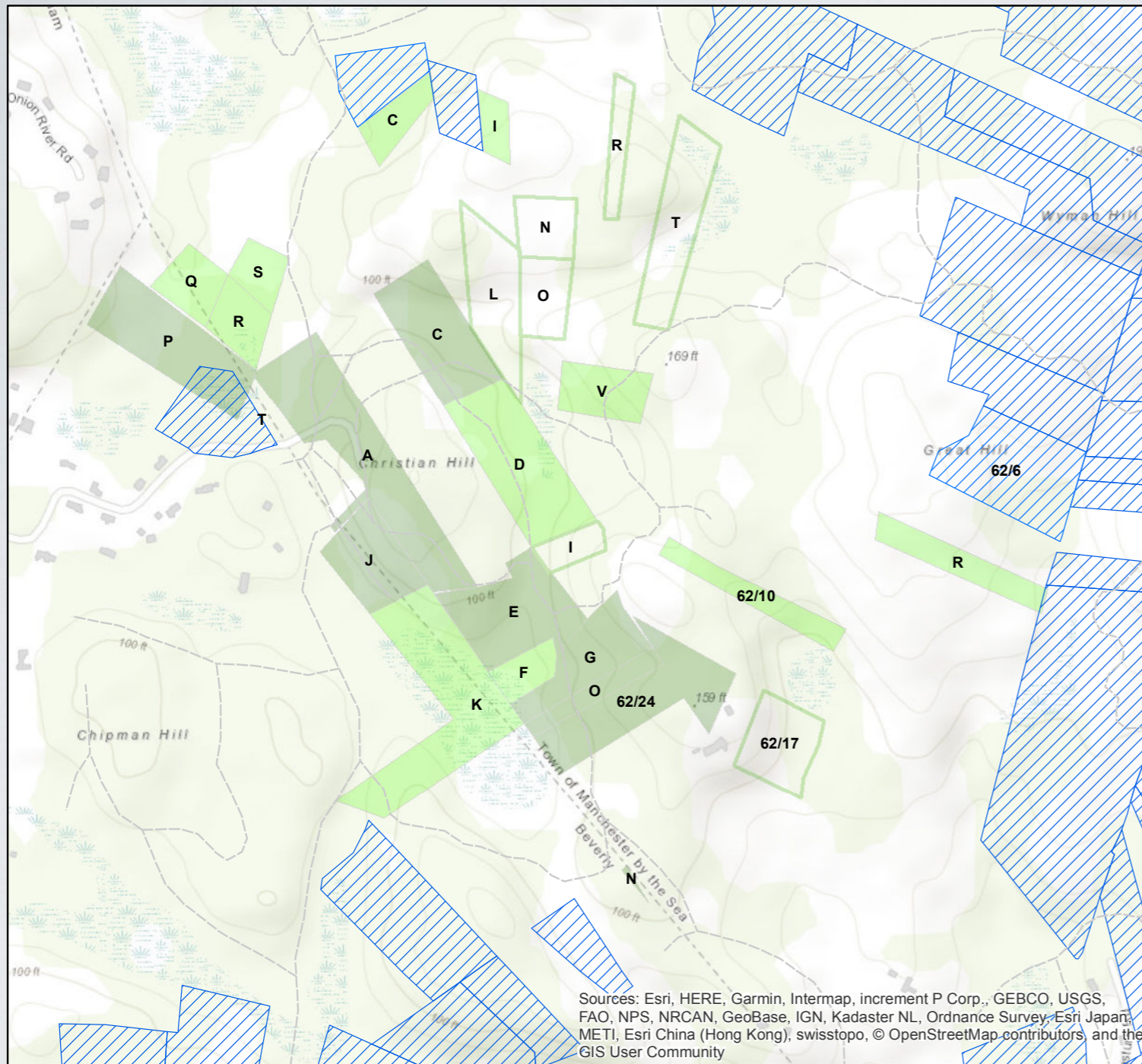
Legend

- Permanently Protected Conservation Land
- Minimal
- Minimal
- Medium
- Medium
- High
- None
- Medium

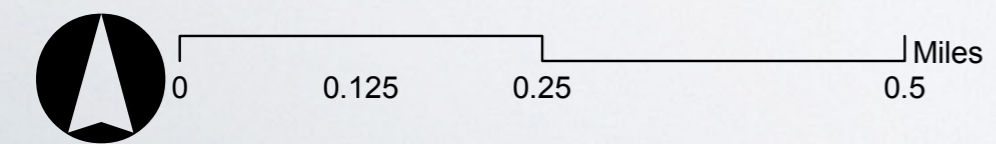
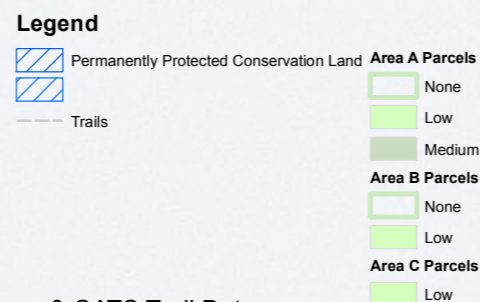


This map illustrates development constraints for each study parcel. A lighter color indicates the parcel has fewer constraints and a darker color indicates the parcel has greater constraints. A parcel that is outlined but is without color has no constraints identified within its boundaries.

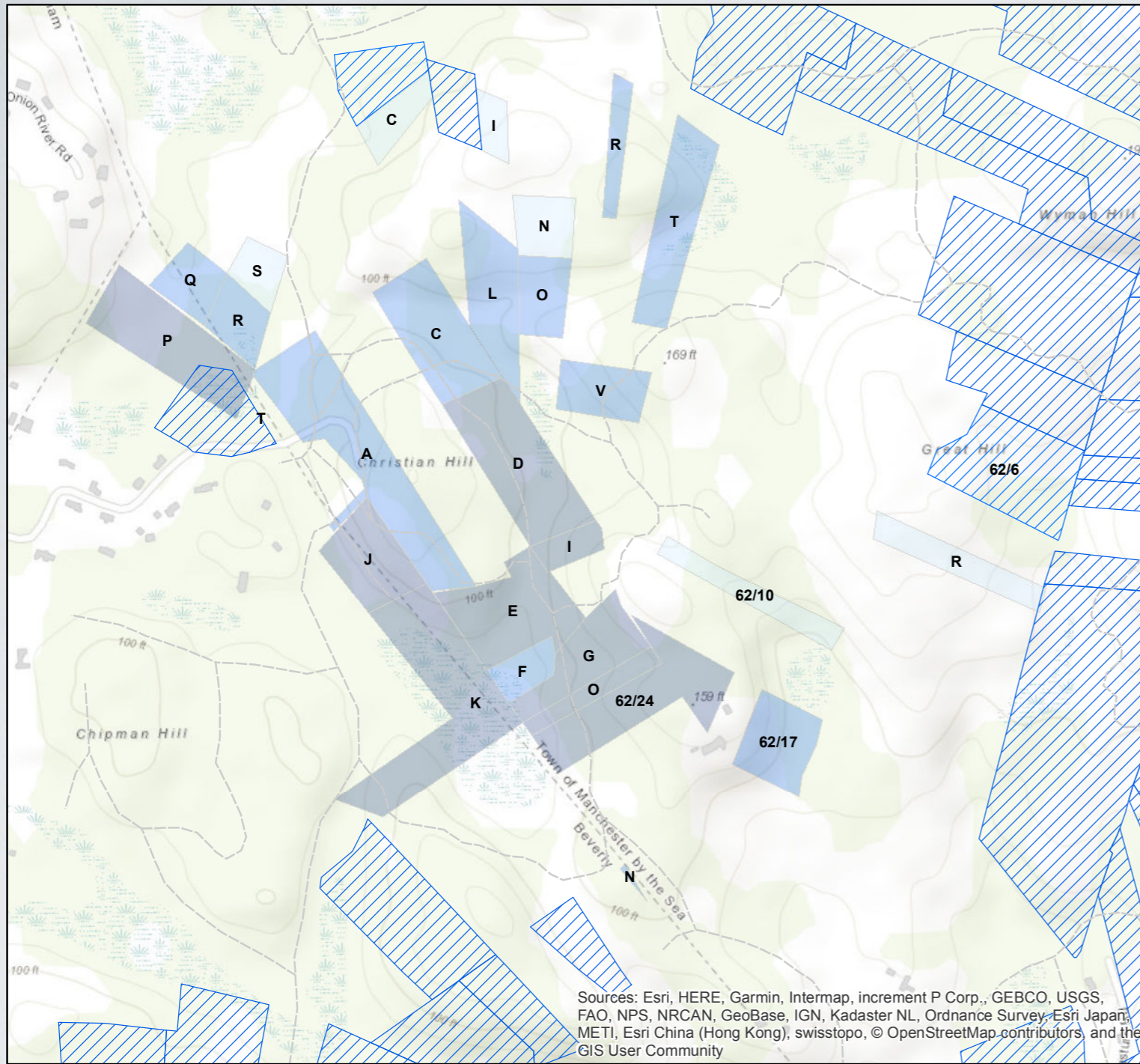
WESTERN WOODS EVALUATION MAP: CONSERVATION VALUES



This map illustrates conservation values for each study parcel. A lighter color indicates the parcel has fewer conservation values and a darker color indicates the parcel has a greater number of conservation values. A parcel that is outlined but is without color has no conservation values identified within its boundaries.



WESTERN WOODS EVALUATION MAP: COMBINED CONSERVATION VALUES & DEVELOPMENT CONSTRAINTS



This map illustrates combined conservation values and development constraints. A lighter color indicates the parcel has fewer conservation values and/or development constraints and a darker color indicates the parcel has a greater number of conservation values and/or development constraints. A parcel that is outlined but is without color has no conservation values and/or constraints identified within its boundaries.

