

**CITY OF CONCORD  
CONSERVATION and OPEN SPACE PLAN  
UPDATE  
June 2017**

**CONCORD, NEW HAMPSHIRE**



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**Moosewood Ecological LLC**

*Innovative Conservation Solutions*

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# **CITY OF CONCORD CONSERVATION and OPEN SPACE PLAN UPDATE**

**CONCORD, NEW HAMPSHIRE**

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*Cover photograph* – The Karner blue butterfly (*Lycaeides melissa samuelis*) is both a federally and state-endangered species that occurs in the pine barrens of Concord. Photo by Ben Kimball

# TABLE OF CONTENTS

	Page
<b>1 - INTRODUCTION</b> .....	1
<b>2 - PURPOSE AND GOALS</b> .....	2
<b>3 - STAKEHOLDER INPUT AND COMMUNITY OUTREACH</b> .....	3
<b>4 - METHODOLOGY</b> .....	3
4.1 - Compilation and Synthesis of Existing Data .....	3
4.1a - <i>Rationale for Update</i> .....	3
4.1b - <i>GIS Data</i> .....	4
4.1c - <i>NH Natural Heritage Bureau Data</i> .....	4
4.1d - <i>Active Agriculture Data</i> .....	4
4.1e - <i>Conservation Lands</i> .....	4
4.1f - <i>NH Fish and Game Department</i> .....	5
4.1g - <i>City of Concord Consulting Forester</i> .....	5
<b>5 - CONCORD'S NATURAL RESOURCES</b> .....	5
5.1 - Ecoregions .....	5
5.2 - Subwatersheds .....	6
5.3 - Water Resources .....	8
5.3a - <i>Surface Waters and Wetlands</i> .....	8
5.3b - <i>Groundwater</i> .....	9
5.3c - <i>Floodplains and Floodways</i> .....	9
5.3d - <i>Key Under-Protected Resources</i> .....	10
5.4 - Ecological Resources .....	12
5.4a - <i>Wildlife and Plant Resources</i> .....	12
5.4b - <i>Unfragmented Landscape</i> .....	15
5.4c - <i>Key Under-Protected Resources</i> .....	16
5.5 - Working Lands Resources .....	16
5.5a - <i>Agricultural Resources</i> .....	17

5.5b - <i>Forest Resources</i> .....	20
5.5c - <i>Key Under-Protected Resources</i> .....	20
5.6 - Conservation Lands .....	22
5.7 - Recreational Resources .....	23
5.7a - <i>City Trails</i> .....	23
5.7b - <i>Regional Trail Systems</i> .....	24
5.7c - <i>Bicycle and Pedestrian Connections</i> .....	25
5.7d - <i>Other Recreational Resources</i> .....	26
5.7e - <i>Key Under-Protected Resources</i> .....	26
5.8 - Built (Human) Environment .....	28
5.8a - <i>Urban Growth Boundary</i> .....	28
5.8b - <i>Concord Impervious Surfaces</i> .....	29
5.8c - <i>Key Recommendations</i> .....	30
<b>6 - CLIMATE CHANGE AND RESILIENCY</b> .....	<b>30</b>
<b>7 - CONSERVATION OPEN SPACE FOCUS AREAS</b> .....	<b>32</b>
7.1 - Selection Criteria .....	32
7.1a - <i>Natural Resources</i> .....	32
7.1b - <i>Landscape Context</i> .....	32
7.1c - <i>Human/Cultural Importance</i> .....	33
7.1d - <i>Concurrence</i> .....	33
7.2 - Conservation Focus Areas by Ecoregion .....	33
7.2a - <i>Merrimack River</i> .....	33
7.2b - <i>Contoocook River Valley</i> .....	34
7.2c - <i>Contoocook/Turkey/Merrimack River Headwaters</i> .....	35
7.2d - <i>Turkey River Lowlands</i> .....	37
7.2e - <i>Hoit Road Lowlands/Oak Hill</i> .....	37
7.2f - <i>Broken Ground/Turtle-town Pond</i> .....	39
7.2g - <i>Concord Heights/Soucook River</i> .....	39
<b>8 - CRITERIA FOR CONSERVATION PROJECTS OUTSIDE FOCUS AREAS</b> .....	<b>42</b>



<b>9 - CONSERVATION and OPEN SPACE RECOMMENDATIONS</b> .....	42
9.1 - Conservation and Open Space Protection and Management .....	42
9.2 - Public Use and Access to Open Space .....	43
9.3 - Habitat Protection.....	44
9.4 - Land Use Regulations .....	45
9.5 - Use and Development of Natural Resources .....	49
9.6 - Scenic Resources .....	50
9.7 - “Low Impact Development” and Green Infrastructure .....	50
<b>10 – MANAGEMENT OF CONCORD’S CONSERVED OPEN SPACE</b> .....	51
<b>11 - LIMITATIONS AND GIS DATA DISCLAIMER</b> .....	52
<b>12 - SOURCES</b> .....	53

**APPENDICES**

	Page
Appendix A – Community Outreach and Survey Results .....	56
Appendix B – Rare Species and Exemplary Natural Communities of Concord .....	81
Appendix C – NH Natural Heritage Rarity Ranks .....	85
Appendix D – Habitat Block Size Requirements for Wildlife .....	87
Appendix E – Definitions for Productive Agricultural Soils .....	89
Appendix F – Definitions for Productive Forest Soils .....	91

**LIST OF NATURAL RESOURCES MAPS**

	Page
1. Water Resources .....	11
2. Wildlife Resources .....	13
3. Agricultural Resources .....	19
4. Forest Resources .....	21
5. Conservation Lands and Recreation .....	27
6. Conservation Open Space Focus Areas .....	41

**LIST OF TABLES**

	Page
1. Size and conservation within the major subwatersheds in Concord, NH .....	7
2. Size and conservation of various water resources in Concord, NH .....	10
3. Size and conservation of wildlife habitats in Concord, NH .....	12
4. Size and conservation of agricultural resources in Concord, NH .....	18
5. Size and conservation of forest resources in Concord, NH .....	20
6. Conservation & public lands protection level categories in Concord, NH .....	22
7. Publicly accessible trail networks in Concord, NH .....	24

**LIST OF FIGURES**

	Page
1. Ecoregions of Concord, NH.....	6
2. Major watersheds in Concord, NH .....	7
3. NH Wildlife Action Plan habitat rankings within and adjacent to Concord, NH .....	14
4. Unfragmented blocks within and adjacent to Concord, NH .....	16
5. Extent of the built environment in Concord, NH .....	29

## **1. Introduction**

The Concord City Council created the Conservation Commission in 1971 under the authority of RSA 36-A. The Commission is codified in the City Code of Ordinances at Title V, Chapter 30, Article 30-3-1. A main goal for the Conservation Commission as set forth by the City Council included “protecting, promoting, and developing the natural resources... and for protecting the watershed resource of the City.” The City Council also mandated that the Conservation Commission prepare “a conservation and open space plan.” The Plan is to be based “on the concept of multiple uses of natural resources and open space.”

In 2008, the City of Concord adopted the Conservation and Open Space Plan as part of the Master Plan 2030, which was intended to guide the protection of the City’s natural resources and the environment while promoting the appropriate and efficient use of land and water within the City of Concord in a manner consistent with the economic, physical, and social needs and desires of the citizens of Concord.

Since adoption of the Master Plan there have been advances in natural resources data geared towards conservation open space planning, and the City has conducted numerous studies of various resources throughout Concord. The City has also acquired more land in fee and by easement, and other entities have placed several parcels in conservation. Furthermore, Concord has also acted upon some of the recommendations set forth by the 2008 Plan, including the adoption of the Aquifer Protection District, establishment of wetland buffers, and groundwater protection regulations. In addition, the City has worked diligently on the original 12 goals identified in the 2008 plan, including land protection, public access to conservation open space, and the protection of surface water, groundwater, wildlife, agricultural, and forest resources. These actions prompted the Conservation Commission to update the 2008 Conservation and Open Space Plan.

Several steps were accomplished during the preparation of this updated Plan. The Conservation Commission developed the Open Space Subcommittee to provide guidance and oversight of the revised Plan. The 2008 Conservation and Open Space Plan was reviewed to determine which recommendations have been acted upon and which policies are still in place. Goals were revised to address previous accomplishments. Educational outreach was achieved through a community forum and public survey to better understand how Concord residents currently use its conservation open space and what areas would be suited for future land protection. In addition, the conservation lands database was updated and new data on rare species were incorporated into the designation of conservation focus areas.

For the purposes of this plan, “Conservation Open Space” is commonly referred to as undeveloped land that is in a relatively natural state, such as forests, wetlands, and farm lands. The City of Concord Site Plan and Subdivision Regulations define open space as “an area of a lot unoccupied by buildings, structures, or impervious surfaces, intended for environmental, scenic, or recreational purposes.” The Conservation Commission’s open space oversight excludes developed areas such as golf courses, City parks, recreational fields, and cemeteries. Concord’s conservation open spaces include City forests, New Hampshire State parks and forests, land trust properties, areas protected by conservation easements, and other privately-owned parcels

currently in a natural state. In Concord, some City-owned and private open spaces are legally protected from development while others have no formal protection measures in place.

Conservation open space can afford many benefits for economic, social, psychological, and health-related reasons. These benefits are provided by means of outdoor recreation, production of food and forest products, reducing the need for additional human services as a result of new developments, protection of wildlife and plant diversity and their habitats, protection of water supplies, mitigation of natural hazards such as flooding, and protection of scenic beauty as well as cultural and historic values. Conservation open space can be attained in many ways, including:

- **Fee acquisition** of lands for conservation by the City or State/Federal government;
- **Conservation easements** on private land held by a land trust or governmental entity;
- **Municipal designation of forest lands** as official City Forests; and
- **Regulatory requirements**, including the protection of open space for subdivisions and natural resource buffers.

## 2. Purpose and Goals

This Concord Conservation and Open Space Plan is intended to provide a blueprint for future conservation efforts. The overall purpose is to provide guidance for acquiring conservation open space and set standards for the appropriate stewardship of natural resources and conservation open space properties. Section 9 of this plan makes recommendations for action and implementation of these goals.

Specific conservation open space and stewardship goals include:

1. Permanently protect open space in Concord for current and future generations, including development of a coherent interconnected system of conservation open spaces. (*general land protection vision*)
2. Foster the wise management of the city's land and water resources while ensuring sustainable and productive use, where appropriate. (*sustainable management of open space*)
3. Support the multiple use of conservation open space area to the extent that such use does not adversely affect its primary functions and natural and cultural resources. (*appropriate multiple uses of City-owned land*)
4. Maximize the opportunities for the citizens of Concord to have pedestrian and bicycling access to public conservation open space through linkages between the city's villages and neighborhoods and the network of conservation open space areas. (*access and trails*)
5. Protect and enhance surface and ground water quality, and to maximize the potential for the use of these water resources as potable water supplies. (*drinking water source protection*)

6. Protect and enhance the air quality of the region. (*air quality protection*)
7. Preserve prime and significant farmland soils for agricultural uses, and encourage the retention and diversification of agricultural uses within the city. (*protection of farmland*)
8. Preserve important forest soils and encourage the use of best management practices on protected lands in the City. (*responsible and sustainable forestry*)
9. Retain and restore habitat for the city's indigenous species of wildlife, including migratory species and those species that have been identified as rare or may be identified as such, and provide adequate area that will foster the perpetuation of these species, and facilitate their movement through and within the city and beyond its borders. (*wildlife and wildlife habitat connectivity including for rare and sensitive species*)
10. Protect and maintain significant natural plant communities and rare plant species that have been or may be identified within the City. (*protection of rare and sensitive plants and natural communities*)
11. Maintain and enhance scenic views and vistas for residents, visitors, and future generations. (*protection of scenic resources*)
12. Incorporate the results of ongoing research regarding climate resilience. (*resiliency*)

### **3. Stakeholder Input and Community Outreach**

The Conservation Commission held a community forum at the City Council Chambers on November 3, 2016. The purpose of the forum was to introduce the Conservation and Open Space Plan project and to solicit input from participants. In addition, the City posted a public survey to further engage community stakeholders. Topics included: importance, use, and improvements of conservation open space areas; types of trails that are of interest; important resources for protection; and which open space areas are important for protection. See Appendix A for a more detailed account of the City's community outreach and survey results.

## **4. Methodology**

### **4.1 Compilation and Synthesis of Existing Data**

#### **4.1a Rationale for Update**

Since the 2008 Conservation and Open Space Plan, numerous conservation plans and studies, new and improved GIS data (see below), City ordinances, land conservation projects, recreational networks and development patterns have been completed or taken place. All these sources and factors point both to the need and opportunities for a fresh look at land conservation priorities and possibilities. In addition, previous open space plans have identified individual parcels for protection for strategic reasons or to enlarge and enhance the existing land conservation base. This plan uses a different approach that recommends broad geographic "Conservation Priority Areas" across the City that contain especially important natural resources, while aspiring to achieve a series of updated Conservation Open Space and Stewardship Goals.

#### 4.1b GIS Data

Spatially-based Geographic Information System (GIS) data formed an important basis for this project. GIS data from the New Hampshire GIS clearinghouse GRANIT and the City of Concord provided the framework for the map design elements and interpretation of data for the selection process. Cultural resources including roads and tax parcels, 2015 1-foot resolution color aerial photographic imagery, hydrography, topography, soils, aquifers, wetlands, and other data were accessed from these sources. The authors of this report also reviewed the 2015 Wildlife Action Plan, the 2010 Wildlife Habitats Analysis produced for Concord by Sperduto Ecological Services, the Conservation Plan for the Merrimack River Watershed, and climate resiliency data developed by The Nature Conservancy and University of Massachusetts.

For this project, the existing GIS conservation lands mapping maintained by the Concord Planning Division was reviewed for accuracy and completeness. The latest release of the conservation lands dataset maintained by GRANIT was also reviewed and compared to Concord's records. This project entailed identifying and entering omissions, and correcting several mapping errors. A number of parcel records date back to the early days of GIS mapping of this data, and these contained a number of errors as well, which were corrected. Finally, recognizing that the existing GIS conservation parcel geography was largely based on earlier versions of the Concord Tax Maps, including presumably pre-digital mapping, all conservation parcel boundaries were rectified to coincide with the most current GIS tax parcel data delineation. Instances where only portions of a tax parcel are subject to conservation restrictions are also reflected in the new data.

#### 4.1c New Hampshire Natural Heritage Bureau Data

The authors also had access to the current entire maximum-precision dataset of rare plant and animal species, and exemplary natural communities and systems for the entire municipal area of Concord. This was made possible under a data sharing agreement with the Natural Heritage Bureau which administers this data allowed the consultant team to view the precise locations and extent of documented rare elements on the landscape - a valuable addition to the analysis. Under the terms of the agreement, this data is not displayed or indicated as to precise location in this plan, but the information contributed to the prioritization process, increasing the resource value of applicable conservation focus areas.

#### 4.1d Active Agriculture Data

2015 one-foot resolution color and infrared aerial photographic imagery was utilized to produce the most current available dataset of areas that are actively used for agriculture in Concord, which provided a new data factor for the prioritization process. Active agricultural areas include pastures, hayfields, crop land, orchards, and fallow farmland.

#### 4.1e Conservation Lands

The authors reviewed existing sources of mapped conservation lands including GRANIT and the City of Concord. They also contacted other local conservation sources to verify the accuracy of the data, and to provide missing parcel information. The parcel geography was rectified to match the digital tax parcel lines. Each parcel was assigned to one of 11 protection codes based on the nature of ownership and level of conservation protection of the parcel. A dataset of parcels with legally-binding conservation restrictions, including conservation easements was produced and displayed as an overlay.

#### 4.1f New Hampshire Fish & Game Department

The authors interviewed a New Hampshire Fish & Game Department Non-Game Program wildlife specialist regarding the specific conservation goals for sensitive wildlife species. The Department provided specific species locations, habitat and observation history, and recommended conservation areas for protection of the unique habitats of Concord. These considerations are contained within the resulting priority focus areas where applicable, but are not displayed or referenced spatially.

#### 4.1g City of Concord Consulting Forester

The City's current consulting forester Ron Klemarczyk of FORECO provided a list of unprotected parcels that he is aware of that would be worthy of protection especially for forestry and trail uses. In instances where these parcels occur within the confines of a conservation focus area, they contribute to its resource values.

### **5. Concord's Natural Resources**

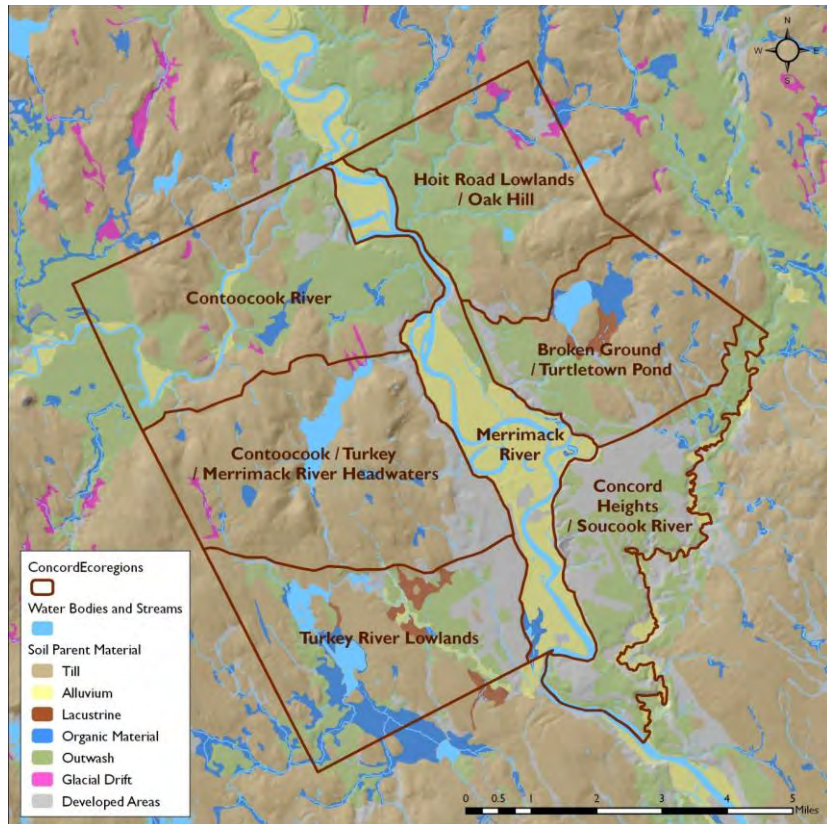
The following sections provide a brief narrative on Concord's natural resources as they relate to the Conservation and Open Space Plan. Topics include water, wildlife, plants, soil, and recreational resources, as well as conservation lands and human infrastructure.

#### **5.1 Ecoregions**

Landscapes can be perceived at multiple scales. A landscape can comprise an entire continent, a geographic region, or the individual State of New Hampshire. Thinking on an ecoregional level helps us to understand the specific physical (i.e., climate, landforms, and soils) and biological features (i.e., ecosystems, natural communities) that define each ecoregion, helping to develop landscape level conservation open space planning. Like landscapes, ecoregions can be recognized and described at a variety of spatial levels.

Sperduto (2010) defined seven separate ecoregions in Concord (Figure 1). These ecoregions are defined based on their physical ecological characteristics. These were used to identify conservation focus areas within each of the ecoregions.





**Figure 1** Ecoregions of Concord. Map developed by Sperduto (2010).

## 5.2 Subwatersheds

Municipal, county and state boundaries are generally irrelevant from the standpoint of plants, animals, and the physical landscape, as well as the elements that interact and co-exist with humans. However, delineations of the landscape that are based on real physical characteristics do have meaning and utility, and can reflect the differences that are observable at various scales. One such delineation is watersheds.

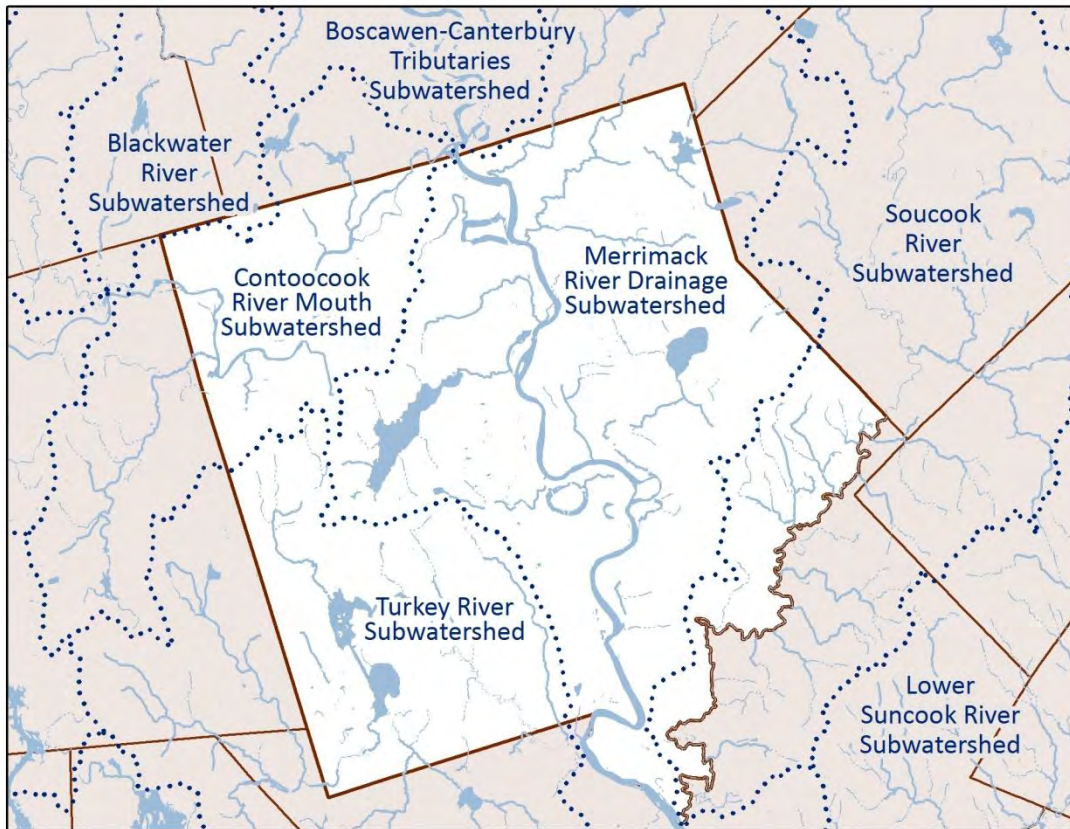
All terrestrial portions of the earth are a part of a “watershed.” Watersheds exist at an almost infinite range of scales, from the tiniest tributary stream to major rivers. Thus, multiple minor watersheds are nested within subwatersheds, which in turn are nested within major watersheds such as the entire Merrimack River basin.

In some instances the dividing lines between watersheds form real biological boundaries for the organisms and natural ecosystems that occur there. In other instances, watershed boundaries are more useful to indicate subtler distinctions, such as likely concentrations and routes of migrating wildlife or nutrient cycles reflective of forest condition. Regardless of their application, watersheds are a convenient and physically definable way to parse the landscape into smaller units. The question becomes one of scale and applicability to a particular purpose.

Concord contains portions of six major subwatersheds (Figure 2 and Table 1). The Merrimack River Drainage subwatershed occupies most of Concord. It covers approximately 23,024 acres or

54% of the City. Other major river drainages in the city include the Turkey River, Contoocook River, and Soucook River.

Conservation lands within these four major river drainages represent the majority of protected lands in Concord. Roughly 14-22% of each of subwatershed is conservation land. The Blackwater River subwatershed in the northwest covers a much smaller portion of Concord but is 21% conserved.



**Figure 2** Major subwatersheds in Concord, NH.

**Table 1** Size and conservation within the major subwatersheds of Concord, NH.

<b>Watershed</b>	<b>Total Area (acres)</b>	<b>Area in Concord (acres)</b>	<b>Percent Conserved</b>
Soucook River	36,807.2	4,022.8	14.0%
Boscawen-Canterbury Tributaries	22,503.3	37.1	0.0%
Blackwater River	11,770.2	157.6	20.7%
Merrimack River Drainage	42,333.7	23,024.1	20.9%
Contoocook River Mouth	13,768.3	6,342.1	20.1%
Turkey River	23,960.4	9,416.3	21.7%

### 5.3 Water Resources

Water resources represent some of our most fragile ecosystems and are particularly sensitive to various types of land use. Water resources comprise a variety of natural features, which include surface waters and groundwater resources. Such features include streams, ponds, wetlands, drinking water sources, floodplains, and aquifers. In terms of their importance, these resources provide a variety of ecological functions and societal values, including: water quality maintenance, flood control, wildlife and fisheries habitat, drinking water sources, recreation, visual and scenic quality and aesthetics, habitat for rare and endangered species and natural communities, groundwater recharge and discharge, drinking water supplies, shoreline stabilization, educational and scientific value, and contribute to overall biological diversity in Concord. Please refer to *Map 1 - Water Resources* for the types and extent of water resources in Concord.

#### 5.3a Surface Waters and Wetlands

Surface waters include all water bodies (lakes and ponds) and water courses (rivers and streams). Wetlands include features such as marshes, wet meadows, beaver impoundments, swamps, and peatlands. Surface waters and wetlands provide a multitude of human benefits such as fishing, hunting, boating, swimming, and nature watching. They are also significant for diverse wildlife and plants that depend upon these resources for part or all of their life cycle needs. Major threats to water resources include water quality degradation and habitat loss due to surrounding land uses, such as unsustainable forestry and agricultural practices and land conversion associated with development.

The City of Concord has approximately 286.5 miles of shoreline along its water bodies and water courses (Table 2). Nearly 76 miles (26.6%) of these shoreline resources have been conserved to some extent. There are nearly 6,700 acres of wetlands within Concord, 23% of which have been conserved. A multitude of other conservation efforts have focused on protection of water bodies and water courses.

The City of Concord has implemented three regulatory ordinances that directly help protect its surface waters and wetlands. Penacook Lake (362 acres) is the main source for the public water supply. The first ordinance, the Penacook Lake Watershed Overlay Protection District, was adopted by the City in 2001 to ensure clean drinking water. It contains no provisions specific to open space, but the residential density in this District is limited to one (1) dwelling unit per four (4) acres, and Cluster Development is allowed in this District with reduced density, both of which contribute to open space areas. The overlay district boundary encompasses the 2,030-acre watershed. To date, approximately 1,062 acres, or 52.5%, of the Penacook Lake Watershed has been conserved.

Secondly, the Shoreland Protection Overlay District is another regulatory measure adopted by the City of Concord in 2001, it is based on RSA 483-B. It contains setbacks and buffers that vary depending on the use and the water resource. The Shoreland Protection Overlay District encompasses all land within 250' of the reference line for Penacook Lake, all surface waters statutorily designated as public waters, and all Great Ponds, as well as within 75' of all surface waters not statutorily designated as public waters. The regulation permanently protects land within 75' of the reference line by requiring the maintenance or restoration of the natural



vegetative buffer. Those areas on which no building is allowed contribute to the overall open space areas in Concord. The Shoreland Protection Overlay District covers 5,835 acres throughout Concord. This Overlay District was established to further protect additional surface waters from degradation and to maintain public health and safety, protect wildlife and their habitats, maintain water quality, and protect natural beauty and scenic qualities. Approximately 36% of this Overlay District has been conserved.

Finally, wetlands and bluffs along rivers are protected under buffer regulations within the Zoning Ordinance. These measures continue with the purpose of protecting water quality. The City has established buffers as part of the Zoning Ordinance. These buffers restrict activities and use within 50 feet of a jurisdictional wetland or the top of a bluff. In addition, wetlands are regulated by the NH Department of Environmental Services Wetlands Bureau as defined by RSA 482-A:2.

### 5.3b Groundwater

Groundwater accumulates and concentrates in two main types of aquifers, which can serve as important drinking water sources. Aquifers can be located within saturated areas of sand and gravel deposits or in fractured bedrock. In the past as glaciers melted they left behind layers of coarse sediments including sand and gravel. The space between fine sediments provides groundwater filtration, storage, and flow. Groundwater stored in *stratified drift aquifers* of this kind can serve as an excellent source of drinking water. Locating and protecting these geologic features helps to ensure a supply of clean drinking water for the community by preventing contamination of these vulnerable resource areas.

Based on recommendation from the 2008 Open Space Plan, the City of Concord developed the Aquifer Protection Overlay District in 2010 to protect the quality and quantity of groundwater resources to be used as drinking water supplies. The District's intent is:

“to maintain public health and welfare by protecting existing and potential sources of groundwater supplies; prevent land use practices and development that could reduce the amount of recharge available to aquifers identified as current or potential sources of drinking water; prevent land use practices and development that could contaminate or adversely impair the quality of groundwater within aquifers identified as current or potential sources of drinking water; provide for future growth, in accordance with the City of Concord Master Plan, by protecting the long-term availability of clean, safe public water; and identify land uses that can safely be sited in aquifer recharge areas and proximal to water supply wells.”

The Overlay District covers approximately 2,788 acres (Table 2). Of this area, approximately 37% has been conserved.

### 5.3c Floodplains and Floodways

Floodplains typically occur along New Hampshire's rivers and major streams. The City of Concord has developed a regulatory ordinance to protect floodplains. The Flood Hazard District, which uses the U.S. Army Corps of Engineers floodplains-floodway mapping, was developed to reduce the hazards of floods in the interest of public health, safety, and welfare; to protect floodplain occupants from losses from flood damage; to protect the public from the burden of

extraordinary financial expenditures for flood control and relief; and to protect the capacity of floodplain areas to absorb, transmit, and store runoff. The Flood Hazard District does not have provisions that speak explicitly to open space; however, there is a prohibition against building in the Floodway.

**Table 2** Size and conservation of various water resources in Concord, NH.

<b>Type of Water Resource</b>	<b>Area or Length in Concord</b>	<b>Percent of Concord</b>
Wetlands	6,677.9 acres	15.5%
Hydric Soils	4,286.1 acres	10.0%
River and Lake Shoreline*	285.5 miles	N/A
Aquifer Protection District	2,788.2 acres	6.5%
Shoreland Protection District	3,788.2 acres	8.8%
Penacook Lake Watershed	2,023.1 acres	2.5%

\*Includes total shoreline of all lakes, ponds, rivers and streams

The intent of the Shoreland Protection District, Aquifer Protection District, and the Flood Hazard District is not to conserve the entire area. Rather, they have been prepared to limit development in a way to appropriately protect these areas.

#### 5.3d Key Under-Protected Resources

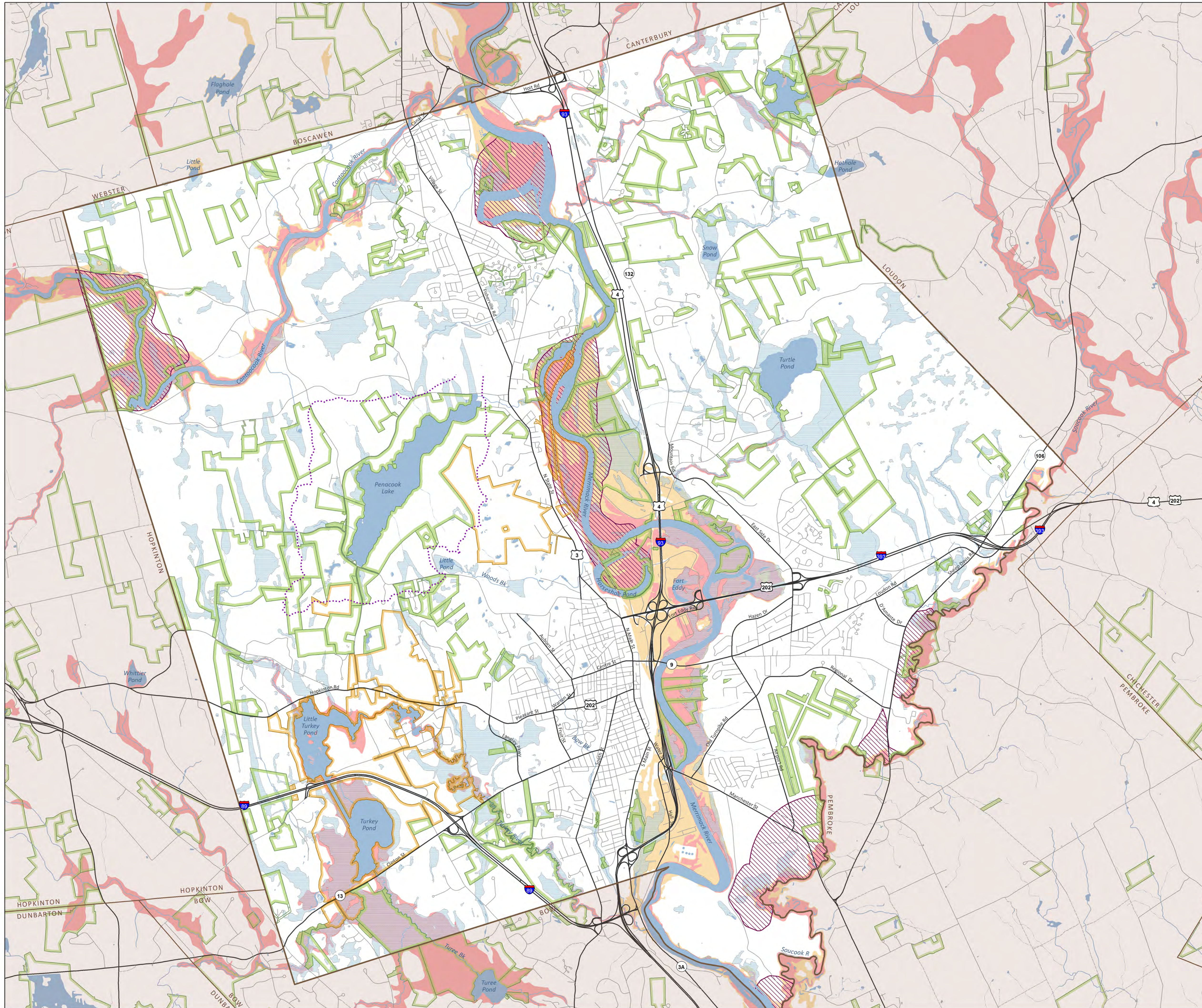
Although protections for key resources are in place, further measures should be taken to protect these resources:

- Riparian buffers along surface waters and wetlands
- Floodplains
- Stratified drift aquifers
- Wetland resources

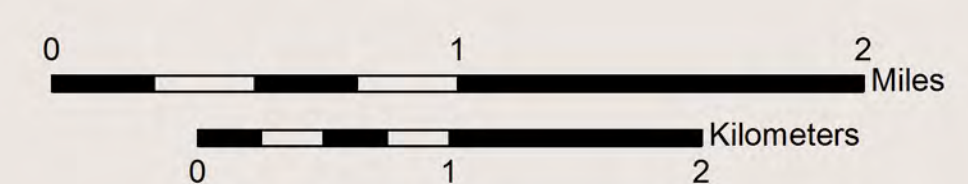


# CITY OF CONCORD OPEN SPACE PLAN 2017

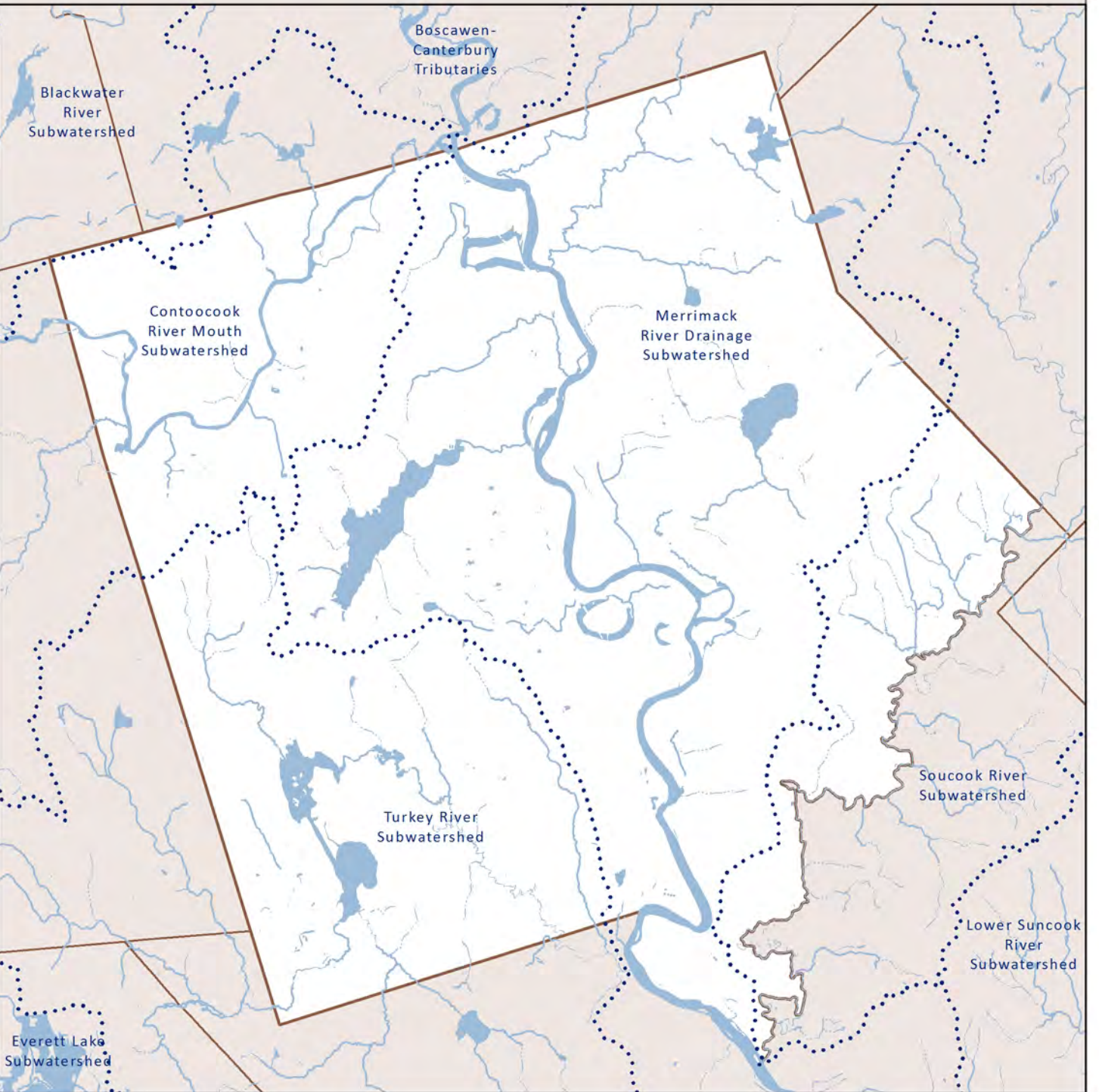
## Resource Map 1: Water Resources



- Wetland and/or Hydric Soil
- Aquifer Protection District
- FEMA 100 Year Flood Zone
- FEMA 500 Year Flood Zone
- Penacook Lake Watershed
- Conservation Open Space Land
- Institutional Land
- Major Road
- Local Road
- Watershed Divide
- Perennial Stream
- Intermittent Stream
- Waterbody (NHD)



Wetlands and Hydric soils were mapped in 2004 for the City of Concord. In this map, wetlands and hydric soils are shown together. Aquifer Protection Districts, and Concord roads were provided by the City. Conservation lands were provided by GRANIT and the City, and were updated by C. Kane in 2017. Wellhead Protection Areas provided by NHDES. The following data layers were mapped at 1:24,000 and distributed by NH GRANIT: flood zones from FEMA's 2010 digital flood insurance rate map; surface waters (lakes, rivers and streams), from the US Geological Society's National Hydrography Dataset; town boundaries, from the US Geological Survey; roads outside of Concord, from NH Department of Transportation; and watershed boundaries, from NRCS and NH DES.





## 5.4 Ecological Resources

### 5.4a Wildlife and Plant Resources

The NH Fish and Game Department, in cooperation with other agencies, organizations, and individuals, produced the original NH Wildlife Action Plan (WAP) in 2005 and revised it in 2015. This document was designed as a planning and educational tool for federal, state, and municipal governing bodies, conservation commissions, land trusts and other conservation organizations, and private landowners, as well as the general public, to promote the conservation and management of New Hampshire’s biological diversity. The WAP provides a resource for developing informed land use decisions and land management planning. The intent is to ensure that there is an adequate representation of various wildlife habitats maintained across our landscape, that common species in New Hampshire remain common, and to prevent the loss of NH’s rare and endangered species.

Based on actual observations and local knowledge, Sperduto Ecological Services, LLC refined seven of the wildlife habitats mapped by the 2010 WAP (Sperduto 2010), including pine barrens, Appalachian oak-pine forests, hemlock-hardwood-pine forests, grasslands, floodplains, marsh-shrub wetlands, and peatlands. This refinement used the same conventions set forth by the WAP. Additional small scale habitats mapped by the 2015 WAP included rocky ridges, cliff and talus slopes, and temperate swamps. Together, there are a total of 10 wildlife habitats mapped for Concord (Table 3 and *Map 2 - Wildlife Resources*).

**Table 3** Size and conservation of wildlife habitats in Concord, NH.

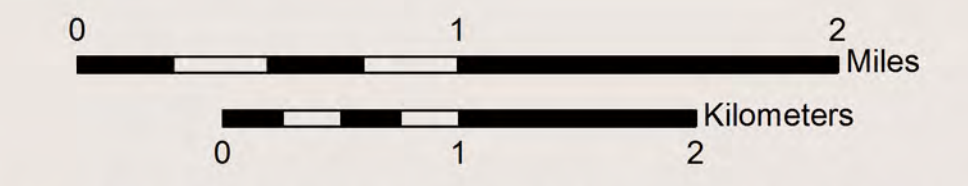
Type of Water Resource	Acreage	Percent of Concord	Acres Conserved	Percent Conserved
Appalachian Oak-Pine Forest	6,631.6	15.4%	1,506.5	22.7%
Floodplain Forest	1,038.8	2.4%	439.3	42.3%
Grasslands	5,250.8	12.2%	1,343.1	25.6%
Hemlock-Hardwood-Pine Forest	22,760.4	52.9%	5,859.9	25.7%
Wet Meadow/Shrub Wetland	1,453.6	3.4%	551.7	38.0%
Peatlands	809.1	1.9%	236.9	29.3%
Pine Barrens	1,198.8	2.8%	441.3	36.8%
Cliff and Talus Slope	11.3	0.03%	1.9	16.3%
Rocky Ridge	19.3	0.05%	7.3	37.9%
Temperate Swamp	1,396.4	3.3%	430.6	30.8%
<b>Source:</b> NH Wildlife Action Plan (2015)				



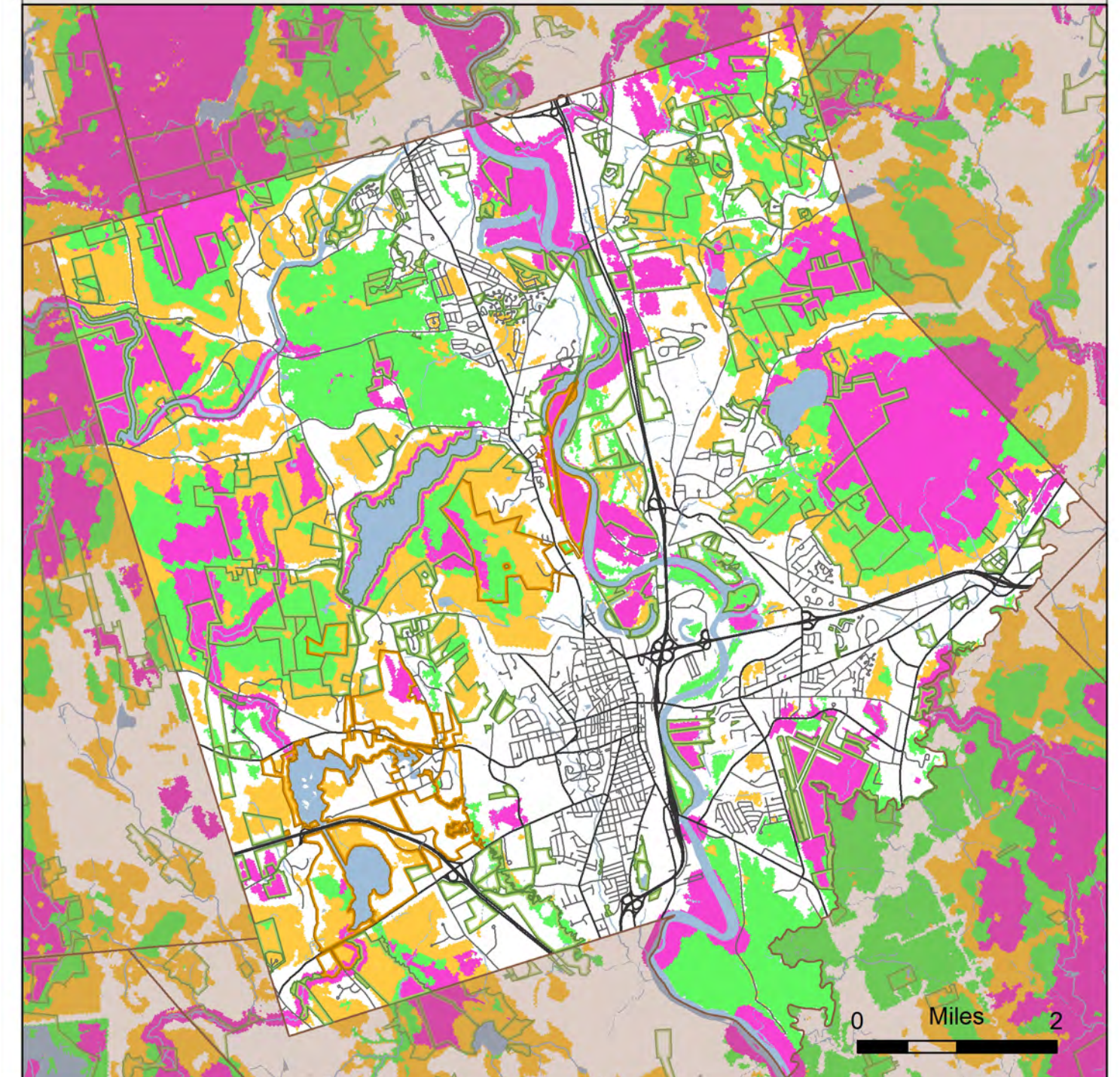
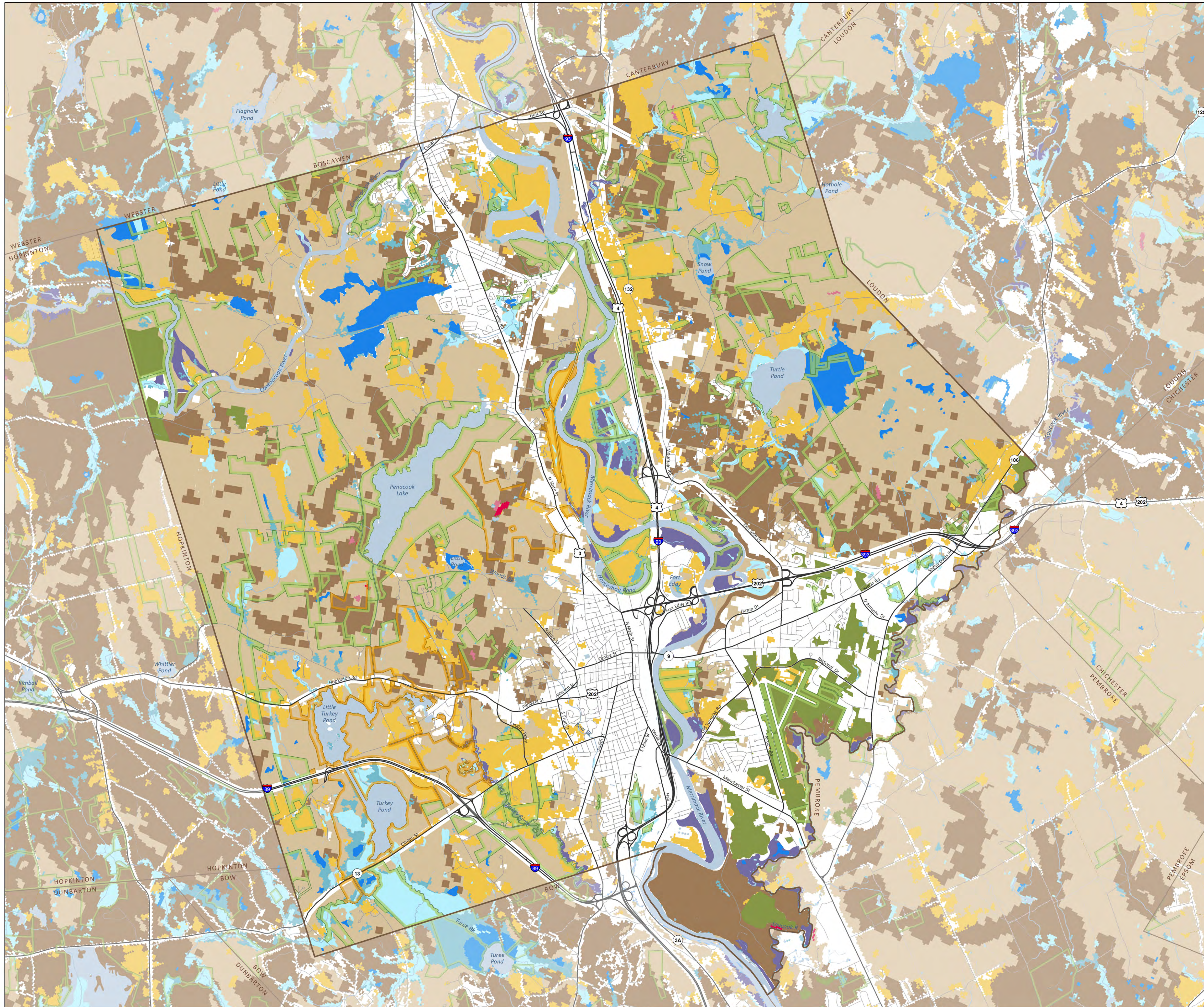
# CITY OF CONCORD OPEN SPACE PLAN 2017

## Resource Map 2: Wildlife Resources

-  Hemlock-hardwood-pine
  -  Appalachian oak-pine
  -  Pine barren
  -  Grassland
  -  Wet meadow/shrub wetland
  -  Peatland
  -  Floodplain forest
  -  Cliff and Talus
  -  Rocky ridge
  -  Temperate swamp
  -  Conservation Open Space Land
  -  Institutional Land
  -  Major Road
  -  Local Road
- ▼ Ranked Habitat Tiers**
-  Highest ranked habitat in the state
  -  Highest ranked habitat in the biological region
  -  Supporting landscape
  -  Conservation Open Space Land
  -  Institutional Land



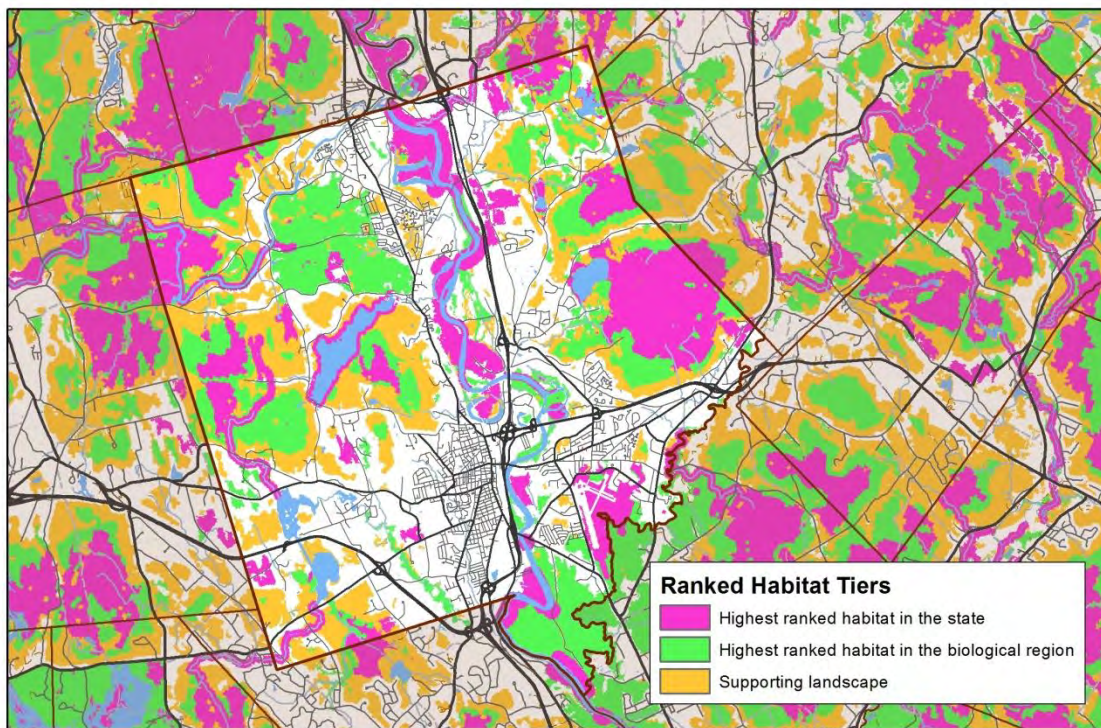
Wildlife habitats and ranked habitat tiers were developed by the NH Department of Fish & Game for the 2015 Wildlife Action Plan. Concord roads were provided by the City. Conservation lands were provided by GRANT and the City, and were updated by C. Kane in 2017. The following data layers were mapped at 1:24,000 and distributed by NH GRANT: surface waters (lakes, rivers and streams), from the US Geological Society's National Hydrography Dataset; town boundaries, from the US Geological Survey; and roads outside of Concord, from NH Department of Transportation.





In addition to mapping the state’s wildlife habitats, the WAP ranked areas predicted to contain the best habitat areas in New Hampshire based on their biological condition, particularly for species of greatest conservation need (Figure 3). The study ranks biological condition for habitat condition and diversity, overall wildlife diversity, presence of rare species and exemplary natural communities, habitat connectivity and fragmentation, human impacts, and risk assessments.

The first tier habitat rankings identify the most significant wildlife habitat groupings on a statewide basis, followed by the most significant regional habitats, and finally identify the surrounding landscapes that can help maintain the ecological integrity of adjacent higher-ranked areas. These rankings are valid at a municipal level for identifying conservation focus areas. For local conservation planning they should be used in conjunction with various other regional conservation plans, site-specific data, and local knowledge about wildlife and their habitats, natural communities, and species of conservation concern.



**Figure 3** NH Wildlife Action Plan habitat rankings within and adjacent to Concord, NH.

Numerous rare and uncommon plant and animal species have been documented in the City of Concord. This data is maintained by the New Hampshire Natural Heritage Bureau (NH NHB) of Department of Resource and Economic Development (NH DRED), in cooperation with the New Hampshire Fish & Game’s Non-Game and Endangered Wildlife Program. Generalized information on the presence of these species and communities is available from the Natural Heritage Bureau by municipality. According to the Bureau’s “Rare Plants, Rare Animals and

Exemplary Natural Communities in New Hampshire Towns”, the species and natural communities/systems listed in Appendix B are now or were at one time documented to exist in Concord. Appendix C provides an explanation for the rarity ranks associated with each species and natural communities/systems.

The geological, glacial and fluvial history of the three major rivers that flow through Concord - the Merrimack, Contoocook and Soucook has resulted in the formation and development of an unusually diverse suite of natural habitats and communities, several of which are rare for New Hampshire. These natural communities include *Pitch pine - scrub oak woodland*, *Acidic riverside seep*, *Dry river bluff*, *Silver maple - false nettle - sensitive fern floodplain forest*, *Semi-rich oak - sugar maple forest* and *Sugar maple - silver maple - white ash floodplain forest*. Two natural community systems are also documented in Concord - *Drainage marsh - shrub swamp system* and *Temperate peat swamp system*. The natural communities and systems included in the NH NHB records represent the highest quality remaining examples of communities of their type in New Hampshire.

The NH NHB derives areas for each mapped record of a species or community based on actual observation points, degree of confidence regarding actual location and extent, knowledge of the biology or ecology of an element, and the extent of suitable habitat. The mapped location and extent of these elements provided a basis for the delineation of conservation priority areas that would protect these resources.

#### 5.4b Unfragmented Lands

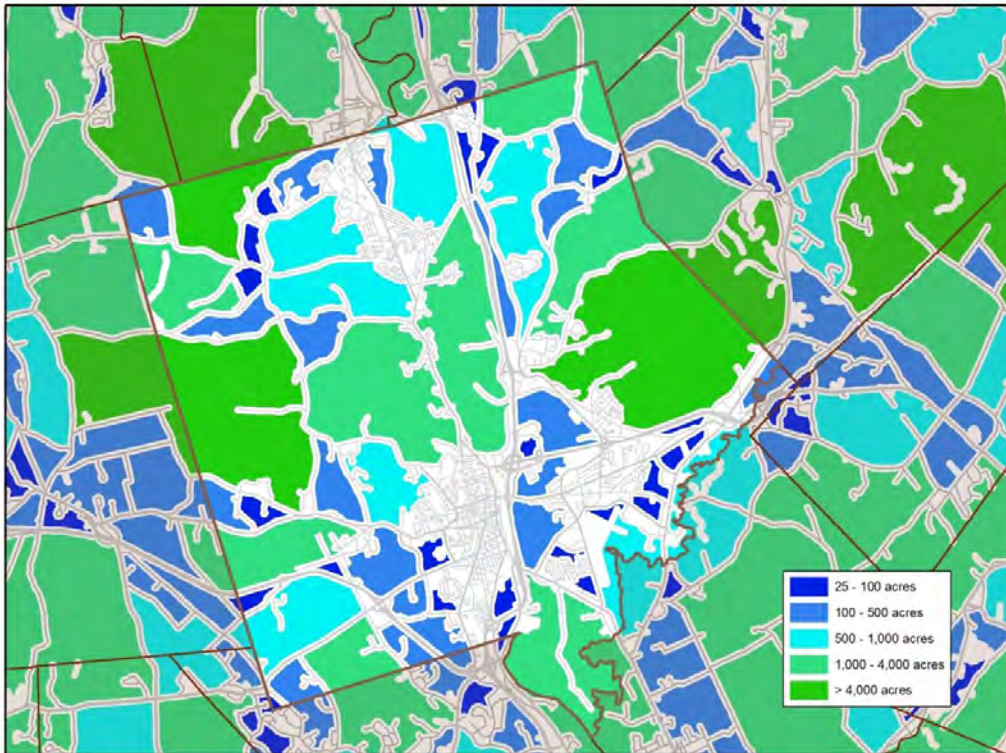
Unfragmented lands are characterized by an absence of the human infrastructure (roads and developed areas) which surround them. Fragmentation of land can negatively affect species survival rates by increasing mortality, lowering breeding success, or contributing to species loss. The degree of severity of fragmentation depends upon many aspects, such as the size and shape of unfragmented blocks, the species or community in question, the extent of loss of natural habitats, intensity of human use, and colonization of invasive species.

Unfragmented lands were developed from the City’s road inventory data (Figure 4). For the purposes of this project, fragmenting features were defined as 300 feet on either side of existing roadways, including all state and town roads but excluding Class VI roads and trails, as well as private driveways. It is this area within 300 feet of roadways which most development is predicted to occur. Unfragmented blocks of land include a variety of natural habitats such as forests, wetlands, streams, and ponds but also can include human-modified areas such as agricultural lands and shrublands.

Large blocks of unfragmented areas are widely known to support greater biodiversity than smaller blocks. As forest blocks become smaller due to the construction of roadways and developments their biodiversity will generally be reduced. This fragmentation effect has less immediate impact on generalist species or those with small home ranges (such as gray squirrels, raccoons, many amphibians, and small rodents) but can affect and potentially eliminate area-sensitive specialists that need large forested blocks to maintain adequate home ranges and for long-term survival (such as bear, bobcat, moose, some reptiles, wood thrush, and goshawk).



Appendix D provides a general list of habitat block size requirements for wildlife to help illustrate this point.



**Figure 4** Unfragmented blocks within and adjacent to Concord, NH.

5.4c Key Under-Protected Resources:

- *Pitch pine - scrub oak woodland* habitat that supports an exceptional diversity and concentration of rare butterfly and moth species in the vicinity of Concord Airport and Soucook River corridor, some of which are globally rare;
- Rare plant populations and high-quality intact natural community in the vicinity of the Concord Heights, Concord Airport and the Soucook River corridor;
- Open habitat along the Merrimack River corridor and elsewhere which supports rare bird populations;
- Intact areas along Merrimack River that support *Silver maple - false nettle - sensitive fern floodplain forest* community;
- Areas across the city that support various peatland natural communities;
- Grasslands, shrubland/early successional habitat, and floodplain forests;
- Large unfragmented block associated with the Broken Grounds area.

**5.5 Working Lands Resources**

Concord is fortunate to have significant soil types conducive for forest management and agriculture. These resources are collectively termed Working Lands Resources. These areas

represent some of the best soils for the production of forest products as well as food, feed and fiber from farming. Awareness of the location and quality of these important soil resources can help provide insight into the potential for production on the working landscape.

#### 5.5a Agricultural Resources

As required by the Farmland Protection Policy Act of 1981<sup>1</sup>, the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) mapped agricultural soils across the United States. Based on a variety of physical and chemical properties (i.e., drainage, texture, hydric regime, pH, erodibility factor), NRCS identified soils which are the most productive lands for agriculture. These include prime farmland soils, farmland soils of statewide significance, and farmland soils of local significance. Each is defined by the USDA NRCS, and the criteria are outlined in Appendix E.

Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses.

Farmland of Statewide Importance refers to land that is not prime or unique but is considered farmland of statewide importance for the production of food, feed, fiber, forage and oilseed crops. A state committee chaired by the Commissioner, New Hampshire Department of Agriculture, Markets and Food, with members representing the University of New Hampshire Cooperative Extension, New Hampshire Association of Conservation Districts and the New Hampshire Office of State Planning developed criteria for defining and delineating farmland of statewide importance. The NRCS State Soil Scientist serves on this committee in an advisory capacity. The original criteria were established in 1983, and updated in 2000.

Farmland of local importance is farmland that is not prime, unique or of statewide importance, but has local significance for the production of food, feed, fiber and forage. Individual County Conservation District Boards developed criteria for the identification and delineation of local farmland on a county-wide basis. The original criteria were established in 1983. Updates are noted according to the county initiating the update.

Significant agricultural soils cover approximately 22,988 acres, or roughly 54% of Concord (Table 4 and *Map 3 - Agricultural Resources*). This total represents the remaining viable areas which have not been lost to development. These soils are widely distributed throughout the town. Prime farmland soils make up about 7% of the total acreage of agricultural soils, while farmland soils of state significance represent 12% and farmland soils of local significance represent 81%.

This plan delineates and maps active agricultural lands, including but not limited to pastures, hayfields, row crops, and orchards, based on an interpretation of aerial photography taken during the active growing season of 2015. A total of 2,204 acres appear to be currently farmed in some manner. Active farmland covers 562.7 acres of prime farmland soils, 298.1 acres of farmland soils of statewide significance, and 549.7 acres of farmland soils of local significance. In addition, there are approximately 850 acres or 38.5% in some form of conservation.

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<sup>1</sup> As defined by the USDA NRCS: “The Farmland Protection Policy Act of 1981 was established to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses.

**Table 4** Size and conservation of agricultural resources in Concord, NH.

<b>Type of Agricultural Resource</b>	<b>Acreage</b>	<b>Percent of Concord</b>	<b>Acres Conserved</b>	<b>Percent Conserved</b>
Prime Farmland Soils	1,520.5	3.5%	430.3	28.3%
Farmland Soils of Local Significance	18,618.3	43.3%	3,889.8	20.9%
Farmland Soils of State Significance	2,849.6	6.6%	868.2	30.5%
Active Agricultural Lands	2,204.0	5.1%	849.6	38.5%

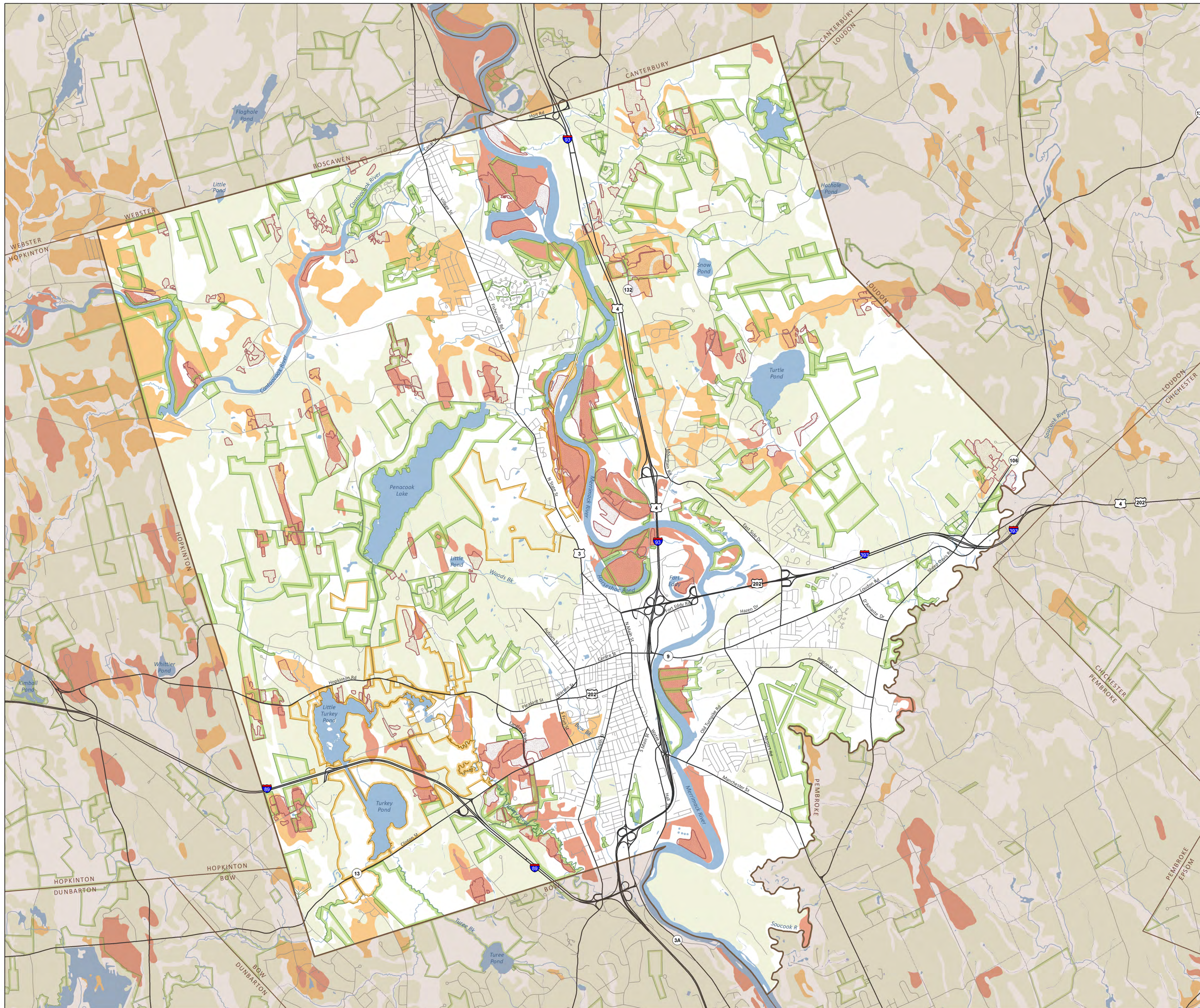


# CITY OF CONCORD OPEN SPACE PLAN 2016

## Resource Map 3: Agriculture

### ◀ Important Agricultural Soils

- All areas are prime farmland
- Farmland of statewide importance
- Farmland of local importance
- Active Agricultural Land
- Conservation Open Space Land
- Institutional Land



Active agricultural lands were developed by C. Kane from review of 2015 aerial photography. Concord roads were provided by the City. Conservation lands were provided by GRANIT and the City, and were updated by C. Kane in 2017. The following data layers were mapped at 1:24,000 and distributed by NH GRANIT: agricultural and forest soils, from the US Geological Society's SSURGO database; surface waters (lakes, rivers and streams), from the US Geological Society's National Hydrography Dataset; town boundaries, from the US Geological Survey; and roads outside of Concord, from NH Department of Transportation.



### 5.5b Forest Resources

Forest resources within New Hampshire provide sources of employment, forest products, promote local economies, recreation and tourism, provide clean air, help sequester carbon, and provide habitat for wildlife and plants. Additionally, forest resources support diverse ecological functions, such as nutrient cycling, carbon sequestration, and water quality maintenance through sediment trapping. For these reasons, it is important to maintain large unfragmented tracts of forest lands and to better understand where important forest soils exist in Concord.

The USDA NRCS mapped the distribution of important forest soils and classified them according to their capacity to grow trees. These soils are ranked according to their specific capacity to provide productive conditions for timber production. The NRCS has identified the three most productive soils groups within this ranking as Forest Soil Class IA, Class IB, and Class IC. These soils are defined in Appendix F.

Important forest soils represent nearly 26,254 acres, or approximately 61% of Concord (Table 5 and *Map 4 - Forest Resources*). This total represents the remaining viable areas that have not been lost to development. Forest soil groups IA and IB make up the majority of this resource and are most ideally suited for hardwood production. Soil group IC appears to be more restricted to stream drainages where outwash sands and gravels were deposited by glacial activity about 11,000 years ago. Group IC soils types are better suited for softwood production, mainly white pine.

**Table 5** Size and conservation of forest resources in Concord, NH.

Type of Forest Resource	Acreage	Percent of Concord	Acres Conserved	Percent Conserved
Group IA Soils	10,097.2	23.5%	2,809.5	27.8%
Group IB Soils	8,999.9	20.9%	2,268.0	25.2%
Group IC Soils	7,157.0	16.6%	1,319.3	18.4%

The City of Concord's Forest Management Plan was prepared by a consulting forester. The City's consulting forester is responsible for implementation of this Plan. The primary mission of Concord's Forestry Program is to promote sound forest management on City-owned lands. A secondary mission is to ensure that forest management is financially self-sustaining.

### 5.5c Key Under-Protected Resources:




- Significant agricultural soils, especially farmland soils of local significance;
- Significant forest soils, especially Group IC soils that are important for white pine production.

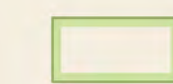



# CITY OF CONCORD OPEN SPACE PLAN 2017


## Resource Map 4: Forestry


### ◀ Important Forest Soils

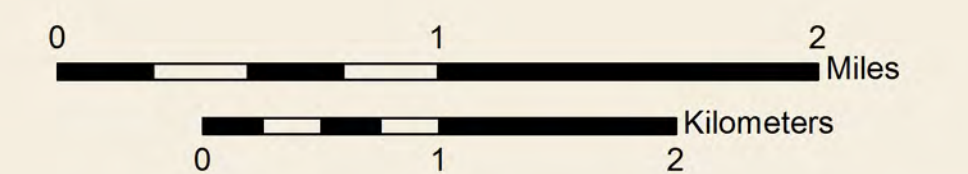
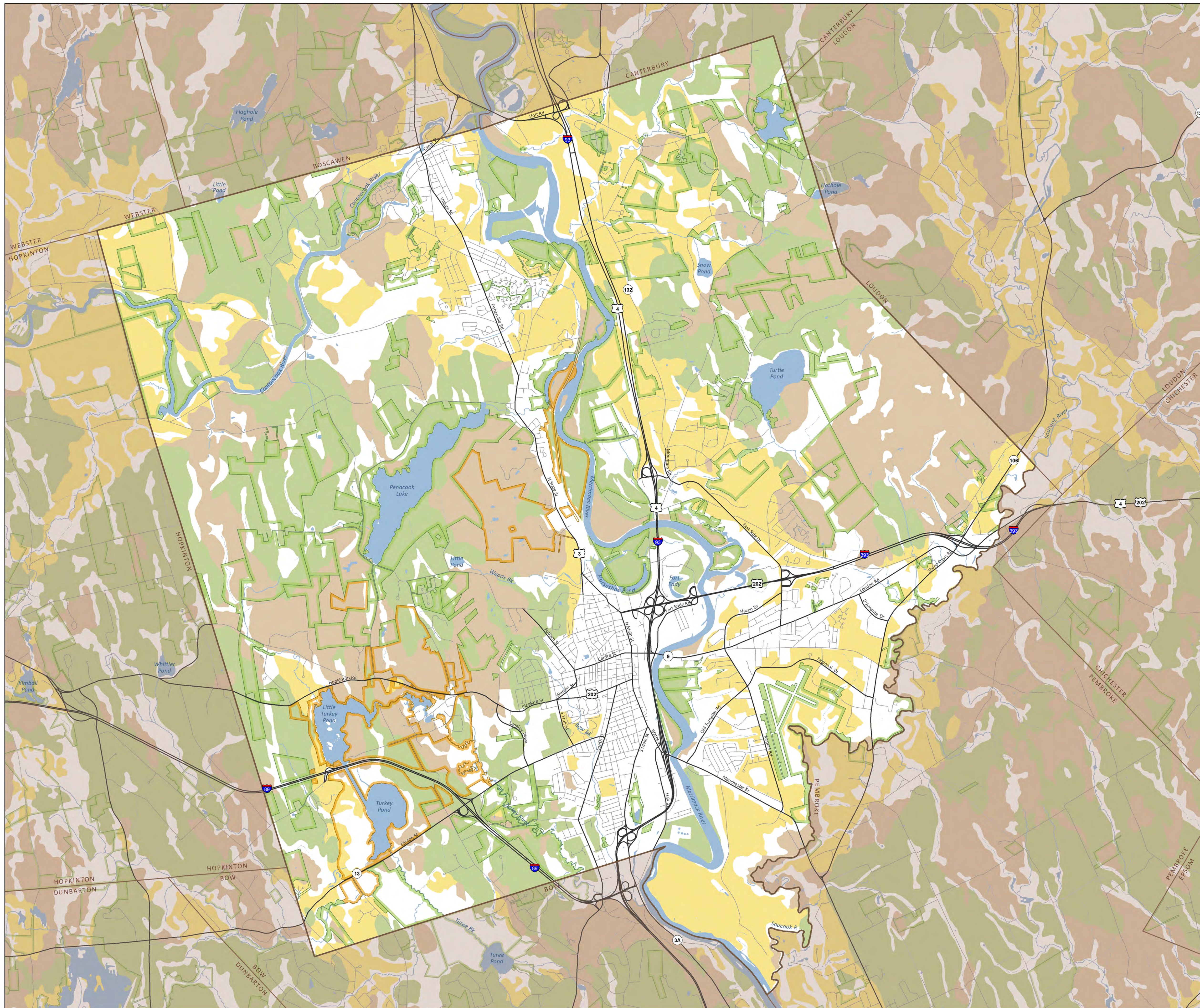
-  Group IA - Deeper, loamy textured, moderately well and well-drained soils that support a variety of hardwood species such as beech, sugar and red maple, yellow and white birch, white ash and red oak, with spruces, hemlock and balsam fir also present.
-  Group IB - Moderately well and well-drained soils that are sandier in texture, generally less moist and less fertile than 1A soils. The tree species found on these soils are similar to those on 1A soils, but productivity is not as high.
-  Group IC - These soils are moderately well drained to well drained and excessively well drained outwash sands and gravels. These soils favor the growth of softwoods such as white pine, balsam fir, red spruce and hemlock, while some hardwoods such as red maple, aspen and white birch may also be present.

 Conservation Open Space Land

 Other Open Space

 Major Road

 Local Road



Concord roads were provided by the City. Conservation lands were provided by GRANIT and the City, and were updated by C. Kane in 2017. The following data layers were mapped at 1:24,000 and distributed by NH GRANIT: forest soils, from the US Geological Society's SSURGO database; surface waters (lakes, rivers and streams), from the US Geological Society's National Hydrography Dataset; town boundaries, from the US Geological Survey; and roads outside of Concord, from NH Department of Transportation.



## 5.6 Conservation Lands

Concord’s updated conservation and public lands are displayed in *Map 5 - Conserved Lands and Recreation*. The history, nature, method and parties involved with “conservation” in Concord are highly variable. A number of parcels are protected with legally-binding conservation restrictions, including conservation easements held by a variety of non-governmental organizations. The City has purchased some parcels in fee as “conservation land”, but without express legal use restrictions. The final conservation lands dataset is inclusive of not only natural open space areas, but also public lands that have a variety of active uses, including parks, school grounds, cemeteries and landfills. A series of conservation level categories was developed, and each parcel was assigned to one of these categories. Table 6 lists these categories and includes a brief description of each, as well as an example.

**Table 6** Conservation and public lands protection level categories in Concord, NH.

Category	Description	Example	Acreage
Concord Conservation Trust Fund and Bond Acquisition	Fee property purchased using funds provided by Conservation Trust Fund monies	Gully Hill Road agricultural lands	1,110
City-owned Conservation Lands	Fee properties acquired specifically for conservation	Oak Hill	3,119.5
City-owned - Drinking Water Protection	Lands acquired in fee to protect drinking water supplies	Penacook Lake watershed lands	884.1
Privately Owned Conservation Land	Properties owned in fee by private entities or individuals, often protected by conservation easements	Dimond Hill Farm	2,567.7
State Conservation Land	State lands dedicated to resource and wildlife protection, public use and/or forestry	Hoit Marsh Wildlife Management Area	1,072.8
City Park	Urban public park developed for a variety of recreation activities include organized sports, swimming and skating	Rollins Park	258.4
Concord Fee - Undeveloped / Unspecified	Properties owned in fee by the City of Concord, but history and intention of acquisition not specified	Fields behind Wastewater Treatment Plant	285.3
State Land - Undeveloped / Unspecified	Significant State-owned open space parcels with no specified of promoted uses or purposes	White Farm	451.1

St. Paul's School Land	Lands owned by St. Paul's School and traditionally used for a variety of purposes including recreation and forestry	Lands surrounding Turkey Pond	1,678.2
State Prison Land	Lands owned and controlled by the State of NH for the purposes and use of the State Prison – No public access	N.H. State Prison farm fields	624

The conservation categories above represent a spectrum of legal protection level, from minimal to robust. Acknowledging this range, the authors selected a subset of five of these categories as “conservation land” in recognition that they do have some measure of restrictions, designation, funding source or traditional use that is primarily for conservation purposes. These parcels were used to calculate the acreages of the resources addressed in this report that are in conservation. The included categories are Concord Conservation Trust Fund Acquisition, Concord Fee - Drinking Water Protection, Concord Fee Conservation Lands, Privately Owned Conservation Land or State Conservation Land. St. Paul’s School Lands and State Prison Lands are displayed because they represent significant open areas of Concord, but they are tracked separately because they lack formal conservation restrictions.

### 5.7 Recreational Resources

The City of Concord is unique in that it provides a major system of recreation resources including parks, open spaces, and trails. These amenities can serve residents, attract new residents and businesses, and attract tourists for recreation.

#### 5.7a City Trails

The City of Concord is fortunate to have an exceptional variety and distribution of trails for passive recreational use. Many of these trails occur on City-owned conservation lands, while others are on private lands by permission with trail agreements generously granted by the land owners. Concord now has 82 miles of mapped trails which are open to the public for hiking, snowshoeing, Nordic skiing, and trail biking. The trails have been laid out, cleared, and maintained over the years by volunteers who took the initiative to establish trail networks which have grown and multiplied, especially in the past 10 years, with input from the City’s consultant forester, Planning Department staff, and Conservation Commission. The trail volunteers were recently formalized as a subcommittee to the Conservation Commission. The mission of the trails subcommittee is to develop, maintain, and promote mixed-use trails for the City of Concord consistent with the Open Space Plan.

Refer to Table 7 and Map 5 Conservation Lands and Recreational Trails that illustrate the publicly accessible trail networks available in Concord. As the map indicates, the majority of existing trails are situated on publicly owned or conservation land. For example, the City has trail agreements with private land owners to allow the use and maintenance of sections of the West End Trail network that do not occur on conservation/public land. This 6.47 mile West End

Trail creates connections between the trail networks at the Audubon Society, Dimond Hill Farm, Marjorie Swope Park and Carter Hill Orchard.

**Table 7** Publicly accessible trail networks in Concord, NH.

<b>Trail Network</b>	<b>Miles</b>	<b>Trail Network</b>	<b>Miles</b>
Audubon Society	2.44	Oak Hill Trails	6.92
Batchelder Mill Road Trails	3.24	O'Reilly-Fleetham Trail	0.77
Bela Brook Trail	1.12	Reserve Place Connector	0.43
Broken Ground	4.62	Riley Trails	1.23
Carter Hill Connector	1.48	Rolfe Park Trails	0.99
Carter Hill Trails	3.61	Russ Martin Park	0.40
Contoocook River Park Trails	1.87	Sewalls Falls Park Trails	4.03
Curtisville Road Trails	0.52	Spear's Park Trails	1.72
Dimond Hill Farm	0.55	SPNHF Trails	2.28
East Concord Heritage Trail	6.23	Sugar Ball	0.28
Healy & Terrill Park Trails	1.44	Swope Park Connector	1.18
Lehtinen Park Trails / Jim Hill River Walk	3.14	Swope-Winant Connector	1.74
Marjory Swope Park	2.30	Turkey River/White Farm Trails	5.14
Mast Yard State Forest Trails	5.75	Upton-Morgan State Forest Interpretive Trail	0.76
Merrill Park Trail	0.53	Walkers Reserve	0.78
Merrimack River Greenway Trail	0.79	Weir Road Boscawen Town Forest Trails	3.04
Morono Park Trails	1.18	West End Farm Trail	6.47
Oak Hill Trails	6.92	Winant Park	<u>2.66</u>
		Total Miles:	81.65

### 5.7b Regional Trail Systems

In addition to the rustic trails across the city, other trail efforts have been backed in recent years to address the interest in connecting to regional recreation trails. The Heritage Trail was adopted in 1988 by the City as an aspirational vision for a trail along the entire Merrimack River corridor to connect communities from Franklin in the north to the river's mouth in Newburyport, MA. Several short sections were dedicated in Concord during the 1990's and remain in use today.

More recently, a new vision has been promoted as the Merrimack River Greenway Trail (MRGT), whose parent "Friends" organization is active with planning, fundraising and public outreach to achieve this long-standing goal of a river trail through the Capital City. The trail is conceived as a paved, multi-use trail that would be suitable for non-motorized uses including for bicycles, roller blades, running and walking. It is contemplated that wheelchairs and other

mobility devices will also have access to the trail. The MRGT would ultimately connect to the Northern Rail Trail (NRT) a short distance beyond the Concord-Boscawen boundary. The NRT currently provides a dedicated 58-mile off-road connection to West Lebanon.

Another initiative in its exploratory stages involves the Concord–Claremont abandoned rail corridor, which could ultimately provide connections to Newport and Claremont to the west. Unlike the Pan Am Railroad corridor incorporated into the MRGT route, much of this corridor reverted to the underlying fee ownerships some time ago, and is currently composed of various narrow private tax parcels, several of which are in public ownership.

#### 5.7c Bicycle and Pedestrian Connections

The City of Concord adopted a Bicycle Master Plan in 2010. This document specifies key bicycling routes on City roads to provide a transportation network for bicycles. It also includes important street and trail improvements to benefit bicycles and a way to include bicycle interests in City planning projects.

The 2017 Pedestrian Master Plan for Concord involved public and staff input to guide planning decisions to achieve the desired outcomes of an improved walking transportation system, improved public health by walking, and economic development as an outgrowth of improving the walkability of the community. A series of three community goals were developed - 1) to make Concord an accessible community to walkers, and those dependent upon mobility devices on safe and clear sidewalks and crossings, 2) to ensure safety and avoidance of injuries by vehicles, and 3) to help enhance the enjoyment of walking by adding amenities including benches and trees. A series of neighborhood plans were also developed, some recommendations of which are relevant to the Conservation and Open Space Plan update, and the connections to open space:

- Construct a shared use path (Rail Trail) from Penacook to the Downtown area and recreational areas along the Merrimack River in between to provide an excellent off-street transportation alternative;
- Construct a shared use path through the downtown area to the South End;
- Include a side path or shared use path as part of the Langley Parkway extension (CIP #40);
- Merrimack River Greenway Trail: A shared use path along the Merrimack River is recommended to increase access to the river, provide recreational opportunities, and improve access to Terrill Park;
- Sewall’s Falls Road, Manor Road, and Sewalls Falls Bridge: Construct sidewalks to connect many residences to the Sewalls Falls Recreation Area and the Merrimack River;

#### 5.7d Other Recreation Resources

The City of Concord Parks and Recreation Department oversees the management and planning for City Parks. A plan and goals for recreation is described as a separate chapter in the 2030 Master Plan, and it focuses on the park and recreational facilities within or immediately adjacent to the Urban Growth Boundary. Some City facilities, such as Lehtinen Park, are called “parks”, but are located outside of the Urban Growth Boundary and are more similar to conservation open space areas which are managed by the Conservation Commission, whereas parks are programmed by the Recreation Department and maintained by the General Services Department.

A Park Master Plan was developed since the 2030 Master Plan, and is implemented by the City’s Recreation and Parks Advisory Committee and Parks and Recreation Department.

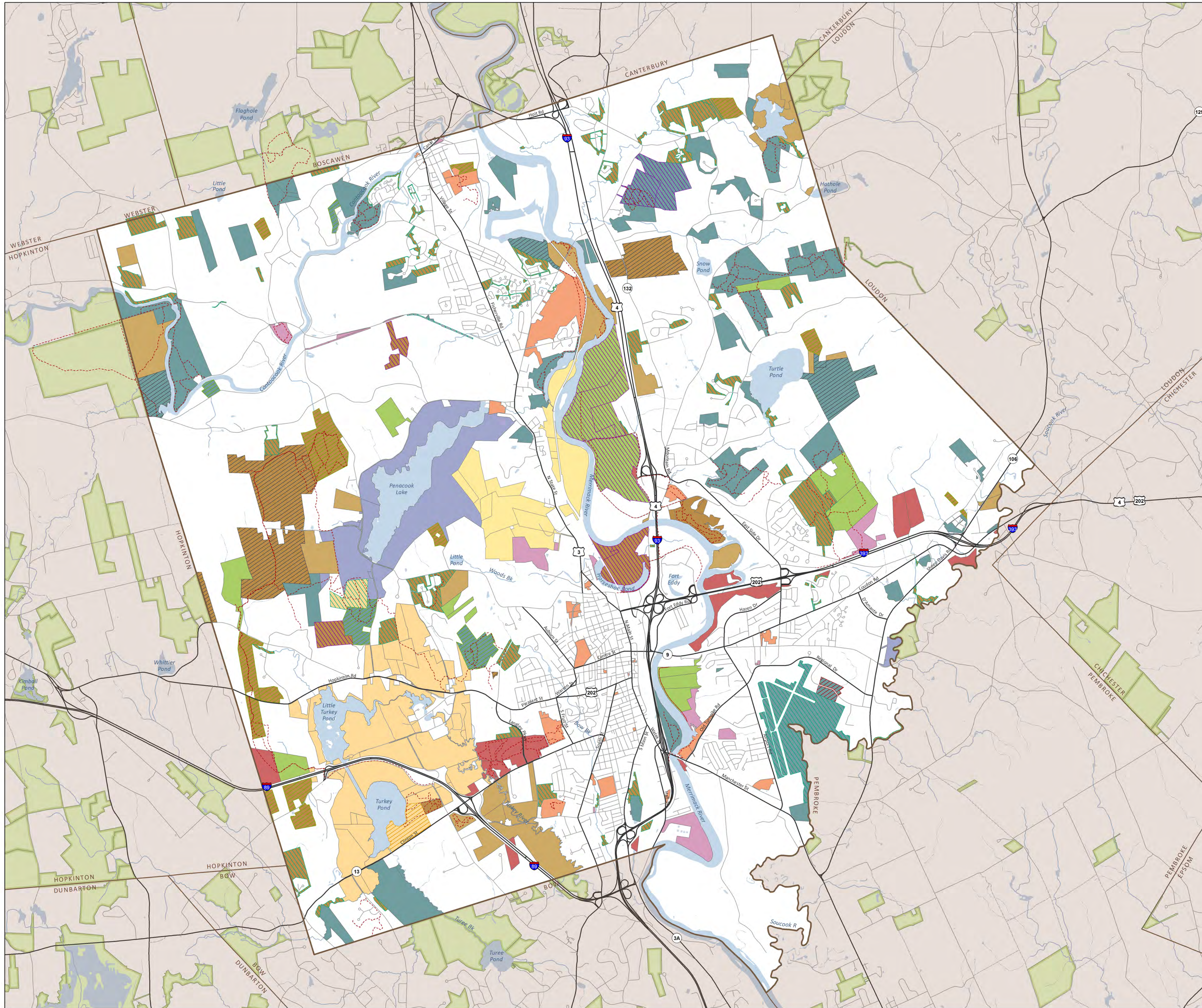
#### 5.7e Key Under-Protected Resources

- Trail corridor for Merrimack River Greenway Trail, including recently abandoned Pan Am Railroad corridor between downtown Concord and the Boscawen town line
- Unprotected segments of Concord – Claremont Rail Road corridor (Concord – Lake Sunapee Rail Trail)
- Unprotected segments of the Merrimack River corridor (Heritage Trail)
- Off-street connections that could link population centers with existing trail networks

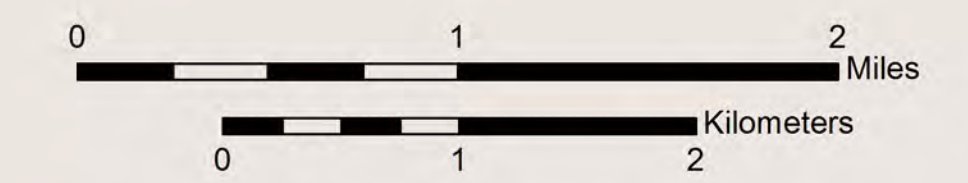


# CITY OF CONCORD OPEN SPACE PLAN 2017

## Resource Map 5: Conservation Land and Recreation



- Conservation Restriction Holders**
- Audubon Society of New Hampshire
  - City of Concord
  - Five Rivers Conservation Trust
  - Society for the Protection of NH Forests
  - State of New Hampshire
  - US Fish & Wildlife
- 
- Concord Conservation Trust Fund Acquisition
  - Concord Fee Conservation Land
  - Concord Fee - Drinking Water Protection
  - Privately Owned Conservation Land
  - State Conservation Land
  - Concord Fee - Undeveloped / Unspecified
  - City Park
  - State Land - Undeveloped / Unspecified Use
  - State Prison Land
  - St. Paul's School Land
- 
- Major Road
  - Local Road
  - Recreational Trails



Concord roads were provided by the City. Conservation lands were provided by GRANIT and the City, and were updated by C. Kane in 2017. The following data layers were mapped at 1:24,000 and distributed by NH GRANIT: agricultural and forest soils, from the US Geological Society's SSURGO database; surface waters (lakes, rivers and streams), from the US Geological Society's National Hydrography Dataset; town boundaries, from the US Geological Survey; and roads outside of Concord, from NH Department of Transportation.



## **5.8 Built (Human) Environment**

Because Concord is centrally located and situated on the Merrimack River, it has been a crossroads of transportation and commerce since its founding. Unlike Manchester, Concord does not have river rapids suitable for large-scale hydro-based industries, although Penacook Falls did provide early mill opportunities. Concord did have an advantage of easily workable and productive farm soils along both sides of the river; and therefore farming was an important early industry, as was quarrying of its high-quality granite.

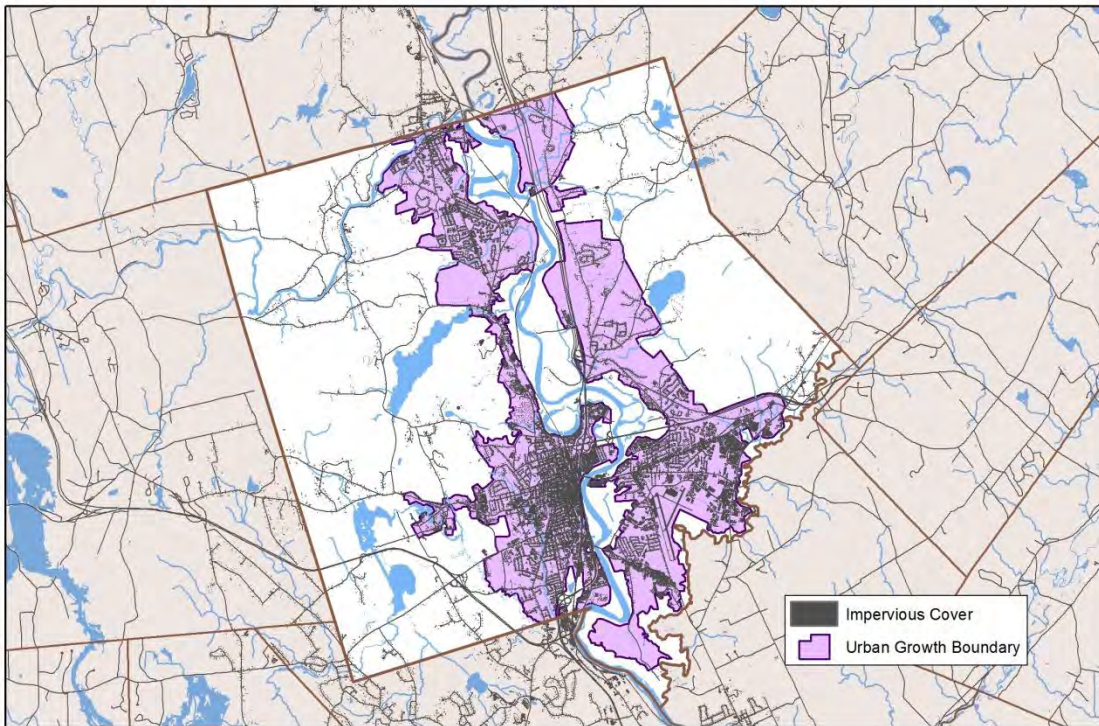
Established as the State Capital in 1808, by the mid-19<sup>th</sup> century the city developed into an important railroad hub. The automobile and truck transportation that characterized the years after 1900 brought a new network of roads converging on the Capital City, including two interstate highways and three major state highways.

Residential and commercial development especially in the 20<sup>th</sup> and early 21<sup>st</sup> centuries has accelerated change in the community. Proliferation of commercial development in the past 25 years along arterial roads, including Loudon Road, Manchester Street, and Rte. 3 and 3A north and south of downtown Concord, have resulted in expansive areas of impervious surfaces from access roads, parking facilities, and a variety of retail and commercial structures.

### **5.8a Urban Growth Boundary**

Residential development has increased along the road corridors and on the buildable high ground near the Merrimack and Contoocook Rivers as well. Community concern about the pace of this development and a sense of urgency about the loss of the rural character that typified the surrounding open areas of Concord led to the adoption of an Urban Growth Boundary in 1993.

The rationale for delineating a zone around the majority of the built portions of the city was to direct continued growth as infill development in areas of existing commercial / dense residential use, while limiting such development in the more rural portions of Concord, including the floodplain of the Merrimack River. The practical effect of the Urban Growth Boundary has been to reduce the cost to taxpayers for expanding water and sewer lines and City maintained roads into areas of the City with less population density. Figure 5 below depicts the extent of the Urban Growth Boundary and the impervious surfaces associated with the built environment.



**Figure 5** Extent of the built environment in Concord, NH.

Source: Central NH Regional Planning Commission. 2015. Impervious Cover Study for City of Concord.

### 5.8b Concord Impervious Surfaces

The Central New Hampshire Regional Planning Commission (CNHRPC) conducted a study in 2015 which analyzed the total area of impervious surfaces that have accumulated in the city as a result of permanent structures and pavement created by all sectors – residential, industrial, commercial, transportation and municipal/State/Federal. Recent scientific advancements allow for the prediction of negative effects resulting from impervious surface levels in a municipality or zone, such as the Concord Urban Growth Boundary. Impacts are generally a result of excessive surface waters associated with waterway flooding and storm water runoff. Collateral impacts can include road runoff such as oils, salt and sediments that can affect water quality. The percent of impervious surfaces can be used as an indicator of the state of ecological balance that a community has maintained, or should consider striving for. The acreage and percentage of total area of impervious surfaces for are listed below:

- Impervious Area of the entire area of Concord: 4,434 acres of 43,000 total acres (10.3%);
- Impervious Area inside the Urban Growth Boundary: 3,690 acres of 134,508 acre total (28.2%).

Negative impacts can be expected as a watershed exceeds a generally accepted threshold of about 5% impervious area. As there are large areas within the watersheds located outside the



city limits of Concord; it should be noted that the impervious surface areas of 10.3% only represents Concord's share of these surfaces. It is expected that if the impervious surface of the less developed portions of these watersheds outside of Concord were added in, that this value would be reduced. The area inside the Urban Growth Boundary currently is 28.2% impervious area (Figure 5).

The CNHRPC study also referenced a NH Department of Environmental Services (NHDES) study which determined that 83% of surface water impairments in Concord in 2008 were due, at least in part, to issues related to storm water. The NHDES report suggests seven regulatory areas for communities to mitigate the impacts of excessive flooding and storm water runoff. Of the seven regulatory recommendations, Concord has made updates to its Zoning Ordinance, Site Plan Regulations and Subdivision Regulations to address all 7 of the stormwater management criteria highlighted in the report.

#### 5.8c Key Recommendations

Areas that would benefit from further efforts include control of peak flow and volume (of runoff waters) to not exceed pre-development conditions, by reducing the allowed amount of impervious surface on existing developments, and increasing storm water infiltration and pre-treatment on existing developed lands. Maintenance of open space strategically spaced within the Urban Growth Boundary would also help to capture, slow and passively treat effluent storm water runoff, and help reduce the worst impacts caused by runoff.

## **6. Climate Change and Resiliency**

In light of evidence of a changing climate, communities are incorporating the concept of resiliency into their proactive planning efforts. The concept of ecological resiliency refers to the capacity of wildlife and plants and their natural processes to sustain change over time. Resiliency studies attempt to predict how the landscape can respond to a changing climate where extreme temperature and precipitation patterns, increasing intensity and frequency of storms, flooding, and rising sea levels are predicted.

When crafting a conservation and open space plan it is necessary to understand the distribution of the various natural resources and conserved lands within and adjacent to Concord. As part of this planning process, it is imperative to identify and capture climate-resilient landscapes. This provides a more inclusive approach, integrating significant natural resources with areas that are capable of recovering from major disturbance events (such as stronger storms, increased droughts, and floods) for long-term conservation success.

There are three major characteristics of resilient landscapes that we can use to plan for this future change. The first characteristic is the geophysical diversity of our landscape. This aspect refers to the diversity of geology, soils, elevations, and landforms, including water features such as lakes and streams. Physical diversity promotes both habitat and species diversity due to a wide range of conditions, including elevations, sun exposure (temperature and moisture), soils, hydrology, and ecological processes that help define distinct ecosystems. In general, the more diversity there is, the more a landscape is likely to recover from extreme disturbances.

The second major characteristic is connectedness. This refers to the ability of species to freely move throughout the landscape unimpeded by major barriers such as human development or large river systems, such as the Merrimack River. Connectedness can be viewed at the local and regional levels. The goal is to connect conservation open space to promote free movement of wildlife and plant species.

Biological condition is the final consideration in planning for climate resilience. This characteristic takes into consideration the impact of stressors on the environment, including past land use, human development, invasive species, air and water pollution, and climate change. Biological condition also considers the presence of species of greatest conservation need.

A number of recent predictive models have shown that northeastern forests are likely to experience greater tree species diversity loss than other parts of the US due to climate change. One recent study also conducted an assessment of 13 broad northeastern habitat types. The study identified habitat types which are especially susceptible to the effects of climate change. Habitat types which occur in Concord are as follows:

Most Susceptible:

- bogs and fens
- southern reaches of northern hardwoods forest

Less Vulnerable:

- central (Appalachian) oak-pine forest
- pine barrens
- marshes
- shrub swamps

The NH Wildlife Action Plan (WAP) includes a risk assessment of 27 habitats and 157 species of greatest conservation concern that was based on standards adopted by other northeastern states. The assessment assigned a number of risk factors to each of these species within each described habitat to determine which habitat types (and the species they support) appear to be most vulnerable to various effects including pollution, climate change, natural systems modification, invasive species, disease and development. The following list of WAP habitats which occur in Concord and were determined to be the most highly ranked threats from these change factors are as follows:

- warmwater rivers and streams
- vernal pools

Invasive species and introduced pathogens in Concord have been recognized as a significant threat since the decimation of virtually all American chestnuts, once a keystone forest species. In more recent years invasive plants as well as introduced insects and diseases have become widespread. Major river valleys are especially susceptible to the introduction and spreading of such exotic plant species as Asian bittersweet, Japanese knotweed and glossy buckthorn, due to the popularity as a food for migrating and resident birds which spread their seeds.

A progressively warmer climate has been seen as one cause of the spread of many of these species. In the last 5 years alone, the emerald ash borer (EAB) and red pine scale have quickly spread to their respective host trees much in the way the American elm was once so drastically affected. In a recent report from the City's consulting forester it was estimated that 20% of ash trees on city-owned lands would be lost in 5-10 years due to the EAB. In addition, the City has had to manage several acres of red pine over the past few years due the invasive red pine scale insect. As road maintenance, forestry and recreational improvements are planned on open space, roads and City land, extra precautions need to be taken to minimize the spread and introduction of invasive plants.

To learn more about climate-resilient landscapes and to view maps developed by The Nature Conservancy go to:

<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/resilience/Pages/default.aspx>

## **7. Conservation Open Space Focus Areas**

Areas of largely undeveloped and unprotected open space were identified and delineated to display geographic areas of Concord that contain high natural resource values. These "Conservation Focus Areas" (CFA's) were grouped according to Concord's Ecoregions defined by Sperduto (2010), and assigned cultural / geographical place names based on their locations. The delineation of these CFA's was driven by the application of a suite of selection criteria. The selection criteria listed below capture a diversity and range of importance values that taken together clearly differentiated high quality areas or the landscape from developed and lower quality areas. This process was used to sort and prioritize the importance of unprotected open space lands in Concord for acquisition.

### **7.1 Selection Criteria**

Conservation priority criteria were developed to guide the location and delineation of proposed CFA's. The criteria were organized under four headings to capture the multiple considerations that support selection of a particular area. The criteria are as follows:

#### **7.1a Natural Resources**

- Resources Present: The specific type of important resources present, including drinking water, degree of fragmentation, productive soils, rare biological elements, scenic importance and active agriculture
- Rarity: How uncommon or widespread a resource is locally and regionally
- Rare Biological Elements: Presence, number and significance of rare plant, animal or natural community elements
- Threats: How vulnerable an area is to degradation / conversion
- Quality: Ranking of general quality and natural condition
- Adjacent Conservation: How protection would connect to, enhance, and/or augment existing conservation areas to strengthen protection of natural resources

#### **7.1b Landscape Context**

- Size: Relative size of entire CFA area (the larger the better)

- Contribution to Existing Conservation Base: Proximity to already protected land
- Physical Diversity: Variety of geology and landform types and hydrological features
- Ecological Integrity: Biological condition including rarity, stress, and degradation
- Strategic Location on Landscape: How well this area benefits the ecological integrity of surrounding areas
- Connectedness: How well this area provides connectivity with adjacent habitats
- Resiliency Value: Overall resiliency based on physical diversity, ecological integrity, and connectedness

#### 7.1c Human / Cultural Importance

- Essential Needs: Provides or has potential to provide essential resources such as drinking water, flood control and storage, food crops, livestock grazing, timber products, etc.
- Quality of Life: Provides or supports recreational opportunities, scenic views, historical context, etc.
- Connection: Strategic location provides walkable / bikeable connections to and between open space areas

#### 7.1d Concurrence

- Identified by other Study or Informed Input: Studies corroborate the selection of an area (e.g., WAP, Spurduto, Merrimack Watershed Plan)
- Acknowledged by Community as Important: Whether the area has been identified as important to Concord
- Meets Established Criteria: How well conservation of an area achieves Concord's conservation goals

### 7.2 Conservation Focus Areas (CFAs) by Ecoregion

#### 7.2a Merrimack River

##### 1. Goodwin Point

- Total Acres: 289
- 1.7 miles of undeveloped frontage on the Merrimack River
- Abuts 2 conservation parcels
- 90% of area underlain by high-yield aquifer
- Entire CFA within Aquifer Protection District
- 40 acres of actively farmed prime agricultural soils
- 7 Rare Biological Elements
- 85 % of CFA ranked as Tier 1, 2 and 3 WAP habitat
- Coincident with Spurduto Conservation Priority Area

##### 2. Sugar Ball

- Total Acres: 63
- 0.4 miles of undeveloped frontage on the Merrimack River
- 90% of area underlain by high-yield aquifer
- Active agricultural fields

- 2 Rare Biological Elements
- Protects 100° of 360° view of undeveloped Merrimack Bluffs, a signature landscape feature of Concord
- 50 % of CFA ranked as Tier 1, 2 and 3 WAP habitat

### 3. Garvin’s Bluffs

- Total Acres: 95
- 1 mile of undeveloped frontage on the Merrimack River
- 100% of area underlain by high-yield aquifer
- Large portions of CFA within Aquifer Protection District
- Protects Merrimack Bluffs, a signature landscape feature of Concord
- 95 % of CFA ranked as Tier 1, 2 and 3 WAP habitat

## 7.2b Contoocook River Valley

### 1. Horse Hill

- Total Acres: 1,179
- Large unfragmented forest block
- Active farms on significant farmland soils
- Abundant significant forest soils
- Numerous wildlife habitats
- Adjacent to Gus Lehtinen Park and 10 other conservation parcels
- Portion of CFA within Aquifer Protection District
- Very high resilience value due to landform diversity, habitat connectivity, and ecological integrity
- Contains rare Biological Element
- Contains productive forest land recommended for acquisition by the City forester
- 100% ranked as high priority in the Merrimack River Conservation Plan
- 100% ranked as Tier 1, 2, and 3 WAP habitat
- Coincident with Sperduto Conservation Priority Area

### 2. Bog Road

- Total Acres: 1,019
- Associated with 2 large unfragmented forests
- Abuts 6 conservation parcels
- 1 rare plant, 1 rare wildlife, and 1 potential large exemplary peatland
- Active farms on significant farmland soils
- Abundant significant forest soils
- Numerous wildlife habitats
- Adjacent to conservation lands

- Moderately high resilience value due to habitat connectivity and ecological integrity
- 100% ranked as Tier 1, 2, and 3 WAP habitat
- 100% highly ranked in Merrimack River Watershed Plan
- Coincident with Sperduto selection

### 3. West Concord

- Total Acres: 352
- Active farms on prime farmland soils; other areas identified as significant for farms
- Abundant significant forest soils
- Drinking water supply protection in Penacook Watershed
- Connectivity to large conserved area to the south associated with Penacook Lake
- 95% ranked as high priority in the Merrimack River Conservation Plan
- 95% ranked as Tier 1, 2, and 3 WAP habitat

## 7.2c Contoocook/Turkey/Merrimack River Headwaters

### 1. Beech Hill

- Total Acres: 1,062
- Adjacent to wellhead protection area
- Large unfragmented forest
- Abuts 6 conservation parcels
- Numerous habitats, including pine barrens
- 1 rare plant
- Active farms on significant farmland soils
- Abundant significant forest soils
- Contains productive forest land recommended for acquisition by the City forester
- Moderately high resilience value due to habitat connectivity and ecological integrity
- 100% ranked as high priority in the Merrimack River Conservation Plan
- 99% ranked as Tier 1, 2, and 3 WAP habitat
- Coincident with Sperduto Conservation Priority Area

### 2. Currier Road

- Total Acres: 160
- Large unfragmented forest
- Abuts 3 conservation parcels
- Abundant significant farmland and forest soils
- Moderately high resilience value due to habitat connectivity and ecological integrity

- 100% ranked as high priority in Merrimack River Conservation Plan
- 100% ranked as Tier 1, 2, and 3 WAP habitat
- Coincident with Sperduto Conservation Priority Area

### 3. Pine Hill

- Total Acres: 125
- Large unfragmented forest
- Connectivity to large conserved area surrounding CFA
- 90% located within drinking water supply protection in Penacook Watershed
- Abundant significant farmland and forest soils
- Moderate resilience value due to habitat connectivity and ecological integrity
- 100% ranked as high priority in Merrimack River Conservation Plan
- 90% ranked as Tier 1, 2, and 3 WAP habitat
- Coincident with Sperduto Conservation Priority Area

### 4. Jerry Hill

- Total Acres: 64
- Large unfragmented forest
- Surrounded by conservation parcels
- 50% located within drinking water supply protection in Penacook Watershed
- Abundant significant farmland and forest soils
- Moderate resilience value due to habitat connectivity and ecological integrity
- CFA recommended for acquisition by the City forester as productive forest land
- 100% ranked as high priority in the Merrimack River Conservation Plan
- 90% ranked as Tier 1, 2, and 3 WAP habitat
- Coincident with Sperduto Conservation Priority Area

### 5. West Parish Road

- Total Acres: 230
- Abuts 2 large conservation parcels including reservoir lands
- 75% located within drinking water supply protection in Penacook Watershed
- Abundant significant farmland and forest soils, including prime farmland
- Moderate resilience value due to habitat connectivity and ecological integrity
- 100% ranked as high priority in the Merrimack River Conservation Plan
- 40% ranked as Tier 3 WAP habitat
- Coincident with Sperduto Conservation Priority Area

### 6. Little Pond

- Total Acres: 209
- Large unfragmented forest

- Abuts 4 conservation parcels including reservoir lands
- Contains 1 potential exemplary peatland
- 25% located within drinking water supply protection in Penacook Watershed and headwater to Penacook Lake
- Contains a major reservoir source stream
- Abundant wildlife habitats
- Abundant significant farmland and forest soils
- Moderate resilience value due to habitat connectivity and ecological integrity
- 100% ranked as high priority in the Merrimack River Conservation Plan
- 90% ranked as Tier 1, 2, and 3 WAP habitat
- Coincident with Sperduto Conservation Priority Area

7.2d Turkey River Lowlands

1. Ash Brook
  - Total Acres: 131
  - Nearly 4,000 feet of shoreline frontage along Ash Brook
  - Abuts 2 conservation parcels
  - Active farm and abundant significant farmland and forest soils
  - 100% ranked as high priority in the Merrimack River Conservation Plan
  - 80% ranked as Tier 1, 2, and 3 WAP habitat
  - Coincident with Sperduto Conservation Priority Area
  
2. Turee Brook
  - Total Acres: 329
  - Large unfragmented forest
  - Connectivity to large conserved area to the north and west
  - Contains portion of exemplary wetland system
  - Abundant wildlife habitats
  - Active farm on prime farmland soil
  - Abundant significant farmland and forest soils
  - Moderate resilience value due to ecological integrity
  - 80% ranked as high priority in the Merrimack River Conservation Plan
  - 99% ranked as Tier 1, 2, and 3 WAP habitat
  - Coincident with Sperduto Conservation Priority Area

7.2e Hoit Road Lowlands/Oak Hill

1. Oak Hill Southwest
  - Total Acres: 43
  - Consolidates protection of Oak Hill
  - Unfragmented forest land



- Abuts conservation parcels on 3 sides
  - Prominent Scenic Resource with views of NH State House
  - Moderately high resilience value due to habitat connectivity and ecological integrity
  - Entire CFA ranked as Tier 1, 2 and 3 WAP habitat
  - Coincident with Sperduto Conservation Priority Area
2. Oak Hill Southeast
- Total Acres: 92
  - Uncommon Appalachian oak – hickory forest
  - Consolidates protection of Oak Hill
  - Abuts 4 conservation parcels
  - Prominent Scenic Resource
  - Moderately high resilience value due to habitat connectivity and ecological integrity
  - Entire CFA ranked as Tier 1, 2 and 3 WAP habitat
  - Coincident with Sperduto Conservation Priority Area
3. Oak Hill North
- Total Acres: 208
  - Consolidates protection of Oak Hill
  - Abuts 6 conservation parcels
  - Prominent Scenic Resource
  - High resilience value due to habitat connectivity and ecological integrity
  - Contains productive forest land recommended for acquisition by the City forester
  - Entire CFA ranked as Tier 1, 2 and 3 WAP habitat
  - Highly ranked in Merrimack River Watershed Plan
  - Coincident with Sperduto Conservation Priority Area
4. Oak Hill View
- Total Acres: 152
  - Completes protection of Blood Farm fields
  - Abuts conservation land
  - 2 Rare Biological Elements
  - Protects iconic scenic vista from Oak Hill
  - Moderate resilience value due to ecological integrity
  - 45% of CFA ranked as Tier 1 and 3 WAP habitat
  - Coincident with Sperduto Conservation Priority Area

## 5. Hayward Brook

- Total Acres: 403
- Protects active agriculture at Apple Hill Farm
- Abuts 5 conservation parcels
- 20% of area underlain by high-yield aquifer
- 20% of CFA is active agricultural fields
- 2 Rare Biological Elements
- Protects iconic view from Oak Hill
- High resilience value due to habitat connectivity and ecological integrity
- 85% of parcel ranked as Tier 1, 2 and 3 WAP habitat
- Highly ranked in Merrimack River Watershed Plan
- Partially coincident with Sperduto Conservation Priority Area

## 7.2f Broken Ground/Turtle-town Pond

### 1. Broken Ground

- Total Acres: 1,599
- Largest undeveloped and unfragmented forest block in Concord
- Abuts large contiguous unfragmented block in Loudon
- Abuts 10 conservation parcels
- Extensive network of wild wetlands
- Contains small areas of prime farmland soils
- 5% of area underlain by high-yield aquifer
- 2 Rare Biological Elements
- High resilience value due to habitat connectivity and ecological integrity
- Entire CFA ranked as Tier 1, 2 and 3 WAP habitat
- Highly ranked in Merrimack River Watershed Plan
- Largely coincident with Sperduto Conservation Priority Area

## 7.2g Concord Heights/Soucook River Valley

### 1. Garvin's Falls

- Total Acres: 1,046
- 2.5 miles of Merrimack River frontage
- 4 miles of Soucook River frontage
- Almost entirely unfragmented
- 90% of area underlain by high-yield aquifer
- 8 Rare Biological Elements
- Moderate resilience value due to ecological integrity
- Entire CFA has Tier 2 or 3 WAP habitat
- Largely coincident with Sperduto Conservation Priority Area

## 2. Soucook Bluffs

- Total Acres: 50
- 0.7 miles of Soucook River frontage
- Adjacent to conservation land
- 100% of area underlain by high-yield aquifer
- 90% of CFA within Aquifer Protection District
- 1 Rare Biological Element
- Entire CFA has Tier 1, 2 and 3 WAP habitat
- Would enhance protection of undeveloped river shore in Pembroke

## 3. Concord Pine Barrens

- Total Acres: 93
- 25 Rare Biological Elements, including Globally Rare Karner Blue butterfly
- Largest remaining undeveloped forest parcel of its type in Concord
- Enhances and connects to USFWS Karner Blue easement
- 100% of area underlain by high-yield aquifer
- 85% CFA is Tier 1, 2 and 3 WAP habitat
- Coincident with Spurduto Conservation Priority Area

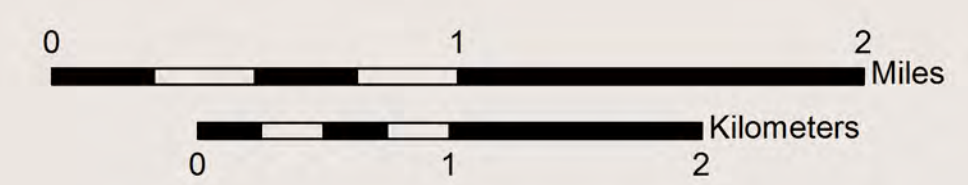
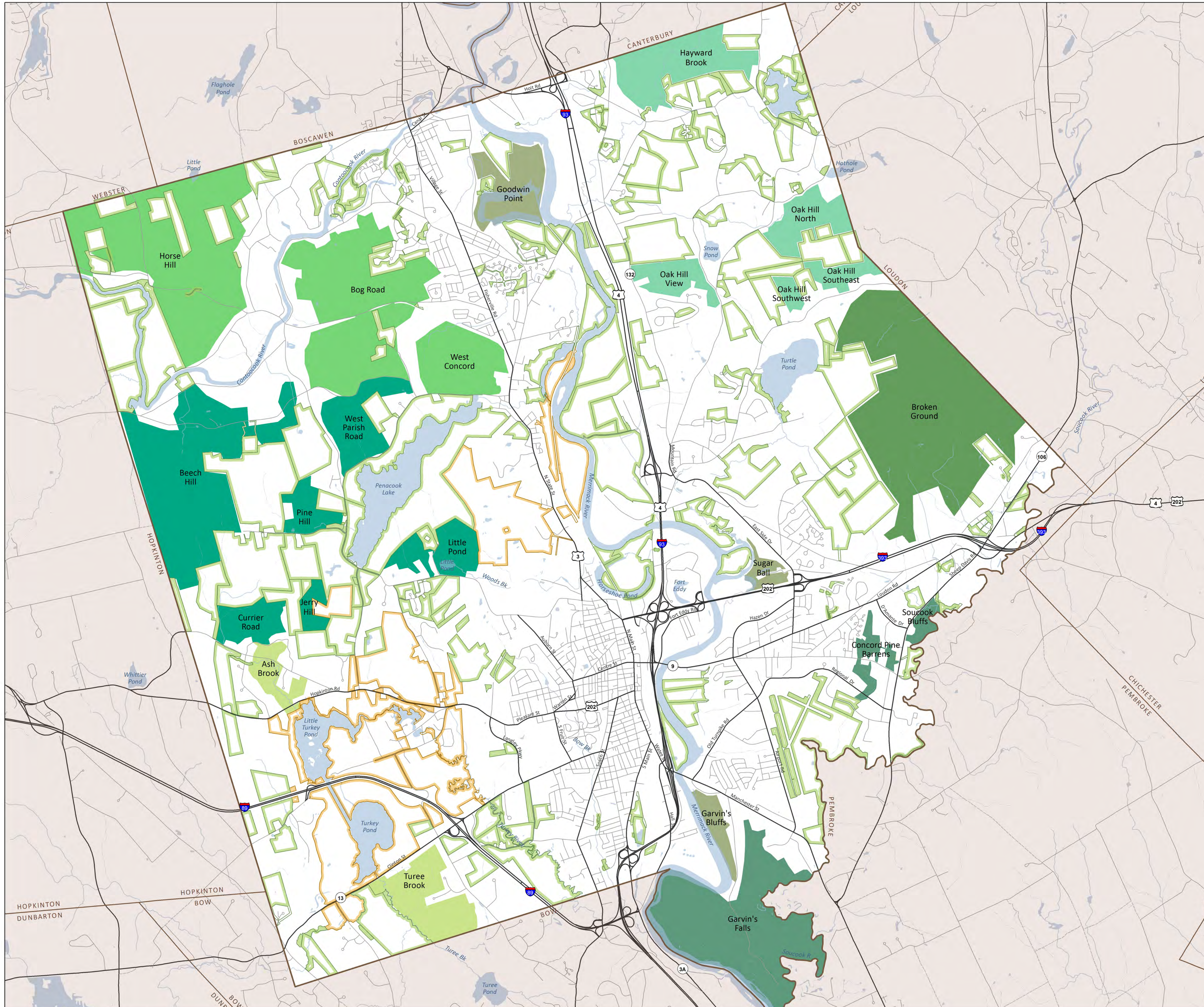


# CITY OF CONCORD OPEN SPACE PLAN 2017

## Resource Map 6: Conservation Focus Areas

### Conservation Focus Area Ecoregion

- Merrimack River
- Contoocook River Valley
- Contoocook/Turkey/Merrimack River Headwaters
- Turkey River Lowland
- Hoit Road Lowland/Oak Hill
- Broken Ground/Turtlepond Pond
- Concord Heights/Soucook River Valley
- Conservation Open Space Land
- Institutional Land
- Major Road
- Local Road



Wetlands and Hydric soils were mapped in 2004 for the City of Concord. In this map, wetlands and hydric soils are shown together. Aquifer Protection District, and Concord roads were provided by the City. Conservation lands were provided by GRANIT and the City, and were updated by C. Kane in 2017. Wellhead Protection Areas provided by NHDES. The following data layers were mapped at 1:24,000 and distributed by NH GRANIT: flood zones from FEMA's 2010 digital flood insurance rate map; surface waters (lakes, rivers and streams), from the US Geological Society's National Hydrography Dataset; town boundaries, from the US Geological Survey; roads outside of Concord, from NH Department of Transportation; and watershed boundaries, from NRCS and NH DES.



## **8. Criteria for Land Conservation Projects Outside of the Focus Areas**

This plan attempted to identify and delineate areas of Concord that represent the most significant natural resources remaining in the city. These delineations were based on reasonable thresholds for consideration that by definition excluded other areas. However, numerous resources important to Concord do actually occur outside the selected Conservation Focus Areas. Some of these occur in the absence of other important resources, or are unique for Concord, or are in areas of limited size.

This plan cannot predict what undocumented resources may be revealed in the future. In addition, resources currently not considered critical for protection may in the future take on more significance than they do today. Finally, important resource lands that are now unavailable for acquisition and protection by the City of Concord due to current ownership may become available in the future, and opportunities may present themselves in the future that would deserve serious conservation consideration.

For these reasons, it is recommended that such parcels and areas be considered on a case-by-case basis for protection using the same selection criteria that resulted in the proposed Conservation Focus Areas. Based on the selection criteria, a number of important resources are known to occur inside the Urban Growth Boundary, and that other resources in this zone may someday be recognized as also worthy of protection.

## **9. Conservation and Open Space Recommendations for Implementation and Action**

The following is a list of open space policies and recommendations for implementation and action. These include those developed as part of the 2008 Conservation and Open Space Plan process and reaffirmed by this plan, and the new recommendations developed through this update (*new recommendations are in italics*). Each of the policies and recommendations correlate with the Goals stated in Section 2.

### **9.1 Conservation and Open Space Protection and Management (Goals 1 and 2)**

1. Acquire and manage open space lands where public access is desired, including lands which provide access to public waters.
2. Acquire conservation easements in perpetuity or purchase development rights in areas proposed to remain as open space and where public access is not envisioned or not desirable due to environmental sensitivity.
3. Provide adequate public funding, such as the proceeds from the Use Change Tax, that will sustain a program for the acquisition and protection, as well as the long term management of open space, and leverage that public investment with other sources of funding.
4. Work with volunteers, private conservation groups, landowners, adjacent towns, and the agencies of the state and federal governments to protect, monitor and maintain the open space areas identified in this open space plan.

5. Encourage and support the continued maintenance of the quality and functions of private open space areas owned individuals and institutions.
6. Evaluate each tax title property for consistency with the Open Space Plan, and if consistent, determine if the title should be retained if public access is desired, or should be resold with conservation easements, if public access is not recommended.
7. Accept donations of conservation easements and/or fee simple title to open space lands after a determination that the donation is consistent with the open space plan, and the site has been evaluated for the presence of hazardous waste.
8. Utilize conservation organizations as secondary grantees in holding easements or executory interests on publicly owned open space, to ensure that the land is protected in perpetuity.
9. Support the continuation of the Current Use Taxation (RSA 79-A) and the Conservation Restriction Assessment (RSA 79-B) Programs for privately held open space.
10. Maintain and improve the quality of ground and surface waters.
11. *Review current land holdings acquired with Conservation Funds and place those properties under easement with a land trust or other organization. (The conservation easement holder should be responsible for the land stewardship, resulting in an economic savings for the City)*
12. *The percentage of the Current Use Tax that goes to the Conservation Fund should be restored to 100% so that the amount collected when land is taken out of current use for development purposes is used to offset the impacts of that change in use by acquiring and preserving open space in the City.*

## **9.2 Public Use and Access to Open Space (Goals 3 and 4)**

1. Establish linkages between large open space areas both for public access and as corridors for wildlife migration along rivers and streams, major transmission line rights-of way, and abandoned railroad rights-of-way.
2. Develop trails, boat ramps, boardwalks, and other facilities for public access to Concord's conservation open space where such access will not adversely impact natural resources and the ecology of the open space.
3. Continue trail development and maintenance within conservation open space areas throughout the City, and encourage and coordinate volunteer efforts to develop and maintain these trails.

4. Carefully consider and mitigate adverse impacts which may occur from the development of public and private recreational facilities within the open space system.
5. *Maintain the adopted Complete Streets Policy. Complete Streets are streets that are safe and accessible for all users – pedestrians and bicyclists as well as motor vehicles. The Complete Streets Policy should be implemented for every new and/or reconstructed street to include a lane for bicyclists.*
6. *Provide for Bicycle Parking Facilities. There are standards in the Subdivision and Site Plan Review Regulations for parking spaces and lots, and provisions in the Zoning Ordinance for parking requirements for particular uses. Consider including requirements for the provision of bicycle racks, for example, a certain number per square footage of non-residential development or per number of units of residential development.*
7. *Ensure that the public open spaces in Concord continue to allow bicycle use as part of the public use of the space where appropriate. The planned development of the Merrimack River Greenway Trail and the Concord – Lake Sunapee Rail Trail in Concord would provide major trail routes to which spur trails could connect. Where possible, include potential connections to these trail artery routes when planning for conservation acquisitions, roads and development projects.*
8. *Ensure that, where possible, Concord’s recreational trails connect to state and regional trail systems outside of Concord.*
9. *Consider Concord’s natural and recreational resources as part of the branding and/or promotion of the City.*

### **9.3 Habitat Protection (Goals 9 and 10)**

1. Conserve large unfragmented areas that provide a variety of wildlife habitats and promote landscape connectivity to allow for the movement of wildlife within the City.
2. Protect the habitat of endangered or threatened species through acquisitions and easements that ensure the continued existence of the natural habitats of these species.
3. *Identification and Documentation. Consider amending the Subdivision and Site Plan Review Regulations to require the identification and documentation of these species/natural communities using not only a NH Natural Heritage Bureau data request, but also on-site inspections, at a minimum within identified CFA’s or in the Open Space Residential District.*
4. *Create a plan to raise awareness and address conservation strategies for the Karner blue butterfly.*

5. *Identify other habitats on the Heights that are of regional importance.*
6. *Ecological Reserves Designation. Conduct a study of biologically significant, high quality habitat that occurs on City-owned conservation land. For parcels that are found to contain habitat that supports rare species or natural communities of State or Regional significance, document these features, and propose a formal designation that limits types of use to informal, undeveloped recreation, education and research as a more appropriate alternative to more traditional and intensive uses such as forestry or hiking trails. Such protected truly wild areas have a place in the spectrum of land conservation purposes that the City considers important, and by conferring a special designation they could be set aside as places where natural processes are allowed to develop independent of direct human influence. Mechanisms for such protection could include the granting of a forever wild conservation easement to a land trust or agency, or a proclamation by the Concord City Council designating special Ecological Reserve status. Models for such designation have been developed by the land trust community.*

#### **9.4 Land Use Regulations (Goals 2, 5, 6, 9, and 12)**

1. Wetlands:
  - Strive for no net loss of the functions and values of wetlands in the City and seek mitigation for unavoidable impacts.
  - Perpetuate setbacks from wetlands for activities that may have an adverse impact upon the wetland. This policy was enacted as a result of the 2008 Conservation and Open Space Plan.
  - Continue to add to the City's inventory of mapped wetlands *and vernal pools* so that wetlands are readily and easily identified when land is proposed to be developed.
  - *Consider a sliding scale of wetland setbacks. The Wetland Ordinance could be amended to have different setbacks and buffers based on the functional values of the wetland in question; a wetland with a high functional value, for example, would have a greater setback and/or buffer than a wetland that scored low on functional value. To begin this effort, the City should conduct a functional analysis of its wetlands.*
2. Floodway - Prohibit the placement of fill and/or obstructions in the floodway, and prohibit the erection of buildings and structures in the floodway other than those which cannot be located elsewhere, such as bridges and boat ramps.
3. Floodplain:
  - Use the best available information to establish the regulatory flood elevations and limits of flood hazard areas and continue participation in the Federal Flood Insurance Program.



- Continue to restrict development in the floodplain to agricultural and recreational uses.
  - Prohibit new residential uses within the floodplain and encourage the removal of existing residences.
4. Steep and Erodible Slopes - Perpetuate setbacks and use regulations intended to protect steep erodible slopes and bluffs from irreversible damage from clearing, grading, and excavation.
  5. Shoreland Protection - Perpetuate setbacks, buffers, and use regulations intended to maintain surface water quality and protect the banks of the rivers, streams and ponds from damage by incompatible development.
    - *Restore or enhance riparian buffers\_(This initiative should exceed the standards of the Shoreland Protection District)*
    - *The City should encourage private land owners to take advantage of programs that are available through the Natural Resources Conservation Service.*
    - *Coordinate with adjacent municipalities, watershed councils, and local river advisory committees to address impacts to the watersheds related to development, climate change, and severe weather events.*
  6. Penacook Lake Watershed – Continue to protect the Penacook Lake Watershed, the City’s primary source of potable water through restrictions on incompatible uses and limitations on density of development.
  7. Aquifers – Perpetuate the ground water protection regulations. This policy was enacted as a result of the 2008 Conservation and Open Space Plan.
  8. Site Development:
    - Require site development to take into account the natural site conditions during the design process and, where appropriate, preserve and promote such physical and natural features as rivers, streams, ponds, marshes, wetlands, scenic vistas, steep slopes, woodlands, wildlife habitat, and special geological features.
    - Require site development to minimize the destruction of natural vegetation and alteration of terrain.
    - *Both the Subdivision and Site Plan Review Regulations contains standards for conservation land, parks, and open space. Section 27 of the Subdivision Regulations address Conservation Lands, Parks, Open Space, and Sites for Other Public Uses and Section 21 of the Site Plan Review Regulations address Sidewalks, Multi-Use Paths and Trails. Section 27 of the Subdivision Regulations should be revised to clarify under what circumstances the Board may require the provision of any of these facilities, for example:*

***“27.01 General Requirements: As allowed by RSA 674:36, the Board may require the protection or reservation of areas or sites...” In making such a decision, the Board will take into account the size and density of the***



***subdivision, the proximity to the subdivision of other open space areas, or other factors deemed applicable by the Board.”***

9. *Maintain the open-space and water protection related provisions in the Concord land use ordinances and regulations. The consultant recommends review of the following:*
- *There is a prohibition against building in the Floodway. Consider a similar prohibition in the Flood Hazard District.*
  - *The Shoreland Protection District contains setbacks and buffers that vary depending on the use and the water resource. Consider whether these setbacks and buffers are sufficient or need to be strengthened.*
  - *Both the Flood Hazard and the Shoreland Protection Districts contain provisions to allow encroachments or disturbance to a buffer by conditional use permit. Consider whether additional restrictions on such encroachments or disturbances are advisable.*
  - *The Penacook Lake Watershed Overlay Protection District contains no provisions specific to open space, but the residential density in this District is limited to one (1) dwelling unit per four (4) acres, and Cluster Development is allowed. Consider whether open space protection should be promoted in this district; and if so, whether the amount of developed area could or should be reduced.*
10. *Cluster Development - Foster the use of cluster development and/or limited development techniques in rural residential areas to promote the preservation of open space and to reduce the economic and environmental costs associated with sprawl.*
- *Review the Cluster Development Ordinance. The Cluster Development Ordinance was adopted in 2007 and amended in 2015. Research at that time indicated that approximately 600 acres of open space had been protected since the adoption of this ordinance that makes major subdivisions within the RO District mandatory, with some exceptions. The preparation of this updated Conservation and Open Space Plan provides an opportunity to review the ongoing effectiveness of the Cluster Ordinance, and consider ways in which the ordinance might be strengthened to provide more open space benefit; for example:*
    - *Require preliminary consultation prior to the submission of an application so the Planning Board has the opportunity to understand the concept and provide feedback to the applicant before time and money are invested in plans.*
    - *Consider ways to make the ordinance more user-friendly and therefore more attractive to developers, such as:*
      - *Set one level of density that would apply to all projects regardless of location.*



- *Consider allowing density bonuses in order to encourage applicants to provide particular amenities considered important, such as agricultural endeavors.*
  - *Consider allowing community water and septic systems to enable cluster developments to locate in areas that are difficult and/or expensive to provide the infrastructure.*
  - *Revisit the areas, uses and management of the designated open spaces in order to ensure that the open space is accessible, usable, and the ongoing management of it is not burdensome to the developer, the home owners or the City.*
- *Require that all plans consider the possibility of connecting proposed opens spaces and/or trails with any that are existing in the area surrounding the proposed project.*
- *The front, rear and side yard setbacks within the RO District are 30, 30, and 20 feet, respectively. While these are fairly standard setbacks for typical single-family development, the Planning Board could evaluate whether reducing these to some extent would continue to provide the desired separation of homes while at the same time adding to the usable open space in the subdivision. Even if the unoccupied land is not designated officially as open space, the closer houses can be clustered will result in more open areas without changing the density of the project.*
- *Lot sizes are another component of the ordinance that could be reevaluated in order to determine whether allowing smaller building lot areas would add to open space areas. In New Hampshire, it is fairly common to see cluster ordinances with larger lot sizes than in more urban and suburban places – after all, in New Hampshire, many people still want some amount of acreage around them. There are some exceptions to this practice, however; communities in the eastern part of the state have ordinances with smaller lot sizes that could be examined for potential relevancy.*
- *Currently, single-family detached dwellings are the only residential use allowed in Cluster Developments. Given that there is a growing interest from the general public in having a range of housing types available to residents, the ordinance could be amended to allow for multiple housing types within a Cluster project.*
- *The Cluster Ordinance was adopted for the specific purpose of preserving open space in specific areas. A review of all cluster projects is recommended, including those that were approved prior to and subsequent to the adoption of the ordinance, to determine whether this purpose is being achieved.*



## 9.5 Use and Development of Natural Resources (Goals 2, 5, 7, and 8)

1. Agriculture:
  - Recognize that agriculture is the highest and best use of prime agricultural soils within open space areas.
  - Support a diverse agricultural industry including but, not limited to, field crops, horticultural production, dairy farms, orchards and animal husbandry.
  - Support the use of agricultural best management practices to protect water and soil resources and to maintain long term productivity.
  - Recognize agriculture as an economic activity which should be supported through tax policy and land use regulation.
  - *Ensure that subdivisions identify prime and significant farmland soils. The Subdivision Regulations do call for the identification of soils, using the USDA Natural Resource Conservation System. Consider calling for specific identification of the farmland soils and requiring plans to locate development elsewhere on the lot, unless the applicant can demonstrate that it is not feasible to do so.*
  - *Implement appropriate techniques for protecting farmland. There are several regulatory tools available that the City can consider, including:*
    - *Designating prime farmland soils and allowing only agricultural uses to occur in those locations.*
    - *Encouraging no-till farming and other Best Management Practices for promoting soil health.*
    - *Adopt a “Right to Farm” ordinance that encourages and incentivizes agricultural uses, for example, designate farming and all associated activities as a “natural right” permitted anywhere in town subject to Best Management Practices.*
    - *Adopt an Agritourism ordinance, per RSA 21:34-a, that provides expanded opportunities for farmers to make productive use of their land.*
2. Forestry:
  - Support the use of forestry best management practices to protect water and soil resources, to prevent soil erosion and sedimentation, and to preserve and enhance wildlife habitat.
  - Recognize forestry as an economic activity which should be supported through tax policy and land use regulation.
  - Continue the forestry management program for the City’s open space lands to provide for sustainable yield of timber and allow for multiple uses which will not adversely impact the ecological functions of the open space.
  - *Monitor and Continue Implementation of the City’s Forest Management Plan. Require “Best Management Practices” on all City-owned lands.*
  - *Maintain the Forest Management Plan.*



3. Potable Water
  - Protect the quality of surface and groundwater to ensure availability of a potable water supply for both the City as well as for individual homeowners.
4. Sand and Gravel Deposits
  - Maintain regulations consistent with the authority of RSA 155-E for the establishment of new excavations as well as the closure and reclamation of depleted excavations.

## **9.6 Scenic Resources (Goal 11)**

1. *Identify and protect important scenic views that are visible from public access points. Many scenic views and vistas that are valued by residents are either on private property and/or visible from private property. The City is limited in its ability to protect resources in those circumstances; for those that are visible from public property, however, the City should take measures to ensure that views and vistas are not obstructed from any construction or activity on City-owned or controlled lands, and make the protection of these vistas a goal for land protection.*

## **9.7 “Low Impact Development” and Green Infrastructure (Goals 2, 5, 6, and 12)**

1. *Maintain and update when necessary the Impervious Cover Study (CNHRPC 2015). This study identifies impervious surfaces in the City and calculates the amount and percentage of land area that is covered by impervious surfaces. The study notes that ideally, impervious area should not exceed 4-6% of a watershed, otherwise negative impacts can occur. And, while this particular study was not of the complete watershed, it is worth noting that 10.3% of the City is impervious; and within the Urban Growth Boundary, much of which is along the Merrimack River, 28.2% is impervious. This information should be updated and monitored in order to track Concord’s progress in reducing the impervious coverage.*
2. *Limit the amount of impervious lot coverage on building lots. The Zoning Ordinance could be amended to set a maximum limit on the amount of impervious coverage for new construction. For example, setting a maximum percentage (40%) of the total lot area; applying a parking and/or floor area ratio; allowing increased coverage if pervious materials are used. In addition, the Ordinance can include incentives to be offered to developers if pervious materials are used in place of impervious materials and for reductions in pavement coverage.*
3. *Consider requiring pervious materials for parking lots and driveways.*
4. *Reexamine City Parking Standards. Consider limiting the number and size of required parking spaces for residential, commercial and other non-residential uses.*



## **10. Management of Concord's Conserved Open Space**

The 2008 Concord Conservation and Open Space Plan clearly outlines the City's role in management of its open space. This plan reaffirms these management policies.

As the City accumulates more land and interests in land for permanent open space, the management of these lands becomes a more substantial matter that needs to be addressed. At present, much of the management undertaken under the aegis of the Conservation Commission is done through the Forestry Program. After starting the Forest Management Program rather modestly some thirty years ago with assistance from the NH Division of Forests and Lands as well as employment of college interns, for the past twenty years the Commission has maintained a contract with a consultant forester who oversees forest management practices, timber harvests, timber stand improvements, including trail blazing through the forests.

The City's Forest Management Plan is continually updated to add new properties to the management schedule. The City's consultant forester has provided a regular presence on these open space lands and a watchful eye for storm-related damage, illegal dumping activity, encroachment by neighboring owners, and other matters of concern in terms of land management. The trail volunteers who work under the forester's guidance and with his assistance also provide a public presence on these properties and public evidence of maintenance activities. Of course the trail users themselves, for whom the trail improvement efforts are expended, provide the best source for the reporting of management issues and concerns such as natural damages as well as acts of vandalism.

The addition to the City's open space inventory of agricultural lands has opened a new chapter in the City's open space management through formal lease agreements with farmers who plant various crops and provide a seasonal presence on these properties.

The terms of some of the easements acquired by the City as well as the terms of certain funding by which interests in land were acquired require stewardship on an annual basis by the City, which is generally performed by the Conservation Commission or a subcommittee thereof. As the number of these stewardship requirements increases, the responsibility will likely have to be shared or even shifted to an employee designated to serve the Commission to manage its land and its programs.

The private non-profit conservation organizations holding interests in open space land in the City are another major player in the management of open space land in the City. The Society for the Protection of NH Forests, and the Audubon Society of NH both own land as well as hold conservation easements, and the Five Rivers Conservation Trust holds a number of conservation easements. These organizations are all active stewards of the lands and are engaged in land management.

The other major land manager in the City's open space network is the State which includes the NH Division of Forests and Lands, NH Fish and Game, and the NH Department of Corrections, all of which manage major open space lands within the City.



As the open space system achieves its maximum limits, management planning should be a focus for the City in the future to provide for adequate and appropriate support and oversight of the system that will ensure the public's enjoyment and safety, as well as protect the public investment in this irreplaceable resource.

## **11. Limitations and GIS Data Disclaimer**

A variety of data layers were used to create the natural resources maps found herein, and most data were developed by numerous governmental agencies and other sources. Much of the existing spatial data were produced using *remote data*, such as the interpretation of satellite imagery and aerial photography. In addition, these data were produced at various scales and hence represent different degrees of errors, omissions, and inaccuracies. While these limitations do represent some uncertainties, this type of mapping and analyses is the most cost-effective first phase of developing an understanding of Concord's natural resources for designing innovative conservation open space planning.

The maps contained herein are for information and planning purposes only. They are suitable for general land use planning. However, they are not suitable for detailed site planning and design, including but not limited to wetlands delineations and other jurisdictional determinations, as well as defining legal property boundaries. These data are approximate and should be field verified. The accuracy of the data is the end user's responsibility. Moosewood Ecological LLC and the City of Concord make no warranty, expressed or implied, as to the accuracy or completeness of the GIS data, and do not assume any liability with the use and/or misuse of this data. Furthermore, Moosewood Ecological LLC and the City of Concord shall assume no responsibility for any errors, omissions, or inaccuracies in the information provided.



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APPENDIX A  
Community Outreach  
and  
Survey Results



On November 3, 2016, the Conservation Commission conducted a community forum held at the City Council Chambers. Residents were invited to participate as the City initiated the revision of their Conservation Open Space Plan. The planning process included outreach through multiple media outlets to solicit participation and input from residents. The City placed announcements in the Concord Monitor and Insider calendars, and an article was published in the Concord Monitor. The City posted flyers were posted at various downtown businesses, City Hall, and the Concord Public Library. In addition, the City posted notices on multiple websites, including the Concord's main web page, the City's Parks & Recreation Department and General Services Division Facebook pages, and on the Capital Area Wellness Coalition website.

The purpose of the community forum was to inform the public about the project background, as well as its purpose, goals, and objectives. Participants were asked to engage in a discussion about Concord's most significant open spaces. They were asked to share which areas they like to visit, why they like to visit these areas, what makes them special, and what could enhance their use of these areas. Afterwards, participants were asked to identify future open space for protection and why they would support the protection of these open spaces.

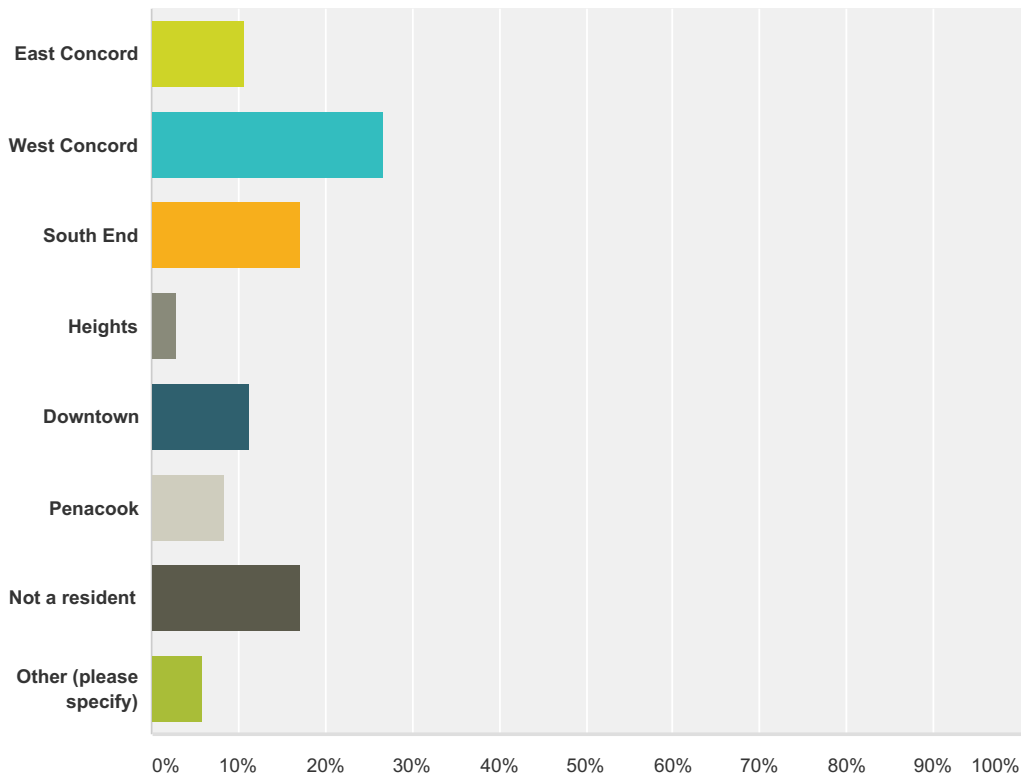
The City prepared and posted a survey on its website to further engage community stakeholders; 170 people responded. Topics included: importance, use, and improvements of open space areas; types of trails that are of interest; important resources for protection; and which open space areas are important for protection. Highlights of the survey include the following. See Appendix A for the detailed results of the survey.

- 98% of respondents agree or strongly agree that the protection of open space in Concord is important
- 87% of respondents are either concerned or very concerned about losing open space to development
- When asked about the various activities or uses of open spaces most responded with hiking/nature walks, nature observations, and scenic views. It is also clear that respondents are using these areas for a multitude of other uses, including trail running, biking, hunting or fishing, boating, picnics, cross-country skiing, snow shoeing, dog walking, photography, food production, and stress relief.
- Suggestions for improvements to open space areas were diverse as well: desire for more information about areas open to the public, trail maps, more amenities (such as benches, more parking), and organized activities (such as hiking events)
- The types of trails that interested the respondents varied markedly, including trails that connect open space to Concord neighborhoods, trails in rural areas, rail trails, cross-country ski trails, mountain biking trails, and snowmobile trails
- Responses suggest that the most important resources to protect include drinking water, wildlife habitat, forests, agricultural lands, rare species, and wetlands, followed by floodplains, recreational areas, and scenic views



### Q1 Which neighborhood do you live in?

Answered: 169 Skipped: 1



Answer Choices	Responses	
East Concord	10.65%	18
West Concord	26.63%	45
South End	17.16%	29
Heights	2.96%	5
Downtown	11.24%	19
Penacook	8.28%	14
Not a resident	17.16%	29
Other (please specify)	5.92%	10
<b>Total</b>		<b>169</b>

#	Other (please specify)	Date
1	North Concord	1/5/2017 1:17 PM
2	I work in Concord	11/23/2016 9:26 AM
3	Downtown business owner	11/14/2016 12:59 PM
4	Londonderry	11/11/2016 1:07 PM
5	near St. Paul's School. Note the stars below are not working correctly. I tried to enter strongly agree and very concerned	11/11/2016 11:54 AM

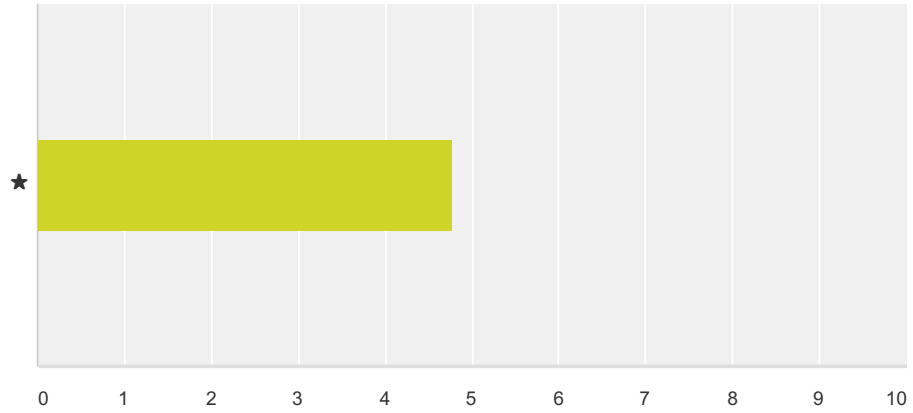


6	work in concord live in warner	11/11/2016 8:52 AM
7	Neighbor - Hopkinton	11/9/2016 6:24 PM
8	West end, by White Park	11/9/2016 3:24 PM
9	North End/Fosterville	11/4/2016 8:05 AM
10	I live in Boscawen but grew up and operate our business in Penacook	11/2/2016 9:16 AM



## Q2 Open Space in the City is important to protect.

Answered: 168 Skipped: 2

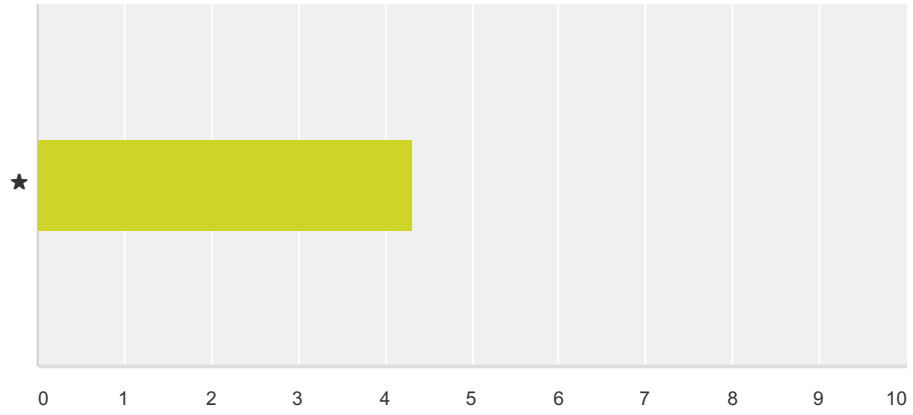


	disagree	somewhat disagree	no opinion	agree	strongly agree	Total	Weighted Average
★	0.00% 0	1.19% 2	0.60% 1	16.67% 28	81.55% 137	168	4.79



### Q3 How concerned are you about losing Open Space to development?

Answered: 168 Skipped: 2



	not concerned	somewhat concerned	no opinion	concerned	very concerned	Total	Weighted Average
★	2.38% 4	5.95% 10	4.76% 8	30.36% 51	56.55% 95	168	4.33



### Q4 What open space areas in Concord do you enjoy? (see map in intro for specific names, or list others)

Answered: 127 Skipped: 43

#	Responses	Date
1	Lime Ridge	1/5/2017 1:17 PM
2	Whispering Heights, Turtle Pond East, Stevens Property	11/29/2016 2:17 PM
3	Rollins Park and the hiking trails	11/29/2016 2:07 PM
4	District 5 State Forest Sewalls Falls Property and abutting forests Oak Hill Whitehouse Property Winant Park West Iron Works Road state forest White Farm Memorial Field Russell-Shea State Forest Primrose Woods Primrose at Penacook Rossvie Farm Easement Penacook Lake Watershed Marjorie Swope Park Freese Property St Pauls Property Loudon Road State Land Whispering Heights NHTI Hazen Drive Land Audubon Society	11/28/2016 1:23 PM
5	The less frequented, typically wooded areas for walking and trails near or along the rivers.	11/27/2016 4:57 PM
6	All areas listed on the City's hiking trails web page.	11/24/2016 11:13 AM
7	The parks (esp Whites), the trail near Granite Ledges/Concord Hospital, NH Forestry area, Audobon area	11/23/2016 9:26 AM
8	NHTI	11/20/2016 10:55 PM
9	Trails all over, especially the one near Island Shores in Penacook; all the parks, too.	11/20/2016 8:22 AM
10	Oak Hill, Iron Works Road	11/19/2016 8:36 PM
11	White Park Win ant Park. Open area near the hospital with Water tower Eagle Square Pokémon Square near margaritas	11/19/2016 7:05 PM
12	Hoit Road trails Forest Conservation trails White and Merrill Park	11/19/2016 4:34 PM
13	Swope, West End Farm, Audubon, Winant, Broken Ground, Oak Hill, Forest Society, Jim Hill River Walk, Morono Park, Sewells Falls, Bachelder Mill, White Farm, Karner Blue area, St. Paul's	11/18/2016 8:27 PM
14	Beaver Meadow, White, Memorial, Grappone, Swope and Winant Parks	11/18/2016 7:00 PM
15	all of them! I am a runner and hiker and frequently do west farm trail, oak hill, jim hill, quarry trails and penacook watershed, marjory swope, walker state forest, winant park, st pauls trails, the Audubon and more. I also highly value our parks such as White's Park, Keech, Boys and Girls Club, and Rollins.	11/18/2016 4:42 PM
16	Sewell's Falls and Hanna Dustin are my favorites	11/18/2016 4:03 PM
17	Winant Park, Swope Park, White Farm, White Park, Rollins Park	11/18/2016 9:09 AM
18	ALL OF THE PARKS AND TRAILS	11/16/2016 12:29 PM
19	White Park, State Office trails, All main street open areas.	11/16/2016 10:50 AM
20	White Park, area outside the State House, Penacook Lake Watershed, Gold Star Farm, all!	11/16/2016 10:46 AM
21	White's Park, Rollins Park, Winant Park, Swope Trail	11/16/2016 9:37 AM
22	white farm, Russell shea forest, iron works road area and the other open areas in this vicinity. Also Winart Park.	11/16/2016 8:39 AM
23	Rattlesnake Hill, West End Trails, Oak Hill, Sewall Falls	11/15/2016 11:56 AM
24	All of them at one time or another	11/15/2016 10:35 AM
25	Marjory Swope, Winant, Oak Hill, Penacook Lake Watershed, Sewalls Falls trails system, Quarries trails, all riverfront land especially.	11/15/2016 8:42 AM
26	White Farm, Winant Park, Marjory Swope Park, Audubon, St. Paul's School, Oak Hill, Rollins Park, White Park, Beaver Meadow (xc skiing), Oak Hill	11/15/2016 8:25 AM
27	st pauls	11/15/2016 12:45 AM
28	oak hill , Marjorie swope trails, rossview farm area	11/14/2016 5:20 PM



29	have not explored any of these, I enjoy a 4 mi approx. walk around cemetery area (Blossom Hill, etc..)	11/14/2016 3:30 PM
30	parks, hiking trails	11/14/2016 3:27 PM
31	All city trails, White Park, Rolfe Park, Sewalls Falls including the areas north of the bridge up to Morrill farm. (Oxbow area)	11/14/2016 10:40 AM
32	Mast Yard, Oak Hill, West End Farm Trail, St. Pauls trails, Broken Ground Trails, Winant Park, State Quarries	11/14/2016 10:04 AM
33	Rollins Park park off Iron Works Rd	11/13/2016 9:33 PM
34	All	11/13/2016 8:26 PM
35	State Prison Farm and Quarries, Winnant Park, St Pauls school area, SPNHF conservation area, Oak hill area, West end trail system, Broken ground & Turtletown pond areas.	11/13/2016 10:54 AM
36	Marjory Swope and the new trails connecting to Dimond hill and Carter hill. The area behind the hospital from Penacook St to the water tower. These are the only trails I know about in Concord but would love to know and have more!	11/13/2016 2:00 AM
37	winant park, mary swope, st pauls	11/12/2016 6:47 PM
38	blood eastment, sewells falls, hoyt road, oak hill, Marjorie swoop	11/12/2016 3:33 PM
39	All	11/12/2016 10:35 AM
40	memorial field,white's park,terril park	11/12/2016 10:27 AM
41	Marjorie Swope, Ross Farm, St. Pauls, Capital Region Healthcare	11/12/2016 9:03 AM
42	Almost all of them!	11/11/2016 10:36 PM
43	The city walking trails in penacook and concord. White's park. Audobon. Society of the protection of new hampshire forests	11/11/2016 4:53 PM
44	Turtle Pond, Winant Park, White Farm, Marjory Swope, Penacook Lake Watershed, Capitol Region Health Care Easement, St. Paul's School, West Portsmouth Street Conservation area, Hitchcock Clinic.	11/11/2016 4:19 PM
45	I frequently visit and hike all the trails on Oak Hill and the open areas contiguous with the Oak Hill property. I also regularly visit the Blood Ag Easement, Merullo Park, Spear park, Richards Cmty Forest, Stonehaven, Riley Property, Hoit Rd Marsh, Maxfield Lot, Bois de Brodeur, Keller Easement, Sewalls Falls, West Portsmouth St State Land, Gold Star Farms land, the Karner Blue Wildlife Refuge, and Whispering Heights. I probably missed some others. I enjoy them all, but I listed the ones I frequently visit.	11/11/2016 4:19 PM
46	Morono Park, Sewalls Falls River and Recreation Area, Beaver Meadow Golf Course, Mast Yard State Forest, West End Trail, Marjorie Swope Trail, White's Park, Oak Hill, Hoit Marsh	11/11/2016 3:41 PM
47	Turtle Town Pond Hoit Road Marsh Sod Farm property	11/11/2016 2:57 PM
48	Winant Park, Marjory Swope, Penacook Lake Watershed, Diamond Hill/Rossvie, Mast Yard	11/11/2016 2:54 PM
49	Parks, Wynant trails, East Concord area next to the river... any place that has a trail head frankly!	11/11/2016 2:30 PM
50	Jim hill river walk.	11/11/2016 12:57 PM
51	All of them!	11/11/2016 12:25 PM
52	parks, golf course, sewalls falls walking area, white farm for skiing	11/11/2016 12:11 PM
53	St. Paul's School vicinity	11/11/2016 11:54 AM
54	Marjorie Swoops park, whites park	11/11/2016 11:46 AM
55	I love it all. I use a lot of the open space in Concord for walks, hikes, xc skiing. Specifically, I enjoy Dimond Hill Farm, the West End Trail, Carter Hill, White Farm, White's Park, looking out at the reservoir, walking Main Street and climbing trees on the State House lawn. However, even more important to me is the open space in residential areas. Concord is beautiful in big part because of the old homes, the history, the beautiful trees, and open space. I enjoy my property at 307 Pleasant Street because I'm surrounded by St. Paul's land, state land, and our residential neighbor at 297 Pleasant with 30 acres of beautiful land. We may not walk on that land now, but we certainly enjoy and value the view of open space. It would be a terrible shame if Concord Orthopedics built a huge surgical center and parking lot in the middle of a residential neighborhood. Many people now safely walk and bike down Pleasant to enjoy the views and homes and that would be destroyed (and become unsafe for walkers/bikers). Medical complexes should not be built in areas zoned for residents and teeming with wildlife. Preserve our beautiful communities- the farms, trails and the residential open areas.	11/11/2016 11:38 AM



56	White Park	11/11/2016 11:27 AM
57	West Portsmouth Street Conservation area SPNHF Conservation area Woodman property/Horseshoe Pond CRHC corporate easement White Park and Eagle Square	11/11/2016 10:33 AM
58	Winant Park	11/11/2016 10:18 AM
59	dog park	11/11/2016 8:59 AM
60	Margery swope trail, conservation center and the NH Audobon to name a few	11/11/2016 8:56 AM
61	White's Park, walking trails	11/11/2016 8:52 AM
62	All open space!	11/10/2016 6:40 PM
63	Boscawen rail trails and Boscawen/concord cross country ski/snowmobile trails downtown concord park with pathways for running	11/10/2016 5:14 PM
64	parks, riverside	11/10/2016 3:44 PM
65	All.	11/10/2016 2:54 PM
66	Winant Park, Swope Park, Dimond Hill, Oak Hill, Ross View, SPNHF/floodplain, Rollins & White parks, Memorial Field	11/10/2016 2:16 PM
67	The extensive trail system throughout Concord.	11/10/2016 1:57 PM
68	All the walking trails	11/10/2016 6:59 AM
69	Rollins Park, White Park, NH Conservation Center	11/9/2016 7:59 PM
70	Oak Hill, Carter Hill, Spears Trails, Sewalls Falls Trails, Leightenin Park/Jim Hill River Walk	11/9/2016 7:17 PM
71	The trail system	11/9/2016 6:57 PM
72	Marjory Swope, Winant, SPS, West End Trail System,	11/9/2016 6:24 PM
73	The open space behind our house at 289 Pleasant street.	11/9/2016 5:21 PM
74	Rollins Park, White Park, hiking trails all around concord, by the river at the Arena, Dimond Hill trails	11/9/2016 4:26 PM
75	Whites park, wooded trails	11/9/2016 4:18 PM
76	Sewalls falls, the conservation center, penacook lake, marjory swope, turtle pond, s whispering heights	11/9/2016 4:11 PM
77	Penacook Lake, Prison Farm Quarries, Oak Hill, Marjory Swope	11/9/2016 3:47 PM
78	Winant Park, Oak Hill, Majorie Swope, West End Farm Trail, White Park	11/9/2016 3:44 PM
79	Carter Hill, West End Farm, Oak Hill, Swope, Winant, Sewalls Falls	11/9/2016 3:41 PM
80	Trails at Audobon, McLane Center Marjory Swope Trails Carter Hill Orchard Trails White Park Rollins Park	11/9/2016 3:37 PM
81	Almost all of it. I run a lot of the trails that we have here in Concord.	11/9/2016 3:30 PM
82	White Park; connected trails such as West End Farm trail with Swope and ultimately Winant	11/9/2016 3:24 PM
83	west end farm trail (and all the land through which it passes), winant park, st. paul's land, oak hill, boscawen town forest (okay not Concord but Concord should be talking to neighbors!), Swope Park, Jim Hill area / Mast Yard... and more unofficial ones	11/9/2016 3:24 PM
84	Walker area, NHTI, Mast Yard, Dimond Hill and everything accessible near St. Paul's School/Concord Hospital area	11/9/2016 2:59 PM
85	Many many of the walking and hiking paths in the community.	11/9/2016 2:44 PM
86	We love the walking trails and city parks!	11/9/2016 2:31 PM
87	Many of them.	11/9/2016 2:17 PM
88	White Farm, White Park, St. Paul's, NHTI, Broken Ground, Turkey Pond, parks in downtown	11/9/2016 2:14 PM
89	Oak Hill, SPNHF Conservation Center, Marjory Swope Park, Jerry Hill, Quarries	11/7/2016 10:24 AM
90	all areas	11/4/2016 8:05 AM
91	Horseshoe pond Locke road Oak Hill Carter Hill Turkey pond turtle pond spnhf and more	11/3/2016 5:36 PM



92	White Park and all the city parks, The trails behind Rolfe park the conservation center trails along the Merrimack the Contocook River Trail Daisy's beach and the associated trails we have been to all the trails on the trail map. Sewall's Falls Penacook Park The quarry The sod farm Horseshoe Pond area Brookside Farm The state forest and the Rail Trail	11/3/2016 5:15 PM
93	Daisy Beach, Swope Park, Rollins Park, White Park, various trails around the rivers	11/3/2016 2:57 PM
94	Winant Park, Marjory Swope Trail, West End Farm and connected trails, Rollins Park, Russell Martin Park	11/3/2016 1:52 PM
95	Horseshoe pond area. Airport area.	11/3/2016 1:39 PM
96	Horseshoe Pond, NHTI, Audubon Soc., Sewalls Falls	11/3/2016 12:34 PM
97	Marjory Swope Park, St Paul's School, Winant Park, Sewalls Falls, State Prison Farm and Quarries, Weir Road Lot, Oak Hill, Stevens Property, Walker State Forest	11/3/2016 12:15 PM
98	Silk Farm Wildlife Sanctuary, St. Paul's School land, Carter Hill Orchard, Birch Street Community Gardens	11/3/2016 10:02 AM
99	Horseshoe Pond	11/3/2016 9:49 AM
100	seawall's park, west portsmouth street, penacook lake watershed, 7 farm trail, Horseshoe Pond...	11/3/2016 8:54 AM
101	Most of the walking trails, especially along the Merrimack River near the Sewells Falls bridge. Carter Hill	11/3/2016 8:41 AM
102	White's park.	11/3/2016 8:12 AM
103	All areas used for birding, walking, sitting, having lunch. Dogs are not usually good for birding. Mountain bike ruts not good for smooth trails for walking	11/2/2016 11:27 PM
104	Shaker Road Anderson Goodman Property, Oak Hill, State Prison, Penacook Lake Watershed, Walker Forest, Cherry Hill Homes, Freese Property, Winant Park, CRHC Easement, Marjory Swope, St Pauls (All), Dimond Hill Farm, Mast Yard State Forest, Gus Lehitnen Park,	11/2/2016 10:42 PM
105	Sewalls Falls, Marjorie Swope, horseshoe pond	11/2/2016 8:46 PM
106	Diamond Hill Farm, Bela Brook, Locke Road Farm( Sod Farm east Concord)	11/2/2016 7:51 PM
107	Any area that has a trail I have likely explored and enjoyed.	11/2/2016 3:29 PM
108	St Paul's School Mast Yard State Forest west end trail Winant Park Marjory Swope Park Oak Hill White Farm Memorial Field Karner Blue National Wildlife Refuge Areas sewalls falls	11/2/2016 2:40 PM
109	Winant, White Farm, West End, Swope, Merrill, etc	11/2/2016 2:33 PM
110	Winant park, Marjory swope, all of the West End Trail, Daisy Beach, Mast yard, quarry land, Penacook lake watershed, Gus lehitinan park, cilly state forest, other	11/2/2016 12:50 PM
111	Locke Rd, West Portsmouth St., Mast Yard	11/2/2016 9:16 AM
112	We walk and bike all of the open space areas in Concord. (oak hill, Marjore swope, apple hill ect)	11/2/2016 8:18 AM
113	I enjoy all of them, both public and privately owned, mainly because developed land especially houses, almost always generate more costs than the taxes revenue collected from them.	11/2/2016 6:13 AM
114	Mast Yard, Weir Rd, Swope, Carter Hill, West End, Winant	11/1/2016 1:29 PM
115	Swope Park and surrounding trails	11/1/2016 11:16 AM
116	Trails on the west side near Long Pond and Diamond Hill. Trails along the Merrimack River in East and West Concord. Trails in East Concord (Hoit Marsh)	10/31/2016 10:18 AM
117	Trails, Parks	10/31/2016 9:11 AM
118	Winnant Park, Marge Swope, Sewalls Falls, Carter Hill, Leightnen Park, Mast Yard State Forest, Jim Hill River Walk, Oak Hill, Forest Society . . . everywhere! I used to walk the power lines on Horse Hill and into the wetlands at the Webster/Concord town line on Deer Meadow Road, but now both have been posted.	10/28/2016 10:29 PM
119	All of them. Especially these: Mast Yard State Forest Trail Lehtinen Park Trail O'Reilly-Fleetham Trail Weir Road-Boscawen Town Forest Trail Contocook River Park Trail Rolfe Park Trail Spear's Park Trail Riley Trail Carter Hill Orchard Trail Sewalls Falls Park Trail Oak Hill Trail Merrill Park Trail SPNHF Trail Curtisville & Batchelder Mill Road Trail Turkey River - White Farm Trail Upton-Morgan State Forest Interpretive Trail Healy & Terrill Park Trail East Concord Heritage Trail Winant Park Trail Dimond Hill Farm Trail Karner Blue Pine Barrens Marjory Swope Park Trail West End Farm Trail Russell Martin Park Trails Broken Ground Trails	10/28/2016 7:29 PM
120	Rattlesnake hill, All hiking trails especially Majorie Swope, River near Sewalls Falls	10/28/2016 6:56 PM

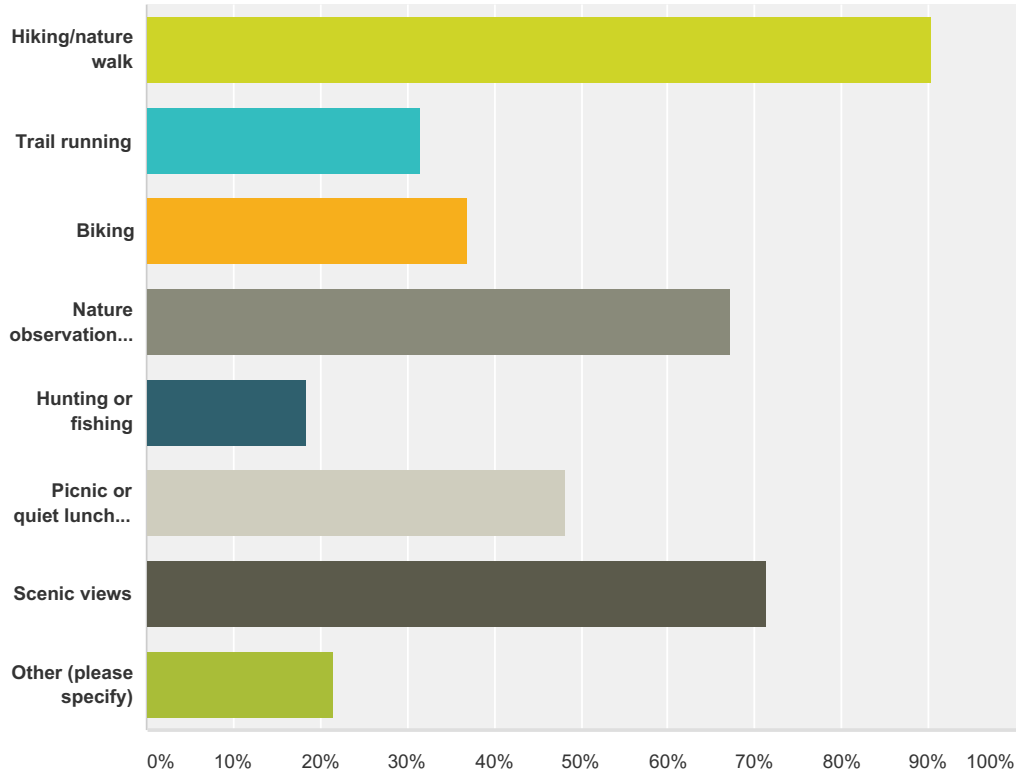


121	all the Concord Trails that have been established; city parks; Audubon; Forest Society; conserved farms; dirt road off Auburn Street leading up to water tower	10/28/2016 6:41 PM
122	Morono Park, Sewall's falls rec. area, Sunnycrest farm	10/28/2016 4:08 PM
123	Merrill Park, Locke Road Wetlands, Oak hill, Swope and hospital trails, west end farm trail etc	10/28/2016 3:26 PM
124	Winnant, Swope, St Pauls, SPNHF conservation center, City Parks, many others!	10/28/2016 2:09 PM
125	Conservation Center at the river here in EC!	10/26/2016 4:22 PM
126	All of the parks & trails	10/26/2016 4:19 PM
127	Gully Hill	10/26/2016 9:35 AM



### Q5 What activities do you enjoy in Concord's open spaces? (check all that apply)

Answered: 168 Skipped: 2



Answer Choices	Responses
Hiking/nature walk	90.48% 152
Trail running	31.55% 53
Biking	36.90% 62
Nature observation (bird watching, leaf peeping, etc.)	67.26% 113
Hunting or fishing	18.45% 31
Picnic or quiet lunch spot	48.21% 81
Scenic views	71.43% 120
Other (please specify)	21.43% 36
<b>Total Respondents: 168</b>	

#	Other (please specify)	Date
1	protecting the homes of wild plant and animal species	11/28/2016 1:23 PM
2	Cross country skiing	11/24/2016 11:13 AM
3	Hanging out	11/19/2016 7:05 PM

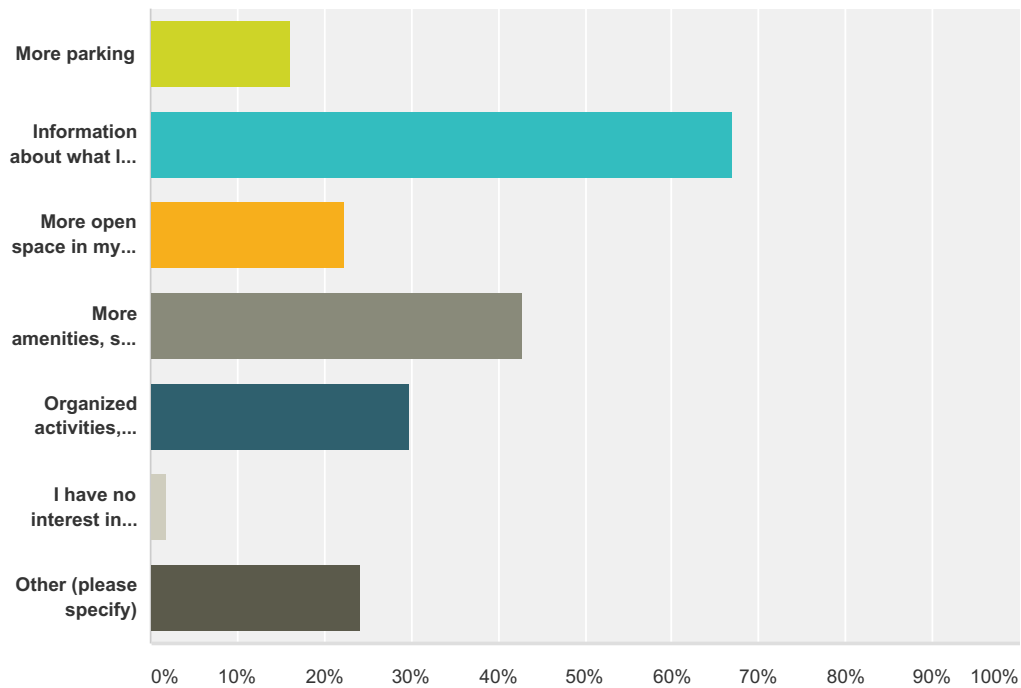


4	X-C Skiing, snow-shoeing	11/18/2016 8:27 PM
5	Walking my dog.	11/16/2016 10:50 AM
6	playgrounds and areas for children	11/16/2016 10:46 AM
7	Children!!!!	11/15/2016 11:56 AM
8	Ice skating	11/15/2016 10:35 AM
9	XC Skiing	11/15/2016 8:25 AM
10	Hiking with my young family	11/14/2016 12:58 PM
11	Romantic dates; Entomology study;	11/11/2016 4:19 PM
12	xc skiing, ice skating at White's park, geocaching, dog walking, the sound of silence	11/11/2016 11:38 AM
13	walking with my dog	11/11/2016 11:27 AM
14	concerts	11/11/2016 10:33 AM
15	Photography	11/11/2016 10:18 AM
16	dog park	11/11/2016 8:59 AM
17	Cross country skiing, snowshoeing	11/10/2016 2:54 PM
18	Snowshoeing & cross-country skiing	11/10/2016 2:16 PM
19	Geocaching	11/9/2016 7:17 PM
20	dog walking, snowshoeing, cross country skiing	11/9/2016 6:57 PM
21	Brain clearing and stress relief, conversations	11/9/2016 3:24 PM
22	kayak on the river and ponds	11/9/2016 2:31 PM
23	Photography	11/3/2016 5:36 PM
24	Dog walking. Tree ID. Swimming.	11/3/2016 5:15 PM
25	Birding	11/3/2016 12:34 PM
26	cross country skiing	11/3/2016 12:15 PM
27	Running	11/3/2016 8:12 AM
28	Snowmobiling / Flying Radio Control Aircraft	11/2/2016 7:51 PM
29	Snowmobileing, Agriculture	11/2/2016 9:16 AM
30	buying food that was produced locally	11/2/2016 6:13 AM
31	the very productive agricultural land	11/1/2016 5:04 PM
32	Allowing some places to NOT have people access. Don't need trails on every single bit.	11/1/2016 8:48 AM
33	Conservation is important. No need to USE all of it.	11/1/2016 6:31 AM
34	X/C skiing	10/31/2016 10:18 AM
35	Dog Walking every day; swimming	10/28/2016 10:29 PM
36	Photography	10/26/2016 4:22 PM



### Q6 What improvements could enhance your use of open space? (check all that apply)

Answered: 161 Skipped: 9



Answer Choices	Responses
More parking	16.15% 26
Information about what land is open for public access	67.08% 108
More open space in my neighborhood	22.36% 36
More amenities, such as trails or benches	42.86% 69
Organized activities, such as guided hikes	29.81% 48
I have no interest in using open space	1.86% 3
Other (please specify)	24.22% 39
<b>Total Respondents: 161</b>	

#	Other (please specify)	Date
1	Biking trails	1/5/2017 1:17 PM
2	parking at trail heads, some are limited	11/29/2016 2:07 PM
3	Additional dog park	11/20/2016 8:35 PM
4	dog owners who pick up after their dogs!	11/18/2016 8:27 PM
5	maintenance of trails and picnic areas	11/18/2016 4:03 PM
6	Dog owners would LOVE a closer dog park. Even one that is small and close to downtown. Manchester street is destroyed now. Id even be willing to help with upkeep.	11/16/2016 10:50 AM
7	Easements, trails as transportation corridors, don't need to be fancy or expensive	11/15/2016 11:56 AM

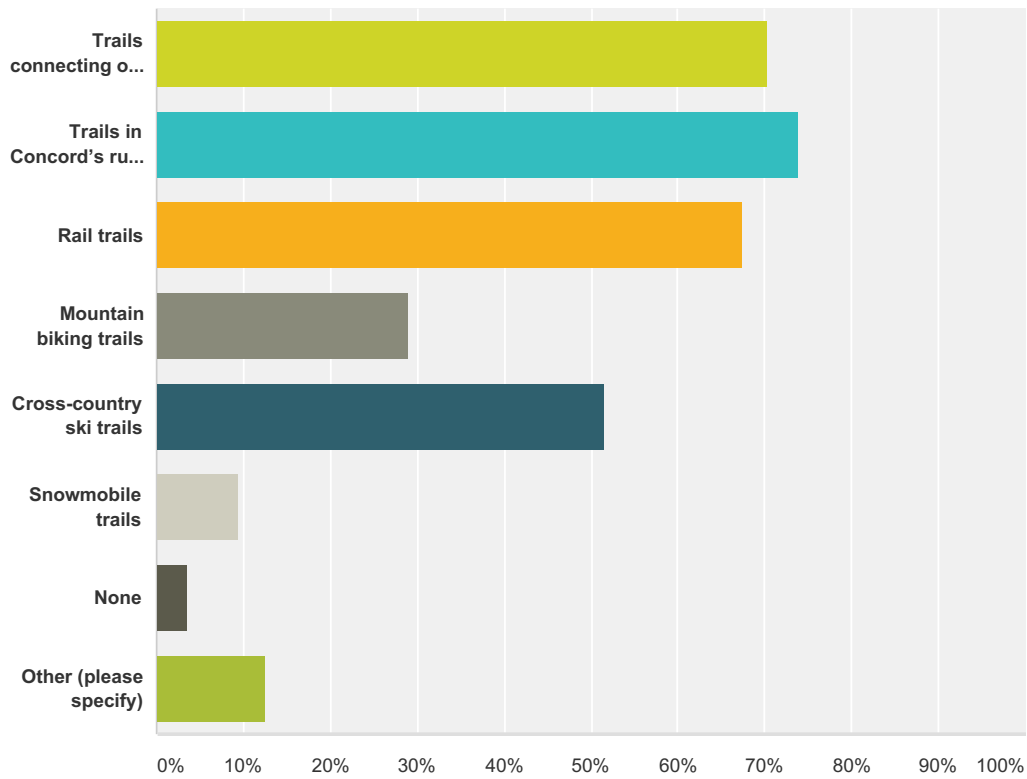


8	Active community trail maintenance, signage indicating public land (we have had a problem with a landowner abutting open land).	11/15/2016 8:42 AM
9	i think they're good right now	11/13/2016 9:33 PM
10	I would love to utilize more of Concord's trails and open space but my knowledge is limited	11/13/2016 2:00 AM
11	marked trails and named	11/12/2016 6:47 PM
12	bathrooms that are open late at Memorial field,br anywhere	11/12/2016 10:27 AM
13	Maybe more trails	11/12/2016 9:03 AM
14	Better maps	11/12/2016 7:26 AM
15	More information on the benefits of open land. The more our citizens know that they gain from this land, the more likely we are to protect it. Even those who do not visit the open land, still benefit from its presence.	11/11/2016 4:19 PM
16	clear directions to trailheads and swimming areas	11/11/2016 12:25 PM
17	Improve information at trailheads indicating trails available + clearly marked trails/blazes	11/11/2016 11:38 AM
18	Board walks within wetlands	11/9/2016 7:17 PM
19	Expansion of existing open space	11/9/2016 6:57 PM
20	I'm happy just having access.	11/9/2016 4:11 PM
21	Make sure that the actual trails are blazed in the same color as the maps on the city website. Release an updated trail guide that is 3-hole punched, rather than spiral-bound, for easy updating and carrying the map on a walk.	11/9/2016 3:24 PM
22	knowing that it's not under threat of development!	11/9/2016 3:24 PM
23	I think things are fine just as they are.	11/9/2016 3:01 PM
24	It would be nice if some open space was left untouched. It's important to conservation efforts and wildlife and not just for people.	11/9/2016 2:17 PM
25	Greenways for deer and other animals to move safely through neighborhoods and ID plaques for interesting trees	11/3/2016 5:15 PM
26	Pedestrian and bike connections from my neighborhood to the open spaces	11/3/2016 2:57 PM
27	Grass lands left natural, other natural areas for birding	11/3/2016 12:34 PM
28	Improved winter parking for cross country skiers, snowshoers etc	11/3/2016 12:15 PM
29	I got the city's green trail book but some of that is outdated and it should be revised. The Extension service collaborates with guided walks-maybe a intro to birding and tree identification walk, or spring or fall blossom and shrub ID day. Probably benches are needed some places but I don't know where that is. It would be nice to sit in the sun and see a view.	11/2/2016 11:27 PM
30	Better trail development in existing space	11/2/2016 10:42 PM
31	Proper use of each of the properties	11/2/2016 7:51 PM
32	Trail maps	11/2/2016 12:50 PM
33	Protecting agriculture land for continued use	11/2/2016 9:16 AM
34	maintaining the agland in the productive stateit is in today	11/1/2016 5:04 PM
35	Currently 'open space' in my neighborhood is very well used and we do not need to encourage more use.	11/1/2016 8:48 AM
36	Leave some as is.	11/1/2016 6:31 AM
37	Random patrols. Someone was living off the sharp corner at Leightnen Park. Rotary Park at Sewalls Falls has not been maintained. Needles at Beaver Meadow Tennis courts and Exit 16 Locke Road trail head.	10/28/2016 10:29 PM
38	Tree cutting opening scenic views	10/28/2016 6:56 PM
39	dogs on leashes and responsible owners picking up	10/28/2016 6:41 PM



### Q7 What types of trails interest you? (check all that apply)

Answered: 169 Skipped: 1



Answer Choices	Responses
Trails connecting open space to Concord neighborhoods	70.41% 119
Trails in Concord's rural areas	73.96% 125
Rail trails	67.46% 114
Mountain biking trails	28.99% 49
Cross-country ski trails	51.48% 87
Snowmobile trails	9.47% 16
None	3.55% 6
Other (please specify)	12.43% 21
<b>Total Respondents: 169</b>	

#	Other (please specify)	Date
1	information along trails, e.g. ID of plants or historical info	11/18/2016 8:27 PM
2	running!	11/18/2016 4:42 PM
3	Dog friendly areas.	11/16/2016 10:50 AM
4	Merrimack River Greenway Trail project	11/16/2016 10:46 AM

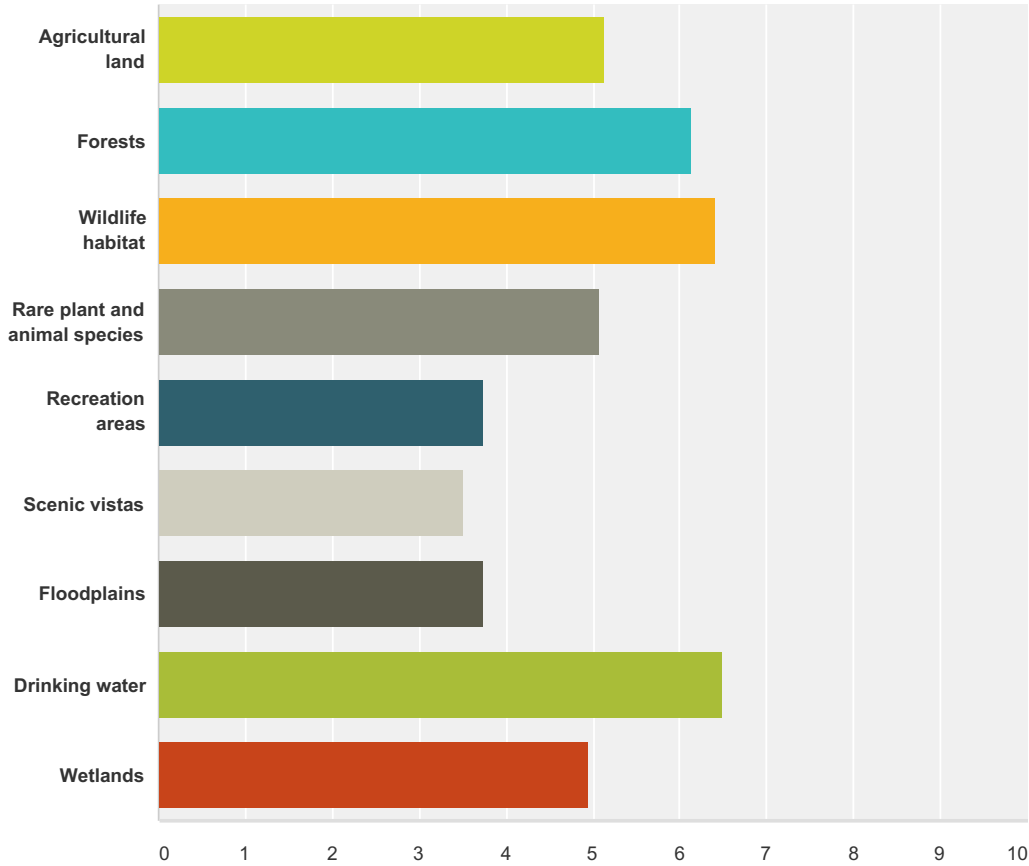


5	I would LOVE to see rail trails.	11/16/2016 9:37 AM
6	I would love to see the Northern Rail Trail extended southward into Concord, along with connecting corridors from both sides of the river and I93.	11/11/2016 4:19 PM
7	Snow shoe trails too.	11/11/2016 2:30 PM
8	Hiking trails	11/11/2016 10:18 AM
9	also trails connect the city parks - walk/bike not on raods	11/9/2016 6:18 PM
10	singletrack	11/9/2016 3:30 PM
11	Signage asking people not to snowshoe or walk where others have skied, but rather to use the other side of the trail.	11/9/2016 3:24 PM
12	There are already lots of trails in town. As mentioned previously, the trails and the congregated people impact on open space has an impact on these lands that will forever change the land, as well as wildlife and birds that use it.	11/9/2016 2:17 PM
13	Snowshoe trails. Trails near swamps/rivers especially.	11/3/2016 5:15 PM
14	Trails could be categorized as several types; connecting neighborhoods to open space, connecting neighborhoods to other neighborhoods, and connecting Concord to a regional network. We need all three types.	11/3/2016 2:57 PM
15	I'm not a jogger any more but it would be nice to jog around and encounter nature and not just asphalt. Anything to overcome our and especially our children's nature deficit. People need to get grounded in something other than themselves. As a single older woman I want to feel safe so I hope connecting open space to neighborhoods would result in safe trails but that would depend on how it's done.	11/2/2016 11:27 PM
16	Trails that allow people to see how the land is being used	11/2/2016 9:16 AM
17	connecting old trails to new trails (large loops)	11/2/2016 8:18 AM
18	Horseback riding	11/1/2016 8:48 AM
19	I think there are more than enough trails in concord. I don't think connecting trails is a good id ea especially through rural areas. . I think it interferes with the wildlife corridor. I like the idea of well maintained /self contained.parks. I could imagine the rural connector trails create problems for fire and police departs.	11/1/2016 6:31 AM
20	Open space should be left alone. There are already so many trails in and around Concord. The City of Concord needs to focus on existing trails and keeping them maintained and patrolled. Adding more trails doesn't seem needed as the trails already have plenty of space and are not crowded.	10/31/2016 9:25 PM
21	Snow shoeing; dog walking	10/28/2016 10:29 PM



### Q8 Which of the following do you feel are important for the City to protect? (rank in order of importance)

Answered: 160 Skipped: 10



	1	2	3	4	5	6	7	8	9	Total	Score
Agricultural land	13.91% 21	5.96% 9	11.92% 18	11.92% 18	13.91% 21	13.25% 20	11.26% 17	11.92% 18	5.96% 9	151	5.14
Forests	12.34% 19	19.48% 30	15.58% 24	17.53% 27	13.64% 21	8.44% 13	5.84% 9	5.84% 9	1.30% 2	154	6.14
Wildlife habitat	18.30% 28	21.57% 33	20.92% 32	8.50% 13	7.84% 12	12.42% 19	1.31% 2	4.58% 7	4.58% 7	153	6.41
Rare plant and animal species	3.31% 5	15.89% 24	12.58% 19	12.58% 19	16.56% 25	8.61% 13	15.23% 23	7.95% 12	7.28% 11	151	5.07
Recreation areas	2.63% 4	8.55% 13	5.92% 9	11.18% 17	8.55% 13	9.21% 14	12.50% 19	15.13% 23	26.32% 40	152	3.74
Scenic vistas	3.92% 6	3.27% 5	6.54% 10	6.54% 10	7.19% 11	15.03% 23	12.42% 19	24.84% 38	20.26% 31	153	3.50
Floodplains	0.00% 0	7.24% 11	9.21% 14	4.61% 7	9.21% 14	13.82% 21	25.66% 39	14.47% 22	15.79% 24	152	3.73
Drinking water	41.94% 65	7.74% 12	4.52% 7	10.32% 16	9.68% 15	7.10% 11	7.10% 11	6.45% 10	5.16% 8	155	6.49
Wetlands	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00



Wetlands	<b>5.77%</b> 9	<b>10.90%</b> 17	<b>12.82%</b> 20	<b>16.67%</b> 26	<b>13.46%</b> 21	<b>11.54%</b> 18	<b>7.69%</b> 12	<b>7.69%</b> 12	<b>13.46%</b> 21	156	4.94
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**Q9 What open space/potential conservation areas would you like to see protected?  
Please indicate why you support protecting these areas. The City has a conservation fund set aside for land protection.**

Answered: 74 Skipped: 96

#	Responses	Date
1	I would like to see large areas of protected space, all the ones listed above that are currently undeveloped, and specifically those larger areas of undeveloped forest that are homes to plant and animal species that need to thrive. I have seen foxes, bobcats and coyotes in the Concord area that need a protected, expansive area of land to live on, so they are not forced to come into neighborhoods looking for food and risking their safety. Communities benefit from green spaces, and one of Concord's greatest assets is it's woodland walking trails within 5 minutes of downtown. A few years ago we had two Moose on the loose in Concord's South end.	11/28/2016 1:23 PM
2	None come to mind.	11/27/2016 4:57 PM
3	the ones listed in question 4	11/23/2016 9:26 AM
4	NHTI	11/20/2016 10:55 PM
5	I would like to see more marked hiking trails for local residents, as well as keeping some of the forests preserved as they are. Not all space should be developed.	11/19/2016 8:36 PM
6	land adjacent and east of Broken Ground when it's available for contiguous land for wildlife. Land in the SE corner of Concord where there is none now, that I know of.	11/18/2016 8:27 PM
7	The land between the state prison, Penacook Lake Watershed, Villa Tranquilla, and Blossom Hill. There is a large track of land here with many beautiful trails but it is often ignored because it is unknown who owns it. Many families hike these trails and it would be an excellent connector piece of property to abutt Walker State Forest, Winant Park, Marjory Swope and West End Farm Trails	11/18/2016 4:42 PM
8	I am concerned about the the storage facility and garage at Sewells Falls state recreation area. The Park would be so much better with that right in the middle of it. Some of that stuff looks like it has been there forever. Landscaping around the picnic tables and the southern boat launch is not maintained throughout the summer and the tall grass is uninviting. Can't we remove that stuff and let the park be a park - not a parking lot for broken vehicles and lost tools?	11/18/2016 4:03 PM
9	297 Pleasant St is a beautiful homestead on a 30acre parcel with walking trails that abuts White Farm and St Pauls. It is under threat of development by Concord Orthopaedics. Neighbors do not want to see this happen!	11/18/2016 9:09 AM
10	Reardon subdivision...property abutter	11/17/2016 10:07 AM
11	All of them honestly. But if you have to lose some I really think it is important to keep the main street open areas protected.	11/16/2016 10:50 AM
12	All, period. We need to keep the open space and not let it get developed. The wildlife need this area and so do we.	11/16/2016 8:39 AM
13	north-south and east - west corridors for transportation "off the roads"	11/15/2016 11:56 AM
14	I do not know enough to comment on this issue.	11/15/2016 10:35 AM
15	Any area where empty buildings falling into disrepair should be turned into open space - even pocket parks. The land around St Paul's and Langley Pkwy is probably under pressure. Fisherville Road is getting over built and can't handle the development pressure. Any open land on the road or connecting roads.	11/15/2016 8:42 AM
16	Watershed protection for water supply, floodplain to reduce destructive flooding, areas abutting existing trails for more hiking etc areas...	11/15/2016 8:25 AM
17	I am not sure specifically. I do think it's important to maintain wildlife corridors and protect wetlands and lakes/ponds.	11/14/2016 12:58 PM
18	Turtle pond (turtle town) has vulnerable properties that could be developed. The wildlife use of those areas could be significantly impacted by development.	11/14/2016 10:40 AM
19	Willing to consider all options!	11/14/2016 10:04 AM
20	Lincoln Financial land	11/13/2016 8:26 PM



21	Merrimack River corridor and trail access, especially the proposed green way and boardwalk	11/13/2016 10:54 AM
22	Langley parkway extension do not need a throughway at this point.	11/12/2016 6:47 PM
23	We live on Knight Street but I have never heard of Knight Morono Park.	11/12/2016 10:35 AM
24	We can't keep building on every piece of property-need area of open land,trees,forests,for O2,animals,you wonder why the bears are coming out into public???	11/12/2016 10:27 AM
25	Turkey River Basin	11/11/2016 5:01 PM
26	Green areas on either side of surrounding Langley Parkway.	11/11/2016 4:19 PM
27	Extend our rail trails. Rail trails use existing, but underutilized rights of way to connect our neighborhoods and our city to neighboring towns. They provide recreation and non-automotive access and mobility year round.	11/11/2016 4:19 PM
28	Extend the Morono Park trail along the Prison Property. Would love to take a trail all the way down to downtown or at least Horseshoe Pond without having to walk on the railroad tracks or have to get back up to N. State Street.	11/11/2016 3:41 PM
29	Mast Yard, Marjory Swope, Penacook Watershed. Because we enjoy mountain biking in these areas.	11/11/2016 2:54 PM
30	Any open space frankly. The charm of Concord is its city/rural mix. Protect what you can!	11/11/2016 2:30 PM
31	Farmland is my first priority as we are losing farms, especially dairy, at an alarming rate. These farms represent our ability to feeds ourselves locally. They also protect the beauty and open space we love. Along with the farmlands go wetlands, as that is where good alluvial soil exists.	11/11/2016 11:54 AM
32	297 Pleasant Street, for reasons stated above.	11/11/2016 11:38 AM
33	All of them	11/11/2016 11:27 AM
34	I actually don't know of any potential conservation areas at this time. I just moved to concord recently, and am still getting to know all the trails and parks. I'd love to be able to access more information on all these things though.	11/11/2016 10:18 AM
35	They should aa be protected. I think they are all equally important!	11/11/2016 8:56 AM
36	?	11/10/2016 2:25 PM
37	Any along the river	11/10/2016 6:59 AM
38	Agricultural land is very important to history, wildlife, and future agricultural use of the people of the City. The City should help to conserve agricultural lands that may be up for sale or potential development. Open lands for pasture and crops are important to the heritage of the City.	11/9/2016 7:17 PM
39	I am opposed to the expansion of Langley Parkway to Penacook Street. Please help protect that area from further development.	11/9/2016 6:57 PM
40	The open space at 297 Pleasant street. It is a beautiful space and has so much beautiful wildlife on it.	11/9/2016 5:21 PM
41	The city & commission has done an excellent job - I would like to see parcels close to higher density living areas be protected and trail connections made connecting these small areas to the propertie already protected.	11/9/2016 3:41 PM
42	Whatever can create the best and longest trail corridors that can connect different parts of the city.	11/9/2016 3:30 PM
43	I would love a hiking trail around Penacook Lake, and a trail along the west side of Turkey Pond.	11/9/2016 3:24 PM
44	not sure of specifics... any! also ensure that zoning keeps inappropriate development out of the city	11/9/2016 3:24 PM
45	I am not well versed in this so I don't have a reply.	11/9/2016 3:01 PM
46	Note that for question #8, I think it's ALL important, approximately equal. I don't have a specific space to set aside to protect, though.	11/9/2016 2:14 PM
47	Additional land between broken ground and Loudon . The rail right of way running from Horseshoe Pond out to the prison and beyond . Act to enlarge and connect pieces of land so pieces are not fragmented and inhibit wildlife corridors	11/3/2016 5:36 PM
48	There's land behind Fowler St., between Fowler and Millstream...there's a stream in there, and it makes a great greenway. I am actually all for protecting any green space...I just can't think of any in particular...	11/3/2016 5:15 PM
49	Enough recreation until more is known about impact. Also, until problems in existing areas are solved.	11/3/2016 3:49 PM
50	Agricultural land; land around the rivers for flood plain protection, agriculture preservation, and recreation purposes; tracts that will increase connectivity for habitat protection and recreation purposes; land that will improve the community bicycle network and regional connectivity	11/3/2016 2:57 PM
51	I would love to see more access along the Merrimack River.	11/3/2016 1:52 PM



52	Areas abutting Winant Park (i.e. Hospital Trails) and State Prison Farm and Quarries (i.e. access to quarry trails)	11/3/2016 12:15 PM
53	Garvin's Falls area	11/3/2016 10:02 AM
54	All along the river. It would be nice to have a trail that follows the river.	11/3/2016 8:54 AM
55	More protected space in the Heights area. Development along Loudon Road has really grown too much.	11/3/2016 8:41 AM
56	As much as possible	11/3/2016 8:12 AM
57	Any areas that would connect to other areas to make the whole big enough to support more wildlife.	11/2/2016 11:27 PM
58	Establish rail trails using abandoned rail system in the city. Connection of trail system on east and west side of the city divided by the river	11/2/2016 7:51 PM
59	As a avid mountain biker and hiker I have a true appreciation for and an invested interest in protecting the trail networks of Concord, Bow, and Hopkinton. The interconnectivity of these trails and their quiet presence crisscrossing through our neighborhoods is a real community asset that should be protected.	11/2/2016 3:29 PM
60	Langley Parkway extension needs to be protected from automobile traffic. It is an important access point to trail systems and perfect buffer	11/2/2016 2:33 PM
61	Would like to make sure all state land, st pauls land, quarry land, Russell martin park and winant park stays protected in perpetuity	11/2/2016 12:50 PM
62	Guly Hill Land, Sewer department land	11/2/2016 9:16 AM
63	Protected from what? Before supporting any more any land being converted from private to public ownership I would need to know just what the threat is. This country was established in part on the principle that private ownership of land is important.	11/2/2016 6:13 AM
64	THE AG LAND OFF GULLY HILL SHOULD STAY AS SUCH PRODUCTIVE	11/1/2016 5:04 PM
65	I would like to see the area around Penacook Lake opened up to appropriate use, (hiking/cross country skiing) which would have low or no impact on drinking water quality.	11/1/2016 1:29 PM
66	1) Protecting watershed land wherever you can. Because it is common sense. 2) Protection for wildlife in large parcels. I don't have anywhere in mind.Maybe you could stop dividing what Concord already owns with trails.	11/1/2016 6:31 AM
67	City watershed land needs to be protected. With a limited water supply in a growing town, not protecting the drinking water in the city would seem short sighted.	10/31/2016 9:25 PM
68	Sunset overlook on West Parish. Wayne Sargent's property on Carter Hill. He's 76 and his property is gorgeous. Open fields owned by Colby on Horse Hill. There are three travel ways on Horse Hill that the animals use. 1) Bear with cubs every year use just past Denault's & Blades and cut up into Blades. 2) Stream from Bowen's to Colby/Bourne property line. Bobcat for the first time yesterday. Bear & dear regularly. 3) Sharp corner down the hill to the river. See bear all the time.	10/28/2016 10:29 PM
69	Concord would not be the beautiful city it is without our beautiful open spaces. There is enough open spaces for many people to find their own quiet space. Frankly, I would not be living here if I did not enjoy the open spaces as much as I do.	10/28/2016 7:29 PM
70	Whitney road extension from Monitor out to Hoit Rd. It's right on the river.	10/28/2016 6:56 PM
71	dirt road between Concord Hospital and Auburn Street; green connection to Merrimack River; Lewis Farm; fields between Clinton Street and Iron Works Road; Horseshoe Pond area (no expansion of road through historic district); farmland behind the post office	10/28/2016 6:41 PM
72	Broken Ground, purchase more of the forested block in the back. Conservation easement on the ag land behind BW3. Connect the eagle scout trail locke trail on locke road to the trail along the river.	10/28/2016 3:26 PM
73	Abandoned railroad rights of way and pubic access along Merrimack River. Rail Trails are great and offer a different experience from the many hiking trails we have.	10/28/2016 2:09 PM
74	More along the river for hiking etc	10/26/2016 4:19 PM



## Q10 Please provide any additional comments.

Answered: 61 Skipped: 109

#	Responses	Date
1	Thank you for taking the time to gather public feedback. Thank you for working to conserve our undeveloped lands.	11/28/2016 1:23 PM
2	The Taxpayers of Concord are already amply burdened by the large amounts of State, Conservation, & non-profits that pay little or no tax. Adding to the already excellent amount of land set aside without a truly substantive reason is uncalled for. Just because there is money "available" doesn't mean it should be spent without good cause. As for adding to wildlife habitat, there is already plenty available and some of us find the growing deer population beyond a nuisance, often endangering drivers.	11/27/2016 4:57 PM
3	If we want the population to healthier, then exercise is an important component of this effort. Creating/maintaining open spaces for people to use for a variety of physical activities year-round is crucial to this endeavor. Also once gone, it is very difficult to reclaim land and return it to its natural state. So, the less we destroy/convert, the more there will be for future generations of people and wildlife to enjoy.	11/23/2016 9:26 AM
4	Would love to see an effort made in Concord to regain control over bittersweet, especially between 93 and the river. Trees are not going to survive much longer under current onslaught of the vines.	11/18/2016 8:27 PM
5	The question where we rank conservation projects is misleading. I am going to put our natural resources and wildlife above recreation and open spaces but that doesn't mean they can't both be protected concurrently. Increased attention to conservation can help protect drinking water, animal and forest habitats and others. They don't need to be pitted against each other.	11/18/2016 4:42 PM
6	thank you for taking the input. I have been wanting to tell someone about my concerns. Sewell's could be so much better if it was maintained. A lot of people use it and the Merrimack is so pretty there. I hope we can find ways to keep it protected and maintained - and for the purposes of recreation.	11/18/2016 4:03 PM
7	Thank you!	11/18/2016 9:09 AM
8	Thanks for doing this survey.	11/15/2016 10:35 AM
9	Thank you for providing this opportunity to give feedback. Concord needs to maintain its unique semi-rural character!	11/15/2016 8:42 AM
10	Is all state and city open land restricted by conservation easements? Labels such as "fee simple" a little hazy.	11/15/2016 8:25 AM
11	#8 is a really tough question ... I feel pretty strong about each area and feel they are quite connected.	11/14/2016 3:27 PM
12	In the ranking section, I would rank them all as a priority. I think it's important to use existing structures for buildings and expansion of business.	11/14/2016 12:59 PM
13	I hope the city will continue to apply pressure to the State to allow access to the Prison lands below Morono park. This is a serious block to connectivity north and south. It would be my highest priority.	11/14/2016 10:40 AM
14	Open space makes Concord a very livable and wonderful city	11/13/2016 8:26 PM
15	We need a blend of conservation and commerce. It would be great if you could link drinking, eating and recreation with the trail system and open space. Maybe a pub system linked with walks, or coffee after early morning guided hikes.	11/13/2016 10:54 AM
16	I support conservation land and would love to be able to support and utilize it more but I don't know much about the city's conservation land.	11/13/2016 2:00 AM
17	Please repave all of Loudon Road. It's a disaster! With the right machine, it can be done in a day. (See the Las Vegas strip).	11/12/2016 10:35 AM
18	Please-you made downtown look so good--don't let people build on every little piece of property--we need trees,animals,birds,bugs	11/12/2016 10:27 AM
19	Thank you....you're doing a great job!	11/12/2016 9:03 AM
20	This survey does not work on my cell phone. I will try to retake it on a computer.	11/12/2016 7:26 AM
21	Concord 's natural surroundings are a big part of it's charm.	11/11/2016 4:53 PM
22	We've got a beautiful ecosystem here. It's worth preserving.	11/11/2016 4:19 PM



23	Open space increases our property values and improves quality of life for all our residents. Thank you for asking about our opinions.	11/11/2016 4:19 PM
24	Thanks for asking!	11/11/2016 2:30 PM
25	Thank you for soliciting my feedback.	11/11/2016 12:25 PM
26	I am concerned about Concord Ortho taking over a big parcel of land on Pleasant St. Please have prevent development of the wetland areas.	11/11/2016 11:54 AM
27	FYI- Questions #2 and #3 above don't appear to be working well. I tried to select "strongly agree" on #2 and "very concerned" on #3, but all stars were highlighted when I made those selections. Thank you for your interest in hearing from the public. I admire you dedication to and protection of open space in Concord.	11/11/2016 11:38 AM
28	In this survey, questions 2&3, my choice is strongly agree and very concerned. The survey didn't work correctly, and checked all boxes.	11/10/2016 2:54 PM
29	Recently moved from East Concord after many yrs. and still enjoy the hiking trails in that area as well as Turtle Pond and surrounding area.	11/10/2016 2:25 PM
30	Rail trails seem like a good idea. If the track has already been removed, then use as a trail is fine. I do not feel it is a wise investment to remove track to use the corridor as a trail. Dual use, with track and trail is fine. Again, the track is a historic feature that the City should embrace and promote to the residents. Thank you to the City for keeping an interest in open space for all.	11/9/2016 7:17 PM
31	Thanks for the services you provide to the community to make it more livable!	11/9/2016 6:57 PM
32	Might want to consider working more with the city recreation department with advertising/marketing trails and non park areas.	11/9/2016 6:18 PM
33	I'm a big trail runner and one of the great things about Concord is the large number of trails. Keep up the good work!	11/9/2016 3:44 PM
34	Great job on the recent trail work to create connectors between hiking areas.	11/9/2016 3:30 PM
35	How can we get people to either push dog waste off the trail or to take ther "doggy goody bag" with them? You don't know misery until you have had to clean dog poop off snowshoes!	11/9/2016 3:24 PM
36	question #8 is a strange ranking... if you have forests you have wildlife habitat, for example.	11/9/2016 3:24 PM
37	This survey seems to be flawed. When I tried to vote on an issue, more than one answer lit up. I therefore left those unmarked.	11/9/2016 3:01 PM
38	We are so fortunate to live in a beautiful health conscious area	11/9/2016 2:31 PM
39	I would like to see more open space, as mentioned, remain open and untouched. It's fine if there are existing woods roads, but would like to see the land remain open but not promoted. In other words, I like that there is land close by that is undeveloped and wildlife can be seen, observed and hunted. There seems to be lots of land available to the public where recreational use is promoted. Slowly, land that has been open to hunting for many years, is now shrinking and wildlife impact is becoming greater. Maybe the city, with its limited resources should focus more on what they already have than to worry about providing more and more places. As I said, lets keep some open land open just for the sake of saving it from any and all development.	11/9/2016 2:17 PM
40	Open space is an important component of human health as well as an environmental benefit.	11/9/2016 2:14 PM
41	The City of Concord and lots of other stake holders have been doing great work preserving and protecting land in the City . I look forward to the successes continuing	11/3/2016 5:36 PM
42	Thank you for the chance to give my input.	11/3/2016 5:15 PM
43	Would like to see more attention toward preservation	11/3/2016 3:49 PM
44	Concord has no definitive protection or recognition of steep slopes for habitat, scenic, or other environmental purposes. The Open Space plan might acknowledge steep slopes as a resource and make recommendations if appropriate.	11/3/2016 2:57 PM
45	question 2 strongly agree question 3 very concerned survey filled in all boxes	11/3/2016 12:34 PM
46	I'm new to the area. Do you ask for volunteers, students, boy scouts, private, schools, businesses, etc to collaborate on conservation goals?	11/2/2016 11:27 PM
47	We are fortunate to have many open spaces in our city. I think we need to be careful to balance open space and keeping taxes at a level where people can afford to live in the city.	11/2/2016 8:46 PM
48	The amount of open space that concord has is absolutely incredible and is a draw for new residents and an incredibly valuable resource for existing residents. This alone makes Concord one of the best places to live in America.	11/2/2016 12:50 PM



49	Concord has done a good job with trails. I think continuing making great biking, walking, skiing trails will attract great people to a great city.	11/2/2016 8:18 AM
50	When the city buys agricultural lands and then despite strong language in the master plan and in the opening statement above "promoting agriculture and forestry" does the opposite. That is wrong. eg the plan to put solar panels on farm land at the treatment plant, taking land out of production agriculture to lease to outside organizations not farmers, and randomly establish buffers that take land out of production.	11/2/2016 6:13 AM
51	THE BIGGEST CONCERN I HAVE THE LOSS OF PRODUCTIVE AG LAND	11/1/2016 5:04 PM
52	I think that the city has an amazing amount of wonderful conservation area and it's much appreciated.	11/1/2016 1:29 PM
53	Concord has done a really good job of mixing residential, agricultural and wildlife space but in recent years the noises about opening the watershed to recreation are very troubling, and the attitude that people should have access to everywhere (more and more trails) is a bit misguided. If we are everywhere, the wildlife will not persist. And if we recreate in the drinking water it will cost \$\$ to keep it clean and it will never be as pristine as it is now.	11/1/2016 8:48 AM
54	Please no more trail heads. They change neighborhoods forever with traffic, trash, vandalism, drinking and sometimes people having sex .Runnels Rd will never be the same.	11/1/2016 6:31 AM
55	Enough with the trails. It seems there are trails everywhere in Concord. Trails in people's back yards. Trails that bring additional people, traffic and problems to neighborhoods. Trails are not problem free or maintenance free. Trails have an impact on the wildlife, the forest, the land, and the neighborhoods which the trails intersect, connect and pass through. Open space should be open and preserved. With so few "wild" spaces these days, enticing people to use these spaces may not bring the outcome some think. People should be able to use open space, but do we need to organize and route people to specific locations all over town?	10/31/2016 9:25 PM
56	Thank you for providing this survey	10/31/2016 9:11 AM
57	Thanks for doing such a great job!!	10/28/2016 10:29 PM
58	Concord does a great job with trails. Keep it up.	10/28/2016 6:56 PM
59	Concentrate development on infill sites and downtown! My family loves Rail Trails and bike paths. We like to get out without having to get in our car. Thanks!	10/28/2016 2:09 PM
60	Great survey-Thanks!	10/26/2016 9:35 AM
61	Way to go Beth!	10/26/2016 9:32 AM



APPENDIX B

Rare Species and Exemplary Natural Communities  
of Concord



**Rare Plants, Animals, Natural Communities and Natural Systems Documented in Concord**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Rarity Rank</b>
<b>Natural Communities - Terrestrial</b>		
Pitch pine - scrub oak woodland		S1S2
Semi-rich oak - sugar maple forest		S2S3
Dry river bluff		S2S3 – G2G4?
<b>Natural Communities - Palustrine</b>		
Acidic riverside seep		S1
Silver maple - false nettle - sensitive fern floodplain forest		S2
Sugar maple - silver maple - white ash floodplain forest		S1S2
<b>Natural Community Systems - Palustrine</b>		
Drainage marsh - shrub swamp system		S5
Temperate peat swamp system		S4?
<b>Birds</b>		
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	S2B
<i>Chordeiles minor</i>	Common Nighthawk	S1B
<i>Eremophila alpestris</i>	Horned Lark	S3B
<i>Falco peregrinus anatum</i>	Peregrine Falcon	S2
<i>Gavia immer</i>	Common Loon	S2B
<i>Haliaeetus leucocephalus</i>	Bald Eagle	S2
<i>Pooecetes gramineus</i>	Vesper Sparrow	S2S3B
<i>Porzana carolina</i>	Sora	S3B
<i>Sturnella magna</i>	Eastern Meadowlark	S3B
<b>Fish</b>		
<i>Anguilla rostrata</i>	American Eel	S3
<b>Amphibians</b>		
<i>Bufo fowleri</i>	Fowler's Toad	S3
<i>Rana pipiens</i>	Northern Leopard Frog	S3
<b>Reptiles</b>		
<i>Clemmys guttata</i>	Spotted Turtle	S2
<i>Coluber constrictor constrictor</i>	Northern Black Racer	S2
<i>Emydoidea blandingii</i>	Blanding's Turtle	S1
<i>Glyptemys insculpta</i>	Wood Turtle	S3
<i>Heterodon platirhinos</i>	Eastern Hognose Snake	S1

<i>Opheodrys vernalis</i>	Smooth Green Snake	S3
<b>Invertebrates</b>		
<i>Alasmidonta varicosa</i>	Brook Floater	S1 – G3
<b>Insects</b>		
<i>Acronicta hamamelis</i>	A Noctuid Moth	S1
<i>Agrotis stigmata</i>		SU
<i>Apamea burgessi</i>	A Noctuid Moth	SU
<i>Apantesis carlotta</i>		SU
<i>Apodrepanulatrix liberaria</i>	New Jersey Tea Span Worm	S1S2 – G3
<i>Argia apicalis</i>	Blue-fronted Dancer	S2
<i>Atrytonopsis hianna</i>	Dusted Skipper	S3?
<i>Callophrys irus</i>	Frosted Elfin	S1 – G3
<i>Catocala sp. 1 nr. jair</i>	No Common Name	S1S2
<i>Celithemis fasciata</i>	Banded Pennant	S1
<i>Celithemis martha</i>	Martha's Pennant	S2S3
<i>Chaetagnaea tremula</i>	Barrens Chaetagnaea	SNR
<i>Chytonix sensilis</i>	A Noctuid Moth	S1S2
<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S2
<i>Enallagma minusculum</i>	Little Bluet	SNR
<i>Erynnis baptisiae</i>	Wild Indigo Duskywing	S1
<i>Euchlaena madusaria</i>	A Geometrid Moth	S1
<i>Eucoptocnemis fimbriaris</i>	A Noctuid Moth	S1
<i>Eumacaria madopata</i>	Brown-bordered Geometer Moth	S2S4
<i>Glena cognataria</i>	Blueberry Gray	S3?
<i>Gomphus quadricolor</i>	Rapids Clubtail	S1S2 – G3G4
<i>Grammia phyllira</i>	Phyllira Tiger Moth	S1
<i>Hesperia metea</i>	Cobweb Skipper	S3
<i>Idia diminuendis</i>	A Noctuid Moth	S2S4
<i>Ischnura hastata</i>	Citrine Forktail	S2
<i>Lapara coniferarum</i>	Southern Pine Sphinx	S1S2
<i>Lycaeides melissa samuelis</i>	Karner Blue Butterfly	S1 - G
<i>Ophiogomphus howei</i>	Pygmy Snaketail	S2 – G3
<i>Pantala hymenaea</i>	Spot-winged Glider	S2
<i>Satyrium edwardsii</i>	Edwards' Hairstreak	S3



<i>Speranza exonerata</i>	Barrens Itame	S1S2 - G3G4
<i>Sphinx drupiferarum</i>	Plum Sphinx	SU
<i>Stylurus amnicola</i>	Riverine Clubtail	S2S3
<i>Sympistis dentata</i>	Blueberry Sallow Moth	S2
<i>Xestia elimata</i>	Southern Variable Dart Moth	S3S4
<i>Xylena thoracica</i>	Pinion Moth	S2
<i>Xylotype capax</i>	Barrens Xylotype	S2
<i>Zale curema</i>	A Noctuid Moth	S2 - G3G4
<i>Zale obliqua</i>	A Noctuid Moth	S2
<i>Zale submediana</i>	Noctuid Moth	S3
<i>Zanclognatha martha</i>	Pine Barrens Zanclognatha Moth	S1
<b>Plants</b>		
<i>Aristida longespica var. geniculata</i>	red threeawn	S1
<i>Asclepias amplexicaulis</i>	clasping milkweed	S2
<i>Asclepias tuberosa</i>	butterfly milkweed	S1
<i>Calystegia spithamea</i>	upright false bindweed	S1
<i>Carex bullata</i>	button sedge	S1
<i>Eleocharis diandra</i>	Wright's sedge	S1 – G2
<i>Eutrochium fistulosum</i>	hollow Joe-Pye weed	S1
<i>Hudsonia ericoides</i>	Golden Heather	S1
<i>Lupinus perennis</i>	Wild Lupine	S2
<i>Lygodium palmatum</i>	American climbing fern	S1

# APPENDIX C

## NH Natural Heritage Rarity Ranks



***Explanation of Global and State Rank Codes***

Ranks describe rarity both throughout a species' range (global or "G" rank) and within New Hampshire (statewide or "S" rank). The rarity of sub-species and varieties is indicated with a taxon ("T") rank. For example, "G5T1" = the species is globally secure (G5) but the sub-species is critically imperiled (T1).

<i>Code</i>	<i>Examples</i>	<i>Description</i>
<b>1</b>	G1 S1	Critically imperiled because extreme rarity (generally one to five occurrences) or some factor of its biology makes it particularly vulnerable to extinction.
<b>2</b>	G2 S2	Imperiled because rarity (generally six to 20 occurrences) or other factors demonstrably make it very vulnerable to extinction.
<b>3</b>	G3 S3	Either very rare and local throughout its range (generally 21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction because of other factors.
<b>4</b>	G4 S4	Widespread and apparently secure, although the species may be quite rare in parts of its range, especially at the periphery.
<b>5</b>	G5 S5	Demonstrably widespread and secure, although the species may be quite rare in parts of its range, particularly at the periphery.
<b>U</b>	GU SU	Status uncertain, but possibly in peril. More information needed.
<b>H</b>	GH SH	Known only from historical records, but may be rediscovered. A G5 SH species is widespread throughout its range (G5), but historical in New Hampshire (SH).
<b>X</b>	GX SX	Believed to be extinct. May be rediscovered, but evidence indicates that this is less likely than for historical species. A G5 SX species is widespread throughout its range (G5), but extirpated from New Hampshire (SX).

Modifiers are used as follows.

<i>Code</i>	<i>Examples</i>	<i>Description</i>
<b>Q</b>	G5Q GHQ	Questions or problems may exist with the species' or sub-species' taxonomy, so more information is needed.
<b>?</b>	G3? S3?	The rank is uncertain due to insufficient information at the state or global level, so more inventories are needed. When no rank has been proposed the global rank may be "G?" or "G5T?"

When ranks are somewhat uncertain or the species' status appears to fall between two ranks, the ranks may be combined. For example:

G4G5	The species may be globally secure (G5), but appears to be at some risk (G4).
G5T2T3	The species is globally secure (G5), but the sub-species is somewhat imperiled (T2T3).
G4?Q	The species appears to be relatively secure (G4), but more information is needed to confirm this (?). Further, there are questions or problems with the species' taxonomy (Q).
G3G4Q S1S2	The species is globally uncommon (G3G4), and there are questions about its taxonomy (Q). In New Hampshire, the species is very imperiled (S1S2).

## APPENDIX D

### Habitat Block Size Requirements for Wildlife



Habitat block size requirements for wildlife.

1-19 Acres	20-99 Acres	100-499 Acres	500-2,500 Acres	>2,500 Acres
raccoon	raccoon hare	raccoon hare	raccoon hare	raccoon hare coyote
small rodent	small rodent porcupine	small rodent porcupine	small rodent porcupine	small rodent porcupine bobcat
cottontail	cottontail beaver	cottontail beaver	cottontail beaver	cottontail beaver black bear
squirrel	squirrel weasel	squirrel weasel mink	squirrel weasel mink	squirrel weasel mink fisher
	woodchuck	woodchuck deer	woodchuck deer	woodchuck deer
muskrat	muskrat	muskrat	muskrat moose	muskrat moose
red fox songbirds	red fox songbirds	red fox songbirds sharp-shinned hawk	red fox songbirds sharp-shinned hawk bald eagle	red fox songbirds sharp-shinned hawk bald eagle
skunk	skunk	skunk Cooper's hawk harrier broad-winged hawk	skunk Cooper's hawk harrier broad-winged hawk goshawk	skunk Cooper's hawk harrier broad-winged hawk goshawk
		kestrel	kestrel	kestrel
		great-horned owl	great-horned owl	great-horned owl
		barred owl	barred owl	barred owl
		osprey	osprey	osprey
		turkey vulture	turkey vulture	turkey vulture
most reptiles	most reptiles garter snake ring-necked snake	reptiles garter snake ring-necked snake	reptiles garter snake ring-necked snake	reptiles garter snake ring-necked snake
most amphibians	most amphibians	most amphibians wood frog	amphibians wood frog	amphibians wood frog

## APPENDIX E

### Definitions for Productive Agricultural Soils



### *Prime Farmland*

- Soils that have an aquic or udic moisture regime and sufficient available water capacity within a depth of 40 inches to produce the commonly grown cultivated crops adapted to New Hampshire in 7 or more years out of 10.
- Soils that are in the frigid or mesic temperature regime.
- Soils that have a pH between 4.5 and 8.4 in all horizons within a depth of 40 inches.
- Soils that have either no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivated crops common to New Hampshire to be grown.
- Soils that have a saturation extract less than 4 mmhoc/cm and the exchangeable sodium percentage is less than 15 in all horizons within a depth of 40 inches.
- Soils that are not frequently flooded during the growing season (less than a 50% chance in any year or the soil floods less than 50 years out of 100.)
- The product of the erodibility factor times the percent slope is less than 2.0 and the product of soil erodibility and the climate factor does not exceed 60.
- Soils that have a permeability rate of at least 0.06 inches per hour in the upper 20 inches.
- Soils that have less than 10 percent of the upper 6 inches consisting of rock fragments larger than 3 inches in diameter.

### *Farmland of Statewide Importance*

Soils of statewide importance are soils that are not prime or unique and:

- Have slopes of less than 15 percent
- Are not stony, very stony or bouldery
- Are not somewhat poorly, poorly or very poorly drained
- Includes soil complexes comprised of less than 30 percent shallow soils and rock outcrop and slopes do not exceed 8 percent.
- Are not excessively drained soils developed in stratified glacial drift, generally having low available water holding capacity.

### *Farmland of Local Importance*

The criteria for soils of local importance in Merrimack County are as follows:

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

APPENDIX F  
Definitions for Productive Forest Soils



### **Forest Soil Class IA**

This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as red oak, beech, sugar maple, red maple, white birch, yellow birch, aspen, and white ash in varying combinations with hemlock and white pine. Red spruce may be present in relative low abundance isolated situations. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.

### **Forest Soil Class IB**

The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red oak, red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with white pine and hemlock. Red spruce and balsam fir may be present in relative low abundance isolated situations. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.

### **Forest Soil Class IC**

The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., hemlock and red spruce. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.