

# City of Beacon

## Natural Resources Inventory



Photo Credit: Dennis O'Brien

**June 2020**

The Beacon NRI was prepared by the City of Beacon Conservation Advisory Committee and Natural Resources Inventory Committee, led by Brian DiFeo with assistance from Anthony Ruggiero, City Administrator, and Mayor Lee Kyriacou. The NRI was developed with support from the Environmental Protection Fund through the New York State Department of Environmental Conservation Hudson River Estuary Program and Cornell University's Cooperative Extension of Dutchess County.



A Program of the New York State Department of Environmental Conservation

**Hudson River  
Estuary Program**



**Cornell University**

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## 1.0 Introduction

This Natural Resources Inventory (NRI) is an inventory and assessment of the current state of nature in Beacon, New York, a small city on the Hudson River. The NRI covers a wide range of resources, from soil types to endangered species to recreational features. It is based on existing data and did not involve new studies.

### What the NRI Shows

Each section of the NRI focuses on a different natural element in Beacon (e.g., water resources or habitat/biodiversity). To help this be a useful tool, the term “natural resources” is interpreted broadly, including the living things and naturally occurring materials in the environment, as well as scenic and cultural resources, the history of human impacts, and current and future challenges.

The NRI is divided into sections that represent a natural resource. Each section consists of: a map accompanied by text that interprets the map; provides additional information on that element of our environment; and explains why the natural resource is relevant to Beacon with considerations for decision-making.

Beacon is a city rich with natural beauty and resources that have fostered a strong sense of place in its residents and enabled its community to prosper. Beacon is situated in a unique environment of urban human development with pockets of open, green spaces packed between the slopes of Mount Beacon and the Hudson River, with Fishkill Creek flowing through the heart of the city. While geographically small, Beacon is environmentally complex, with many distinct areas, habitats, features, and considerations.

Historically, Beacon’s natural bounty helped the native Wappinger tribe to thrive by hunting and fishing these lands. Dutch and English colonists utilized the Fishkill Creek’s power for milling their grain and lumber harvests. Decades of heavy industry, now mostly gone, left its architectural mark on the city with brick factory buildings and workers’ homes.

Today, tourists flock to enjoy the views of the mountain, quiet sunsets from the riverbank, and Beacon’s rich cultural offerings. Diverse bird and fish populations still migrate through each year, and mammals as large as bears make use of the southeastern edge of the city – one of the few

remaining greenways connecting the Hudson Highland mountains to the Hudson River.

### How to Use the NRI for Decision-Making

The NRI can be used by Beacon municipal officials, the planning board, zoning board of appeals, the conservation advisory committee, community groups, non-profit organizations, recreational groups, residents, and others to help assess the environmental impacts of proposed activities and development plans; to assist in completing environmental assessment forms; to provide natural resource data for the development of city policies and ordinances; to provide natural resource data for future comprehensive and land use plans; and to identify areas for natural resource conservation, management, and stewardship.

The NRI can be useful for those in Beacon’s community who are interested in local nature or whose work intersects with environmental needs. The NRI can be a resource and conversation-starter for decision-makers for protecting and enjoying the natural elements of Beacon. A better understanding of Beacon’s natural resources will enable the community to protect and conserve them for current and future generations.

The maps and data in the NRI should not substitute for site-specific studies. Municipal-level or parcel-level issues may need to be examined on a site-specific basis.

### Considerations for Decision-Making

The City may wish to consider these high-level recommendations from the NRI:

- Incorporating climate change mitigation and adaptation in decision-making;
- Engaging Beacon residents in the stewardship of its natural resources; and
- Incorporating impacts on Beacon’s natural resources in development decision-making.

### More Information & Sources

Please see the References section at the end of the document, which includes sources used to create each map and text, as well as useful documents, data sets, websites, and organizations.

## 1.1 Base Map

Map 1.1 is an aerial image from 2016 that depicts the context of the natural resources of Beacon, New York.

### Why This Is Relevant to Beacon

Beacon covers approximately 4.7 square miles, and includes approximately 4.3 miles of Hudson River shoreline. The land slopes from east to west, down from the mountainous Fishkill Ridge to the Hudson River. After the Hudson, Fishkill Creek is the most significant water feature in the city, flowing toward the southwest through the center of the city over many waterfalls and dams, and entering the Hudson River via a natural bay south of Dennings Point.

Beacon has a variety of habitats, including forests and wetlands, and residential neighborhoods and yards, the riverfront, fields, and more all thrive within the city of Beacon. Some areas are maintained (e.g., mowed parks) while others are left in their more natural state.

Beacon is most densely developed along Main Street. The thoroughfare runs from the bluff over the river's harbor and the Metro-North Train Station southeast across Fishkill Creek to the foot of the mountains. Main Street is more than a mile long and features dozens of shops, restaurants, and other services. Development density generally decreases the further you get from Main Street, and the municipalities surrounding Beacon are not as densely populated as the city itself.

Beacon's built environment and population has remained fairly unchanged since 1950, with the population decreasing slightly between 1960 and 1990. According to the 2012 revision to the 2010 United States Census, the population of Beacon was 14,599 with a population density of 3,106 people per square mile. Recent and proposed residential development suggest there will soon be an uptick in population.

Other visible features are the Fishkill Correctional Facility, a New York State Prison with approximately 1,650 inmates, located in the northeast; and the shoreline of the Hudson River, which is largely undeveloped but includes the railroad tracks used by Metro-North and Amtrak.

### What This Map Shows

The Base Map and similar aerial images serves as the basis for all maps in the NRI. It highlights the following unique natural and cultural landmarks, which can be used for orientation on subsequent maps:

- Beacon Harbor\*
- The Hudson River\*
- Dennings Point
- Dia: Beacon
- Memorial Park
- Fishkill Creek
- Mount Beacon\*

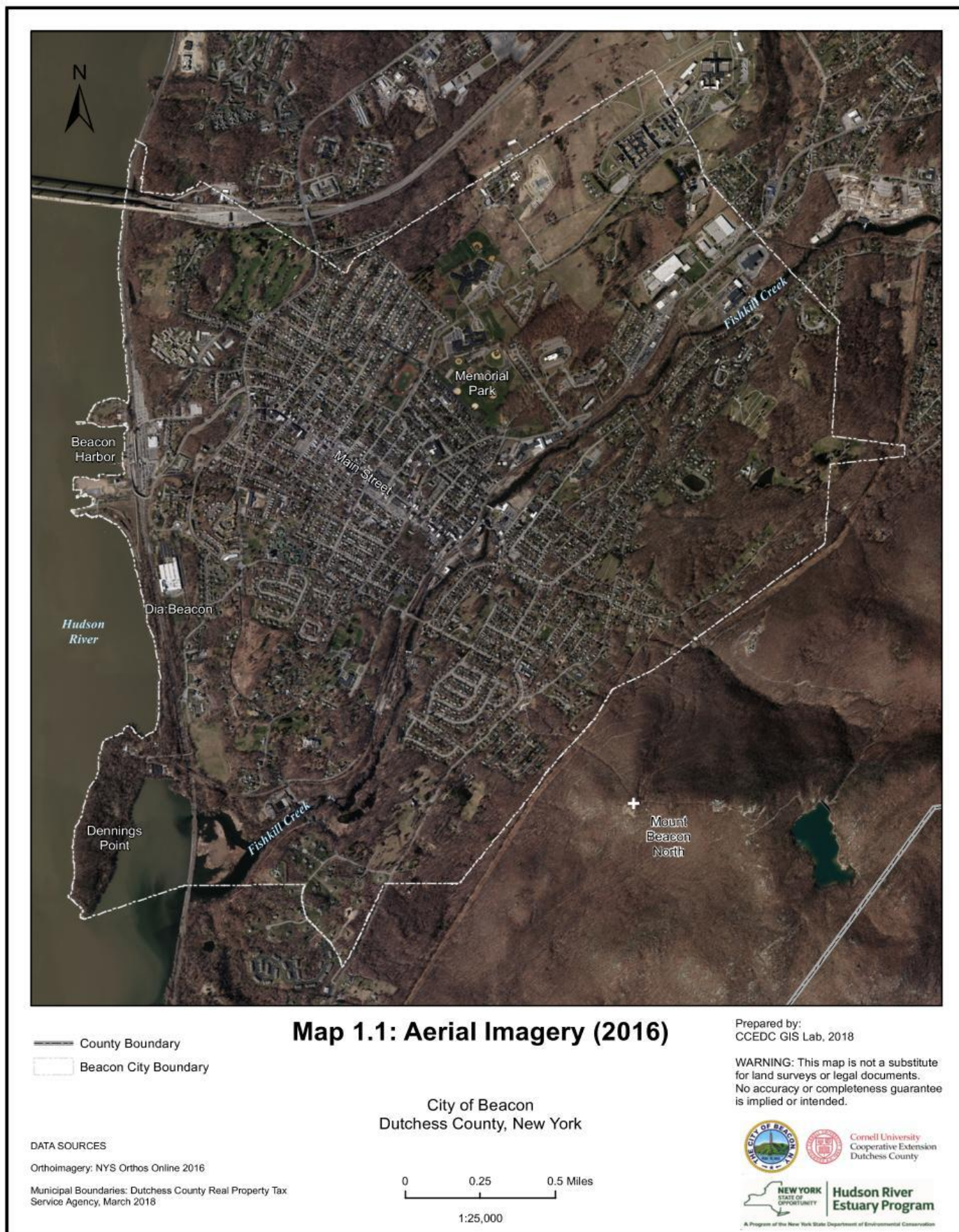
\*these locations are largely or entirely in the Town of Fishkill



*Main Street and surrounding neighborhoods, looking west to the Hudson River. Photo by Scott Harrison.*



## Map 1.1 Base Map





## 1.2 Regional Context

Map 1.2 is a map of the Beacon area showing the city in relation to the Hudson River and local roads.

### What This Map Shows and Why This Is Relevant to Beacon

Beacon is located in New York's Hudson Valley. Other than Dutchess Junction, the small portion of the Town of Fishkill that wraps around the southern city limit, Beacon is the southernmost municipality in Dutchess County. The nearest point of the Putnam County line is just south of Beacon at the Breakneck Ridge trail of the Hudson Highland mountain range.

To the west, Beacon is bordered by the Hudson River Estuary, which is fully a mile wide at Beacon's shores and extends 153 miles from New York Harbor to Troy, New York. The river is a tidal estuary at Beacon, bringing salt water north and fresh water south, with two high and two low tides every 24 hours. The Hudson River and Hudson Valley have environmental, historical, and economic significance, both regionally and nationally.

The City of Newburgh in Orange County is across the river and is Beacon's sister city, connected by bridge, ferry, vistas, community, and a shared sense of responsibility for the river that flows between. Beacon is bordered by the Town of Fishkill in all other directions, including most of the Hudson River facing Beacon to the west.

Beacon is bordered to the east by the Hudson Highlands mountain range, which includes Mount Beacon North (1,531 feet) and Mount Beacon South (1,610 feet). These rocky, forested mountains rise steeply from Beacon; they are virtually undeveloped in their upper elevations and are now state parkland.

To the north of Beacon is Interstate 84, which connects Beacon to communities and cities to the east and west. Twenty-five million vehicles drive through Beacon on I-84 across the Beacon-Newburgh Bridge each year, as it is a major artery for regional commerce between Pennsylvania and the Northeast of the United States. Seven miles to the west is the New York State Thruway. Just five miles beyond is Stewart International Airport, which offers flights on major airlines. Route 9D is the primary road connecting Beacon to communities to the north and south. The Metro-North Train Station connects Beacon to New York City, 60 miles to the south, and Poughkeepsie, the county seat of Dutchess County, 15 miles to the north. Beacon is nestled in a narrow lowland between the mountains and the Hudson River. A person could walk the 1.8 miles from the train station at the river's edge to the foot of the mountain, or the 2.9 miles

along Fishkill Creek through the length of the city. There are multiple trail heads within the city that provide access to Mount Beacon and Fishkill Ridge.

### Considerations for Decision-Making

Beacon's location within the Hudson Valley, proximity to New York City, connection via major roads and train, and small size make it easily accessible and invaluable to residents, commuters, businesses, and tourists alike.

To protect Beacon's regional significance, the City may wish to consider:

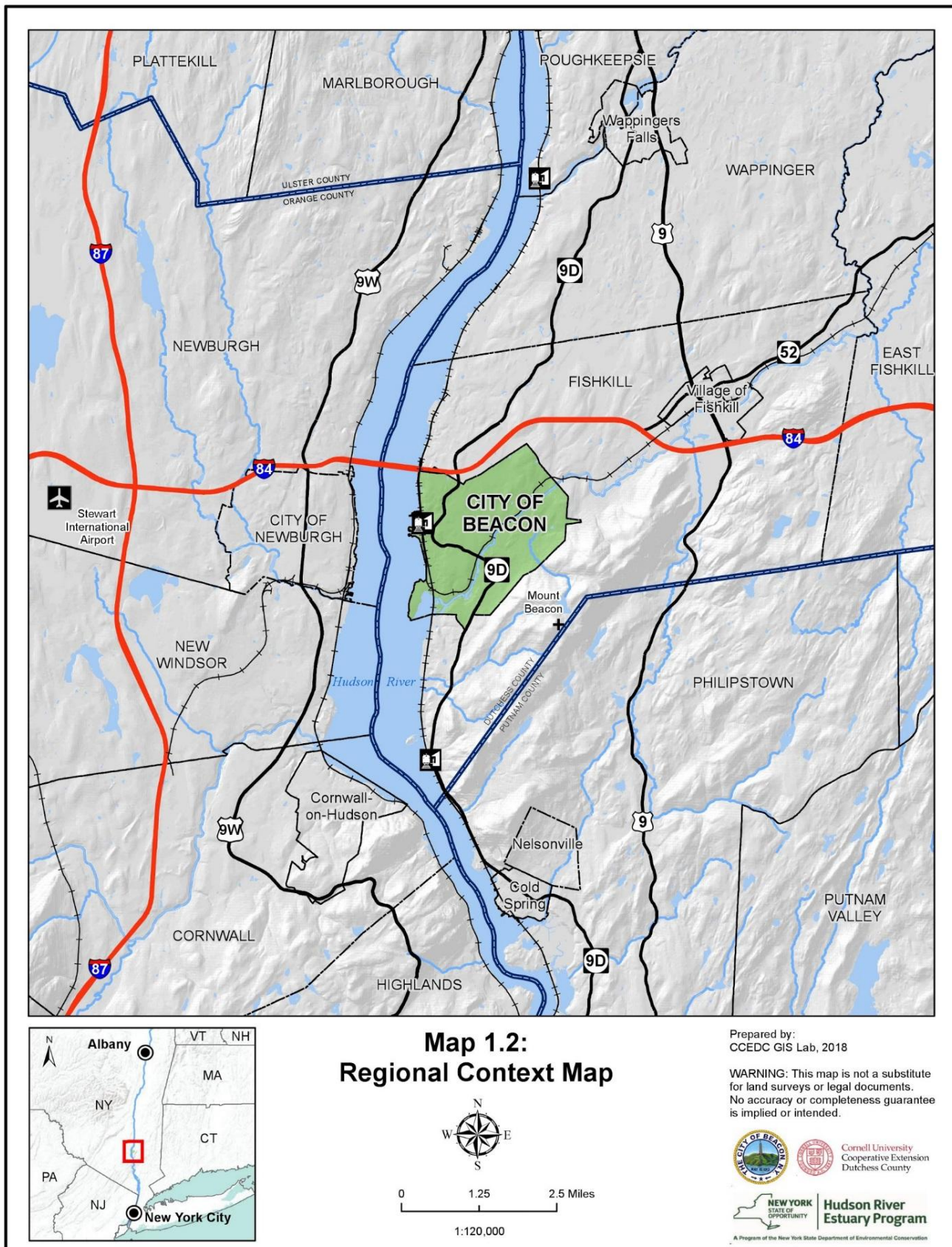
- Continuing to refine proactive development policies that accommodate sustainable growth while protecting the natural and cultural character of the city. Beacon is physically and politically bounded, so any population growth will have to be by infill development and increased density, not sprawl;
- Celebrating and expanding upon Beacon's accessibility by all modes of transportation including train, vehicular, public transit, ferry, bike, and pedestrian; and
- Maintaining good working relationships with neighboring municipalities for planning and operational coordination.

This information largely comes from New York State Department of Environmental Conservation and New York Bridge Authority. For more information on these topics, see the References section.



*View of Beacon, Fishkill, the Hudson River, and Orange County, looking north-northwest from Mount Beacon.*

## Map 1.2 Regional Context





## 2.0 Geology

### Why This Is Relevant to Beacon

Geology is the study of naturally-occurring earth materials. This document considers Beacon's geology in two sections:

(1) Surficial geology refers to the soils and rocks that loosely cover the ground. This affects which plants grow, what wildlife thrives, and how water drains. Protecting Beacon's surficial geology can prevent erosion, keep streams clean, and help maintain biodiversity.

(2) Bedrock geology refers to the solid rocks that lie beneath the loose surface rocks and soils. This determines topography and appropriate siting of development and drinking water wells. Applying in-depth knowledge of bedrock geology can prevent hazards like residential flooding, erosion, and groundwater contamination.

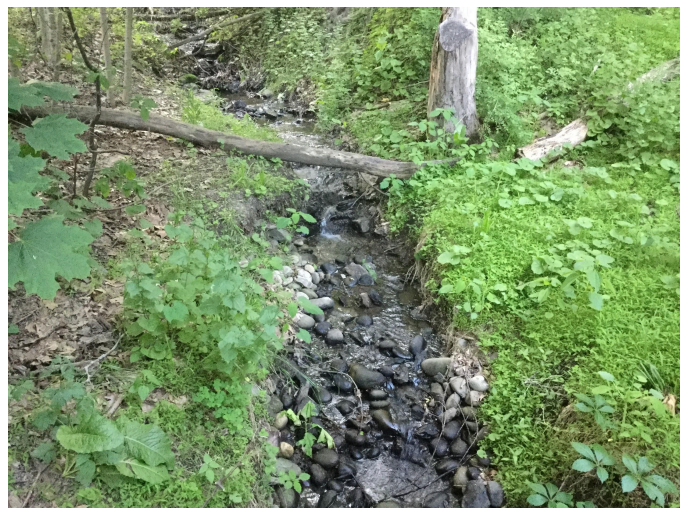
Bedrock geology also contributes to Beacon's success as a tourist destination, since Mount Beacon would not exist without the elevational differences in the underlying bedrock geology.



*Bedrock geology plays a major role in determining where wells are most successful, as well as which areas are amenable for retention of drinking water. The Beacon Reservoir (located in Fishkill) is pictured here.*



*A bedrock outcrop, where bedrock protrudes to the surface, is pictured here south of the train station.*



*Stream sediments and glacial outwash materials surround the southern portion of Fishkill Creek, a tributary of which is seen here.*

## 2.1 Surficial Geology

Map 2.1 displays Beacon's surface geology.

### Why This Is Relevant to Beacon

The soils and rocks that loosely cover the ground affect plant community composition and biodiversity, as well as water flows. They also affect decomposition rates and determine whether land is good for infrastructure and farming – or, in Beacon's case, smaller-scale gardening.

The sediments in Beacon today were deposited here 14,000 years ago when the previous ice age ended and the Laurentide Ice Sheet and Wisconsin glacier retreated. This major geologic event helped shaped the city's boundaries. The southeastern boundary of Beacon traces the bedrock-till divide.

### What This Map Shows

Beacon's surface geology consists primarily of glacial till (rocks and soils of various sizes and types that were carried here by the last glacier). Bedrock outcrops, where soils are extremely shallow or nonexistent, occur under the Beacon train station and in small portions on its north and east borders.

Lake sediments exist along the western border of Beacon, to the south of the train station. These sediments were left by Lake Albany, a massive glacial melt lake, which existed 13,000 years ago. They contributed to Beacon's long and rich brick manufacturing industry.

Small areas of stream sediments and glacial outwash materials surround the southern portion of Fishkill Creek. Glacial outwash materials, which were carried by the last glacier and deposited here by ice melt streams, and stream sediments both include small, fast-draining particulates like sand and gravel.

### Considerations for Decision-Making

Soil types are a determining factor in infrastructure development. Hardy, faster-draining soils can withstand compaction from roads, large buildings, basements, and septic systems. More sensitive soils, like those near waterways, are less desirable sites for construction. If disturbed, sensitive soils will erode rapidly, causing nutrient leaching, stream sedimentation, and damage of aquatic life. A variety of soils supports a variety of flora and fauna.

To protect Beacon's soil quality, the City may wish to consider:

- Managing development within stream sediment and glacial outwash zones;
- Reducing impervious surfaces in developments to lower soil erosion that can result from increased storm water flowing off-site;
- Encouraging use of green infrastructure to increase infiltration, including permeable pavement, enhanced tree pits, and green roofs;
- Testing soil for pollutants in previous industrial zones and remediating if necessary; and
- Preserving areas of each soil type, which will in turn help protect Beacon's array of plant and animal biodiversity.

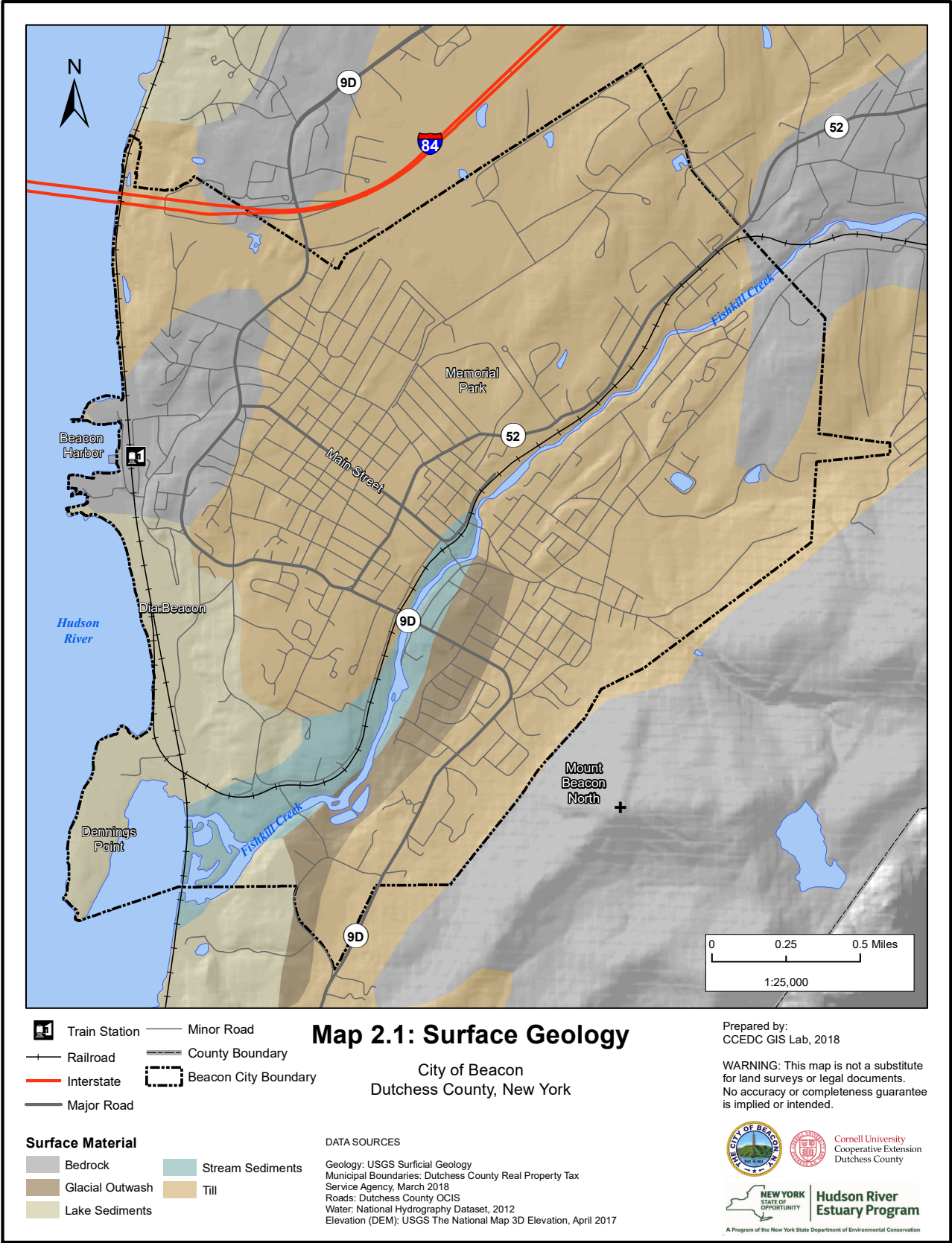
This information largely comes from USGS, USDA, the Hudson River Estuary Program, and the Dutchess County NRI. For more information on these topics, see the References section.



*Glacial outwash and stream sediments are visible along the stream banks in Beacon.*



# Map 2.1 Surficial Geology



## 2.2–2.3 Bedrock Geology and Topography

Map 2.2 displays Beacon’s bedrock types, while Map 2.3 shows elevations in the City.

### Why This Is Relevant to Beacon

Topography related to bedrock geology helped shape settlement patterns in Beacon, with the city’s population concentrated along a relatively flat plain. The high terrain of nearby Mount Beacon and Fishkill Ridge to the east provide scenery and recreation opportunity for residents, as well as visitors who bring the economic benefits of tourism.

Bedrock geology also determines the best locations for high-production wells, as noted in Section 5 of the City of Beacon Comprehensive Plan. At present, Beacon’s water sources are: (1) two wells dug into bedrock aquifers to the north of Beacon, (2) a subsurface soil and gravel aquifer in the Village of Fishkill, and (3) three surface water reservoirs. An area of Taconic Sequence bedrock in the northeast portion of the City is being explored for a potential new drinking water well. Surficial and bedrock geology together help retain water in these areas.

### What This Map Shows

Beacon’s bedrock is primarily Austin Glen Formation (a type of sandstone) and Taconic Sequence (a coarse-grained shale that can be easily split into irregular pieces). Areas of Precambrian Granite and Gneiss exist along Beacon’s eastern boundary. These are some of the oldest, hardest rocks in the region. They were formed over one billion years ago, and are highly resistant to erosion. They are the Hudson Highlands bedrock. A zone of Autochthonous (“formed-in-place”) Shale is sandwiched between Precambrian Granite and Gneiss. Shale is a mix of fine-grained minerals that were formed through accumulation and low pressure, and it easily breaks into slabs.

### Considerations for Decision-Making:

Bedrock is a determining factor in infrastructure development. Development of roads and structures on areas where bedrock is close to the surface may be costly and cause intensive erosion of thin, fragile surface soils. As mentioned, it is also a major factor in water flow, filtration, and storage.

To make effective use of Beacon’s bedrock resources, the City may wish to consider:

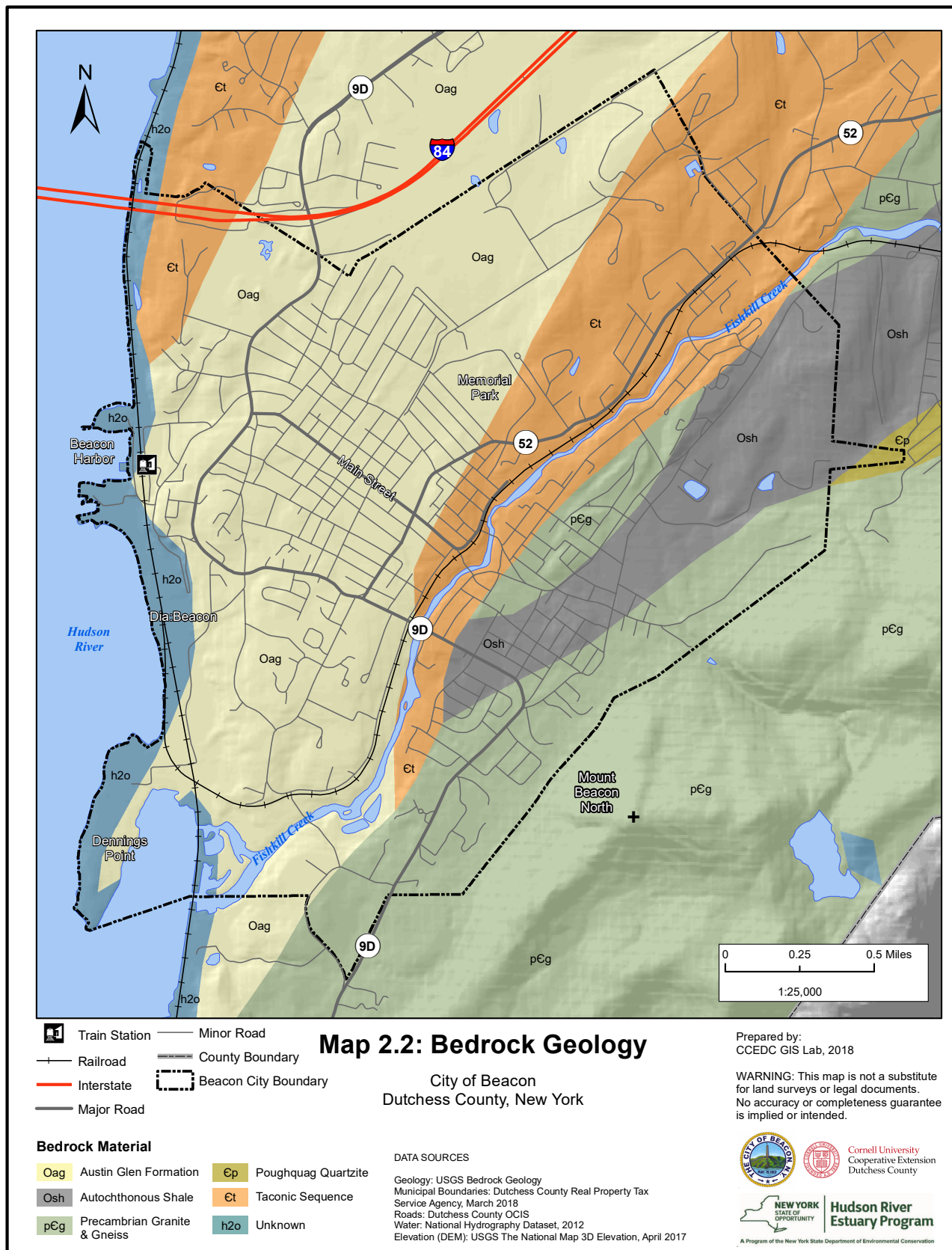
- Limiting development on steep slopes to avoid erosion and stormwater runoff (the City recently did so);
- Preserving areas of land overlying each bedrock type, which will in turn help protect Beacon’s array of plant and animal diversity;
- Consider protecting interesting geologic features, such as glacial erratics; and
- Properly capping and sealing wells that are not in use, as well as exploratory well cuts, to avoid potential contamination of subsurface bedrock waterways.

This information largely comes from USGS, USDA, the Hudson River Estuary Program, and the Dutchess County NRI. For more information on these topics, see the References section.



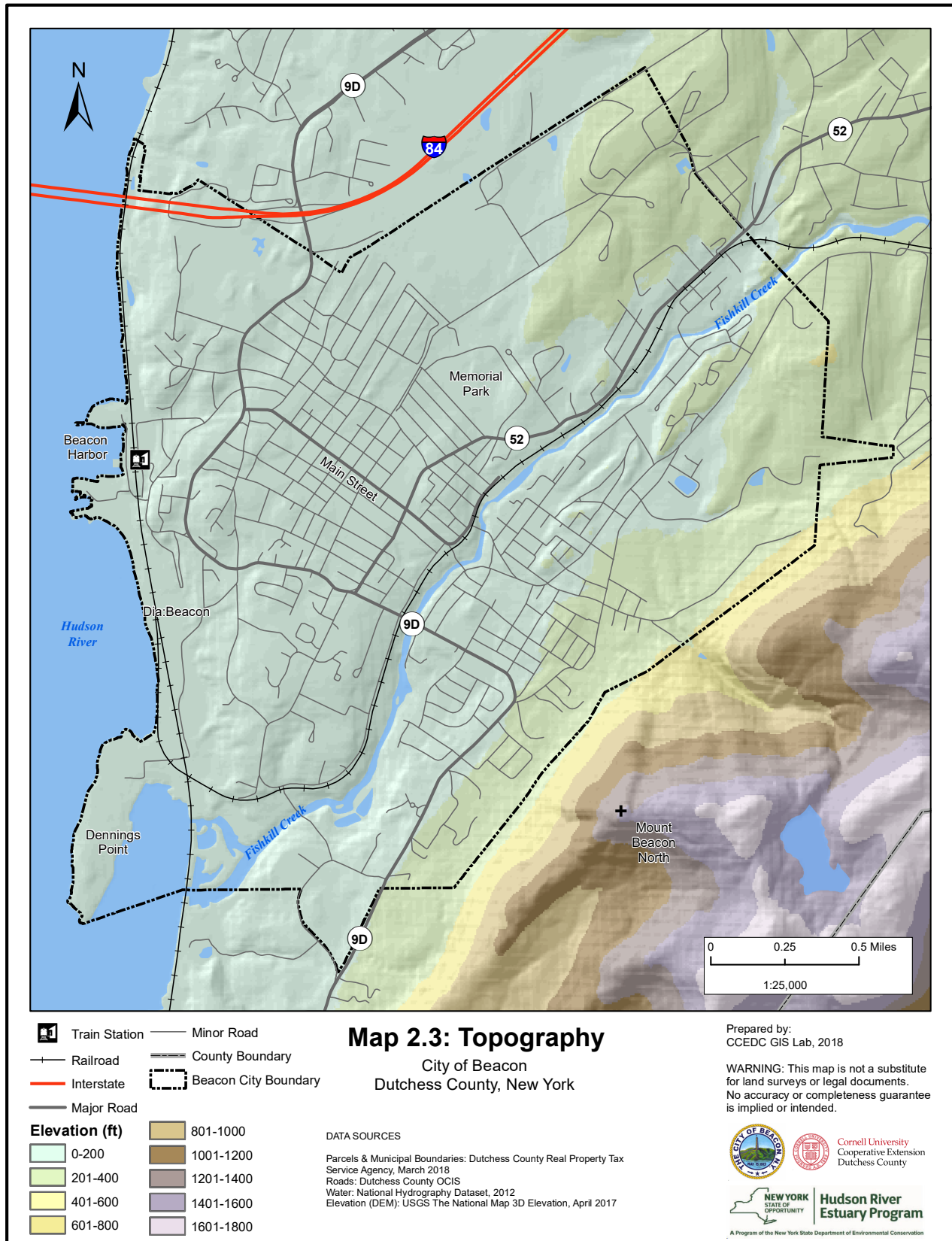
*Striations typical of gneiss – a common bedrock along Beacon’s eastern boundary – are visible on the rock in this photo*

## Map 2.2 Bedrock Geology





## Map 2.3 Topography





### 3.0 Water Resources

#### Why This Is Relevant to Beacon

Beacon is situated along a historic and nationally important waterway: the Hudson River. The Hudson and other waterways in Beacon, along with their adjacent riparian zones, provide many ecosystem functions and services for nature and people. For example, Fishkill Creek is an important spawning area for migratory fish, and the Hudson River provides scenic and recreational opportunities.

Stormwater and its management are also important to consider. Beacon's wetlands help to naturally regulate stormwater runoff flows, moderate flooding, and protect surface water quality. Engineered green infrastructure such as rain gardens can also help slow runoff, reducing the impacts of development on water quality and quantity.

Beacon relies on clean water to support biodiversity, recreation, and its drinking water supplies. Beacon's water comes from both groundwater and surface water sources, and water quality monitoring data can be used to confirm whether existing pollution controls are succeeding at achieving the desired water quality.



*Kayakers on the Hudson River at Long Dock Park.*



*Fishkill Creek.*



*Beacon Reservoir.*

## 3.1 Streams, Waterbodies and Watersheds

Map 3.1 displays water courses, bodies of water, and watersheds in Beacon.

### Why This Is Relevant to Beacon

Streams, rivers and their adjacent riparian zones provide many ecosystem functions and services, such as clean water, recreational opportunities, scenery and wildlife habitat. In addition, tributary streams deliver water, nutrients, sediment and organisms to larger waterways.

The economic and social value of water in Beacon are demonstrated by businesses such as the Roundhouse, which benefits from views of the waterfall on Fishkill Creek, and by the tourism draw of the Hudson River waterfront at Long Dock Park and Pete and Toshi Seeger Riverfront Park. The Newburgh-Beacon ferry that crosses the Hudson provides additional economic benefits to Beacon.

### What This Map Shows

Beacon has two principal waterbodies: the Hudson River and Fishkill Creek. The lighter area of the map on the west side of Beacon drains directly to the Hudson. The darker area is a local sub-watershed where rainfall fills Beacon Reservoir, feeds surface flows of Dry Brook and Fishkill Creek, and helps recharge large groundwater aquifers at the foot of Mount Beacon.

Fishkill Creek and the Hudson River are identified as “rare assets” in the Beacon Comprehensive Plan. The Hudson River is an iconic and nationally recognized waterway, designated by Congress in 1996 as the Hudson River Valley National Heritage Area. It is a tidal estuary where salt and freshwater mix, resulting in high biodiversity. The Hudson’s tides extend to the Capital Region, so Beacon’s waterfront is influenced by tidal fluctuations.

Fishkill Creek begins in the Town of Union Vale, flowing southwest through the towns of Beekman, East Fishkill, and Fishkill before reaching Beacon. The Hudson’s tides also reach into Fishkill Creek as far as the first road bridge crossing. The lower section of Fishkill Creek, from the mouth to the first dam, is an important spawning area for migratory fish that travel from the ocean, up the Hudson River Estuary, and into its tributaries to spawn. Stream barriers, such as dams and poorly designed and installed bridges and culverts, can have serious effects on stream habitat, local flooding, and water quality. Fishkill Creek is an approved drinking water source for the city.

## Considerations for Decision-Making

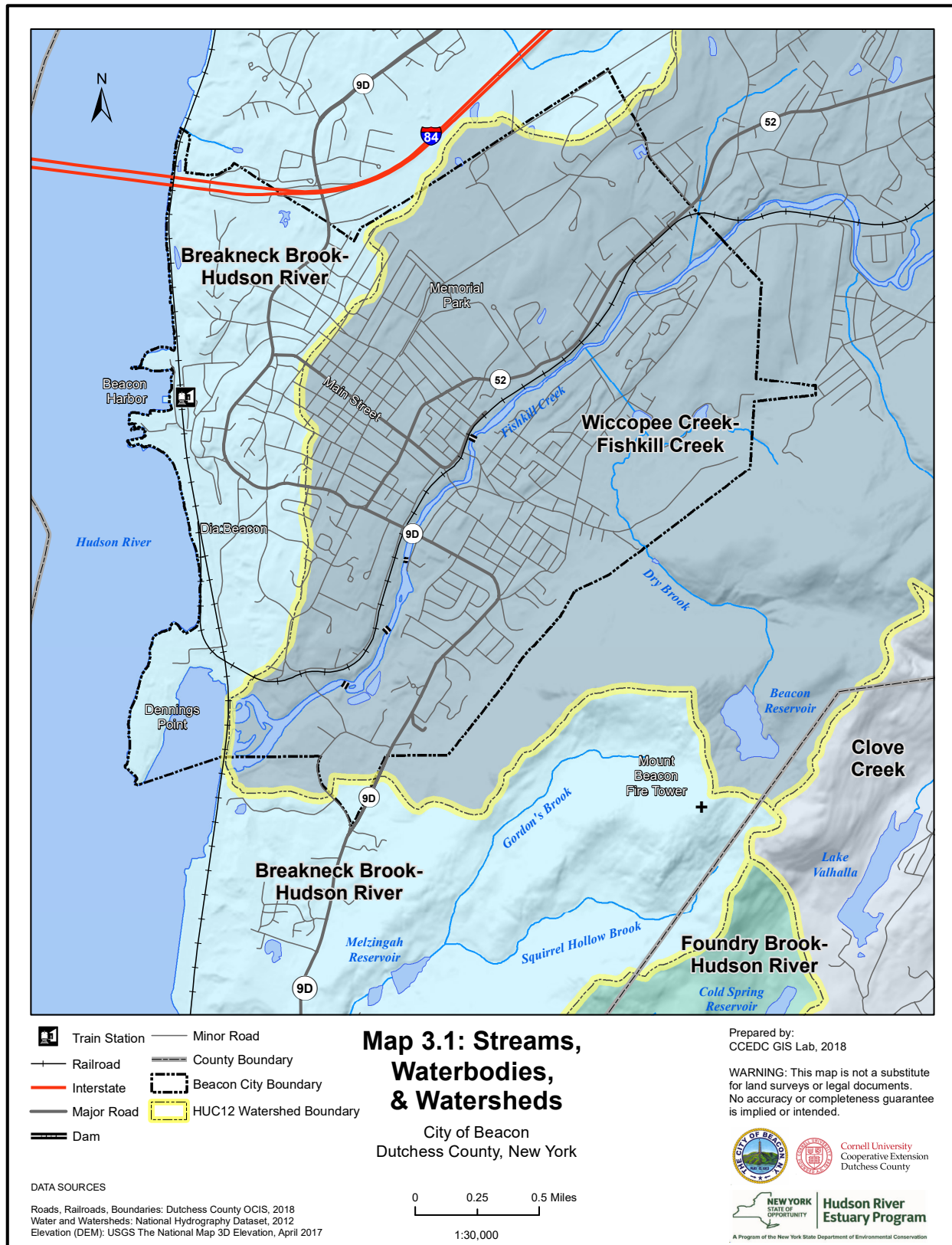
To protect Beacon’s streams and waterbodies, the City may wish to consider:

- Utilizing a watershed management approach, which can comprehensively address a wide range of water quality and quantity issues;
- Preserving wetlands, stream corridors, and floodplains in their undeveloped states;
- Replacing poorly designed or undersized culverts with bridges, open-bottom culverts and similar structures that completely span the waterway and associated riparian area and floodplain;
- Requiring a building buffer from the mean high tide mark of the Hudson River and along stream courses;
- Protecting and restoring naturally vegetated areas along streams and rivers; and
- Controlling shoreline and streambank erosion using living shorelines or ecological materials.

This information largely comes from Dutchess County NRI, Hudson River Estuary Program NRI Guide, Hudsonia Habitat Fact Sheet, *Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for protecting the Biological Diversity of New York’s Hudson River Valley*, Beacon Drinking water report, LHCCD/Emily Svenson, City of Beacon Local Waterfront Revitalization Plan, and *Watershed Design Guide: Best Practices for the Hudson Valley*.

For more information on these topics, see the References section.

# Map 3.1 Streams, Waterbodies, and Watersheds



## 3.2 Wetlands

Map 3.2 depicts wetlands of various types as mapped by the U.S. Fish and Wildlife Service (USFWS) and New York State Department of Environmental Conservation (NYSDEC). It also includes poorly and very poorly drained soils, which can be indicative of where wetlands are likely to occur (“probable wetlands”) and somewhat poorly drained soils, which indicate “possible wetland” locations.

### Why This Is Relevant to Beacon

Wetlands are areas with saturated soils. Certain plants and animals are specifically adapted to wetland conditions, or the resources they provide. Some spend their entire lives in wetlands, while others require wetlands for part of their life cycles.

Wetlands provide multiple benefits to humans, such as regulating stormwater runoff flows, controlling shoreline erosion, protecting surface water quality, protecting groundwater quality, and attracting recreational users.

Tidal wetland habitats play a critical role as nursery grounds for fish and shellfish species, as well as providing nesting sites and migration stops for birds and sources of nutrients for the estuary food web. They can also serve as buffers to storm surge in the estuary and help to mitigate shoreline damage.

### What This Map Shows

The map notes four categories of wetlands mapped by USFWS in the National Wetland Inventory (NWI) in Beacon:

- Estuarine and Marine Deepwater: Open water estuary, bay, sound or open ocean
- Estuarine and Marine Wetland: Vegetated and non-vegetated brackish and saltwater marsh, shrubs, beach, bar, shoal or flat
- Freshwater Emergent Wetland: Herbaceous marsh, fen, swale or wet meadow
- Freshwater Forested/Shrub Wetland: Woody wetlands; forested swamp or shrub bog

The map shows that many of Beacon’s wetlands are concentrated along the Fishkill Creek stream corridor and the Hudson River shoreline. It also shows that outside of these areas, most of the mapped wetlands have adjacent to them larger patches of poorly drained or very poorly drained soils, that may be probable or potential wetlands.

### Considerations for Decision-Making

The need to protect wetlands has been recognized widely. However, many of the wetlands on this map are not protected, and it is likely that not all existing wetlands are mapped.

Land use in adjacent upland areas and hydrologically connected areas can impact wetlands, so it is important to closely examine relationships between wetlands and surrounding areas when making land use decisions. Similar management strategies can often be applied to wetlands and stream corridors.

Small pockets of wetlands in the city, or locations of possible wetlands (based on soil drainage characteristics), can serve as “green infrastructure” that naturally helps to store run-off during storm events.

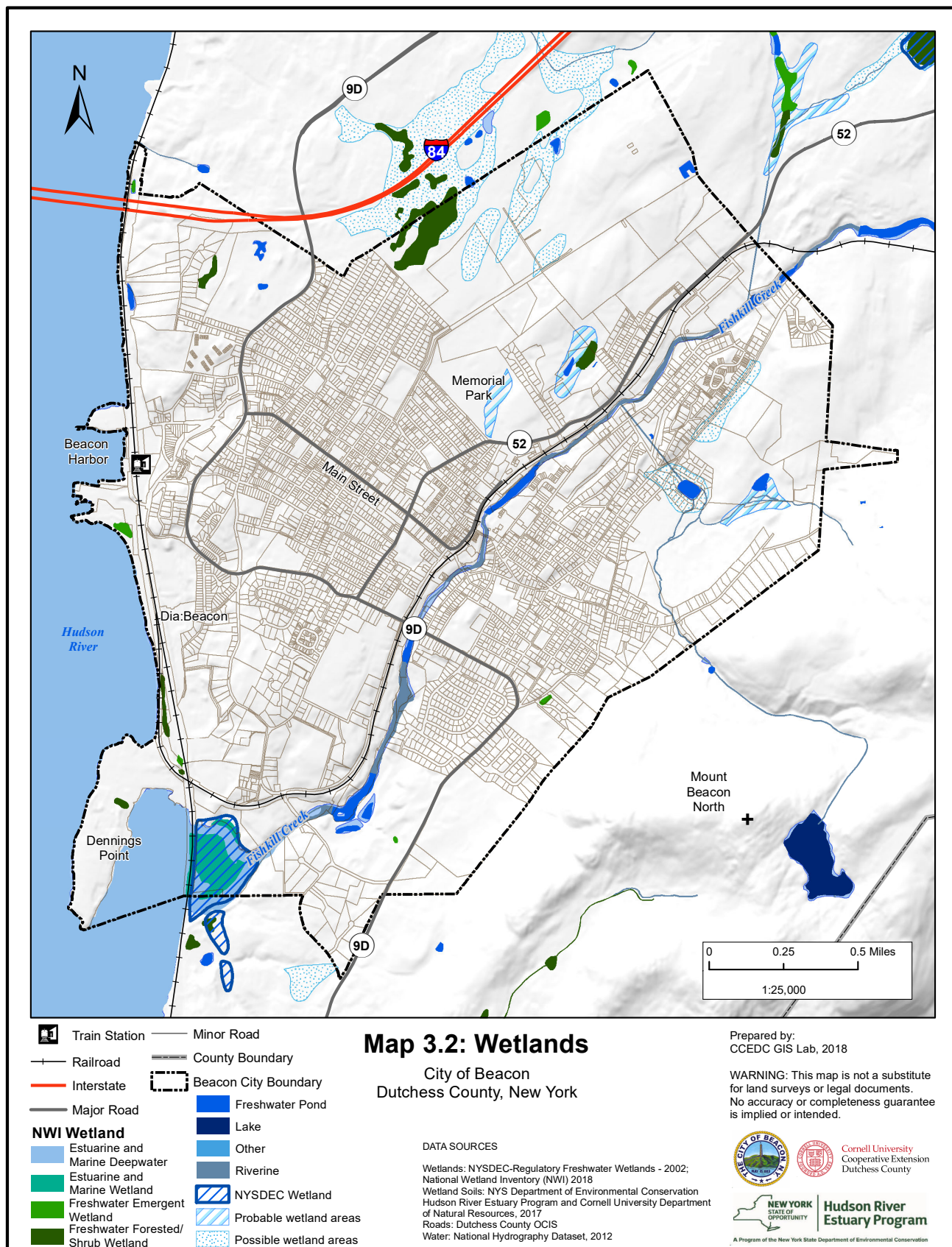
To protect Beacon’s wetlands, the City may wish to consider:

- Setting a minimum acreage lower than the State DEC minimum for required wetland mapping;
- Establishing wetland protection ordinances for significant wetlands that are not currently regulated by State or Federal law;
- Preserving additional wetlands in their undeveloped states; and
- Avoiding filling shallows and small wetlands.

This information largely comes from Local Strategies for Wetland and Watercourse Protection and the US Fish and Wildlife Service National Wetland Inventory. For more information on these topics, see the References section.



## Map 3.2 Wetlands



### 3.3 Stormwater

#### (Map Not Available)

##### Why This Is Relevant to Beacon

A sewershed is an area of land where any water running off the street surface drains via the storm sewer system to a single pipe that discharges into surface waters, such as the Hudson River or Fishkill Creek. Sewersheds are man-made, the product of human development patterns and stormwater system design.

Impervious surfaces, such as roads, rooftops and parking lots are a central feature of human development. In undeveloped areas, precipitation infiltrates soils and moves gradually into surface and ground waters, which helps maintain more stable stream flow over time. Impervious surfaces prevent rainwater from infiltrating into the ground, instead directing it into underground piping systems that are designed to convey stormwater runoff quickly to surface waters. In this way, impervious surfaces drastically alter the timing and quantity of stream flow. Stormwater discharge pipes may also erode or scour stream banks and beds.

Impervious surfaces also have water quality impacts. As water flows over pavement, it picks up pollutants such as salt, oil, and sediment, and carries them into surface waters. The effects of impervious surfaces on surface waters are detectable even at low levels of development.

Green infrastructure is a category of stormwater management practices in which pervious surfaces, vegetation and topography are used to slow the movement of runoff and promote infiltration, thereby reducing the impacts of development on water quality and quantity. Green infrastructure practices often produce multiple benefits, such as creating wildlife habitat and increasing greenery in urban spaces.

Runoff carries nutrients, sediment and pollutants in forms and concentrations that are atypical of undisturbed systems, and changes the timing and magnitude of flow. Development within floodplains removes their ability to store and infiltrate water. Direct alterations to the stream channel, such as road crossings, culverts, and dams, also alter flow and affect habitat quality for fish and wildlife.

Stormwater runoff from certain municipal areas is regulated under the New York State Municipal Separate Storm Sewer System Permit, or “MS4” program. Beacon is a subject to this permit program, which requires six “minimum control measures” to protect nearby surface waters:

1. Public education and outreach;
2. Public participation;
3. Illicit discharge detection and elimination;
4. Management of construction site runoff;
5. Management of post construction site runoff; and
6. Good housekeeping in municipal operations.

##### Considerations for Decision-Making

With an understanding of surface water drainage patterns, we can assess which land areas within Beacon have more potential to generate pollutants that wind up in streams and rivers. We can also begin to identify areas where green infrastructure practices may have the greatest impact.

To manage stormwater in Beacon, the City may wish to consider:

- Continuing to limit impervious surfaces;
- Continuing to require new developments to retain all stormwater on site, or to treat stormwater runoff before it leaves the site;
- Upgrading old systems with green infrastructure or modern treatment practices;
- Installing enhanced tree pits, which store water for plant uptake or groundwater infiltration;
- Ensuring that downspouts and sump pumps are directed toward permeable areas instead of storm sewers; and
- Encouraging construction of rain gardens and green roofs.

This information largely comes from Fishkill Creek Watershed Management Plan, US Environmental Protection Agency, and Orange County Watershed Design Guide. For more information on these topics, see the References section.

### 3.4 Water Quality

Map 3.4 displays water quality of local streams as determined by the State DEC.

#### Why This Is Relevant to Beacon

Clean water is necessary for the plants and animals that use Beacon's streams and rivers for habitat; for the people that fish and recreate in them; and for drinking water.

Groundwater resources include water located underground in the pore space of soil and rocks, and in aquifers. Surface water is water in a stream, lake or wetland. After heavy rains, streams act as natural stormwater management systems and wetlands naturally filter pollutants. Beacon's drinking water sources at present consist of three surface sources – Cargill, Mt. Beacon, and Melzingah reservoirs, and three groundwater sources – Beacon Wells 1 & 2 and Village of Fishkill Well 8. The City is currently exploring the development of Well 3. Water from these sources are blended depending on source condition and demand for water.

Pollution sources can be broadly classified into point sources, such as discharges from pipes, and nonpoint sources, such as stormwater runoff. Development causes runoff by creating paved surfaces, and poorly planned development can dramatically increase the amount of pollutants entering water bodies. On the other hand, municipalities can provide more comprehensive water quality protection than the county, state or federal level.

Water quality monitoring data can be used to confirm whether existing pollution controls are succeeding at achieving the desired water quality. Where water quality goals are not being met, data can help identify areas where nutrient management, riparian shading, stormwater controls or stream restoration are needed.

#### What This Map Shows

Under the federal Clean Water Act, all water bodies must be assigned a "best use" by the New York State Department of Environmental Conservation (DEC). This designation determines the water quality goals for the waterbody and has implications for what types of disturbance are allowed in the stream and along its banks. Water bodies that are not meeting their best uses are designated "Impaired." The best uses and corresponding classifications in New York State are:

Best Use	Classification	Waterbodies
Drinking	AA, A	Upper Dry Brook Cargill Reservoir* Melzingah Reservoir* Beacon Reservoir*
Swimming,	B	Hudson River*
Fishing	C	Fishkill Creek Lower Dry Brook

\*Located outside of Beacon's municipal boundary

DEC regularly monitors surface waters to assess whether the water quality supports the designated uses. DEC's assessment for Fishkill Creek was last updated in 2008, based on sampling in 2002, and indicated slightly impacted conditions. It identified nutrients (phosphorus) as a known pollutant, and pathogens, metals, unknown toxic substances and silt/sediment as possible pollutants. Impacts are primarily from non-point sources and possibly from municipal and industrial toxic inputs. Beacon's drinking water reservoirs – Melzingah Reservoir, Beacon Reservoir, and Cargill Reservoir – were not assessed.

#### Considerations for Decision-Making

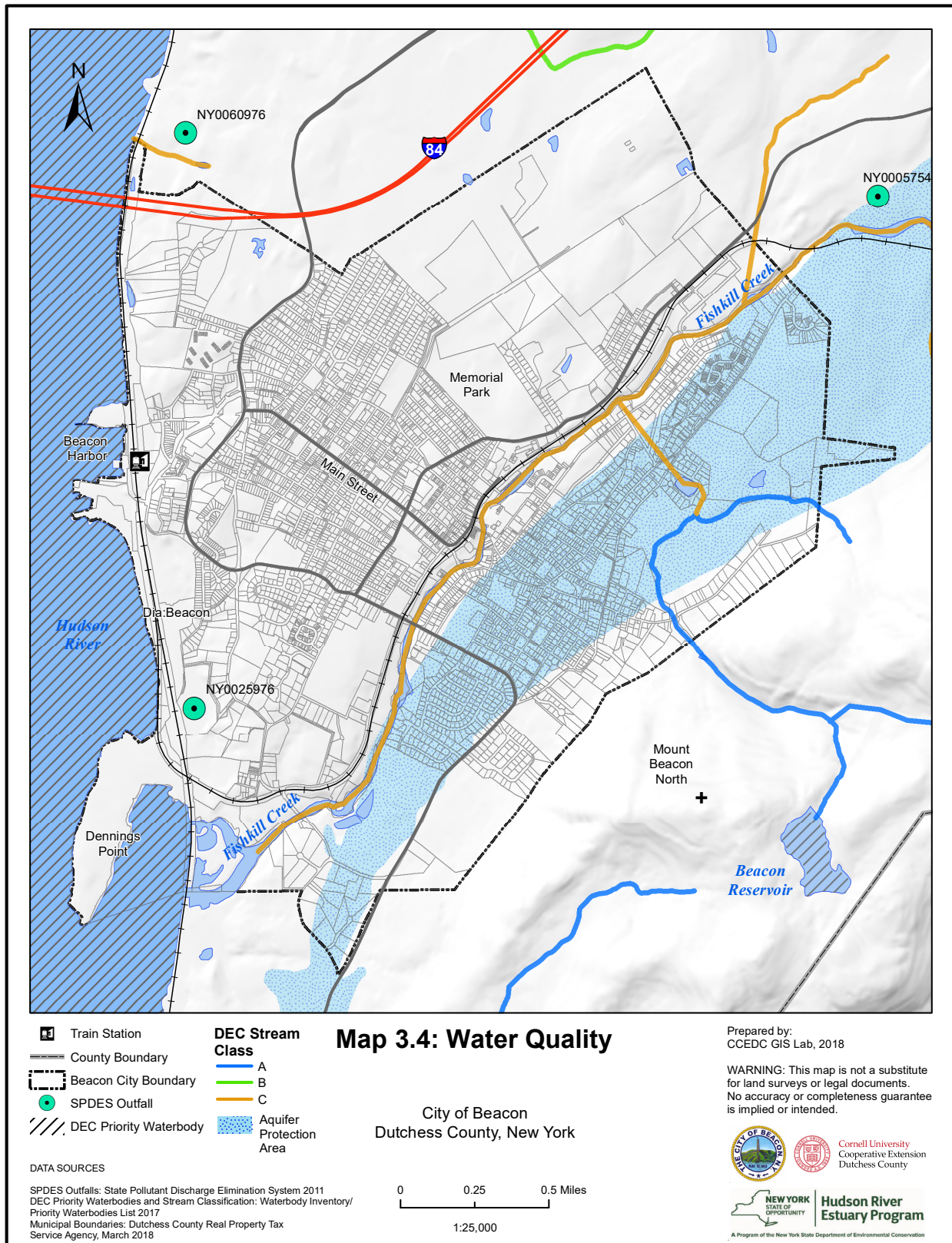
To protect water quality in Beacon, the City may wish to consider:

- Continuing to provide an annual water report;
- Monitoring water bodies regularly;
- Reviewing and adjusting use of de-icing substances to minimize undissolved salt residues in surface and groundwater;
- Restoring and maintaining broad buffer zones of natural vegetation along streams and shorelines;
- Limiting areas of impervious surfaces (roads, parking lots, driveways, etc.);
- Participating in the Fishkill Creek Watershed Committee;
- Encouraging onsite retention and infiltration of stormwater runoff; and
- Designing new development such that surface runoff during and after construction does not exceed pre-construction runoff volume.

This information largely comes from DEC Waterbody Inventory, Natural Resources Management Plan for the Fishkill Creek Watershed, The Natural Resource Inventory of Dutchess County, NY, and Creating a Natural Resources Inventory: A Guide for Communities in the Hudson River Estuary Watershed. For more information on these topics, see the References section.



## Map 3.4 Water Quality



### 3.5 Water Supply

Map 3.5 displays Beacon's water supply sources.

#### Why This Is Relevant to Beacon

Beacon's current development projects are expected to increase the population by 13-15% between 2016 and 2022. By 2050, 32% of counties in the United States are projected to be at high or extreme risk of water shortages. Although the Hudson Valley is not heavily impacted in these national projections, unmitigated population increase and non-renewable power plant production could have negative impacts on the long-term security of clean water in Beacon and the Hudson Valley.

Beacon's Comprehensive Plan identifies that the water supply can meet the needs of more than a 10% residential population growth between 2010 and 2022. Additionally, the Comprehensive Water Supply Plan concluded that the city has adequate water capacity to meet the current projected needs and the even the full build-out estimates to 2035. Care must be taken now to ensure collaborative protections for the infrastructure and sources of drinking water in the region.

Altered groundwater recharge due to development, as well as an intensified demand on supply due to resident, commuter, and tourist population increases, will pose challenges for the maintenance of consistent, high-quality water supply.

#### What This Map Shows

Beacon's water supply wells and reservoirs are located in the neighboring towns of Fishkill and Philipstown. The inter-jurisdictional nature of Beacon's water sources limits the city's ability to sufficiently enact or enforce source water protection planning.

#### Considerations for Decision-Making

Climate change is making water supply less predictable due to droughts, floods, and pollution. Moratoriums on development in 2017 and 2020 allowed the City to quantify future water supply. An additional study to focus on water quality may be beneficial. According to the Comprehensive Water Supply Plan, infrastructure leaks accounted for a 22% loss on output.

Greenhouse gas emissions and water supply pollution from neighboring municipality power-plants and brownfields should be considered in securing Beacon's water supply for the long term.

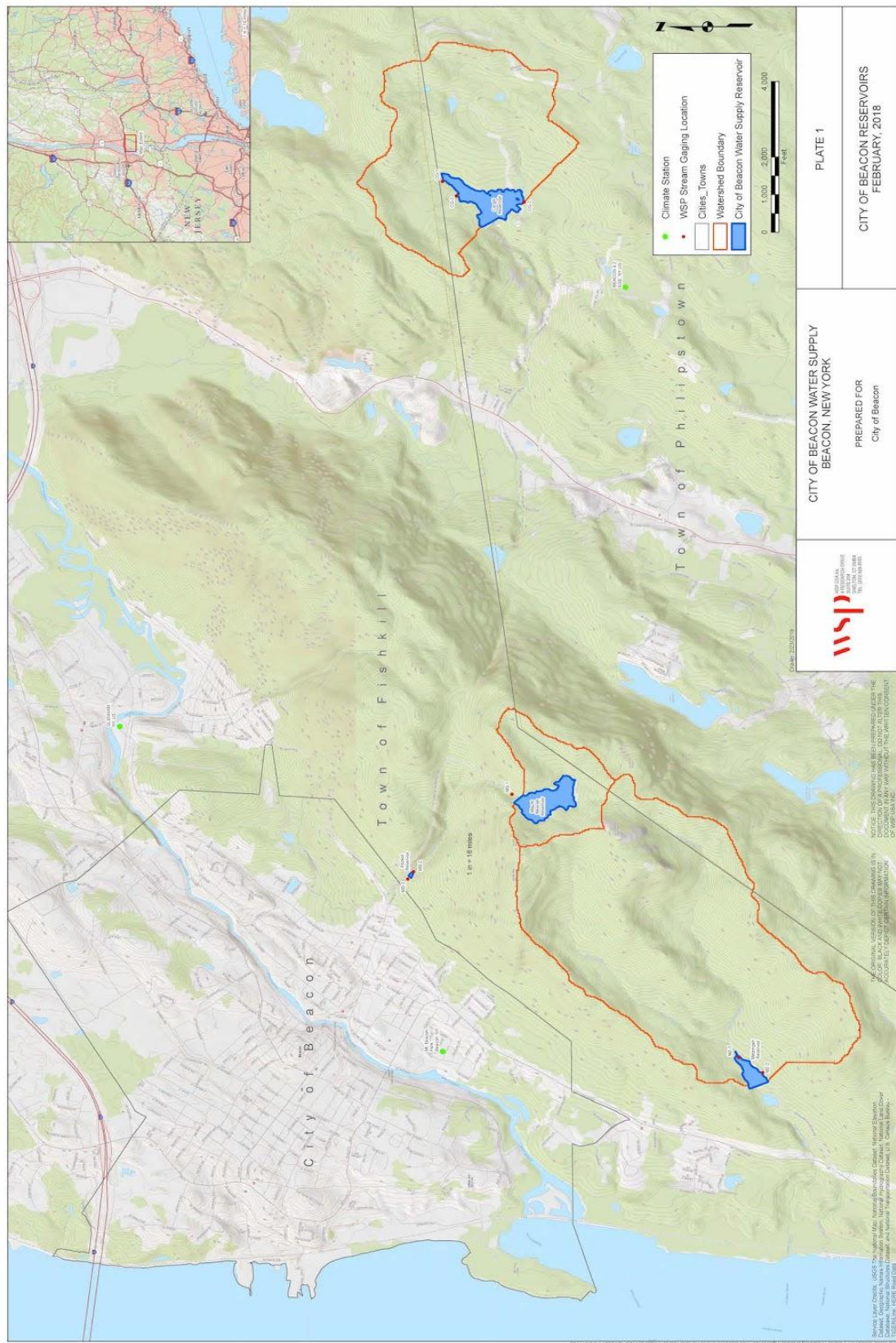
The City may wish to consider:

- Continuing to monitor aging infrastructure in Beacon to ensure proper flow;
- Continuing to repair infrastructure leaks. At the current rate of development, in order to supply enough water, the leaks will need to be fully repaired by the time the build-out is complete;
- Creating requirements to ensure that new developers and infrastructure projects establish water-source preservation plans in their designs to help further protect water quantity and quality; and
- Supporting residential installation of low-flow showers and toilets; rooftop gardens; rainwater / greywater catchment systems; and stormwater gardens and swales.

This information comes from Beacon's Comprehensive Water Supply Plan of 2018 and Beacon's Comprehensive Plan updated in 2017.



Map 3.5 Water Supply





### 3.6 Flooding and Climate Change

Map 3.6 shows the areas in Beacon in danger of increased flooding due to climate change.

#### Why This Is Relevant to Beacon

Climate change, describing significant changes in climate over long periods of time, is the paramount environmental issue now and in the coming decades. Climate change effects, such as increased precipitation, extreme weather events and sea level rise, will directly affect Beacon. Climate change will impact food security, efforts toward disease prevention, and the economy at large.

According to Cornell University, “New York’s Climate is changing faster than national and global averages.” Their study charts describe exponential increases in climate related extreme weather events.

#### What This Map Shows

A “100-year flood” is a high-intensity flood with a 1% likelihood of occurring any year; or, one that typically occurs only once every 100 years. These events are becoming increasingly common due to climate change. Areas within 100-year flood zones may now be in danger of frequent flooding.

**Hudson River:** At the upper range, some forecasts estimate that water levels will rise as much 6 feet within 100 years. Beacon’s waterfront will be severely impacted by these changes, with Long Dock Park, Metro North, the Pete and Toshi Seeger Riverfront Park, and Dennings Point lying within the AE 100-year Flood Zone. Flooding in these areas will significantly impact tourism, recreation, and commuting.

**Fishkill Creek:** A floodway area surrounds Fishkill Creek through Beacon. Several small sites in the city, including The Lofts at Beacon, lay in the AE 100-year Flood Zone. Additional areas noncontiguous to the creek lay within the A 100-year Flood Zone.

In general, flooding and sea level rise threaten infrastructure in various locations throughout Beacon.

#### Considerations for Decision-Making

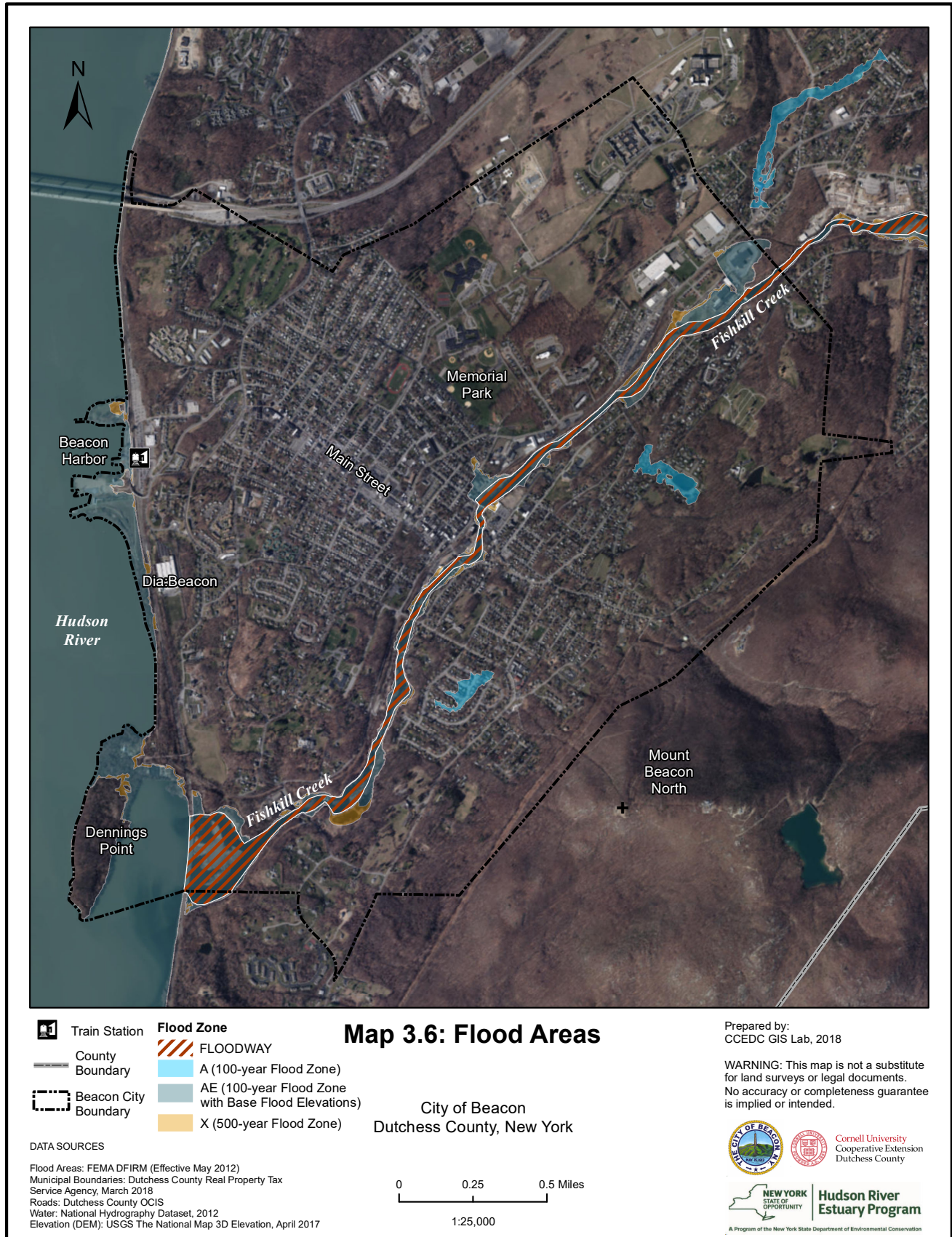
Every community has the opportunity to develop solutions appropriate to its unique circumstances. Green infrastructure should be considered in all development to help mitigate environmental events. Resiliency plans are crucial to future survival rates and successful communities. Creating a plan to conserve wetlands and forests to manage stormwater, recharge groundwater, and mitigate flooding would be highly beneficial. The City may wish to consider:

- conserving, revegetating and reconnecting floodplains and buffers in riparian areas;
- Prohibiting new construction in flood-prone areas;
- protecting further bluffs and eroding cliffs from disturbance or development; and
- Increasing tree canopy to reduce heat impacts.



*Long Dock Park flooded by the Hudson River in 2018*

## Map 3.6 Flood Areas





## 4.0 Biodiversity and Habitats

### Why This Is Relevant to Beacon

Biodiversity encompasses the variety of life in all its forms, and the interactions between living organisms and their environment.

The health of the environment, including the people that inhabit it, depends on the health of each of its component parts. A biodiverse ecosystem tends to be more sustainable and adaptable over the long run. Each part – the forests, waterways, and individual species and plants – contribute to the health of the full system.

While some urban areas contain relatively low levels of biodiversity, this is not the case in Beacon. The Hudson River Estuary to the west combined with the large forest blocks on Mt. Beacon to the east, and the interspersed greenspaces, make for various high-quality wildlife habitats and relatively high biodiversity.

This section breaks down Beacon's biodiversity and habitats into six sections:

- Habitat Types;
- Forests and Street Trees;
- Important Areas for Rare Plants and Animals;
- Coastal and Shoreline Habitat;
- Wildlife Habitat Index; and
- Greenspaces



*Monarch butterfly caterpillar is seen here on milkweed, its host plant.*



*The Hudson River Estuary, seen here south of Dennings Point, contains a high level of biodiversity.*



## 4.1 Wildlife Habitat Index

Map 4.1 displays an index of habitat values for Beacon.

### Why This Is Relevant to Beacon

Unfragmented habitat blocks are natural areas of the landscape that are undivided by roads or development. These intact natural areas can include forest, wetlands, meadows, open water and farmland – often encompassing many habitat types – supporting a diverse array of plants and animals. Large, connected habitat blocks allow for the maintenance of ecological processes and disturbances that help sustain natural communities. They provide habitat for far-ranging species and those that are sensitive to human disturbance.

For example, certain migratory songbirds will not nest in forests of less than 500 acres. They require deep interior forest habitat to find essential microhabitats. The effects of development at habitat edges can cause disturbance for hundreds of feet into the interior of a habitat block, measurably altering light and temperature. Such disturbance creates favorable conditions for the establishment of invasive species and pests. Siting new development near existing roads and developed areas can help to avoid or minimize fragmentation of natural areas at the landscape scale and its negative consequences.

### What This Map Shows

Habitat index values represent the sum of key habitat attributes: amount of forest cover, wetlands, stream corridors, and seasonal water resources. Dark areas (red-brown) represent areas of high value habitats, while lighter areas (yellow) show lower value habitat. High value habitat may be referred to as habitat “cores,” while mid-value habitat may be referred to as habitat “edges.”

Red-brown high-value areas on the map have high usefulness to a range of species. Yellow areas on the map can also be valuable to wildlife, however these

areas support a more limited range and number of animals and plants as they often have higher levels of disturbance. Note the large, intact cores of habitat, as well as the connected blocks of darker shading, especially at the borders of the city. Hunting, spawning, nesting and migrating species may use such core areas all year long, throughout their life cycles. In contrast, manicured lawns are the most popular form of residential landscaping, but have a lower habitat value than almost any other type of vegetation.

### Considerations for Decision-Making

Through careful planning and select restoration, core habitat areas in and around Beacon can be connected to increase their value to wildlife. The habitat value of urban landscapes can also be maintained or increased while continuing to meet human needs. To help ensure that critical urban habitats continue to provide ecosystem services, the City may wish to consider:

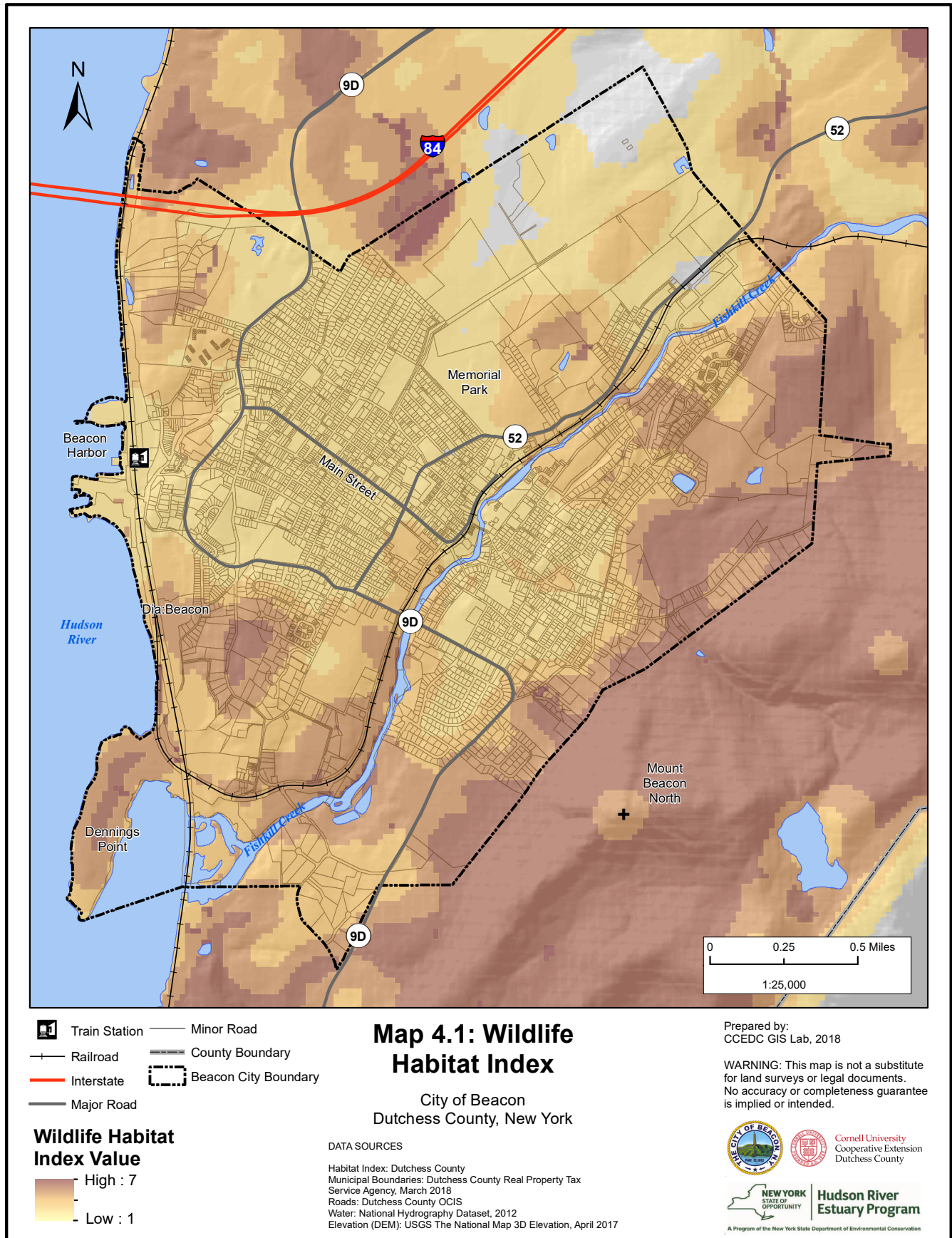
- Connecting mid- and high-value habitat to protect Beacon’s wildlife, and encouraging surrounding municipalities to do the same;
- Concentrating new development away from mid- and high-value habitat to avoid further fragmentation;
- Replacing municipal lawns with wildflower meadows, perennial gardens or ornamental woodlands;
- Introducing the concept of converting mowed lawns to wild meadows where appropriate, to increase benefits to wildlife; and
- Landscaping with native plants to support native pollinators and food webs.

This information largely comes from the Hudson River Estuary Program and Hudsonia. For more information on these topics, see the References section.



*Grey tree frog inhabits moist, deciduous woodlands*

## Map 4.1 Wildlife Habitat Index



## 4.2 Forests and Street Trees

Map 4.2 presents wooded areas in Beacon as well as street trees.

### Why This Is Relevant to Beacon

Forests provide wildlife habitat, water filtration and climate moderation. While large forests provide more ecosystem services and higher quality habitat, small patches of forest also have value. They can also provide habitat and contribute to a better quality of life in residential areas. Even single street trees help moderate temperature and intercept stormwater.

Along streams, networks of forest patches create riparian corridors that help maintain water quality and provide habitat for aquatic as well as terrestrial wildlife.

The large forested slopes of Mount Beacon are identified in the Beacon Comprehensive Plan as a “rare asset of the city” to be protected due to their tourism and recreational values.

### What This Map Shows

The southeastern border of Beacon, in the Town of Fishkill, contains the edge of a “regionally-significant” forest block (10,000+ acres). It includes forest communities such as Appalachian oak-hickory forest and oak-tulip tree forest. It covers Mount Beacon and extends beyond the city limits along Scofield Ridge and Breakneck Ridge toward the Hudson River and Cold Spring. It is part of a larger complex of Hudson Highlands forests that form a connected corridor of habitat used by breeding and migratory birds, resident amphibians and reptiles, and rare plants and communities (Penhollow et al. 2006). The forest complex has been recognized as a Significant Biodiversity Area by the Hudson River Estuary Program (Penhollow et al. 2006) and an Important Bird Area by the Audubon Society. Its proximity to Beacon provides benefits to residents, including clean air and water, scenery, and recreational opportunities that also attract visitors and tourism.

Smaller, isolated patches of forest are interspersed within the developed parts of Beacon. A notable example is the “stepping stone” forest block at the mouth of Fishkill Creek that extends in a narrow band to the northeast along the creek and further south along the Hudson River. While relatively small, this patch

helps to create streamside habitat, protect water quality, and mitigate the impacts of flooding along Fishkill Creek and the Hudson River.

Additionally, there are small wooded areas that contain forested wetlands as well as individual street trees, primarily along Main Street.

### Considerations for Decision-Making

The Forests and Street Trees map, along with the Wildlife Habitat Index Map, can be used in concert with other NRI information to consider conservation and restoration opportunities in the city or recommendations to the Town of Fishkill. Larger, intact wooded areas could benefit from conservation efforts that prevent further fragmentation. Streamsides and neighborhoods where there is limited canopy may present restoration opportunities that will improve quality of life for residents and improve stream habitat and water quality.

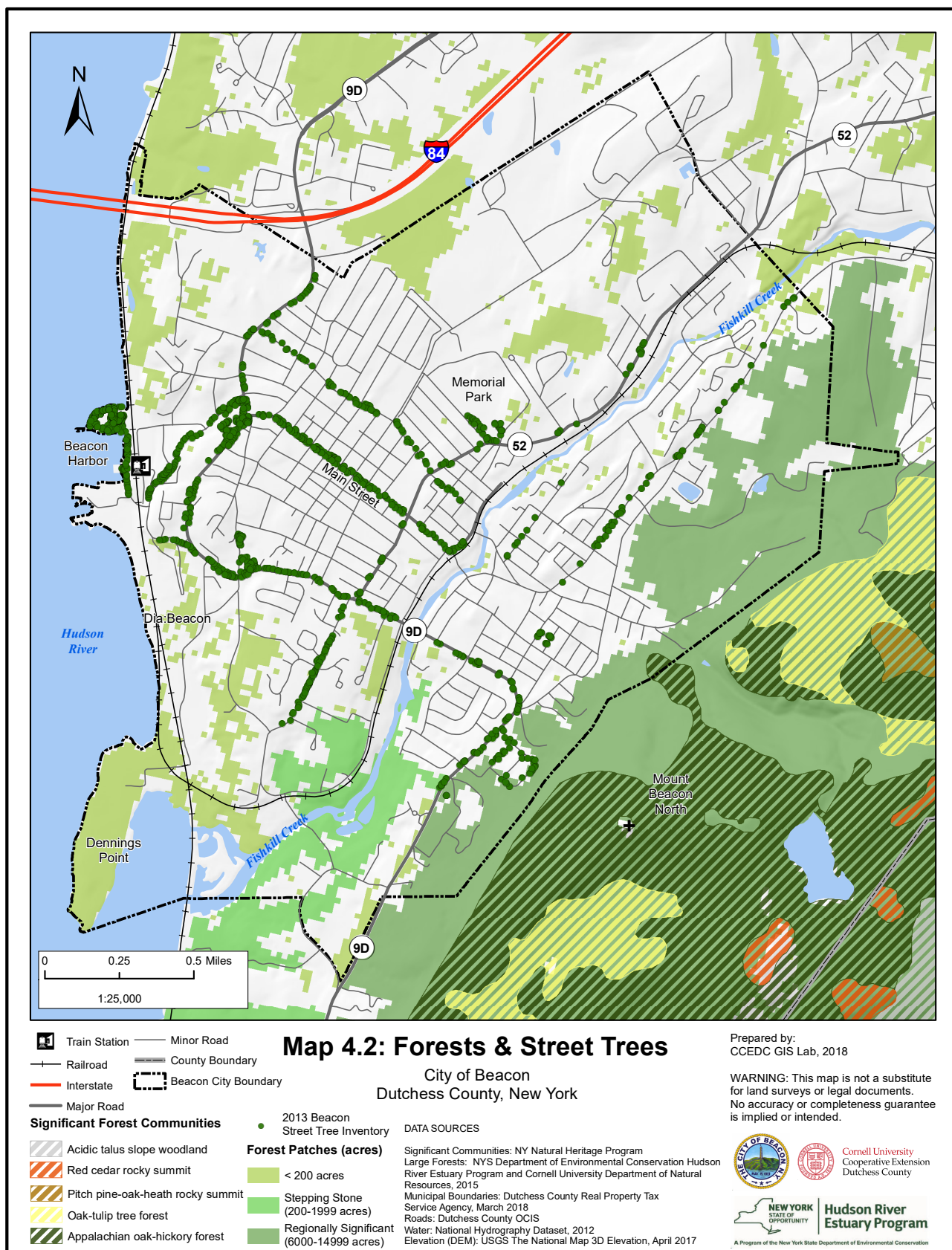
To protect forests, the City may wish to consider:

- Keeping large forests and mature forests intact and unfragmented;
- Limiting construction of new roads, houses, and other forms of development in forests, especially in large or mature forests;
- Concentrating new development near existing developed areas;
- Maintaining intact habitats between forest patches to allow for migration and dispersal of plants and animals;
- Avoiding tree cutting on steep slopes, and leave tree crowns in the woods to conserve soil fertility and increase habitat diversity;
- Limiting gap size and road construction to prevent the establishment of non-native species (e.g., tree-of-heaven);
- Limiting off-road vehicle use, which damages vegetation, compacts soil and disturbs wildlife; and
- Updating the 2013 Street Tree Inventory, and expand the planting of street trees for beautification, stormwater absorption, and temperature moderation.

This information largely comes from L. Heady, Beacon Biodiversity Memo, Hudson River Estuary Program, and Hudsonia. For more information on these topics, see the References section.



## Map 4.2 Forests and Street Trees



## 4.3 Habitats

Map 4.3 displays various types of habitats in Beacon.

### Why This Is Relevant to Beacon

Beacon is part of the Hudson Highlands, an area that is recognized nationally for its incredible biodiversity. The Hudson River, its tributary streams, the toe-slopes of Mount Beacon and the interspersed green spaces provide a variety of habitats for wildlife.

The presence of a variety of wildlife and plants keeps Beacon's environment healthy. It also provides for recreation like bird-watching and fishing. Many animals migrate to and from this area, like anadromous fish and migratory songbirds, so Beacon's environmental health also affects lands and waters far beyond its borders.

Running along Beacon's western border is a unique habitat type: the Hudson River Estuary, a place where fresh and saltwater mix. The estuary here is home to an incredibly diverse array of plants and animals that depend on its waters for essential activities such as spawning and overwintering.

The Hudson River's waters flow cleaner today than they have in generations. Years of hard work by scientists, government officials, river lovers, and local environmentalists like Pete and Toshi Seeger, have re-opened the Hudson's shores to swimming, fishing, and boating. Keeping this habitat clean benefits both humans and wildlife.

### What This Map Shows

Beacon contains many different types of habitat, as illustrated by Hudsonia's habitat map for the city. Some of the most prevalent types are:

- Upland Hardwood Forest: These areas contain wildlife typical of "Appalachian oak-hickory" forest species, ranging from small grey tree frogs to large white-tailed deer.
- Cultural: Cultivated lawns, sports fields and cemeteries are grouped into this category. These areas, though green, have low value for wildlife.
- Upland Meadow and Upland Shrubland: These areas are more open than forests, with lower tree canopy cover. Both are important areas for mammal forage, ground-nesting bird nest sites and pollinating insects.

- Seeps and Hardwood/Shrub Swamp: A seep is where the groundwater reaches surface-level and flows across land, while a swamp is a type of shrubby or forested wetland. Water resources like these are critical for wildlife.
- Tidal Tributary Mouth: Areas where freshwater streams meet saltwater estuaries, which are extremely high in biodiversity.

Each habitat type has value on its own. When combined with surrounding areas, multiple habitats can create ideal conditions for wildlife that have different daily habitat needs (e.g. a fox that may forage in a meadow and sleep in a forest). Further, many species require multiple habitat types throughout their life cycles. For instance, some forest amphibians, like mole salamanders and wood frogs, must move to vernal pools to breed. Having connected habitats is vital to their survival.

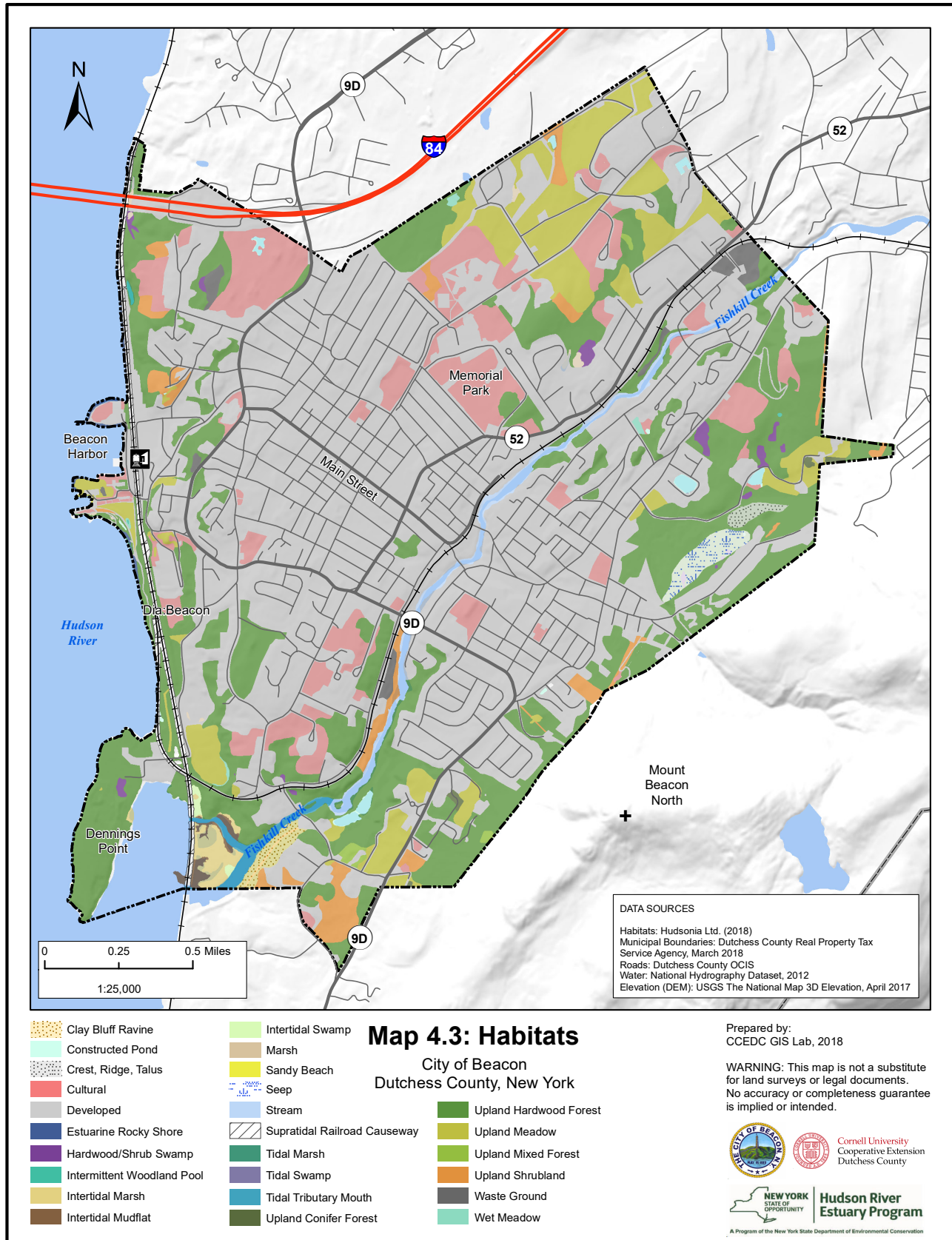
### Considerations for Decision-Making

To protect habitats, the City may wish to consider:

- Connecting isolated green spaces to ensure that wildlife and plants can move or spread, thereby ensuring they can exchange genetic material so their populations stay healthy;
- Encouraging green infrastructure, low-impact site design practices, and native plant landscaping;
- Incorporating the special value of the Fishkill Creek mouth when evaluating stormwater management aspects of site plans, as well as any projects that directly affect the stream banks or bed;
- Creating a biotic management plan that includes removal of select invasive species to help maintain and increase populations of high-value species that are at risk; and
- Identifying and protecting vernal pools.

This information largely comes from L. Heady Beacon Biodiversity Memo, Hudson River Estuary Program, USFWS, and Hudsonia. For more information, see the References section.

## Map 4.3 Habitats





## 4.4 Hudson River Coastal and Shoreline Habitat

Map 4.4 displays shoreline habitat along the Hudson in Beacon.

### Why This Is Relevant to Beacon

The Hudson River is a tidal estuary, where freshwater and saltwater mix. It hosts an extremely high amount of biodiversity. Shoreline habitats such as tidal marshes and mudflats support a great diversity of life and contribute to the economic significance of the Hudson River Estuary. The underwater plants, or submerged aquatic vegetation (SAV), in the estuary shallows along the Beacon waterfront improve water quality in the river and provide foraging and refuge habitat for invertebrates, fish and waterfowl. Tidal wetland systems help filter pollutants and buffer shoreline properties by stabilizing the shoreline and providing protection from storm surge.

Beacon's shoreline is home to several rare plant species. Fishkill Creek is a major crossing point of the Hudson Valley for migratory raptors, and is an overwintering site for bald eagles. The mouth and lower section of Fishkill Creek (up to the first dam) are important spawning areas for multiple species of migratory fish, which travel from the Atlantic Ocean, up the Hudson River Estuary, and into its tributaries to spawn. The mouth of Fishkill Creek is also an overwintering area for striped bass. As such, it is a popular feeding area for heron and egret.

Several recreation and tourism attractions along the Beacon waterfront are based upon, or derive value from, the natural surroundings. Dennings Point Park, Long Dock Park, Klara Sauer Trail, and the Pete and Toshi Seeger Riverfront Park are examples.

### What This Map Shows

The western boundary of Beacon is the Hudson River Estuary, although the Hudson River itself is almost entirely outside the borders of the City of Beacon and instead is in the Town of Fishkill. Its tidal influences are felt on Fishkill Creek as far as the first dam. The mouth of Fishkill Creek, and the Hudson shoreline including Dennings Point and its bay, are recognized by the NYS Department of State as a Significant Coastal Fish and Wildlife Habitat. The Hudson River Estuary Program designated the estuary a Significant Biodiversity Area because it is a globally rare ecosystem that supports many threatened species as well as regionally important fisheries (Penhollow et al. 2006).

The mouth of Fishkill Creek supports a variety of tidal wetlands, including brackish intertidal mudflats, brackish tidal marsh and SAV. These tidal wetlands are spawning and nursery habitats and a migratory pathway between the upper and lower estuary for anadromous and resident fish.

### Considerations for Decision-Making

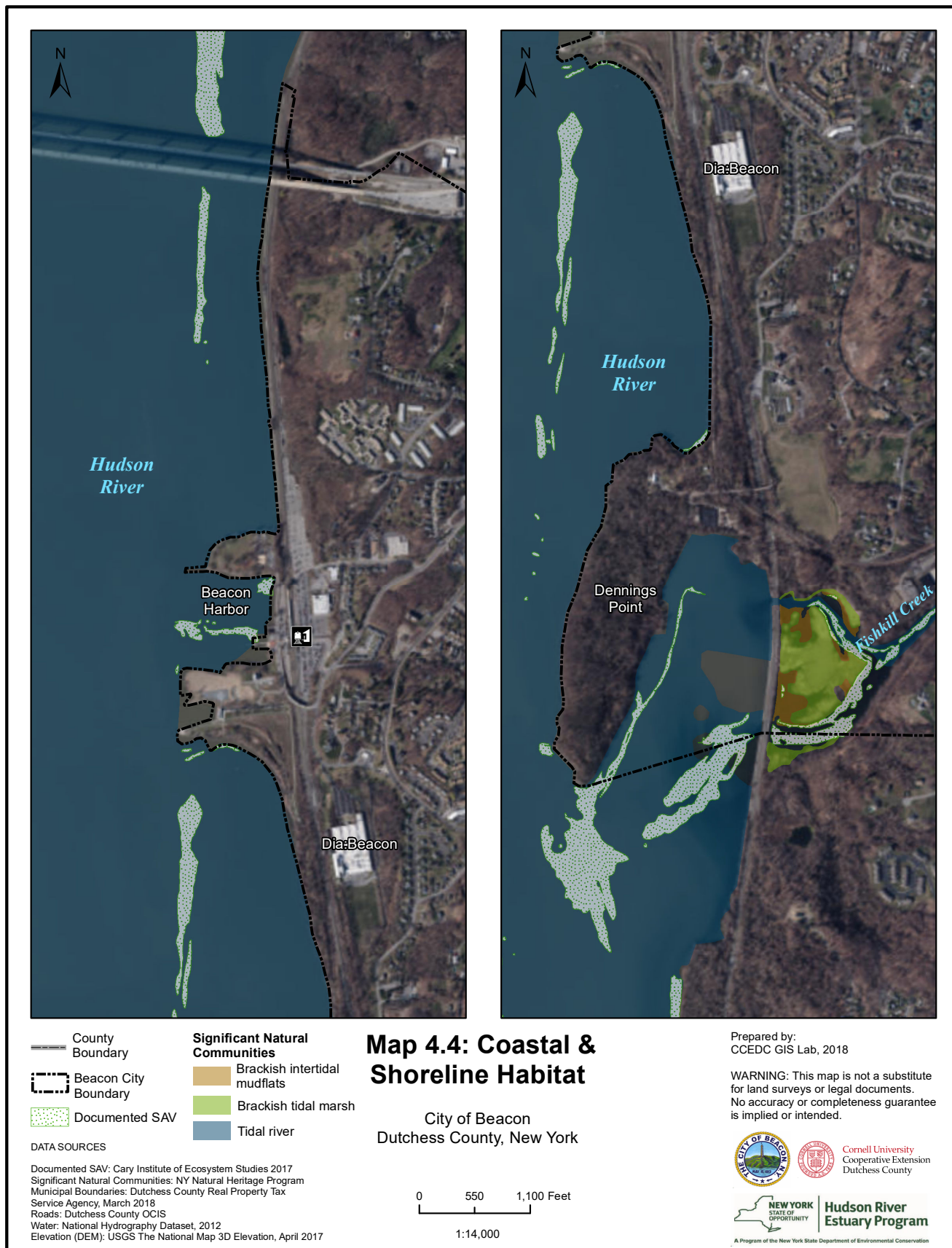
Water and habitat quality in the mouth of Fishkill Creek are heavily influenced by actions further up the watershed, including: upland development; modifications to stream banks and beds; and point and nonpoint source pollution. Global sea level rise is projected to fundamentally affect the shoreline of the Hudson River Estuary in the coming decades. Natural shorelines will allow for the inland migration of tidal and shoreline habitats as sea level rises.

To protect the Hudson River Shoreline, the City may wish to consider:

- Avoiding filling shallows and small wetlands;
- Restricting herbicide use along roads and railroads adjacent to riparian areas, which could destroy adjacent rare plant populations;
- Controlling point and nonpoint sources of water pollution throughout the watersheds;
- Restoring and maintaining a broad buffer zones of natural vegetation along shorelines;
- Preserving natural features and limiting impervious surfaces in developments;
- Using green infrastructure to increase infiltration and/or treat stormwater runoff;
- Requiring mapping of all tidal wetlands on plans for projects along the Hudson River shoreline;
- Maintaining a building buffer from the mean high tide mark of the Hudson River;
- Protecting and restoring naturally vegetated areas;
- Taking steps to stop water chestnut invasion around the mouth of Fishkill Creek;
- Controlling shoreline and streambank erosion using living shorelines or ecological materials; and
- Working collaboratively with the Town of Fishkill on all of the above.

This information largely comes from US Fish & Wildlife Service, NYS Department of State, DEC Hudson River Estuary Program, and L. Heady. For more information on these topics, see the References section.

## Map 4.4 Coastal and Shoreline Habitat



## 4.5 Plants and Animals of Conservation Concern

Map 4.5 displays areas in Beacon considered important for rare plants and animals.

### Why This Is Relevant to Beacon:

The presence of rare plants and animals in Beacon adds to the city's significance for New York State biodiversity. Rare biota are one of the most vulnerable parts of the ecosystem. Their continued existence in turn supports the health of a full ecosystem and keeps it biodiverse as well as high-functioning. A diverse system is more sustainable and adaptable in the long run.

Some rare biota are important for medical or industrial purposes, and their applications may not yet be fully realized. Other rare plants and animals may be of interest to eco-tourists. The New York Natural Heritage Program keeps a statewide database on the status and location of rare species and natural communities.

### What This Map Shows

The identified Important Areas for rare plants and animals represent the lands and waters needed to support the continued presence of species of conservation concern. Not surprisingly, they coincide to a high degree with areas recognized for other natural resources, such as large forest blocks, high-value wildlife habitat, water resources, and significant natural communities.

The areas that are most important for rare animals are primarily located along the shoreline of the Hudson River and in the southern and eastern portions of Beacon. A state and federally-endangered species of bat uses the forests. Likewise, interior forest species of birds, like wood thrush and scarlet tanager, can be found in Beacon and its vicinity. Both species are considered Species of Greatest Conservation Need by DEC.

Important areas for rare plants encompass Dennings Point and the mouth of Fishkill Creek. They have also been recognized by New York's Department of State as Significant Coastal Fish and Wildlife Habitat. It also supports a regionally important fishery and globally rare ecosystem.

Migratory fish, like alewife and blueback herring, use the creek for spawning, foraging and refuge. Submerged aquatic vegetation creates safe habitat for

fish as well as waterfowl and aquatic invertebrates. Atlantic and shortnose sturgeon, both federally endangered species, can be found in the nearby deep waters. Bald eagle, which are considered a threatened species in New York, forage and nest in the area. Other raptors such as osprey can be found along the creek, especially during migration periods. Blanding's Turtles are a New York State threatened species and there may be potential habitat in Beacon.

Concentrating development away from the Important Areas, including conserving high-quality wildlife habitat, will help ensure that rare animals and plants survive. Other, more common species will also benefit from protection of these ecosystem areas, and will help keep Beacon's environment healthy.

### Considerations for Decision-Making

Because successful conservation of rare species requires protecting their habitats, this map should be considered alongside the maps of Wildlife Habitat Index, Forests and Street Trees, and Hudson River Coastal and Shoreline Habitat maps. Proactive planning that considers how species move across the landscape, with careful attention to maintaining connected habitat complexes, will contribute to the long-term survival of rare animals and to the persistence and dispersal of rare plants.

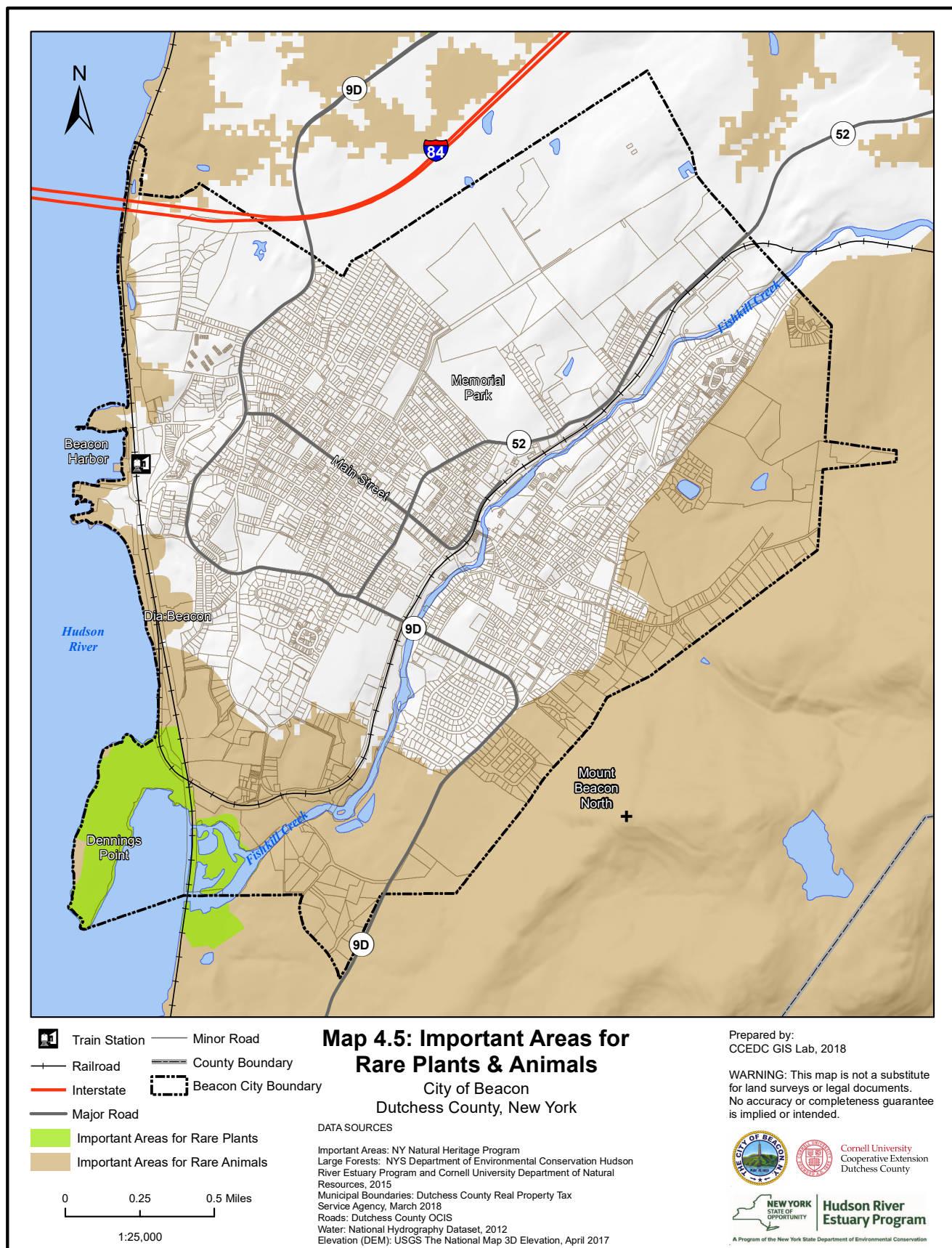
To protect rare plants and animals, the City may wish to consider:

- Using the [New York Natural Heritage Program Online Conservation Guides](#) to identify species-specific threats, conservation strategies, and management practices;
- Continuing to partner with the Hudson River Estuary Program and the New York Natural Heritage Program to develop and implement holistic conservation strategies for rare animal and plant habitat;
- Limiting disturbance to and fragmentation of the Important Areas and surrounding lands; and
- Limiting use of motorized vehicles in Important Areas.

This information largely comes from Beacon Biodiversity Memo (L. Heady), HREP NRI Guide, Hudsonia's Report on Blanding's Turtle Habitats in Southern Dutchess County, and NYS Department of Environmental Conservation. For more information on these topics, see the References section.



## Map 4.5 Important Areas for Rare Plants and Animals



## 5.0 Land Cover and Greenspaces/ Protected Areas

### Why This Is Relevant to Beacon

Patterns of human land uses and natural land cover strongly influence water resources and biological communities. Changes in natural land cover (especially forests, floodplains and wetlands) accompanying conventional development often result in substantial increases in impervious surfaces (e.g., roofs, parking lots and roads) and can drastically alter water quality.

Land cover types can generally be classified into two categories: “pervious surfaces,” or areas where rainwater can be absorbed, and “impervious surfaces,” where rainwater runs off. Understanding the locations of these land cover types can help determine where flooding risks are highest, as well as where vegetated buffers exist or may be needed near surface water bodies.

Open spaces and protected areas provide many ecological services. They may have high biodiversity, act as havens for wildlife, provide recreational opportunities, mitigate flooding from large precipitation events, and generate ecotourism revenue.

### Considerations for Decision-Making

Land cover information can be used to help determine potential risks and opportunities, such as the mitigation of stormwater runoff and protection of water quality. One key value of mapped open space (or greenspace) and protected areas is to show how protected areas relate to each other, and where there may be opportunities to better connect these protected areas for trails, wildlife habitat, stream corridor protection, park enhancement, etc.



*Increasing pervious surfaces helps reduce flooding and protect water quality of Fishkill Creek, pictured here.*



*An evening view from Scenic Hudson's Long Dock is pictured here.*



*Artists perform at Pete & Toshi Seeger Riverfront Park, pictured here.*



## 5.1 Land Cover

Map 5.1 displays pervious and impervious surfaces across the City of Beacon.

### Why This Is Relevant to Beacon

As discussed, “pervious” or permeable areas allow water to infiltrate underlying soils. When precipitation falls on natural areas like forests and wetlands, stormwater swales, and even pervious pavement, it can soak into the ground and become groundwater.

Water cannot percolate through “impervious” surfaces, however. When rainwater hits surfaces like asphalt, concrete, roof shingles, and bedrock, it runs off and cannot soak into the ground. These surfaces also can contribute to urban heating. The negative impacts of impervious surfaces can be offset by conserving and restoring areas of natural cover. This will be especially important as storm intensities and air temperatures continue to increase due to climate change.

### What This Map Shows

Impervious surface from commercial and residential development is spread across the city, with the highest degree of development – seen in dark red on the map – centering around Main Street. It also spreads along the Route 52 and Route 9D corridors.

There is a partial ring of natural cover types around the city, especially to the south and east. These pervious areas are primarily deciduous and evergreen forest (in green on the map), occurring primarily in public open space and protected areas. Other natural cover types on the map include wetlands, open water and mixed forest, as well as hay/pasture land (yellow), developed-open space (light pink), and developed-low intensity (medium pink), which often represent pervious areas of mowed lawns and managed fields.

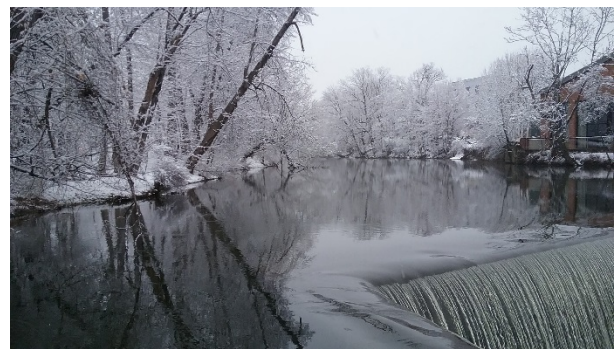
### Considerations for Decision-Making

It is unsurprising that an urban community like Beacon has high-density development, but the

resulting impervious cover can contribute to increased stormwater flow and flooding. To reduce impervious surfaces, the City may wish to consider:

- Promoting development practices and restoration projects that improve pervious conditions and help Beacon to be more resilient to climate change and related intense storms;
- Offsetting the creation of new development with creation of new pervious surfaces elsewhere, which would lower flood risk throughout the city;
- Keeping a large buffer of natural vegetation around waterways, especially wetlands and Fishkill Creek;
- Supporting green infrastructure like pocket parks, rain gardens, and green roofs, which can mitigate effects of impervious surfaces; and
- Introducing the concept of converting mowed lawns to alternative groundcover where appropriate, which is more effective at absorbing stormwater.

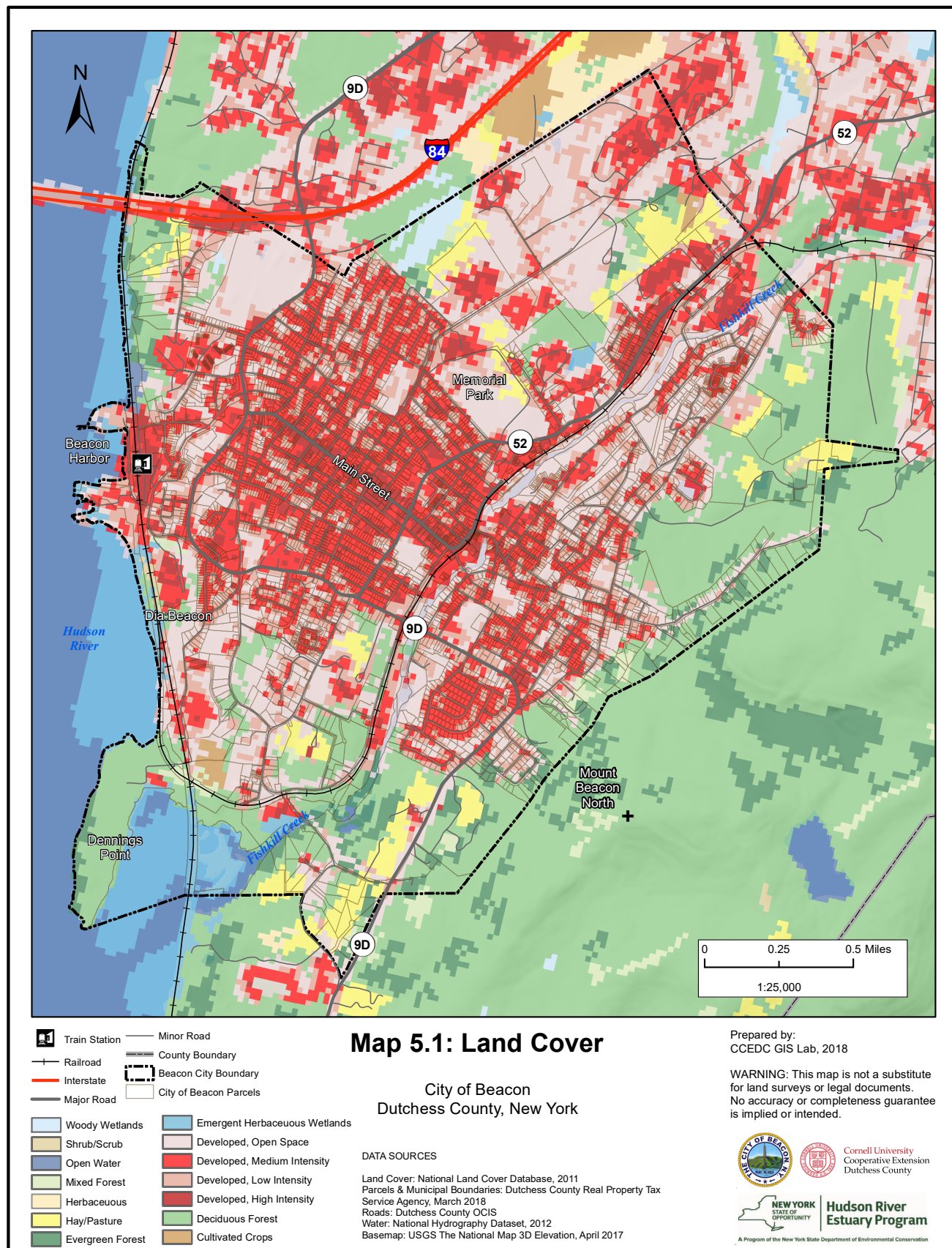
This information largely comes from the City of Beacon Comprehensive Plan (2007), Comprehensive Plan Update (2017), the National Fish & Wildlife Service, and Hudson River Estuary Program. For more information on these topics, see the References section.



*Natural vegetation helps to absorb stormwater that runs off impervious surfaces, like roads, during precipitation events. Increasing natural areas and pervious surfaces can help to reduce flooding and protect water quality of Fishkill Creek (pictured here).*



## Map 5.1 Land Cover



## 5.2 Open Space and Protected Areas

Map 5.2 displays Beacon’s parks, open spaces, and larger green areas.

### Why This Is Relevant to Beacon

Beacon is known for its exceptional “greenspaces,” which are large natural areas, parks, and protected lands in an urban environment. They provide scenic views and recreational opportunities, and increase the health and happiness of residents and visitors. They are also significant sources of ecotourism revenue.

Ecologically, these protected areas are biodiversity strongholds. They provide many ecosystem services, including wildlife habitat, water and air purification, and stormwater runoff and floodwater mitigation.

### What This Map Shows

Beacon has a mix of open spaces, ranging from small pocket parks to 100+ acre conserved lands. This map shows the mosaic of land ownership across Beacon’s open space areas.

As seen on the map, these open areas are primarily owned and protected by:

#### The City of Beacon, including:

- Memorial Park
- Pete & Toshi Seeger Riverfront Park
- South Avenue Park
- Green Street Park
- Hiddenbrooke

#### The State of New York, including:

- Dennings Point (Part of Hudson Highlands State Park)
- University Settlement Camp
- Hudson Highlands State Park

#### Scenic Hudson Land Trust, including:

- Long Dock Park
- Madame Brett Park
- Mount Beacon trailhead area (including a portion located beyond in the Town of Fishkill)

## Considerations for Decision-Making

In unprotected areas of high natural resource values, such as large undeveloped parcels, wetlands, stream corridors and land with steep slopes, further land protection may be desirable. Different municipal, county, state and nonprofit partners may have different tools available for further protecting land, including parkland acquisition, development rights purchases (conservation easements) and/or conservation subdivisions.

To support these natural resources, the City may wish to consider:

- Creating an Open Space Inventory, which will aid in prioritization of important natural areas in the city;
- Developing subsequently an Open Space Plan, with strategies to conserve priority areas; and
- Encouraging the creation of an Urban Design Plan, with recommendations of interspersed pocket parks on undeveloped lots, which can both increase ecological services and community engagement.

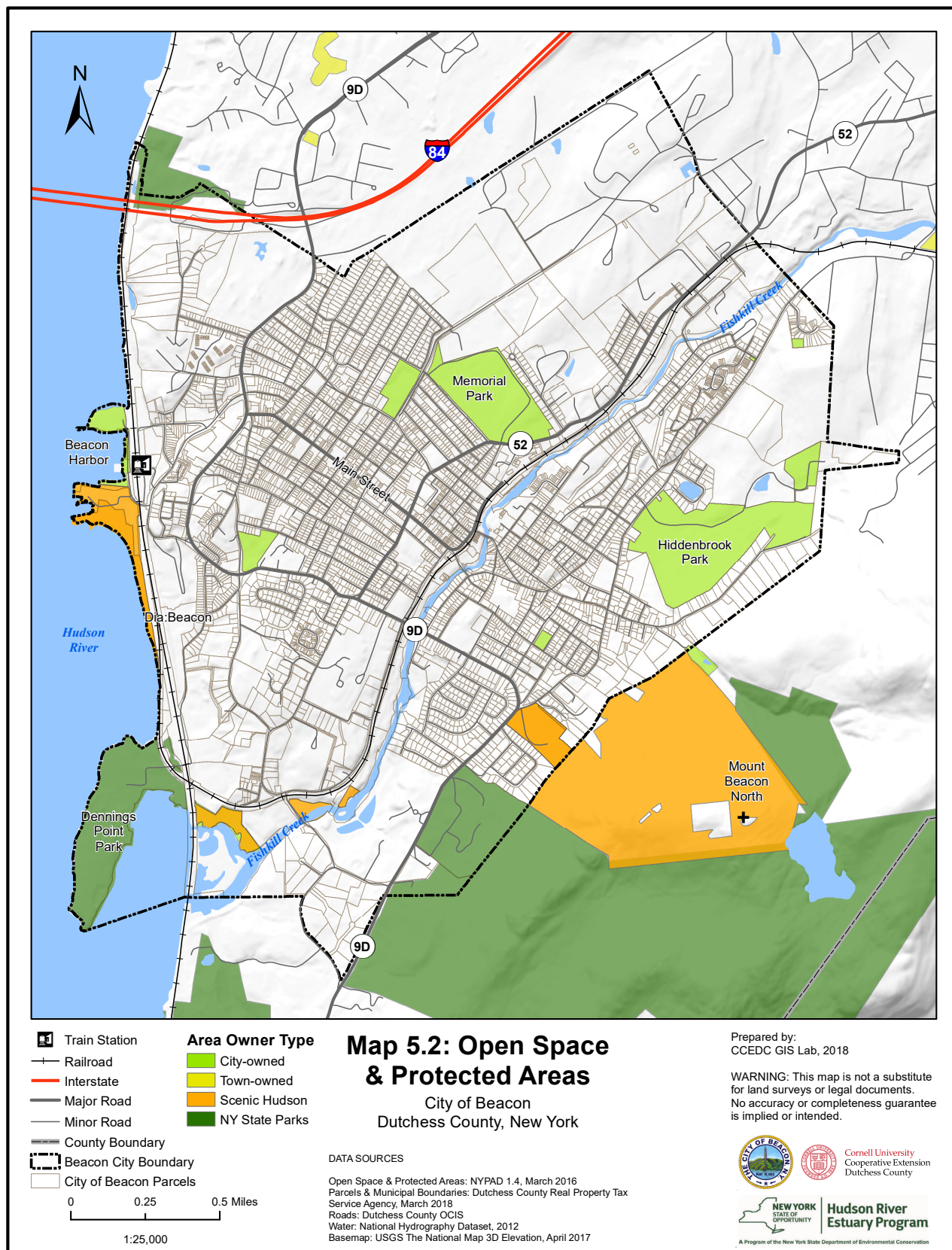
This information largely comes from the City of Beacon Comprehensive Plan (2007), Comprehensive Plan Update (2017), and Hudson River Estuary Program. For more information on these topics, see the References section.



*Beacon has multiple public open space areas made possible by various conservation partners, including this view of Memorial Park during an Independence Day celebration.*



## Map 5.2 Open Space and Protected Areas





## 6.0 Historical and Cultural Resources

### Why These Are Relevant to Beacon:

The identity of Beacon today is inseparable from the cultural history of the city's past. As Beacon builds its way into the future, insight from the city's history illuminates where the city has been, and where it is going.

Beacon's built environment – including storied religious institutions, former factories, and other historic sites – reflects its culture and history. Similarly, Beacon's natural resources, including the Hudson River, Fishkill Ridge, Fishkill Creek and beyond create a sense of place and belonging to the city's identity as one rich in scenic and recreational resources.

The NYS Greenway is a voluntary community planning program, based on incentives and guidelines, for the 13 counties in the Hudson River Valley. Beacon joined the Greenway Compact Program in 2000, along with almost all the other municipalities in Dutchess County. Greenway Connections, the countywide compact plan, includes guideline pages on such NRI-relevant topics as Connected Habitats, Stream Corridor Protection, Wellhead and Aquifer Protection, Street Trees, Green Infrastructure, and Centers and Greenspaces. A City of Beacon Centers and Greenspaces Plan map was included in the 2007 Comprehensive Plan appendix.

This section's three maps outline Beacon's historical, scenic and recreational resources and offers considerations for policy decisions.

### A Brief History of Beacon

The land that is now Beacon was first settled by people of the Wappinger and Mahicannituck tribes, who were part of Lenape cultural group. The first known European contact with Beacon was in 1609 when Henry Hudson sailed up the river that was to bear his name, and described Beacon and/or Newburgh as "...a very pleasant place to build a Towne on...." Beacon's first European settlers were Roger and Catheryna Rombout Brett, who in 1709 built what is known today as the Madam Brett Homestead (featured in section 6.2). The two villages of Fishkill Landing and Matteawan, centered around her gristmill and storehouse, eventually merged to create the City of Beacon in 1913.

Beacon remained a small farming hamlet until the War of 1812 jump-started an industrial revolution, with a population and building boom. Throughout the 1800s, large quantities of hats, bricks, fabric, and more were produced here. In winter, ice cut from the frozen

Hudson was shipped down to Manhattan. Beacon remained a significant factory town through the 1950s. In addition, Beacon was a well-known tourist destination during the early 1900s, with its most popular feature being the Mount Beacon Incline Railway, which brought visitors to the top of Mount Beacon. Many tourists came from New York City, up the Hudson via steamship ferries. The bridge connecting Beacon to Newburgh didn't open until 1963. Prior to then, only a ferry had connected the two banks for 220 years.

Starting in the post WWII decades, Beacon experienced a significant economic decline. Most factories closed, leading to the vacancy of approximately 80% of commercial spaces. The ski slope which had operated on Mt Beacon since 1967 closed in the late 1970s, along with the Incline Railway. "Urban Renewal" led to the removal of large sections of older housing, the cutting off of Main Street from the Hudson River. The town remained underutilized and economically depressed until the early 2000s. Beacon's current revitalization began in the late 1990s with modern rezoning and closing of the City's riverfront sludge incinerator, which brought the Dia:Beacon museum, the Beacon Institute for Rivers & Estuaries, and Scenic Hudson's Long Dock and Madam Brett Parks. Before and during this resurgence, Pete Seeger (1919-2014) and Toshi Seeger (1922-2013) were prominent Beacon-area residents (they resided in the Town of Fishkill, but are associated with Beacon) who sparked a resurgence in the interest of protecting the environment in Beacon and throughout the Hudson Valley. Thanks to their intervention, Beacon has some of the most green and accessible waterfront along the entire Hudson River.

Beacon is now a thriving commuter, residential and arts community, appears on top global tourism lists as a weekend getaway, and has a very competitive real estate market. Beacon uniquely offers a mix of cultural heritage and outdoor recreational opportunities that few municipalities in the Hudson Valley can match. It is important to identify the full range of Beacon's opportunities in order to weigh the impacts of the city's development and growth against strategies for preserving Beacon's unique culture and environment.

## 6.1 Historical Resources

Map 6.1 shows the historic and cultural resources in Beacon. In addition, this section contains two reprinted Birdseye view maps from the late 1800s showing the two villages that make up today's Beacon: Fishkill Landing and Matteawan.

### Why This Is Relevant to Beacon

Beacon has a rich cultural history, including Native American settlements, well-preserved colonial landmarks, and a plethora of historic buildings that highlight the city's colonial and industrial past. Beacon's built environment – from the buildings that house businesses on Main Street to the historic landmarks – form part of the cultural fabric of Beacon's identity. As former factories are converted into condominiums, hotels and other businesses, and the city's historic brick buildings are renovated to create new shops and restaurants, it is more important than ever to honor Beacon's past as the city builds its future. Beacon's Comprehensive Plan states that residents regularly cite the city's historical and cultural legacy as a point of pride and distinction.

### What This Map Shows

Main Street in Beacon, as well as its environs, is dotted with cultural and historical landmarks including a number of religious institutions. Beacon is home to sixteen structures and buildings on the National Register of Historic places.

The one National Register structure owned by the City of Beacon is the Tioronda Bridge located at the end of South Avenue as it crosses near the mouth of the Fishkill Creek. Completed in 1873, it was one of the last remaining bowstring truss bridges in the County. Sadly, the bridge fell into disrepair and the city removed the iron trusses in hopes of restoring them. Recently, the City committed to a restoration of all salvageable parts, and expects to dedicate the bridge as a pedestrian walking bridge with emergency access, using parts of the original Bridge as a living museum. The Bridge will connect with the City's Greenway trail system, the Fjord Trail System and lead into the Hudson Highlands State Park. The City has applied to the New York State Office of Parks, Recreation and Historic Preservation to have the Bridge relisted on the National Register.

In addition, Beacon boasts important historical monuments: the DAR monument on Mt. Beacon and the 1909 Hudson Fulton statue of Hebe. An iconic "dummy" traffic light fixture stands on the east end of Main Street. The Beacon Historical Society preserves, procures, and presents Beacon's heritage and history

since 1976. Exhibits and local archives are housed in the former rectory of St. Andrew Church at 17 South Avenue.

Since 1991, the City's historic overlay zone has been the primary way that Beacon designates and protects its historic buildings and sites. Any proposed substantial exterior alterations to a structure visible to the public in this overlay zone must be reviewed by the Planning Board for its consistency with the adopted historic standards. The City Council has recently proposed the addition of 35 buildings in the Main Street area to the historic overlay zone. See City of Beacon Zoning Map for more information.

### Considerations for Decision-Making

The City may wish to consider:

- Completing a City-wide review of additions to its historic overlay zone;
- Evaluating historic sites, structures and buildings within the city for proposed inclusion on the State or National Registers of Historic Places; and
- Researching, identifying, and honoring pre-colonial historic sites, including those of importance to Beacon's indigenous people.

This information largely comes from the City of Beacon's Comprehensive Plan and the Dutchess County NRI. For more information on these topics, see the References section.

Number on Map	Name	Listed on National Register of Historic Places
1	Annan Street Church	
2	Trinity Methodist / Springfield Baptist Church	YES
3	United Methodist Church	
4	St. Luke's Episcopal Church	YES
5	Reformed Dutch Church of Fishkill Landing	YES
6	Beacon Hebrew Alliance	
7	Carmelite Communion Nunnery	
8	St Lawrence Friary	
9	Masjid Ar-Rashid	
10	Incline Railway wheelhouse ruins	YES
11	Eustatia	YES
12	Bogardus-DeWindt House	YES
13	Chrystie House	
14	U.S. Post Office	YES
15	Beacon Historical Society	
16	Peter C. DuBois House	YES
17	Beacon Engine Company No.1 Firehouse	YES
18	Howland Cultural Center	YES
19	Matteawan Station	
20	Old Tioranda School	
21	Madam Brett Homestead	YES
22	Craig House	
23	Beacon Fires Obelisk	YES
24	Howland Public Library	
25	Tioranda Bridge (former)	YES
26	Beacon Gorge Bridge	
27	Bridge St Bridge	
28	Dia:Beacon	YES
29	Dummy Light	

*1886 Birdseye view of Fishkill Landing (Beacon's current west end)*

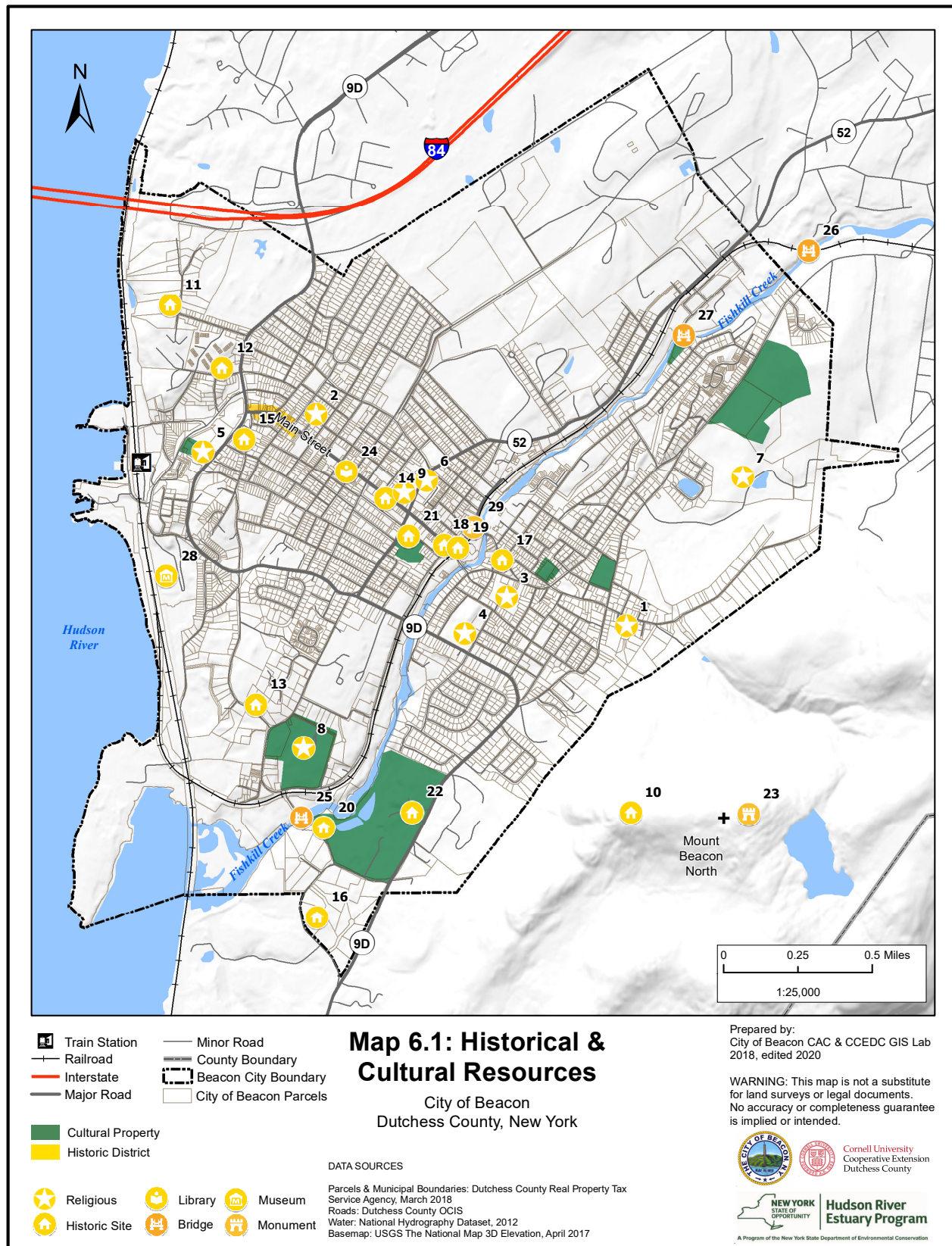


*1886 Birdseye view of Matteawan (Beacon's current east end)*





## Map 6.1 Cultural Resources



## 6.2 Scenic Resources

Map 6.2 displays various scenic resources in Beacon, including parks, scenic viewpoints, waterfalls, etc.

### Why This Is Relevant to Beacon

The New York Department of State's Scenic Areas of Statewide Significance report recognizes the Hudson Valley region for its unique, highly scenic landscapes of outstanding quality that are accessible to the public. The wealth of accessible scenic viewpoints in Beacon draws local citizens and tourists alike and helps to define the character of the city. Beacon is beautifully situated between the Hudson River to the west and the mountains of Fishkill Ridge to the east, with Fishkill Creek running through the middle. These natural features lie within the Hudson Highlands, which is a region that the state of New York recognizes for its high scenic quality. Beacon's location affords the city numerous scenic resources that provide cultural and economic value, while contributing to the preservation of open space and habitat. These scenic resources are vital to Beacon's high quality of life and growing tourism industry. The City of Beacon's Comprehensive Plan includes recommendations to protect the city's scenic resources as part of its plan for future development.

### What This Map Shows:

Beacon has three primary natural scenic viewsheds: The Hudson River, Fishkill Creek, and Fishkill Ridge, which includes Mount Beacon.

- Long Dock Park, Pete and Toshi Seeger Riverfront Park, and Dennings Point afford direct Hudson River viewpoints with walking trails, playground equipment, picnic areas, fishing areas and boat launching facilities.
- The Greenway Trail and Madam Brett Park offer access to Fishkill Creek for walking, biking, fishing, and bird watching.
- Mount Beacon Park and its interconnected trails offer views of the entire city of Beacon and beyond, including Fishkill Creek, the Hudson River, the mountains of the Hudson Highlands, and the Shawangunk Ridge.

In addition, in its Local Waterfront Revitalization Plan (LWRP) as adopted by City Council and approved by NY State are specific protected viewsheds, Exhibit 1 shows the city's viewsheds from the LWRP. The Mayor and City Council have expressed the goal of adding to protected City view sheds, and expects to do so in the next year or so. Following is a list of the view sheds protected in the LWRP:

1. Main Street and Route 9D
2. Beacon Street and Route 9D
3. Rombout Avenue and Route 9D
4. Route 9D and Wolcott Avenue
5. South Avenue and Route 9D
6. Dennings Avenue at South Avenue
7. Sargent Avenue at St. Lawrence Seminary
8. South Avenue 1/4 Mile West of Dennings Avenue
9. Paye Street
10. River Street and Beekman Street
11. Southwest View from Wolcott Avenue 200 Feet West of Bayview Avenue
12. West View from Wolcott Avenue 200 Feet West of Bayview Avenue
13. Northwest View from Wolcott Avenue 200 Feet West of Bayview Avenue

### Recommendations for Decision-Making

The City may wish to consider:

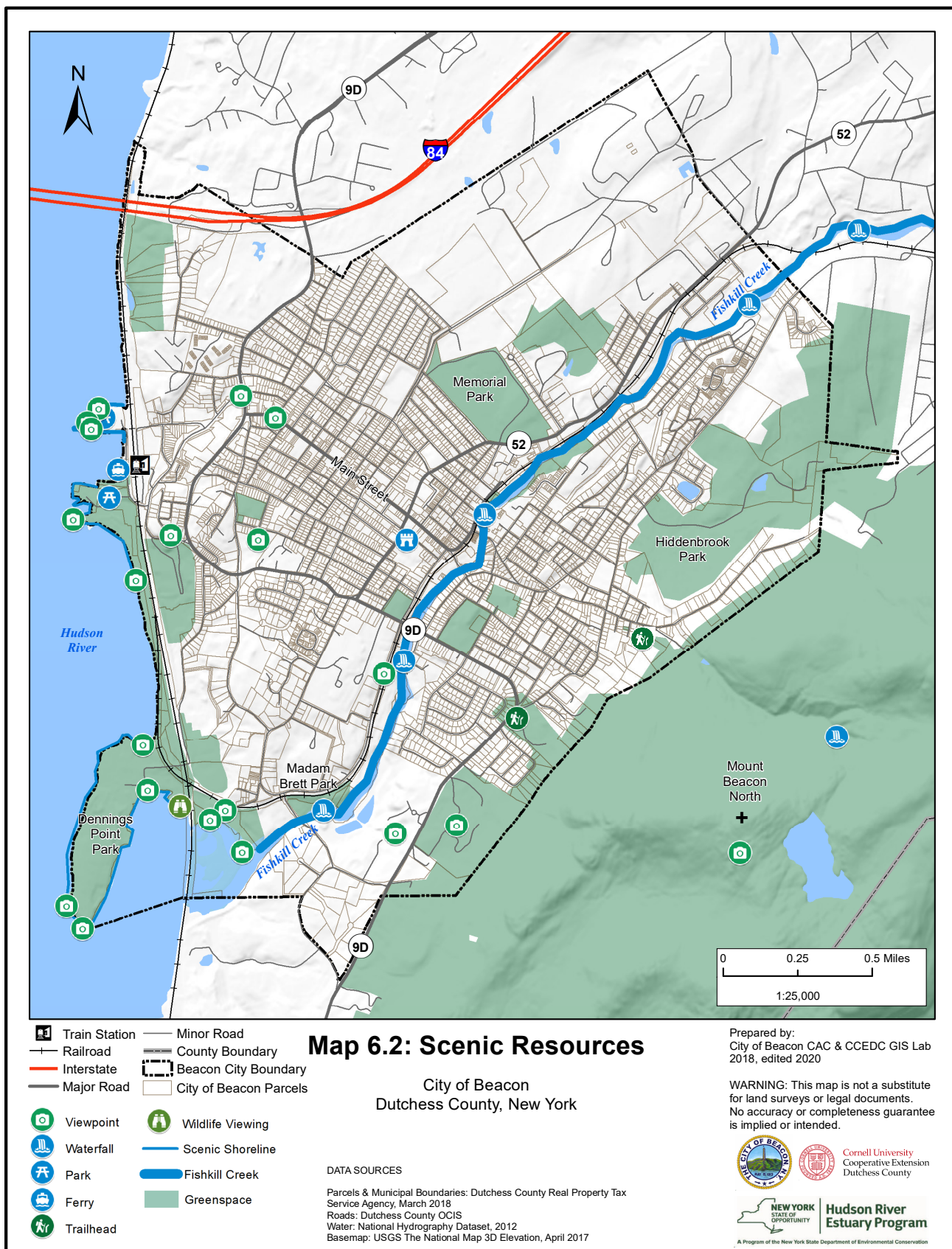
- Ensuring that the preservation of Beacon's scenic resources and viewsheds remains a top priority during any development plans that affect the city's three primary scenic viewsheds: the Hudson River, Fishkill Creek, and Fishkill Ridge;
- Expanding direct access to the Hudson River for outdoor recreation; and
- Creating multi-use linkages (e.g., walking and biking paths) that connect Beacon's three main scenic areas, to increase accessibility for residents and tourists.

This information largely comes from New York State Department of State's Scenic Areas of Statewide Significance report, City of Beacon Comprehensive Plan, and the City of Beacon LWRP. For more information on these topics, see the References section.

1. Main Street and Route 9D



## Map 6.2 Scenic Resources





## 6.3 Recreational Resources

Map 6.3 displays various recreational sites and resources in the City of Beacon.

### Why This Is Relevant to Beacon

Recreational opportunities abound in Beacon. Indeed, the city is known for the diversity of high-quality outdoor activities right at its doorstep. One can hike Mount Beacon, cast a line in Fishkill Creek, and birdwatch along the Hudson River. Hiking, biking, fishing, boating, wildlife viewing, playgrounds, sport fields and courts, and more greet the recreation enthusiast looking for a chance to get outside. The city's public parks, combined with Scenic Hudson-owned parks and The Hudson Highlands State Park, provide the outdoor enthusiast or the casual citizen with ample recreational opportunities within the city's neighborhoods, or among its protected mountains, woods, creeks and trails.

### What This Map Shows

Beacon contains a wide variety of recreational resources that belies the city's small size:

- The City of Beacon operates four parks: Pete and Toshi Seeger Riverfront Park, Memorial Park, South Avenue Park, and Greene Street Park, in addition to the University Settlement Camp and Hiddenbrook. Scenic Hudson owns Madam Brett Park and Long Dock Park, and The State owns Hudson Highlands State Park and Dennings Point State Park.
- The City has 373 acres of recreation area, well exceeding the National Parks and Recreation Association's recommendation of 10 acres per 1,000 residents.
- Sport fields and courts for basketball, soccer, tennis, football, baseball and softball, a frisbee golf course, fishing piers, a skatepark, track, and more can all be found within the city's public parks and at the University Settlement Camp. Additionally, Southern Dutchess Country Club offers golf.
- Beacon's parks boast five picnic pavilions, several picnic areas, four playgrounds, an official dog park, a natural play area, and miles of walking paths. In addition, there are recreational opportunities not listed on the map such as sledding hills and sport fields at Sargent Elementary School.
- Beacon offers swimming at the Beacon Pool at University Settlement Camp, Riverpool in the Hudson River (pictured right), lap swim and open swim at the Beacon High School pool, and community pool membership at Southern Dutchess Country Club.

- The Greenway Trail is a success story of Beacon public policy and public-private partnerships that is worth noting. At present there are trails down the Hudson and large portions of Fishkill Creek. The Mayor and City Council are looking to expand the trail system along Fishkill Creek to encompass the unused adjacent rail line connecting to the New York State Trail system. Once complete, the Trail will offer continuous exposure to nature and provide walking and biking opportunities along the Fishkill Creek to the Hudson River.
- Nature is always nearby with miles of hiking trails, mountains, waterfalls, creeks and the Hudson River. The city park of Hiddenbrook, Scenic Hudson parks such as Long Dock Park, Madam Brett Park, and Mount Beacon, Hudson Highlands State Park's Dennings Point, and more all offer opportunities for exploring Beacon's natural environment.

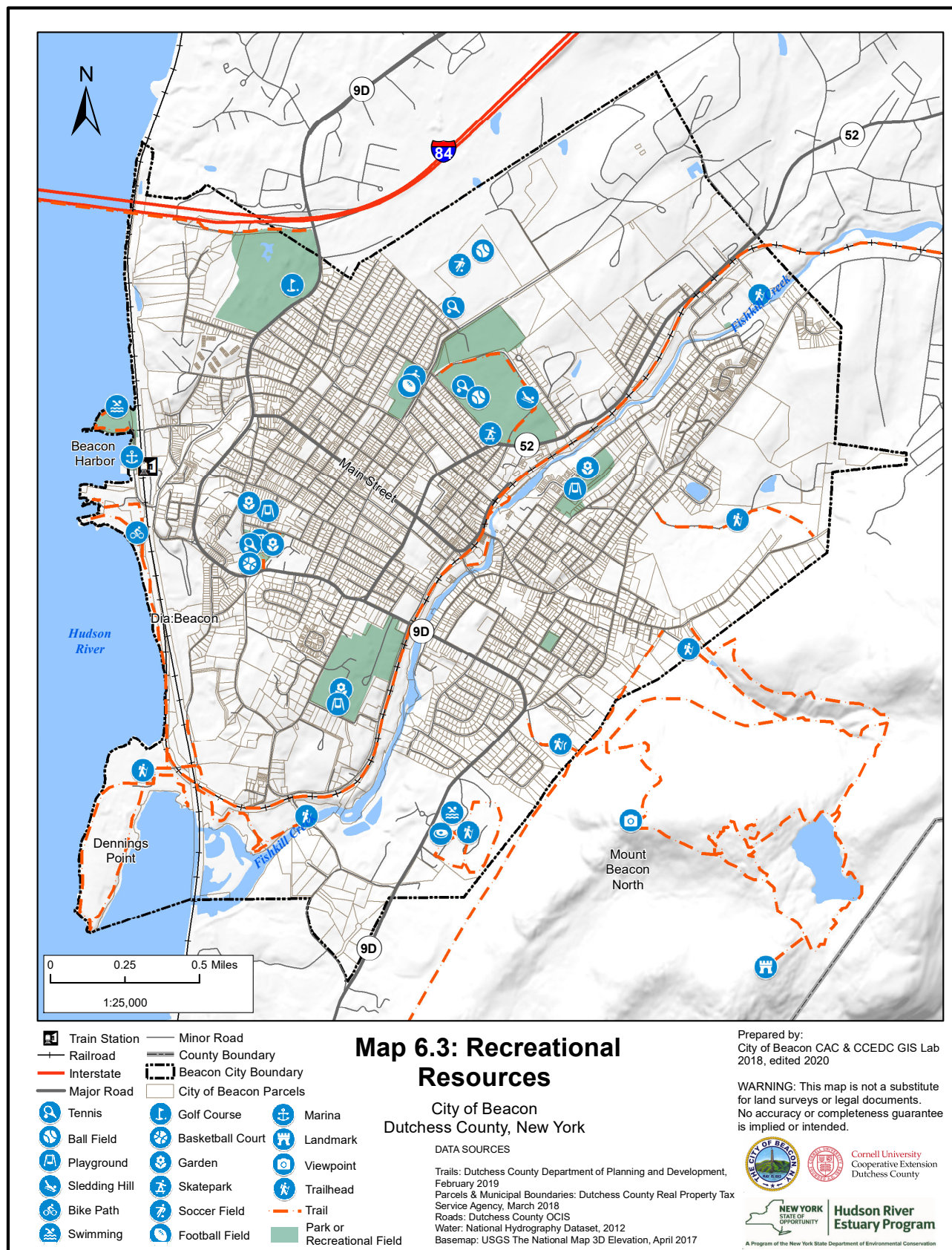
### Considerations for Decision-Making

The City may wish to consider:

- Maintaining or potentially increasing access to the Hudson River and Fishkill Creek;
- Preserving open space and protect large tracts of forest, field, and waterfront;
- Ensuring that various recreational opportunities are accessible to all; and
- Continuing to partner with non-profit partners like Scenic Hudson and state entities like NYS Office of Parks, Recreation, and Historic Preservation for the effective management of their properties within the city limits.

This information largely comes from City of Beacon Parks and Recreation, including a 2017 study conducted by BFJ Planning about the City's recreation resources, and Scenic Hudson. For more information on these topics, see the References section.

## Map 6.3 Recreational Resources



## 7.0 Land Use and Zoning

Map 7.0 is the City of Beacon Land Use Map, taken from its Comprehensive Plan Update of 2017, and displays broad zoning categories across the city, including the location and concentration of land use activities.

### Why This Is Relevant to Beacon

The City of Beacon has the authority to enact zoning regulations to promote the public health, safety, and general welfare of their communities, among other purposes. Zoning is primarily enacted to control the use of land and the density of those uses, as deemed appropriate for the community. Zoning can encourage a variety of uses that are desirable, appropriate regulate those that may be potentially inharmonious, or prohibit those uses that are unwanted in specific areas or throughout the community. Zoning laws can protect important natural areas and cultural resources such as historic landmarks or districts, wetlands, floodplains, groundwater, wildlife habitats and scenic areas. Various statutes define the use of zoning to encourage the appropriate use of land.

Knowing the general distribution of land use in a municipality can help a community better understand past and present development patterns, as well as plans for future growth. Directing new development to existing areas of development uses land more efficiently, saves money by taking advantage of existing infrastructure, and importantly, allows for greater density in already settled areas. Concentrating greater density in existing centers is quite often the best option to protect water resources, biological communities and farmland, because it takes pressure off development of the community's remaining green spaces.

In the latter half of the 20<sup>th</sup> century, suburban areas in the U.S. generally and Dutchess County locally experienced rapid population and housing growth. In Dutchess, suburban communities added approximately 100,000 additional residents since 1960. In contrast, cities – both nationally and the City of Beacon, experienced stagnant or even shrinking populations. Beacon saw a relatively flat population count across several decades, and a slight decline in some. Public construction of roads, as well as the increase in household access to private automobiles and coincident parking, accelerated this movement; adding to it was the dispersion and growth of commercial and industrial sites away from cities, epitomized by the ascendancy of the retail mall to the detriment of traditional Main Streets. This national and local suburbanization trend has had a major impact on local natural resources,

encroaching on or significantly shrinking natural habitats, farmland and undeveloped land.

One response to the de-urbanization was “urban renewal” – which basically involved razing large sections of older buildings and attempting new patterns of urban development. Beacon experienced this as well with wide swaths of housing torn down and Main Street cut off from the Hudson River – with little success. In the 1990s, the City revised its zoning, eliminating most of the vestiges of urban renewal concepts, and shifting instead to: phasing out storefront apartments on Main Street to make room for retail and commercial; protecting residential neighborhoods including code enforcement; and closing the city's riverfront sludge incinerator to attract non-industrial uses. These zoning and usage changes set the stage for Beacon's economic revival.

In the last two decades, cities and urban areas have made a comeback, regaining popularity among younger professionals and attracting businesses back to city centers. The City of Beacon has enjoyed great success from this trend. This reversal bodes well on natural resources issues, assuming cities plan effectively and take natural resource issues into account in their land use plans.

### What This Map Shows

Beacon's basic land use pattern has higher residential and commercial density along and adjacent to Main Street, the areas between Main Street and the Metro-North Train Station, and along Fishkill Creek repurposing old industrial sites. Residential density declines as distance from Main Street increases. Commercial uses are also centered along Route 52 heading toward Fishkill, with a few remaining industrial uses. A substantial portion of Beacon's land is open, used for parks or open space, especially adjacent to the Hudson River, Fishkill Creek and Mount Beacon.

A summary of current land uses, acreages and percentage of the total land area for each category in the City of Beacon can be viewed in the City's Comprehensive Plan Update dated 2017. Highlights are summarized here, with changes from 1960.

1. Developed Land: In 1960, 68% of the land area of the City was developed (991 acres were undeveloped); in 2017 87% of the City was developed (408 acres were undeveloped).
2. Residential Use: Acreage used for residences (only) more than doubled in this time period, rising from 407 acres (13% of City land) to 1,066 acres (34% of City land).
3. Commercial Use: Use of commercial land (includes retail, service, office, and mixed use) has slightly



increased between 1960 and 2017, although the intensity and value of these uses contribute substantially to the city's tax base.

4. Industry Use: Lands used for industrial purposes have decreased from 159 acres in 1960 to 72 in 2017.
5. Recreational Use: Recreation (public and private) and open space lands comprise almost 400 acres, or 12% of the City. This use has significantly increased since 1970, which had 170 acres, or 5% of the city.

Beacon has experienced a dramatic increase in popularity as a small attractive urban environment, resulting in an influx of new residents. Coming with that popularity has been a recent spurt of development, with fallow urban renewal sites being built out. As development as occurred, the City has taken stock and undertaken recent zoning and land use changes to steer toward a stronger, more sustainable and attractive urban community. Some key recent land use changes or proposals are summarized here.

1. Restoration or redevelopment of former industrial sites, notably along Fishkill Creek, as multi-family or mixed-use buildings, with recent increases in required commercial space to encourage local employment.
2. Creation of two form-based zones, the Central Main Street (CMS) zone for the core of Main Street, and the Linkage (L) zone connecting Main Street to the Metro-North station – both with higher residential and commercial density.
3. Adjustments to height and size limits for Main Street developments, including tying fourth floor approval to providing of defined public benefits.
4. Expected adoption of new Zoning Tables, the first full revision since the early 1970s, which will standardize uses and simplify zoning compliance.
5. Expected adoption of a new Transition District around Main Street, which will provide the moderate adjacent residential and commercial density.
6. An initiated review of Linkage and Waterfront Development zones, looking to encourage commercial along with residential development, while preserving almost the entire length of the Hudson River for recreational use and green space.
7. Expected adoption of a local law regulating short-term rentals.
8. Expected revisions to the city's historic overlay zone to simplify compliance, and add additional properties for historic protection.

- Maintaining a focus increased residential and commercial density in Main Street and Linkage zones, as well as targeted areas Fishkill Creek, Waterfront Development and Transition zones;
- Planning for and encouraging appropriate residential and commercial development (Transit-Oriented Development) at the Metro-North Train Station;
- Continuing brownfield redevelopment projects that clean up and repurpose former industrial sites;
- Continuing to preserve open space, especially along the Hudson River, Fishkill Creek and Mount Beacon;
- Developing Main Street green spaces and more urban open space; and
- Exploring and expanding policies that promote sustainability.



*West End Lofts on Wolcott Ave includes 73 affordable-workforce artist lofts, a new short-cut walking path down to the Train Station, and a restored river view from the Beacon Street intersection.*

### **Considerations for Decision-Making**

To ensure that land use and zoning decisions remain compatible with natural resource considerations, the City may wish to consider:

## Map 7.0 Future Land Use Map

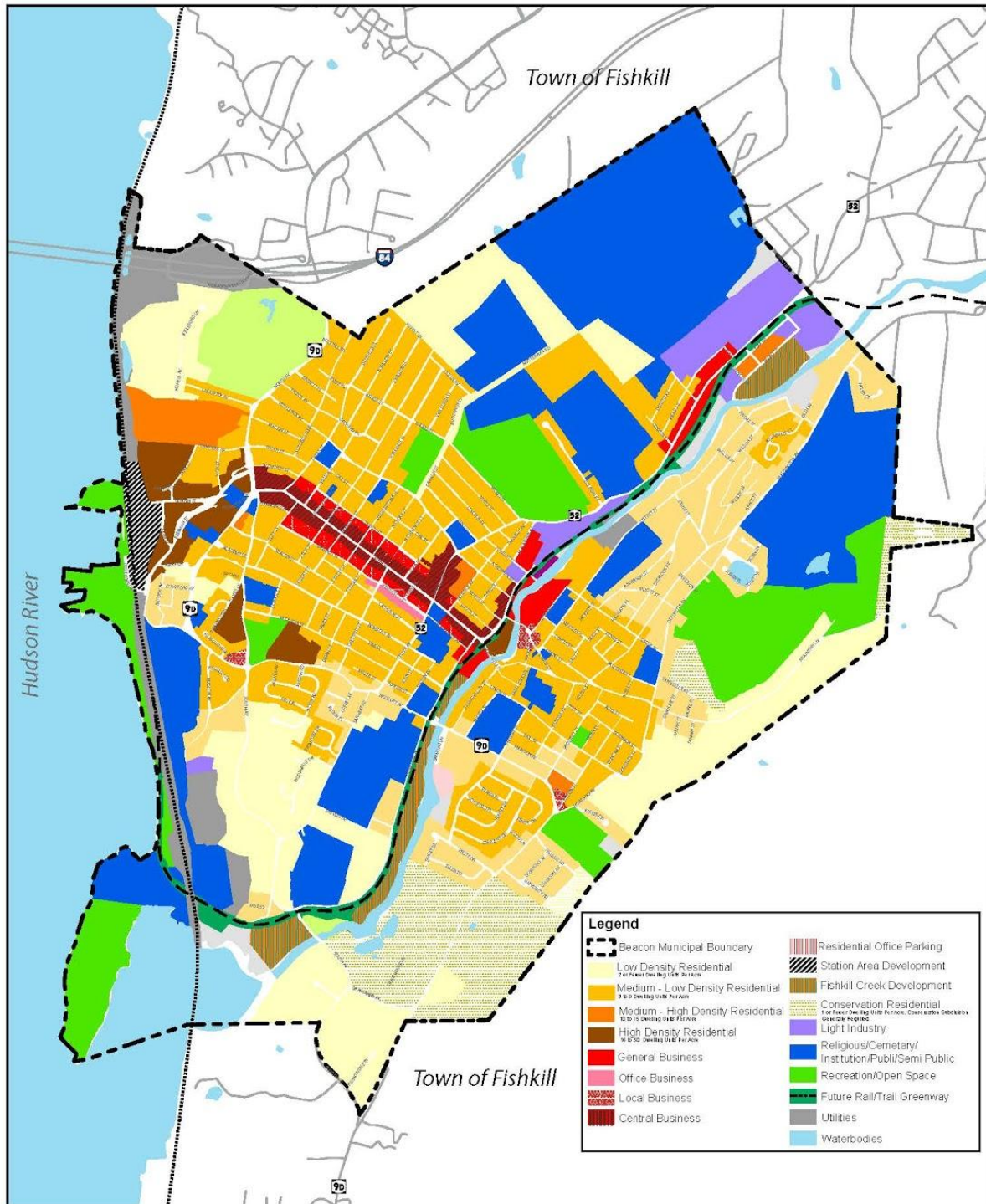


FIGURE 11-1: FUTURE LAND USE MAP

CITY OF BEACON COMPREHENSIVE PLAN UPDATE



## 8.0 Considerations for Local Decision-Making

The City of Beacon's Natural Resources Inventory is a public resource for all stakeholders interested in learning more about Beacon's rich natural environment. As the data was assessed within the NRI, common themes emerged that have considerable implications across all of the city's natural resources. As noted in Section 1.0 Introduction, the NRI resulted in these high-level considerations that the City may wish to consider:

- Incorporating climate change mitigation and adaptation in decision-making across all sectors;
- Engaging Beacon residents in the stewardship of our natural resources; and
- Understanding the impact of future development on Beacon's natural resources.

Each of these areas are outlined in greater detail below.

### **Incorporating climate change mitigation and adaptation in decision-making across all sectors**

Climate change is the biggest threat today, both globally and locally. To help Beacon prepare for and adapt to a changing climate, the City should consider:

- Creating plans to mitigate flooding and sea level rise;
- Creating emergency storm management and community adaptation plans;
- Continuing to inventory our emissions, energy use, and municipal material sourcing; and
- Creating a local Climate Action Plan, which outlines the policies and measures that Beacon can enact to reduce greenhouse gas emissions and increase the community's resilience to climate change.

### **Engage Beacon residents in the stewardship of our natural resources**

Despite the negative impact humans have had on Beacon's natural environment, its residents are the greatest asset in protecting and stewarding Beacon's natural resources. The City should consider:

- Keeping residents of Beacon and its surrounding communities engaged in decision-making around protecting natural resources; and
- Increasing public access to Beacon's natural resources, such as the Hudson River, Fishkill Creek, and the Hudson Highlands, as part of a

comprehensive strategy to expand and promote our city's natural environment.

### **Understanding the impact of development on Beacon's natural resources**

As Beacon continues to grow and flourish, the City should consider:

- Pursuing proactive conservation of priority resources, including development of an open space plan and participation in broad efforts like watershed planning for Fishkill Creek, and considering designations such as "critical environmental areas" as a tool to bring conservation attention to the community's priorities; and
- Considering each proposed development, redevelopment, and/or infrastructure adjustment with respect to its potential effect on Beacon's natural, cultural, and scenic resources.

### **In Summary**

It is becoming more apparent that smaller cities like Beacon are the most environmentally conscious places to live. "Thinking has come full circle on cities, from blaming them for environmental destruction to considering that urban environments, when properly designed and managed, can be a kind of biological as well as cultural ark – places where human beings can have the lowest impact on the planet and be educated, creative and healthy." From *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*, Paul Hawken, ed., 2017



## 9.0 What Comes Next and Acknowledgements

On behalf of all the inhabitants of the City and Beacon's environmental future, thank you!

### What Comes Next

We hope this document is useful to City of Beacon officials, committees, and residents as they learn about the city's environment and lead towards Beacon's future with consideration of its natural context.

We hope that this NRI can be the basis for developing an Open Space Plan for Beacon, and can be helpful for City policy-makers as they consider resource-impacted programs, development, and decisions.

If you have related information that you would like to share for potential inclusion in the online resources related to this document, or would like to be part of ongoing conversations related to the content in this NRI, please contact the City's Conservation Advisory Committee (CAC) at [beaconcac@cityofbeacon.org](mailto:beaconcac@cityofbeacon.org). The CAC holds monthly meetings and welcomes the public: see the City of Beacon's website for the time and location of their next meeting.

### Thank you!

This NRI was made possible through funding from the NYSDEC Hudson River Estuary Program, which engaged Cornell Cooperative Extension of Dutchess County as a technical assistance partner. We are so grateful for this opportunity.

This NRI would not have been possible without the following individuals' support:

- Cornell Cooperative Extension, Sean Carroll
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- Mayor Randy Casale, through 2019
- Mayor Lee Kyriacou, 2020 on
- Beacon City Council, Amber Grant
- Beacon Institute of Rivers and Estuaries, Asher Pacht
- Diane Lapis, Beacon Historical Society
- Gretchen Stevens and Hudsonia
- City of Beacon's Conservation Advisory Committee (CAC) including:
  - o Brian DiFeo, CAC Chair
  - o Air Nonken Rhodes
  - o Jennifer Epstein
  - o Peggy Ross
  - o Antony Tseng
  - o Jeff Domanski
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