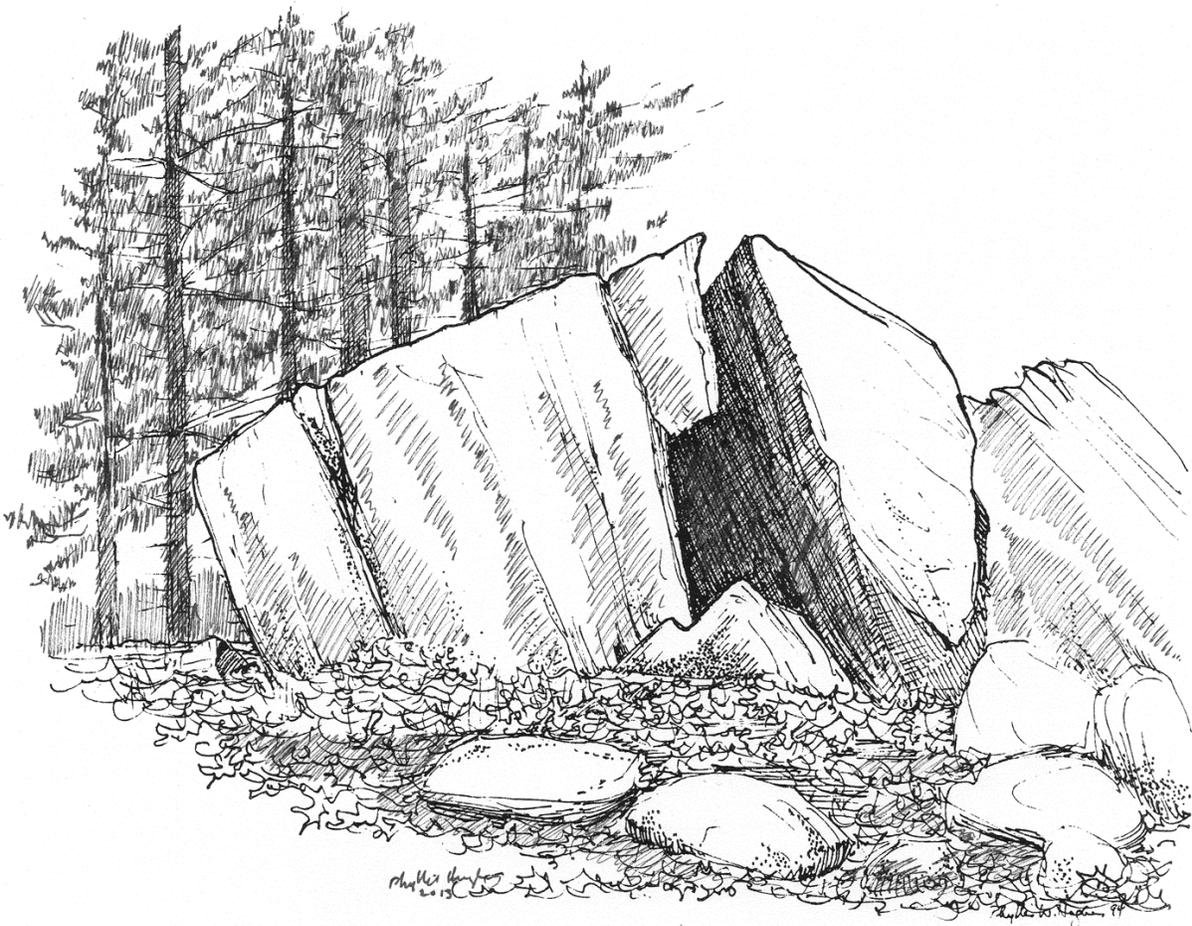


Town of Carlisle Open Space & Recreation Plan 2013

Carlisle, Massachusetts

1 November 2013

Approved through September 2020



2013 Open Space and Recreation Plan Committee

Louise Hara, *Chair*

Rick Amodei, Elisabeth Carpenter, David Freedman,
Lynn Knight, Kevin C. Smith, Mary Zoll

Sylvia Willard, *Conservation Commission Administrator*

2013 Open Space and Recreation Plan Committee

Louise Hara, *Chair*
Rick Amodei
Elisabeth Carpenter
David Freedman
Lynn Knight
Kevin C. Smith
Mary Zoll

Sylvia Willard, *Conservation Commission Administrator*

Board Of Selectmen

Tim Hult, *Chair*
John Gorecki
Peter Scavongelli
Doug Stevenson
John Williams

Town Administrator

Timothy Goddard

Conservation Commission

Kelly Guarino, *Chair*
Luke Ascolillo
J. Thomas Brownrigg
Tom Brown
Peter Burn
Jenifer Bush
Lee Tatistcheff

Recreation Commission

Rick Amodei, *Chair*
Noreen Ma
David Moreau
Kevin Smith
Mark Spears

Acknowledgments

The 2013 Open Space and Recreation Plan Committee is grateful to the following individuals for their assistance in the preparation of this document: Alan Ankers, Elaine Bojanic, Peter Burn, Alan Cameron, Steve Carlin, Gretchen Caywood, Thomas Dunkers, Kay Fairweather, Linda Fantasia, Ray Faucher, Betsy Fell, Tom Fitzpatrick, David Flannery, Debbie Geltner, Terry Golson, Ken Harte, Charlene Hinton, Steve Hinton, Mary Hopkins, Ernest Huber, John Keating, Steve Kirk, David Klein, John Luther, Bobby Lyman, Michael Malcos, George Mansfield, Holly Mansfield, Steve Spang, Melissa Stamp, Sally Swift, Steve Tobin, John Williams, and Sally Zielinski.

The Committee thanks conservation commission members and personnel in Acton, Bedford, Billerica, Chelmsford, Concord, and Westford for taking the time to explore with us how our open spaces interrelate.

The Committee thanks the Carlisle Board of Assessors, Carlisle Planning Board, and John E. O'Donnell & Associates for their support in the preparation of the Geographic Information Systems (GIS) maps included in this Plan.

The Committee extends special appreciation to local artist Phyllis Hughes for her pen-and-ink drawings of Carlisle landscapes.

Finally, the Committee acknowledges the contributions of Carlisle citizens, past and present, who have provided a legacy of conservation and recreation lands for our enjoyment and stewardship.

*Note: All maps and data in this report are approximate or subject to error.
Please refer to official information on file in Carlisle Town Hall.*

Open Space and Recreation Plan 2013

TABLE OF CONTENTS

Acknowledgments

Section 1: Plan Summary	1-1
Section 2: Introduction	2-1
A. Statement of Purpose	2-1
B. Planning Process and Public Participation	2-6
Section 3: Community Setting	3-1
A. Regional Context	3-1
B. History of the Community	3-6
C. Population Characteristics	3-7
D. Growth and Development Patterns	3-9
Section 4: Environmental Inventory and Analysis	4-1
A. Geology, Soils, and Topography	4-1
B. Landscape Character	4-3
C. Water Resources	4-4
D. Vegetation	4-5
E. Fisheries and Wildlife	4-8
F. Scenic Resources and Unique Environments	4-12
G. Environmental Challenges	4-14
Section 5: Inventory of Lands of Conservation and Recreation Interest	5-1
A. Private Parcels	5-1
B. Public and Nonprofit Parcels	5-4
Section 6: Community Vision	6-1
A. Description of Process	6-1
B. Statement of Open Space and Recreation Goals	6-6
Section 7: Analysis of Needs	7-1
A. Summary of Needs for Resource Protection	7-1
B. Summary of Community's Needs	7-5
C. Management Needs	7-15
Section 8: Goals and Objectives	8-1
A. Goals and Objectives	8-1
B. Available Protection Methods	8-2

Section 9: Seven-Year Action Plan	9-1
A. Introduction	9-1
B. Board of Assessors Initiatives for 2013 through 2019	9-3
C. Board of Health Initiatives for 2013 through 2019	9-3
D. Board of Selectmen Initiatives for 2013 through 2019	9-4
E. Carlisle Conservation Foundation (CCF) Initiatives for 2013 through 2019	9-6
F. Conservation Commission Initiatives 2013 through 2019	9-7
G. Conservation Restriction Advisory Committee Initiatives for 2013 through 2019	9-12
H. Council on Aging Initiatives for 2013 through 2019	9-13
I. Finance Committee Initiatives for 2013 through 2019	9-15
J. Historical Commission Initiatives for 2013 through 2019	9-15
K. Housing Authority and Affordable Housing Trust Goals and Action Initiatives for 2013 through 2019	9-15
L. Land Stewardship Committee Initiatives for 2013 through 2019	9-16
M. Planning Board Initiatives for 2013 through 2019	9-17
N. Recreation Commission Initiatives for 2013 through 2019	9-19
O. Trails Committee Initiatives for 2013 through 2019	9-20
 Section 10: Public Comments and Letters of Approval	 10-1
 Section 11: Appendices	
Appendix A: Land Protection Values	
Appendix B: Carlisle Conservation Commission: Rules and Regulations	
Appendix C: Natural Heritage and Endangered Species Program Summary Letter and Fact Sheets for State-listed Species	
Appendix D: Wild Animals, Plants, and Other Organisms in Carlisle	
Appendix E: Template for Email Sent to the Conservation Administrators of Each of the Six Contiguous Towns	
Appendix F: ADA Access Self-Evaluation and Compliance with ADA Requirements	
Appendix G: Recreation Commission Plans for the Banta-Davis Land	
Appendix H: Recreation Commission: Grievance Policy: Equal Access	
Appendix I: Carlisle Planning Board: Development Standards	
Appendix J: Conservation and Recreation Projects Receiving Community Preservation Act Funds	

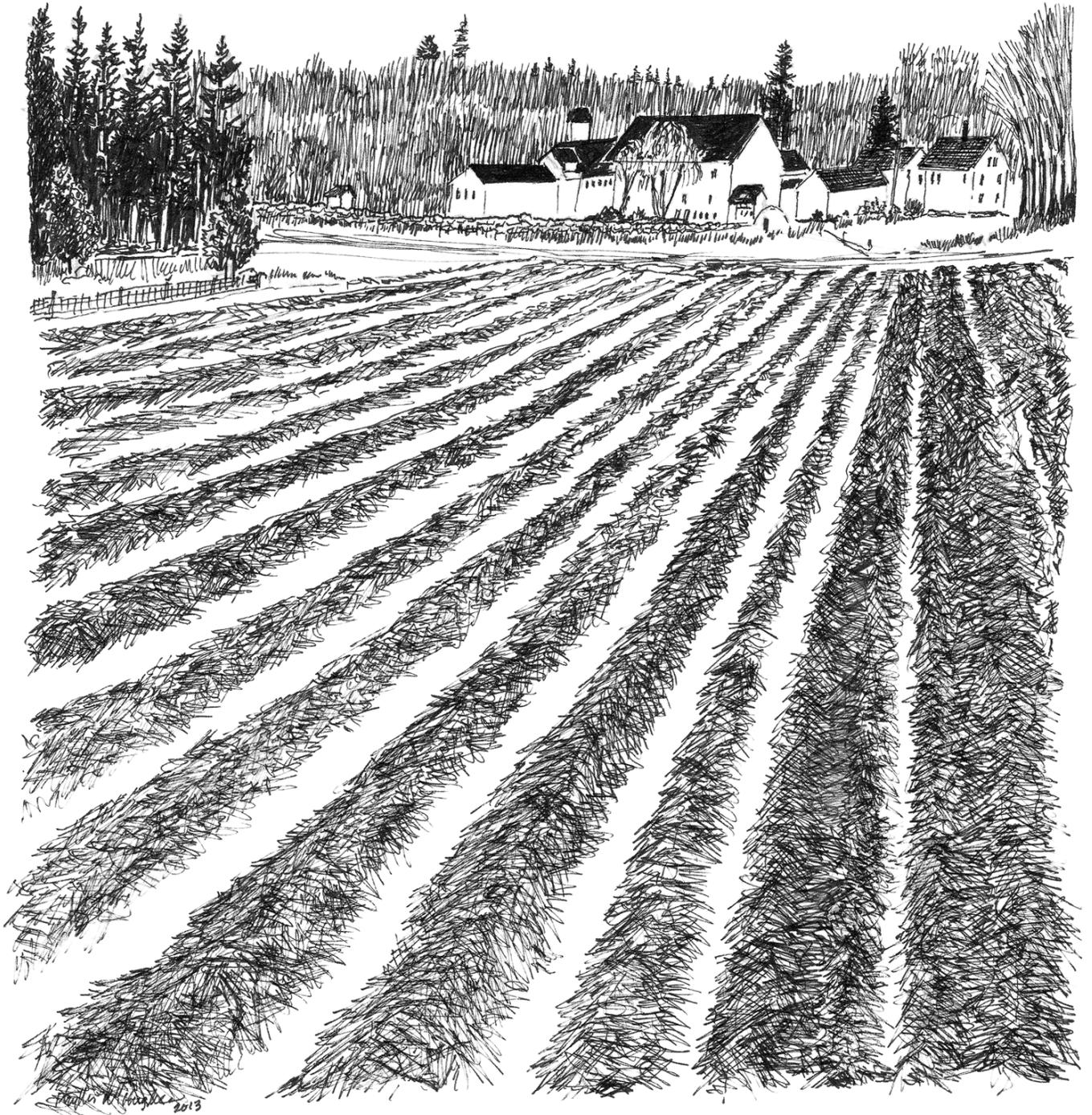
Section 12: Maps

- Map 1: Regional Context
- Map 2: Environmental Justice (*not required*)
- Map 3: Zoning Districts
- Map 4: Soils and Geologic Features
- Map 5: Unique Features
- Map 6: Water Resources
- Map 7: Inventory of Open Space
- Map 8: Seven-Year Action Plan
- Map 9: Unprotected Private Parcels (≥ 10 acres) Priority Rankings
- Map 10: Trail Network
- Map 11: Historical Map
- Map 12: Development and Land Protection Over Time

Section 13: Tables

- Table 1: Town-owned Conservation Lands
- Table 2: Town Acquisitions for Conservation
- Table 3: Commonwealth and Federal Lands in Carlisle
- Table 4: Carlisle Conservation Foundation (CCF) Lands
- Table 5: Properties with Conservation Restrictions (CRs)
- Table 6: Lands in 61, 61A, or 61B
- Table 7: Seven-Year Action Plan Private Property Protection Priority List
- Table 8: Open Space Created by Conservation Cluster Developments
- Table 9: Properties of the Greater Estabrook Woods in Carlisle
- Table 10: Town-owned Conservation and Recreation Properties and Facilities in Carlisle
- Table 11: Accessibility of Conservation and Recreation Lands in Carlisle

Section 1: Plan Summary



Viewed across a plowed field from School Street, historic Clark Farm, with the farmstead dating as far back as 1742, was owned over the centuries by notable Carlisleans, including the Blood, Spaulding, Green, Wilkins, Nickles, and Carr families, and was acquired by the Clark family in 1899. After the passings of Guy and Dot Clark, the farm was purchased, the farmhouse and historic barn were renovated, and Clark Farm today remains a working farm, operating as a CSA.

Section 1: Plan Summary

Carlisle was historically a farming community and is now a small bedroom community consisting of 9,913 acres (15.4 sq. miles) located 18 miles northwest of Boston and 8 miles southeast of Lowell. A long tradition of two-acre zoning, the lack of a public water system or sewage service, and a wealth of conservation land, has helped maintain the highly valued rural appearance of the town. Low-density housing combined with significant undeveloped land disperses Carlisle's 4,900 citizens for an average population density of about 320 persons per square mile. Carlisle has permanently protected approximately 3,362 acres, or about 34%, of its undeveloped land. Overseers of this protected open space include the Carlisle Conservation Commission, the Carlisle Conservation Foundation, The Trustees of Reservations, Harvard University, the New England Forestry Foundation, the Commonwealth of Massachusetts, and the federal government. Private citizens have contributed approximately 627 acres (an increase of 25% since 2005) of Carlisle's open space by means of permanent conservation restrictions (CRs) on their properties.

Carlisle enjoys a long history of publicly supported efforts to preserve its rural appearance and protect natural resources and wildlife habitat. Over the years since the early 1970s, various study groups and surveys have ranked saving Carlisle's small-town rural character as the highest priority in shaping the town's future. Recent surveys have confirmed citizen support for expanded facilities for active recreation and community activities.

Despite a decade or more of slower residential growth, the effect of residential development on the character of the community remains a concern. The largest standard subdivision development in almost 20 years was approved in 2008; 25% more land was taken for development in the last decade than in the previous one. Another concern is the increased likelihood of 40B developments that have the potential for serious environmental and visual impact. To serve the increased population, a K-8 school renovation and expansion project was just completed in Carlisle and a new regional high school is being constructed in neighboring Concord.

In addition to a wealth of open space for passive recreation such as walking on the extensive trail system and nature study, Carlisle citizens also enjoy a variety of active recreation facilities including playing fields, tennis courts, playgrounds, a fitness course, and a running track. The town provides a riding ring on public property, supplementing trails and private facilities for horseback riding. The cross-country skiing concession at Great Brook Farm State Park (GBFSP) is an important resource for residents and attracts skiers from the surrounding area. Trails in GBFSP and Carlisle roads are also popular among bicyclists. Despite limited public land dedicated to active recreation, the Recreation Commission has recognized and responded to the needs of a diverse population by providing active recreation facilities and a variety of programs.

The 2013 Open Space and Recreation (OS&R) Plan includes an inventory of lands of conservation and recreation interest, including Town-owned, Commonwealth-owned, federally owned, and privately owned protected land; lands and facilities used for active recreation; publicly owned unprotected land; and a priority ranking of privately owned unprotected parcels. The acquisition of 9 acres of the top-ranked Elliott property, with 1,000 feet of riverfront along the Concord River, has been a major focus for the past two years.

Looking to the future, the 2013 OS&R Plan states the need to preserve additional open space for groundwater protection, conservation, and recreation as the population increases. Groundwater issues may become more significant in the future as increased numbers of households provide for their own drinking water and sewage disposal, especially in denser 40B developments that can override 2-acre zoning. Acquisitions of land for conservation will enhance already protected land and the additional land will improve and expand both wildlife corridors and links between walking trails.

The Plan states the need for ongoing maintenance of existing open space, which has become more evident in recent years, with land stewardship receiving increased attention both within town government and local conservation groups. Good stewardship includes the development of baseline assessments and management plans, improved signage, and efforts to monitor and control invasive plants and burgeoning deer populations.

The Plan also encourages the support of agricultural efforts by local farmers in order to save what remains of Carlisle's farming tradition. The establishment of an Agricultural Commission at 2013 Town Meeting will enhance these efforts.

To address the increased demands of a growing and diverse population, this Plan supports the short-term and long-term goals articulated by the Recreation Commission to increase the number of facilities for active recreation, including playing fields, basketball and tennis courts, baseball diamonds, and some combination of Community Center, Senior Center, and Recreation Center. Given the need for more fields in Carlisle, the Recreation Commission is particularly concerned about proposals to use areas adjacent to existing recreation facilities on the Banta-Davis Land for municipally supported affordable housing. In the current economic climate, Carlisle's leaders are mindful of the limited financial resources for acquisition of additional municipal land, whether for recreation facilities, open space, or affordable housing. Nevertheless, their central location make the Banta-Davis Land and Spalding Field—soon to be linked by a CPA-funded boardwalk through the wetlands between these properties—an ideal site for the town's outdoor recreation facility, as it abuts the Carlisle Schools property, providing convenient access for student athletes both during and after school. The consolidated facility also provides efficiencies for maintenance and infrastructure, including irrigation and parking. The Plan supports the preservation of this land for recreation, with the understanding that a portion of it may be needed for school expansion in the distant future.

An important part of the planning process has been the Americans with Disabilities Act (ADA) Access Self-Evaluation of public lands and facilities. Carlisle needs to develop communication channels with the disabled community and improve handicap accessibility to both recreational facilities and conservation lands and is developing transition plans to help prioritize these efforts.

Recognizing Carlisle's community vision and its needs in the areas of conservation and recreation, this Plan includes objectives that will help to meet four primary goals.

Goal 1: Maintain the rural character of Carlisle.

Goal 2: Protect the town's environment.

Goal 3: Meet the town's recreational needs.

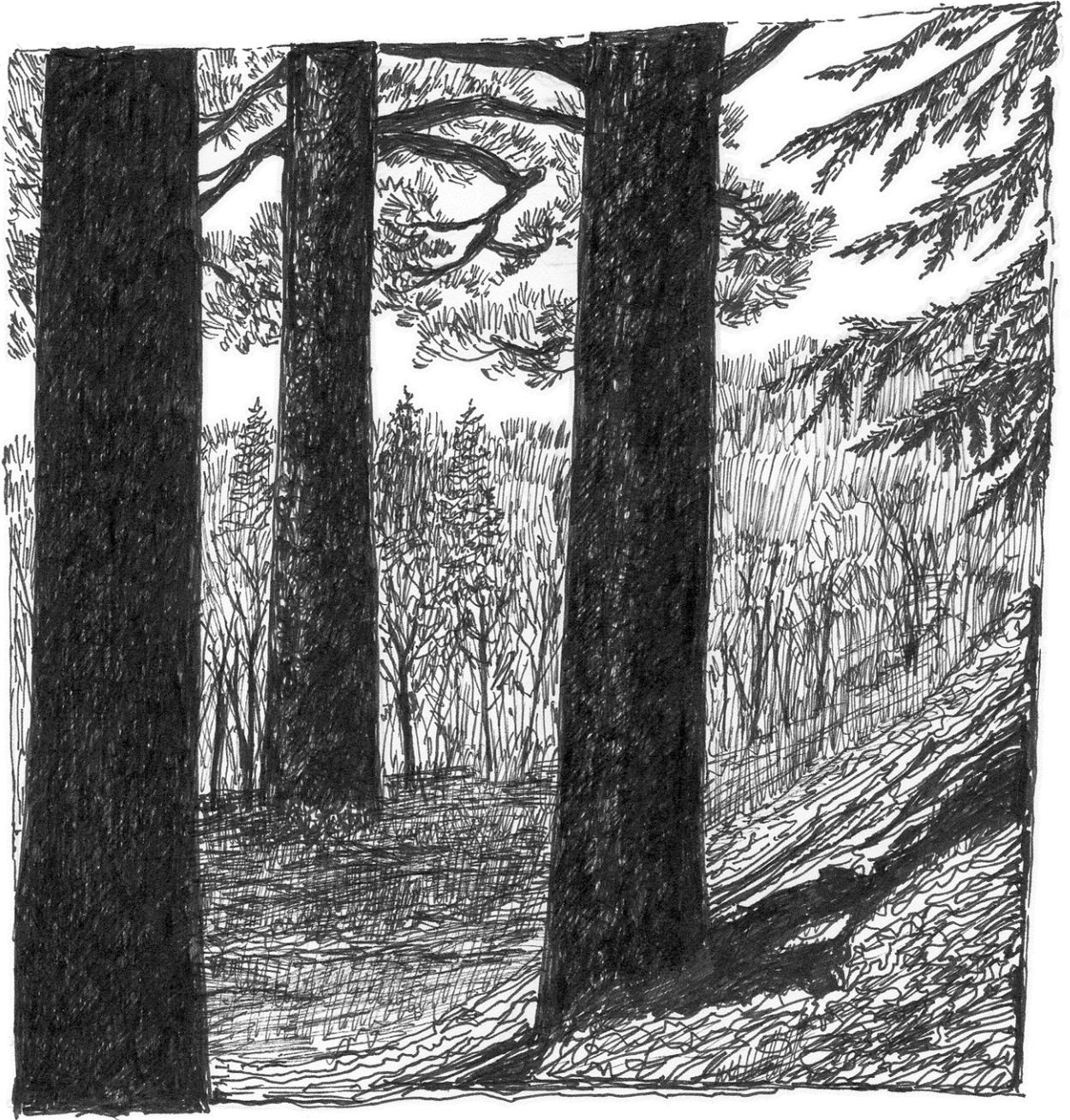
Goal 4: Proactively manage land use in town.

In order to address each of these goals, 15 Town boards and interested groups developed their seven-year action plans, or initiatives, for 2013 through 2019. From these, the OS&R Plan Committee identified a list of high-priority initiatives including expansion of recreation fields and facilities; evaluating sites for a possible community center; improving trail connections within town, to neighboring communities, and to regional trail networks; protecting important rural vistas; increasing access for persons with disabilities; and resolving long-standing issues on the Town's Cranberry Bog and Greenough Lands.

The Plan is enhanced by detailed full-color maps, benefiting from the recent conversion of the Town's hand-drawn Assessors' maps to Geographic Information Systems (GIS). This conversion was coordinated by members of the OS&R Plan Committee. Town boards and committees are encouraged to use and expand the GIS database to make GIS a working tool for document retrieval, planning, and oversight of open space, municipal land, CRs, water resources (including private wells and septic systems), and other resources. The town should also develop protocols to make GIS data available to Carlisle's citizens through the Town website to improve their access to and understanding of existing town data for their properties and neighborhoods.

Section 2: Introduction

- A. Statement of Purpose
- B. Planning Process and Public Participation



Carlisle Pines State Forest, owned by the Commonwealth and managed by the staff of Great Brook Farm State Park, is home to some old growth white pines and hemlocks that may date to before the Revolutionary War.

Section 2: Introduction

A. Statement of Purpose

Purpose of the Plan

The 2013 Open Space and Recreation (OS&R) Plan has been developed to help Carlisle identify its current resources, both physical and cultural, and its goals in the areas of open space, conservation, and active and passive outdoor recreation.

Carlisle prepared an OS&R Plan in 1979 and again in 1987, under the direction of Kay Kulmala. In 1994, the plan was revised according to the Commonwealth's 1991 requirements for OS&R plans; this plan was revised again in 2000. In 2005, the plan was revised according to the Commonwealth's 2001 requirements; in 2010 Carlisle took advantage of the opportunity for a 2-year extension on its plan by updating the 2005 OS&R Five-year Action Plan. The current document has been revised to meet the requirements set out in the Commonwealth's 2008 "Open Space and Recreation Planner's Workbook."

Accomplishments from 2005 through 2012

Carlisle is making significant progress in its efforts to protect open space permanently, thus providing active and passive recreational facilities for its own citizens as well as for visitors. As of March 2013, approximately 3,362 acres of natural space have been protected in Carlisle, an increase of 154 acres since the 2005 OS&R Plan. Protected open space comprises approximately 34% of Carlisle's total acreage of 9,913 acres. This progress is evidenced in the following discussions of 1) Land Acquisitions, 2) Land Protection, 3) Land Management, 4) Land Use, and 5) Legal Issues.

1. Land Acquisitions

Following several decades of acquisition of considerable acreage for open space—as documented in Carlisle's previous OS&R plans—the past seven years have seen a consolidation through conservation restrictions (CRs) of the most recent gains in open space and a closer focus on acquisitions of smaller parcels of special value. This shift in focus is due to a number of factors including the reduction in large parcels available for protection (many large parcels already protected or lost to development), the local effect of the global recession (limiting federal, state, and local funding available for land acquisition), a growing appreciation of the long-term costs (both monetary and in manpower) of managing lands already protected, and an understanding that small parcels can have a significant impact. Two examples of this closer focus are the conversion from municipal use to protected open space of the 1-acre Keystone Link parcel (critical to a trail and wildlife connection to the vernal pool on part of the Benfield Land) and the ongoing efforts to preserve the 9-acre Elliott property (top-ranked unprotected parcel with the feature unique for Carlisle of 1,000 feet of riverfront along the Concord River).

ACQUISITIONS BY THE TOWN OF CARLISLE

Since 2005, Carlisle has acquired four parcels, three for open space.

Greystone Crossing Conservation Land

This 14.33-acre property surrounding the Greystone Crossing conservation cluster development

was deeded to the Town for conservation purposes in 2006. It has a certified vernal pool, a paved pathway serving the neighborhood, and a trail.

Rangeway Conservation Land

This 8.15-acre open space parcel surrounding the Chestnut Estates conservation cluster development was deeded to the Town for conservation purposes in 2007. It has a certified vernal pool. A trail was created in 2011 by Boy Scouts.

Keystone Link

This landlocked, approximately 1-acre parcel located off West Street was transferred to the Conservation Commission from the Town in 2009. A trail was built through the parcel in 2011, providing a link from South Street to the Benfield Hill parcel, owned by the Carlisle Conservation Foundation (CCF).

Goff Property

The 5-acre parcel on Bedford Road lies between two properties already owned by the Town: the Banta-Davis Land and the Fox Hill Conservation Land. The Housing Trust controls the property and has proposed to use it as a site for a 10-bedroom group residence to be built and managed under the auspices of the Department of Developmental Services (DDS). Other possible uses include active or passive recreation, including a trail connecting Banta-Davis and Fox Hill, and a senior center or a community center with recreation facilities.

ACQUISITIONS BY THE CARLISLE CONSERVATION FOUNDATION

The Carlisle Conservation Foundation (CCF) is a private organization committed to protecting the rural character of the town through the conservation of open space. In 2012, CCF acquired one small 0.2-acre parcel along Bedford Road, with access to the Concord River.

2. Land Protections

INITIATIVES OF THE CARLISLE CONSERVATION FOUNDATION

Since 2005, CCF has brought to fruition the decade-long initiative to provide a large conservation area in southwest Carlisle to create a western corridor from the Westford border to the Concord line by working to secure CRs on the Benfield and Valentine lands. The Benfield lands include the 48.7 acres of Ben's Woods located off West Street and Pope Road and the 12.5 wooded acres of Benfield Hill located off West Street, both owned by CCF with the CRs held by the Conservation Commission, and the Town-owned 25.6-acre Benfield Conservation Land off South Street (CR held by CCF) that includes wetlands associated with Spencer Brook, that connect this parcel with the Bisbee Land and CCF's Spencer Brook Reservation. CCF also holds the CR on 105 acres of the Valentine land off Acton and West Streets, which preserves rural vistas of fields and farmland. The CR establishes 17 building envelopes that ensure that any houses built in the future will be hidden in the woods.

Since 2005, in addition to the CRs on lands in the western corridor, CCF has acquired CRs on an additional 10 acres on two parcels, including one with trail access.

Coordinating its efforts with Sudbury Valley Trustees (SVT), CCF spearheaded the Town's ongoing effort to preserve the significant riverfront resource of the 9-acre Elliott property along the Concord River, to be owned and managed by SVT, with the CR held by the Town.

CCF worked with the Elliott family during the planning process of subdividing their River Road Farm to configure the lots such that almost the entire riverfront portion of the 36.4-acre parcel is captured in a lot on which CCF then negotiated an option to purchase. CCF provided funds towards the option and dedicated two years of the proceeds from its annual appeal and from a special appeal (after an anticipated state grant was not received) towards the purchase. The property includes rare species habitat and 1,000 feet of frontage along the Wild and Scenic designated section of the Concord River amid the Great Meadows National Wildlife Refuge and will allow public access.

CONSERVATION RESTRICTIONS

Since 2005, the Town of Carlisle has permanently protected by CR 25.7 acres of its publicly owned conservation land and 130.7 acres of privately owned land resulting from the generosity of individual residents. On privately owned land, the CRs may or may not allow public access.

A conservation restriction is an important tool for land protection. CRs on potentially vulnerable land in town help Carlisle retain its rural character, protect its water resources, and provide wildlife habitat and corridors. CRs also increase the potential for trail connections, both between already existing conservation properties in Carlisle and also into the surrounding public lands of contiguous towns. CRs also help control future development.

PROTECTION OF SPECIFIC PARCELS

Elliott Property

As noted above (Initiatives of CCF) and detailed in Sections 7 and 8, the acquisition of this unique, top-ranked, riverfront property has been a major focus in Carlisle for the past two years. In 2011, the Conservation Commission approved the use of \$45,000 from its Conservation Fund toward expenses related to the planned purchase, the first significant allocation from the fund since it was replenished by \$100,000 approved by Town Meeting in 1999. In 2013, the Conservation Commission approved another \$30,000 from its Conservation Fund for this acquisition. Carlisle Town Meeting in 2012 and 2013 approved a total of \$300,000 from the Community Preservation Fund and \$189,000 was privately raised by CCF toward the Town's purchase of a conservation restriction on the property, to be called the Elliott Concord River Preserve (Elliott River Preserve). Closing on the property took place on May 30, 2013.

3. Land Management

STEWARDSHIP

In acknowledgement of the responsibility of maintaining the large number of open-space parcels falling under the jurisdiction of the Conservation Commission, the Commission created the Land Stewardship Committee (LSC) in 2005. The mission of LSC is to assist the Conservation Commission with its task of managing Town-owned conservation land to protect, maintain, and enhance conservation interests on the approximately 30 conservation parcels (totaling over one thousand acres) owned by the Town of Carlisle. Through a program of land management and maintenance activities, the LSC protects natural and cultural resources, including wildlife habitat, water and forest resources, agricultural lands, passive recreational uses, scenic vistas, historic structures, and related cultural values.

INVASIVES CONTROL

The Conservation Commission, the LSC, and CCF are actively developing control strategies, spearheading removal projects, and increasing public awareness of invasive plant species. Carlisle is part of the Sudbury Assabet Concord (SuAsCo) Cooperative Invasive Species Management Area (CISMA) and received a grant in 2012 from the National Fish and Wildlife Foundation to control invasives on Foss Farm Conservation Land and part of Ben's Woods (CCF land). LSC will work with a local Boy Scout in Spring 2013 on an Eagle Scout project to control buckthorn on part of the Greenough Conservation Land. The Carlisle Boy Scout troop has expressed interest in community service to help control invasive plants on town conservation lands.

4. Land Use

TRAILS COMMITTEE

The Trails Committee produced a guidebook, a full-color, wire-bound, Geographic Information Systems (GIS)-based edition of its *Trails in Carlisle* in 2010, its publication coinciding with the 25th anniversary of the Committee and the 50th anniversary of CCF, which funded the printing. The maps are also displayed on the Trails Committee website, launched in 2007. (See Map 10 for a map of the entire town showing existing trails and pathways.)

Since 2005, the Trails Committee, in several cases assisted by the Carlisle Boy Scout troop, has created new trails on the Greenough, Towle, Foss Farm, and Benfield Lands, within the Stalker CR, in the Hanover Hill development, in the open space created by the Chestnut Estates conservation cluster developments, on land connecting to neighboring Westford, and on the newly created Elliott River Preserve along the Concord River. The Trails Committee coordinated the construction of nearly 20 bridges and boardwalks (one 260 feet long) to improve or extend trails throughout the trail network and to protect wetlands from damage caused by pedestrians and horses. The crowning achievement was the construction, through the winter of 2010 into the spring of 2011, of a boardwalk leading from the expansive back meadow of the Benfield Conservation Land to a wildlife viewing platform overlooking the Spencer Brook and its marshes. The viewing platform is supported by helical piers sunk into the muddy bottom of the Spencer Brook wetlands, an expensive but exciting technological response to the challenge of creating trails in a community like Carlisle characterized by extensive wetlands on conservation lands.

In addition to routine trail maintenance, the Committee coordinated major efforts at clearing numerous downed trees throughout the trail network following significant storms, including the Halloween snowstorm (2011) and Hurricanes Irene (2011) and Sandy (2012).

The Trails Committee received funding from two sources. In 2010, the Town appropriated \$15,000 from Community Preservation Act funds to cover costs for materials and permitting to build boardwalks, bridges, kiosks, and signs over a 5-year period. Funding was also provided by CCF for the wildlife viewing platform and boardwalk on the Benfield Conservation Land, as well as for the printing of the 2010 *Trails in Carlisle* guidebook.

The Trails Committee has continued to lead approximately five public walks per year to promote enjoyment and appreciation of conservation land in Carlisle. The Committee has also led trail

walks for the public on parcels of land that the Town is considering purchasing for preservation. The Committee started a Trekker Award in 2007 for individuals who document that they have hiked all the trails in town, volunteer for trail work, and attend a Trails Committee meeting. Announcements of the awards in the *Carlisle Mosquito* have encouraged more people to support the Committee's efforts and to hike the trails. To date, 20 residents have received the award.

CARLISLE CONSERVATION FOUNDATION

Beginning in 2012, CCF has sponsored a number of nature walks on Carlisle's conservation lands, including CCF's Spencer Brook Reservation and Benfield Hill; the Town's Foss Farm, Cranberry Bog, and Greenough conservation parcels; Great Brook Farm State Park; and Great Meadows National Wildlife Refuge. The walks focused on birds, dragonflies, and mushrooms and lichens. Upcoming outings are planned to include vernal pools, wildflowers, rocks and geology, winter tree identification, and stargazing.

RECREATION COMMISSION

While demand for athletic fields has grown, Carlisle has not added to its athletic-field inventory in over a decade. Nonetheless, the Recreation Commission has expanded its offerings well beyond the standard sports offerings to include a wide range of activities for a wide range of ages, from yoga, water aerobics, and dance to kayaking, fencing, and rock climbing. In 2011, the Recreation Commission implemented the Home Base after-school program for middle-school children designed to give students a sense of freedom and independence with supervision.

BRUCE FREEMAN RAIL TRAIL

The Bruce Freeman Rail Trail is a proposed, 25-mile trail through property in the communities of Lowell, Chelmsford, Westford, Carlisle, Acton, Concord, Sudbury, and Framingham using the abandoned rail beds of New Haven Railroad's Framingham and Lowell line. Phase 1 of the trail (6.8 miles in Lowell, Chelmsford, and Westford, stopping just short of the Carlisle town line) opened to the public in October 2010. Phase 2 (including Westford, Carlisle, Acton, Concord, and Sudbury) and Phase 3 (including Sudbury and Framingham) are proposed extensions. The trail is open to non-motorized uses such as cycling, jogging, walking, and cross-country skiing. The Carlisle portion, when completed in Phase 2, will be 0.2 mile long.

NATIONAL WILD AND SCENIC RIVERS

In 1995, Carlisle Annual Town Meeting passed a warrant article to petition the U. S. Congress to enact legislation designating the Concord River as part of the National Wild and Scenic Rivers System under the jurisdiction of the National Park System. Congress subsequently acted to place 29 miles of the Sudbury, Assabet, and Concord Rivers officially into the National Wild and Scenic Rivers System. These 29 miles run from the Danforth Street Bridge in Saxonville (Framingham) to the Route 3 Bridge in Billerica and the Damon Mill Dam on the Assabet and include all of the Concord River frontage in Carlisle.

Carlisle is represented on the Sudbury, Assabet, and Concord (SuAsCo) Stewardship Council. Through the Conservation Commission, Carlisle participates in the annual celebration of Riverfest organized by the SuAsCo Stewardship Council and the National Park Service.

5. Legal Issues

THE COMMUNITY PRESERVATION ACT

Carlisle adopted the state's Community Preservation Act (CPA) in spring 2001. Town citizens elected to levy a 2% surcharge on real estate taxes, excluding the first \$100,000 in assessed value, for three uses: open space (conservation and recreation), historic preservation, and community housing. A minimum of 10% of the fund must be used for each of the three CPA-designated uses. Carlisle's citizens reaffirmed their support for the real estate tax surcharge by soundly defeating a warrant article to rescind the CPA at a Special Town Meeting in 2011.

A Community Preservation Committee (CPC) was established to oversee CPA funding proposals. The Committee consists of seven members, one each from the Conservation Commission, Historical Commission, Planning Board, Recreation Commission, Housing Authority, Board of Selectmen, and one member from the community at large. The CPC can recommend expenditures, but funds can be appropriated only by approval at Town Meeting.

As noted in Section 7 (Needs for Conservation), significant CPA funding was appropriated in 2012 and 2013 toward the purchase of the Elliott River Preserve along the Concord River. A list of conservation and recreation projects receiving CPA allocations is provided in Appendix J.

CONSERVATION RESTRICTION ADVISORY COMMITTEE

The Conservation Restriction Advisory Committee (CRAC), formed more than 20 years ago, meets regularly throughout the year and advises the Town on the acceptance of new CRs and monitors those CRs held by the Town. The Committee strives to educate property owners with CRs on the legal constraints on the use of lands under CRs.

B. Planning Process and Public Participation

Section 6 documents Carlisle's ongoing history of soliciting input from its residents about the Town's long-term plans and the consistent support from residents for maintaining the rural character of Carlisle through the preservation of open space and for maintaining and enhancing opportunities for active and passive recreation. Since the previous OS&R Plan was updated, community forums, planning days, and surveys have taken place in 2007, 2008, and 2009.

The OS&R Plan Committee, consisting of representatives from the Conservation Commission, the Land Stewardship Committee, the Planning Board, the Recreation Commission, and the Trails Committee, as well as a citizen representative, met regularly from November 2011 through June 2013. Early in 2012, Committee members held several meetings with stakeholders in the conservation community (including experts on the local flora and fauna, citizens who have spearheaded past preservation efforts, and professionals in environmental engineering and public policy) to gather input on the key factors to consider when assessing currently unprotected lands for conservation interest. This input from the public informed the extensive revision of the ranking criteria used to prioritize private parcels of 10 acres or more. Additional emphasis was placed on the preservation of water resources and identifying opportunities for possible recreation fields. A criterion previously used, Balancing Location, which valued parcels in a section of town lacking other open space nearby, was eliminated because of the successful efforts over the past

eight years of CCF, as noted above, in protecting Open Space in the western corridor, the last remaining underserved section of town. The ranking criteria are detailed in Section 5.

Once the ranking criteria were established, the Committee placed multiple press releases in the *Carlisle Mosquito* (distributed free to all Carlisle residents and available online) describing the OS&R Plan and its importance, with invitations to the public to attend ranking sessions to review in detail all the private lands in Carlisle of 10 acres or more. The public meetings, held on two evenings in April 2012, were well attended. Materials provided at these planning sessions included Town Assessor's maps, an enlarged poster of BioMap2, a Water Resources map, a map showing waterways and watersheds in town to identify parcels critical to protecting water resources, a map of all trails in Carlisle, and a map showing existing protected open space to identify parcels that might provide new links among trails and expand existing wildlife corridors. In addition to presentation of the actual parcel rankings, the meetings included wide-ranging discussions of Carlisle's core values, strategies to increase the amount of protected open space and to maintain what we have, and the importance of development plans and water resources beyond our borders.

In an effort to gather additional data necessary for this report, the Committee sent letters in the fall of 2012 to the following Carlisle entities requesting their goals, objectives, and initiatives for the next five years: Board of Assessors, Board of Health, Board of Selectmen, Carlisle Conservation Foundation, Conservation Commission, Conservation Restriction Advisory Committee, Council on Aging, Finance Committee, Historical Commission, Housing Authority and Affordable Housing Trust, Land Stewardship Committee, Planning Board, Recreation Commission, and Trails Committee. Subsequent to feedback on the first draft of the Plan from the Executive Office of Energy and Environmental Affairs (EOEEA) and the Metropolitan Area Planning Council (MAPC), representatives from each of these entities were contacted again in November 2013 to confirm that their five-year initiatives were valid for a seven-year period.¹ The input from each of these entities is included in Section 9.

In addition, OS&R Plan Committee members met with representatives of the conservation commissions in the six neighboring towns of Acton, Bedford, Billerica, Chelmsford, Concord, and Westford. The areas of mutual concern gleaned from these meetings are included in Section 3.

As part of the Americans with Disabilities Act (ADA) Access Self-Evaluation, a major effort was undertaken through the latter part of 2012 into 2013 to gather information from the Town Administrator, the Recreation Commission, the Trails Committee, and the Carlisle Public Schools concerning handicapped accessibility of lands, buildings, and facilities in Carlisle. An OS&R Plan Committee member visited several parking areas for conservation lands with a Carlisle resident who uses a wheelchair to gain insight into features that may limit access by the disabled. The Committee also met with representatives of the disabled community and members of the Town's ADA Task Force to gather input regarding perceptions of accessibility; much of the feedback centered on improving communication channels between members of the disabled

¹ The Housing Authority approved the extension to seven years of its joint initiatives with the Housing Trust; the Housing Trust did not vote on the extension.

community and Town officials. The results of this self-evaluation effort are documented in Sections 7 and 8 and Appendix F.

Committee members divided up the tasks of working with Town Hall staff to gather the information needed to update the required tables and maps. To ensure that the mapping would be up-to-date and accurate, Committee members met with the Town Administrator, Town Treasurer, Town Assessor, and the Board of Assessors in 2012 to initiate a complete review of the Town's existing hand-drawn parcel maps and to get approval for the conversion of the Town's official maps to GIS format. With CPA funding approved in 2009 for the mapping requirements of the OS&R Plan, Committee members thoroughly reviewed the existing maps, gathered plans and other support materials for necessary updates and corrections, and sought bids for converting the maps to GIS format. During this review, the Committee coordinated with the coincident efforts at the State level to update the parcel database for every Massachusetts community. Ultimately, the Committee selected Joseph E. O'Donnell & Company, the firm that had been doing the town's mapping for almost 50 years, to do the conversion. Committee members worked closely with O'Donnell through the winter of 2012-2013 to complete the conversion. They also worked with the Board of Assessors and the Town Treasurer to ensure that funding was in place going forward for annual updating of the GIS database.

The new, full-color maps are more detailed than the hand-drawn maps and include boundaries of CRs and easements. A member of the Committee had the necessary GIS mapping skills to utilize the new GIS Town maps to create the required and optional maps included in this plan, creating additional data layers to the Town's GIS resources in the process. As noted in Section 9, many Town boards and committees expect to benefit from the enhanced capabilities of land planning and management that a GIS-based mapping system provides to Carlisle and its citizens.

The Committee then developed a working draft of the 2013 Open Space and Recreation Plan, including required maps and tables, and circulated it in the spring of 2013 to all the boards and committees whose input had been solicited, as noted above, for the updated Action Plan. The Committee incorporated the input received, as appropriate, into a revised draft which was posted on the Town's website and made available in printed form at Town Hall and the public library. Through notices in the *Carlisle Mosquito*, the public was invited to review the revised draft and provide feedback. Input was also solicited from Town officials and volunteers. A public meeting was held on June 26, 2013 to present the draft plan. The meeting was attended by 20 individuals. Input from this meeting is summarized in Section 10 and has been incorporated into the Plan, which was then submitted in July 2013 to the EOEEA and MAPC for review. Conditional approval was granted by the EOEEA on September 30, 2013, pending a few requested changes in the draft (and a recommendation that the Five-Year Action Plan be extended to seven years), which the Committee addressed in a revised draft that was submitted to the EOEEA and MAPC in November 2013. After final approval (through September 2020) by the EOEEA and MAPC, the Plan was submitted to Carlisle's Board of Selectmen, Conservation Commission, Recreation Commission, and Planning Board for formal letters of approval (Section 10).

Section 3: Community Setting

- A. Regional Context
- B. History of the Community
- C. Population Characteristics
- D. Growth and Development Patterns



Seen here from North Road, Great Brook Farm is a working dairy farm with a state-of-the-art barn and robotic milking facility and is part of Great Brook Farm State Park, which includes a visitors center, ice cream stand and picnic area, historic Native American and early settler sites, plus over 20 miles of trails used by walkers, mountain bikers, horseback riders, and cross-country skiers.

Section 3: Community Setting

Carlisle, Middlesex County, Massachusetts, is bounded on the north by Chelmsford and Billerica; on the east by Billerica and Bedford; on the south by Concord; and on the west by Acton and Westford; and had assessed in the year 1917, 9886 acres of land. The location is considered extremely healthful and comfortable, being just far enough from the salt water to be properly tempered by the ocean breezes, but near enough to escape the extremes of heat or cold that locations farther inland experience.

The contour of the landscape is typical of New England, being undulating or diversified with hill and dale, giving the section a pleasing variety of scenery that is not monotonous.

Carlisle is an agricultural town, and the land gives good returns for the efforts of the husbandman. Being located but eighteen miles from Boston, and nine miles from Lowell, good markets are within easy access by team or truck.

The mean altitude of the town is two hundred feet above sea level, that being the altitude of the center of town. There are four hills in the town that attain altitudes as follows: School House Hill has an altitude of 240 feet; Bellows Hill in the southern part has an altitude of 260 feet; Wilkins Hill in the western part is 300 feet; and Wilson Hill in the eastern part is 380 feet. There are no natural ponds or lakes in town large enough to receive a name. Tophet Swamp, a brushy and wooded marsh, occupies a central position in the area of the town, and has an altitude of one hundred and eighty feet above sea level; that really amounts to a divide, as all streams of water having their source on its northern border flow to the north, and those rising on its southern border flow to the south.

History of the Town of Carlisle Massachusetts by Sidney A. Bull, 1920

A. Regional Context

Physical Location

Carlisle is a 15.4-square-mile town located about 18 miles northwest of Boston, between circumferential I-95 (Route 128) and I-495 and radial Routes 2 and 3. Though closer to Lowell than to Boston, it is considered part of greater Boston's metropolitan area. Carlisle's open space also serves the Lowell metropolitan area. In 2010, according to the U.S. Census, Carlisle had a population of 4,852.

Carlisle has a classic geographical shape, being almost circular, with five main roads converging at the Town Center. The Center area includes churches, schools and recreation fields, the public library, the fire station, the police station, Town Hall, a post office, a few commercial enterprises, single-family homes, Center Park, and the Village Green. The Center has a defined Historic District, which protects the historic buildings and their scenic surroundings (Map 11).

Regional Aspects

Carlisle is bordered by the six towns of Acton, Bedford, Billerica, Chelmsford, Concord, and Westford (Map 1). Carlisle shares various natural resources with these towns, including the Concord River, Great Meadows National Wildlife Refuge (GMNWR), Greater Estabrook Woods,

the Cranberry Bog Conservation Land, and other open space parcels, roads and trails, streams and watersheds. Carlisle is in the Sudbury, Assabet, and Concord Rivers watershed.

Great Brook Farm State Park (GBFSP), located in Carlisle, is a wonderful regional resource with trails for hiking, biking, horseback riding, snowshoeing, and cross-country skiing. It also provides ample opportunities for picnicking, nature study, and close observation of active agricultural activities, both traditional and state of the art.

The Bruce Freeman Rail Trail runs just beyond the border of Carlisle and Westford at the junction of Routes 225 and 27. Carlisle residents can gain access there or via trails on the MacAfee and Holmes-Avery Lands from Kimball Road to the Rail Tree Hill development in Westford.

Carlisle is considered a rural suburb in the extended northwest metropolitan Boston area, just outside of I-95 (Route 128). It is a middle- to upper-income residential community with very little commercial development. Its picturesque rural nature brings people from neighboring towns to use the conservation lands for dog walking, hiking, bird watching, bicycling, and other outdoor activities. The popularity of the some conservation lands among commercial dog walkers has caused problems from time to time. Carlisle roads are popular among bicyclists. One Town-owned conservation parcel, Foss Farm, offers simple riding rings maintained by a local pony club. Dog sledders in the area also use Foss Farm to train their dog teams during the winter months. In addition, this property has a large community garden area that is open to gardeners in Carlisle and other towns.

As a small town, Carlisle has limited public recreation facilities. However, residents have access to Concord's playing fields, outdoor track, and other facilities. See Section 7 for more details.

Members of the OS&R Plan Committee met with the Conservation Administrators of neighboring towns to discuss open space planning issues related to shared and adjacent resources. Following are summaries by town of the issues of common interest discussed, including future trail and open space connections and efforts to control invasive plant species. Almost all of the towns interviewed had ongoing initiatives to control invasive plants. The towns of Carlisle, Acton, Chelmsford, and Concord and the land trust in Westford are all members of the SuAsCo Cooperative Invasive Species Management Area (CISMA), a regional, invasive-species group that is discussed in more detail below. (See Regional Coordination below.)

In addition to the ecological threats associated with invasive species, all towns expressed concerns regarding the ecological effects on forest ecosystems and public health risks associated with overpopulation of deer. All communities are experiencing high rates of Lyme and other tick-borne diseases and are concerned about the degradation of forests due to over-browsing. As of the time of these discussions, none of the towns had any initiatives underway to target the deer issue.

Carlisle recently developed and adopted regulations regarding the use of Other Power-Driven Mobility Devices (OPDMDs) on Town-owned conservation land in response to the Department of Justice rulemaking. The Committee shared Carlisle's new regulations with the staff members in each town during these meetings. All the towns are at the beginning stages of addressing this

need and expressed interest in using Carlisle's regulations as a model, which will be helpful in ensuring compatibility of allowed uses where trails cross town boundaries.

ACTON

The town of Acton abuts the western border of Carlisle from Pope Road to Route 225. This area has seen significant consolidation of protected land in both towns. The Bruce Freeman Rail Trail briefly enters Carlisle at the north end of this shared border. Acton will oversee the majority of the design and construction of this section of the bike path, with construction scheduled to start in 2014.

During the recent discussions, a potential link was noted at the southwest corner of Carlisle between Carlisle's Ben's Woods (Carlisle Conservation Foundation (CCF) property) and Acton's Nashoba Brook, Spring Hill, and Camp Acton conservation lands. An easement across a narrow point of private property in Carlisle would connect lands in Carlisle with conservation lands in Acton and the Robbins Mill and Spring Hill developments. This potential connection, coupled with the conservation restriction on the Valentine farm, other CCF properties in the area, the Tennessee Gas pipeline easement to Acton Street, and the Bruce Freeman Rail Trail, would link trails and expand a wildlife corridor.

BEDFORD

The Town of Bedford and the Town of Carlisle share a length of the Concord River, a designated Wild and Scenic River, as a common town line. This line extends both north and south of the Route 225 bridge over the river. Open spaces connected by the river between the two towns are significant, with GMNWR owning nearly 700 acres along the river in Bedford and the Town of Bedford owning 350 acres under the jurisdiction of Bedford's Conservation Commission. Also abutting Carlisle is the 203 acres held in Bedford's Huckins Farm Conservation Restriction area. Trails abound in this area. There has long been interest in establishing a Carlisle-Billerica-Bedford loop trail along both sides of the river, but the land in Bedford needed to complete the loop is too wet to be passable.

In spring 2013, the Town of Carlisle, CCF, and the Sudbury Valley Trustees (SVT) coordinated a successful effort to preserve the 9-acre Elliott property upstream of the Route 225 bridge at the Bedford-Carlisle line. This newly created Elliott Preserve protects nearly 1,000 feet of river frontage on the Carlisle side amid GMNWR.

Under the Natural Heritage and Endangered Species Program (NHESP), wood turtle habitat exists in areas of Foss Farm Conservation Land and in GMNWR on both the Carlisle and Bedford sides of the river. These areas also have habitat for rare plants, amphibians, and reptiles.

BILLERICA

The towns of Billerica and Carlisle share abutting open space in Carlisle's Greenough Conservation Land. A large natural corridor exists between the contiguous parcels owned in both towns and GMNWR along the Concord River. Billerica also has been focused on acquiring riverfront property adjacent to GMNWR. Trails connect from Billerica through Carlisle along the Concord River. Billerica has developed trails on the east side of the river as well via Dudley Park. As noted above, extensive wetlands prevent the trails from reaching farther into Bedford.

CHELMSFORD

Carlisle and Chelmsford share an important natural corridor along the town boundaries abutting GBFSP and the Carlisle Cranberry Bog Conservation Land. Although Chelmsford is considerably more developed than Carlisle, it has made a major effort to establish trails and other open space parcels in the vicinity of both the state park and the Cranberry Bog. Chelmsford has trail easements leading from the state park to its 16-acre Town Forest and to the 48-acre Thanksgiving Forest. Trails leading from the Cranberry Bog Conservation Land in Carlisle into the 180 acres of the Chelmsford Cranberry Bog Reservation are actively enjoyed by many in both communities. Chelmsford would like to acquire property and a CR with public access along the border of GBFSP at High Meadow, which would create another open space connection with the State park in Carlisle.

In 2000, the Town of Carlisle and the Carlisle Conservation Commission, with assistance from Cranberry Bog lease farmer Mark Duffy, challenged a plan by the privately run Chelmsford Water District to pump up to 360,000 gallons of water per day for public water supply from proposed wells on land owned by the District abutting Chelmsford's Cranberry Reservation, Carlisle's Cranberry Bog Conservation Land, and the surrounding wetlands. The District withdrew its plan in 2000. However, in the autumn of 2011, the Town of Carlisle learned that the District was resubmitting its plan to withdraw water. Water from Chelmsford's conservation areas travels through the Cranberry Bog in Carlisle, GBFSP, and eventually flows into Chelmsford's Center Well district. Coincidentally, in 2011, Carlisle and Chelmsford formed the Cranberry Bog Subcommittee with members from both town's Conservation Commissions and residents in order to maintain a joint dialog pertaining to management issues in the bog, such as water use (including potential water supply wells), trails, dogs, wildlife, and land management. In January 2013, Carlisle was informed by the Town of Chelmsford that the Chelmsford Water District was temporarily withdrawing its application to install water supply wells near the bog.

CONCORD

Concord shares several important resources with Carlisle: Greater Estabrook Woods, the Concord River, the Spencer Brook watershed, GMNWR, and a network of country roads used heavily by bicyclists. Both Carlisle and Concord maintain an ongoing dialog with Harvard University, which owns the core acreage of Estabrook Woods, and the Estabrook Council, comprising representatives of all the land interests of this sensitive and historic area. Estabrook Woods is designated a Core Habitat Area under the NHESP, and several public and private Carlisle conservation parcels are a part of this large natural corridor.

Carlisle and Concord also share boundaries within the U.S. Fish and Wildlife's GMNWR along the Concord River. Some portion of this area is also overlain by a Priority Habitat (PH) polygon established by the NHESP (PH 147/WH 139). As noted earlier, in 2013, the Town of Carlisle and SVT preserved an additional 9 acres of riverfront property near the Concord-Carlisle border.

WESTFORD

Currently no new development or open space acquisition plans exist that would directly affect Carlisle. Westford has been and continues to be under significant development pressure. New open space connections have been discussed, specifically a potential trail connection between Westford's Rail Tree Hill development and several of Carlisle's protected open space parcels

(MacAfee, Pines Woodlot, Holmes-Avery, Carlisle Pines State Forest, Erickson Land, and Swanson Family Land). Connection from Carlisle through the Rail Tree Hill easement would allow access to the Bruce Freeman Rail Trail via a short public access trail easement to Abby Road in Westford.

Regional Coordination

Carlisle is a member of the Metropolitan Area Planning Council (MAPC), the regional planning agency serving the 101 cities and towns of Metro Boston. MAPC promotes regional coordination and principles of smart growth, including these principles from the mapc.org website:

“development that respects natural and built features and landmarks,” “physical environments that reflect the culture and values of the people that live there, while supporting a more cohesive community fabric,” the preservation of open space to enhance “quality of life by providing community space, recreation opportunities, critical habitat for plants and wildlife, working lands for farming and forestry,” and to preserve “the quality of critical environmental resources such as wetlands, watersheds, and drinking water supplies.”

In support of these and other goals, MAPC developed *MetroFuture*, a regional policy plan for the Boston metropolitan area, including Carlisle. The achievements and aspirations outlined in this OS&R Plan for Carlisle are consistent with the principles of smart growth listed above and the goals, objectives, and implementation strategies set forth in *MetroFuture*. These achievements and aspirations include the strong tradition of community involvement in planning in Carlisle, the foresighted adoption of the Community Preservation Act (CPA), coordination with neighboring communities (as outlined above under Regional Aspects), and an ongoing tradition of permanent protection of open space. Carlisle has also initiated a GIS-based mapping process to improve data-gathering and sharing over time, has created a commission to support local agriculture, is working to improve pedestrian and bicycle access and safety as well as the handicapped accessibility of municipal facilities, and has adopted a set of development standards and wetlands protection policies that promote the protection of the environment—particularly water supplies.

Carlisle is an active member of the Minuteman Advisory Group on Interlocal Coordination (MAGIC) sub-region of the MAPC. MAGIC is a group of representatives from thirteen communities that meets monthly to discuss issues of common concern. Carlisle has participated in two phases of a Suburban Mobility Transit Study of the MAGIC subregion to identify and find ways to strengthen opportunities to provide means of transportation other than individual private vehicles within the sub-region and to other parts of the metropolitan area.

In 2009, a new regional group formed to focus on invasive species documentation and control in the Sudbury, Assabet, and Concord (SuAsCo) River watershed. This group, the SuAsCo Cooperative Invasive Species Management Area (CISMA), has more than 40 member organizations, including towns, land trusts, and interested non-governmental organizations, such as the Massachusetts Audubon Society and the New England Wildflower Society, as well as governmental organizations, such as the U.S. Fish and Wildlife Service, the National Park Service, and several state agencies. The Towns of Carlisle, Chelmsford, Acton, and Concord are all partners of the CISMA. The land trusts in Concord, Carlisle, and Westford are also partners. The CISMA helps its members in many ways, including public education and technical training, sharing of tools and volunteers, and fundraising for control projects.

During the 2012 field season, Carlisle conducted two large projects to control invasive plants using funds from a grant obtained by the CISMA from the National Fish and Wildlife Foundation. Both projects had field restoration through invasives control as their primary focus. Porcelain berry, euonymus, multiflora rose, glossy buckthorn, and oriental bittersweet were targeted on Foss Farm Conservation Land and an abandoned field and surrounding woods on CCF property.

Most surrounding towns also have ongoing projects to control invasive plants. Chelmsford noted plans to address Japanese barberry and winged euonymus on property adjacent to the Cranberry Bog. Bedford has an ongoing project controlling glossy buckthorn on riverfront conservation land. In Acton, invasives planning has been a priority for several years. It has targeted Norway Maples at the Arboretum and water chestnut at Ice House Pond. Acton held a town-wide Garlic Mustard Pull in the spring of 2012. The Town of Concord has several invasive-plant-control projects ongoing, such as restoring the Old Calf Pasture. The Concord Division of Natural Resources has been including invasive-plant-control conditions where appropriate in some landowner filings under the Wetlands Protection Act; the Carlisle Conservation Commission began this practice in 2012.

Socio-economic Context

Carlisle is a residential community of mostly single-family homes in a rural setting. With a zoning requirement outside the Town Center of 2-acre full-frontage lots and 4-acre reduced- frontage lots, homes outside of the Town Center are situated on mostly wooded tracts of 2 to 4 acres, with many larger lots as well. New houses tend to be larger than the older houses. Between 1990 and 1999, eight subdivisions and conservation clusters were built with a total of 87 homes on 293 acres. Between 2000 and 2010, development slowed somewhat, with just six subdivisions and clusters approved. However, because one of these was a standard subdivision of 34 homes on 126 acres—the largest such development since 1991—the total number of new lots (87) matched that of the previous decade. Moreover, about 368 acres of land were taken for development during this decade, a 25% increase over 1990 through 1999. Apart from that 34-lot development in 2008, however, the more common form of land development has become the “conservation cluster” for which a developer receives a bonus lot in exchange for setting aside a minimum of 30% of the parcel as open space. In the past decade, four clusters were approved for 44 lots on 133 acres, of which 41.7 acres were permanently preserved as open space. As many as 30 lots remain unsold in the last three developments approved in the 2000 through 2009 decade.

The median value of a home in Carlisle rose from \$367,000 in 1990 to \$456,000 in 2000 and \$660,000 in 2010. In calendar year 2011, for the 58 single-family houses that sold, the average sale price in Carlisle was approximately \$790,000. Of those 58 sales, four were listed at under \$450,000.

The increase in housing costs is matched by an increase in income level for Carlisle residents. Carlisle’s median household income rose from \$83,985 in 1999 to \$129,811 in 2000 and \$160,903 in 2010. The 2010 median household income for the Boston Metropolitan Statistical Area was \$68,020; the statewide median was \$62,072. Carlisle generally has much lower unemployment than the state as a whole. Although the statistics aren’t exactly comparable due to

the different way local and state unemployment figures are determined, the 2010 unemployment rate in Carlisle was approximately 5%, compared with about 8.5% statewide.

Carlisle is situated between Boston and Lowell, and midway between the technology industries along I-95 (Route 128) and those on I-495. Carlisle has no public transportation but has access to commuter trains in neighboring towns. Its rural setting is unusual considering its proximity to Boston. Annual statewide testing results confirm that its school system is excellent. Carlisle is a popular site for new homebuyers. Residential development pressures on remaining available land mean that Carlisle must take action if it is to preserve its rural character. Lack of industry and commercial development in Carlisle helps protect its quiet, rural ambiance, but the lack of any meaningful commercial tax base puts the property tax burden entirely on town residents.

B. History of the Community

First settled by colonists in 1650, what would eventually become the Town of Carlisle has been predominantly a farming community for much of its existence. Beginning in Colonial times, Carlisle's many streams supported small mills of various types including fulling (for textiles), grist, hoop, and saw, a few operating through the nineteenth century. Another early industry was burning limestone to get lime powder for plaster and other uses. The remains of a limestone quarry and several lime kilns are still visible in Carlisle. Several Colonial-era inns and taverns were situated on Carlisle's well-traveled roads; a few still stand and are private residences. Carlisle was first incorporated as a district in 1754, utilizing land formerly a part of Concord, but it was reintegrated with Concord two years later. The second district of Carlisle was formed in 1780 from parts of the surrounding towns of Acton, Chelmsford, Billerica, and Concord (Map 11). In 1805, the District of Carlisle was incorporated as a town.

A copper mine was operated successfully for about a decade in the 1840s; it was put out of business by new and much more productive mines in Michigan. Farming was an export business through the nineteenth century, with farmers transporting farm produce and lumber to Boston markets. In 1900, Carlisle was still a small farming community, with 126 houses and 629 cows and other cattle. Electricity came to Carlisle Center in 1911, but it was not until 1928 that Town Meeting voted to provide electricity along all the roads in town.

In 1933, the first zoning bylaw instituted 1-acre zoning. In 1956, 2-acre zoning was established, with a 1-acre District A zone defined within a 1500-foot radius of the memorial statue in the Center rotary (Map 3). Because each home relies on its own well and septic/leaching system, 2-acre zoning is important to Carlisle to protect water quality. In 1969, Carlisle established an Historic District to preserve the architectural aesthetics and historical vista in the Town Center. An appointed five-member Historic Commission is charged with the protection of the District.

Carlisle still has an Open Town Meeting as its form of government. The town is governed by a five-member Board of Selectmen, supported by a Town Administrator.

C. Population Characteristics

Carlisle's population increased over 32% between 1980 and 1990. Growth slowed in the 1990s as the population increased less than 13% between 1990 and 2000 and then stabilized in the past decade.

Carlisle Population*		
YEAR	POPULATION	DENSITY (people/sq mi)
1900	480	31
1950	876	57
1960	1,488	96
1970	2,871	185
1980	3,306	213
1990	4,379	283
2000	4,923	318
2010	4,852	315

**Source, Annual Reports of the Town of Carlisle, except 2010, which is from U.S. Census*

From 1970 to 2000, the percentage of the town's households with children younger than 18 increased from less than 25% to over 45%. By the 2010 census, this percentage had decreased slightly to 42.6%. Between the 2000 and 2010 censuses, the population younger than 18 decreased from 30.1 to 27.4%, and the population older than 65 increased from 8.4% to 12.9% with the median age increasing from 41.9 in 2000 to 46.9 in 2010. The following table shows 2000 and 2010 age distributions with percent increase or decrease and the projections for 2035. The 2035 projections show the clear trend towards a more elderly population, with the percentage of Carlisle residents aged 65 and older projected to nearly double from 12.9% in 2010 to 23.3% in 2035.

Age distribution in Carlisle 2000 and 2010*, with 2035 Projections**				
AGE (YEARS)	POPULATION 2000	POPULATION 2010	% CHANGE	POPULATION 2035, projected
Under 5	340	197	- 42.1	207
5 to 9	439	372	- 15.3	269
10-14	461	455	- 1.3	436
15-19	280	391	39.6	309
20-24	85	140	64.7	104
25-34	213	184	- 13.6	137
35-44	884	517	- 41.5	305
45-54	1033	1073	3.9	1031
55-64	587	898	53.0	1262
65-74	277	404	45.8	916
75-84	81	186	129.6	249
85 and over	37	35	- 5.4	69

**Source, U.S. Census Bureau, **Source, Metro Future 2035 Update*

Enrollment in the Carlisle Public Schools remained quite constant in the period 1975 through 1995, but 2000 and 2005 data show a significant increase in students. Though factors such as changing percentages of children attending private school affect the public school numbers, after

a decade of steady increases, the school population for students in the Carlisle Public Schools (grades K-8) and for students in Concord-Carlisle Regional High School (CCHS) leveled off, then decreased in the past 5 years in K-8 but continued to grow in CCHS. (A small number of Carlisle students, from one or two to four in the most recent entering class, attend the nearby Minuteman Regional High School, a Career and Technical Education school supported by taxpayers from Carlisle and 15 other regional towns.)

Number of Students in Carlisle Public Schools*			
YEAR	K-8	CCHS	TOTAL
1975	616	241	857
1980	504	249	763
1985	490	252	742
1990	550	180	730
1995	664	195	859
2000	819	264.5	1083.5
2005	814	312	1126
2010	687	337	1024

**Source, Annual Reports of the Town of Carlisle*

Employment Trends

Until the 1950s and 60s, Carlisle was primarily agricultural, with both small farms and a few medium-sized dairy farms. It had two psychiatric nursing homes, a small general store and gas station in Carlisle Center, two or three realty offices, and two banks. Carlisle Center is still home to the realty offices and has a convenience, deli, and beer and wine package store, a mortgage company, a dentist, a handyman business, and an automated banking machine. Scattered throughout town are a daycare center and an extended day program for young schoolchildren, two nursery schools, a research facility in the larger of the two former nursing homes, a car repair shop, an auto body shop, and several landscaping businesses. Other small businesses range from a family-run manufactory of handcrafted collectible miniatures to the headquarters of a high-tech research and development consultancy for aerospace and military applications with up to 80 employees in Carlisle. The town still has a few small farming operations with 15 to 20 cattle and has a recently modernized small dairy operation with 138 dairy cows, at least three small horticultural nurseries, a cranberry-growing operation under lease from the Town of Carlisle, and two ice cream stands—all of which hark back to Carlisle’s agricultural past. In the past several years, increasing interest in locally grown food has resulted in more individual household produce production, the development of the Carlisle Farmer’s Market, and the establishment of several Community Supported Agriculture (CSA) ventures on local farms, some of which have been certified as organic.

Most residents are employed outside of the community, in neighboring towns, employment centers along I-95 or I-495, or Boston. According the 2000 U.S. Census, the top five work destinations for Carlisle residents were Boston, Cambridge, Carlisle, Concord, and Burlington. A high rate of employment and high level of education characterize Carlisle’s labor force. The *Boston Globe* reported in December 2010 that at 87% Carlisle had the highest percentage in the

state of residents 25 and older with an undergraduate degree or higher. Half the population over 25 has a graduate degree or higher, compared to 38% statewide.

A growing segment of Carlisle's economic base is home-based businesses, including plumbers, carpenters, and mechanics, as well as architects, artists, craftsmen, consultants, information technologists, accountants, and telecommuters. According to records of the Town Clerk, 114 home businesses were registered as of August 2012.

D. Growth and Development Patterns

Patterns and Trends

Historically Carlisle was an agricultural community. During the last 40 years, the economic viability of most farms became marginal. Some have been protected as open space; others have been subdivided into single-family residential housing. This transformation is illustrated in Map 12: Development and Land Protection Over Time. Now Carlisle is predominantly residential, with a collection of buildings that comprise a small service-oriented Center Business District in the Town Center, plus three scattered sites outside the Center that have housed small businesses since the 1930s, collectively known as the General Business District (Map 3).

In 2000, there were 1,618 households and a population of 4,923, or an average of about three people per household. In 2001, the Town participated in and received the results of a build-out analysis prepared by the state's Executive Office of Environmental Affairs. The town consists of approximately 9,900 acres. According to the report, about 2,900 acres were undeveloped (and currently unprotected) land. (See Table 7 for a prioritized list of unprotected private parcels of 10 acres or more.) The current development pattern is division of land into lots averaging 2.5 acres in size. The report showed that, under present zoning and other land-use restrictions, Carlisle could add 1,169 additional residential units to its current stock of 1,660 units, an increase of more than two thirds. This increase would result in over 3,200 additional residents, 600 of them school children, 1,679 additional tons of solid waste per year, and an increase in daily water demand of over 245,000 gallons.

The build-out analysis does not provide an estimated time frame for achieving build-out, nor does it predict that it will indeed occur. Moreover, these estimates do not include possible comprehensive permit developments. If comprehensive permits are used to bypass local zoning regulations, then the population growth may be significantly higher. Under MGL Chapter 40B, if the town does not have 10% of its housing certified as affordable, then a comprehensive permit may be issued by the Zoning Board of Appeals to a developer. This permit allows a developer to exceed local zoning restrictions if at least 25% of the units in a development are affordable. (It does not allow a developer to bypass state wetland regulations or health regulations.) Carlisle currently has slightly more than 1% affordable housing. This percentage should rise in the next few years when planned housing is developed on the Benfield land, purchased by the Town with CPA funds and issued a comprehensive permit in 2010, but Carlisle will still be well short of the 10% threshold. Lower annual thresholds (currently 0.5% to 1%) of affordable housing actually permitted may allow one- to two-year periods during which the Town can deny comprehensive permit requests.

Phasing affordable housing development thus may provide breathing space for the Town to control the development of parcels coming to market even if the full 10% threshold is not reached.

Continued population growth will necessitate commensurate growth of the infrastructure and the attendant increase in taxes, possibly including schools, recreation fields, police and fire departments, and town government, as well as protection of additional open space to serve the needs of the population.

Near-term population forecasts are difficult to make, because of the uncertainty of economic conditions and development patterns. The MAPC has run several scenarios for regional growth projections, projecting a population for Carlisle of between 5,074 and 5,439 for the year 2030 (MAPC Current Trends Projections (2005), Metro Future 2030 Projections (2007), Metro Future 2035 Update (March 2011), from <http://mapc.org/data-services/available-data/projections>, Updated on 7 February 2012, 2:12 p.m., Accessed 13 August 2012).

The numbers of building permits issued for new dwellings for selected years are listed below.

New Building Permits in Carlisle*	
YEAR	# OF PERMITS
1985	54
1990	13
1995	20
2000	24
2005	21
2006	11
2007	5
2008	1
2009	10
2010	7
2011	7
2012	10

**Source, Annual Reports of the Town of Carlisle*

For the past decade, the number of new residential units in Carlisle has decreased considerably from the 1991 through 2001 average of about 25 new homes per year to the current average of just over 10 per year, most likely due to a general slowdown in the economy. It parallels the drop-off in the late 1980s following the rapid development period of 1978 through 1985, when an average of 43 new homes were built in Carlisle each year. Initially during this period, the number of new building lots created through Approval Not Required (ANR) plans filed with the Planning Board increased dramatically. In 2003, 18 such lots were created, three times the number created during the previous two years combined, but over the last three years (2009 through 2011), these filings have averaged less than 14 new lots per year.

Infrastructure

Carlisle's major roads radiate from its center. Although none is a major highway, they are inter-community roads. The main east-west road, Route 225, is a popular commuting road. This and Carlisle's other through roads have become overloaded during commuting hours.

Aside from very limited, special-purpose systems (e.g., Council on Aging van), no public transportation is available in Carlisle. The nearest connections to train service to Boston are in Concord (about 5 miles from the Concord-Carlisle border), in Acton, and in Billerica.

In 2008 and 2009, a system of almost 2.5 miles of pedestrian pathways, funded by a 2007 Town Meeting appropriation, was built from the Center along all five major roads to link with the extensive Carlisle trail network or with other notable destinations in town. An additional 0.62-mile pedestrian pathway west of the Center on Route 225 was constructed in 2009 by a developer of a subdivision as part of the subdivision approval granted by the Planning Board, and a similarly generated 0.37-mile footpath is being constructed parallel to a portion of Cross Street, linking with Town-owned open space parcels. The regional Bruce Freeman Rail Trail has been completed from Westford to the edge of Carlisle's western border. By 2015, this trail is expected to extend south through Acton and Concord.

No public water system exists in Carlisle. All water is derived from individually owned wells, most of which are deep wells tapping bedrock fractures at typical yields of 3 to 5 gallons per minute. Given the very rocky terrain, the construction of a water distribution system would be very expensive. Nevertheless, to plan for the needs of potentially denser development or an event of groundwater pollution that might damage supply aquifers, in 2002, Carlisle reserved a water rights area on a portion of the O'Rourke land that was sold to the federal government and incorporated into GMNWR. A series of consultants and qualified town citizens have developed a water-supply plan for the parcel after preliminary hydrogeologic studies indicated that a public water supply yielding approximately half a million gallons per day could be developed (Water Supply Development Plan, O'Rourke Parcel, Carlisle, Massachusetts, October 2001).

No sewer service exists in Carlisle. The school is served by a sewage treatment plant, constructed in 2005 to replace a failed septic system. Aside from the school, each building site in town has its own septic system. The Board of Health adopted new septic regulations in 2008 that call for smaller systems and encourage alternate septic-system technologies, long allowed under the state's Title 5 requirements. These changes may allow development on some land previously considered undevelopable, but it should also require less clearing of land for new and replacement systems.

Long-term Development Patterns

Current development outside of the Town Center predominantly conforms to the town's 2- and 4-acre zoning. Building lots must either be 2 acres with 250 feet of frontage on a public way or four acres with 40 feet of frontage. The reduced frontage lots, coupled with the opportunity to create common driveways by special permit (wherein several homes are served by a single drive off a roadway), have reduced the visual impact of developments on town ways. The Zoning Bylaws include a Distinctive Structures Preservation Bylaw, allowing barns and other outbuildings no longer in agricultural use to be renovated for other purposes such as office use.

It was adopted in 1998 to preserve some of the rural atmosphere of the town and has been used most recently in 2007 to convert an old barn in the Town Center into office space housing a custom woodworking business and retail furniture store.

The current special permit exceptions to standard 2- and 4-acre zoning are the Senior Residential Open Space Communities (SROSC) and Conservation Clusters. These exceptions offer the opportunity to build clusters to serve the needs of senior citizens for smaller housing units as well as clusters solely to preserve conservation values, or both. The most recent senior housing development in Carlisle was Malcolm Meadows, built in 1995 as an SROSC, with 33 acres preserved as open space and 4 acres used for 12 units of attached housing. Four of the last six subdivisions approved in Carlisle (from 2000 through 2008) were at least partially developed as Conservation Clusters.

The high cost of developable land suggests that Carlisle should expect more 40B comprehensive permits for denser development than what would be allowed under standard zoning. Another trend seems to be the desire of property owners to create second units on single-family lots, either creating accessory apartments for lower-cost housing, or converting former guest and agricultural-employee housing to full-time occupancy.

It is unknown how increased development density and its inevitable increase in water withdrawal and on-site sewage disposal will affect groundwater resources. However, signs of stress to the water supply of some abutters of the small senior housing complex at Malcolm Meadows have been observed over the years. As more dense developments are proposed for Carlisle, increasing attention will be necessary to protect our groundwater, not only from onsite sewage disposal, but also from increased pesticide use on lawns, runoff from roofscapes and paved areas, road salt for ice management, and the overall increased demand for water.

Increased development also brings with it a reduction in tree cover that alters the water cycle and surface-water temperatures and interrupts long-established wildlife corridors and habitat. With no public transportation servicing such a small town, increased development will continue to increase local traffic on an expanding network of roads and dramatically increase through traffic from surrounding towns experiencing similar growth. This increased traffic will further disrupt wildlife corridors, both terrestrial and wetland, and increase collisions between animals and automobiles.

For practical purposes, current zoning permits no new commercial development beyond the few businesses already in existence. However, it does permit home-based businesses, and there are over 100 in town. This phenomenon, prevalent as cottage industry during the town's agricultural period, enhances the town's sense of community and limits increases in internally generated commuter traffic.

Section 4: Environmental Inventory and Analysis

- A. Geology, Soils, and Topography
- B. Landscape Character
- C. Water Resources
- D. Vegetation
- E. Fisheries and Wildlife
- F. Scenic Resources and Unique Environments
- G. Environmental Challenges



Pink Lady's-slipper
Cypripedium acaule

Section 4: Environmental Inventory and Analysis

A. Geology, Soils, and Topography

Carlisle's present topography is largely due to the most recent glacial period ending 10,000 years ago. The great weight of the moving glacier reshaped the terrain, and subsequent erosion, deposition, and the sorting action of glacial melt waters formed today's landscape and soils with underlying granite bedrock. The resulting countryside attracted Carlisle's earliest European settlers to this area, to what is considered to be the first New England inland settlement (then part of Concord). The settlers found streams for fishing and for powering grist and lumber mills, grassy meadows for grazing cattle, and upland forests for harvesting firewood and building materials. Indeed, before the Europeans arrived, the Native Americans had long enjoyed the largesse of this bountiful area.

However, the gentle-looking landscape with its rolling hills and wet valleys tested the early settlers. Today's farmers continue to be challenged by sodden fields at spring plowing, hazardous fieldstones pushed up with each spring thaw, hidden rocky ledges that can hang up a harrow, and sandy areas that leach nutrients and water as fast as they are applied. Nevertheless, the soils are generally good, well drained, and moist throughout the growing season.

Carlisle's topography provides a textbook tour of glaciation effects. Moving ice smoothed the hills into their present, gently rounded shapes. Meltwater running beneath the ice carried and deposited coarse sand and gravel in sub-glacial tunnels. They show themselves today as raised, steep-sided, sinuous natural highways called eskers. Some eskers are visible, running parallel to town roads, as seen along Curve Street; others are hidden in wetlands or woods, such as those in Great Brook Farm State Park (GBFSP). A trail along the top of an esker can provide a walker with a bird's eye view of the surrounding woods.

The glacier also broadened or deepened valleys. Water from Carlisle's three largest watersheds flows into Spencer Brook, Page's Brook, and River Meadow (Great) Brook. The valleys were wide enough to invite damming by early European settlers to provide waterpower for lumber and grist mills. Remnants of millworks are still visible along River Meadow (Great) Brook near Lowell Street, on the Greenough Conservation Land, and on private land behind Kimball's Ice Cream stand on Route 225. The millpond that once powered Robbins Mill is now an expansive, wet meadow that extends from Old Morse Road to Westford Street.

The melting glacial ice left outwash gravel and sand deposits that have been excavated over the years to provide fill for road construction and for sanding cranberry bogs. Numerous glacial erratics, enormous boulders that were carried along by the ice sheet, still sit on top of the ground where they were set down by the retreating ice. A fine example of a glacial erratic is Wolf Rock near the Wolf Rock Road cul-de-sac. There are also several in the State Park.

The glacier also left smaller rocks of gneiss, schist, granite, basalt, and quartzite, some carried great distances from where they formed, which the early European farmers wrested from the glacial soil as they cleared fields. They stacked these rocks to form stone walls or stone fences that delineated pastureland throughout Carlisle. Many still run along the main and back roads, helping give Carlisle its classic New England character. These stone walls still run in every

direction over the landscape, a reminder that, in its agrarian past, Carlisle was once almost entirely cleared of trees. Now, many of the remaining stone walls are tumbled down, overgrown with vegetation, and at odds with present-day property lines. An increasing problem in Carlisle is the removal of rocks from historic stone walls and other structures (and recently, even some ledge) to be used in landscaping projects.

Carlisle has geological deposits that once supported small scale quarrying and mining. Early settlers found deposits of dolomite limestone, which they quarried and burned in lime kilns to make plaster that can still be found in the walls of some older Carlisle homes. Lime kiln ruins are located off Curve Street and at the intersection of South and West Streets; plaster may still be found in the crevices of these kilns. Another abandoned lime kiln and quarry can still be seen on Estabrook Road in Concord.

Carlisle also had small granite quarries. Rough-hewn granite scraps still lie where they were discarded near those now defunct quarries, as on private property along Westford Street near the town line. Quarried granite was used for foundations and for well-crafted stone walls, as visible along Curve Street near Robbins Field. The most ambitious mining operation was the Carlisle Copper Mine, located along Concord Street near South Street. The mine provided fairly high-grade copper ore for a Boston foundry in the mid 1800s. Today, entrances to the mine's 220-foot-deep shaft are plugged with fill and hidden by leaf litter.

Carlisle's soils and geologic features are shown on Map 4. The soils reflect a terrain that was once glaciated. The glacier's grinding action pulverized rock into sand and mud and spread it over the landscape as the glacier advanced. As the glacier retreated, melt waters sorted the particles and stones. In some areas, such as Foss Farm, extensive outwash plains resulted in the sandy deposits in evidence today. In other areas, the mixing of fine particles and stones produced the well-drained, mineral-rich, and moisture-retaining soils that supported Carlisle's early agriculture and nourish its woods, fields, and croplands today.

The soil substrate is a thick layer of hardpan. This hard and stony sub-layer, although difficult to break up with tools, keeps the topsoil moist and relatively rich in minerals. It is responsible for the success of early farming, as well as today's verdant New England landscape. Above the hardpan is a thinner, looser subsoil layer of stones and sand, known as ablation till. On top of the ablation till, organic soil formed from decayed plant and animal matter. Cultivation of cleared land mixed the topsoil with the subsoil. Over time, sub-surface stones were heaved upwards by frost action, removed, and used to build stone walls or discarded in stone dumps.

Some parts of Carlisle have layers of soil that are stained reddish brown from an accumulation of iron oxides and organic acids; these may lead to rust deposits in well water. In Carlisle's wetlands, frequent saturation led to the formation of hydric soils. Anaerobic conditions slow the decomposition of organic matter and result in the deep, characteristic wet muck.

Of the 81 types of soil in Carlisle (Map 4), 14 are classified as prime agricultural soils by the Natural Resources Conservation Service. Baseline assessments of some of Carlisle's largest and most significant conservation properties have specifically documented the existence of these prime soils on areas of the Greenough Land, Town Forest, Fox Hill, Towle Land, and

Cranberry Bog, likely indicating previous agricultural use. Foss Farm does not have prime soils but includes some that are classified as locally important; Foss Farm has historically been farmed and is used today for hay and corn and community gardens. Prime soils are uncommon in Carlisle, and their presence is likely indicated by the location of historic farmstead properties.

The soils and geology of Carlisle have had significant effects on development, drinking water, wastewater, and recreation opportunities. Development cannot be sited in wetlands and is considerably more expensive in areas with much ledge. Drinking water wells must be carefully sited with respect to the soils and geology (particularly the nature of fractures in the bedrock). Carlisle has no municipal sewer system, so all septic systems must be carefully sited, and a reserve area must be designated as a protection against septic system failure. Large, flat sites for playing fields are very limited.

B. Landscape Character

On the east side of town, the Concord River forms the boundary line with Bedford. Broad, wet meadows define the flood plain for the slow flowing, meandering river. From the Concord River floodplain on the east and the Spencer Brook floodplain on the west, Carlisle's landscape rises to a maximum of 355 feet, with a mean elevation of 200 feet. Four major hills are 300 feet or higher: Hemlock (Wilson) Hill (355 feet), Heald Road Hill (335 feet), Munroe Hill (330 feet), and Cranberry Hill (300 feet). Minor hills include Bellows Hill, Benfield Hill, and Log Hill (all about 285 feet), and Schoolhouse Hill (260 feet). About half the land slopes in town are less than 3%, and the rest are generally 3% to 8%. Dry land lends itself to development, and, given the economics of development, all dry land in town is considered acceptable for building when in compliance with zoning restrictions and the Wetlands Protection Act.

Due in part to 2-acre zoning, Carlisle's landscape remains semi-rural in character. A few large working farms and the protected open space provide field vistas, whereas neighborhood properties have historically been wooded with houses widely spaced. In the past two decades, some developments with larger homes have resulted in more clearing and a more traditional suburban development pattern. The Town Center with its limited commercial development and small rotary is the geographical hub of the town. Five major roads radiate from the Town Center, including state Route 225. These roads are important commuter routes, sometimes with backups at rush hour. Carlisle has no traffic signals. Surrounded by towns that are considerably more developed, Carlisle is an oasis of quiet byways good for biking, protected open space for walking, and vistas for sightseeing. The town attracts visitors looking for relief from busier places. Its pleasant landscape also satisfies the passive recreational needs of its own inhabitants.

Carlisle adopted the state Community Preservation Act (CPA) in 2001. The resulting funds have enabled the Town to protect additional open space (such as Benfield Conservation Land), preserve historic structures (such as the Heald House barn, the church steeple of the First Religious Society in the Town Center, and the Cranberry Bog House), create more recreational opportunities (such as at the Benfield land), and manage conservation land (such as providing signs for conservation land). These actions have helped maintain the rural character of Carlisle.

Notable areas and sites are shown on Map 5: Unique Features.

C. Water Resources

Watersheds

Map 6: Water Resources outlines the hundred-year flood hazard and wetland areas. Carlisle lies mainly in the Sudbury-Concord-Assabet (SuAsCo) watershed. Within the town, water flows into three streams: Pages Brook runs east into the Concord River, River Meadow (Great) Brook runs north through Chelmsford to the Concord River, and Spencer Brook flows south to the Assabet River in Concord. Thus the Concord River provides the ultimate drainage for Carlisle's water on its way to the Merrimac River and, ultimately, to the Atlantic Ocean in Newburyport.

Surface Water

Carlisle lies along the Concord River and is almost entirely bordered on its southeastern edge by Great Meadows National Wildlife Refuge (GMNWR). The entire Carlisle stretch of the river was federally designated as Wild and Scenic in 1999, affording some protections geared to preserving the character of the river. The town has a seat on the SuAsCo River Stewardship Council.

The town also has three major streams: Pages Brook, River Meadow (Great) Brook, and Spencer Brook. Most of the headwaters are in Carlisle near the center, except for one tributary of Pages Brook that starts in Billerica and a major branch of the River Meadow Brook that enters Carlisle from Chelmsford through the Cranberry Bog. Carlisle has no large natural lakes or ponds, but it does have a number of sizeable impoundment ponds formed by dammed streams. Greenough Pond, the reservoirs at the Cranberry Bog Conservation Land, and the ponds at GBFSP are examples on public land.

Surface water recreation areas include the Concord River and several ponds in town. The river is used for boating, fishing, and nature watching. Carlisle does not have a boat launch on the river, but there is one just across the river in Bedford. Plans for the Elliott Concord River Preserve include a canoe landing site a short distance downstream of the Bedford boat launch. Greenough Pond is used for ice skating and fishing. There is a canoe launch on Meadow Pond in GBFSP, making the pond accessible for fishing and nature watching. A section of land leading to the Concord River along Route 225 just west of the bridge has been given to CCF by the Bose family and will provide a clear access point to the river that is also accessible by vehicles. Carlisle has no public swimming areas.

Aquifer Recharge Areas

Carlisle does not have a public water supply. Most private wells in town are recharged from fractures in the bedrock, a process that provides enough water for residential wells but not for a municipal supply. Some aquifer sites in town may be suitable for public wells for a future town water supply. One high-ranking site is on the former O'Rourke Farm, now owned by U. S. Fish and Wildlife Service. Following extensive investigation and testing, a "Water Rights Area" was identified, and the Town has secured its right to this area for a potential public water supply (Map 6). Another site, with no testing to date, is the Hart Farm property. Currently, Carlisle is working with Chelmsford to ensure preservation of its water rights at the Cranberry Bog.

Map 6: Water Resources identifies aquifers as having low yield (less than 50 gallons per minutes) and medium yield (50 to 300 gallons per minute). The two areas identified as having a medium

yield are on the Town's borders (one on the western border with Acton near Westford, the other on the northern border with Chelmsford near Billerica) and should be studied for their potential for a public water supply.

Flood Hazard Areas

Map 6 shows the hundred-year-flood hazard zone, as established by the Federal Emergency Management Agency (FEMA) and adopted by Town Meeting. The map also shows areas subject to 500-year flooding.

Wetlands

Approximately 19.5% of Carlisle's surface area is classified as wetland by the Carlisle Wetland/Flood Hazard zoning district (Map 6). Most are forested wetlands (primarily red maple swamps), marshes, or wet meadows. The Concord River with its extensive wetland flood plain forms the town's southeast boundary.

Development proposed in or near wetlands and water bodies is regulated under the Massachusetts Wetlands Protection Act (MGL Chapter 131, Section 40) and the Carlisle Wetlands Bylaw. These laws, administered by the Conservation Commission, recognize the important roles wetlands play in protecting public health and safety and the environment. Wetlands filter runoff, remove pollutants, store floodwaters, recharge or discharge groundwater, protect public and private water supply and groundwater supply, prevent storm damage and pollution, and protect fisheries and wildlife habitat. The protection of water quality is particularly important in Carlisle where homes have private wells. The Conservation Commission reviews proposed development projects and issues permits for those that comply with legal requirements.

D. Vegetation

General Inventory

Carlisle's natural vegetation is found in forests and vegetated wetlands. Some meadows and fields survive from early clearing activities, but most open areas progressed to woodland after farming activities ceased. Large areas of fresh water marsh and wet meadows exist along the river and streams. An extensive list of plants can be found in Appendix D.

Forest Land

Most of the town's former farmland is now second- and third-growth forest or has been developed. Mature upland forests are dominated by white pine and oak species. Carlisle lies between the largely deciduous forests to the south and the coniferous expanses to the north. Depending on the exposure of the land, north-facing slopes succeed to hemlock and northern hardwood climax communities, whereas south-facing slopes succeed to oak and hickory climax communities. Much of the disturbed and sandy soil area is now dominated by white pine. Some old fields have succeeded to the pasture juniper stage. Along the Concord River silver maple dominates the forested floodplain wetlands; red maples prevail in other forested wetlands. Several areas in Carlisle, such as parts of the Greenough Conservation Land and the Town Forest, were planted in red and white pine in the 1930s and 1940s. These plantations remain today as dense, mature forest monocultures.

Public Shade Trees

Carlisle, until recently a fairly rural and isolated small community, has no shortage of trees. There are, however, several public places that have been planted with ornamental and shade trees. Green Cemetery and Center Park have significant shade trees. The Town Common and Town Hall have trees planted in memory of past Carlisle citizens. The Library, the Police Station, and Center Park have some nice specimens.

Pursuant to State statute (MGL Chapter 40, Section 15C), Carlisle citizens have designated 20 public ways in town as Scenic Roads through votes at Town Meeting in 1973 and 1993. These include all the major streets in town except for Bedford Road and Westford Street (Route 225), the one state highway traversing Carlisle. Once so designated, trees and stone walls bordering a Scenic Road cannot be removed without the consent of the Planning Board. In addition, the Commonwealth's Public Shade Tree statute (MGL Chapter 87) designates all trees within a public right of way as Public Shade Trees, which cannot be cut, trimmed, or removed without the permission of the Tree Warden. Thus in Carlisle any trees on Scenic Roads cannot be removed without approval of both the Planning Board and the Tree Warden acting at a joint public hearing. The Planning Board considers requests for trimming or removal of a public shade tree based on criteria in its rules and regulations including preservation of natural resources, environmental values, historical values, scenic and aesthetic characteristics, and proposed compensatory actions such as the planting of replacement trees.

Agricultural Land

In the recent past, Carlisle had commercial poultry, dairy, and pig farms. Today the town has one commercial dairy operation (at GBFSP) and several smaller-scale operations raising fruit trees and other crops, ornamental plants, chickens, horses, beef cattle, pigs, sheep, and goats. A number of public and private fields are mowed for hay, alfalfa, and corn silage. Carlisle owns the most northerly active cranberry bog in Massachusetts and the only one in Middlesex County; the Town has a long-term lease with a farmer. Other agricultural businesses today include nurseries growing perennial garden plants and a cut flower business. Currently, 32 parcels of land, totaling about 362 acres, are in Chapter 61A, the Massachusetts law that provides tax breaks to the owners and gives the Town first refusal rights if the land is being sold and taken out of agriculture.

The past few years have seen a significant increase in interest in local farming. Part of the Fox Hill Conservation Land is currently licensed to a private farmer for organic farming. The sugar maples at Towle Field and at the Gleason Public Library have been tapped to make syrup. Agriculture on private land is increasing as interest in locally grown food and Community Supported Agriculture (CSA) has increased. Several historic farming properties (such as Black Brook Farm and Clark Farm) have recently reinvigorated their farming traditions and are providing produce, eggs, and meat.

The Foss Farm Community Gardens provide more than 100 garden plots for Carlisle residents and others to raise vegetables and flowers, and interest in the gardens has been increasing over the past several years. The individual plots are easily accessible by automobile and therefore could provide a gardening opportunity for people with some disabilities. Carlisle has had a thriving Farmer's Market offering locally grown produce since the summer of 2005. Markets are held once weekly during the summer growing season; markets are now periodically held in the winter to provide locally produced goods such as meat, eggs, honey, bread, and handcrafts.

Wetland Vegetation

Vegetated wetlands (forested wetland, also known as wooded swamps), wet meadows, and freshwater marshes) are common features in Carlisle. Wetlands form in areas where the soil is saturated long enough during the growing season that characteristic soils and plant communities develop. Most of the forested wetlands, which are seasonally flooded, are red maple swamps. Common shrubs in these areas are highbush blueberry, swamp azalea, and sweet pepperbush. The wet meadows and marshes are primarily herbaceous plant communities. Both have numerous species of grasses, sedges and rushes. The wet meadows, where the water table is at or near the soil surface most of the time, often have marsh, sensitive, and royal ferns and blue flag iris. The plants in marshes, which often have shallow standing water, often include buttonbush, leatherleaf, cattails, and water lilies.

Rare Plant Species

The state Natural Heritage and Endangered Species Program (NHESP) has documented two rare plant species in Carlisle since 1988: Britton's Violet and Climbing Fern. There are old records of four other rare plant species, but none has been seen since 1915. Rare species receive limited protection under the Massachusetts Wetlands Protection and Endangered Species Acts. NHESP Fact Sheets for Carlisle's two rare plant species are presented in Appendix C.

Carlisle's best-known rare plant is *Viola brittoniana* (Britton's or the Coast Violet). The species, listed as "Threatened" by NHESP, grows mainly in river floodplains and currently ranges from Massachusetts to the Carolinas. There are about two dozen known sites in the Commonwealth. Six of these occur along the Concord River—four in Concord, one in Bedford, and, thanks to a discovery by Louise Hara in May, 2013, two in Carlisle. Since 1989, Dr. Sally Zielinski of Carlisle has studied the biology and ecology of the plant, monitored population levels, located additional populations, and developed restoration and management plans for the Concord River sites. Development, habitat erosion by floodwaters, and competition from alien invasive and certain native plants are the main threats to Britton's Violet.

Lygodium palmatum (Climbing Fern) is a species of "Special Concern" in Massachusetts. *Asclepias tuberosa* (Butterfly Weed) has recently been found in Carlisle; it is not listed as rare or given protection, but it is on the state's Watch List because its numbers are low.

Some uncommon, although not state-listed, plants have been seen recently in Carlisle. These include Canada lily, nodding ladies' tresses (an orchid), and ragged fringed orchid.

Sites Having Unique Natural Resources

Carlisle's natural history resources can be described as significant examples of New England natural history, rather than unique occurrences. Vernal pools are widely distributed throughout the town's wetlands, as depicted on Map 6. There are currently at least 70 certified vernal pools in Carlisle.

Map 5: Unique Features shows the salient features of Carlisle's other significant natural resources. Carlisle Pines is a small stand of impressive ancient white pines. Tophet Swamp is an extensive wooded wetland that features in historic New England legends. Glacial features include Wolf Rock, a large glacial erratic, and various glacial eskers. Castle Rock is a huge outcropping

on the Conant Land, long popular with Carlisle's children. Greenough Pond is an impressive scenic water body. Greater Estabrook Woods, with its surrounding properties protected by conservation restrictions (CRs) in Carlisle and Concord, is the most extensive wild forested region in eastern Massachusetts. Spencer Brook has wonderful meadows and a wildlife viewing platform.

GMNWR is a valuable part of Carlisle's natural lands, bordering the Concord River. The Concord River itself provides extensive riverine habitat, and the portion bordering Carlisle is within the section of the river designated as Wild and Scenic.

E. Fisheries and Wildlife

General Inventory

In the past, Carlisle has sponsored several Biodiversity Days when experts in various fields of natural history have identified and listed as many species as possible in their area of interest on the given day on a parcel of Town-owned land. Records of these biodiversity inventories are on file in the Carlisle Conservation Commission's office in Town Hall. The bulk of the Biodiversity Days' activity (which started in 1998) peaked in between 2000 and 2005. Since that time, several plant lists have been compiled for selected conservation properties by the Land Stewardship Committee, and wildlife lists have been kept by Carlisle citizens. The wildlife and plant lists have been reviewed and updated and are presented in Appendix D.

Two current activities in Carlisle deserve mention. Some of the weekly "Biodiversity Corner" columns previously published in the *Carlisle Mosquito* by Carlisle resident Kay Fairweather have been compiled into a book, *Who's Who in the Natural World: Selections from a 10-year ramble through a corner of New England*, published in 2012 by Carlisle Communications, Inc. Over 300 local species are described. In 2012, the Carlisle Natural History Survey was initiated by Carlisle residents Dr. Peter Burn and Dr. Sally Zielinski to provide a forum to compile, organize, and share information on Carlisle's wildlife.

Carlisle's wildlife includes an increasing population of deer and numerous small mammals such as fox, raccoon, woodchuck, opossum, porcupine, skunk, fisher, weasel, mink, beaver, muskrat, otter, and coyote. A black bear was sighted frequently in many locations around town in 2006 and 2007. The animal caused much damage to bird feeders, fruit trees, beehives, etc., and even climbed over electric fences and entered buildings. The bear activity decreased significantly by 2008. Moose have occasionally been sighted, but less frequently in recent years.

Carlisle has a number of interesting insects (Appendix D). A recent addition to Carlisle's nature walks has been walks oriented toward sighting dragonflies and damselflies, led by Alan Ankers of the Carlisle Conservation Foundation and Susan Emmons. A White-M Hairstreak butterfly was found recently at the Cranberry Bog and was just the fifth recorded for Middlesex County. Arrowhead Spiketail dragonflies have also been recently sighted at GBFSP; they are local and uncommon in Massachusetts.

Birds

Each winter, a group of Carlisle birdwatchers inventories all bird species sighted, with their numbers, on the day of the annual Concord Christmas Bird Count in a sector of the Concord

census circle that includes a portion of southern Carlisle. Detailed records from 1973 to the present provide data for identifying trends in winter bird populations.

Carlisle's bird life is quite varied, due to a variety of habitats including fields, wetlands, and forests. Pileated woodpeckers, which require extensive woodlands, are still relatively common. Northern goshawk, red-shouldered hawk, and turkey vulture are uncommon birds that have bred in Carlisle in recent years; red-shouldered hawk and turkey vulture are increasing. Spotted sandpiper and killdeer have bred at the Carlisle Cranberry Bog for the past several years, and yellow-throated vireo have nested at GBFSP.

A number of bald eagles have been sighted in Carlisle in recent years. American kestrel is declining in Massachusetts in general. While sightings have occurred recently in Carlisle, it cannot be stated with any certainty that they are currently breeding here. Blue-winged warblers, which are declining due to loss of habitat (they rely on early-successional second-growth areas), appear to be breeding at several places in Carlisle. A pilot project to restore early successional habitat on selected Carlisle conservation lands was initiated in 2012. In 2011, both Virginia rail and sora were found at the Spencer Brook wetlands near the Benfield Conservation Land. This was the first sora sighting in Carlisle.

American woodcocks continue to be sighted in Carlisle, and annual "woodcock walks" are conducted at Foss Farm to observe them.

Eastern bluebird is now relatively common and is increasing, partly due to nest boxes at Towle Field and Foss Farm initiated by naturalists Don and Lillian Stokes and volunteers in the 1980s. Many of these nest boxes are still in use by bluebirds and are also used by tree swallows and house wrens. Bluebirds will use natural cavities as well, such as in dead trees (snags). Snags also provide good potential nest sites for other birds such as woodpeckers, chickadees, titmice, and nuthatches. At this time, a project has been initiated involving the Conservation Commission and the Carlisle Boy Scouts to restore and maintain the nest boxes at Towle Field.

The bobolink population on Towle Field has declined for the past few years, perhaps due to the incursion of European buckthorn and other woody plants. No nesting bobolinks were found on Towle in the summer of 2011, but bobolinks were sighted elsewhere in Carlisle on private land. An experiment with sheep grazing, along with regular mowing outside the nesting season, has helped restore the grasses at Towle Field, but neither of these methods has proved a long-term solution for keeping poison ivy and invasive buckthorn out of the field. During the summer of 2012, mowing on Towle Field was refined to cut the grass shorter and do more edge maintenance while respecting the bobolink habitat.

Bobolink and ruffed grouse are much less common than they were about 10 years ago. At Towle Field, there were seven male bobolinks in 1995 (a high count since 1990); in 2011 there were none. Very few Ruffed Grouse have been seen in Carlisle since 2001. These declines could be related to the fact that both are ground-nesting birds, although other factors may be involved.

Carolina wren and red-bellied woodpecker have expanded their ranges northward and are now quite common in Carlisle; range expansion is encouraged by the increasing popularity of bird

feeding. Wild turkeys have become common since their reintroduction and sometimes strut boldly through back yards and across access roads. Common raven are increasing as well.

Nesting boxes for wood duck are maintained at the Greenough Conservation Land by the Massachusetts Division of Fisheries and Wildlife. Mergansers were observed to be nesting in some of these boxes in 2012.

During the spring 2012 Riverfest Celebration, participants observed a black-crowned night heron on the proposed Elliott Preserve, the first recorded sighting of this species in Carlisle.

Vernal Pools

Carlisle contains many vernal pools, and at least 70 at the latest count—over half of which were documented and submitted to NHESP by Tom Brownrigg—have been certified by NHESP and receive limited protection under the state Wetlands Protection Act and Title 5. See Map 6 for the latest mapped locations of the vernal pools.

An effort is ongoing to identify and certify more of the vernal pools in town, especially those in areas vulnerable to new development. Each year, the Conservation Commission and Trails Committee host a walk for families to a vernal pool where a specialist in vernal pools informs the participants about the unique role vernal pools serve in wildlife biology.

In Carlisle, obligate species found that allow for vernal pool certification include wood frog, mole salamander, and fairy shrimp. Obligate species can only breed in vernal pools. NHESP also allows certification based on breeding evidence of facultative amphibian species, such as spring peepers and American toads. Facultative species breed in vernal pools but also other places. Breeding evidence of two facultative species and evidence that the pool dries up seasonally are required for certification of a pool.

Corridors for Wildlife Migration

Carlisle has successfully and permanently protected numerous large parcels of land that both support significant wildlife populations and provide passive recreation opportunities. Carlisle encourages wildlife corridors by promoting linkages between protected lands that additionally provide trail connections for people. An important corridor along the Concord River with linked trails is formed by the contiguous protected properties of the Town Forest, Heidke Conservation Land, Greenough Conservation Land, GMNWR, and Foss Farm Conservation Land, resulting in almost 2 miles of corridor across undeveloped land and totaling well over 1 square mile in area.

On the western edge of town, the protection of a West Corridor (including discussions with neighboring Acton) is well underway, including CRs with both private and public access, publicly owned protected open space, and Trail Easements in an effort to stitch together wildlife corridors. Section 7 includes more details about additional linkages needed for more extensive wildlife corridors in Carlisle.

Corridors also foster vigorous native plant communities.

Rare Animal Species

NHESP has identified five Estimated Habitat areas for Rare Wetland Wildlife in town: two along Curve Street, two along the Concord River (north and south of Bedford Road), and one along East Street. Priority Habitat for Rare Plant and Animal Species has been designated in two areas: a small section along the Gas pipeline off Acton Street, and near the Concord River. Priority Habitat areas are considered good habitat for multiple rare species. Carlisle has significant acreage that is classified as Core Habitat by BioMap 2. Core Habitat includes key areas that are critical for the long-term persistence of rare species and other species of conservation concern and areas that have a wide diversity of natural communities and intact ecosystems. Carlisle's Core Habitat is shown on Map 1. Carlisle also has significant areas that rank in the top 50% of the Conservation Assessment and Prioritization System (CAPS) Index of Ecological Integrity and in the top 40% of the CAPS Habitat of Potential Regional or Statewide Importance.

Carlisle has four animal species listed as rare by NHESP under the Massachusetts Endangered Species Act (MESA). One of the MESA-listed species, the Blanding's turtle (*Emydoidea blandingii*), is listed as Threatened and is the focus of activities at the Carlisle Public Schools funded by the Carlisle Conservation Foundation, include tracking and monitoring individual turtles and raising young turtles for release into the wild by students.

The other three rare animal species are listed as Species of Special Concern: the Blue-spotted Salamander, the Eastern Box Turtle, and the Wood Turtle. Data sheets for these four rare animal species are found in Appendix C.

Fishing and Hunting

The northeastern U.S. contains over 200,000 miles of streams and rivers supporting over 1,000 aquatic species, including 300 types of fish. The majority of the region's watersheds still retain 95 to 100 of their native fish species, but are also home to up to 37 non-indigenous species. The original range of native brook trout, a species that prefers cold, high-quality streams, has been reduced by 60 percent. There is no recorded occurrence in Carlisle of any threatened, endangered, or special-concern species of fish, as listed by NHESP.

Anglers in Carlisle have the opportunity to catch many different types of fish, by spinning, fly fishing, or baitcasting methods. Most fishing requires some type of license in accordance with Mass Wildlife regulations. In Carlisle ponds, the most predominant fish are largemouth bass, northern chain pickerel, crappie, and various species of sunfish. Some ponds also have catfish. These fish are found in the ponds at GBFSP, accessible from the canoe launch, and in Bates Pond, Greenough Pond, and Buttrick Pond.

The state stocks River Meadow (Great) Brook with small brown trout, which are water-temperature tolerant, rainbow trout, and brook trout. The most abundant fish in the Concord River are carp, largemouth bass, northern chain pickerel, crappie, and sunfish. Catfish may also be found in the Concord River. Northern pike, which can get quite large, are also caught in the Concord River. Signs near the Concord River warn fishermen not to consume the fish due to high levels of mercury.

The Concord River does not have a canoe launch in Carlisle, but there is one just across the river off Route 225 in Bedford. At GBFSP, Meadow Pond has a canoe launch. In GMNWR, fishing is allowed from boats on the Concord River and from riverbanks in accordance with state regulations. No fishing is allowed from any refuge pond or impoundment.

Hunting is not allowed on Town-owned conservation land. Limited types of recreational hunting (such as bow hunting for deer) are allowed on private parcels with the permission of the owner and a valid state hunting license. The U.S. Fish and Wildlife Service allows limited hunting on GMNWR for white-tailed deer (archery only) and waterfowl (ducks and geese). All hunters are required to have a refuge-issued permit along with state licenses in their possession to scout or hunt on each refuge. Not all parts of each refuge are open for each hunt season. Hunters should be familiar with the hunt maps and regulations to ensure they are hunting in an open area and at the correct time.

At GMNWR, hunters are not allowed to access the refuge from Town of Carlisle conservation lands. Parking is available off the driveway at 342 Maple Street, Carlisle. Hunters are expected to be courteous as this is a private residence.

F. Scenic Resources and Unique Environments

Scenic Landscapes

Carlisle's open space includes many scenic areas. People driving through town along main roads see rural vistas of field and forest, old stone walls, and a Town Center that epitomize a small New England town. Open fields, bogs, meadows and forest boundaries, agricultural land, and roadside forest frontage all contribute to the rural character of Carlisle and are highly valued by the town residents. Vistas provide a sense of openness and varied land use that distinguishes Carlisle from other more developed communities in the region. In addition to spending time on conservation lands, residents can appreciate many parcels from the road—for instance, the Towle Land and Bisbee Land, both with views across the fields and to forest frontage. By contrast, some parcels that are extensive and provide linkages and habitat value have little road frontage or vista. An example is the Davis Corridor off Bedford Road.

Vistas can be categorized according to the following scheme.

- External (views into a property from a road, public space, or adjacent private property)
 - From major roads such as Route 225 (Bedford Road and Westford Street), Lowell Street, Concord Street, East Street. These roads provide motorists, cyclists, and walkers, both resident and non-resident, with significant vistas.
 - From minor roads with significant traffic such as Curve, Fiske, West, and Maple Streets
 - From abutting private property
- Internal (views within a property)
 - These can include a mix of fields, edges, forests, ponds, wetlands, stone walls, and structures. Examples of significant interior views include views across the Cranberry Bog to the open water and forest edge, views across Towle field to the forest boundary and

stone walls, interior woodland views in the Town Forest, and interior views toward the barn at Greenough. Carlisle's conservation lands have many unique interior vistas, all part of the outdoors experience.

Vista maintenance, preservation, and enhancement are important considerations for conservation land and can include the following.

- Prohibiting or limiting additional structures or structures that are incompatible with the view (Structures include both buildings and fences.)
- Preservation or restoration of historic structures such as stone walls, barns, water features, and foundations
- Removal of vegetation that obscures views into a property, especially from major roads such as the view from Bedford Road into the south (upper) field of Foss Farm and into Fox Hill, the view into Towle Field from Westford Street, and the view into the Bisbee Land from Concord Street)

Visitors to GBFSP can view and tour the operating dairy farm, picnic by the fire pond, enjoy ice cream from the stand, canoe in Meadow Pond, or walk, run, bike, horseback ride, dog walk, or cross-country ski along trails winding through the farm, fields, and woodlands.

At the nearby Carlisle Pines section of GBFSP (at the end of Forest Park Drive), people can walk among several towering virgin pines and hemlock trees with heights over 100 feet and that may have already been mature at the time of the Revolutionary War. These trees remain from a patch of forest that was saved from logging in 1901.

Anyone passing Carlisle by boat or canoe on the Concord River can see the natural vistas along the GMNWR land and the Town's Greenough Conservation Land.

People who walk the town's conservation lands can explore ponds, wetlands, geological outcroppings, woodland trails, and gently rolling fields.

Major, Characteristic, or Unusual Geologic Features

The topography of Carlisle includes features formed by the last glacier (Map 5: Unique Features). People exploring the public lands of the town can observe excellent examples of glacial eskers and erratic boulders (GBFSP), impressive ledge outcroppings (Conant Land), and undisturbed riverine environment (Foss Farm, GMNWR, and Greenough Land).

Cultural, Archeological, and Historic Sites

Along many roads and scattered through the woods are miles of old stone walls and the occasional stone foundations of Colonial- and Federal-era homes or mill sites, reminders of the town's earlier inhabitants. An old Indian grinding stone located in GBFSP is only one of several sites around town that have been investigated as potentially having pre-Colonial historical importance. Other sites attesting to the presence of Native Americans are on Foss Farm and Towle Field. An historic lime kiln and lime quarry have been protected in the Western Corridor.

The Town of Carlisle, through its Community Preservation Fund, undertook a survey to document Carlisle's historic heritage. A preliminary survey plan for the town, completed

by preservation consultants in 2006, provided guidance for the “Carlisle, Massachusetts, Historic Properties Survey Final Report,” completed in 2010. This survey project was the first comprehensive effort to record the town’s historic, architectural, and cultural resources. A total of 220 Massachusetts Historical Commission (MHC) historic-property inventory forms were filled out by the consultants, covering individual historic buildings, cemeteries, areas, landscapes, objects, and structures. The survey included identification of Carlisle’s historic resources before 1960, establishment of a historic context for the town’s development (particularly its agricultural landscape), and evaluation of the identified resources according to criteria for the National Register of Historic Places. The survey resulted in a list of properties and districts recommended as eligible for nomination to the National Register.

A Historic District in the Town Center was designated in 1969 (Maps 5 and 11). The Carlisle Historical Commission must review and approve any significant changes to properties in this district. The Historical Commission has published guidelines and application forms, which are available at Carlisle Town Hall.

Unique Environments

Although Carlisle’s topography is somewhat typical for the region, the town is home to half a dozen species of rare plants and animals and features a small, protected stand of virgin white pines (Map 5). The large amount of protected land kept in natural condition and lower density development provide additional potential habitat for rare species.

The Cranberry Bog is an unusual feature in Carlisle (Map 5). It is the northernmost cranberry bog operating in Massachusetts and the only one remaining in Middlesex County. During the fall harvest, people can observe workers waist deep in a mat of floating red berries and can enjoy the surrounding ponds and forest year-round.

Carlisle has an exceptional trail network, with more than 62 miles of protected and maintained hiking trails on public lands and easements on private lands. Much work remains to be done to preserve important sections of the trail network that lie on unprotected land. The Trails Committee publishes a *Trails in Carlisle* guidebook, extensively updated in 2010, that features maps of trail networks throughout town. The trail network is shown on Map 10.

G. Environmental Challenges

Environmental Equity

Thanks to progress since the previous Plan, as noted in Section 2 in the discussion of changes in the criteria used to rank currently unprotected parcels, protected open space is distributed evenly throughout Carlisle. Similarly, although new trails and links between existing trails are goals of this plan, Carlisle’s extensive trail network extends throughout the community. Carlisle’s small size and relatively even distribution of homes throughout this almost exclusively residential community means that no residences are far from the valued environmental assets in town including open space, park areas, and recreational facilities. Appendix F identifies issues related to handicapped accessibility, recent efforts to improve accessibility, and the areas where further progress is needed. Aside from this identified need to improve handicapped accessibility, Carlisle does not have any significant environmental inequities to address.

Hazardous Waste

All known hazardous spills have been addressed. One known area of ground contamination is at the site of the Carlisle Police Station, and the Town is in the final phases of certification that all contaminants have been removed. MTBE (methyl tertiary-butyl ether) contamination in the groundwater in the Town Center from the former gas station is being assessed. The gas station stopped operation, and contaminated soil was partially removed in 2001. The site is undergoing a Phase II Comprehensive Site Assessment, and preliminary information is available under a Public Involvement Plan. Nearby wells are periodically monitored by the Board of Health as recommended by the Department of Environmental Protection (DEP). There were three minor spills in 2009 and 2010 that have been addressed.

Landfills

Carlisle has no active landfills. Household waste is collected at the Carlisle Transfer Station on the site of the former landfill and then trucked to the Massachusetts Refusetech incinerator in North Andover through a contract with North East Solid Waste Committee (NESWC). Today Carlisle has an extensive recycling program. The town separates newspaper, cardboard, miscellaneous paper, aluminum cans, tin cans, plastic, Styrofoam, clear glass, colored glass, batteries, light bulbs, building materials, metals, used motor oil, and tires for processing and reuse. There are hazardous waste collection days. The swap shed at the transfer station gives residents the opportunity to pass on goods to other local families. The annual Pass It Forward Day and the used book sale at the library provide additional opportunities.

Erosion and Chronic Flooding

Carlisle has no recognized erosion hazards and no recognized chronic flooding hazards. However, areas of Carlisle are within the 100-year Flood District (Flood Hazard Zone) as delineated by the Federal Emergency Management Agency (FEMA) (Map 6). Over the past decade, incursions of beavers into local wetlands resulted in novel flooding problems affecting public land, farms, and some homes. With climate models predicting increased rainfall, the Town needs to monitor aging dams and potential flood hazards. A dike and water control device at the Cranberry Bog experienced a major failure during a high water event in 2011 and was subsequently repaired. Beavers may have contributed greatly to this problem, and upstream water management is complex. Another breach in a dike occurred on the Chelmsford side of the town line in 2006. The dam at Greenough pond is in need of major repairs and is now closed to motor vehicles. It has developed several large sinkholes since 2009.

Sedimentation

Other than that caused by the ruptured dam on the Cranberry Bog Conservation Land during the October 2011 storm and storm-related sedimentation damage to at least one construction site, Carlisle has no major sedimentation issues. Buttrick pond, an historic millpond site (where Spencer Brook was dammed) is filling with sediment. A smaller pond at 80 Russell Street was dredged over 10 years ago. Downstream from this point, the pond has filled and turned to grasses for approximately one quarter of the pond's length. The rest of the pond has decreased in depth.

Effect of Development

Although Carlisle is subject to development pressures as are other towns, some mitigating features are present in this community. Zoning laws enacted to protect groundwater resources by

establishing 2-acre minimum lot sizes continue to limit the density of new developments but also encourage construction of very large residential structures. The high price of building lots tempts people to tear down older, smaller homes, reducing the inventory of smaller residences in favor of new larger ones.

Although Carlisle is aggressive about protecting wetlands and their buffer zones, alternative technology and raised septic designs are increasingly common, and parcels once thought to be unbuildable are now being developed. In addition, a change in the accepted percolation time from 30 minutes to 60 minutes may contribute to additional building opportunities (with larger septic systems).

“Non-friendly” Chapter 40B developments are of significant concern to residents. Town planners worry about the possible construction of high-density 40B housing with little regulatory input and the limited opportunity to plan adequately for the effect of unpredictable rapid growth. There is a very real risk of effects on the quality and quantity of water from private wells both to 40B project residents and abutters in a town without a public water supply. The current law makes it difficult for a community such as Carlisle with private wells and private septic to reach the mandated quotas of affording housing because the ownership developments often preferred by developers add three more market-rate units for every affordable unit. Carlisle has responded to this situation by providing Town-owned land and subsidies to a developer to build a 26-unit development on the Benfield land that will be 100% affordable. The Town is also looking into the development of rental projects which, even though only 25% of the rental units may be affordable, 100% of the rental units would “count” as part of Carlisle’s Subsidized Housing Inventory (SHI).

Because Carlisle lacks a business center and has little land zoned for industrial or commercial use, businesses in town tend to be cottage industries and limited in size. Opportunity for commercial development in town is limited.

Ground and Surface Water Pollution

The town continues to use road salt to improve road safety during the winter. Due to a salt storage problem many years ago, some wells in the Town Center have high salt levels. The town now applies a non-sodium-based salt to the roads in the center of town, and road salt is stored in a covered shed. Many residents use salt on walks and driveways, posing a threat to nearby private wells. The effect of salt discharge from home water softeners on the town’s water supplies and the environment may be of concern as well, but has yet to be investigated.

Impaired Water Bodies

Carlisle has no bodies of water designated as impaired.

Invasive Plants

More than a dozen alien invasive plant species have become established in Carlisle. (See the list in Appendix D.) Invasives include trees, shrubs, vines, and herbaceous plants. They can be found along roadsides; in woodlands, wetlands, and fields; on conservation properties; and on public and private lands. Among the most widespread and problematic are Purple Loosestrife, Glossy Buckthorn, Oriental Bittersweet, and Multiflora Rose. Garlic Mustard and Japanese Knotweed are

currently spreading rapidly. Porcelain Berry is an aggressive invasive that has appeared in Carlisle in the last few years. Black swallow-wort has recently been found in isolated but scattered locations in town.

Invasive plants have displaced and replaced native vegetation. This change has reduced plant diversity, eliminated food and habitat for birds and other animals, changed the character of roadsides, and decreased the public's enjoyment of conservation lands.

The Conservation Commission, its Land Stewardship Committee, and the Carlisle Conservation Foundation are actively developing control strategies, spearheading removal projects, and increasing public awareness of the problem. Carlisle is part of the Sudbury Assabet Concord (SuAsCo) Cooperative Invasive Species Management Area (CISMA). Carlisle recently received a grant from the National Fish and Wildlife Foundation to control invasives on Foss Farm Conservation Land and part of Ben's Woods (CCF land).

The native poison ivy has expanded dramatically on the open areas at Towle Field and vastly reduced the public's enjoyment of walking, picnicking, and other activities. Control efforts have included mowing and intensive grazing by sheep. Currently, frequent low mowing has begun in some parts of the field. Poison ivy is a problem on many other conservation properties and along roadsides, impairing the use of these areas for walking and other human recreation.

Overpopulation of Deer

The deer population has continued its expansion in Carlisle and regionally and shows no sign of abating. Indications are that deer are reaching or exceeding the carrying capacity of the land to reasonably support them in balance with other members of the natural community. Problems associated with overpopulation of deer in Carlisle include increase in the number of deer ticks and concurrent increase in incidence of Lyme disease, ravaging of forest tree seedlings and rare understory plants and wildflowers, destructive encroachment into gardens and vegetable plots, and increase of car accidents associated with deer. Habitats that have been denuded of low-growing plants can adversely affect ground-nesting bird populations. Deer hunting is allowed in Carlisle with the permission of private landowners (not on conservation land) and at GMNWR, but to date has had little effect on deer population growth. Control methods continue to be evaluated. Ways to evaluate deer impact may include monitoring individual plants that are palatable to deer (such as lady's slipper flowers), monitoring of plants less palatable to deer (such as beech suckers) to provide a measure of higher deer populations levels, and comparing fenced enclosures that exclude deer from vegetation with browsed areas.

Insect pests

There are currently no known widespread problems from introduced insect pests in Carlisle. However, several species highly destructive to woody plants are found here. Population levels and the damage insects cause can vary from year to year. Thus, vigilance and treatment where needed are key to preventing problems from worsening.

The Winter Moth (*Operophtera brumata*) has become very abundant in the past few years. It feeds on the buds and leaves of woody plants including oak, maple, and blueberry. The Hemlock Woolly Adelgid (*Adelges tsugae*), present here for over a decade, sucks hemlock sap, which can

lead to defoliation and the ultimate death of the tree. The Gypsy Moth (*Lymantria dispar*), which caused widespread defoliation of oaks and other woody plants in the early 1980s, is still present in low numbers.

Two highly damaging insects could reach Carlisle. One insect, the Asian Longhorned Beetle (*Anoplophora glabripennis*), is a wood-boring pest that poses a serious threat to New England's hardwood forests. It has been found in Boston and Worcester.

The other insect, the Emerald Ash Borer (*Agilus planipennis*), is a buprestid beetle that burrows in the bark of ash trees and can kill them. It has been found near the Massachusetts border. For the past several years, the U.S. Forest Service (USFS) has conducted early-detection training and studies at Foss Farm conservation land which has both ash trees and a large colony of the native burrowing wasp (*Cerceris fumipennis*). The solitary wasps collect adult beetles in the family *Buprestidae* to feed their young, and thus their presence may be an indicator of the presence of the ash borer. In June 2012, the U.S. Department of Agriculture conducted a program on Foss Farm to train observers to recognize the wasps in their colony near the dressage ring. The state Department of Conservation and Recreation recently set out beetle traps in Carlisle. No Emerald Ash Borers have been reported in Carlisle to date.

Honey Bee Decline

A number of Carlisle beekeepers have experienced severe difficulties with survival of their bee colonies since about 2005. Some of the affected hives have been on Carlisle conservation land. A nationwide decline of honeybees in this same time frame has been attributed to a malady called Colony Collapse Disorder (CCD), which is a technical specification of specific symptoms, not a specific disease. The causes of CCD are thought to be many—including stress, nosema (caused by a parasitic fungus), viruses introduced via parasitic mite infestations, and pesticides. All of these causes may be operating in any given identified CCD outbreak.

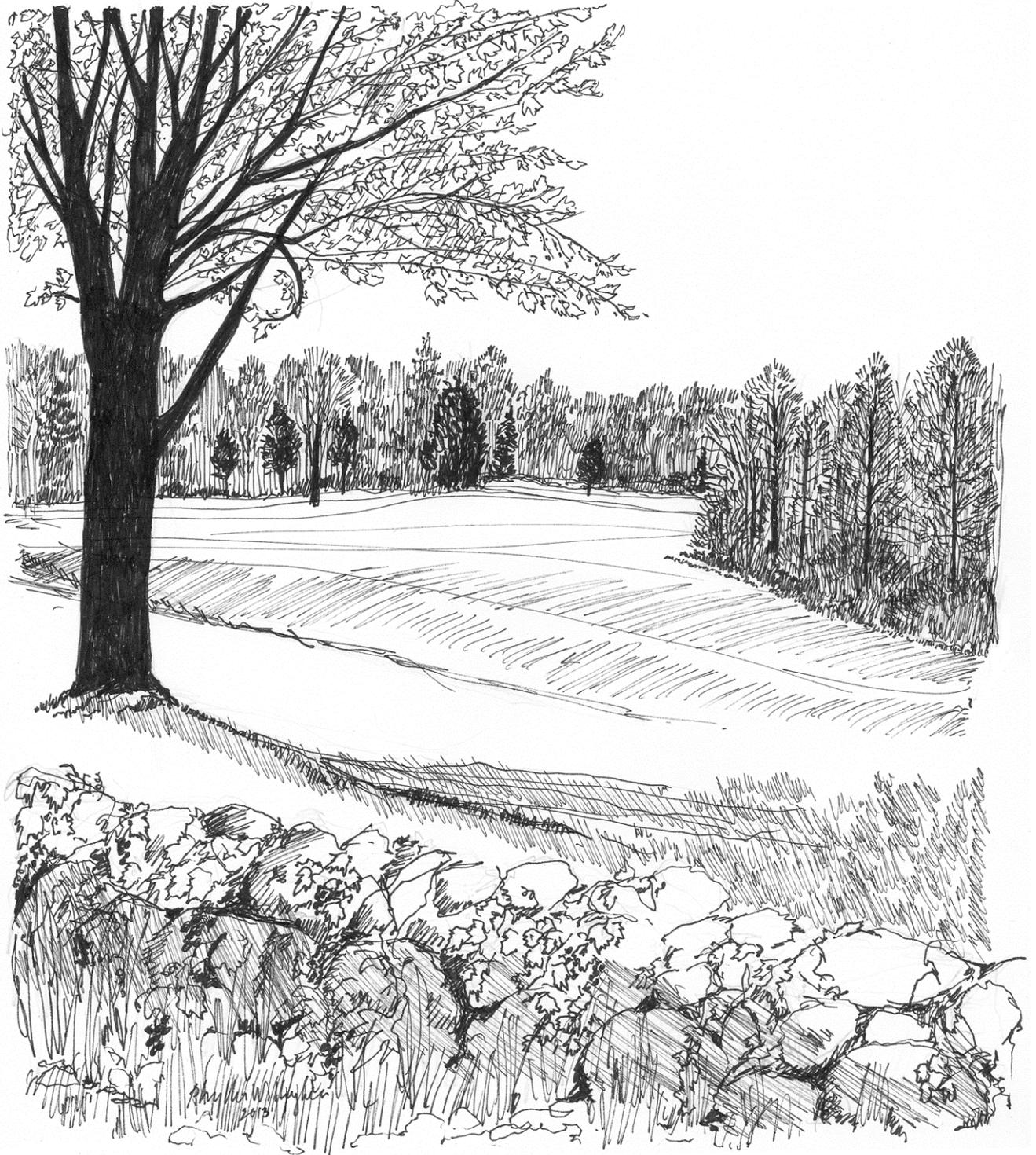
It is known, however, that low-level pesticide exposure can impair the honeybee's immune system and affect colony health. Neonicotinoid pesticides are thought to be particularly devastating, affecting the bees' sense of direction and making it difficult for them to return to the hive. These chemicals are used in grub control products and on the coatings of corn seeds. They are widely available to homeowners, lawn-maintenance services, and corn farmers. This class of pesticide has been in wide use since 2005.

The comprehensive U.S. Government report on the subject attributed the rapid decline of American honeybees to a combination of factors, including parasitic mites, viruses, bacteria, poor nutrition, genetics, and also pesticides, but concluded that there is no clear evidence that pesticides are a leading cause of colony collapse and that more research is needed. (*U.S. Department of Agriculture, Report on the National Stakeholders Conference on Honey Bee Health, October 15-17, 2012, Alexandria, Virginia*).

The European Union, however, recently called for a two-year ban on neonicotinoid pesticides. Carlisle beekeepers remain seriously concerned about the use of these pesticides. The Harvard School of Public Health is launching a study of neonicotinoid concentrations in pollen being brought into beehives in Middlesex County.

Section 5: Inventory of Lands of Conservation and Recreation Interest

- A. Private Parcels
- B. Public and Nonprofit Parcels



Roadside vista across Towle Field, part of the 121-acre Towle Land, with trails through a rich variety of wildlife habitats, from open field to mixed hardwood forest, past 8 certified vernal pools, and featuring a century-old cow tunnel under Westford Street.

Section 5: Inventory of Lands of Conservation and Recreation Interest

As a relatively sparsely populated, historically agricultural community, Carlisle has always been characterized by its open spaces; this quality has been central to Carlisle's appeal to new residents for more than half a century. Today's citizens owe a debt to past town residents who had the foresight to permanently protect the open spaces that were attracting new residents to new housing developments that, if unchecked, would have eventually consumed this precious resource. Today, over a third of Carlisle's land is permanently protected; protection of additional open space is needed to offset increased housing density within Carlisle and particularly in our neighboring communities that poses significant threats to finite groundwater resources, both in terms of quantity and quality (from pollution, runoff, pesticides, and herbicides), especially since Carlisleans rely on individual private wells for drinking water. Additional reasons for further protection of Open Space are highlighted in Section 7: Analysis of Needs.

This section inventories parcels of land of conservation and recreation interest owned by private, public, and nonprofit entities and examines the degree of protection afforded to these parcels. Existing open space and recreation properties that are legally protected and lands essential for natural resource or recreation purposes that are not currently protected are identified.

Protected open spaces are lands that are permanently committed for conservation or recreation purposes or both. They include holdings of the Carlisle Conservation Commission (Table 1 and Table 2), the Commonwealth and Federal governments (Table 3), and the private Carlisle Conservation Foundation (CCF) (Table 4). Protected open space also includes private properties with permanent conservation restrictions (CRs) (Table 5) and open space created by conservation cluster developments (Table 8). Unprotected open space consists of public and private properties that are not designated for conservation or recreation and includes land in Chapter 61, 61A, or 61B (Table 6). These properties are vulnerable to development or exploitation.

Section A below provides an inventory of significant **private** parcels and ranks them according to how they rate on a scale of community-specific values developed for this plan. Section B provides a descriptive inventory of **public** conservation and recreation resources (including federal, state, and municipal lands), nonprofit conservation lands, and other public unprotected lands.

Private and public protected and unprotected open space in Carlisle is depicted on Map 7: Inventory of Open Space.

A. Private Parcels

For the 2013 Open Space and Recreation (OS&R) Plan, an inventory was compiled of private parcels of 10 acres or more. The current level of protection of these properties was assessed. The properties were then ranked according to land protection values and criteria established for this plan.

Private parcels with conservation restrictions, which are considered to be permanent protections, are shown in Table 5. Lands in Chapter 61, 61A, or 61B are shown in Table 6. Although Carlisle encourages landowners to place land under Chapter 61, 61A, and 61B, these lands can be easily removed from these classifications and therefore cannot be considered as protected open space. Chapter 61 indicates lands that are declared as managed forest land. Chapter 61A is land that is in agricultural or horticultural use, and 61B is land that is in recreational use or is considered to be of significant value for the preservation of wildlife or other natural resources. Property owners who use these classifications qualify for reduced property taxes on the portion of the property in the specified use. The designated use must be maintained for specified periods of time or back taxes can be assessed against the property. When a property owner wishes to remove land from these classifications in order to sell or to change the use of the land, the Town must decide within 120 days whether to purchase the property at fair-market value.

Carlisle does not have any private recreation lands such as game clubs, major institutional holdings such as colleges or hospitals, or large corporate holdings with extensive recreation fields.

Privately Owned, Unprotected Land Inventory

Ranking of unprotected open space parcels

Of particular interest to the town are sizeable unprotected parcels that would be desirable additions to its protected open space inventory based on established criteria used to evaluate and rank them. The large parcels (10 acres or more) of unprotected open space remaining in Carlisle are inventoried and ranked in Table 7: Seven-Year Action Plan Private Property Protection Priority List and shown on Map 9: Unprotected Private Parcels Priority Rankings.

Much of Carlisle's character is determined by the large parcels of open space that are not yet protected in any way. The goal to maintain the town's rural character can be accomplished by protecting selected vulnerable open spaces. Privately owned parcels of 10 acres or more were inventoried and ranked for each of the three previous OS&R plans and again for the 2013 plan. To set protection priorities, public ranking sessions were held in the fall of 2012. As detailed in Section 2, refinement of the ranking criteria involved many stakeholders in the local conservation community, and the ranking sessions were well attended by additional members of the public. The resulting land protection values for ranking unprotected lands of 10 acres or more, and the ranking method, are described below and presented in Appendix A.

Land Protection Criteria and Values

These criteria are values used to rank unprotected parcels of land in Carlisle for their desirability for protection if and when they become available.

1. Core Habitat – The land includes priority areas for protection of rare species and natural communities. The land provides habitat for rare, vulnerable, or uncommon native species. Relevant areas were identified from the Natural Heritage and Endangered Species (NHESP) Program's *BioMap2* (Map 1: Regional Context).

2. Water Resources – The land includes areas significant for water resources protection. The land contains or is adjacent to surface water (Concord River, streams, ponds), wetlands, vernal pools, potential sites for town wells, or protective zones around town wells.

3. Active Recreation – The land is suitable for playing fields or community garden plots.

4. Rural Vista – The land provides a view of open fields, woodlands, or water visible from any road. Visibility from a major road is more important than visibility from a neighborhood road.

5. Linking Location – The land abuts a parcel of land that is already protected (existing link) or a significant parcel that is undeveloped and unprotected (potential link). Both existing and potential links increase the usefulness of the entire tract (linking parcel plus abutting parcel) both for recreation and for native plant and animal habitat.

6. Trails – The land contains cart paths, trails, potential links to existing trails, or areas where new trails can be created for passive recreation.

7. Size – Larger parcels are more valuable than smaller parcels for values such as plant and animal habitat, protection of water resources, and active or passive recreation.

Parcels greater than or equal to 40 acres were scored 4;

Parcels greater than or equal to 30 acres but less than 40 acres were scored 3;

Parcels greater than or equal to 20 acres but less than 30 acres were scored 2;

Parcels greater than or equal to 10 acres but less than 20 acres were scored 1.

8. Prime or Active Agricultural Land – The land possesses fertile or arable soil suitable for agriculture, including growing crops or other plants or grazing animals, whether or not it is currently in agriculture.

9. Diversity of Habitat – The land contains an unusual terrain, a terrain underrepresented in town, or a variety of terrains and thus provides for a variety of habitats, which, in turn, may support a variety of native animals or plants.

10. Special Feature – The land contains an unusual feature, such as a special habitat, a scenic spot, an exceptional woodland, or a site with archaeological, geological, historical, or other interest.

11. Level of Development – The land is currently undeveloped, minimally developed, or easily returned to an undeveloped state.

Ranking Method

All private undeveloped parcels of 10 acres or more in Carlisle were identified. Each parcel was evaluated and scored in the public ranking sessions. Each parcel was scored 0 through 4 for each of the 11 criteria above.

Criteria 1 through 6 (Core Habitat, Water Resources, Active Recreation, Vista, Linking, and Trails) were deemed to be the most critical values and were weighted twice as heavily as the rest.

1. *Core Habitat is more critical as more land is developed and is valued for wildlife corridors connecting protected parcels.*
2. *Water is central to Carlisle's long-term ecological health.*
3. *Active Recreation isn't covered by the other criteria, so it needs a multiplier to have a reasonable effect on the rankings.*
4. *Rural Vistas remain central to Carlisle's character, and there remain some important unprotected parcels with vistas along major through roads.*
5. *Linking remains a high priority because missing connections among the many previously protected parcels become more critical as some highly ranked parcels have been developed.*
6. *As with Linking, Trails remains a high priority to achieve a goal of more interconnections to allow uninterrupted walks and connections to through trails such as the regional Bruce Freeman Rail Trail.*

Criteria 7 through 11 (Size, Agricultural, Diversity of Habitat, Special Feature, Level of Development) were not weighted.

7. *Size: Large parcels get high marks on many other criteria, so weighting size is not needed.*
8. *Agriculture: Most existing agricultural parcels are already protected.*
9. *Diversity of Habitat: A diversity of habitat types is already protected, and this value is covered somewhat by criterion 1 (Core Habitat).*
10. *Special Feature: Although important, this criterion is not determinant.*
11. *Level of Development: This new criterion provides some added information but need not be weighted.*

B. Public and Nonprofit Parcels

This section provides a descriptive inventory of public conservation and recreation resources (including federal, state, and municipal lands), nonprofit conservation lands, and public unprotected lands. These parcels are shown on Map 7: Inventory of Open Space.

Nonprofit parcels include properties of local land trusts and similar private nonprofit conservation organizations. These properties are described according to features, usage, and potential.

Municipally owned land is classified according to ownership, management agency, current use, condition, recreation potential, public access, type of public grant accepted, zoning, and degree of protection. The information is presented in Table 10: Town-owned Conservation and Recreation Land. Carlisle has a few Town-owned parcels that are not protected but does not have unprotected open space for public institutions such as hospital or prison grounds or state or federal institutions.

Public Conservation and Recreation Resources **Recreation Facilities Inventory**

Town-owned Playing Fields are on Town-owned property, both school and non-school, and are located in residential zones. All Town-owned recreational areas are listed here. For locations, ownership, management, facilities, and features, see Table 10.

BANTA-DAVIS LAND

Construction of three dedicated fields—one soccer, one Little League, and one softball—was completed in spring 2001. There is the Rory Bentley Exercise course and a running track around the soccer field. An additional play structure salvaged from the recent school building project will be installed adjacent to the soccer field. The complex has sufficient parking needed for more than 100 vehicles during peak season. Irrigation for this complex is drawn from a well on this property. While centrally located (and walking distance from the school), there is sufficient buffer between the active play areas and neighboring residences to minimize noise and privacy conflicts. Future expansion, including tennis courts and a multi-purpose (lacrosse and soccer) field would be possible with limited impact on abutters. The Recreation Commission believes Banta-Davis is the only site in Carlisle where organized active recreation can operate without conflict with other town interests. This land is controlled by the Carlisle Public Schools and may be designated for town projects other than recreation with approval of the Carlisle School Committee, Board of Selectmen, and Town Meeting.

BENFIELD LAND

In spring 2004, additional land with room for a single playing field was acquired for active recreation at the Benfield Parcel A site using Community Preservation Act (CPA) funds. This parcel is the only land in Carlisle specifically dedicated to active recreation. Subsequent to the acquisition, however, environmental concerns, the need for a lengthy access road through bordering vegetated wetlands including a certified vernal pool, and neighborhood opposition impose significant obstacles to development of a playing field at this location. Accordingly, there are no immediate plans for a playing field at this site.

COREY GYM

This large gym with an exercise room was built during the school expansion project in the late 1980s. The gym and exercise room are wheelchair accessible. In addition to school-run recreation activities, the Recreation Commission uses the Corey Gym for many before-school and after-school programs for all ages.

DIMENT PARK

Diment Park, named for a long-time member of the Recreation Commission, was created in 1983. In 1999, a group of volunteers called the Carlisle Parents Connection (CPC) raised \$27,000 in private funds towards the transformation of the park into a playground for toddlers younger than two. An additional \$10,000 was sought from Town Meeting, and, though not supported by the Finance Committee, the Warrant article was heartily supported by citizens in attendance. In 2000, the town voted to accept the toddler playground as an asset, and the Recreation Commission accepted responsibility for its maintenance. CPC continues to assist with maintenance. Some minor structural repair will be undertaken during the summer of 2013. Due to its location on sloped land, the park is not handicapped accessible.

RECESS AND PLAY AREAS

The school building project, completed in 2012, includes a new plaza cement-topped play area with basketball hoops and a kickball area. In addition, a pre-K playground was constructed outside the pre-K classroom and a new structure for grades K-2 was built between the new plaza and the existing Carlisle Castle playground. A play structure was removed and will be installed

on the Banta-Davis Land. There is ample parking adjacent to the play areas, and ramps provide wheelchair access to the plaza.

THE CARLISLE CASTLE

The Carlisle Castle is a wooden climbing structure, constructed in 1988 by volunteers, and, with some repairs over the years, continues to be used during school recess and when school is not in session.

AFTER-SCHOOL PROGRAM

An after-school program for middle school students is operated in a room provided by the school. This program was started in 2011 and is designed to give students a space that provides a sense of freedom and independence. The program has been fully subscribed since its inception.

SPALDING FIELD

Spalding Field is a 5-acre parcel that has baseball or softball diamonds in three corners overlaid by two soccer fields in the center. An underground sprinkler system has been added, and the field is in good condition. The adjacent parking area contains a curb cut for field access and one handicapped parking space. Like the Banta-Davis Land, this land is controlled by the Carlisle Public Schools and may be designated for town projects other than recreation with approval of the Carlisle School Committee, Board of Selectmen, and Town Meeting.

RORY BENTLEY FITNESS COURSE

As part of the development of the Banta-Davis recreation area, the Rory Bentley Fitness Course was moved in 2000 from its location near Spalding Field and Diment Park to its current location adjacent to the running track on the Banta-Davis Land.

TENNIS COURTS

At Annual Town Meeting in 2003, the citizens voted to appropriate \$75,000 for the construction of four new tennis courts on the Banta-Davis land. This project was never initiated due to higher than expected construction bids, and the appropriation expired. The Recreation Commission is currently reviewing this project and hopes to place a new proposal before 2013 Annual Town Meeting. If the tennis courts are completed, the Commission plans to convert the existing two tennis courts, built in 1987 on school property, to outdoor basketball courts.

TOWN HALL

The Recreation Commission has an office in the Town Hall and offers exercise and fine art classes in the building for all ages.

SKATING RINK

A seasonal outdoor skating rink at the parking lot at Kimball's ice cream stand is installed in winter if conditions are appropriate.

Accessibility

All lands used for recreation that are not under school management, in addition to Conservation lands, were inventoried for accessibility (Table 11 and Appendix F).

Conservation Land Inventory

Carlisle has approximately 3,362 acres of protected natural space as of May 2013, an increase of 154 acres since the 2005 OS&R Plan. Protected open space comprises approximately 34% of Carlisle's total acreage of 9,913 acres and includes conservation lands owned by the Town (1,103 acres) protected under Article 97 of the Massachusetts constitution, land owned by the Commonwealth (998 acres), Federal land (321 acres), land privately owned by CCF (217 acres), land owned by Harvard University and protected by a recorded "Statement Of Public Charitable Obligation" (95 acres), additional land protected by permanent CRs (627 acres), and land restricted by a landowners' association (2 acres). Lands such as the Davis Corridor (126 acres) and the Estabrook Woods Buffer Lands (68 acres), which are Town-owned conservation lands also protected by permanent CRs, are counted only once in the final total acreage of protected land. Similarly, lands such as Poole Swamp (15.2 acres) that are CCF-owned conservation lands that are also protected by CRs are counted only once. Harvard University's holdings in Estabrook Woods in Carlisle (95 acres) are permanently protected through a recorded "Statement Of Public Charitable Obligation" rather than through a CR (Table 9). (Any slight discrepancy between the acreages in this paragraph and those in the tables is due to rounding off.)

The following Tables list protected land in Carlisle and land in Chapter 61, 61A, or 61B.

Table 1: Town-owned Conservation Lands (as of 31 December 2012)

Table 2: Town Acquisitions for Conservation – Listed by Date

Table 3: Commonwealth and Federal Lands in Carlisle

Table 4: Carlisle Conservation Foundation (CCF) Lands (as of 31 December 2012)

Table 5: Properties with Conservations Restrictions (CRs) (as of 31 December 2012)

Table 6: Lands in Chapter 61, 61A, or 61B

Table 8: Open Space Created by Conservation Cluster Developments

Table 9: Properties of the Greater Estabrook Woods in Carlisle

The Carlisle Conservation Commission has established rules and regulations for Town-owned conservation lands (Appendix B).

The Carlisle Trails Committee published a new guidebook, *Trails in Carlisle* in 2010, with maps of trails, descriptions of public open space lands in town, and descriptions of historical markers. The trail network is shown on Map 10.

Town-owned Conservation Land

Town-owned conservation lands are described below. Suggested activities, the facilities, the accessibility, and special regulations are included for the more frequented properties. Signage on Town conservation land has been replaced and upgraded over the past few years using Community Preservation Act funds. In addition, rules for camping were adopted by the Conservation Commission in 2010 and regulations for trail use by Other Power-Driven Mobility Devices (OPDMDs) on Town-owned conservation land were developed and approved by the Commission in 2012; these rules are presented in Appendix B.

BENFIELD CONSERVATION LAND

This 25.68-acre parcel was acquired for conservation in 2004 as part of a larger 45-acre purchase

for limited affordable housing, one ball field, and additional protected open space. Although not conservation land under MGL Chapter 40, Section 8C, this parcel is subject to a CR granted to CCF. The parcel consists of open fields, a certified vernal pool, and wetlands associated with Spencer Brook. The wetlands connect this parcel with the Bisbee Land and CCF's Spencer Brook Reservation. The land is included in BioMap 2's Core Habitat designation.

Activities: The fields are available for hiking, birding, kite flying, and other passive recreation activities.

Facilities: Upon completion of the Benfield Farms housing project currently under construction, there will be public access and parking available from South Street. There is a wildlife viewing platform over the Spencer Brook wetlands built in 2011 by CCF and the Carlisle Trails Committee. The field is periodically mowed.

Accessibility: Currently trail accessibility is limited and not suitable for wheelchairs. The wildlife viewing platform was built to standards of the Americans with Disabilities Act (ADA).

Special Regulations: The CR allows for installation of a public water supply well and for a subsurface septic system for the affordable housing complex on another portion of the Benfield property. To protect the well, portions of the property are subject to restrictions on activities that would normally be allowed on conservation land.

BISBEE LAND

This 34-acre property was purchased in 1987 for purposes of conservation and outdoor recreation. According to the original Warrant Article, the Carlisle Conservation Commission is responsible for managing the outdoor recreation on this parcel. It includes open fields, which are currently hayed by a local farmer, and trails in wooded areas.

Activities: Currently the area is used for walking, horseback riding, and cross-country skiing.

Facilities: Parking is informal, on a pull out along Concord Street.

Accessibility: The trails are not handicapped accessible. Parts of the field, however, can be navigated by some wheelchairs. The Bisbee Loop is accessible to certain types of OPDMDs (Appendix B).

Special Regulations: There are no special regulations.

BUTTRICK WOODS CONSERVATION LAND

This 13.97-acre parcel bounds three sides of the Buttrick Woods development, on Concord Street. It is part of the Estabrook Woods Buffer Lands and is subject to CR #52, which is monitored annually by The Trustees of Reservations (TTOR). It was deeded to the Town through the Conservation Commission in 2000 as part of a conservation cluster development to provide a wildlife corridor from the Bisbee Land to the nearby Estabrook Woods.

Activities: Currently there are no activities on the land. No trails have been established.

Facilities: There are no facilities.

Accessibility: There are no trails on this property.

Special Regulations: There are no special regulations.

CARR LAND

This 6.08-acre, land-locked property of upland forest abuts the Rockstrom Conservation Land. It is part of the Estabrook Woods Buffer Lands and is subject to CR #52. Trails leading from both Bellows Hill Road and the Rockstrom Land to the Estabrook Woods pass through this property.

CRANBERRY BOG CONSERVATION LAND

The 310-acre Cranberry Bog conservation area straddles the Carlisle-Chelmsford line. Access to Carlisle's 151 acres is via Curve Street. Carlisle's portion contains about 40 acres of cranberry bog in addition to the ponds, reservoir, and an adjoining wooded area of both uplands and wetlands. There are two certified vernal pools. A Blanding's turtle, state-listed as Threatened, was found at the bog, thus placing the bog lands within an area subject to NHESP review. A local farmer currently grows cranberries under a long-term agreement with the Town and provides public demonstrations during the cranberry harvest. This lease expires in 2015. Renovation and repair of the historic Cranberry Bog house was initiated in 2010 and completed in fall of 2012 with funds from the Community Preservation Act. The northern dike of the pond was breached in 2011 and has been repaired by the farmer.

Activities: Self-guided trails with interpretive signs circle the cranberry bogs and connect to trails that wind through the wooded uplands. The ponds provide fishing, canoeing, and ice skating. The land is used for hiking, cross-country skiing, and horseback riding. The varied habitats invite birding and other natural history studies.

Facilities: Parking is along the street. There is a small lot for a few cars next to the Bog House.

Accessibility: The interpretive signs and parts of the dike trails are wheelchair accessible. Several trails are accessible by certain types of OPDMDs (Appendix B).

Special Regulations: Dogs and people must stay on the trails and off the cranberry plants. In response to repeated public complaints, dispensers for dog-waste bags have been placed near the parking area on Curve Street. A new sign has been installed with suggestions for considerate behavior on the part of dogs and their walkers.

Connections: Carlisle's Cranberry bog trails connect with trails in the Chelmsford-owned Cranberry Bog Reservation, with trails in GBFSP, and with the gas pipeline easement.

DAVIS CORRIDOR

This 126.4-acre wooded property is accessed from Bedford Road and continues southward off Stearns Street, into Harvard's Estabrook Woods to the Concord town line. Between 1974 and 1979, the Town of Carlisle, with the assistance provided by the State Self-Help Program, purchased the properties that compose this north-south corridor, which has trails connecting through Estabrook Woods to miles of trail in Concord. The Davis Corridor is subject to CR #36, which is monitored annually by TTOR. There is also a small, wild cranberry bog along Two-Rod Road, an historic carriage trail that connected Carlisle to Concord during the Colonial period.

Activities: The land is used for hiking, cross-country skiing, horseback riding, and birding.

Facilities: Access on Bedford Road is marked with a sign. Although there is currently no parking by the Bedford Road entrance, there is a space where a small two- or three-car parking lot could be built. The Davis Corridor also abuts the Malcolm Land and its nine-car parking lot, which is plowed during winter and provides ample parking for those entering the Davis Corridor and Estabrook Woods via the Two Rod Road trail.

Accessibility: The trail is not recommended for wheelchairs, due to rough terrain and wet conditions most of the year. Several trails are accessible by some OPDMDs (Appendix B).

Special Regulations: There are no special regulations.

DEACON LAND

This 7.51-acre property consisting of wetland and some upland forest abuts the Sachs Greenway

and the Rockstrom Conservation Land but lacks a dry trail connecting the two. It is part of the Estabrook Woods Buffer Lands and is subject to CR #52.

FISK MEADOW

This 11.6-acre property off Lowell Street across from the Transfer Station is approximately two-thirds wetlands and one-third open agricultural field, under a farming agreement with a local farmer. It has no trails but serves as a wildlife corridor from Old Morse Road (path) and Conant Land through the Department of Public Works (DPW) area to Great Brook Farm State Park (GBFSP). It functions as part of the historic district's backdrop and as plant and wildlife habitat. It adjoins a 3-acre open field along Lowell Street that is protected by a local CR.

FOSS FARM

This 55.7-acre property off Bedford Road was purchased in 1971 for conservation and recreational use with monies from the town's Conservation Fund, the state's Self-Help Fund, and the Federal Land and Water Conservation Fund. The property is bordered by Great Meadows National Wildlife Refuge (GMNWR) and the Concord River to the south and east. A popular trail leads from Foss Farm across the Refuge and connects to the Greenough Conservation Land. In 2012, a new trail was built in the western part of Foss Farm as an Eagle Scout project.

Activities: Approximately 20 acres of field are currently dedicated as agricultural land and are cultivated by a local farmer under an agricultural license agreement with the Conservation Commission. Woods and trails provide for walking and horseback riding. More than 100 community garden plots are available on a first come, first served basis. All the garden plots are accessible by automobile via the farmer's road from the Foss Farm parking lot on Bedford Road. During the Community Garden sign-up period in spring 2013, TILL Central, a vocational program of TILL (Toward Independent Living and Learning) in neighboring Billerica, that provides daytime activities and services for approximately 18 participants with disabilities, contacted the Conservation Commission Administrator to explore the possibility of program participants using the Foss Farm Community Gardens. In 2013, the Conservation Commission provided a garden plot where raised beds made of straw bales and bordered by rubber mats will allow disabled gardeners to access garden plots from wheelchairs. The horse and pony riding rings accommodate both dressage and jumping. Woodland roads and the farmer's road around the agricultural fields provide for training sled dogs. Other activities include jogging, hiking, limited trail biking, model airplane flying, model rocket launching, cross-country skiing, snow shoeing, and birding. Woodcocks are in residence, and several bluebird houses have been erected. Group activities are allowed by permit from the Conservation Commission.

Facilities: Garden plots are chiseled and disked in the spring by a volunteer (the property's licensed farmer), and hand pumps provide the water supply. Three new wells were installed during the last three years, bringing the total of wells for the gardens to seven. The community garden rules were recently revised to provide a more structured application process and wait list; the gardens are managed by a volunteer team. The parking lot is large enough for about 50 cars. A new boardwalk to complete a trail connection to the South Field was completed by the Trails Committee in May, 2013.

Accessibility: Handicapped parking is provided. The land is flat to gently sloping. The dirt road to the community gardens and some of the other trails are marginally wheelchair accessible. Access could be improved by surfacing some of the paths with crushed stone dust. Some of the trails are

accessible by certain types of OPDMDs (Appendix B).

Special Regulations Permits are required for certain activities, such as gardening, dog training, and horse activities. The 2008 map from the NHESP shows an Estimated Habitat of Rare Wildlife polygon for Blue-spotted Salamander. Foss Farm is included in BioMap 2's Core Habitat designation. There is a documented Native American site on the property as designated by the Massachusetts Historical Commission.

FOX HILL

This 11.22-acre area of open fields, field edge, and forest on the corner of Bedford Road and Stearns Street provides a rural vista to travelers on Bedford Road.

Activities: A local farmer maintains hay fields in the eastern portion of the property. The western field is licensed to another local farmer for growing vegetables and fruit trees. The open areas are available for walking dogs, birding, and horseback riding. A path is periodically mowed across the fields and around the field edges. With permission of the Conservation Commission and the farmers, the Carlisle Public Schools cross-country running team recently began using the perimeter of the fields for some of its training in order to limit training on roadways.

Facilities: Parking is along the street.

Accessibility: The field is generally accessible from Stearns Street and can be traversed by wheelchair or stroller when the hay is not too high. However, erosion is a problem at the entrance. The addition of a small amount of crushed stone dust at the entranceway would improve accessibility. The Fox Hill path is accessible to certain types of OPDMDs.

Special Regulations: There are no special regulations. The Board of Health maintains a water monitoring well on this property near Bedford Road, and one of the licensed farmers installed a shallow well to assist with crop production.

GAGE WOODLAND

This landlocked 14-acre property with an access easement over private land is located off Ember Lane and abuts GBFSP. It was a gift by will to the Town of Carlisle in 1936. The 1994 Annual Town Meeting voted that the property be managed by the Carlisle Conservation Commission. The property is an upland hardwood forest without mapped trails. A recently constructed trail expansion west of Lowell Street provides public trail access from the State Park to the Gage Woodland.

GREAT BROOK ESTATES OPEN SPACE PARCEL 1

This 3.67-acre parcel is associated with a conservation cluster development and was acquired by the Town in 2000. A trail on the property provides access from Rutland Street to GBFSP.

GREENOUGH LAND

This 255-acre property was purchased in 1973 with state and federal assistance. It includes 8 adjoining acres located in Billerica owned by CCF. The land features large rock outcroppings, a planted red pine grove, a 20-acre pond, streams, wet meadows, and 1,800 feet of frontage along the Concord River. There are four certified vernal pools. A trail across GMNWR connects the Greenough Land to Foss Farm. The southeastern portion adjacent to Billerica includes a large slate-roofed barn and an earthen dam across Pages Brook that creates Greenough Pond. Pages Brook flows to the Concord River. The dam is classified Low Hazard by the Massachusetts Office of Dam Safety. A small cottage near the barn was demolished around 2007. Most of

Greenough Land is included in BioMap 2's Core Habitat designation, and the property is mapped by the Natural Heritage and Endangered Species Program as Priority and Estimated Habitat for Rare Species.

Activities: A trail network was established, with a link to GMNWR and Foss Farm. The pond is used for fishing and canoeing. The varied habitats are exceptional for bird and dragonfly watching. Massachusetts Department of Fish and Wildlife maintains wood duck boxes at the pond and in the associated wetland on Maple Street. In winter, the trails are used for cross-country skiing, and the pond is available for skating and ice fishing.

Facilities: There are two off-street parking lots for 18 cars on Maple Street.

Accessibility: Numerous tree roots in the paths make wheelchair travel difficult beyond the parking lot on Maple Street. The Wood Duck Trail is accessible to certain types of OPDMDs (Appendix B). The driveway to the Greenough barn from Billerica is available only to emergency vehicles. Limited parking is available near the barn at the end of River Edge Road in Billerica.

Special Regulations: There are no special regulations.

GREYSTONE CROSSING CONSERVATION LAND

This 14.33-acre series of parcels abutting the Greystone Crossing development is the portion of the developed parcel required to be set aside for open space by the Planning Board as a condition of the conservation cluster special permit. The parcels were acquired by the Town for conservation purposes in 2006. There is a certified vernal pool on the property. Trails have been created by Boy Scouts as an Eagle project and pass some of the large rock outcroppings on the property. A pathway installed by the developer meanders the length of the development through the woods and along Cross Street.

HART FARM CONSERVATION LAND

This 13.5-acre parcel off Curve Street was deeded to the Town as part of a conservation cluster development. This parcel is contiguous with the Cranberry Bog. With an additional 65 acres of municipal land, it is reserved as a potential future water source. The land is level, wooded, quite low, and bordering an extensive wetland. There is a certified vernal pool on the property.

Activities: The Trails Committee established a connecting trail from the end of Hart Farm Road to Old Morse Road (path) and another from the end of Daniels Lane to the Otter Slide Trail. These trails create a walking loop and link to GBFSP, the Cranberry Bog Conservation Land, and the Conant Land.

Facilities: There is off-road parking for two cars at a small lot off the Hart Farm Road cul de sac.

Accessibility: The trail is rough and not suitable for wheelchairs.

Special Regulations: There are no special regulations.

HEIDKE LAND

This 8.19-acre parcel off Brook Street is almost entirely wetland. A trail across this parcel could link the Town Forest to the Greenough Land in winter months; however, the trail would be difficult to build.

HUTCHINS AND ROBBINS FIELDS

This property consists of 34.45 acres of fields and woodland purchased by the Town in 1999 with assistance from the Massachusetts Agriculture Preservation Program, so the property is under an Agricultural Preservation Restriction (APR).

Activities: The fields are in active agriculture and are managed by a local farmer. People enjoy walking their dogs and birding along the perimeter of the fields during the growing season.

Facilities: There are no facilities.

Accessibility: There are two short trails from the Robbins Field. Although the land is flat, the nature of plowed land makes it difficult for wheel chairs to navigate because of the loose soils.

Special Regulations: Agricultural activities during the growing season allow public access to the field edges only.

ICE POND CONSERVATION LAND

This 7.05-acre parcel is mostly wetland and was acquired by the Town in 1997 for conservation purposes.

KEYSTONE LINK

This landlocked, approximately 1.0-acre lot located off of South Street was transferred to the Conservation Commission from the Town in 2009. A trail was built through the lot in 2011, providing a link from West Street to the CCF-owned Benfield Hill property.

MACAFEE LAND

This 15-acre parcel was given to the Town in 1992. It contains large areas of wetlands. The land lies along Carlisle's border with Westford, and trails lead toward Westford and nearby Chelmsford. The parcel also serves as a conservation buffer for the nearby historic, state-owned Carlisle Pines section of GBFSP. A trail links the two natural spaces.

MACONE PROPERTY

This 3-acre parcel was given to the Town in 1992. The property is land-locked and is located off Bedford Road and Brook Streets. It is almost entirely wet year round. There is an easement leading from Bedford Road, but it is otherwise inaccessible.

MALCOLM LAND

This 23.1-acre parcel off Stearns Street was purchased in 1996 and received Commonwealth Self-Help reimbursement. It abuts both the Town-owned Davis Corridor and the CCF and TTOR jointly owned 10.6-acre Malcolm Preserve. This upland property includes woods and nearly reforested fields. The Malcolm Land is part of the Estabrook Woods Buffer Lands and is subject to CR #52.

Activities: A trail (historic Two Rod Road) runs from Stearns Street to the Estabrook Woods. The property invites hiking, birding, and cross-country skiing.

Facilities: There is an off-street parking lot with nine spaces. In 1999, bluebirds fledged from birdhouses along the edge of the parking lot. Access to this parking area is through the driveway for Malcolm Meadows, a senior housing development on Stearns Street.

Accessibility: The handicapped-accessible stone-dust trail on the adjacent Malcolm Preserve invites wheelchair users to enjoy the woods and fields. There is handicap-accessible parking immediately next to the trail.

Special Regulations: There are no special regulations.

MANNIS LAND

This 28-acre property is an aggregation of wet and wooded lots off Aldershot Lane, Rutland Street, and North Road. It serves as wildlife habitat and a buffer between developments. There is one certified vernal pool. Trails created in 2012 link with a trail installed on the Rangeway Conservation Land. This land abuts the historic Rangeway Road.

RANGEWAY CONSERVATION LAND

This 8.15-acre open space parcel abutting the Chestnut Estates development is the portion of the developed parcel required to be set aside for open space by the Planning Board as a condition of the conservation cluster special permit. It was deeded to the Town for conservation purposes in 2007. There is a certified vernal pool on the property. A trail was installed in 2011 by Boy Scouts as an Eagle project. Boardwalks will be constructed in the fall of 2013.

ROCKSTROM CONSERVATION LAND

This 7.55-acre parcel was deeded to the Town in 1998 as part of a conservation cluster development. The wooded parcel contains an important trail that runs from School Street to trails on the Carr Land, the Woodridge Road neighborhood through CCF's Poole Swamp land, and the Estabrook Woods. The Trails Committee received in 2005 a Wetlands Protection Act (WPA) permit to bridge an upper reach of Spencer Brook in order to provide a more consistent trail connection between the Poole Swamp Land and the Rockstrom Conservation Land. The Rockstrom Conservation Land is subject to CR #52, the Estabrook Woods Buffer Lands.

Activities: The trails are used year-round. The natural space offers trail biking, horseback riding, hiking, cross-country skiing, and birding.

Facilities: There are no facilities.

Accessibility: The trails are not handicapped accessible due to terrain, tree roots, and rocks.

Special Regulations: There are no special regulations.

SACHS GREENWAY

This 9.34-acre parcel, which was purchased in 1997, is a narrow parcel abutting Harvard's Estabrook Woods and features a trail connecting the south end of Baldwin Road to the Two Rod Road trail. The trail connection between this land and the western side of the Estabrook Woods is on private property. Sachs Greenway is part of the Estabrook Woods Buffer Lands and is subject to CR #52.

Activities: The hiking trails are used year-round.

Facilities: There are no facilities.

Accessibility: The trails are not handicapped accessible.

Special Regulations: Trail bikes and horses are not allowed.

SWANSON FAMILY LAND

This 3-acre lot with frontage on Barnes Place within the Tall Pines subdivision abuts Carlisle Pines and was given to the Town for conservation in 1998. The Trails Committee established a trail through this lot to link with the trail network in the Carlisle Pines section of GBFSP.

(A portion of this lot serves as a retention basin.)

Accessibility: Limited parking is available on a turn out on Barnes Place. The marked trail is not suitable for wheelchairs.

SWANSON LAND

This 20-acre parcel abuts the Hutchins and Robbins Fields. The accessible portion is a mature white pine forest, surrounded by an extensive wetland.

Activities: The open pine forest is available for hiking and picnicking.

Facilities: There are no facilities.

Accessibility: Limited off-road parking is available at the Robbins Field turn-in along Curve Street. A poorly marked trail leads from the field's south edge. The trail is not suitable for wheelchairs.

Special Regulations: There are no special regulations.

TOWLE LAND

This 121-acre parcel, the greater part of which was purchased in 1968 with state and federal assistance, features rolling fields along Westford Street, and the surrounding woods contain hills with rock outcrops, small streams, and wetlands. There is a small pond held in place by an earthen dam near the parking area. Piles of stones possibly made by Native Americans include effigies and stones aligned with astronomical events such as sunrise on the winter solstice. Most of the Towle Land is included in BioMap 2's Core Habitat designation. There are eight certified vernal pools.

Activities: Wooded trails and open fields invite hiking and birding. The trails and fields are available for cross-country skiing in winter. Bluebird boxes are placed all around the field, and from 2001 to 2004 the field was intensively grazed by sheep as part of a study on the effectiveness of sheep for control of invasive vegetation.

Facilities: Towle Field is mowed regularly on a schedule respecting the bobolink nesting season. When no boblinks were nesting, a new intensive mowing scheme was implemented in the summer of 2012 to facilitate edge clearance and invasive plant and poison ivy control. A parking lot off Westford Street accommodates 12 cars.

Accessibility: The terrain is hilly in the forested areas and not readily traversed by wheelchair. The Towle Field trail may be accessible to certain types of OPDMDs (Appendix B).

Special Regulations: There are no special regulations.

TOWN FOREST

Since 1994, the Conservation Commission has managed the 71-acre Town Forest on East Street. Since its establishment by the Town in 1925, the Town Forest has been treated by the Town, and specifically managed by the Conservation Commission since 1994, as a single, undivided, open space parcel. The parcel features hilly hardwood forestlands, mature red and white pine plantations, wetlands, several certified vernal pools, and overgrown fields. The Town Forest is also included in BioMap 2's Core Habitat designation. During the fall of 2012, this property suffered severe tree loss from Hurricane Sandy.

Activities: A trail network within the forest invites hiking, cross-country skiing, bird watching, and nature study. A group of Boy Scouts camped in the Town Forest in the winter of 2012.

Facilities: There is no parking lot at the Town Forest. Visitors must park on the street.

Accessibility: Although some of the trails are old woods roads, the terrain is hilly, rough, and not suitable for wheelchairs. Several trails are accessible to OPDMDs (Appendix B).

Special Regulations: The Town Forest is included in the NHESP Priority and Estimated Habitat map for 2008. There are three certified vernal pools.

Commonwealth-owned Conservation Land

GREAT BROOK FARM STATE PARK (GBFSP)

This 998-acre area features a Visitor Center, a working dairy farm with a state-of-the-art barn and robotic milking facility, an ice cream stand, an extensive trail network through fields and woods, small ponds, a canoe launch, streams, a cross-country skiing venue, and trail linkages to many of Carlisle's other open spaces. As noted in Section 7, the New England Mountain Bike Association sponsors periodic Trail Maintenance Days in the State Park. Volunteer crews from the Student Conservation Association (SCA), funded by the National Park Service and private donations, have also assisted with trail maintenance. There is a \$2.00 parking fee for visitors to the Park. Carlisle Pines State Forest is a 22-acre isolated parcel of GBFSP (about 2 miles away from the main park acreage) that protects a small stand of virgin white pine trees exceptional for their size and grandeur. The Carlisle Pines State Forest parcel is completely wooded with deciduous and coniferous trees, with some planted red pines. Old cart paths provide access through the woods. Parking and access is available at the ends of Barnes Place and Forest Park Drive.

Federally owned Protected Land

GREAT MEADOWS NATIONAL WILDLIFE REFUGE

This 321-acre area bordering the Concord River protects much of Carlisle's riverfront on this Wild and Scenic River. The refuge can be traversed by trails that link the Greenough Land and Foss Farm conservation lands. Archery deer and waterfowl hunting are allowed in some parts of the refuge with a refuge hunt permit.

Activities: The hiking trails are open year-round, with encouraged activities including wildlife observation (especially birdwatching), photography, snowshoeing and cross-country skiing.

Facilities: There are no facilities and no public access to barns and other buildings.

Accessibility: The trails are not handicapped accessible in the Carlisle portion of the refuge.

Special Regulations: Dogs, bikes, off-road recreational vehicles and horses are not allowed on trails. Building fires and swimming are prohibited. No access is allowed off the trails. Fishing is allowed in the Concord River.

Privately-owned Protected Land

Select privately owned protected lands of interest are described below. See Table 4 for privately owned CCF lands and Table 5 for private lands protected by CRs.

BATES FARM LOT

This 6-acre property located along Bedford Road opposite Green Cemetery is owned by Carlisle Land Trust, a legal entity of CCF and is protected by a CR. The meadow contributes to the open vista along Bedford Road and is maintained as pasturage by an abutter. A paved town pathway along its perimeter on Bedford Road provides public access. Survey activities and marking to resolve boundary questions were completed in 2011.

BEN'S WOODS (formerly known as BENFIELD C AND D)

This 48.7-acre CCF property of two adjoining parcels is located off West Street and Pope Road. A publicly accessible trail traverses the property from West Street to the junction of Pope Road and West Street, connecting with the Spencer Brook Reservation across the road. The Carlisle Conservation Commission holds a CR on this property.

BENFIELD HILL (formerly known as BENFIELD E)

This 12.5-acre CCF property is located off West Street. The wooded parcel is protected by a CR and is publicly accessible via a trail from West Street through a private easement and Town-owned conservation land (Keystone Link) to Benfield Hill, where there are several loop trail options. There is a certified vernal pool on this property.

BOSE PROPERTY

This 0.21-acre parcel along Bedford Road, the only access point to the Concord River from a public way in Carlisle, was acquired by CCF in 2012 to ensure public access for fishing and as a canoe launch. It lies on the old roadbed to the former bridge to Bedford along Route 225 and faces across the river from the Bedford boat landing. The property abuts GMNWR and is near the Foss Farm Conservation Land.

CLARK FARM

This 9.57-acre parcel was recently purchased by Carlisle residents from the Clark family who had farmed the land through the previous century. The new owners restored the barn and farmhouse, now inhabited by a farmer and his family who manage a new farming operation. They have initiated a Community Supported Agriculture (CSA) venture for the 2013 growing season, offering organic produce, flowers, eggs, lamb, and pork. The land is protected by a larger CR that covers additional adjacent property, much of which used to be part of the farm. This property has a trail along its northern edge that provides a passage between Concord Street and School Street.

CLARK WOODLOT

This 8.8-acre CCF parcel is off Morse Road and is contiguous with the Ember Lane Cluster.

COTE-FOSTER PROPERTY

This 5.47-acre CCF parcel is off Acton Street at the Acton town line and is part of a 26-acre assemblage of contiguous lands along West Street. The parcel is wet and contains no trails. Long-term plans are to include this property along with the Taylor gift, Fleming Lot, Pannell Property, and an established trail easement on the Valentine property to create a trail link from West Street to Acton Street, to conservation lands in Acton, and to the Bruce Freeman Rail Trail.

EMBER LANE CLUSTER

This 20.86-acre CCF parcel is off Ember Lane. The parcel provides a trail easement along Old Morse Road through a housing development.

ESTABROOK WOODS

This 94.63-acre parcel is owned by Harvard University and is protected by a recorded "Statement of Public Charitable Obligation." Estabrook Woods is the core of approximately 1,750 acres of woodland known as Greater Estabrook Woods consisting of Harvard's property and conservation restricted private and public lands in both Carlisle and Concord.

FIFIELD WORKUM

This 21.4-acre open space parcel is owned by the Greenough Pond Realty Trust. A trail just outside this property follows the perimeter of the fields in the forest edge connecting the northern and southern portions of the Greenough Land and with GMNWR.

FLEMING OPEN SPACE PARCEL (HIGH WOODS)

This 5.52-acre CCF parcel, the Open Space for the High Woods Conservation Cluster, is off 662 West Street and is part of the 26-acre assemblage of continuous CCF lands off West Street. These CCF properties will enable trail connections to conservations lands in Acton and to the Bruce Freeman Rail Trail.

GREENOUGH PROPERTY

This 8.22-acre parcel is off Pauline Road and Riveredge Road in Billerica and abuts the Greenough Conservation Land. The CCF-owned property is accessible by trail and features a “wood road” that provides the only unrestricted road access to the Town-owned Greenough Land with its barn structure. It provides the land ownership for the footbridge that allows for the loop trail around Town-owned Greenough Pond. The property also abuts Town of Billerica Conservation Land along the Concord River.

HOLMES-AVERY PROPERTY

This 5.37-acre CCF parcel is off Kimball Road. The property is mixed forest and contains a trail that connects to the Town-owned MacAfee Land with important connections to trails in both Chelmsford and Westford and to the Bruce Freeman Rail Trail.

MACAFEE LAND

A 2010 property survey determined that 0.73 acres of the Town-owned MacAfee land is actually in Westford. CCF originally gifted the MacAfee land to the Town back in 1989. CCF retains ownership of this small parcel in Westford.

MALCOLM PRESERVE

This 10.61-acre parcel off Stearns Street is jointly owned by CCF and The Trustees of Reservations. Contiguous with a senior housing development, the property provides a small handicapped-only parking area along Stearns Street with immediate access to a stone-dust trail that winds through the open field and mixed forest and is handicapped accessible except in winter snow and ice conditions. On another trail, there is a bench where people can rest in the shade while looking over the field. A butterfly garden was planted in 1999 as an Eagle Scout project. The Carlisle Conservation Commission holds a CR on the property.

PAGES BROOK RESERVATION

This 6-acre CCF parcel is off Maple Street near the Greenough Land. The reservation is mostly wetland with no trail access.

PANNELL PROPERTY

This 11.53-acre, two-lot CCF property is off West Street and is part of the 26-acre assemblage of contiguous CCF lands off West Street.

PINES WOODLOT

This 10.4 acre CCF parcel is located off Curve Street and straddles the town line with Westford. According to a 2010 property survey, 12.17 acres are in Carlisle and 3.19 acres are in Westford. It is bisected by the Tennessee gas pipeline. The Trails Committee and CCF are investigating a trail through the wetlands on this property to link the Town-owned MacAfee Land and the Commonwealth-owned Carlisle Pines State Forest section of GBFSP.

POOLE SWAMP

This 14.5-acre CCF parcel, protected by a CR, is off School Street. Though mostly wetland, the Poole's Trail on its eastern border provides a link between School Street and the Rockstrom Trail. There is also a connecting easement that provides trail access from Woodridge Road.

RICHARDSON PROPERTY

This recently created 4.1-acre CR preserves a field providing a significant rural vista along Skelton Road. It is adjacent to River Road Farm and provides a buffer to the recently created Elliott Preserve.

SPENCER BROOK RESERVATION

This 31.5-acre, three-lot CCF parcel is off West Street. Featuring open fields, stone walls, and vistas of the Spencer Brook wetland meadow, the property is easily accessible from South and West Streets and features several trails. Some trail portions are accessible to certain types of OPDMDs (Appendix B). This property is included in BioMap 2's Core Habitat designation.

STALKER LAND

This 5.6-acre wooded area comprises two lots off Bingham Road and abuts portions of the 15 acres of open space in the 15-unit Greystone Crossing Development off Cross Street. The CR adds protection to a wildlife corridor bustling with birdlife, from a pond on Concord Street to a large maple swamp on Bingham Road, and includes a trail easement and a certified vernal pool.

SUFFOLK LANE LOT

This 0.24-acre CCF parcel is off Suffolk Lane. It provides a trail connection from the Knollwood neighborhood to the trails in the Davis Corridor and extends to other trails in southern Carlisle and into Concord through the Estabrook Woods.

TAYLOR PROPERTY

This 3.42-acre CCF parcel is off West Street and is part of the 26-acre assemblage of contiguous CCF lands off West Street.

Publicly Owned Unprotected Land

Not all public open space is protected for conservation. In Carlisle, significant parcels of publicly owned, unprotected open space include the **Conant Land** (54 acres), the **Banta-Davis Land** (39 acres), the **Hart Farm Land** (65 acres), **Department of Public Works (DPW) land** (18.3 acres), **Center Park** (0.6 acres), and the **Goff Property** (5 acres). These lands were acquired for various town uses and cannot be considered as protected open space.

The Banta-Davis Land now provides most of the town's playing fields, but as noted, the land is controlled by the Carlisle Public Schools and may be designated for town projects other than recreation with approval of the Carlisle School Committee, Board of Selectmen, and Town Meeting.

The Conant Land contains the Fire House and the Town Hall, but the undeveloped core serves as a natural space, wildlife habitat, and wildlife corridor in the center of town. It was originally purchased for water resource protection for the Town Center. A trail network provides access to its jagged terrain, rugged deciduous and pine forests, wet depressions, dramatic rock outcrops, streams, swamps, and links to contiguous neighborhoods. There are four certified vernal pools.

Groups of schoolchildren from the Carlisle Schools regularly visit the Conant Land for natural history walks sponsored by CCF in coordination with Mass Audubon. Parking for the Conant Land is available next to the Town Hall.

Center Park, dedicated in 2007, was developed in Carlisle Center between a classic Victorian residence and the convenience store. Vacant for decades, the land was purchased by the Town in 1974 after a failed effort to develop the parcel as part of a shopping complex. It remained vacant for 30 more years until private fund-raising efforts and donated services resulted in its transformation into a professionally designed landscaped space with memorial granite benches. Center Park also provides much needed additional parking for the Town Center.

The newly acquired Goff Property and its planned and possible uses are described in Section 9 in the Goals and Action Initiatives of the Housing Trust and Housing Authority.

The Town also owns various small parcels scattered throughout the town, ranging in size from 0.4 to 6 acres, acquired by the Town in lieu of taxes. Most are wet, lack access, or are too small to be of use. At the request of the Selectmen, the Conservation Commission and the Land Stewardship Committee are assessing these parcels to see if any should be protected as conservation land.

The Town Common in the historic Town Center is an open parcel of land in front of the First Religious Society (FRS), surrounded by historic churches, residences, and small businesses. The green is cared for by the Town DPW, including mowing and fertilizing. The Common is used regularly for informal children's games, walking by town residents, and as a site for special town events. Both the town and the FRS desire to keep the common as open space. The Carlisle Historical Commission has also expressed interest in preserving this parcel as open space.

Table 10 provides an inventory of Town-owned conservation and recreation properties and facilities in Carlisle. Table 11 provides additional information about the accessibility of these properties and facilities.

Section 6: Community Vision

- A. Description of Process
- B. Statement of Open Space and Recreation Goals



The Cranberry Bog was created over a century ago from a grazing meadow and marsh, with private water rights obtained from a Chelmsford landowner, and incorporated as the Nickles Cranberry Company in 1912. The land and 1905 Bog House were purchased by the Town of Carlisle in 1986. The land is leased to a local farmer and is the only remaining active cranberry operation in Middlesex County; the fall cranberry harvest remains a popular local attraction. The Cranberry Bog Conservation Land is popular for walking (often with dogs), horseback riding, cross-country skiing, and ice-skating.

Section 6: Community Vision

A. Description of Process

Throughout the past two years, in the process of considering the purchase of the Elliott property on the Concord River, the community has been involved in a sustained conversation about the importance of preserving Open Space and a myriad of related issues. This conversation has taken place both broadly and deeply within the community, in public discussions at multiple meetings of, among others, the Board of Selectmen, the Finance Committee, the Planning Board, the Community Preservation Committee, and the Conservation Commission. Representatives of the private non-profit Carlisle Conservation Foundation and Sudbury Valley Trustees made presentations and led site walks and discussions among diverse groups of interested citizens. The need for Community Preservation Act (CPA) funding led to votes at the last two Annual Meetings, both attended by a broad spectrum of town residents who heard multiple presentations about the importance of preserving open space. Throughout the two years, numerous articles, editorials, and letters were published in the *Carlisle Mosquito* not only about the Elliott property but also about the core community value of preserving open space for current and future citizens and for the health of our environment and our community. The importance of rankings of past OS&R Plans which have consistently rated the Elliott property near or at the top of the lists of parcels most deserving permanent protection were referenced throughout this two-year process.

As this community conversation was coincident with the development of this Plan, the OS&R Plan Committee decided to forego a separate visioning session to gauge the town's understanding of, interest in, and commitment to this core value. Carlisleans made significant commitments of both time and money to effectuate the purchase of this property. The successful culmination of the campaign to preserve this top-ranked parcel is a clear demonstration of the centrality of preserving Open Space to Carlisle's Community Vision.

As noted at the conclusion of Section 2 about the Planning Process and Public Participation and as explained in more detail in Section 10: Public Comments, the Committee confirmed the assumptions inherent in our reliance on the two-year community discussion that led to the creation of the Elliott River Preserve by making a draft of this Plan broadly available to the public and inviting the public (through announcements at various public events preceding the public meeting and printed announcements in the *Carlisle Mosquito*) to participate in a discussion of the draft in June, 2013 and to provide feedback to the Committee. Attendees representing a broad spectrum of the public, from young parents to long-time residents, and representatives from Town boards and committees as well as members of private citizen groups demonstrated through their questions and comments that they had taken the time to read the draft in some detail. They were in broad general agreement with the Community Vision, Goals and Objectives, and Action Plans outlined in the draft and provided some suggestions on a few specifics that were incorporated into the final document. They were impressed with the volume and clarity of the data presented and noted that the appendices, maps, and tables would be useful references and tools for citizens and Town government.

Past Planning Efforts

Since 1974, Carlisle has formally solicited input from its citizens about what the long-term plans

for the town should be. In 1974, 1985, 1990, 1994, and 2009, Carlisle residents were asked by questionnaire about the kind of community they wanted. The response has been remarkably consistent over the years, particularly responses related to shaping the physical environment of the town. Goals for Carlisle in 2012 are generally consistent with town goals for the past forty years.

“A Study Plan for the Town of Carlisle,” was completed in 1995. Although the “Study Plan” was developed almost 20 years ago, it remains relevant because it is the last comprehensive plan developed by the town; more recent planning efforts have been focused on more limited areas of study, such as housing or open space and recreation. Additionally, as demonstrated by the statement in 1995 that the values had remained unchanged for the previous 20 years and the summaries of some of the more recent, more focused plans and surveys discussed above that show that the goals identified in 1995 have continued for 20 more years to be the goals of the community, this consistency is central to the findings of this Plan. The “Study Plan” includes the following statement.

That townspeople greatly value the rural appearance of Carlisle can be seen from the results of questionnaires of 1974, 1985, 1990, and 1994 and the Community Planning Days of 1992 and 1993. Residents consistently value the remaining natural views along Town roads, appreciate the rural vistas, and enjoy the open spaces of Carlisle. The significance of this issue is so great as to take precedence over all other issues to townspeople. Although there has been a substantial turnover of residents, the significance of this issue has not changed in more than 20 years.

The first community-wide Planning Day was held in 1992, at which professional consultants facilitated daylong group discussions with participating citizens. From the results of this planning day, a report entitled “Long-Range Goals of the Carlisle Community” was prepared and accepted at 1993 Town Meeting. In general, these goals have not changed and remain valid today.

After the first Planning Day in 1992, the Planning Board continued to hold Master Plan meetings, each one devoted to a specific aspect of the plan. The original goals were sorted into the value categories of Rural Character, Safety, Community, and Education, which were described in 1995 in “A Study Plan for the Town of Carlisle.” The Study Plan included the following list of Action Recommendations. [Bracketed notations document recent town initiatives that confirm the currency of the recommendations from 1995 relating to Open Space and Recreation.]

- Enhance the rural aesthetic of the town and maintain the perception of rurality in the most reasonable and achievable manner. Encourage the use of conservation easements and conservation restrictions (CRs). Purchase development rights and use other preservation mechanisms for the protection of selected undeveloped parcels. [Since 1995, 764 acres of land have been placed under CR protection. Of this total, 173 acres, including 105 acres of the Valentine property and 4 acres of the Richardson property (both ranked as top priorities for protection in the 2005 OS&R Plan) have been protected since 2005.]
- Acquire open space properties to enhance the rural aesthetic in keeping with the recommendations of the Open Space and Recreation Report and reduce the impact of

new development on the provision and quality of town services. [The purchase of almost 9 acres of the top-priority 36.4-acre Elliott property along the Concord River was completed in May 2013, spearheaded by the Carlisle Conservation Foundation and the Sudbury Valley Trustees, with considerable financial support from private donations, the Conservation Commission, and CPA funding allocated by unanimous vote at spring 2012 Annual Town Meeting. After failing to receive a Local Acquisition for Natural Diversity (LAND) grant from the state, additional CPA funding was sought and approved unanimously at 2013 Annual Town Meeting to complete the purchase. Plans for the property include a parking area, new trails, and a canoe landing on the Concord River.]

- Evaluate and update the Conservation Cluster Bylaw, the Zoning Bylaw, and the Subdivision Rules and Regulations to ensure that the rural aesthetic is given paramount importance in the town's regulatory structure. [In 2009 through 2011, the Planning Board adopted a consistent set of Development Standards in all its rules and regulations governing development in town. Preservation of the natural environment and water resources is central to these standards. (See Appendix I for the Planning Board's Development Standards.)]
- Protect residents' drinking water. Safeguard water supply and groundwater resources.
- Meet the needs for housing alternatives for those of moderate means, including seniors, town employees, and adult children of town residents, or those for whom the existing housing stock is unsuitable, in the interest of the community as a whole.
- Maintain the scenic qualities of old and new town roads while making them as safe as possible, explore techniques to reduce commuter traffic, and provide safe ways for pedestrian and non-motorized traffic.
- Explore the transportation tools that can provide safe paved pathways for pedestrian and non-motorized traffic while maintaining the natural terrain and scenic features of the area. [In 2008 and 2009, a 2.5-mile, Town-funded, paved pathway system was built from Carlisle Center along all five major roads to link with the trail network or with other notable destinations in town. Two additional pathways almost a mile in total were built by residential developers to allow residents to walk safely along busy major roads and narrow town roads and for access to new trails on easements in the new developments.]
- Preserve and extend the trails system, creating more trail linkages across town. Encourage research and investigate funding to annotate historic and natural features, and investigate incentives for landowners to donate trail linkage. [Active volunteers of the Trails Committee work diligently to maintain the approximately 45 miles of trails under their care. Since 2005, 16 new trails, altogether almost 5 miles, have been added to the trail network along with 18 boardwalks outside of GBFSP, crossing more than 1,300 feet of wetlands. Additional boardwalks and several bridges have been built since 2005 within GBFSP by park staff and the New England Mountain Bike Association (NEMBA).]
- Encourage the location of the Town office building in the center of town, where it can provide a nucleus for town activities.
- Emphasize the traditional Town Center focused on the village green.

- Work with local business organizations to foster and encourage the vitality of local businesses while maintaining the open spaces and historic aspects of the center.
- Work to encourage the growth of home businesses.
- Preserve and enhance the high quality of our schools.
- Support the inclusion of meeting space for the purposes of social and educational functions in the plans for new town offices, library, or other town facility.
- Plan for an adequate level of facilities and services to support town and volunteer organizations as well as the town's service professionals.
- Promote a strong sense of community through the design of cohesive neighborhoods and public gathering places, and encourage and invite neighbors to take part in social and cultural town activities.
- Encourage communication throughout the town to keep residents informed and involved in the community.

At 1998 Annual Town Meeting, Carlisle established the Carlisle 2000 Task Force, which yielded The Carlisle Municipal Land Committee (CMLC). In 2001, The CMLC held a Municipal Planning Day to ask Carlisle's citizens "what kind of community do we want Carlisle to be in the future, and how can we get there?" The CMLC was looking forward to the year 2020 and analyzing land needs for the next 20 years. It identified land crucial to its vision for Carlisle, land that is currently available or potentially available in the future. CMLC's vision for Carlisle in 20 years retains Carlisle's current values, which emphasize education, community, and conservation. The major needs for land for the next 20 years were identified as being for the school, recreation, housing, and conservation.

The CMLC presented charts showing how these needs matched up with existing municipal land. The school ball fields on Spalding had recently been supplemented with a Little League baseball field, a softball field, and a soccer field with a running track on the Banta-Davis land (approved as Phase I of three planned phases of athletic facility development on the site through affirmative votes at 1998 Annual Town Meeting and subsequently at the ballot box). Because the Carlisle Schools hold first rights to the Banta-Davis land, the CMLC noted that school expansion could force the relocation of the new playing fields. As reported in the *Carlisle Mosquito* (16 February 2001), "even without having to redevelop fields lost at Banta-Davis, the CMLC estimates a need for 12 to 25 acres for more playing fields."

In March 2003, The Planning Board and the local League of Women Voters jointly sponsored a survey and hosted a Community Planning Day. "Participants, ranging in age from 10 to 75 and in residency from less than a year to over 30 years, responded with strikingly similar opinions. There was a chorus of praise for the town's rural and agricultural setting" (*Carlisle Mosquito*, 28 March 2003). Attendees were asked to choose their top 7 priorities for the town from approximately 90 topics. When the specific priorities were grouped into six general categories, the majority of votes were for conservation issues (open space, rural and agricultural aspects, and water quality). "Most participants seemed very proud and fiercely protective of the Town's

bucolic, small-town character.” Among the aspects of Carlisle for which participants expressed a “dislike” were that it was “unsafe to walk on roads,” a “lack of affordable housing,” and a “lack of recreational facilities” (*ibid.*).

In 2006, roughly 5 years after completion of Phase I of development on the Banta-Davis land, the Recreation Commission returned to Town Meeting with a plan for Phase II, including two Little League baseball fields and a multi-purpose field, the latter with artificial turf to maximize use. Despite some concerns from voters that the school might someday need the land (*Carlisle Mosquito*, 5 May 2006), the proposal easily received the necessary two-thirds majority at Town Meeting but fell 11 votes short (out of over 900 votes cast) at the ballot box a week later.

The Recreation Commission presented revised plans at Fall 2006 Town Meeting, including more facilities for members of the community in addition to fields for kids, such as a covered pavilion for picnics and other gatherings, and with artificial turf for one of the proposed fields as a separate article. The plans were supported by statistics about field usage in Carlisle and neighboring Concord (which shares recreation facilities with Carlisle) and statements from citizens confirming “that youth and community teams are constantly scrambling for field time.” (*Carlisle Mosquito*, 3 November 2006). The article fell two votes short of the necessary two-thirds majority.

In early 2007, a group of citizens (many also serving in town government) who shared concerns about a perceived deficit of opportunities for social interaction, began meeting at the public library. Calling itself A Livable Carlisle Community (LCC), the group convened two community meetings (one weekday evening and a Saturday morning) at Town Hall in March 2007. A letter in the *Carlisle Mosquito* announcing the events posed these questions: “Do you worry about whether you or your children will be able to afford to live here? Whether we can maintain the quality of our schools? Whether we will have the services our aging population needs? Whether we can continue our commitment to environmental protection and open access to land?” (*Carlisle Mosquito*, 16 March 2007). The events included a presentation on how changing demographics (more elderly) and expected increases in already high tax rates to maintain current services and for new schools would change the town, both socially and financially. Breaking into small groups, participants then did some visioning to “imagine what Carlisle will look like in 2020” (*Carlisle Mosquito*, 6 April 2007). Addressing the desire for more connection and community, participants identified a need for more places to enable social interaction, both public (senior center) and private (pub or coffee shop). The community conversation continued over the next year, including a Conservation Coffee discussion in January 2008.

On April 5, 2008, LCC hosted a community forum supported with funding by the Planning Board, “Carlisle Yesterday, Today and Tomorrow,” attended by over 50 interested citizens. Quotations posted around the room from past planning efforts dating from 1960 through 1999 illustrated how the community’s concerns hadn’t really changed significantly for almost half a century. The forum included an opportunity for participants to vote for what they considered the most important Issues, Values, and Needs for the Town. The items selected most often were Rurality/Conservation (49 votes), Gathering Place/Senior Center (42), Education (24), Housing Options (20), Small Town Feel (20), Green/Alternative energy (20), Recreation

Facilities (17) and Agriculture/Farming (16). A survey was distributed listing the activities and events participated in or important to the community. The most important activity or event was Old Home Day (36). Open Space and Recreation activities or events with significant support included Walking/hiking/trails (33), Farmers' Market (29), Great Brook Farm State Park (GBFSP) (28), Carlisle Conservation Foundation (28), Nature walks (27), Fitness classes for seniors (27), Community gardens (26), Conservation Coffees (24), Cross-country skiing (23), Carlisle Recreation Commission activities (21), Bicycle riding/touring (21), Local agriculture purveyors (daylilies, perennials, mums, etc.) (21), Canoeing/kayaking/rowing (18), Bird watching (17), and Community Swimming Pool (in Concord) (16).

The impetus from the forum was to translate interest into concrete actions by town government. LCC petitioned the Selectmen to include "building community" as a priority goal in their annual list of board goals and then focused its efforts on providing input to the group developing a town survey for the Council on Aging, funded through a Community Preservation Committee (CPC) allocation by 2007 Town Meeting.

The scope of the survey expanded beyond just the needs of seniors. The local newspaper reported on the scope, beginning with a statement from a member of the survey team: "The purpose of the survey is to gain a better understanding of the needs of the citizens of Carlisle. It's for all citizens, not just senior citizens." The survey includes questions on residents' needs for services relating to transportation, housing, healthcare, town government, community activities and socialization." (*Carlisle Mosquito*, 23 January 2009). The 12-page Carlisle Town Needs Survey was mailed to all town residents in January 2009, and 1,755 responses were received, from over 40% of the adult population. Questions related to Open Space and Recreation issues included ones related to the importance of the rural nature of Carlisle, fitness and recreation activities, exercise in general, and the quality of life of respondents. Other questions asked about frequency of use of town pathways and the trails and whether the town needs more venues for recreation and social activities.

Over 96% of respondents rated their quality of life as excellent or good, and nearly 94% indicated that the rural nature of Carlisle (along with friends and acquaintances, services, and the quality of medical care) contributed to this feeling. The high cost of living was a significant negative for 63% and more than 40% expressed a desire for more housing options. Exercise was important or very important to 82%. Town pathways or trails were used "often" by 33%, with an additional 37% using them "sometimes." Finally, more than a quarter of respondents felt the town needed more venues for recreation and social activities, with less than a third believing the number of such venues was adequate.

B. Statement of Open Space and Recreation Goals

In defining open space and recreation goals for Carlisle, the town's highly valued rural character must be emphasized. Rural character is predicated on harmony between natural and human-made environments. In order to enhance the visual quality of Carlisle and the perception of open or natural space and rural characteristics, the following goals were established in "A Study Plan for the Town of Carlisle" (1995).

- Encourage and protect the use of land for agriculture.
- Maintain large undeveloped parcels, with connections that serve as wildlife corridors and provide for trail links.
- Protect natural and historic features.
- Protect historical, social, and aesthetic features of the Town Center.
- Encourage variety of size, style, and setback of housing, with flexibility in the use of open space.
- Maintain overall 2-acre density in order to protect the natural resources of the town (although in 2004 some people advocated cluster housing in order to reduce sprawl).
- Require roads that are sensitive to and preserve the natural environment and preserve the traditional components of the landscape, such as stone walls and fences.

Related community goals are the following.

- Maintain mutual respect for the different ways that and the degree to which individuals participate in the town's activity offerings.
- Maintain inclusiveness of diverse populations.

These last two goals necessitate ensuring handicapped access to a variety of conservation and recreation facilities in town.

“A Study Plan for the Town of Carlisle” states that the town should continue to “protect and preserve undeveloped land by purchase or other means.”

The Study Plan virtually ignored the need for additional facilities for active recreation, but as noted, there was significant community support for plans put forth by the Recreation Commission for additional fields in 1998 (when funding for new fields was approved) and in 2006 (when funding failed by very small margins on two occasions to gain approval).

More recently, evidence of community support for the limited recreation facilities in town came in the form of strong community response to plans announced in the winter of 2010-2011 by the Massachusetts Department of Conservation and Recreation (DCR) for shared use of trails by hikers and cross-country skiers in GBFSP. Stuart Johnstone, who has run the cross-country ski concession in GBFSP since 1988, opposed the proposed changes because groomed winter trails are ruined by hikers and dogs that accompany them and because shared use would create safety issues. An outpouring of support for Johnstone in the form of letters to local newspapers and calls to Carlisle's state representatives and to DCR from the numerous locals and visitors who use the park for cross-country skiing resulted in a compromise plan preserving the existing groomed trails and with parallel trails for hikers and cross-country skiers in a few locations with new signage posted by DCR.

The controversy was a valuable learning experience for state officials. The record cross-country skiing season at GBFSP was reported by the local paper: “Over 22,000 tickets were sold – to

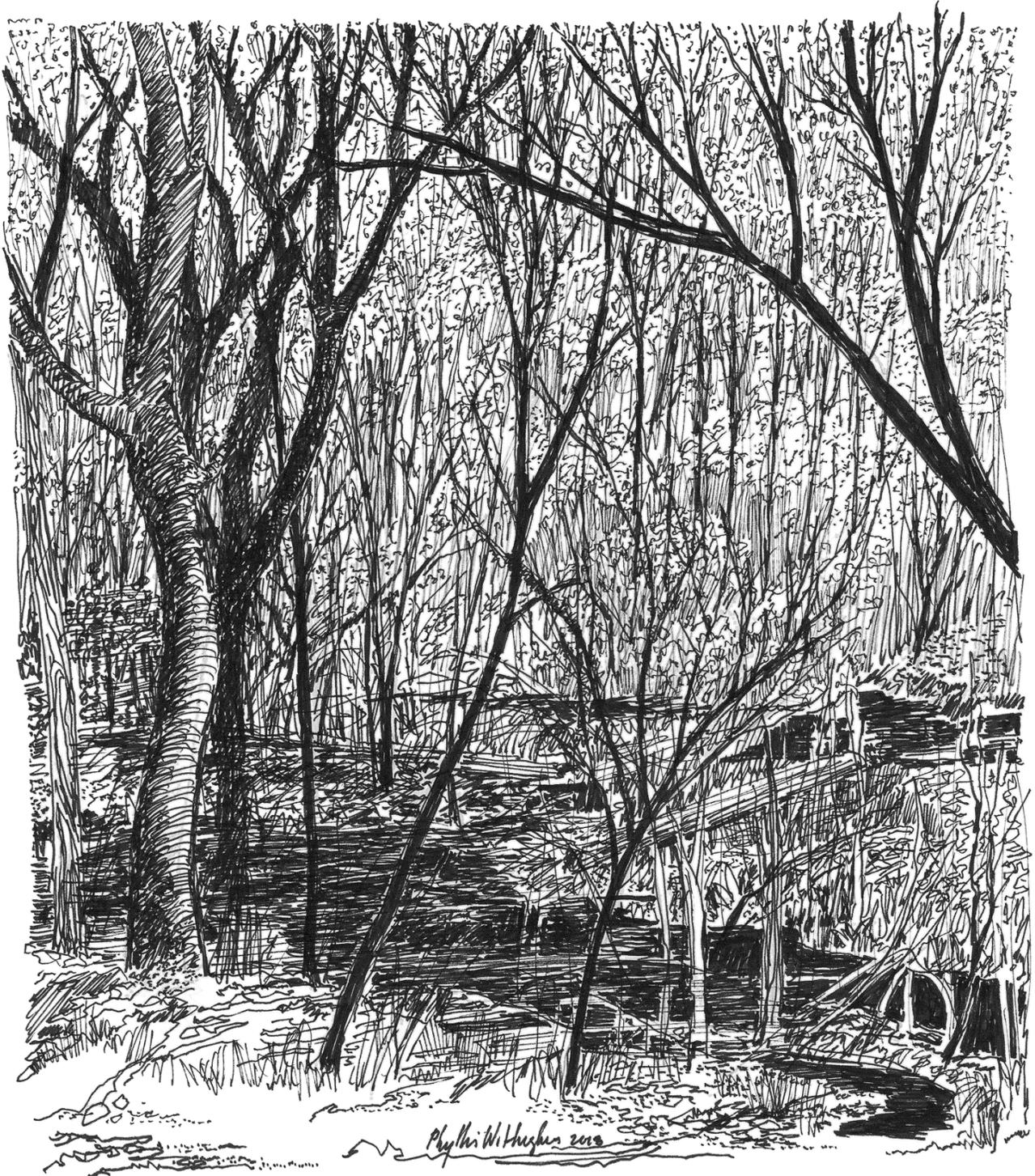
more than 400 people on each skiing day.” It then reported an exchange between State Representative Cory Atkins and Johnstone at a Conservation Coffee sponsored by the Conservation Commission in early May 2011: “He [Johnstone] said he thinks the state has new appreciation of what Carlisle has—one of only two areas of groomed cross-country ski trails in eastern Massachusetts. Atkins responded: ‘We can never have enough land for public recreation. People use it and they love it. It is something we all share. It is hard to see budgets suffering.’” (*Carlisle Mosquito*, 18 May 2011). In 2009, Johnstone restarted the Bill Koch Cross-Country League in GBFSP. The League has locations throughout Massachusetts for children aged 5 to 13 to learn to cross-country ski. Despite little snow in the winter of 2011-2012, the League attracted 130 participants from Carlisle and surrounding towns.

Although today the community is facing economic pressures from high taxes (in part due to citizen support for new schools) in a challenging economy, the goal that still resonates consistently through the most recent community forum in 2008, the town survey in 2009—and the town’s ongoing investment in time and money for pathways, trails, CRs, and purchases of land for preservation—is that of preserving Carlisle’s open spaces and rural nature. As noted above, citizens have expressed support for the goal of having adequate opportunities and resources for recreation, both through their use of existing trails and other outdoor recreation opportunities and their support for more venues for recreation and social activities.

There is also increasing understanding of the need to maintain and protect existing open space and recreation areas through good management practices, including the development of baseline assessments and management plans and the control of natural threats from invasive plant species and burgeoning deer populations. There are growing concerns about the use of pesticides, herbicides, and fertilizers on agricultural land and residential lawns, specifically their impacts on human health and the natural environment, including groundwater. Organic alternatives should be encouraged.

Section 7: Analysis of Needs

- A. Summary of Needs for Resource Protection
- B. Summary of Community's Needs
- C. Management Needs



Tophet Swamp is the southernmost section of Great Brook Farm State Park; it includes a loop trail punctuated by boardwalks.

Section 7: Analysis of Needs

In this section, the needs of Carlisle are analyzed, and this analysis is informed by several considerations: past successes in preserving open space (particularly progress over the past seven years as outlined in Section 2), the continued residential development on unprotected lands and the resulting increase in the town's population and demographic changes as outlined in Section 3, and the importance of preserving and protecting the town's current inventory of water and land resources for private water supply, wildlife habitat and corridors, recreation, and aesthetics as outlined in Sections 4 and 5. As outlined in Section 6, the community has been consistent over the past thirty years in supporting the goal of protecting open space to preserve and enhance the perceived rural nature of Carlisle. Additionally, citizens have expressed support for the goal of supplementing existing opportunities and resources for recreation, including support for more venues for recreation and social activities. In addition to recognizing a need for conservation and recreation, the community has also recognized a need for excellent schools and housing diversity.

A. Summary of Needs for Resource Protection

As Carlisle's population increases, with more land taken up by developments and their associated infrastructure and clearing for new roads, the town needs to protect additional open space for groundwater protection, conservation, and recreation.

Need for Groundwater Protection

Individual wells supply Carlisle residents' drinking water, and safeguarding the water supply is critical. Studying aquifers and protecting surface waters and wetlands is important to maintain the quality of the groundwater. Recognizing that town planning is essential to ensure that water quantity and quality is maintained, in February 2012, the Board of Health (BOH) created a Water Quality Subcommittee. The Committee is tasked with developing a comprehensive map of water resources in Carlisle. The Chair of the BOH also asked that it identify a viable site for a public water supply in case an emergency should arise in town.

Planning is even more important now because of several applications for 40B comprehensive permits in Carlisle over the past several years. Aside from the increased pressure from additional residents on all of Carlisle's resources (natural resources as well as schools, roads, town staff, and volunteer time, among others), comprehensive permits allow developers to bypass local zoning bylaws. Of particular concern is the ability of developers to bypass 2-acre zoning, established almost 50 years ago to protect water quality (as noted in Section 3); the increased density of a 40B is likely to have a greater effect on groundwater quantity and quality than "normal" development has. Because 40B comprehensive permits can be filed on unprotected parcels throughout town, the more land that has been protected, the greater the likelihood that adequate open-space buffers will already exist near the denser development.

Due to the high cost of land, "normal" development on 2-acre parcels currently means large, million-dollar homes, whether on newly developed parcels or replacing smaller tear-downs. These homes tend to come with larger lawns and more impermeable surfaces. Larger lawns are a double threat to groundwater resources with the increased demand on groundwater from sprinkler systems and the runoff from herbicides, pesticides, and fertilizers. Increased stormwater runoff from the increased impermeable surfaces can harm wetlands and groundwater.

Carlisle has preserved or reserved some possible sites for public water supplies (Section 5) should groundwater sources become depleted or extensively polluted. Additional sites would be needed to provide sufficient water for the entire town; some possible locations are identified on Map 6: Water Resources. Public education about the following issues relating to groundwater supply remains important: collecting runoff in rain barrels for irrigation, landscaping with plantings that require less water than residential lawns require (xeriscaping) to reduce irrigation demand, managing sources of pollution, and identifying and protecting a possible future water supply for the town.

Needs for Conservation

Protect Additional Open Space.

The high value that Carlisle continues to place on conservation is demonstrated by the passage of the Community Preservation Act in 2001 and reaffirmation in 2011, the purchase in 2004 of Benfield Parcel A with CPA funds, and the commitment at Annual Town Meeting in 2012 and 2013 of \$300,000 in CPA funding towards the purchase of the Mark and Rachel Page Elliott River Preserve. As indicated in Table 7, the Elliott property is the private parcel rated highest among all parcels for permanent preservation. CCF worked with the Elliott family to reconfigure their development plans for the land to create a 9-acre parcel that includes nearly all the river frontage of the 36.4-acre parcel: 1,000 feet along the Concord River, within the designated Wild and Scenic River corridor. Sudbury Valley Trustees and the Carlisle Conservation Foundation coordinated efforts to raise the additional funds to complete the purchase through grants and private donations.

Resource protection can be achieved by a variety of means, not just by the purchase of property. The Town should continue to work with private developers to reduce the effects of development on the rural nature of Carlisle. Conservation cluster developments that preserve a minimum of 30% of a parcel for conservation should continue to be encouraged. The protected land can provide buffers to neighboring properties, linkages for trails and wildlife corridors, or preservation of rural vistas. In the past 15 years, 61 acres have been permanently protected as open space as a result of special permits granted by the Planning Board for conservation clusters.

Public and private open space can also be protected by placing permanent conservation restrictions (CRs) on the properties.

Protect Wetlands.

As noted in Section 4, wetlands are a common feature in Carlisle. Wetlands on protected lands play a vital role in flood control and water purification and serve as habitat for a variety of species, both flora and fauna. Wetlands on non-protected lands are equally important, if not more so, due to the increased stormwater runoff and pollution from developed lands. The Town should remain vigilant in its protection of wetlands, working to educate homeowners not only on the wetland bylaw requirements, but also on the importance of wetland protection in a town that relies on groundwater for its water supply. As noted in Section 9, the Conservation Commission has plans to review and update the local wetland bylaw and policies. When violations of the bylaws occur, the Conservation Commission should continue to work with property owners on mitigation to restore or replicate affected wetlands.

Support Ongoing Initiatives.

The past five years have seen continued progress in achieving the 2005 OS&R Plan's goal of increasing conservation holdings in the southwest corridor. Conservation interests will continue to explore additional opportunities to add to Carlisle's protected open space inventory in this part of town.

Protect Large Parcels.

The number of large, single-owner parcels in Carlisle still available for conservation has diminished since the 2005 Open Space and Recreation Plan. Of particular interest to the town is the remaining large Sorli farm located on both sides of one of the major access roads entering the town and providing residents and through travelers with rural vistas highlighting the rural history of the community. (See Table 7 for the updated Property Protection Priority List for parcels of 10 acres or more.)

Facilitate Land Stewardship.

Ongoing maintenance of Carlisle's Town-owned conservation lands became an important issue in recent years as more and more of the Conservation Commission's time was taken up with wetlands regulatory hearings. Accordingly, the Commission established a subcommittee, the Land Stewardship Committee, to provide for maintenance and monitoring of existing conservation lands, including improved signage, trash and invasive plant clearing, development of management plans, and other activities. The Carlisle Conservation Foundation also initiated a planning effort in 2011 to provide a framework for organized stewardship of its parcels.

Facilitate Trail Stewardship.

Volunteers have traditionally maintained Carlisle's trails. However, larger projects will require funding and professional assistance. For example, the Trails Committee would like to add additional parking near popular trailheads. The Committee would also like to secure town support and equipment for mowing trails in open fields, such as the Benfield Conservation Land, Clark Farm, and Towle properties.

The occurrence of poison ivy on trails has expanded markedly in recent years, making passage on many trails a perilous activity for susceptible individuals. A perception that the public would oppose herbicide use on Town-owned lands and the need for applicator training if herbicides were to be used has left the Trails Committee with no solution to this problem. A discussion is needed among interested individuals and town boards and committees to develop and fund a workable plan for poison ivy control on trails.

Between 2005 and 2010, the Trails Committee completed the entering of Carlisle's trails into the Town's GIS system. It published a new trail guide with color GIS maps in 2010, financed by CCF as part of its 50th anniversary. The trail maps are also available online at the Trails Committee's website. Now that the Town Assessor's maps are being converted to a GIS system, the Trails Committee hopes to develop a better means of documenting and communicating management issues and future planning for the trail network. For example, trail maps downloaded from the Internet were key to pinpointing downed trees and organizing work crews during the cleanup after Hurricane Sandy in 2012. Additionally, regular users of the trails send photographs and annotated maps via email to inform committee members of tree falls and other obstacles on trails. Such communication is to be encouraged.

Included in the management goals for trails is a review of signage from both safety and accessibility perspectives. The first step will be a survey of existing signage (Appendix F).

Create Trail and Protected Parcel Linkages.

Carlisle should continue its fine work to acquire more important linking parcels that abut existing protected parcels. Such linkages are important for extending and creating wildlife corridors, for water resource protections, for trail connections, and as additional buffers to residential development. Since the last report in 2005, a significant number of larger parcels in town have been developed or protected. The conservation cluster bylaw has been instrumental in securing trail easements in several of these developments. Areas of prime focus on the western corridor have been conserved, but connections between those parcels and linkages elsewhere in town are still needed.

As regional cooperation grows, planning efforts in Acton, Concord, and other surrounding towns help to create a network of protected lands that better protects our watersheds and biodiversity. Acton's major land protection efforts have paralleled Carlisle's in the southwestern part of town, thereby creating a larger conservation area than could have been achieved in either town alone. Trail connections should be established as a network extending between Acton and Carlisle from Pope Road to Route 27, connecting to the planned extension of the Bruce Freeman Rail Trail. Similarly, efforts to increase the protection of Harvard's Estabrook Woods in 2004 resulted in CRs on a large group of lands in both Concord and Carlisle. These parcels, combined with the Benfield lands and other CCF lands, have created significantly expanded protected habitat. The next step is to secure linkages between these larger areas to allow for the flow of wildlife and create more opportunities for trail connections.

A major focus of the 2012 ranking review of unprotected parcels was the need for linkages and the protection of habitat and buffer lands along watersheds. Three watersheds exist in Carlisle: Spencer Brook, River Meadow Brook, and Pages Brook. Some private CRs, such as the Lovejoy and Valentine CRs, have offered a high level of protection for the Spencer Brook watershed in the western part of town. Further protection along the wetlands of Sorli farm and the open space, some subject to CRs, remaining from the 35-lot subdivision off Westford Street and leading to Hart Farm (Town land) would greatly enhance protection for the River Meadow Brook. To the north, Great Brook Farm State Park (GBFSP) and the Cranberry Bog also provide protection for the River Meadow Brook system, and cooperation between Chelmsford and Carlisle could ensure preservation of this water resource. Great Meadows National Wildlife Refuge (GMNWR) on the Bedford and Carlisle sides of the Concord River helps to protect our eastern edge. The Elliott Preserve will strengthen those protections. Similarly, the Pages Brook watershed, which has recently been determined to rise from Tophet Swamp, flows under East Street near the Town Center and extends toward the Greenough property, would benefit from land protections along its route. Many of the identified high-priority parcels lie along its banks.

Another effort is the joining of neighborhoods through connections that are not dependent on the use of automobiles. Thus far, pathways developed along major roads have improved pedestrian access from Carlisle Center. Wetlands along roadways, particularly along Westford Street, are a major obstacle to expanding the pathway system beyond the Center. Widening of rights of way will require significant funding and engineering expertise as well as wetlands permitting.

Specific linkages that would enhance the trail connections for the town are included in Section 9 at the end of the Trails Committee’s Seven-Year Initiatives.

Encourage Agriculture.

Economic pressures on agricultural use of land in Carlisle (and elsewhere in the state) cannot be underestimated. The town should monitor existing agricultural operations in Carlisle and provide support as necessary to help them remain. Continued existence of the agricultural operations—particularly those using organic farming techniques—supports the aesthetically pleasing rural nature of Carlisle, supports proper stewardship of the land, and helps keep land from residential development, thus protecting natural resources and reducing the strain on other limited town resources. The town should continue to support initiatives such as the Farmer’s Market to encourage local farmers. A few interested residents successfully petitioned the Selectmen to place the establishment of an Agricultural Commission on the Warrant for 2013 Annual Town Meeting; Town Meeting passed the article almost unanimously. The five-member Commission will provide a forum for farmers and citizens concerned with agriculture to organize educational programs and promote agricultural activities.

B. Summary of Community’s Needs

The Massachusetts Statewide Comprehensive Outdoor Recreation Plan (SCORP) has identified open space and recreational needs for Massachusetts and the Northeast Region, which includes the Town of Carlisle. Carlisle is fortunate to have had forward-thinking residents in the past who urged acquisition of several large tracts of land for preservation and future public use. Carlisle’s central location between circumferential I-95 (Route 128) and I-495 and radial Routes 2 and 3 brings increasing numbers of visitors to these protected properties to take advantage of many of the amenities identified in the SCORP.

The needs of the community are best expressed by a description of the resources currently being extensively used by large numbers of Carlisle citizens and visitors. To meet these needs, the various resources and facilities must continue to be protected and maintained, with appropriate allocation of funding from federal, state, and local resources.

GBFSP draws many visitors year-round, not only for the demonstration farm itself, but also for the extensive trail network available for walking, mountain biking, dog walking, nature study, horseback riding, and the cross-country skiing business in the State Park. Night skiing by lantern is also available. The trails are also used by cross-country running and cross-country skiing teams representing schools from several towns. The park is home to the first robotic milking system in Massachusetts, installed in a state-of-the-art “smart” barn designed specifically for this technology. The barn was completed in 2010 and opened for public tours in the spring of 2011. Another recent addition to the park is a new winter-only access trail from the interpretive center into the park, intended for non-skiers, that parallels the ski trail. The New England Mountain Biking Association (NEMBA) continues to coordinate yearly work parties to do maintenance work on the park trails.

In the fall of 2009 and spring of 2010, GBFSP participated in the Homeowner Firewood Program. Under this program, a Department of Conservation and Recreation (DCR) forester marked certain trees in the park as suitable for cutting and opened the area for limited logging by citizens who contracted to harvest the marked timber.

Hikers and cross-country skiers also frequent other Town-owned conservation lands, especially Foss Farm, the Towle Land, the Greenough Land, and the Davis Corridor.

The Bruce Freeman Rail Trail is a proposed trail through the communities of Lowell, Chelmsford, Westford, Carlisle, Acton, Concord, Sudbury, and Framingham. It will follow the 25-mile route of the old New Haven Railroad Framingham and Lowell line. Phase 1 of the trail (6.8 miles in Lowell, Chelmsford, and Westford, stopping just short of the Carlisle town line) opened to the public in October 2010. Phase 2 (through Westford, Carlisle, Acton, Concord, and Sudbury) and Phase 3 (through Sudbury and Framingham) are proposed extensions. The trail is open to non-motorized uses such as cycling, jogging, walking, and skiing. The Carlisle portion, when completed in Phase 2, will be 0.2 mile.

Carlisle's two major through roadways have two lanes with narrow shoulders. Its side roads are narrow, winding, and generally without shoulders. Nevertheless, the town has become increasingly popular with road bicyclists, now seen virtually year-round. A seasonal time-trial event beginning and ending in Concord also passes through Carlisle.

Active recreation facilities including fields for baseball, softball, soccer, and field hockey are available on the Banta-Davis Land and Spalding Field. The school campus is home to tennis courts, public playground facilities, a tot-lot, and basketball hoops. For over 35 years, Foss Farm has provided riding rings for youth horseback riding and trails used seasonally for training sled dogs.

Nature walks focusing on birds, dragonflies, mushrooms, lichens, and vernal pools open to the public are seasonally available. Residents and visitors alike enjoy the agricultural vistas in GBFSP, Foss Farm, Fox Hill, Bisbee Land, and the Carlisle Cranberry Bog. The annual fall cranberry harvest is another local attraction. Foss Farm includes an area with more than 100 community gardens, enjoyed by residents and non-residents alike. Some of the gardeners grow produce for sale at the Carlisle's Farmers' Market established in 2005.

The Carlisle Trails Committee maintains more than 40 miles of interconnecting trails around town, excluding the trails in GBFSP. The Committee tries to provide walking trails to new neighborhoods as they are developed. In addition, coordination with several surrounding towns to provide trail connections with their adjacent properties is ongoing.

Carlisle has little surface water for water sports. There is a launch area at GBFSP for canoeing on a large wetland pond and limited canoeing on Greenough Pond, a shallow flooded wetland. Greenough Pond is fished from its dam during the summer and is used for ice fishing, ice skating, and pick-up hockey games during the winter. Carlisle residents can access the Concord River for fishing and boating from a small piece of CCF-owned land at the Route 225 bridge in Carlisle, but access is more easily obtained from the boat launch areas across the river in Bedford or in Concord. The Concord River as it flows past Carlisle is part of the Sudbury Assabet Concord Wild and Scenic River system and also part of GMNWR. It is popular for motorized boating, fishing, canoeing, bird watching, kayaking, rowing, seasonal duck hunting (where permitted), and nature photography.

Carlisle remains open to hunting on private property with written permission of the owner and on U.S. Fish and Wildlife Service property with a permit.

Clearly, as Carlisle and surrounding towns continue to develop, use of our open spaces will increase, providing a valuable resource to the nearby region.

Needs for Active Recreation

Support Current Active Recreation Programs.

The Recreation Commission and volunteer organizations offer a variety of popular athletic programs, which serve children and adults from both Carlisle and surrounding towns.

Youth programs for baseball, softball, T-ball, lacrosse, football, soccer, and ice hockey are combined with Concord. As many as 1,500 children aged 5 through 14 participate in these organized programs. Depending on the sport, from one-fifth to one-third of these children live in Carlisle. Many of them participate in more than one sport per season. Carlisle contributes the use of one 90-foot baseball field (sometimes unusable due to activities on adjacent fields), two Little League fields (only one of which is a regulation field), two softball fields (one of which is sometimes unavailable), and one soccer field. Soccer is offered on Spalding Field when baseball and softball are not using this space. The Carlisle Middle School offers a variety of outdoor sports to students, including cross-country running, soccer, baseball, softball, and field hockey. Middle school students use the Spalding and Banta-Davis Fields after school during both fall and spring.

Although athletic field demand has grown, Carlisle has not added to athletic field inventory in over a decade. During peak season, all Carlisle's athletic fields are being used at or beyond capacity, damaging the turf. Fields are shared with Concord, but Carlisle provides a smaller percentage of fields than the percentage of Carlisle participants in each sport. For example, for baseball and softball, one third (33%) of the approximately 900 participants are from Carlisle, but Carlisle provides 2 of 10 total Little League fields (20%), 2 of 7 total softball fields (29%), zero of the two T-ball fields (0%), 1 of the 6 total 90-foot baseball fields (17%), and 1 of 5 total batting cages (20%). For soccer, approximately 22% of the 2,600 participants are from Carlisle, but Carlisle provides just one of 10 full-size (11v11) fields (10%), zero of six 8v8 fields (0%), and somewhat more than its fair share of smaller (6v6 and 5v5) fields. For lacrosse, approximately 20% of 600 participants are from Carlisle, but Carlisle provides no venues for lacrosse.

Given the need for more fields in Carlisle, the Recreation Commission is particularly concerned about proposals to use areas adjacent to existing recreation facilities on the Banta-Davis Land for municipally supported affordable housing. In addition to the possible loss of locations for expansion for current and future recreation needs, the Recreation Commission has serious concerns that a housing development at Banta-Davis will limit activities at existing town playing fields due to conflicts between the traffic, parking needs, and noise from sporting activities and the perceived rights of residents in the proposed housing. Aside from facilities on school property, the Recreation Commission currently has no in-town alternative to the Banta-Davis Land for recreation facilities.

The Recreation Commission is committed to the full build-out of the Banta-Davis land as the Town's outdoor recreation facility in accordance with a multi-phase plan first presented at Town

Meeting in 1998. Phase 1, funded in 1998 and subsequently constructed, included one Little League field, one adult softball field, one soccer field, bleachers, an irrigation well, and a parking area. Given the documented need for additional fields and facilities, plans for Phase 2 were presented at 2006 Town Meeting fulfilling the 1998 plan, with two additional Little League fields, a second soccer/multi-purpose field, four new tennis courts, and expanded parking and drop-off areas. The 2006 plans added paved ADA-compliant walking paths connecting the proposed new fields, a covered picnic pavilion, and a cross-country course through the adjacent woods to enhance the overall experiential feel of the site as a park in the community. An aerial photograph of the existing recreation facilities and an artist's rendering of the additional planned facilities for the Banta-Davis Land are shown in Appendix G. Both the 1998 and 2006 plans were supported by the Board of Selectmen and the Finance Committee. As noted in Section 6, the 2006 plan was approved at Town Meeting but fell just short of garnering the necessary votes at the ballot box a week later. The subsequent budget impact of two new schools during difficult financial times has put the plans on hold, but in the interim, the need for expansion on Banta-Davis has increased.

The Banta-Davis Land will soon be linked to the Spalding athletic fields with an ADA-compliant boardwalk through the wetlands for which CPA funding was approved at 2013 Town Meeting. The boardwalk through the wetlands and a contiguous path through the woods will provide safe transit for parents and athletes between the adjoining fields and will eliminate the need to walk between the two facilities on the narrow, curving, main road with limited shoulders. Automobile trips through the Town Center will also be reduced because the drive from Banta-Davis to Spalding—due to one-way streets through the center—is over 1 mile, about five times the distance of the walk through the woods.

Their central location makes Banta-Davis and Spalding Field an ideal site for the town's outdoor recreation facility, as it abuts the Carlisle Schools property, providing convenient access for student athletes both during and after school. The consolidated facility also provides efficiencies for maintenance and infrastructure, including irrigation and parking.

Some people have suggested siting recreation fields and facilities on scattered sites in residential neighborhoods throughout our small residential town, but scattered siting would require duplicating the infrastructure and would increase maintenance costs substantially. Aside from the environmental impact of the construction of the fields themselves, the additional clearing required for the necessary parking and the impact of irrigation wells on additional sites would conflict with the town's strong environmental priorities. The additional cost for acquiring land and maintaining fields and facilities would unnecessarily strain the Town's limited financial resources (due to the lack of a commercial tax base). In addition, the increased traffic in residential neighborhoods, the inevitable parking alongside our narrow and winding roads with limited shoulders, and the inevitable conflicts between organized sports that run well into summer evenings and the quiet enjoyment of neighboring residents further preclude scattered siting as a reasonable option.

Many other public and privately run opportunities exist for residents to play outdoor sports. More than 300 Carlisle children participate in spring, summer, fall, and winter programs. The activities available for residents of all ages include but are not limited to yoga, pilates, nia, zumba, water aerobics, soccer, basketball, baseball, boating, fishing, kayaking, rock climbing, karate, fencing,

hip hop dance, ballroom dance, line dance, cheerleading, boxing, golf, badminton, tennis, hiking, letter boxing, gardening, skiing, snowboarding, and snowshoeing.

The Recreation Commission sponsors tennis lessons during the fall, spring, and summer. A women's tennis league also uses the courts. About 500 people a year participate in these tennis programs. The courts are used by the general public when not in use by recreation programs.

During the summer, the recreation commission sponsors swimming lessons at several private pools in town, generously made available for this use by residents. Red Cross Certified instructors teach the classes. Year round, there is a state-of-the-art pool facility located in Concord, The Beede Swim & Fitness Center, which is run by the Concord Recreation Department on a paid membership basis, with discounted rates for residents of Concord and Carlisle, further discounted for seniors, and free for citizens over 80 years old. This facility offers eight swimming lanes, a shallow pool area for exercise classes, a diving pool, and a specially heated pool for persons with disabilities with full wheelchair lifts and supports along the side of the pool.

In the summer of 2012, Carlisle Summer Fun enrolled approximately 125 youth. These youth engage in activities such as swim lessons, archery, pottery, horseback riding, arts and crafts, drama, sports, dance, and tennis. Carlisle Recreation's philosophy is to employ Carlisle residents, usually older youth, to work as counselors. Approximately 30 counselors and counselors-in-training were employed during the 2012 season.

Seasonally, the Recreation Commission offers a variety of arts, crafts, and exercise programs to children and adults. Also offered is an after school program with pizza, sports, and arts and crafts for children to enjoy on those Tuesdays when children are released early from the public school.

In 2011, the Recreation Commission implemented the Home Base program for middle school children. This program is organized for children in grades 5 through 8 and meets weekly on Wednesdays and Thursday afternoons. Children can sign in after school and are able to "hang out," do homework, socialize, or venture off campus, with parental permission, to destinations such as the library and general store in the nearby Town Center. This program is designed to give students a sense of freedom and independence with supervision.

Some recreation programs offered to Carlisle youth are held out of town. These include canoe and kayak lessons held in Concord, Chelmsford, and Billerica, golf lessons held in Billerica, skiing and snowboarding held at the Nashoba Valley Ski Area in Westford, lacrosse, football, baseball, and soccer held in Concord, rock climbing at various locations, and boating in Newburyport.

Need to Augment Recreation Facilities.

The need for additional sports fields is being driven by a number of factors, such as the following.

- An increase in the popularity of organized sports in general
- An increase in the number of girls participating in sports
- An increase in the number of sports offered
- An increase in the number of seasons a sport is played (example: both spring and fall)
- An increase in the number of teams a child plays on
- An increase in specialized or travel teams
- The presence of adult leagues and teams
- The need to rest fields in order to keep them healthy and safe

The Recreation Commission has identified the following short- and long-term needs for additional facilities.

FIELD NEEDS (THROUGH 2017)

- One additional all-purpose, artificial-turf field for soccer, lacrosse, field hockey, flag football, etc. on the Banta-Davis Land per the 2006 Phase 2 Plan (Carlisle currently has no lacrosse venue.)
- Four additional tennis courts on the Banta-Davis Land per the 2006 Plan
- Two renovated basketball courts replacing the existing tennis courts at Spalding Field per the 2006 Phase 2 Plan (These courts may also be used for ice skating in the winter.)
- Walking pathways throughout the Banta-Davis Land per the 2006 Phase 2 Plan
- A path and bridge through the wetlands connecting Banta-Davis to Spalding Field to give the school access to the Banta-Davis facilities and to create another trail connection for residents (CPA funding for this project was approved at 2013 Town Meeting.)

LONG-TERM NEEDS

- Additional parking to accompany increased field use and improved drop-off loops per the 2006 Phase 2 Plan
- Two additional Little League fields per the 2006 Phase 2 Plan
- A Community Center for exercise, fine arts, and after-school programs

Support The New England Mountain Bike Association (NEMBA).

NEMBA is a recreational organization that advocates responsible trail use and includes as part of its mission “taking care of the places that we ride, preserving open space, and educating the mountain bike community about the importance of responsible riding.” (www.nemba.org) NEMBA organizes an informal bike patrol to help other trail users at GBFSP and sponsors periodic Trail Maintenance Days in the Boston area including the State Park. Carlisle has hosted NEMBA bike races through the years and has received financial support for community organizations in return.

Support Equestrian Activities.

The Board of Health listed 148 horses kept in the town in 2011. These animals are kept on private land in Carlisle and make use of the trail network or other facilities available in the community. Foss Farm and GBFSP are home to many of the organized equestrian activities, such as shows and hunter pace events. Although the drag hunting organized by Old North Bridge Hounds in the State Park has been discontinued, hunter paces and other horse events continue. Training of young hounds continues both in the State Park and at Foss Farm. Many horses are ridden on the extensive town trail network and on public roads as part of daily activities.

OLD NORTH BRIDGE PONY CLUB

The Old North Bridge Pony Club (ONBPC) is the largest pony club in the Central New England Region and is part of the United States Pony Club, the foremost national nonprofit youth organization for equestrians. ONBPC was founded by Carlisle and Concord residents in the 1980s. Currently, ONBPC lists nineteen members, ages 7 through 21. The majority live in Carlisle, with others from the neighboring communities of Concord, Lincoln, Acton, and Groton.

The club holds mounted meetings twice a week (except in winter when they meet indoors), alternating groups among Foss Farm, Black Brook Farm (a private farm), and GBFSP in Carlisle and Scarlet Hill Farm in Groton. Special activities including training sessions for dressage, show jumping, and eventing are also held at these venues. Testings and prep clinics are offered twice a year as part of the club's educational mission.

Fundraisers are held on a regular basis. A two-phase show is held every year at Foss Farm to raise money for maintenance and improvements at Foss Farm. A pace event at GBFSP is used to raise funds for ONBPC's educational programs. These events are well attended and provide activities for both Pony Club members and adult riders from Carlisle and surrounding communities.

Foss Farm provides a unique venue for the horse community as it provides an open area with good footing and a secure riding area for beginner riders. Future needs for ONBPC at Foss are improvements to the footing in the riding rings, reclamation of the cross-country course, and more connections among trail networks that are accessible for horses.

Need to Increase Handicap Accessibility

Carlisle is a town of resourceful and independent individuals who come together to make a community. The disabled community exhibits the same independence, and, as a result, members may find themselves feeling isolated. In the Committee's discussions with representatives of the disabled community, the consistent comment was that "we dealt with it ourselves." Improved communication could counter the isolation created by the feeling that there are no others who experience the same challenges or who could benefit collectively from shared communication. There is a continuum, from mild to severe, across a range of disabilities, some more obvious (such as those who need wheelchairs) than others (such as the hearing impaired, a growing segment of an aging community). In the small community of Carlisle, the more that communication channels can be opened, the more likely it will be that timely and appropriate assistance will be implemented in response.

Carlisle has made significant improvements in accessibility in its new buildings and recent school renovation. Carlisle needs to improve handicap accessibility to some areas of the playing fields, playgrounds, and conservation lands. Although total accessibility is not feasible (e.g. along steep, rocky trails), some handicap accessibility to Carlisle's recreation and conservation lands can be improved in some areas with minimal changes. For example, curbs can be cut to make some recreation fields more accessible, and a few already flat trails may be able to be maintained with an eye to wheelchair accessibility. Barriers erected to keep motorized vehicles off fields and trails may need to be modified or removed to allow wheelchairs to pass.

As noted in the section on "Need for Pedestrian Pathways" below, Carlisle has been working on developing a pathway network. Although most of the pathways are accessible, the self-evaluation process identified areas where better and more consistent maintenance is necessary, for example leveling of some drainage grates and trimming of shrubs and poison ivy that periodically encroach on some pathways. Provision of benches at regular intervals along the pathways would provide resting spots for those who find it difficult to walk long distances.

Grading in parking areas can be improved to drain water and prevent pooling. Representatives of the disabled community who met with the Committee stressed that provision of handicapped parking spaces is not worthwhile unless the surface and allocated space allows for unloading and then accessing the facility or feature served by the parking lot. In several lots, the surface, such as sand, cannot be adequately compacted and does not allow for wheelchair access. It was also noted that snow is sometimes cleared into or left on handicapped spaces and the adjacent unloading areas, rendering them unusable; even a small amount of snow or gravel debris represents a significant barrier. Care should be taken to ensure the entire travel route from the parking spaces to the entry is cleared. Representatives of the ADA Task Force have agreed to review these issues with the Department of Public Works and to investigate possible protocols to improve the situation in Town parking lots.

As noted above, another suggestion from representatives of the disabled community was to improve communication channels between the members of the disabled community and Town officials. Members of the disabled community and their families tend to be well informed about the latest technologies that respond to their particular disabilities; what is lacking is a means for them to get this information into the hands of those who may be able to implement some of these technologies as appropriate at Town facilities or events. Communication about programs, events, and emergencies should also be made more accessible, with more information provided online for the hearing impaired and others who can't use the telephone, as well as more channels created for getting information, for example about the accessibility of an event. Carlisle has an ADA Task Force consisting of the Town Administrator (and ADA Coordinator), the Fire Chief (and Facilities Manager for the Carlisle Schools), the Building Commissioner (and Zoning Enforcement Officer), the Library Director, and a citizen representative. The Task Force intends to respond to these issues and will look into implementation of regular outreach to the disabled community and a possible website link to provide opportunities for questions to be asked and answered and other feedback to be provided.

To respond to the self-isolation that is sometimes a response of members of the disabled community to accessibility limitations, the town should encourage the formation of an advocacy group to provide feedback with regard to problems, progress, and priorities at least yearly. The Gleason Public Library is an accessible and valuable community resource that can play a major part in facilitating the necessary communication. Administrators of all service arms of the town should be aware of assistive services that are available and be able to direct people appropriately. Coordination among departments, from the Council on Aging to the Police Department, is critical.

Signage on many properties requires evaluation and modification. Trails signs could be modified by the addition of accessible signs with QR (quick-response) codes at appropriate heights on existing posts; these codes, when scanned by a cell phone or other hand-held device, provide direct access to a specific web page with trail or site information. Kiosks should be evaluated for firmness of terrain around the base to allow for wheelchair access, and all notices should be placed at a height less than 60 inches. Table 11 documents the accessibility of lands under the management of the Recreation and Conservation Commissions.

Americans with Disabilities Act (ADA) improvements that have been identified through the self-evaluations carried out for the purpose of this report (Appendix F), the recent federal OPDMD (Other Power-Driven Mobility Devices) ruling, and the new Supreme Court decision of January 2013 requiring access or alternate facilities for sports teams have yet to be studied fully in Carlisle as to their implications for its current facilities. The new rulings, similar to the effect of Title 9, could require some modifications to recreation facilities. As noted in Sections 3 and 5, Carlisle has developed and adopted OPDMD regulations for the use of such vehicles on Town-owned conservation lands (Appendix B). The regulations have not been implemented on other lands such as those owned by the Carlisle Conservation Foundation. Lands and trails in Carlisle require further study to determine their accessibility. Additionally, signage for active and passive recreation facilities and trails needs review with regard to disabled users.

Public comments on a draft of this plan included the observation that difficulties in navigating pathways and trails, as well as areas where neither are available, with a stroller can create access issues for parents with very young children just as the difficulties in navigating with a wheelchair do for the disabled. The assessments of Town conservation and recreation facilities called for in Table 11 should take into consideration access by parents with strollers as well as access by the disabled. In addition, the need for better communication channels to provide feedback loops between the Town and the disabled community on accessibility issues should be extended to include communication with parents of young children.

Need for Public Education

The need to educate the public about conservation and promote conservation is ongoing. Education is needed to encourage residents to conserve water and other limited resources and to make lifestyle changes to reduce pollution and limit damage to our shared environment. Educating people about the value and importance of the town's conservation lands is also necessary. Past successes in land preservation can lead to a sense of complacency or a view that Carlisle already has enough protected lands. Opportunities to engage the community in discussions on conservation are needed to dispel myths and galvanize local support, political and financial, for conservation and protection of additional lands. Outreach programs should be developed for landowners, particularly those with large unprotected parcels, many high on the priority list (Table 7), to educate them about the estate-planning benefits of putting land under CRs or donating land for permanent protection.

Need for Pedestrian Pathways

Having completed the development of the Pedestrian Pathway plan for the Town Center (Map 10), the Town should still continue to seek easements and deeding of lands to Town ownership along roads throughout the town for possible future pathways. In developments where pathways are not feasible, the Town should work towards payments from developers into a pathway fund for use in creating pathways elsewhere and maintaining existing pathways.

Pathways have been identified in the *Acton, Concord, and Carlisle Regional Accessibility Study* as an important asset, particularly for a town in which the population is shifting toward more elderly residents. The Study was funded by a grant to the Carlisle Board of Health, in collaboration with Concord and Acton, from the Metropolitan Area Planning Council (MAPC) through the Centers for Disease Control and Prevention Community Transformation Grant

program. The study cited evidence that increasing “walkability” in a community leads to healthier residents from increased physical activity and a healthier, more connected community by creating more opportunities for casual and spontaneous interactions. Additionally, as traffic—especially commuter through traffic—continues to increase in Carlisle, providing an alternative for pedestrians to walking along the narrow roads will become a greater priority. Increasing pedestrian connections among the town’s public lands will make the town more accessible.

Without direct access to public transportation and with limited local commercial enterprises, Carlisle is dependent on automobiles; amenities that reduce reliance on automobiles will be beneficial. Making Carlisle more bicycle-friendly—for example with dedicated bicycle lanes—is a laudable but daunting goal due to the typically narrow, winding roads with minimal or no shoulders; the town will need to find ways to realize the long-term benefits of making our roads safer for cyclists. Providing more bicycle racks in parking areas should be considered.

Although the Pedestrian and Bike Safety (Pathways) Committee was disbanded in 2010 after the completion of the Town Center pathways, former members of that committee have reached out to the Selectmen to take the lead on possible extensions of the pathways system along the major routes in town. Acknowledging the importance of pathways to the community, the OS&R Plan Committee recommends that this committee be reconstituted and that new funding sources be identified to continue the work.

Need for Communication and Planning

Interdepartmental communication among the various land use boards (Conservation Commission, Recreation Commission, Planning Board, and Board of Health) remains critical, as does communication with other town boards involved in decisions affecting the future of land use in Carlisle (Board of Selectmen, Zoning Board of Appeals, and Housing Authority).

As land values have increased and the number of parcels in need of protection has decreased (both due to past successes and to the development of lands previously on the priority list), the complexity of the issues related to the remaining unprotected lands in town has also increased. As demonstrated by the Carlisle Conservation Foundation’s involvement in the Town’s purchase of Benfield Parcel A for mixed uses, including community housing and recreation in addition to conservation, land conservation can not be considered in a vacuum. The purchase of the Goff property for a group home for the Department of Developmental Services includes a potential recreation component, but gaps in communication during the process demonstrate how the goals of various stakeholders in town government do not always align. Another example is the proposal to site affordable housing on the Banta-Davis Land, putting structures, parking, and access ways in place of and adjacent to existing recreation fields, limiting future use and expansion of recreation facilities.

Protection of natural resources goes beyond protecting land from development. The town must identify parcels where affordable housing will have the least impact on the environment and the community so that less environmentally suitable locations are not selected by private developers who may use Chapter 40B to bypass local zoning protections. The Housing Production Plan the town has filed with the state is an important part of the process. Implementation of the plan is a difficult balancing act, but it must be addressed through public discussion and interdepartmental cooperation.

C. Management Needs

Because of the large number of open-space parcels falling under the jurisdiction of the Conservation Commission, the Land Stewardship Committee (LSC), as noted in Section 2, was created as a permanent sub-committee of the Conservation Commission in December 2005. The mission of LSC is to manage Town-owned conservation land to protect, maintain, and enhance conservation interests. This mandate covers the approximately 30 conservation parcels (totaling over one thousand acres) owned by the Town of Carlisle under the care of its Conservation Commission. Through a program of land management and maintenance activities, the LSC protects natural and cultural resources, including wildlife habitat, water and forest resources, agricultural lands, recreational uses, scenic vistas, historic structures, and related cultural values. In addition, as stewards, the LSC also seeks to foster a commitment among the town's residents to protect and preserve its conservation lands.

Projects

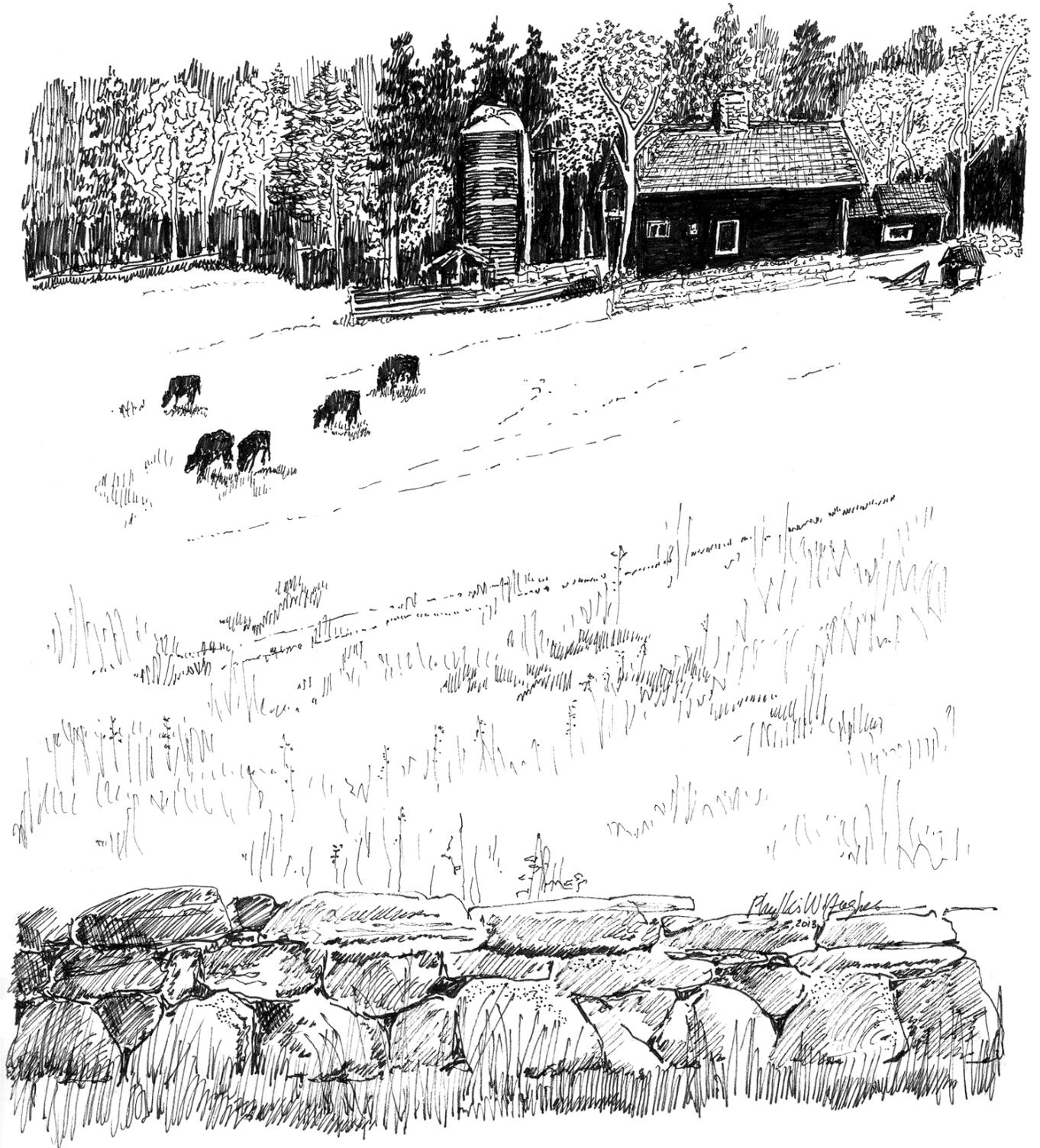
- Baseline assessments (completed for Fox Hill, Foss Farm, Cranberry Bog, Town Forest, Towle Land, Greenough, Davis Corridor, and Carr Land/Rockstrom Land/Deacon Land/Sachs Greenway conservation parcels)
- Management plans (completed for Towle Land, Fox Hill, and Davis Corridor)
- Special reports: Use of chemicals on conservation land
- Joint meetings of Town boards and committees and private groups with conservation-related agendas held at least yearly
- Educational programs
- Eagle Scout projects
- Property maintenance and improvement. These range from small and routine activities through major projects.
 - New signage and repair and stabilization of the historic Cranberry Bog house via CPA funds
 - Cleaning up after vandalism and encroachments
 - Invasive species control
 - New wells at Foss Farm community gardens
- Rules and guidelines for conservation land use
 - OPDMD guidelines in conjunction with the Trails Committee and the Carlisle Conservation Commission
 - Revised rules for Foss Farm community gardens
 - Revised camping regulations for conservation land
 - Conservation Land Use Guidelines document (2011)

The Conservation Restriction Advisory Committee (CRAC) continues to monitor the condition of lands subject to Town-owned CRs, walking the properties periodically and submitting written reports to the Town on the condition of the properties and existence of any violations of the terms of the CRs.

CCF has recently initiated a more formal effort to plan for the development of management plans for its properties. It has set a goal of establishing a certain number of plans to be completed each year and to have all board members become familiar with the properties.

Section 8: Goals and Objectives

- A. Goals and Objectives
- B. Available Protection Methods



Rural vista of the Valentine Farm, part of an expanded western Carlisle corridor of open space preserved in the past 5 years, thanks to a 121-acre Conservation Restriction Jack and Betty Valentine placed on their land, to preserve the vistas of fields and farmland surrounding 17 building envelopes that will ensure that any houses built in the future will be hidden in the woods.

Section 8: Goals and Objectives

In Section 2, the accomplishments of the previous Open Space Plan were reviewed. In this section, the community vision from Section 6 and the Town of Carlisle's needs from Section 7 are formulated into a comprehensive set of goals and objectives. Section 9 contains action plans in the form of initiatives for achieving these goals.

A. Goals and Objectives

Open or natural space is a finite resource that is becoming scarcer as the town develops. The town has realized for some time that it must be proactive in its efforts to guide residential development in a way that supports ongoing efforts to preserve open space. In the current economic climate, Carlisle's leaders are also mindful of the limited financial resources for acquisition of additional municipal land, whether for open space, recreation facilities, or Town-supported affordable housing. Successful preservation of open space and acquisition and allocation of lands for recreation may require coordination with the Town's municipal efforts to mitigate the threat of 40B developments that can override long-standing protections enshrined in local zoning. Carlisle's citizens will need to determine what is the best way to manage the town's assets as a whole to direct growth most effectively for the overall environmental and social health of the town.

Carlisle needs to continue to plan and to preserve open space and enhance opportunities and facilities for recreation to meet the following goals and objectives.

Goal 1 – Maintain the rural character of Carlisle.

Objectives

- a. Protect natural features such as open fields, woodlands, wildlife habitat, and scenic vistas.
- b. Protect corridors and trail linkages for wildlife and provide additional protected connections between existing open spaces.
- c. Encourage agriculture in town.

Goal 2 – Protect the town's environment.

Objectives

- a. Protect the town's water resources: lands with surface water resources, wetlands, streams, ponds, or potential aquifer sites.
- b. Protect natural spaces that provide ecological diversity.
- c. Identify and protect sites with rare, endangered, or protected species.
- d. Proactively manage protected lands, including invasives control.

Goal 3 – Meet the town's recreational needs.

Objectives

- a. Upgrade existing recreation areas and facilities.

- b. Provide additional sites for active recreation facilities and a possible community center (for recreation and senior activities).
- c. Improve signage, accessibility, and communication channels for the handicapped.

Goal 4 – Proactively manage land use in town.

Objectives

- a. Educate the town about the value of long-term planning for land use.
- b. Guide where and how concentrated development occurs.
- c. Encourage cooperation among diverse stakeholders involved in efforts to acquire land for municipal use.
- d. Improve the Town’s ability to finance preservation of open space and recreation.

B. Available Protection Methods

To meet the goals and objectives related to land acquisition listed above, understanding the protection methods available to the town is necessary. Open space can be protected in several ways. Direct acquisition of the land is usually the best method to preserve the conservation and recreation values of a piece of land. However, other ways also exist to protect open space.

Commonwealth and Federal Funding has helped Carlisle immensely in acquiring several conservation lands, such as Foss Farm, the Towle Land, the Greenough Land, and the Davis Corridor. The Great Brook Farm State Park and Great Meadows National Wildlife Refuge (GMNWR) preserve large areas of important natural space in town.

The state Local Acquisitions for Natural Diversity (LAND) Program (formerly the Self-Help Program) was established to assist municipal conservation commissions acquiring land for natural resource and passive outdoor recreation purposes. Carlisle’s Conservation Commission sought a LAND grant in 2012 to support its purchase of a conservation restriction (CR) on the Elliott riverfront parcel to be owned and managed by the Sudbury Valley Trustees (SVT). The newly created Elliott Preserve includes rare species habitat and 1,000 feet of frontage along the Wild and Scenic section of the Concord River that runs through the GMNWR. Despite meeting the key criteria for the grant program, Carlisle fell just below the cut-off line for funding, in part due to reduced state resources for this program and the relative affluence of the community. Carlisle made up the lost funding through additional CPA allocations and private donations and should expect similarly to shoulder much of the financial burden of future open space protection itself.

Adoption of the Community Preservation Act (CPA) in spring 2001 was an important step in protecting open space. CPA funds may be used for open space (both conservation and recreation), historic preservation, and community housing. The town’s citizens elected to levy a 2% surcharge (the state would have allowed up to 3%) on real estate taxes, excluding the first \$100,000 in assessed value. A minimum of 10% of CPA funds must be used for each of the three purposes noted above, but the allocation of the rest of the fund is up to Carlisle’s citizens. The state no longer matches the surcharge dollar for dollar; nevertheless more than \$2 million in state

CPA funding has leveraged the tax dollars Carlisle's citizens have been contributing since the adoption of the CPA by the town. Carlisle's citizens reaffirmed their support for the real estate tax surcharge by soundly defeating a Warrant Article to rescind the CPA at a Special Town Meeting in 2011.

A Community Preservation Committee (CPC), consisting of seven members, one each from the Conservation Commission, Historical Commission, Planning Board, Recreation Commission, Housing Authority, Board of Selectmen, and one member from the community at large, can recommend expenditures of CPA funds, but funds can only be appropriated by approval at Town Meeting.

Permanent Conservation Restrictions (CRs) allow the land to remain in private ownership while limiting or preventing future development. This tool is especially useful for preserving wildlife corridors and linking trails, although CRs may prohibit public access to the land. CRs protect conservation values such as vista, habitat for endangered species, and ecological diversity, but they do not necessarily provide the public with sites for active or passive recreation.

Permanent CRs on Town Conservation Lands create permanent protection against proposals to change the use of these lands.

Agricultural Preservation Grants were once seen by town planners as a useful tool to help preserve farmland in Carlisle, but for the most part they have not been successful. Carlisle farms do not compare in size or productivity with those in less developed, more fertile parts of the Commonwealth. However, in 1999, Carlisle was fortunate to receive state Agricultural Preservation Restriction (APR) aid, which helped finance the purchase of the Wang-Coombs farmland. Over the past several years, local citizens have filled some of the gap in government financing by initiating farm preservation on their own, buying properties (some protected by CRs) from retiring long-time farming families, renovating historic barns, and leasing the land to new farm families to help keep active farming alive in town.

The local Open Space Land Development Trust, called the Carlisle Land Trust (CLT) was formed as a private entity in 1981 under the aegis of the Carlisle Conservation Foundation (CCF), also a private entity. In 1982, the Trust developed Bates Farm, and in 1986, the Trust also developed some of Clark Farm. Both developments preserved large areas of natural space.

In 1996, CCF along with The Trustees of Reservations (TTOR) purchased 11 acres abutting the Town-owned Malcolm Conservation Land. The next year, the CLT and CCF helped the Town acquire the properties and CRs that form the Sachs Greenway, a 67-acre swath of protected land that abuts Estabrook Woods.

In 1999, CLT helped the Town preserve 35 acres of the Wang-Coombs land, later renamed Robbins Field and Hutchins Field. By selling a small part of the original property for the limited development of two houses, CLT helped lower the costs for the Town to protect the remaining 35 acres.

In 2004, CCF negotiated the limited development of the Benfield property that resulted in CCF's acquisition of 61 acres of the property to be permanently protected by CRs. CCF also supported

the Town's purchase of 45 acres of the Benfield property, 26 acres of which are designated as conservation land, with the remaining 19 acres available for affordable housing and a recreation field, with additional open space and buffer areas.

Coordinating its efforts with SVT, CCF spearheaded the Town's successful effort to preserve the significant riverfront resource of the Elliott property along the Concord River.

Zoning that encourages protection of natural space through cluster development can preserve open space without the Town needing to purchase the land. In the 30 years since the adoption of cluster zoning, the Town has protected 161 acres of natural space in eleven cluster developments (Table 8).

Charitable Donations can be prompted by the desire to reduce property taxes, income taxes, and future estate taxes, as well as to prevent unwanted development or to preserve traditional or historical land uses. Landowners donate CRs on their property to qualifying organizations such as the Town of Carlisle, the Carlisle Conservation Foundation, The Trustees of Reservations, or the New England Forestry Foundation, which typically help pay for the costs of surveys, land planning, and legal work needed to effect the donation.

Section 9: Seven-Year Action Plan

- A. Introduction
- B. Board of Assessors Initiatives for 2013 through 2019
- C. Board of Health Initiatives for 2013 through 2019
- D. Board of Selectmen Initiatives for 2013 through 2019
- E. Carlisle Conservation Foundation (CCF) Initiatives for 2013 through 2019
- F. Conservation Commission Initiatives 2013 through 2019
- G. Conservation Restriction Advisory Committee Initiatives for 2013 through 2019
- H. Council on Aging Initiatives for 2013 through 2019
- I. Finance Committee Initiatives for 2013 through 2019
- J. Historical Commission Initiatives for 2013 through 2019
- K. Housing Authority and Affordable Housing Trust
Goals and Action Initiatives for 2013 through 2019
- L. Land Stewardship Committee Initiatives for 2013 through 2019
- M. Planning Board Initiatives for 2013 through 2019
- N. Recreation Commission Initiatives for 2013 through 2019
- O. Trails Committee Initiatives for 2013 through 2019



Section 9: Seven-Year Action Plan

A. Introduction

The residents of Carlisle treasure the town's open spaces for active and passive recreation, for the protection of wildlife, and for the maintenance of the town's rural character and natural resources. In order to continue to increase the inventory of protected open spaces and rural vistas, the Town must actively pursue strategies that will ensure that some of the remaining undeveloped parcels are acquired or protected in some way (such as by conservation restrictions (CRs)). The current Open Space and Recreation (OS&R) Plan Committee specifically recommends that the Town attempt to provide more protected corridors between protected parcels to provide linkages to benefit wildlife and to connect sections of trail. The Town must look at all the means available to preserve and protect its natural spaces and to strengthen its management of conservation and recreation lands.

The Committee also recommends that the Town plan for additional active recreation needs and the development of a dedicated space for some combination of Community Center, Senior Center, and Recreation Center.

As part of the community process of determining Carlisle's goals and an analysis of the town's needs, the OS&R Plan Committee asked each Town board or committee first to review its progress on initiatives listed in the 2005 OS&R Plan (if it participated in that plan) and then to revise the list of specific initiatives it intends to pursue over the next seven years. These follow, arranged alphabetically, in subsections B through O of this section. High-priority initiatives selected from the various lists of initiatives, with dates for completion and responsible parties, are included in the table on the next page. (See also Map 8: Seven-Year Action Plan.)

The Board of Selectmen, Housing Trust, and Housing Authority have all noted the need to balance the needs for open space and recreation with the need for land to provide a variety of housing options in town, including affordable housing, particularly in relation to the threat of development under Chapter 40B that may be considerably denser than that allowed under local zoning, with the associated potential threats to Carlisle's rural character and natural resources.

Many of the initiatives listed below are ongoing and require little if any additional funding beyond existing Town department budgets. Others, such as development of new playing fields and other active recreation facilities, require substantial funding that would require approval at Town Meeting. There are several funding methods for initiatives in Carlisle, each of which receives careful vetting through an annual process.

- If an initiative is expected to be ongoing and requires annual funding, it is included within regular department budgets.
- If an initiative is considered a non-recurring expenditure, it is presented as a Warrant Article at Town Meeting. If deemed a capital expense, the initiative is considered by the Long-Term Capital Requirements Committee as part of a long-term financing plan.
- If an initiative meets Community Preservation Act (CPA) requirements, a request to fund it is submitted to the Community Preservation Committee (CPC) and, if approved, to Town Meeting. Recreation and Open Space are among the acceptable uses for CPA funds.

When an identified priority parcel becomes available, land acquisition is considered. Historically, land acquisitions have been complex, requiring coordination among many Town boards and commissions as well as private organizations such as the Carlisle Conservation Foundation (CCF). State Local Acquisition for Natural Diversity (LAND) grant funds may be sought for conservation purposes to supplement Town Meeting appropriations or approval of CPA funds, but as the Elliott property acquisition demonstrates, such funding is competitive and not assured.

High-Priority Initiatives, Timetable, Funding Source, and Responsible Parties			
INITIATIVE	YEAR	FUNDING SOURCE	RESPONSIBLE PARTY
Recreation Needs			
<i>Banta-Davis: Evaluate need for more recreation fields</i>	2013	DB	RecCom
<i>Goff Property: Evaluate for recreation center/facilities</i>	2014	CPA	RecCom/CHT
<i>Spalding Field: Complete boardwalk to Banta-Davis</i>	2014		RecCom
Improve Accessibility			
<i>Town: Improve communication w/disabled community</i>	2013+	N/A	BOS/TA
<i>Cranberry Bog: Make paths accessible to OPDMDs</i>	2019	CPA	ConsCom
Invasives Control and Edge Reclamation			
<i>Foss Farm: Maintain clearing of field</i>	2013+	DB, G	ConsCom/Trails
<i>Ben's Woods: Monitor invasives control project</i>	2013+	NP, G	CCF
<i>Towle Land: Expand on buckthorn/poison ivy control</i>	2013+		ConsCom
Water Resources & Agriculture			
<i>Cranberry Bog: Protect water rights</i>	2013+	TBD	BOS/ConsCom
<i>Cranberry Bog: Extension of Agricultural Agreement</i>	2015	TBD	BOS/ConsCom
Land Protection & Property Maintenance			
<i>Benfield Cons. Land: Coordinate field maintenance</i>	2013+	TBD	ConsCom/CHA
<i>Greenough Barn: Develop Management Plan</i>	2013+	CPA	ConsCom/BOS
<i>Elliott River Preserve: Fulfill plans for canoe landing</i>	2015	NP, CPA	SVT/CCF
<i>Conant Land: Seek permanent CR on sensitive areas</i>	2015+	DB	ConsCom
<i>Town Common: Develop ongoing maintenance plan</i>	2015	TBD	HistCom
<i>Flannery property: Seek protection</i>	2017+	CPA, NP	Trails
<i>Sorli property: Trail connections/protection for vistas</i>	2019	N/A	CCF/Trails
<i>Greenough Dam: Repair or remove dam</i>	2019	CPA	ConsCom
Trails and Connections			
<i>West: Connections to Open Space in neighbor towns</i>	2013+	N/A	Trails/CCF
<i>Benfield Cons. Land: Complete trails connections</i>	2014	TBD	Trails/CCF
<i>Bruce Freeman Rail Trail: Completion/better parking</i>	2014+	CPA	ConsCom/Trails
<i>NW: Connections from CPSF to neighbor towns</i>	2018	TBD	Trails/CCF
BOS = Board of Selectmen; CCF = Carlisle Conservation Foundation; CHA = Carlisle Housing Authority; CHT = Carlisle Housing Trust; ConsCom = Conservation Commission; CPA = Community Preservation Act Funding; CPSF = Carlisle Pines State Forest; CR = Conservation Restriction; DB = Departmental Budget; G = Grant(s); HistCom = Historical Commission; N/A = Not Applicable (no funding need currently anticipated; work expected to be done by Town staff, committees, or volunteers); NP = Local Non-profit (e.g. CCF); OPDMD = Other Power-Driven Mobility Device; RecCom = Recreation Commission; TA = Town Administrator; TBD (To Be Determined following planning; may or may not require funding from CPA or other sources, plus possible legal expense in some cases); Trails = Carlisle Trails Committee			

B. Board of Assessors Initiatives for 2013 through 2019

Coordinate with the Planning Board on the conversion of the Town Assessors' maps from hand-drawn to digital format, to allow access to underlying GIS parcel data by other Town boards, departments, and committees. Once established, coordinate with the Planning and Conservation Administrators on annual digital parcel updates to include mutually beneficial updates to data layers for common drives and conservation restrictions, among others. Coordinate with the outside mapping service provider doing the conversion and annual updates to maintain the integrity of the base data.

Work with the Town Administrator, Planning Board, and other stakeholders to develop policy and protocols for determining what amount of the GIS database will be made available to Carlisle's citizens and how it will be made available.

C. Board of Health Initiatives for 2013 through 2019

Protection of ground water remains a primary goal for the Board of Health since the Town continues to be 100% dependent on private wells and septic systems. This year the Board is also focusing on improving the health of Carlisle residents through healthy behaviors. Promotion of physical activity is one of the behaviors targeted in CDC's Healthy People 2020 Goals and which the Board supports.

Current Activities

The Board is pleased to report that many of the initiatives identified in the previous OS&R Plan have been successfully implemented. In 2008, the Board revised its Supplementary Sewage Disposal Regulations to better address design flow requirements so that systems are not unduly oversized with a garbage grinder allowance. Garbage grinder allowances are still required for smaller systems (330 GPD) but larger systems (440 GPD) follow a design flow table that is more reflective of actual usage. The Board also standardized its criteria for granting waivers for distances to wetlands and revised its design and construction standards for systems greater than 2000 GPD. More than 50% of septic designs submitted are alternative technology systems. These systems provide additional treatment area with less disturbance of the landscape.

The Board strengthened its annual inspection of barns to include evaluating manure management activities in order to prevent health nuisances and protect nearby wetlands and wells.

The Board continues with its bi-annual well testing program. The collection of this data is helping to build an overall picture of the water quality in town. Future efforts may include adding this information as a GIS layer along with well construction information available under the new state's well driller reporting requirements.

Beavers and beaver caused flooding continue to be problematic. The Board has issued beaver removal permits to alleviate flooding of nearby homes, septic systems and/or wells

The Board is looking into establishing a local permitting process for geothermal wells that will include design guidelines and requirements for local certification. The state modified its

guidelines for open and closed loop wells in 2010. At least five of the wells have been installed in Carlisle over the last two years. They are becoming more popular with homeowners.

In 2011, the Board applied for a State Revolving Fund Loan with a proposal to tie the Library and nearby municipal facilities into the school's wastewater treatment plan. The plant would benefit from regular daily flows and the Library system is very old and may need replacing. Although not funded, the Board intends on reapplying.

The Board also established a Community Septic Loan Program funded through the State Revolving Fund. This program allows owners with failed systems to apply for a loan to upgrade the system. The loan is paid back through a betterment on the property. This enables owners experiencing financial hardship to replace a failed system in a timely manner. Four loans have been issued under this program.

Future Planning

In Carlisle the groundwater withdrawn is eventually returned to the same area. In a large municipal system the water withdrawn travels far away from the original source and therefore can be difficult to replenish. Having this local control is an advantage and one of the reasons that the Board of Health makes groundwater protection one of its most important goals. At some point, however, the Town may need to secure a public water supply for its citizens. The Board is looking into how to address the potential for a future municipal water supply should the need arise. The Board has re-established its Water Quality Subcommittee to explore this issue. There is no immediate reason to do so now but planning for the future is important. The Town should be prepared to identify and purchase land suitable for this purpose.

The Board continues to take other protective measures such as organizing a drug take back program to reduce medications leaching into the water table. A sharps collection will also be offered in conjunction with the annual hazardous waste collection day in the spring.

Recreational Land Use – current

The Board has received a Community Health Network Area (CHNA) grant to do a public education campaign on preventing tick borne illnesses and to develop land management techniques to reduce exposure. Signs will be placed on public trails to advise the public using recreational lands and trails. The Board has created a Lyme Disease Subcommittee to continue with this work.

The Board has also received a CDC Community Transformation Grant to provide recommendations on how to improve accessibility on Town lands and trails. Design standards and recommendations will be provided for the Town's consideration.

D. Board of Selectmen Initiatives for 2013 through 2019

Overview

The Board of Selectmen have traditionally outlined three intrinsic key values that guide the management of Town affairs:

- An excellent educational system,
- The conservation and protection of our unique physical environment, and

- The maintenance of strong small town community values that support the needs of all of our citizens.

Obviously, the Open Space and Recreation Plan is a document that outlines in detail our commitment to conserving and protecting our unique environment. The document outlines the tremendous amount of work that many committees and countless individuals regularly undertake to protect and care for our environment. The Board of Selectmen is committed to support the plans and goals that are outlined in the document. The following is an outline of the specific goals and objectives that the Selectmen will attempt to undertake in support of the plan.

Administrative

1. The Selectmen will be actively involved in the recruitment and prompt appointment of qualified personnel to all appointed committees that are involved with the work of open space and recreation.
2. The Selectmen will work to see that the emerging technology plans for the Town take into account the systems and support mechanisms that are essential to the proper management and conservation of our land.
3. The Selectmen will work with the appropriate committees to see that budget issues or requests are dealt with openly and fairly and that any warrant articles are presented clearly and effectively.

Land Acquisition

1. The Selectmen will work to remain informed regarding critical targeted acquisitions and/or conservation restrictions and work with the appropriate Committees regarding the most appropriate strategies for action.
2. When a particular initiative is undertaken the Selectmen will work to develop a town consensus regarding the need and appropriateness of the action.
3. The Board of Selectmen, in particular, is supportive of appropriate potential actions regarding the preservation of both the Western Corridor and the Concord River reservation areas.
4. The Selectmen will work with appropriate committees to determine in the conceptual phase of an action if it may make sense to include an affordable housing initiative.

Land Stewardship

1. The Selectmen will continue to work with the appropriate committees to establish ongoing budget resources to manage the properties that have been placed under conservation restrictions or another form of protection.
2. The Selectmen will work with the appropriate committees regarding the issue of wildlife management, helping to manage the balance between wildlife protection and public safety and the protection of private property.
3. The Selectmen will take particular interest in issues related to the protection of public ground water and work with appropriate committees to ensure that our fragile water resources are protected in balance with personal property rights.
4. The Selectmen will support the Conservation Commission in their ongoing responsibility to enforce rules and regulations.

5. The Selectmen will work to facilitate the long-term extension of the Cranberry Bog lease and assist in protecting Carlisle's rights and interests relating to the potential water well field in the Chelmsford section of the bog.

Active Recreation

1. The Selectmen will support the investigation of a strategy and plan for the potential creation of a Carlisle Community Center.
2. The Selectmen will support the efforts of the Carlisle Trails Committee in maintaining our current trails network, improving and extending the network and encouraging usage of this unique resource.
3. The Selectmen will work with the Recreation Commission to understand and support key initiatives relating to our fields, courts and active recreation resources. The Board is committed to maintaining, at a minimum, the level of resources that we currently enjoy.
4. The Selectmen will work with appropriate committees to explore potential extensions to the footpath network that may be appropriate.

E. Carlisle Conservation Foundation (CCF) Initiatives for 2013 through 2019

CCF is a non-profit, volunteer organization, dedicated to maintaining the rural character of Carlisle and preserving its natural beauty and wildlife habitats.

Working with private landowners, public entities, and other local and regional land conservation organizations, CCF serves as a resource and catalyst for land conservation, land stewardship, and community education about conservation.

Included in CCF's Goals and initiatives for the next seven years:

- Conduct an annual review of CCF's priority list of unprotected private lands and develop and update strategies for working with individual landowners, Town committees and other conservation groups to protect those open spaces
- Pursue opportunities to preserve open vistas, protect wildlife corridors and habitat and acquire critical trail connections
- Put permanent conservation restrictions (CRs) on CCF properties, where appropriate
- Advocate for Town measures favoring open space protection
- Update and/or develop land management plans for all CCF parcels
- Address high-priority needs for CCF property maintenance and enhancement, including boundary markers, signage, parking, trail access
- Monitor land on which CCF holds CRs and enforce terms of CR agreements
- Work to remove invasive species from CCF land and encourage native plants
- Increase community awareness of CCF and its activities
- Sponsor educational experiences focused on conservation land in Carlisle
- Encourage residents to access and utilize Carlisle's conservation lands
- Use community outreach to encourage placing of CRs on private lands
- Coordinate with other Town conservation groups re: goals and collaboration
- Enhance CCF website to provide information about CCF and serve as a community conservation resource

F. Conservation Commission Initiatives 2013 through 2019

(Organized into four sections of Administrative Tasks, Outreach, Land Management, and Land Protection)

Administrative Tasks

Promote Effective Financial Management

- Continue to support the Community Preservation Act (CPA) and seek the state's matching funds that may be available to support the buying of land for preservation with locally raised CPA funds.
- Coordinate with the CPA Committee to provide information on land acquisitions for protecting open space and water resources.
- Establish a maintenance fund for conservation land to be used for purposes such as mowing, field edge maintenance, tree or shrub removal, bird nest boxes, invasive species control and wildlife or plant inventories.
- Consider seeking re-authorization of bonding authority at a suggested level of \$5 million. Bonding authority demonstrates to landowners that the Town is committed to open space preservation. Also, when a property is for sale, with bonding authority in place, the Town needs only to approve the purchase at Town Meeting and does not need a vote or ballot initiative to authorize the bonding.

- Coordinate closely with Carlisle's Finance Committee and Long-Term Capital Requirements Committee so that both short- and long-term funding needs are clearly presented.
- Continue to budget for sending Conservation Commissioners and staff to trainings and conferences (e.g., Massachusetts Association of Conservation Commissions, Massachusetts Land Trust Coalition) to keep apprised of new developments, best practices, and education.
- Monitor the fee schedule, successfully revised in 2011, to ensure that fees continue to be appropriate relative to administrative time and cost.
- Budget and plan in advance for the timely, high-quality update of the OS&R Plan every five years; begin the process at least two years prior to due date.

Review and update local wetland bylaw and policies

Possible update areas follow.

- No-disturb or no-build zones within a stipulated distance of wetlands
- Review and update the Carlisle Standard Orders of Conditions
- Wetland replication standards that would consider ecological factors and wildlife that would be more stringent than the present state regulations.
- Inclusion of "federal wetlands" or large Isolated Land Subject to Flooding as town wetlands in order to protect vernal pools.
- Definition and enactment of standard enforcement procedures.
- Simplified procedures for single tree removal and invasive species control.

Propose changes to Town bylaws and regulations that could result in additional wetlands protection

Ensure the timely submission of an updated OS&R Plan

Support and encourage the development of a Town Geographic Information System (GIS) accessible to Carlisle boards, committees, staff and residents

Outreach

Provide Education and Activities

- Support the Conservation Restriction Advisory Committee (CRAC) in its efforts to educate the public about conservation restrictions (CRs), their benefits, and how they are drafted. Willing landowners may step forward once CRs are demystified. Encourage permanent restrictions.
- Support schools, scouting, 4H, and other youth programs involving conservation, ecology, and agriculture.
- Provide lectures, information sessions and press releases on educational topics, such as vernal pools, local conservation lands, local agricultural ventures, historical resources, Native American resources, and invasive species.
- Continue to offer a vernal pool walk annually in the spring.
- Work with the Recreation Commission to develop a variety of recreational and educational programs for conservation lands that would meet the interests of many residents and which would be consistent with conservation values.
- Support individuals and groups using conservation land for various purposes (e.g., camping, bird walks, search-rescue dog training, dog sledding, artistic endeavors).
- Continue to offer the monthly Conservation Coffee.
- Continue to support the Federal Riverfest celebration and local, state or federal biodiversity efforts.
- Provide programs and other structured opportunities for wildlife professionals to educate how wildlife can affect public safety.
- Develop and maintain a list of volunteer tasks and opportunities.

Facilitate communication and coordination of activities

- Continue coordination with Chelmsford Conservation Commission and other entities and individuals regarding land and water use in the Cranberry Bog Conservation Land.
- Continue to provide a representative for and help coordinate the Chelmsford-Carlisle Cranberry Bog Coordination Committee.
- Provide a complimentary copy of the OS&R Plan to Conservation Commissions in abutting towns.
- Continue ongoing dialogue with private organizations, such as Carlisle Conservation Foundation, Harvard University, New England Forestry Foundation, Sudbury Valley Trustees and The Trustees of Reservations.
- Continue ongoing dialogues with State and Federal agencies that own land in Carlisle, such as the Department of Conservation and Recreation and the U. S. Fish and Wildlife Service.
- Support the Bruce Freeman Rail Trail in the western corner of Carlisle.
- Support the work of Communities for Restorative Justice (C4RJ) when individuals or groups as first-time offenders violate the law on Conservation Lands and when the

- Conservation Commission is identified as the victim. The goal is to encourage more appreciation and respect among the transgressors for our treasured conservation lands.
- Work effectively with other Town committees such as the Board of Selectmen, Planning Board, Board of Health, Recreation Commission, School Building Committee, Housing Authority, and Finance Committee.
 - Work with the Recreation Commission to develop active and passive recreation programs for residents who do not participate in competitive team sports.
 - Work with the Planning Board to propose revisions to the Zoning Bylaws to require a minimum percentage of upland area within a lot's dwelling building envelope.
 - Work with the Board of Selectmen and Police Department to develop a long-term solution for vandalism, safety and preservation issues at the Greenough Land and the Greenough Barn.
 - Continue to review and ensure as much as possible accessibility of conservation lands and trails with Other Power-Driven Mobility Devices (OPDMD).
 - Provide a representative or observer on conservation-related boards and committees:
 - Bylaw Review Committee (occasional observer)
 - Community Preservation Act Committee (active member)
 - Conservation Restriction Advisory Committee (active member)
 - Conservation Land Stewardship Committee (active member)
 - Municipal Land Committee (active member)
 - Planning Board (occasional observer for special projects that involve land development)
 - Open Space and Recreation Committee (active member)
 - Trails Committee (occasional observer)
 - Wild and Scenic Rivers Committee (SuAsCo Stewardship Council) (occasional observer)
 - Post meeting agendas and meeting minutes on Town website.
 - Provide required copies of meeting minutes to the Carlisle Town Clerk.

Land Management

Promote Conservation and Land Management

- Continue to prepare, review and update Management Plans for each parcel of conservation land and for each parcel of Town land under Conservation Commission management.
- Make a calendar of yearly maintenance and inspection tasks. This calendar should include items such as: brush cutting; field mowing; restrictions on field mowing to respect bird nesting and other wildlife interests; inspection of fences, nest boxes, and signage; inspection of paths and parking areas; inspection of field conditions; monitoring of invasive species; confirming property line integrity and possible need for property line surveys.
- Review conservation lands for invasive plants and develop a strategy for their control, especially within environmentally sensitive areas. Continue the work begun, but not yet completed, to control invasive plants on the Foss Farm Conservation Land and to control poison ivy and invasive buckthorn on Towle Field on the Towle Conservation Land.
- Develop yearly and long-term budgets for the maintenance for each parcel.
- Renew Cranberry Bog lease agreement, expiring in June 2015.

- Evaluate Greenough dam for repair, replacement or removal and initiate and support the actions necessary to carry out that decision.
- Coordinate responsibilities for providing annual funding for maintenance of the Benfield Conservation Land with the Housing Trust, Housing Authority, and the leaseholder for the Benfield Farms housing development on South Street.
- Help the Recreation Commission evaluate the suitability of conservation land for future athletic fields or evaluate future purchases as multi-purpose conservation or recreation sites.
- Develop forestry management plans for identified tracts on conservation lands.
- Develop agricultural management goals and incorporate those goals in the awarding of agricultural licenses.
- Continue to support the Land Stewardship Committee.
- Regularly review regulations for camping on conservation lands to provide best guidance for camping.
- Continue to review rules associated with the Community Gardens on Foss Farm to ensure fairness for all.
- Develop a Conservation Land Management Plan to provide guidance for evaluating activities proposed for conservation lands, such as agriculture, commercial filming, and active recreation.
- Review proposed trails for habitat impact.
- Maintain the new signs on conservation lands.
- Install or maintain kiosks on all the major properties, and provide current maps and wildlife information in all kiosks.
- Support efforts to encourage agriculture in Carlisle and also efforts to reduce conflicts between agricultural activities and nearby homeowners.

Encourage Conservation Restrictions

- Maintain and support activities of the Conservation Restriction Advisory Committee (CRAC), including the periodic field inspections of CRs.
- Continue to improve file information on CRs and continue the accurate depiction of CRs on the Town's Assessors maps.
- Work with the Planning Board to ensure that Open Space in Conservation Clusters is adequately demarcated in the field so that property owners understand that a CR and/or conservation property exists and where the boundaries are.
- Work with the Planning Board to assure that Conservation Cluster developments protect those portions of the land that optimally should be conserved.
- Develop a standardized enforcement procedure to handle CR violations.

Promote Wildlife Management

Plant and Wildlife Inventory

- Support the Carlisle Natural History Survey.
- In order to protect species diversity adequately, continue a project through volunteer participation to survey wildlife in town (Appendix D)
- Support mapping of vernal pools.

- Work with the Massachusetts Natural Heritage and Endangered Species Program to map rare plants and animals in town.
- Support efforts by qualified individuals and organizations to monitor rare species and species in decline located in Carlisle.
- Encourage reporting of observed listed wildlife species, including plant species.
- Support invasive species reporting.

Wildlife Management

- Explore management options when wildlife and human populations conflict (e.g., expanding deer, coyote, and bear populations; disease-bearing wildlife such as deer ticks and mosquitoes).

Control Pollution

- Work with the Department of Public Works on resurfacing projects to protect wetlands from road-salt runoff using best management practices.
- Seek reduction in use of road salt through adoption of best management practices.
- Seek the use of best land management practices during construction by developers through adequate review and comment on permit filings.
- Encourage the adoption of “eco-friendly” residential practices through support of the Carlisle Pesticide Awareness Group. Encourage coordinated press releases with other Town boards or community interest groups about alternative residential technologies.

Increase Accessibility

- Make the paths around the Cranberry Bog accessible for OPDMDs with low-cost improvements.
- Monitor the implementation of the recently enacted OPDMD policy, and suggest revision as necessary.
- Consider accessibility improvements whenever parking or other facilities are improved or constructed.
- Develop a review and grievance procedure so that the public can suggest how to improve access to conservation lands (Table 11 and Appendix F)
- Support the installation of properly constructed and maintained pathways and trails as a means of improving access to scenic vistas and conservation lands.

Land Protection

Promote Acquisition Programs

- Periodically review and confirm selection of parcels essential to meet recommended goals and acquire parcels as available for open space to round out existing holdings; link major trails, major pieces of open space, or both; preserve land for passive recreation and wildlife management (e.g. keep balance of fields and woodland, protect rare species).
- Western Corridor: Continue to protect areas in the southwest sector (Map 7) to create a western corridor from the Chelmsford border to the Concord line, preserving land from the Sorli farm on Westford Street and the Valentine farm on Acton Street with their vistas and also Spencer Brook. (*Note: This goal is consistent with the Metropolitan Area Planning Council (MAPC) MetroGreen recommendations*).

- River Reservation: Protect remaining open space near the Concord River (Map 7), with possible assistance from the Sudbury Valley Trustees, the Great Meadows National Wildlife Refuge, or both.

Pursue Programs Not Involving Full Acquisition

- Seek permanent conservation restrictions on properties not needed for active or passive recreation. Particularly suited for conservation restrictions are those sites whose main values include vista, aquifer, agriculture, wildlife habitat, or trail corridors.
- Explore possibility of securing conservation and agricultural restrictions for various priority parcels.
- Support placing permanent conservation restrictions on Town conservation land, including, but not limited to, the Conant Land.

Practice Planning

Yearly review

- Set aside time each year to review goals and priorities. Be proactive in preservation and land management.

Early planning for large parcels

- Work with the Carlisle Land Trust and landowners to plan protection of large properties to ensure that conservation values can be preserved. Where some development is financially necessary, suggest a Conservation Cluster development or a Senior Residential Open Space Community. Where appropriate, work with the Municipal Land Committee and Carlisle Housing Authority to help meet additional town needs while preserving a property's conservation values and providing open space associated with such a development.

Grants

- Maintain eligibility for state discretionary grants.
- Continue to work with the Bay Circuit Trail Program to find and to protect areas of mutual town-state benefit. Become informed of the open space components and objectives within MAPC's MetroFuture regional plan for Metro Boston through 2030. Explore other state and federal programs that may assist Carlisle or Carlisle/Bay Circuit trail projects.

Tax Incentives

- Investigate how to provide maximum property tax incentives for granting publicly beneficial permanent conservation restrictions.

G. Conservation Restriction Advisory Committee Initiatives for 2013 through 2019

The Conservation Restriction Advisory Committee (CRAC) advises the Town on the acceptance of new conservation restrictions (CRs) and monitors those conservation restrictions held by the Town. The committee strives to educate property owners with CRs and all Carlisle residents on the benefits of conservation restrictions, including preservation of open space, scenic vistas, trail connections, and wildlife habitat. Plans for the next seven years include the following:

- **Advising the Town on new conservation restrictions**
CRAC will review and advise the Town on new proposed conservation restrictions. An example of this activity is the new CR 64 on Skelton Road that was created during 2011.

- **Monitoring of conservation restrictions**

CRAC will periodically conduct site visits to properties that have Town-held CRs. The goal is to have every property visited on a 5-year cycle. The site visits will be conducted after obtaining permission of the property owners. A CR inspection report, documenting the condition of the site, the presence or absence of CR violations, and CR boundaries, will be prepared and approved by CRAC after each site visit and stored at Town Hall to be available to the public.

If violations of the terms of the CR occur (such as trash dumping, unauthorized vegetation clearing, building of unauthorized structures, etc.), CRAC will initiate discussions with the property owner in conjunction with the Conservation Administrator and help develop strategies for mitigation.

- **Education of property owners**

CRAC will periodically send letters to owners of properties with CRs to remind them of the existence of the CR on their properties and their responsibilities, and to provide a list of frequently asked questions on CRs.

CRAC will also periodically publish articles and reminders in the Mosquito (the local town newspaper) on Town-held CRs.

H. Council on Aging Initiatives for 2013 through 2019

Support community initiatives toward the following goals

- Ensure all recreational areas meet Americans with Disabilities Act (ADA) standards for individual mobility, regardless of functional impairments. In particular, focus on providing more fully for the hearing or visually impaired during events and presentations.
- Create a “walkable” community through pathways and upgraded crosswalks to improve pedestrian safety. Over the past 7 years, pathways and crosswalks have been dramatically improved in Town Center and radiating therefrom. Continue to support the extension of pathways elsewhere in town and the walkability of new developments. Promote the establishment of a “walking group” on the town pathways. Acknowledging the limited number of trails that could be adapted for senior and disabled residents, work with the Trails Committee should opportunities arise for accessible trails or other facilities or opportunities for seniors to experience the valuable natural resources in town.
- Encourage the development of a community center to accommodate the many recreational and educational programs offered by Town departments. While this remains a long-term goal, the COA understands the near-term fiscal constraints of financing two new schools. The COA also has concerns about the potential isolation of seniors within a facility dedicated to seniors and believes that integration of seniors within the community should remain paramount. Nevertheless, the COA will support efforts, and will coordinate with the Recreation Commission as appropriate, to acquire municipal land that may provide a future home for a community recreational and education center to serve all ages. As noted below, the expanding senior population from the “boomer” generation has greater expectations of remaining physically active into retirement; this may drive the need for more exercise spaces and expanded hours of access.
- Create recreational opportunities and leisure activities for people of all ages. The COA

expects to continue to be the main resource for activities for seniors and will continue to work with the Gleason Public Library, the Carlisle Cultural Council, and the Recreation Commission to expand opportunities.

- Provide large and easy-to-read signs at recreational fields and trails. Coordinate with the Conservation Commission and the Trails Committee to expand the implementation of this goal.
- Increase homebound recreational planning for those who cannot leave their homes by teaming with the Recreation Commission, Library, Cultural Council and other Town boards and organizations.
- Offer cultural programs, in addition to recreational programs through the Friends of the COA, Library and Cultural Council.
- Expand resources to respond to the increasing transportation needs of seniors who would like to access recreational facilities both in town and beyond.
- Expand the supply of suitable and affordable housing for low- and moderate-income older persons.
- Although there is a continuing need for affordable housing, there is also a demand for market-rate housing for seniors who have finished raising families and wish to remain in town. Work to ensure that municipal efforts towards the development of housing options do not neglect this need, even though market-rate condominium units such as those at Malcolm Meadows do not “count” towards the Town’s supply of affordable units.

Work to improve open space and recreation offerings in town

- Raise senior citizen’s awareness of open space and recreational resources by including notices in the COA monthly newsletter, in the Outreach Coordinator’s weekly email updates, through the *Carlisle Mosquito* and on CCTV, the local community access cable TV station.
- Work to expand recreation offerings that would appeal to seniors such as the establishment of a “walking group” for all ages on Town pathways.
- Work with other Town boards to meet the increasingly varied recreational needs of an expanding population of senior citizens, with a growing number of younger seniors from the “boomer” generation expecting to remain more physically active. Toward this end, support the goal of the Board of Selectmen to investigate a strategy and plan for the creation of a Carlisle Community Center to provide expanded facilities and hours for exercise and recreation for seniors integrated with the rest of the community.
- Work with Town boards on housing needs for senior citizens, including, as noted above, both affordable and market-rate solutions for downsizing seniors who wish to remain in town but no longer need or have difficulty supporting older, larger single-family homes.
- Support municipal priorities that focus on the needs of seniors, including expanding tax relief (especially for long-term residents) to allow more seniors to remain in town, as well as providing more financial support for staff for recreational programs.

I. Finance Committee Initiatives for 2013 through 2019

Assist in analyzing the financial aspects of an Open Space and Recreation Plan.

Evaluate each new project on its merits within the context of the Town's current financial situation.

J. Historical Commission Initiatives for 2013 through 2019

The Historical Commission would like to see the creation of an improvement and ongoing maintenance plan for the Town Common and would like to take the lead in the development of such a plan.

K. Housing Authority and Affordable Housing Trust Goals and Action Initiatives for 2013 through 2019

Over the next seven years the Carlisle Housing Authority (CHA) and the Carlisle Affordable Housing Trust (the Trust) expect to continue to look to site affordable housing in locations and in ways that coordinate with recreational opportunities and open space. Almost unique among Massachusetts cities and towns, conservation, recreation and affordable housing supporters have cooperated in practical and effective ways in Carlisle. In 2004, the Carlisle Conservation Foundation (CCF) working with the Town of Carlisle's Conservation Commission, Recreation Commission and Planning Board, among others, provided the Town with an option to acquire the 45-acre Benfield "Parcel A" property on South Street for multi-purpose use. Since then, Benfield Parcel A has been cooperative master-planned and control transferred to CHA (4 acres), Recreation Commission (15 acres) and Conservation Commission (over 25 acres), with the Recreation and Conservation lands subject to both reserved easements for a water supply well and septic system serving the CHA parcel and to perpetual conservation restrictions. The well has been installed at and the septic system approved on the Conservation Parcel at Benfield A, and construction of 26 units of affordable, rental senior housing on the CHA Parcel began in the Spring of 2013. The Conservation Parcel and Recreation Parcel at Benfield A have been improved with public trails and a wildlife viewing platform built out over the expansive wet meadows of Spencer Brook at the southeastern edge of the Conservation Parcel. The senior housing development at the CHA land will include six parking spaces and a trailhead for these public trails and the wildlife viewing platform.

In 2012, the Trust, working with CCF and supporters of active and passive recreation, proactively obtained a purchase and sale agreement on the 5-acre Goff property, located at 338 Bedford Road, connecting the existing active recreational complex on the Town-owned Banta-Davis property with the Fox Hill Conservation Land. In November, 2012, a Special Town Meeting and debt-exclusion ballot vote approved the funding for the purchase of the Goff property for group homes for the adult developmentally challenged, for a second means of access to Banta-Davis, and for multiple loop trail connections among Banta-Davis, the School property and Fox Hill (connecting via the Rodgers Road trail and Stearns Street to the Malcolm Preserve and Estabrook Woods). In addition, Special Town Meeting approved use of the Goff property for other recreational uses in conjunction with the above, including the construction of a community and/or senior center, tennis and basketball courts and playing fields.

The Trust and CHA are, and will continue to be, in active conversations with the Board of Selectmen and the Carlisle School Committee, who control the Banta-Davis Land, and the Recreation Commission, who use a portion of the Banta-Davis Land, to seek committee and then Town Meeting authorization to use limited portions of the Banta-Davis property, for non-age-restricted rental housing, which would provide a much-needed housing alternative in Carlisle (for seniors as well as singles and families) and would also help the Town make progress toward its obligations under Chapter 40B, as 100% of such rental housing units would count toward the Town's 40B obligation, so long as 25% of such units are targeted for low- or moderate-income households. The Trust and CHA believe that rental housing and recreation and open space opportunities can and should be co-located when possible, both to preserve the character of Carlisle and to provide all residents with ample opportunity to live healthy and active lives while enjoying the protected open lands in Carlisle.

The Trust and CHA will continue to look for ways to maintain and deepen cooperative ties with open space and recreation advocates and to advance housing choice and to satisfy the Town's 40B obligations while maintaining the character of Carlisle as a town open and supportive of all ages, incomes, abilities, and recreation preferences.

L. Land Stewardship Committee Initiatives for 2013 through 2019

Property maintenance and improvement

- Work with ConsCom to prepare a new agricultural lease agreement for the Cranberry Bog for 2015
- Work with ConsCom to prepare revised agricultural lease and license agreements for conservation lands
- Monitor the condition of conservation land signs
- Coordinate with ConsCom in dealing with vandalism, encroachments, and cleanup on Town conservation land
- Monitor ongoing pilot projects for invasive plant removal at Foss Farm and other properties, and develop new initiatives based on experience with the pilot projects
- Continue to coordinate with Town volunteer groups to maintain and improve Town conservation lands

Outreach and education

- Plan and hold joint conservation meetings with other conservation groups at least once yearly
- Plan public programs and events on topics such as wildlife habitat, invasive species control, etc.
- Periodically hold appreciation events for volunteers

Rules and guidelines for conservation land use

- Assist other boards and committees to tailor and enable implementation of OPDMD guidelines, initially developed for Town conservation land
- Revise other sets of conservation rules and guidelines as needed and requested by ConsCom (camping, community gardens, dogs on conservation land, etc.)

Baseline Assessments and Management Plans

- Complete Baseline Assessments for significant Town-owned conservation parcels
- Complete Management Plans for significant Town-owned conservation parcels

Special reports and projects

- Complete analysis of the conservation value of Town-owned tax parcels (odd lots) for ConsCom
- Continue to work with the Cranberry Bog Subcommittee of Carlisle and Chelmsford on issues of common concern, including new wells and dike repair
- Evaluate the feasibility and usefulness of surface water testing on conservation land
- Find and evaluate mechanisms for funding special projects on conservation land
- Others as requested by ConsCom or initiated by LSC

M. Planning Board Initiatives for 2013 through 2019

Use the permitting process for developments to continue to encourage preservation of open space and minimization of disturbance of the existing landscape

Over the past five years the Planning Board developed and adopted as part of all its rules and regulations for all types of development in town a set of General Development Standards to “assure that development will not adversely impact the environment, particularly the private water sources exclusively relied upon by Carlisle residents.”

Following these development standards, the Board will continue to encourage development patterns that preserve: water resources and natural recharge of the underlying aquifer; existing trails and the opportunities for connections to and between protected open space and other trails; and vistas, stone walls, natural buffers and wildlife corridors.

Where development is proposed, the Board will continue to encourage the use of Conservation Clusters, Senior Residential Open Space Communities (SROSCs) and common driveways as an alternative to standard subdivisions to preserve as much as possible of the existing landscape and other natural resources.

The Board will also coordinate with the other Land Use Boards and the Building Commissioner to ensure compliance with local bylaws designed to restrict development that may place an unreasonable demand on scarce natural resources, particular adequate supplies of drinking water.

The Board will continue in its advisory role to the Selectmen on municipal and other non-residential as well as multi-family housing projects under Site Plan Review, in all cases encouraging development that is optimally sited to protect and preserve natural areas, wetlands and wetland buffers, and habitat for rare or endangered species.

The Board will continue to review applications for alterations of stone walls and tree removal along local scenic roads under the Scenic Roads Bylaw, in all cases considering the preservation of natural resources, historical values and aesthetic characteristics.

Work to integrate GIS into all aspects of Town government to facilitate delivery of services and mapping required for planning documents and initiatives

Work with the Assessors' office to convert all Town parcel maps to GIS format such that the parcel and roadway databases will be automatically updated annually through the Assessors tax map update process.

Build onto the GIS database to make GIS a working tool for document retrieval, planning, and oversight of open space, municipal land, conservation restrictions, water resources (including private wells and septic systems), and other resources.

Encourage all Town agencies to train for and use GIS as a working tool to coordinate objectives and efforts across all boards, committees, and departments.

Develop protocols to make GIS data available to Carlisle's citizens through the Town website to improve their access to and understanding of existing town data for their property and neighborhoods.

Help develop Town-wide strategies for improving housing diversity while maintaining Carlisle's rural character

The Planning Board will work with other Town boards and committees to develop strategies that will allow rational planning for housing development, public facilities, and land preservation in the locations desired by the Town, rather than entrust this future development to the comprehensive permit (Chapter 40B) process, which limits local controls.

Specifically, the Board will evaluate existing zoning bylaws to determine whether amendments that might be proposed to Town Meeting would provide opportunities for open space and more efficient use of water resources, including revisiting the concept of increasing density in certain areas to preserve more significant tracts of open space, similar to what was incorporated in the "Open Space Neighborhoods" bylaw that was presented to Town meeting in 1998 and 1999 but did not garner the 2/3 majority vote needed for its adoption.

Among the other housing strategies that may be considered are the following.

- Work with the Selectmen and Housing Authority to develop Local Initiative Project (LIP) guidelines that strike the right balance between creating adequate economic incentives for developers seeking to build denser developments for affordable housing with the necessary protections for neighbors' private wells and septic systems and the preservation of environmental and other community resources.
- Consider expansion of Conservation Cluster bylaw to allow multi-family and/or attached housing in return for preservation of valuable natural resources.
- Consider creation of a new overlay Residence District zoned for denser development in specified locations (based on land characteristics to meet specified "carrying capacity" criteria, buffering, and impacts on neighboring properties) in conjunction with Town-directed local initiatives.
- Consider application of existing Senior Residential Open Space Community bylaw (applicable to parcels greater than 10 acres) on parcels available for development (only applied once to date at Malcolm Meadows, 12 units of unsubsidized elderly housing).

Review revised State policy for Stormwater Management.

The Planning Board will review and revise as necessary the bylaws, rules, and regulations permitting local development to ensure they are consistent with new state regulations. As part of this process, the Board will incorporate standards relating to Low Impact Development as applicable. The Board will also coordinate with the Carlisle Conservation Commission and the Carlisle Board of Health regarding the effect of the new State stormwater management standards on wetlands permitting and on policies for groundwater, surface water, drinking water, and septic systems.

N. Recreation Commission Initiatives for 2013 through 2019

Augment Recreation Facilities.

The need for additional sports fields is being driven by a number of factors, such as the following.

- Increased popularity of organized sports in general
- Increase in the number of girls participating in sports
- Increase in the number of sports offered
- Increase in the number of seasons a sport is played (example: both spring and fall)
- Increase in the number of teams a child plays on
- Increase in specialized or travel teams
- Adult leagues and teams
- The need to rest fields in order to keep them healthy and safe (During peak season all Carlisle's athletic fields are being utilized at or beyond capacity damaging the turf.)

The Recreation Commission has identified the following short- and long-term needs for additional facilities.

FIELD NEEDS (THROUGH 2019)

- One additional all-purpose artificial turf field for soccer, lacrosse, field hockey, flag football, etc. on the Banta-Davis Land (There is currently no lacrosse venue in Carlisle.)
- Four additional tennis courts on the Banta-Davis Land to serve the community at large as well as allow for a school tennis program
- Two renovated basketball courts replacing the existing tennis courts at Spalding (These courts may possibly also be used for ice skating in the winter.)
- Walking pathways throughout the Banta-Davis Land
- A path and bridge through the wetlands connecting Banta-Davis to Spalding Field to give the school access to the Banta-Davis facilities as well as create another trail connection for residents (CPA funding expected to be sought in 2013)

LONG-TERM NEEDS

- Community Center for exercise, fine arts, and after-school programs

Maintain Recreation Facilities.

Continue to maintain recreation facilities according to the detailed maintenance plan for all active recreational facilities, including Spalding field, Banta-Davis Land fields, and Diment Park. Carlisle Recreation is responsible for mowing, planting, fence repair, and all related maintenance of these facilities.

Initiate a plan for organic field maintenance.

Analyze success of organic treatment of fields and adjust maintenance as needed to address insects, appearance, and grass quality. Continue to evaluate organic field maintenance and seek additional funding, if necessary, to sustain field quality and to obtain the best outcome possible.

Increase Accessibility

Engage a consultant to undertake a comprehensive review of the accessibility of all facilities used by the Recreation Commission (aside from Town Hall and the new Carlisle Public School building), including cost estimates for recommended programmatic and/or structural changes to improve accessibility. Prioritize the recommendations into a 5-year plan and seek funding for implementation.

Keep informed on regional recreation plans.

Maintain a dialog with contiguous towns and the Commonwealth, especially the Statewide Comprehensive Outdoor Recreation Plan (SCORP), to keep abreast of regional recreation plans.

O. Trails Committee Initiatives for 2013 through 2019

The Trails Committee continues with its mission in four areas: Mapping, Education, Maintenance, and Developing new or protecting existing trails.

Trails Mapping

The Trails Committee completed an extensive rewrite of its trails book, *Trails in Carlisle*, in 2010. All trails were walked and entered on the GIS system using GPS technology. Special features of trails and land parcels were noted in the text. All trails were given identifying names. The trail book is available at the Town Hall and at Ferns Country Store. Trail maps are also available electronically from the Committee's website, <http://CarlisleTrails.pbworks.com>.

In the next seven years, the Committee will:

- Continue to update maps with new trails and information about the trails on the GIS system
- Evaluate all trails in map form for level of accessibility
- Work with dispatcher on maps appropriate for off-road rescue

Education

The Trails Committee educates the public about the trails network in several ways. The new (2010) *Trails in Carlisle* book included updated information about the trail system. The Committee also established a website (<http://CarlisleTrails.pbworks.com>) that contains much of the information from the trails book, along with additional documents and more time sensitive information. The Committee historically has led a variety of public walks, including a winter night walk, spring vernal pool walk, a double sundae Sunday saunter with two ice cream stand visits, a Riverfest walk, mushroom walk and a post-Thanksgiving day walk. The Committee has also led walks to educate residents about new conservation parcels and trails. The most popular walks in the last few years have been on the Benfield Land, including the Twin Peaks Trail and a moonlight walk to the newly built observation platform overlooking Spencer Brook. The Committee has also led trail walks for parcels of land that the Town is considering purchasing to inform the public on its natural features.

The committee started a Carlisle Trekker Award given to individuals who document hiking all the trails in Town and volunteer a half-day of trail work. Thus far 20 people have completed the requirements and received the award. Announcements of the awards in the local newspaper have encouraged more people—young and old—to support our efforts, hike the trail system and come forward to receive their Trekker patch.

During the next seven years, the Committee plans to:

- Continue to lead at least one public walk per season, with additional walks as the occasion arises
- Coordinate nature walks with CCF and the Conservation Commission
- Update the website periodically

Trail Maintenance

The Trails Committee conducts an active program to maintain Carlisle's existing trails and will continue this program over the next seven years.

Activities include:

- Utilize local volunteers to maintain and improve trails
- Host workdays for trail clearings, which also are used to teach volunteers about land stewardship, local invasive plants and other aspects of trail maintenance
- Coordinate regional trail development with our trail network. These may include the Bay Circuit Trail, Bruce Freeman Rail Trail or the Concord River
- Establish relationship with Sudbury Valley Trustees for trail maintenance on the Elliott Preserve
- Construct new boardwalks where needed and repair existing ones as required. (New Foss Farm and Chestnut Estates (Rangeway) boardwalks are planned in 2013.)

New initiatives, which may require additional funding from the Town or through grants, as well as a commitment from the Town to pursue, include:

- Survey existing signage on all trails to assess adequacy for safety considerations, particularly in relation to the search and rescue needs of the Carlisle Police Department
- Survey existing signage on all trails to assess opportunities for signage for the handicapped, including informational signage for people who are seeing impaired
- Survey existing trails to determine which portions may be made more accessible to the handicapped, with appropriate funding to effectuate the necessary modifications to access points and the trails themselves, as well as the expected costs of maintenance

Developing New Trails and Easements

The Trails Committee frequently collaborates with Town boards, other committees, the Carlisle Conservation Foundation, and developers to help locate new trails and to encourage granting of easements or other forms of public access. Once trail access has been secured, the Committee organizes volunteers to clear the trails and build improvements such as boardwalks.

During the next seven years, the Trails Committee will continue these activities, including:

- Coordinate with Town boards, committees and with Carlisle Conservation Foundation to educate the public on the existence of trails or possible connections between trails

- Inform the Planning Board and Conservation Commission about the location of major trails on private land
- Attend Planning Board meetings as appropriate during hearings for developments that involve trails
- Work with the Conservation Restriction Advisory Committee, CCF, and other groups to permanently protect trails
- Coordinate with other Town boards including the Conservation Commission and Land Stewards on trail issues as needed
- Work with trail groups in surrounding towns to provide inter-town trail connections
- Work with landowners and developers to preserve and protect public access to trails, with priority given to the following trails connections:

North-West connections

- Morse Road: public access along entire length
- Carlisle Pines to MacAfee Trail, with connection to Westford and Chelmsford trails
- Western protected land (Valentine) to those in the northern section, including Sorli farm to Carlisle Pines and sections of Hanover Hill

The first two links would allow clear passage between the Bruce Freeman Rail Trail and many areas of Great Brook Farm State Park and Carlisle Pines and the Cranberry Bog to the center of town. The third link would protect a major flow of water to the River Meadow Brook. Views of Sorli farm greatly enhance the rural vistas along Route 225 and pedestrian access would provide a connection to Carlisle Pines.

South-West Connections

- Benfield area connections: Benfield Hill to South Street/Benfield Conservation Land; Spencer Brook Reservation to Benfield Conservation Land
- West border with Acton: Ben's Woods to Acton Street, including connections to Acton conservation land at Ben's Woods, Log Hill, High Woods CCF land, and Valentine land
- Connection of Bisbee Land to Estabrook Woods
- Loop connections to Towle, Greystone and Pathways out to Concord Street and Route 225

These connections would enhance pedestrian access to many of the Town's preserved open space parcels and would secure protection for the wildlife corridors from Acton's Spring Hill and Robbins Mill areas through the Spencer Brook lands and into Estabrook Woods.

South Connections

- Bartlett Farm
- Flannery

Both of these privately owned parcels have old carpaths, trails and critical dry land access between two wetlands that separate the east and west side of town at its southern

end. Bartlett Farm has existing CR protections, but no public trail easement. The Flannery property is a keystone property within the Estabrook Reserve for pedestrian access and wildlife, completely surrounded by protected land, with a critical trail connection.

Center Connections

- Banta-Davis: better connections from school and neighborhoods. Wetland boardwalks are needed from Rodgers Road and between Spalding field and the Banta-Davis Land.
- Kimball's to Cutter's Ridge
- Morse Road to Conant
- Pathway connection to Towle from Town Center
- Concord Street to Towle
- Former Seawright land (part of alternate route for Town Center to Cutter's Ridge)
- Top ranked parcels in and near the Center (Hamilton, Zoll, and Talbot)

Some of these connections will make the Town a more walkable community. Others provide protection for the headwaters of the Pages Brook and tributaries of the River Meadow Brook and Spencer Brook.

North-East Connections

- Rangeway to East Street and/or Nickles Lane
- Tophet East Loop to East Street gate
- Pathway on East Street to connect Partridge Lane and Ice Pond Road
- Rangeway to Nickles Lane and/or Oak Knoll neighborhood to the Red Fox Drive and Greenough

The first three connections would make for safer access for both pedestrians and wildlife between Great Brook Farm State Park and the eastern side of town in an area where the road is narrow and winding. The fourth would extend access from the state park along the old King's Grant Highway (now a cart path) into the Greenough Land and Great Meadows National Wildlife Refuge.

East Connections

- Dry land access to the Concord River (Elliott River Preserve, planned boat landing)
- Beaver Trail loop and Maple Street connection
- Blood Farm Trail to Stoney Gate
- Bedford Road pathway extended to Davis Corridor and new Foss Farm trail

The boardwalk just completed on Foss Farm provides access to Skelton Road near the newly acquired Bose property along the Concord River, and to the Elliott Preserve, creating a much needed access route for safe pedestrian traffic from the lands along Great Meadows National Wildlife Refuge and the Concord River to Estabrook Woods, as well as making more connections to the neighborhoods in these areas.

Section 10: Public Comments and Letters of Approval



A view along the Twin Peaks Trail on the Benfield Hill property owned by the Carlisle Conservation Foundation. Benfield Hill is one of the highest spots in Carlisle and served as an informal ski hill in the 1960s. The trail loops around a large vernal pool nestled in a hemlock grove and past some large granite outcroppings.

Section 10: Public Comments and Letters of Approval

In early June 2013, the public was invited to review and provide input to the Committee on the draft 2013 Open Space and Recreation (OS&R) Plan, posted online and available in Town Hall and at the public library. Feedback was received from numerous citizens in the several weeks before the public presentation of the Plan in late June. The specificity and detail of that feedback (including suggested refinements in wording for clarity, some corrections to a few facts and figures, and even the spelling of the Latin name of a threatened species) was quite heartening; that so many people were carefully reading the voluminous report demonstrated the importance to the community of open space and recreation and of the planning process itself.

Twenty people attended the public presentation of the draft on June 26, 2013, in Town Hall, at which were displayed large copies of some of the key maps and other visuals from the plan. After an introduction, description of the planning process, and presentation of plan highlights by Committee Chair Louise Hara, members of the public weighed in. Comments were generally positive and included the observations that each successive OS&R Plan has built on and been an improvement upon previous plans and that, as a result, the plan is an extremely useful reference document on the current state of our open space and recreation facilities and a tool for understanding and addressing needs going forward.

Two members of a private organization, Carlisle Parents Connection (CPC), presented some concerns from their group that is dedicated to issues affecting parents of infants and toddlers in town. They noted that older residents are served by the Council on Aging and that the concerns of older residents and of the disabled are addressed in the Plan, but that the very young are not represented by any town committee, and their concerns (or the concerns of their parents) are not specifically addressed in the Plan. One mother commented that difficulties in navigating pathways and trails, as well as areas where neither are available, with a stroller—particularly a double stroller—create access issues for her just as they do for people in wheelchairs. She identified areas in the Town Center—an area generally considered well served by the recently completed Town Center Pathways System—that are difficult or dangerous for strollers and even older children heading to or from school on foot.

She also noted that information about what is and what is not accessible was hard to come by. Committee members noted that much of the ADA assessment work still to be done pursuant to Table 11 on the accessibility of Town facilities should be expanded to address, as appropriate, the concerns she had raised. They also suggested that the promised improvement in communication between Town government and the disabled community should be extended to families with very young children, such as those represented by CPC. They provided the CPC representatives with town government and volunteer contacts related to the pathways issue. She also expressed CPC concerns about needed repairs of a playground and a batting cage; these concerns were duly noted by the Chair of the Recreation Commission.

One attendee said that, although she was heartened by the reports in the Plan of the recent increase of organic farming operations in town, she believes that this increase is more accidental than planned. She stressed the importance to our food supply, our water quality, and our environment of a move away from toxic chemical use in agriculture; this view was

enthusiastically seconded by several other attendees. It was also noted that pesticides, herbicides and fertilizers used on residential lawns may affect the local environment and groundwater more than those used in farming operations. It was suggested that the newly formed Agricultural Commission might be the ideal mechanism for encouraging organic methods in local agriculture. The Plan's text has been amended to emphasize concerns already included about toxic chemical use in both farming and residential landscaping and the need to promote alternate organic approaches.

The discussion continued to the issue of chemical treatment of invasive species. It was noted that topical application of herbicides, for example, to cut stems of invasives such as bittersweet and buckthorn was quite different from broadcast spraying that may be used in commercial farming operations. It was agreed that the threats from invasives on our natural environment warranted targeted application of herbicides (done or supervised by trained professionals).

Another comment addressed the Five-Year Action Plan items that are highlighted on Map 8 as high-priority initiatives selected by the Committee from the five-year action plans submitted by numerous town boards and committees. Noting that five-year action plan maps in previous OS&R Plans focused almost exclusively on land acquisition, the priorities mapped this time comprise predominantly management and other efforts on already protected parcels. Although attendees understood that priorities have changed over time, one parcel was identified as likely to be a priority in the near future. The Committee agreed to add acquisition of that parcel to Map 8 as a high-priority initiative for the next five years. (The Five-Year Action Plan was subsequently extended to a Seven-Year Action Plan.)

The final major discussion topic related to Recreation Commission plans, illustrated visually in Appendix G and displayed as part of the presentation, to address current and future needs for active recreation fields and other recreation facilities in town. In answer to a question as to whether the Town should be actively seeking additional land for recreation, the Chair of the Recreation Commission stated that the Banta-Davis Land, if dedicated to recreation and not used for the rental housing development currently under consideration, should suffice for town recreation needs for the foreseeable future. Advantages of using Banta-Davis for recreation were noted, including the significant investment already made on the site for existing fields and infrastructure (including irrigation and parking), adjacency to the school, significant buffer areas on all sides from neighboring residences, access off one of the major through roads in town, and the many efficiencies (for maintenance as well as for users of the facility) of a consolidated recreational facility with neighboring Spalding Field. The community-park feel of the plans also appealed to the representatives of the CPC. The Chair of the Recreation Commission acknowledged that much of the work in support of recreation is done by volunteers and that in some cases, repairs take some time. Attendees noted that building out the facility as planned will be expensive and that the Town will also need to fund the annual maintenance of the additional fields and facilities.

The meeting closed with suggestions that once the Plan is approved and filed with the Commonwealth, the Plan's visuals, including the informative maps, should be displayed prominently in Town Hall or in the library for broader public viewing.



The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Deval Patrick
GOVERNOR

Timothy Murray
LIEUTENANT GOVERNOR

Richard K. Sullivan, Jr.
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181

September 20, 2013

RECEIVED

SEP 25 2013

CARLISLE
CONSERVATION COMMISSION

Sylvia Willard
Conservation Commission
66 Westford Street
Carlisle, MA 01741

Re: Open Space and Recreation Plan

Dear Ms. Willard:

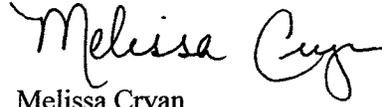
Thank you for submitting the draft Open Space and Recreation Plan for Carlisle to this office for review and compliance with the current Open Space and Recreation Plan Requirements. This plan was particularly thorough and has been conditionally approved through September 2018. Conditional approval will allow the town to participate in DCS grant rounds through September 2018, and a grant award may be offered to the town. However, no final grant payments will be made until the plan is completed.

Once the following items are addressed, your plan will receive final approval:

1. Introduction – how were the meetings for the Public Participation Process advertised?
2. Environmental Challenges – additional information on environmental equity is needed. Environmental equity refers to looking at the distribution of open space in the town and noting which areas need more access.
3. Section 5 – the section should begin with an explanation of why open space protection is important. Any APRs in the town should be listed. Table 10 was very well done! We strongly recommend against listing specific parcels that the town is interested in purchasing. This is a good way of putting the owners on notice and driving up the selling price.
4. Community Goals – how was the public sentiment gauged for this plan specifically? The latest date I see public input being gathered was 2009. Also, the statement of goals includes the goals from 1995. Are you sure that you want to use 18 year old goals?
5. Action Plan – the goals and objectives should be listed year-by-year in some sort of priority order, with a funding source and responsible party identified for each, preferably in a table format, not listed in paragraphs. Please note that DCS now allows for seven year action plans. If the goals and objectives are spread out over seven years, the plan will be good for seven years instead of five. Letters of Review – letters from the Regional Planning Agency, Planning Board, and chief municipal officer are required.

Congratulations on undertaking this important task! Please contact me at (617) 626-1171 or melissa.cryan@state.ma.us if you have any questions or concerns, and I look forward to reviewing your final plan.

Sincerely,



Melissa Cryan
Grants Manager

617 626 1171

STATE OF MASSACHUSETTS
DEPARTMENT OF REVENUE

From: Cryan, Melissa (ENV)
Sent: Monday, November 18, 2013 3:55 PM
To: Sylvia Willard
Subject: RE: Carlisle's OS&R Plan Resubmission

Sylvia,

The edits that you made address all of the concerns from my comment letter. Once I receive a hard copy in the mail (as long as it includes review letters from the RPA, planning board, and chief municipal officer), the plan will receive final approval.

Thanks,
Melissa

~~~~~  
Melissa Cryan  
(617) 626-1171

**From:** Sylvia Willard  
**Sent:** Monday, November 18, 2013 11:16 AM  
**To:** Cryan, Melissa (EEA)  
**Cc:** mdraisen@mapc.org; David Freedman; Louise Hara  
**Subject:** Carlisle's OS&R Plan Resubmission

Dear Melissa,

Please find three attachments to this email which represent Carlisle's Open Space and Recreation Plan Committee's response to the input we received from you and from Marc Draisen of MAPC (whom I have copied on this email). The attachments are as follows:

The attachments are as follows:

1. A pdf file of a signed letter from Louise Hara, our Committee Chair, outlining the changes we've made in the Plan, keyed to your letter and the letter from Marc Draisen,
2. A Zip folder showing redlined changes in Sections 2-6 and 9 plus Map 8, the Sections of the plan that were changed in response to the input from EOEEA and MAPC.
3. A pdf file of a clean updated revised draft of Sections 1-10, the core text of the plan.

You will note that the letter from Louise ends with a request for a prompt review of the attached so we can try to get our local approvals completed by the end of this calendar year. I realize this may not be possible, but I will contact you later this week to check in and see what the likelihood is, so we can try and get Plan approval on some agendas. As Louise notes in her letter, please let me know if you need anything further from us.

Thank you very much.

---

Sylvia Willard, Administrator

Carlisle Conservation Commission  
66 Westford Street  
Carlisle, MA 01741

PH: (978) 369-0336  
FX: (978) 369-4521

*In compliance with M.G.L. c.66, all email correspondence to and from this account is being archived.*



August 14, 2013

Sylvia R. Willard, Administrator  
Carlisle Conservation Commission  
66 Westford Street  
Carlisle, MA 01741

Dear Ms. Willard:

Thank you for submitting the draft "Town of Carlisle Open Space and Recreation Plan 2013" to the Metropolitan Area Planning Council (MAPC) for review.

The Division of Conservation Services (DCS) requires that all open space plans must be submitted to the regional planning agency for review. This review is advisory and only DCS has the power to approve a municipal open space plan. While DCS reviews open space plans for compliance with their guidelines, MAPC reviews these plans for their attention to regional issues generally and more specifically for consistency with *MetroFuture*, the regional policy plan for the Boston metropolitan area.

The following are MAPC's recommendations for amendments to the Carlisle Open Space and Recreation Plan.

***Consistency with MetroFuture*** - *MetroFuture* is the official regional plan for Greater Boston, adopted consistently with the requirements of Massachusetts General Law. The plan includes goals and objectives as well as 13 detailed implementation strategies for accomplishing these goals. We encourage all communities to become familiar with the plan by visiting the web site at <http://www.metrofuture.org/>.

The Carlisle Open Space and Recreation Plan does not specifically mention *MetroFuture*. We encourage communities to include a brief paragraph about *MetroFuture* in Chapter III under Regional Context. Ideally this paragraph should explain ways in which Carlisle's Open Space and Recreation Plan will help to advance some of the goals and implementation strategies that relate specifically to open space, recreation, and the environment generally.

In the case of Carlisle's plan, this shouldn't be too hard to do since we see many positive connections between your plan and *MetroFuture* such as adoption of the Community Preservation Act, an emphasis on regional open space resources, consideration of the open space plans of surrounding communities and, an awareness of the importance of protecting agricultural land.

**Duration of the Plan** – DCS now allows open space and recreation plans to be good for seven years if a seven year action plan is submitted. If you add two more years' worth of activities to your action plan it will extend the life of the plan.

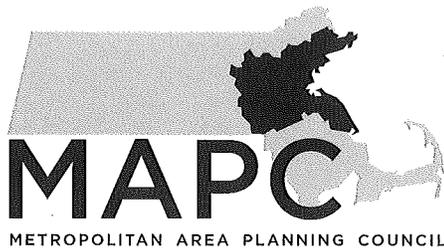
The plan is very thorough and it should serve the town well as it continues its efforts to preserve open space and provide for the recreational needs of its residents.

Thank you for the opportunity to review this plan.

A handwritten signature in black ink, appearing to read "Marc D. Draisen". The signature is fluid and cursive, with a long horizontal stroke at the end.

Marc D. Draisen  
Executive Director

cc: Melissa Cryan, Division of Conservation Resources



November 26, 2013

Sylvia R. Willard, Administrator  
Carlisle Conservation Commission  
66 Westford Street  
Carlisle, MA 01741

Dear Ms. Willard:

Thank you for submitting the draft "Town of Carlisle Open Space and Recreation Plan 2013" to the Metropolitan Area Planning Council (MAPC) for review.

The Division of Conservation Services (DCS) requires that all open space plans must be submitted to the regional planning agency for review. This review is advisory and only DCS has the power to approve a municipal open space plan. While DCS reviews open space plans for compliance with their guidelines, MAPC reviews these plans for their attention to regional issues generally and more specifically for consistency with *MetroFuture*, the regional policy plan for the Boston metropolitan area.

We are pleased to see that the plan includes information on consistency with *MetroFuture* as well as consideration of regional open space resources.

The plan is very thorough and it should serve the town well as it continues its efforts to preserve open space and provide for the recreational needs of its residents.

Thank you for the opportunity to review this plan.

Marc D. Draisen  
Executive Director

cc: Melissa Cryan, Division of Conservation Resources



Town Administrator  
Tel. (978) 371-6688

# Town of Carlisle

Office of

*BOARD OF SELECTMEN*

66 WESTFORD STREET  
CARLISLE, MASSACHUSETTS 01741  
TEL. (978) 369-6136



Fax. (978) 318-0098

December 13, 2013

To Whom It May Concern:

The Carlisle Board of Selectmen, at their December 10, 2013 meeting, voted unanimously to approve the Year 2013 update of the Carlisle Open Space and Recreation Plan. The Board reviewed the Plan and found it very complete and well written. The plan accurately represents the views of the Board and Town residents with respect to the continued preservation of our open space and rural character.

The Board continues to work with our various boards and departments to provide both passive and active recreation to meet the needs of our residents. The Carlisle Open Space and Recreation Plan is an invaluable source of information and guide that aids us in this endeavor.

Sincerely,

Timothy F. Hult, Chairman  
Carlisle Board of Selectmen



# Town of Carlisle

MASSACHUSETTS 01741

Office of  
**PLANNING BOARD**

66 Westford Street  
Carlisle, Massachusetts 01741

Tel. (978) 369-9702  
Fax (978) 369-4521  
E-mail: [planning@carlisle.mec.edu](mailto:planning@carlisle.mec.edu)

December 16, 2013

Ms. Louise Hara, Chair  
Open Space and Recreation Plan Committee  
739 Concord Street  
Carlisle, MA 01741

Dear Ms. Hara,

On December 9, 2013, the Carlisle Planning Board reviewed the final 2013 Open Space and Recreation Plan, dated November 1, 2013, and endorsed that plan by a vote of 6-0, with one member absent. The Board looks forward to utilizing this updated plan and the mapping and data analysis that was generated to support it as an invaluable resource to guide us in the land development and preservation decisions we are called upon to make regularly.

The Board and I also wish to express our deep appreciation and thanks for the work you and your committee members undertook on an almost daily basis for more than the past year. The product of those efforts will enhance the experience of those living and working in Carlisle through 2020 and for many years beyond.

Sincerely,

Marc E. Lamere  
Planning Board Chair

cc. Sylvia Willard, Conservation Commission Administrator  
Planning Board



# Town of Carlisle

Office of  
**CONSERVATION COMMISSION**  
66 Westford Street  
Carlisle, Massachusetts 01741

Tel. (978) 369-0336  
Fax: (978) 369-4521

December 12, 2013

Ms. Louise Hara  
Chair, 2013 Open Space and Recreation Plan Committee  
739 Concord Street  
Carlisle, MA 01741

Subject: Carlisle Conservation Commission Endorsement of the 2013 Open Space and Recreation Plan

Dear Louise,

The Carlisle Conservation Commission has reviewed and accepted with enthusiasm the updated Open Space and Recreation Plan submitted by your committee. The Commission congratulates and thanks you for your hard work and diligence in creating a plan that is truly reflective of the present status of Carlisle's open space and recreation programs. The report also creates a vision for the future that the Conservation Commission will utilize as Carlisle moves forward during the next several years. Citizens of Carlisle will benefit greatly from the work of you and your committee.

Sincerely,

Kelly Guarino  
Chair, Carlisle Conservation Commission





[www.carlislema.gov](http://www.carlislema.gov)

*Town of Carlisle*  
Office of  
**RECREATION DEPARTMENT**  
66 WESTFORD STREET  
CARLISLE, MASSACHUSETTS 01741  
Telephone: 978-369-9815



Fax: 978-371-6686

Open Space & Recreation Plan Committee

Town of Carlisle

December 5, 2013

To whom it may concern:

On December 4, 2013, the Carlisle Recreation Commission voted unanimously to approve the 2013 Carlisle Open Space & Recreation Plan.

We extend our thanks to the Committee for its hard work in creating a plan that accurately Presents the programs offered by the Commission as well as the current status, future needs and vision for recreation facilities in Carlisle.

Sincerely,

Rick Amodei

Chairman

## Section 11: Appendices

Appendix A: Land Protection Values

Appendix B: Carlisle Conservation Commission: Rules and Regulations

Appendix C: Natural Heritage and Endangered Species Program Summary Letter  
and Fact Sheets for State-listed Species

Appendix D: Wild Animals, Plants, and Other Organisms in Carlisle

Appendix E: Template for Email Sent to the Conservation Administrators  
of Each of the Six Contiguous Towns

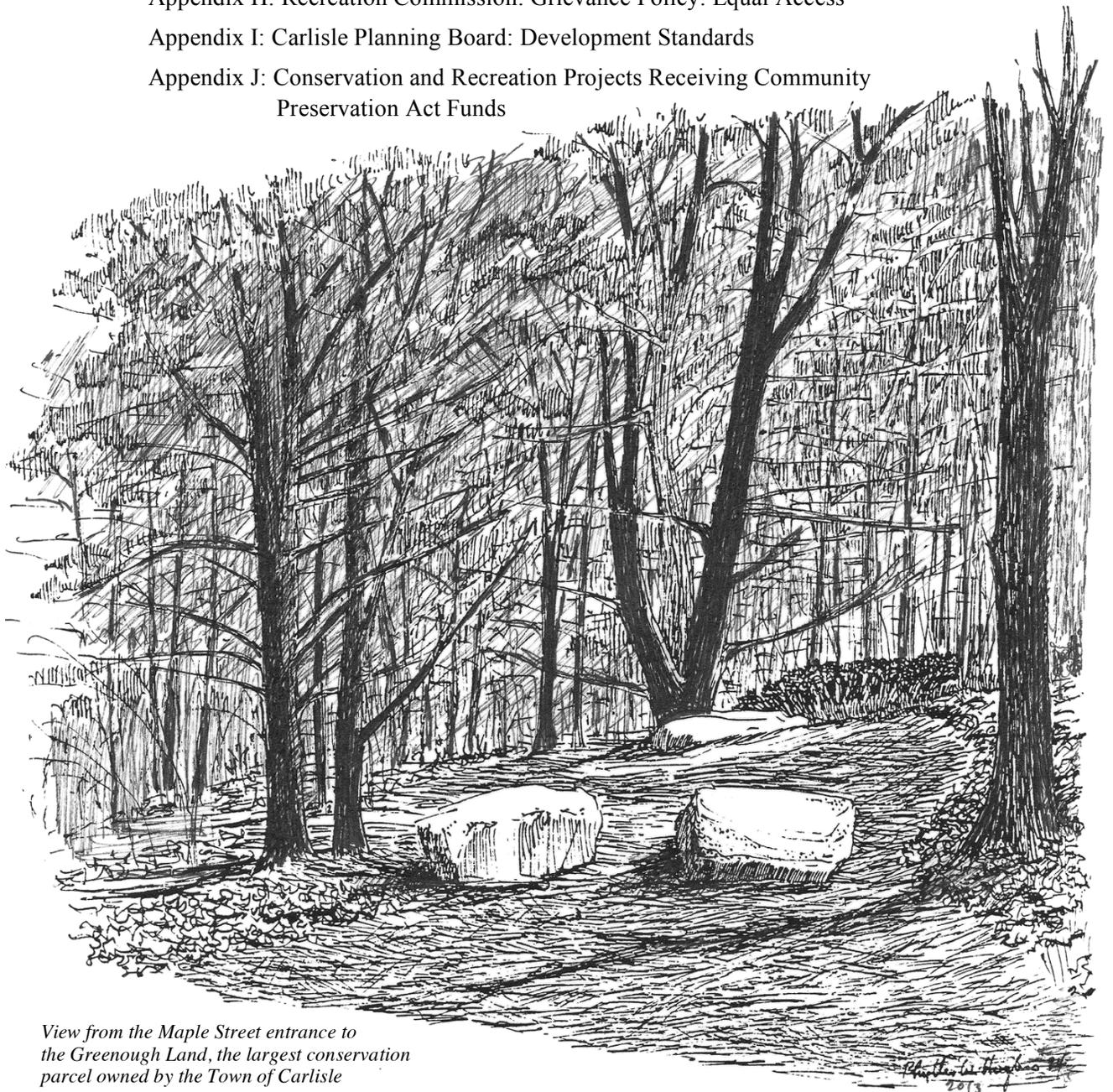
Appendix F: ADA Access Self-Evaluation and Compliance with ADA Requirements

Appendix G: Recreation Commission Plans for the Banta-Davis Land

Appendix H: Recreation Commission: Grievance Policy: Equal Access

Appendix I: Carlisle Planning Board: Development Standards

Appendix J: Conservation and Recreation Projects Receiving Community  
Preservation Act Funds



*View from the Maple Street entrance to  
the Greenough Land, the largest conservation  
parcel owned by the Town of Carlisle*

**Appendix A**  
**Land Protection Values**  
**(for Ranking Private Unprotected Parcels of 10 Acres or More)**

APPENDIX

**A**

## **Appendix A: Land Protection Values (for Ranking Private Unprotected Parcels of 10 Acres or More)**

### **Land Protection Criteria and Values Defined**

- 1. Core Habitat** – The land includes priority areas for protection of rare species and natural communities. The land provides habitat for rare, vulnerable, or uncommon native species. Relevant areas were identified from the Natural Heritage & Endangered Species Program’s *BioMap2*.
- 2. Water Resources** – The land includes areas significant for water resources protection. The land contains or is adjacent to surface water (Concord River, streams, ponds), wetlands, vernal pools, potential sites for town wells, or protective zones around town wells.
- 3. Active Recreation** – The land is suitable for playing fields or community garden plots.
- 4. Rural Vista** – The land provides a view of open fields, forested land, woodlands, or water visible from any road. Visibility from a major road is more important than visibility from a neighborhood road.
- 5. Linking Location** – The land abuts a parcel of land that is already protected (existing link) or a significant parcel that is undeveloped and unprotected (potential link). Both existing and potential links increase the usefulness of the entire tract (linking parcel plus abutting parcel) both for recreation and for native plant and animal habitat.
- 6. Trails** – The land contains cart paths, trails, potential links to existing trails, or areas where new trails can be created for passive recreation.
- 7. Size** – Larger parcels are more valuable than smaller parcels for values such as plant and animal habitat, protection of water resources, and active or passive recreation.  
  
Parcels greater than or equal to 40 acres were scored 4;  
Parcels greater than or equal to 30 acres but less than 40 acres were scored 3;  
Parcels greater than or equal to 20 acres but less than 30 acres were scored 2;  
Parcels greater than or equal to 10 acres but less than 20 acres were scored 1.
- 8. Prime or Active Agricultural Land** – The land possesses fertile or arable soil suitable for agriculture, including growing crops or other plants or grazing animals, whether or not it is currently in agriculture.
- 9. Diversity of Habitat** – The land contains an unusual terrain, a terrain underrepresented in town, or a variety of terrains and thus provides for a variety of habitats, which, in turn, may support a variety of native animals or plants.
- 10. Special Feature** – The land contains an unusual feature, such as a special habitat, a scenic spot, an exceptional woodland, or a site with archaeological, geological, historical, or other interest.
- 11. Level of Development** – The land is currently undeveloped, minimally developed, or easily returned to an undeveloped state.

# B

## **Appendix B** **Carlisle Conservation Commission: Rules and Regulations**

Rules and Regulations for Use of Carlisle Conservation Land B-1

Rules And Regulations of Town of Carlisle Conservation  
Commission on Use of Other Power-Driven Mobility Devices  
on Town of Carlisle Conservation Lands per the  
Americans with Disabilities Act (ADA) B-4

# Appendix B: Carlisle Conservation: Commission Rules and Regulations

## Rules and Regulations for Use of Carlisle Conservation Land

### 1. HOURS, NIGHT USE BY PERMIT

All people are welcome to enjoy themselves on the conservation land of the Town of Carlisle. They do so at their own risk from sunrise to sunset provided such use is consistent with the Commission's rules and regulations and other applicable local, state and federal laws, rules and regulations. The conservation land and parking lots may not be used between sunset and sunrises except in accordance with a permit duly issued by the Carlisle Conservation Commission (the "Commission"). Groups of eight or more people that wish to use conservation land must obtain a use permit. This permit may be granted by one Commissioner or by the Commission Administrator, except that if said groups wish to use the conservation land in excess of four (4) daylight hours, that use permit must be duly issued by a majority vote of the Commission.

### 2. FIRES BY PERMIT

Open fires are forbidden on conservation land except by permits duly issued by the Commission and the Carlisle Fire Department. The use of portable stoves does not require a fire permit, but the intention to use such stoves must be reported in writing to the Commission and the Carlisle Fire Department or noted on any use permit issued in accordance with Rule 1 hereinabove. The following fire safety measures shall apply on all conservation land: Stoves or open fires shall be at least three (3) feet from any combustible material; those making fires or operating stoves must possess an operable fire extinguisher rated consistent with the object fire and/or stove; they must also possess a spade, iron rake and water supply reasonably adequate to suppress the fire or the stove.

### 3. CAMPING BY PERMIT

Overnight camping on conservation land is permitted under the Camping Permit Guidelines available through the Conservation Commission Office, Carlisle Town Hall, 66 Westford Street, Carlisle, MA 01741. Call 978-369-0336 for an appointment with the Administrator.

### 4. ARMS/FIREARMS BY PERMIT

Arms/firearms, ammunition, bows, arrows and all other projectile weapons or devices are forbidden on conservation land, except that a majority of the Commission may issue an Arms/firearms permit for such use at Foss Farm, but only for non-hunting activities. Historically, the activities which have received permits include the colonial musters and dog training.

### 5. SPONSORED EVENTS AND CONCESSIONS BY PERMIT

No one shall engage in business, sell or expose for sale or give away goods or circulars without a permit from the Commission. Applications for sponsored events will be accepted only from non-profit organizations. No admission or parking fees may be charged, but donations to the organization may be requested by posting a sign at the entrance to the event. Registration fees may be charged to participants but not to spectators in events organized by the sponsoring group. The Commission will ordinarily authorize only concessions for food to be consumed on the premises. In limited circumstances, when the Commission deems it in the public interest, additional concessions may be permitted. Although primary use of the

land may be reserved for a specific event, other regular activities on the land shall continue on any given day.

6. TRAILS

New trails or extensions of existing trails may not be installed by any person unless duly authorized by majority vote of the Conservation Commission at a public meeting.

7. PENALTIES

Without limiting any other available remedies or penalties, any person who submits false information in connection with any documentation or application required under these Rules or Regulations, or who otherwise violates these Rules and Regulations may be punished by a fine of not more than fifty dollars (\$50.00) for each violation hereof. Each day or part thereof during which such violation occurs or continues shall constitute a separate violation.

**CARLISLE CONSERVATION LAND USES**

**1. Uses allowed on all Conservation Land.**

- Walking, hiking, jogging, running
- Picnicking
- Kite-flying
- Horseback riding
- Snowshoeing
- Cross country skiing
- Nature study (observation)
- Other uses of a passive recreational nature

**Uses prohibited except by special permission from a majority of the Commission**

- Camping
- Discharge of firearms
- Fires (Fire department must also issue permit)

**Uses prohibited on all Conservation Land**

- Hunting, trapping
- Swimming
- Driving motorized vehicles (except by special permit and as regulated on Foss Farm)

***Use by camping and large organized groups***

To be scheduled through the Conservation office

**2. Additional uses allowed on specific parcels of land**

**Greenough Land**

- Ice skating
- Fishing, ice fishing
- Canoeing

**Foss Farm**

- Pony Club activities
- Dog shows

Dog field trials  
Dog sledding  
Dog training classes  
Horse show  
4-H Club activities  
Fairs  
Colonial Minutemen Historical Muster  
Plot gardens

**Towle Field**

X-C Ski League

*Date Adopted: March 2009*

## **Rules and Regulations of Town of Carlisle Conservation Commission on Use of Other Power-Driven Mobility Devices on Town of Carlisle Conservation Lands per the Americans with Disabilities Act (ADA)**

1. Introduction and Authority: These Rules and Regulations (“Rules”) describe and regulate use of other power-driven mobility devices (OPDMDs) on Town of Carlisle conservation lands pursuant to the U. S. Department of Justice regulations amending the Americans with Disabilities Act (“ADA”), Title II, 28 C.F.R., Part 35, effective March 15, 2011.

In addition to these Rules, all conservation land users should be familiar with the Rules & Regulations for Use of Carlisle Conservation Land and the Trail Etiquette Guidelines for the use of conservation lands in Carlisle.

These Rules are promulgated by the Conservation Commission pursuant to the authority granted under M.G.L. c. 40, Section 8C and Article III, Section 3.14 of the Town of Carlisle General Bylaws.

2. Definitions: For the purposes of these Rules, the following terms shall have the following meanings unless a different meaning is clearly stated:

“Commission” or “Conservation Commission”: the Town of Carlisle Conservation Commission.

“Narrow Single Track Trail”: Unpaved, narrow gauge trail. This type of trail is for natural areas or steep terrain where environmental or topographic constraints require no user impact to natural resources or for trails that do not provide adequate space to OPDMDs for safe passage of trail-users traveling in opposing directions. All trails not listed in either Appendix A or Appendix B are Narrow Single Track Trails.

“Other Power-Driven Mobility Device” or “OPDMD”: Any mobility device powered by batteries, fuel, or other engines, whether or not designed primarily for use by individuals with mobility disabilities, that is used by individuals with mobility disabilities for the purpose of locomotion, including golf carts, electronic personal assistance mobility devices (EPAMDs), such as the Segway® PT, or any mobility device designed to operate in areas without defined pedestrian routes, but that is not a wheelchair within the meaning of Part 35 of the Title II Regulations.

“Service Trail”: Unpaved, unimproved service trail, typically greater than 8 feet in width, capable of accommodating service vehicle traffic. See Appendix A for list of Service Trails.

“Town”: the Town of Carlisle, Massachusetts.

“Wide Single Track Trail”: Unpaved, wider gauge trail. These are trails where two-way traffic would require pedestrians to step off the trail and harm natural resources when allowing passage of OPDMD devices larger than 26” wide. See Appendix B for list of Wide Single Track Trails.

3. Trail Use: The Town of Carlisle’s conservation lands and trails are available for use to individuals with a mobility disability subject to these Rules. The purposes of these Rules are the physical safety of OPDMD users and other trail users, the protection of sensitive natural resources, noise mitigation and fire prevention.

- a. The use of OPDMDs powered by internal combustion engines is prohibited. The exclusion of gas-powered OPDMDs, as compared to electric-powered OPDMDs, is due to the substantial risk of serious harm to the immediate environment from the fire danger created by the heat of the gas-fired engine and from noise impacts to animal habitats.
  - b. Noise emitted by OPDMDs may not exceed 65 decibels.
  - c. No person shall operate an OPDMD at a speed in excess of 3 miles per hour (which equals normal walking speed).
  - d. OPDMDs must stay on designated trails at all times. Many trails pass near or cross wetlands and are vulnerable to erosion, particularly during wet periods.
  - e. No OPDMDs are permitted in historical structures.
  - f. Additional limitations are based on the type of trail:
    - i. **Service Trail:** All OPDMDs are allowed on service trails provided that the OPDMDs do not exceed 36" inch maximum width in order to allow safe passage of OPDMDs, pedestrians, equestrian riders, and service vehicles;
    - ii. **Wide Single Track Trail:** OPDMDs not to exceed 26" inch maximum width and a maximum wheel width of 6" are allowed on Wide Single Track Trails;
    - iii. **Narrow Single Track Trail:** No OPDMD devices are permitted on Narrow Single Track Trails. All trails not assessed as Service Trails or Wide Single Track Trails (Appendices A and B) are defined as Narrow Single Track Trails.
4. Limitations:
- a. The adoption of these Rules does not represent an endorsement that the Town's trails or conservation properties are safe for any trail user. Users must exercise reasonable caution and care while on Town conservation lands and operate OPDMDs at their own risk.
  - b. These Rules may be amended from time to time as new information is available regarding the extent of physical constraints, resource protection criteria, specific trail conditions, and safety concerns for all trail users.
  - c. Nothing in these Rules shall contradict Federal or Commonwealth of Massachusetts statutes or regulations. In the case of conflict, Federal or Commonwealth statutes or regulations shall prevail.
  - d. Use of other vehicles may be allowed on conservation lands with the specific approval and issuance of a permit by the Conservation Commission. This includes farm vehicles.
5. Enforcement:
- a. Whoever violates any provision of these Rules may be penalized by indictment or on complaint brought in the District Court. The maximum penalty for each violation shall be fifty dollars (\$50.00).
  - b. Whoever violates any provision of the Rules may be penalized by non-criminal disposition as provided in General Laws, Chapter 40, Section 21D, in which case the penalty for each violation shall be fifty dollars (\$50.00) and the enforcing persons shall be the Conservation Commission, its Agent or any Police Officer of the Town.
6. Additional Information:
- Complete trail maps and Trail Etiquette guidelines are available on the Trails Committee website at [CarlisleTrails.pbworks.com](http://CarlisleTrails.pbworks.com) and in the "Trails in Carlisle" booklet, prepared by the Carlisle Trails Committee. The booklet is available at the Carlisle Town Hall and local retail outlets. For information on trail use and trail conditions, contact the Town of Carlisle Conservation Administrator, at 66 Westford Street Carlisle, MA, or (978) 369-0336.

*Adopted March 8, 2012*

## Appendices to OPDMD Rules and Regulations

Trail users are advised to refer to 4A and 4B. Users must exercise reasonable caution and care while on Town conservation lands and operate OPDMDs at their own risk.

### Appendix A: Service Trails

| <b>Parcel</b>              | <b>Trail</b>                             |
|----------------------------|------------------------------------------|
| Benfield Conservation Land | Larsen Trail (to Benfield Platform)      |
| Cranberry Bog              | East Bog Loop<br>West Bog Loop           |
| Davis Corridor             | Blood Farm Trail                         |
| Foss Farm                  | Foss Farm Loop<br>Trails at garden plots |

### Appendix B: Wide Single Track Trails

| <b>Parcel</b>                             | <b>Trail</b>                                      |
|-------------------------------------------|---------------------------------------------------|
| Bisbee Land                               | Bisbee Loop                                       |
| Davis Corridor                            | Two Rod Road                                      |
| Foss Farm                                 | Pony Ring East<br>South Field Loop<br>Woods Loop  |
| Fox Hill                                  | Fox Hill Trail                                    |
| Greenough Land                            | Wood Duck Trail                                   |
| Mannis Land/Rangeway<br>Conservation Land | Rangeway North                                    |
| Towle Land                                | Towle Field Trail                                 |
| Town Forest                               | Crossover Trail<br>Double Loop<br>Hurricane Alley |

*Adopted March 8, 2012*

**Appendix C**  
**Natural Heritage & Endangered Species Program (NHESP)**  
**Summary Letter and Fact Sheets for State-listed Species in Carlisle**

|                         |      |
|-------------------------|------|
| NHESP Summary Letter    | C-1  |
| Blanding's Turtle       | C-4  |
| Blue-spotted Salamander | C-7  |
| Britton's Violet        | C-10 |
| Climbing Fern           | C-12 |
| Eastern Box Turtle      | C-13 |
| Wood Turtle             | C-16 |

# Appendix C: Natural Heritage & Endangered Species Program Summary Letter and Fact Sheets for State-listed Species

Commonwealth of Massachusetts



## Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

February 14, 2013

Sylvia Willard  
Town of Carlisle  
Conservation Administrator  
66 Westford Street  
Carlisle, MA 01741

VIA E-MAIL

Re: Open Space Plan; NHESP #13-31866 (2013 update)  
Town of Carlisle

Dear Ms. Willard:

Thank you for contacting the Natural Heritage and Endangered Species Program regarding the update for the Open Space and Recreation Plan for Carlisle. Enclosed is information on the rare species, vernal pools, and other aspects of biodiversity that we have documented in Carlisle.

For biodiversity conservation purposes, based on analysis for the BioMap2 and information discussed below, NHESP recommends land protection in the BioMap2 cores or protecting lands adjacent to existing conservation land. All of the areas discussed below are important for biodiversity protection in Carlisle.

Enclosed is a list from our database of rare species known to occur in Carlisle. NHESP has no records of any state-listed invertebrates or priority natural communities in Carlisle.

Carlisle was recently sent a town focused report on BioMap2 Core Habitats (BC) and Critical Natural Landscapes (CNL) and their components which can be included in the OSRP if desired. We were pleased to hear that the Carlisle OSRP committee has already downloaded fact sheets for state listed species from our website to include in the OSRP. Fact sheets for some of the other species of conservation interest are also available from our website: [http://www.mass.gov/dfwele/dfw/nhesp/species\\_info/fact\\_sheets.htm](http://www.mass.gov/dfwele/dfw/nhesp/species_info/fact_sheets.htm) and

NHESP produced fact sheets describing the various other components of BioMap2 (relevant to Carlisle are Forest Core, Aquatic Core, and Wetland Cores (Least disturbed Wetland complexes), and, in CNL, Upland Buffers of Aquatic and Wetland Cores, and Landscape Blocks) that are on our website at:

[http://www.mass.gov/dfwele/dfw/nhesp/land\\_protection/biomap/biomap\\_methodology.htm](http://www.mass.gov/dfwele/dfw/nhesp/land_protection/biomap/biomap_methodology.htm)

The components are described in full in the BioMap2 summary report available from:  
[http://www.mass.gov/dfwele/dfw/nhesp/land\\_protection/biomap/biomap2\\_summary\\_report.pdf](http://www.mass.gov/dfwele/dfw/nhesp/land_protection/biomap/biomap2_summary_report.pdf)

The rare animal species currently known from Carlisle are all associated with wetlands, although some of these species use upland habitat as well.

Carlisle has several known occurrences of Blue-spotted Salamanders (SC): these salamanders breed in vernal pools in the spring and spend the rest of their adult lives in the leaf litter of surrounding upland forest areas. The populations are scattered around the less developed parts of town; however, at least one has had the habitat fragmented by development. All of the Blue-spotted Salamander populations are on or near protected open space and are in BioMap2 Core Habitats (2266, 2344, and 2378), although the Core Habitats weren't always drawn to protect those particular populations. Four-toed Salamanders (delisted, that is removed from the state list because they have been shown to be more common than previously thought) nest in patches of



### Natural Heritage & Endangered Species Program

Route 135, Westborough, MA 01581 Tel: (508) 389-6360 Fax: (508) 389-7891

An Agency of the Department of Fish & Game

<http://www.nhesp.org>

sphagnum moss that overhang streams. The young drop into the streams where they live until they become adult, at which point they move to nearby forests to live. Both populations in Carlisle are in BioMap2 Core Habitat (2299 and 2378) but not on protected lands.

Four species of turtles of conservation interest occur in Carlisle. For all of the turtles loss of only a few adults annually can cause populations to decline as they do not reproduce until they are at least several years old, often into their teens, and have low replacement rates due to low nest and juvenile survivorship. Roads are the primary cause of adult mortality. All of the turtle species travel to appropriate nesting sites, usually open sandy areas. Blanding's Turtles (T) have an excellent population in BioMap2 Core Habitat 2378 in the wetlands and forests of the eastern part of town. Blanding's Turtles inhabit a mix of seasonal pools, marshes, shrub swamps, forest, and open uplands. These turtles move overland to vernal pools and shrub swamps to feed and mate, as well as to nesting areas. Wood Turtles (SC) overwinter in stream banks and tend to stay in the vicinity of the streams and wetlands through the year, although they may follow a stream for miles or go cross country to reach a nesting area; a very small population is known from the eastern part of town in Core Habitat 2378. The Eastern Box Turtle (SC) is a terrestrial turtle, inhabiting dry and moist woodland habitats. In Massachusetts, the main populations are in the southeast and the Connecticut Valley. The very small population in northern Carlisle is towards the northern edge of its range. The delisted Spotted Turtle favors wetlands and adjacent forests, and, like all the turtles, use open sandy areas for nesting. They are often associated with Vernal Pools. The multiple occurrences in Carlisle are scattered around town, usually near vernal pools, in Core Habitats 2344 and 2378, as well as elsewhere in town on and off of conservation land.

Protecting all types of wetlands and their surrounding forests and other uplands enhances the habitats of all these species and others, as well as protecting water quality.

Of the seven state-listed and three unregulated Watch Listed (WL) species of plants known from Carlisle, six state-listed and one of the WL species are considered to be historic, not seen in town in over 25 years, most with observation dates a century or more ago. These are species of open areas that have all decreased state wide as forests have grown where open agricultural land with its open or partially forested edges used to be. Even the rare species currently occurring in town are species that grow best where there are openings. Before these lands were in agriculture, the currently rare species would have been uncommon, as now, dependent on natural disturbances to create small openings in the prevailing forest. However, now, unlike the distant past, some of the disturbances are controlled (less beaver activity and less natural flooding, for example), and much of the landscape is now not available as habitat where residential and other development occur.

Climbing Fern (SC) does not have the characteristic overall shape of most ferns. Instead, it is an evergreen, ivy-like plant that sprawls over the ground or climbs clockwise short distances up shrubs and coarse herbs. Climbing Fern does best in open areas such as old fields and power line rights of way, but populations persist in moist pine-oak-maple woods with an open understory, in moist thickets, and along stream margins.

Britton's Violet (T) is a low-growing, herbaceous, purple flowered perennial found along the edges of river floodplains. It, too, is a species that does best without shade, but in this case it is restricted to floodplains and wet meadows associated with them. The occurrence in Carlisle is on conservation land in Core Habitat 2378 with Blanding's Turtles and other wetland species. Threats include disruption of the hydrologic regime, and shading from shrubs or trees that might become established if water patterns change.

River Bulrush (WL) is an uncommon (but not MESA-listed) plant currently known to be in Carlisle in Core Habitat 2378. It is a 2 to 5 foot tall sedge that grows in wetlands along lakes, ponds, and rivers.

Orange Milkweed (WL), an orange flowered 1 to 2 foot herbaceous plant of the milkweed family, grows in open, dry sandy areas such as old fields and clearings. It is known from Core Habitat 2378.

The other rare plants that were collected in Carlisle many years ago are all species that tend to disappear when their open habits become shaded by dense shrubs and trees. The records are from museum (herbarium) specimens that give only the town name. Even so, most have been sought in appropriate habitats and not found in the past few years. Arethusa (T), an orchid of bogs, was collected in a "grassy bog" in town in 1904 and in a swamp in the Great Brook Farm area in 1902 (should anyone find it, NHESP would be thrilled to hear of it). Purple Milkweed (E), an herbaceous perennial of open sparsely vegetated woodlands and borders has declined dramatically statewide, only 3 of 43 records are current. Hayden's Sedge (WL) grows in wet meadows. Few-fruited Sedge (E) is a grass-like plant of acidic peatlands. Collected from a "meadow in

Carlisle” almost a century ago, it has recently been found in Bedford in Core Habitat 2378, so it is possible that new surveys in open, peaty wetlands would relocate it in Carlisle. Cornel-leaved Aster (E) is a white flowered aster that inhabits non-acidic, dry rocky, wooded slopes in partial shade. New England Blazing Star (SC), an endemic, globally rare, purple flowered perennial of dry, sandy grasslands and clearings, thrives in fire-influenced natural communities that are periodically disturbed and devoid of dense woody plant cover.

With 69 Certified Vernal Pools (CVPs), Carlisle has done an impressive job of identifying this special type of habitat. Of the 88 Potential Vernal Pools (PVPs) (identified from aerial photographs, needing verification on the ground) in town, some have been certified as CVPs and some will be not be functioning as vernal pool habitat and are not certifiable. Remaining PVPs, and other likely areas of town, should be visited and evaluated for certification and the protections that gives them under the Wetlands Protection Act. Clusters of vernal pools provide particularly good habitat for species that depend on vernal pools. The clusters mean that there are alternate habitats if something happens to one pool, and slightly different conditions in each may provide different habitats for pool dependent species. Clusters of vernal pools are good targets for biodiversity protection: there are clusters in BioMap2 Core 2378 and 2299. In addition, areas of swamps provide habitat for vernal pool species.

The BioMap2 core areas and Contributing Natural Landscape are particularly valuable in ecological terms, and important to the conservation of a variety of species. Completing conservation protection of remaining unprotected land in those areas would enhance the viability of these habitats - size and continuity of open space is particularly important for supporting wildlife populations. Preventing habitat fragmentation is vital in protecting the ecosystem, for the rare species on the enclosed list, as well as for additional common species, particularly reptiles and amphibians (several are noted in the BioMap2 write-up as species of conservation concern from the State Wildlife Action Plan (SWAP).

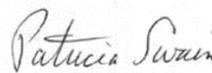
The NHESP produces maps for use under the Wetlands Protection Act (Estimated Habitat maps, provided to the Conservation Commission and shown in reduced form in the *Natural Heritage Atlas*, and the Massachusetts Endangered Species Act (also in the *Natural Heritage Atlas*). These data layers are also available from MassGIS, requiring access to some form of GIS to view them, at <http://www.state.ma.us/mgis/wethab.htm> and <http://www.state.ma.us/mgis/prihab.htm>. These two sets of maps are created for regulatory use. BioMap2 and the original BioMap and Living Waters projects are focused on conservation and cover broader areas and non-regulated components of biodiversity. Town commissions and boards are encouraged to request the assistance of the Natural Heritage and Endangered Species Program in reviewing any project proposed in the habitat areas of the regulatory areas of the maps in the *Natural Heritage Atlas* (the 2008 Atlas, the 13<sup>th</sup> edition is the current version).

Management and monitoring of conservation lands become important as acquisition and protection are accomplished. All wetlands particularly need to maintain their natural water regime, including normal fluctuations and connections with the uplands and other wetlands. Water quantity and quality are ongoing issues for wetlands. Another aspect of managing conservation lands that is important in many areas is controlling invasive non-native species that alter the habitat and occupy space that native species would otherwise use. We strongly recommend monitoring conservation land, and removing non-native species before they become a problem and impact native species.

Please note that this evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. Should new rare species information become available, this evaluation may need to be reconsidered.

Please do not hesitate to contact me at (508) 389-6352 or by email at [pat.swain@state.ma.us](mailto:pat.swain@state.ma.us) if you have any questions.

Sincerely,



Patricia C. Swain, Ph.D.  
Ecologist

cc: Melissa Cryan, EOEEA, DCS



## Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife  
Route 135, Westborough, MA 01581  
tel: (508) 389-6360; fax: (508) 389-7891  
www.nhesp.org

**DESCRIPTION:** The Blanding's Turtle is a mid-sized turtle ranging between 16 and 22 cm (6-9 in.) in shell length. Its high-domed carapace (top shell) is dark and covered with pale yellow flecking. The lower shell (plastron) is yellow with large black blotches on the outer posterior corner of each scute (scale). The plastron is hinged, allowing movement; however, the shell does not close tightly. In older individuals, the entire plastron may be black. The most distinguishing feature is its long, yellow throat and chin, which makes it recognizable at a distance. Males have slightly concave plastrons, females have flat plastrons. The tails of males are thicker and their cloacal opening (the common orifice of the digestive, reproductive and urinary systems) is located beyond the edge of the carapace. Hatchlings have a brown carapace and brown to black plastron, and range between 3.4 and 3.7 cm (1.3-1.5 in.) in length.

**SIMILAR SPECIES:** This species could be confused with the Eastern Box Turtle (*Terrapene carolina*). The Eastern Box Turtle can have a yellow chin but lacks the yellow throat and neck. Box Turtles are smaller, 10-18 cm (4-7 in.) in shell length. In addition, the Box Turtle has a prominent mid-line ridge (keel) on the carapace, which is absent on Blanding's Turtles. The Blanding's Turtle may also be confused with the Spotted Turtle. However, The Spotted Turtle is much smaller, 3.5-4.5 inches in length and has very distinct round yellow spots.

**HABITAT IN MASSACHUSETTS:** Blanding's Turtles use a variety of wetland and terrestrial habitat types. Blanding's Turtles have been observed in seasonal pools, marshes, scrub-shrub wetlands and open uplands (Siefert et al. 2003). Habitat use appears to vary according to the individual and the amount of precipitation, with more upland utilization during dry years (Joyal et al. 2001). Wetlands are used for overwintering during their inactive season (Nov-Mar).

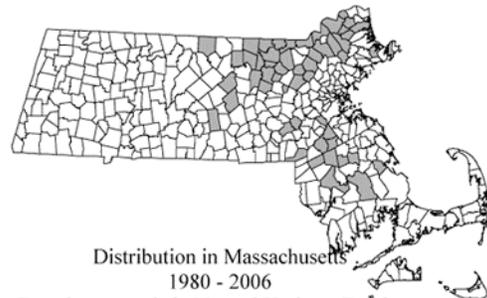
## Blanding's Turtle *Emydoidea blandingii*

State Status: **Threatened**  
Federal Status: None



Photo by Susan Speak

**RANGE:** The Blanding's Turtle is found primarily in the Great Lakes region, extending to Kansas. Several smaller, disjunct populations occur in the East: in southern Nova Scotia, in an arc extending from eastern Massachusetts through southeastern New Hampshire to southern Maine, and in the lower Hudson Valley of New York. These populations (with the exception of those in New Hampshire) are all listed as Threatened or Endangered at the state or provincial level.



**LIFE CYCLE & BEHAVIOR:** Blanding's Turtles overwinter in organic substrate in the deepest parts of marshes, ponds, and occasionally, vernal pools. Some individuals overwinter under hummocks in red maple or highbush blueberry swamps. Upon emergence from overwintering, Blanding's Turtles often leave permanent wetlands and move overland to vernal pools and scrub-shrub swamps, where they feed and mate. It is during the summer months that females estivate in upland forest or along forest/field edges. At night and during periods of hot weather, Blanding's Turtles retreat to "forms". These small terrestrial shelters are found beneath leaf litter, in the grass, under logs or brush located up to 110 m (361 ft) from the nearest wetland. They are called "forms" because when the turtle leaves them, they retain the shape of the turtle's shell.

Blanding's Turtles are omnivores, eating both plants and animals. They eat while on land and in the water. The animals Blanding's Turtles are known to eat, either alive or as carrion, consist of Pulmonate snails, crayfish, earthworms, insects, golden shiners, brown bullheads, and other small vertebrates. Vernal pools are an important source of many of these prey items. The plants that Blanding's Turtles have been known to eat include coontail, duckweed, bulrush, and sedge.

Courtship and mating takes place during the spring and early summer and typically occurs in water. Baker and Gillingham (1983) reported that in seminatural conditions male Blanding's Turtles exhibit a variety of behaviors during mating including: chasing, mounting, chinning, gulping, swaying, violent swaying, and snorkeling. Chinning occurs after the male is mounted, if the female moves forward the male will start gulping (taking in water and expelling it over the female's head). Gulping is typically followed by swaying and escalates to violent swaying if the female remains motionless.

Females will remain in wetland or vernal pool habitat until they begin nesting. The majority of nesting occurs in June in open areas with well-drained loamy or sandy soils, such as: dirt roads, powerline right-of-ways, residential lawns, gravel pits and early successional fields. Female Blanding's Turtles reach sexual maturity at 14-20 years of age (Congdon *et al.*, 1993; Congdon and van Loben Sels, 1993) and may travel great distances, often more than 1 km (3280 ft), to find appropriate nesting habitat (Grgurovic and Sievert, 2005). Females typically begin nesting during the daylight and continue the process until after dark.

Blanding's Turtles display temperature-dependent sex determination; eggs incubated below a pivotal temperature that lies between 26.5°C and 30°C (79.7-86°F) produce males, and higher temperatures produce females (Ewert and Nelson 1991). Typical clutch size ranges from 10 to 12 eggs. Hatchlings emerge in the late August and September. The typical size of a hatchling is about 3.5 cm (1.4 in.) and 10 g (0.35 oz).

**ACTIVE PERIOD**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |

**THREATS:** Blanding's Turtles are particularly vulnerable because they travel very long distances during their active season, do not reproduce until late in life (14-20 yrs), and have low nest and juvenile survivorship. These traits make them extremely sensitive to even a 1-2% increase in adult mortality. Roads are the primary cause of adult mortality. Blanding's Turtles travel to multiple wetlands throughout a single year (typically 3-6) and adult females travel to nesting habitats, crossing roads in the process.

As this turtle is relatively difficult to study, it is not known how great a decline this species has experienced. In Massachusetts, few nesting sites are currently known and a variety of factors are attributed to this species' low numbers. Habitat loss, degradation, and fragmentation (i.e. roads) are driven by human activities such as commercial and residential expansion. Other threats include illegal collection, unnaturally inflated rates of predation in suburban and urban areas, agricultural and forestry practices, and natural succession (i.e. loss of nesting habitat).

**MANAGEMENT RECOMMENDATIONS:**

Using a turtle habitat model developed by UMass and NHESP records, Blanding's Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of Blanding's Turtles. Other considerations should include the size and lack of fragmentation of both wetland and upland habitats and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space.

Given limited conservation funds, alternatives to outright purchase of conservation land is an important component to the conservation strategy. These can include Conservation Restrictions (CRs) and Agricultural Preservation Restrictions (APRs). Another method of protecting large blocks of land is through the regulatory process by allowing the building of small or clustered roadside developments in conjunction with the protection of large areas of unimpacted land.

Habitat management and restoration guidelines should be developed and implemented in order to create and/or maintain consistent access to nesting habitat at key sites. This is most practical on state-owned conservation lands (i.e. DFW, DCR). However, educational materials should be made available to guide private land owners on appropriate management practices for Blanding's Turtle habitat.

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrade and road-widening projects within Blanding's Turtle Habitat. Efforts should be made to inform Mass Highways of key locations where these measures would be most effective for turtle conservation.

Educational materials are being developed and distributed to the public in reference to the detrimental effects of keeping our native turtles as pets (an illegal activity that reduces reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), feeding suburban wildlife (which increases numbers of natural predators to turtles), and driving ATVs in nesting areas from June-October. People should be encouraged, when safe to do so, to help Blanding's Turtles cross roads (always in the direction the animal was heading); however turtles should never be transported to "better" locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild populations, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practice guidelines should be applied on state and private lands to avoid direct turtle mortality. Seasonal timber harvesting restrictions apply to Blanding's Turtle habitat and to stands with wetlands. Motorized vehicle access to timber harvesting sites in Blanding's Turtle habitat is restricted to times when the Blanding's Turtle is overwintering. Hand felling in wetland areas is required in order to maintain structural integrity of overwintering sites.

Finally, a statewide monitoring program is needed to track long-term population trends in Blanding's Turtles.

#### REFERENCES:

- Baker, R.E., and J.C. Gillingham. 1983. An analysis of courtship behavior in Blanding's turtle, *Emydoidea blandingii*. *Herpetologica* 39:166-173.
- Congdon, J.D., Dunham, A.E. and R.C. van Loben Sels. 1993. Delayed sexual maturity and demographics of Blanding's turtles (*Emydoidea blandingii*)—Implications for conservation and management of long-lived organisms. *Conservation Biology* 7, 826–833.
- Congdon, J.D. and R.C. van Loben Sel., 1993. Relationships of reproductive traits and body-size with attainment of sexual maturity and age in Blanding's turtles (*Emydoidea blandingii*). *Journal of Evolutionary Biology* 6, 547–557.
- Ewert, M.A., and C.E. Nelson. 1991. Sex determination in turtles: Diverse patterns and some possible adaptive values. *Copeia* 1991:50-69.
- Ernst, C.H., Lovich, J.E. and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington and London.
- Grgurovic, M., and P.R. Sievert. 2005. Movement patterns of Blanding's Turtles (*Emydoidea blandingii*) in the suburban landscape of eastern Massachusetts. *Urban Ecosystems* 8:201-211.
- Joyal, L.A., McCollough, M. and J.M.L. Hunter. 2000. Population structure and reproductive ecology of Blanding's Turtle (*Emydoidea blandingii*) in Maine, near the Northeastern edge of its range. *Chelonian Conservation and Biology* 3:580-588.
- Sievert, P.R., Compton B.W., and M. Grgurovic. 2003. Blanding's Turtle (*Emydoidea blandingii*) conservation plan for Massachusetts. Pages 1-61. Report for Natural Heritage and Endangered Species Program. Westborough, MA.

Updated 2007



## Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife  
Route 135, Westborough, MA 01581  
tel: (508) 389-6360; fax: (508) 389-7891  
www.nhesp.org

## Blue-spotted Salamander *Ambystoma laterale*

State Status: **Species of Special Concern**  
Federal Status: None

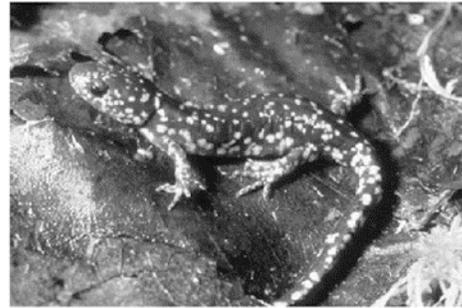


Photo by Bill Byrne

**Description:** The blue-spotted salamander is a slender salamander with short limbs, long digits, and a narrow, rounded snout. A dark blue to black dorsum with brilliant sky-blue spots or specks on the lower sides of the body makes the coloration of this species quite distinct and reminiscent of antique blue enamel pots and dishware. The ventral surface is a paler grey with black pigmentation surrounding the vent. The tail is long and laterally compressed; averaging 44% of the total body length. Adults range from 4.0 to 5.5 inches (10 to 14 cm) in total length.

Determining the sex of this species is easiest done during the breeding season, when males are identifiable by a swollen vent area caused by enlarged cloacal glands. Additionally, the larvae are also difficult to differentiate from other *Ambystoma* species; larvae are olive green to black and have a long dorsal fin that extends from behind the head along the back and tail.

**Similar species:** The blue-spotted salamander is a member of the Jefferson / Blue-spotted complex salamander (*A. jeffersonianum* / *A. laterale* complex). Jefferson salamanders (*A. jeffersonianum*) and blue-spotted salamanders were separated by ice age glaciation, but after the ice melted, the two species came into contact with each other and began interbreeding producing hybrid populations. The hybridization of these two species has led to the development of two completely female populations that are all polyploids – that is, they have multiple sets of chromosomes rather than the normal set of two (diploid). Although Jefferson salamanders and blue-spotted salamanders are fairly easy to differentiate from each other, the identification of the hybrid species is very difficult to distinguish on the basis of appearance alone; typically, identification can only be completed through chromosome counts or size of red blood cells in conjunction with their external appearance. Even

though, these two hybrid populations have been formally named as the Silvery salamander (*Ambystoma platineum*) and the Tremblay's salamander (*Ambystoma tremblayi*), the hybrid salamanders are simply referred to as the Jefferson / Blue-spotted complex salamander.

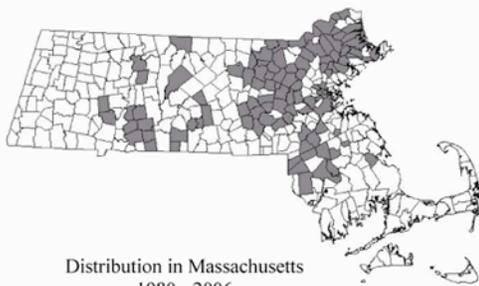
When the Jefferson / Blue-spotted complex hybrids are present in an area, they may outnumber the blue-spotted or Jefferson salamanders by a 2:1 margin. A population with many more females than males is a good indicator of the presence of hybridization of these species. The mode of reproduction of the female hybrids is gynogenesis: sperm is obtained from male diploids to stimulate egg division, but no genetic recombination occurs. However, additional hybrid forms such as triploid males and tetraploid and diploid females have been found, indicating that some offspring retain genetic material from two parents.

The members of the complex form a continuum in appearance from the grayish-brown coloration, pale blue flecks, and wide snout of the Jefferson salamander to the bluish-black coloration, prominent blue spots, and narrow snout of the blue-spotted salamander.

**Range:** The ranges of the Jefferson and blue-spotted salamanders overlap in New England. Populations of pure blue-spotted salamanders therefore occur north of the hybridization zone with Jefferson salamanders. The area of populations of pure blue-spotted salamanders and hybrids extends from the Canadian Maritime

Provinces, south along the Atlantic coast to northern New Jersey. The range extends westward through to northern Indiana and northeastern Illinois, through most of Wisconsin, eastern Minnesota and the southern half of Ontario.

In Massachusetts, they occur predominantly within Middlesex and Essex counties and in the adjacent eastern towns of Worcester County. Some occurrences also lie within Bristol and Plymouth counties as well. In general, Jefferson - Blue-spotted complex salamanders found east of the Connecticut River are more likely to be blue-spotted salamanders.



Distribution in Massachusetts  
1980 - 2006  
Based on records in Natural Heritage Database

**Habitat:** Blue-spotted salamanders require moist, moderately shaded environments; they favor northern hardwood/hemlock forests occurring in glaciated areas having depressions available for seasonal flooding. Vernal pools, or temporary ponds, are necessary for reproduction and need to be full of dead and decaying leaves for cover and overhanging bushes or grass for egg deposition. Roadside drainage ditches, small kettle holes, and temporary pasture ponds also provide habitat when flooded in the spring.

**Life Cycle / Behavior:** Blue-spotted salamanders are rarely encountered above ground, except as adults during their early spring breeding season, or as metamorphosed juveniles in the late summer. Adults reside most of the year beneath leaf litter or underground to a depth of one meter, usually within 500 meters of their breeding pond. The breeding season is brief, lasting from mid March to late April. As soon as the ground surface thaws, males migrate above ground to temporary ponds and females join them a few days later. An elaborate courtship, similar to the Jefferson salamander, occurs including approach, contact, nudging, and tail-fanning routines that takes place in the water between a single male and single female. Following a period of amplexus,

the female will follow the male, pick up a deposited spermatophore, and store it in the cloaca for egg fertilization. (Normal sexual reproduction occurs in the diploid females, while no true fertilization or recombination of chromosomes takes place in the triploid hybrids.) Eggs are often laid singly or in a small egg mass, with 6 to 10 eggs per mass, for a total clutch ranging from 82 to 489 eggs. The egg masses cling lightly to overhanging vegetation or fall to the bottom of the pond. Hatching about a month later, larvae are voracious eaters, preying on insect larvae and other small aquatic animals. No overwintering of larvae has been reported in Massachusetts, so by late August larvae have metamorphosed completely into air-breathing adults.

Blue-spotted salamanders have been found to migrate to and from breeding pools an average of 100 to 900 feet from their terrestrial habitat. A study of vernal pool species in Massachusetts found that at least half of the blue-spotted salamanders that were breeding in the studied vernal pool moved more than 300 feet to overwintering sites; the maximum known movement distance of an adult is 2050 feet (625 m) in Indiana.

Adult blue-spotted salamanders feed on small invertebrates such as larval and adult insects, spiders, worms, and centipedes. They produce noxious skin secretions from specialized poison glands in their tail and are thus rarely preyed upon by native predators. If blue-spotted salamanders reach adulthood and their habitat is secure, they may live for decades.

**Population status in Massachusetts:** The blue-spotted salamander (including triploid and other polyploid forms within the *A. laterale/A. jeffersonianum* complex) is currently listed as a "Species of Special Concern" in Massachusetts. There are 102 towns in Massachusetts where blue-spotted salamanders have been observed. One hundred and seventy-two occurrences have been documented since 1981, as well as 27 historic occurrences that were documented prior to 1981. The major threat to this species—and most salamanders in general—is the loss, degradation and fragmentation of both aquatic breeding pool habitat required for reproduction and terrestrial habitat needed for foraging, overwintering, growth and development to development and urbanization. For example, making temporary ponds deeper can create permanent ponds with fish populations which will predate amphibian eggs and larvae. Some population declines may be attributed to over collection, heavy road traffic, and pesticides or other toxic chemicals polluting breeding pool water.

Studies on the effects of acid rain on salamander eggs and larvae have been contradictory, and further studies must be made to resolve this issue, however, it appears that blue-spotted salamanders from eastern Massachusetts are highly tolerant of acid conditions and can hatch successfully down to a pH of 4.0.

**Management Recommendations:** In order to ensure the survival of this species in Massachusetts, the following recommendations regarding habitat preservation are suggested. There are two critical components in the life history of this species: vernal pool habitat required for reproduction and upland forest habitat required for foraging, hibernation, and other terrestrial and fossorial activities. Conservation of the blue-spotted salamander—and all native members of the genus *Ambystoma*—must therefore focus on the preservation of vernal pools and small ponds known to be inhabited by this species, as well as a significant parcel (250–1600 meter radius) of upland habitat surrounding such breeding sites. Provided these habitats are not significantly degraded—and that the salamanders are not subject to illegal collection or high road mortality—the salamander populations should be capable of maintaining themselves indefinitely.

It should be kept in mind, however, that every population is unique. The majority of the population, for instance, may be concentrated in a relatively small and discrete upland habitat, which would safely allow carefully conducted development within some portions of the “uninhabited” habitat around the breeding pool without serious effects on the population. The only way to determine if such a case exists, however, is through a detailed environmental study conducted by a qualified researcher(s) over a series of years, charting the movements of the animals to and from the breeding site. Unless such a study is conducted, it should be assumed that the salamanders are relatively evenly distributed around the pool and development should be strongly discouraged within a minimum radius of 500–1,000 meters surrounding the breeding pool.

Vernal pools and breeding ponds must be protected not only from draining, filling, and development, but also from degradation in the form of road and lawn run-off. If forestry activities are conducted within surrounding areas, a no-cut buffer zone of 50–100 feet should be established around the pool depression, and no slash or other debris should be dumped in the

depression. While vernal pools receive some protection under the Massachusetts Wetlands Protection Act, and several vernal pool species (including the blue-spotted salamander) are protected under the Massachusetts Endangered Species Act, efforts should be made to certify all vernal pools and to enhance and promote the enforcement of the laws mentioned above. Because of their ephemeral nature, vernal pools are often difficult to locate during dry periods and may be inadvertently damaged if their locations are not surveyed and marked prior to forestry or construction operations.

Citizens must be encouraged to recognize and report blue-spotted salamanders and the locations of their breeding pools. Due to the rarity of this species, its ephemeral terrestrial occurrence, and its very specific habitat requirements, some populations undoubtedly remain undiscovered and therefore under protected.

**References:**

AmphibiaWeb: Information on amphibian biology and conservation. (2006). Berkeley, California. Available: <http://amphibiaweb.org/>. (Accessed: May 24, 2007).

Bol, L. (2006). Massachusetts Forestry Conservation Management Practices for MESA-Listed Mole Salamanders, Natural Heritage and Endangered Species Program, Westborough, MA.

DeGraaf, R.M. and M. Yamasaki. (2001). New England Wildlife: Habitat, Natural History, and Distribution. University Press of New England, Hanover, NH.

Kenney, L. P., and M. R. Burne. (2001). A Field Guide to the Animals of Vernal Pools. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program and Vernal Pool Association, Westborough, Massachusetts.

Petranka, J. W. (1998). Salamanders of the United States and Canada. Smithsonian Institution Press, Washington and London.

Regosin, J. V., B. S. Windmiller, R. N. Homan, and J. M. Reed. (2005). Variation in terrestrial habitat use by four pool-breeding amphibian species. *Journal of Wildlife Management*, 69 (4).

Originated: 1994  
Updated: 2007



## Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife  
Route 135, Westborough, MA 01581

Telephone: (508) 389-6360/Fax: (508) 389-7891  
www.nhesp.org

## Britton's Violet

*Viola brittoniana*

State Status: **Threatened**

Federal Status: None

**Description:** Britton's Violet (*Viola brittoniana*) is a low-growing, herbaceous perennial found within or at the edges of floodplains of freshwater rivers. It has variably dissected leaves, and purple flowers that bloom from the middle of May to early June.

**Aids to identification:** Britton's Violet grows 5 to 10 inches (12–25 cm) in height and has basal leaves arising directly from a rhizome. Two varieties of Britton's Violet (and their hybrids) are currently recognized and protected here: *V. brittoniana* var. *brittoniana* and *V. brittoniana* var. *pectinata*. (Some authors consider these taxa separate species; this question is currently under evaluation by NHESP). The nominate variety has consistently dissected leaves, usually deeply dissected into three lobes; the center lobe is usually further divided into three sublobes, and the lateral ones into three or four sublobes. In *V. brittoniana* var. *pectinata*, the leaves are narrowly to (increasingly through the season) broad-triangular and uncut but with long-toothed margins, especially toward the base. In both varieties, closed, self-fertilizing (cleistogamous) flowers appear above ground but below the taller leaves during June and July. Fruits produced from both flower types are similar, round to ovoid dark tan capsules that become upright and split into three parts when mature. Forcible ejection of the seeds has been observed up to 9 feet (3 m) from the plant. Seeds are further dispersed by ants.



Gleason, H.A. 1952. *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*. Published for NY Botanical Garden by Hafner Press. New York.

**Similar species:** Several other violets occur intermingled with or near Britton's Violet populations. Bird's Foot Violet (*V. pedata*) is the only other species with deeply dissected leaves. In this species, leaves are divided into as many as 15 narrow segments. Leaves of other violets with purple flowers have different leaf morphology: Marsh Blue Violet (*V. cucullata*) has heart-shaped unlobed leaves; Early Blue Violet (*V. palmata*) has shallowly-lobed leaf sinuses; Arrow-leaved Violet (*V. sagittata*) has oblong to triangular leaves often with only basal lobes; Woolly Blue Violet (*V. sororia*) has kidney-shaped leaves. The nominate variety of Britton's Violet is known to hybridize with Marsh Blue Violet, Woolly Blue Violet and Arrow-leaved Violet; hybrids have unlobed early-season leaves and lobed later-season leaves.



### Petaliferous (Chasmogamous) Flowers Present in Mass.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |

### Cleistogamous Flowers Present in Massachusetts

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |

Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for 'endangered wildlife conservation' on your state income tax form as these donations comprise a significant portion of our operating budget.

**Habitat in Massachusetts:** In Massachusetts Britton's Violet is found mostly between the upper part of the annually flooded zone and the 100-year flood line of freshwater rivers. The U.S. Fish and Wildlife Service classifies it as a facultative wetland species (FAC), indicating that it occurs equally often in wetland or upland areas of the floodplain. The wetlands are generally wet meadows. This terrestrial species occurs in two distinct habitats in Massachusetts: within mowed areas and along woodland trails (generally whose edges are occasionally mowed or cleared). The species is rare in Massachusetts because most of the suitable habitat has been altered by fill for development, floodplain diking, or conversion to or from agriculture.

**Threats:** Threats to Britton's Violet include disruptions to the natural hydrologic regime, changes in water quality due to sedimentation, trampling, and over-shading or competition from aggressive native and exotic invasive species. Glossy Buckthorn (*Frangula alnus*) is an exotic invasive species of particular concern at Britton's Violet habitat locations.

**Range:** The limited range of Britton's Violet extends from Massachusetts, Connecticut, and New York south to the Carolinas. It is also tracked as a rare in Connecticut, New York, Pennsylvania, North Carolina, and Virginia.

**Population status in Massachusetts:** Britton's Violet is listed under the Massachusetts Endangered Species Act as Threatened. All listed species are legally protected from killing, collection, possession, or sale, and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. It is currently known from Middlesex, Norfolk, and Suffolk Counties, and is historically known from Plymouth County.

**Management recommendations:** As with many rare species, the exact management needs of Britton's Violet are unknown. This species apparently does not compete well in successional areas; germination occurs in recently disturbed areas, but plants die out as taller native and exotic species become established. Successful management may include periodic mechanical removal of dense competing vegetation, and targeted treatment for particularly insidious invasive species. All active management of rare plant populations (including invasive species removal) should be planned in consultation with the Massachusetts Natural Heritage & Endangered Species Program to avoid inadvertent damage to rare species.

Updated June 2007

Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for 'endangered wildlife conservation' on your state income tax form as these donations comprise a significant portion of our operating budget.



## Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife  
1 Rabbit Hill Road, Westborough, MA 01581  
tel: (508) 389-6360, fax: (508) 389-7891  
www.nhesp.org

## Climbing Fern

*Lygodium palmatum* (Bernh.) Sw.

State Status: **Special Concern**

Federal Status: **None**

**DESCRIPTION:** Climbing Fern does not have the characteristic overall shape of most ferns. It is an evergreen, ivy-like plant which sprawls over the ground or climbs clockwise short distances up shrubs and coarse herbs. In very favorable conditions, Climbing Fern may carpet up to an acre of more of the forest floor. The rootstalk is black, wiry, widely creeping, and branching. The root sends up a row of twining delicate fronds to a height of 3-5 ft. (0.9-1.5 m). The pinnae (fern equivalent of leaflets) are a forking stalk, each stalk ending in a palmately lobed yellow-green blade about 2 in (3-6 cm) across. The fertile blades are tiny, palmate, and produce spores on the underside. The gross morphology of this fern distinguishes it from any other species in Massachusetts.

**HABITAT IN MASSACHUSETTS:** Climbing Fern grows in moist pine-oak-maple woods with an open understory, in moist thickets, and along stream margins. This plant prefers acidic soils that are sandy and rich in humus, but nutrient-poor. Regenerating woodlands and powerline corridors also provide habitat for this species in Massachusetts.

**RANGE:** Climbing Fern occurs from southern New Hampshire and northwestern Vermont west to Michigan, and south to Georgia and Alabama.

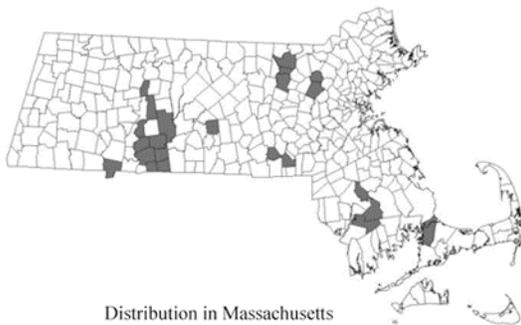


Holmgren, Noel H. 1998. *The Illustrated Companion to Gleason and Cronquist's Manual*. New York Botanical Garden.

**POPULATION STATUS:** Climbing Fern is a Species of Special Concern in Massachusetts. It is considered rare in New Hampshire, Vermont, Rhode Island, Connecticut, New York, New Jersey, Maryland, West Virginia, Virginia, North and South Carolina, Alabama, Georgia, Indiana, and Michigan. It was known historically from Delaware and Washington, DC. There are 34 current sites (since 1984) in Massachusetts for Climbing Fern, and 27 additional historical (before 1984) locations.

In the 1800's, when Climbing Fern was much more common, it was very popular as a decoration and commercial collection contributed to its decline. The first plant protection law was passed in Connecticut in 1869 specifically to protect this species. Legal protection helped alleviate the collection problem. However, loss of habitat through expansion of agriculture and development continued as the major factor contributing to the species decline.

Although Climbing Fern may be abundant where it is found, populations are rare and localized. Climbing Fern continues to decline in Massachusetts due to loss of habitat through draining and filling of wetlands, land development projects, and the maturation of woodlands. Seemingly appropriate habitat for Climbing Fern is fairly common in Massachusetts; however, for unknown reasons, Climbing Fern occurs in only a very few of these areas.



Distribution in Massachusetts  
1984-2009

Based on records in Natural Heritage Database

Updated 12 February 2009

Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for 'endangered wildlife conservation' on your state income tax form as these donations comprise a significant portion of our operating budget.



Natural Heritage  
& Endangered Species  
Program

Massachusetts Division of Fisheries & Wildlife  
Route 135, Westborough, MA 01581  
tel: (508) 389-6360; fax: (508) 389-7891  
www.nhesp.org

**Eastern Box Turtle**  
*Terrapene carolina*

State Status: **Species of Special Concern**  
Federal Status: None



Photo by Liz Willey

**DESCRIPTION:** The Eastern Box Turtle is a small, terrestrial turtle ranging from 11.4–16.5 cm (4.5–6.6 in.) in length. It is so named because a hinge on the lower shell (plastron) allows it to enclose head, legs, and tail completely within the upper (carapace) and lower shells. The adult box turtle has an oval, high-domed shell with variable coloration and markings. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish blotches. The plastron typically has a light and dark variable pattern, but some may be completely tan, brown, or black. The head, neck, and legs also vary in color and markings, but are generally dark with orange or yellow mottling. The Eastern Box Turtle has a short tail and an upper jaw ending in a down-turned beak. The male box turtle almost always has red eyes, and females have yellowish-brown or some times dark red eyes. Males have a moderately concave plastron (female's are flat), the claws on the hind legs are longer and the tail is both longer and thicker than the females. Hatchlings have brownish-gray carapace with a yellow spot on each scute (scale or plate), and a distinct light colored mid-dorsal keel (ridge). The plastron is yellow with a black central blotch, and the hinge is poorly developed.

**SIMILAR SPECIES:** The Blanding's Turtle (*Emydoidea blandingii*) may be confused with the Eastern Box Turtle. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull into its shell but with less closure than in the Eastern Box Turtle. Both may have yellow markings on the carapace; however, the marking on a Blanding's Turtle are spots or flecks rather than blotches. An adult Blanding's Turtle is larger than the box turtle (15-23 cm; 6-9 in. in shell length). While both will be found nesting in similar habitat, the Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial. Eastern Box Turtle hatchlings could be confused with Spotted Turtle hatchlings, because both have spots on each scute. However, the Spotted Turtle lacks a mid-dorsal keel.

**RANGE:** The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although Eastern Box Turtles occur in many towns in Massachusetts, they are more heavily concentrated in the southeastern section of the state.

**HABITAT IN MASSACHUSETTS:** The Eastern Box Turtle is a terrestrial turtle, inhabiting many types of habitats. It is found in both dry and moist woodlands, brushy fields, thickets, marsh edges, bogs, swales, fens, stream banks, and well-drained bottomland.



Distribution in Massachusetts  
1980 - 2006  
Based on records in Natural Heritage Database

**LIFE CYCLE & BEHAVIOR:** The Eastern Box Turtle hibernates in the northern parts of its range from late October or November until mid-March or April depending on the weather. Box Turtles overwinter in upland forest, a few inches under the soil surface, typically covered by leaf litter or woody debris. As soil temperatures drop, the turtles burrow into soft ground. Overwintering is usually not communal, although several may overwinter within close proximity of one another. Some individuals may emerge prematurely during warm spells in winter and early spring. When this occurs they may perish from exposure if there's a sudden cold snap. During the spring, Box Turtles start to forage and mate in the forest and fields.

In summer, adult Box Turtles are most active in the morning and evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. They often scoop out a "form" (a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms may be used on more than one occasion over a period of weeks. Though known as "land turtles", in hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, Box Turtles forage at any daylight hour.

The Eastern Box Turtle is omnivorous, feeding on animal matter such as: slugs, insects, earthworms, snails, and even carrion. Box Turtles also have a fondness for mushrooms, berries, fruits, leafy vegetables, roots, leaves, and seeds.

Females reach sexual maturity at approximately 13 years of age. Mating is opportunistic and may take place anytime between April and October. Courtship begins with the male circling, biting, and shoving the female. After which the pre-mounting and copulatory phases take place. Females can store sperm and lay fertile eggs up to four years after mating.

Females nest in June or early July and can travel great distances to find appropriate nesting habitat. They may travel up to approximately 1600 m (1 mile), many crossing roads during their journey. Nesting areas may be in early successional fields, meadows, utility right of ways, woodland openings, roadsides, cultivated gardens, residential lawns, mulch piles, beach dunes, and abandoned gravel pits. Females sometimes exhibit nest site fidelity, laying eggs in close proximity to the previous years' nest. Females typically start nesting in the late afternoon-early evening and continue for up to five hours.

Typically four or five white, elliptical eggs are deposited at intervals of one to six minutes, with the incubation period depending on soil temperature. Hatchlings emerge approximately 87–89 days after laying, usually in September. Juvenile Box Turtles are rarely seen, which is true of other turtle species as well.

During the first four or five years of life, box turtles may grow at a rate of half an inch to about three-quarters of an inch a year. The average life expectancy of a Box Turtle is 40 to 50 years, but it may live to be about 100.

**ACTIVE PERIOD**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |

**THREATS:** There are several reasons the Eastern Box Turtle is threatened in Massachusetts: habitat destruction resulting from residential and industrial development; road mortality; collection by individuals for pets; mowing of fields and early successional habitat during the active season; unnaturally inflated rates of predation in suburban and urban areas; disturbance of nest sites by ATVs; and genetic degradation due to the release of non-native (pet store) turtles. The release of non-native species could also transmit disease, which may become an issue in Massachusetts, but is not currently a problem.

**MANAGEMENT RECOMMENDATIONS:**

Using NHESP records, Eastern Box Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of Box Turtles. Other considerations should include the size and lack of fragmentation of habitat and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space.

Given limited conservation funds, alternatives to outright purchase of conservation land is an important component to the conservation strategy. These can include Conservation Restrictions (CRs) and Agricultural Preservation Restrictions (APRs).

Habitat management and restoration guidelines should be developed and implemented in order to create and/or maintain consistent access to nesting habitat at key sites. This is most practical on state-owned conservation lands (i.e. DFW, DCR). However, educational materials should be made available to guide private land-owners on the best management practices for Box Turtle habitat.

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrade and road-widening projects within Box Turtle habitat. Efforts should be made to inform local regulatory agencies of key locations where these measures would be most effective for turtle conservation.

Educational materials need to be developed and distributed to the public in reference to the detrimental effects of keeping our native Box Turtles as pets (an illegal activity that slows reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), mowing of fields and shrubby areas, feeding suburban wildlife (which increases numbers of natural predators to turtles), and driving ATVs in nesting areas from June-October. People should be encouraged, when safe to do so, to help Box Turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to "better" locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild populations, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practices should be applied on state and private lands to avoid direct turtle mortality. Motorized vehicle access to timber harvesting sites in Box Turtle habitat is restricted to the times when the Box Turtle is inactive during the winter, preferably when the ground is frozen. Motorized vehicles should not be used for soil scarification.

Finally, a statewide monitoring program is needed to track long-term population trends in Eastern Box Turtles.

#### REFERENCES:

- Babcock, H.L. 1971. Turtles of the Northeastern United States. New York: Dover Publications.
- Conant, R. and J.T. Collins. 1991. A Field Guide to Reptiles and Amphibians—Eastern and Central North America. Boston: Houghton Mifflin Company.
- DeGraaf, R.M. and D.D. Rudis. 1983. Amphibians and Reptiles of New England. Amherst, Massachusetts: The University of Massachusetts.
- DeGraaf, R.M. and D.D. Rudis. 1986. New England Wildlife: Habitat, Natural History, and Distribution. General Technical Report NE-108. Broomall, Pennsylvania: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station.
- Ernst, C.H., Lovich J.E., and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington and London.
- Hunter, M.L., Jr., Albright, J., and J.E. Arbuckle. 1992. The Amphibians and Reptiles of Maine. Bulletin 838, The Maine Amphibian and Reptile Atlas Project. Orono, Maine: University of Maine, Maine Agricultural Experiment Station.
- Lazell, James. 1974. Reptiles and Amphibians of Massachusetts. Lincoln, Massachusetts: Massachusetts Audubon Society.
- Lazell, James. 1969. "Nantucket Herpetology," *Massachusetts Audubon* 54 (2): 32-34.
- Shiffer, Clark N. 1990. "Turtle In A Box," *Pennsylvania Angler*, pp. 23-24.
- Simmons, T. 1988. "All Outdoors," *Vineyard Gazette*.
- Tyning, T.F. 1990. A Guide to Amphibians and Reptiles. Boston: Little, Brown and Company.
- Willey, L. 2006. Personal communication. M.S. student at the University of Massachusetts, Amherst.

Updated: 2007



## Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife  
Route 135, Westborough, MA 01581  
tel: (508) 389-6360; fax: (508) 389-7891  
www.nhesp.org

**DESCRIPTION:** The Wood Turtle is a medium-sized turtle (14-20 cm; 5.5-8 in) that can be recognized by its sculpted shell and orange coloration on the legs and neck. The carapace (upper shell) is rough and each scale (scute) rises upwards in an irregularly shaped pyramid of grooves and ridges. The carapace is tan, grayish-brown or brown, has a mid-line ridge (keel) and often has a pattern of black or yellow lines on the larger scutes. The plastron (lower shell) is yellow with oblong dark patches on the outer, posterior corner of each scute. The head is black, but may be speckled with faint yellow spots. The legs, neck, and chin can have orange to reddish coloration. Males have a concave plastron, thick tail, long front claws, and a wider and more robust head than females. Hatchlings have a dull-colored shell that is broad and low, a tail that is almost as long as their carapace and they lack orange coloration on the neck and legs.

**SIMILAR SPECIES:** The habitat of the Eastern Box Turtle (*Terrapene carolina*) and the Blanding's Turtle (*Emydoidea blandingii*) may overlap that of the Wood Turtle, but neither has the Wood Turtle's pyramidal shell segments. Unlike the Wood Turtle, the Box and Blanding's Turtle have hinged plastrons into which they can withdraw or partially withdraw if threatened. The Northern Diamond-backed Terrapin (*Malaclemys terrapin*) has a shell similar to that of the Wood Turtle. However, its skin is grey and it lives only near brackish water, which the Wood Turtle avoids.

**RANGE:** The Wood Turtle can be found throughout New England, north to Nova Scotia, west to eastern Minnesota, and south to northern Virginia. The Wood Turtle appears to be widespread in Massachusetts. However, it should be kept in mind that little is known about the status of local populations associated with the majority of these sightings. Most of the towns have fewer than 5 known occurrences.

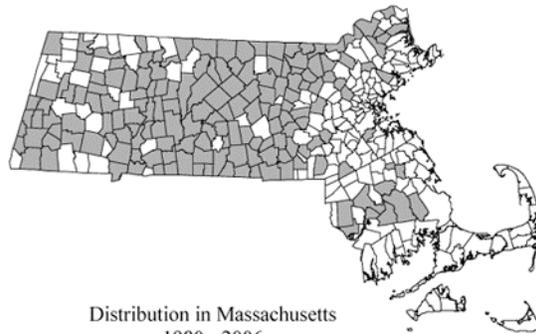
## Wood Turtle *Glyptemys insculpta*

State Status: **Species of Special Concern**  
Federal Status: None



Photo by Mike Jones

**HABITAT IN MASSACHUSETTS:** The preferred habitat of the Wood Turtle is riparian areas. Slower moving mid-sized streams are favored, with sandy bottoms and heavily vegetated stream banks. The stream bottom and muddy banks provide hibernating sites for overwintering, and open areas with sand or gravel substrate near the streams edge are used for nesting. Wood Turtles spend most of the spring and summer in mixed or deciduous forests, fields, hay-fields, riparian wetlands including wet meadows, bogs, and beaver ponds. Then they return to the streams in late summer or early fall to their favored overwintering location.



Distribution in Massachusetts  
1980 - 2006  
Based on records in Natural Heritage Database

**LIFE CYCLE & BEHAVIOR:** The Wood Turtle typically spends the winter in flowing rivers and perennial streams. Full-time submersion in the water begins in November, once freezing occurs regularly overnight, and continues until temperatures begin to increase in spring. It may hibernate alone or in large groups in community burrows in muddy banks, stream bottoms, deep pools, instream woody debris, and abandoned muskrat burrows. The Wood Turtle may make underwater movements in the stream during the winter; however, extended periods of activity and emergence from the water do not occur until mid-March or early April.

In spring, Wood Turtles are active during the day and are usually encountered within a few hundred meters from the stream banks. They have relatively linear home ranges that can be ½ a mile in length in Massachusetts (M. Jones, unpubl data). They will use emergent logs or grassy, sandy, and muddy banks to soak up the spring sun. During the summer months they feed in early successional fields, hayfields, and forests.

Wood Turtles are opportunistic omnivores; their diet consists of both plant and animal matter that is consumed on land and in the water. The Wood Turtle occasionally exhibits an unusual feeding behavior referred to as “stomping.” In its search for food, this species will stomp on the ground alternating its front feet, creating vibrations in the ground resembling rainfall. Earthworms respond, rising to the ground’s surface to keep from drowning. Instead of rain, the earthworm is met by the Wood Turtle, and is promptly devoured.

Although the peaks in mating activity occur in the spring and fall, Wood Turtles are known to mate opportunistically throughout their activity period. Males have been observed exhibiting aggressive behavior such as chasing, biting, and butting both during the mating season and at other times. A courtship ritual “dance” typically takes place at the edge of a stream or brook for several hours prior to mating. The dance involves the male and female approaching each other slowly with necks extended and their heads up. Before they actually touch noses, they lower their heads, and swing them from side to side. Copulation usually takes place within the water. Courting adults may produce a very subdued whistle that is rarely heard by observers. A female may mate with multiple individuals over the course of the active season.

In Massachusetts, most nesting occurs over a four-week period, primarily in June. Nesting sites may be a limited resource for Wood Turtles. Females are known to travel long distances in search of appropriate nesting habitat (average straight line distance of 244 m; 800 ft). Once they have arrived at a suitable nesting area, there may be multiple nesting attempts or false nests that occur over the course of several days, prior to laying eggs. They abort attempts when disturbed (e.g. by human activities) early in the process or hit a large rock while digging. Female Wood Turtles lay one clutch a year and often congregate in a good nesting area. Clutch size in Massachusetts averages 7 eggs (Jones, 2004, pers. comm.). Hatchling emergence occurs from August through September. The life span of the adult Wood Turtle is easily 46 years and may reach as much as 100 years.

**ACTIVE PERIOD**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |

**THREATS:** Hatchling and juvenile survival is very low and the time to sexual maturity is long. These characteristics are compensated by adults living a long time and reproducing for many years. Adult survivorship must be very high to sustain a viable population. These characteristics make Wood Turtles vulnerable to human disturbances. Population declines of Wood Turtles has likely been caused by hay-mowing operations, development of wooded stream banks, roadway casualties, incidental collection of specimens for pets, unnaturally inflated rates of predation in suburban and urban areas, forestry and agricultural activities and pollution of streams.

**MANAGEMENT RECOMMENDATIONS:** Using a turtle habitat model developed by UMass and NHESP records, Wood Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of Wood Turtles. Other considerations should include the size and lack of fragmentation of both riverine and upland habitats and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space. This information will be used to direct land acquisition and to target areas for Conservation Restrictions (CRs), Agricultural Preservation Restrictions (APRs) and Landowner Incentive Program (LIP) projects.

Mowing and nest site creation guidelines developed by NHESP should be followed on properties managed for Wood Turtles. These practices will be most practical on state-owned conservation lands. However, these materials are available to town land managers and private landowners.

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrade and road-widening projects within or near Wood Turtle habitat. Efforts should be made to inform local regulatory agencies of key locations where these measures would be most effective for Wood Turtle conservation.

Educational materials are being developed and distributed to the public in reference to the detrimental effects of keeping our native Wood Turtles as pets (an illegal activity that reduces reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), mowing of fields and shrubby areas, feeding suburban wildlife (which increases the number of natural predators to turtles), and driving ATVs in nesting areas from June-October. People should be encouraged, when safe to do so, to help Wood Turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to "better" locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild turtles, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practices should be applied on state and private lands to avoid direct turtle mortality. Seasonal timber harvesting restrictions apply to Wood Turtle habitat and to upland habitat that occurs up to 600 ft (183 m) beyond the stream edge. Motorized vehicle access to timber harvesting sites in Wood Turtle habitat is restricted to times when the Wood Turtle is overwintering. Bridges should be laid down across streams prior to any motorized equipment crossing the stream in order to maintain the structural integrity of overwintering sites.

Finally, a statewide monitoring program is needed to track long-term population trends in Wood Turtles.

#### REFERENCES:

- Compton, B. 2006. Personal Communication. University of Massachusetts, Dept of Natural Resources Conservation, Amherst, MA
- DeGraaf, R.M. and D.D. Rudis. 1983. Amphibians and Reptiles of New England. Amherst, Massachusetts: The University of Massachusetts.
- Ernst, C.H., Lovich, J.E. and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington and London.
- Jones, M. 2006. Personal Communication. University of Massachusetts, Dept. of Natural Resources Conservation, Amherst, MA.
- Kaufmann, J.H. 1986. Stomping for earthworms by Wood Turtles, *Clemmys insculpta*: A newly discovered foraging technique. *Copeia* 1986(4), pp.1001-1004.

**Appendix D**  
**Wild Animals, Plants, and Other Organisms in Carlisle**

|                                   |      |
|-----------------------------------|------|
| Birds                             | D-1  |
| Amphibians                        | D-7  |
| Reptiles                          | D-7  |
| Mammals                           | D-7  |
| Fish                              | D-9  |
| Arthropods                        | D-10 |
| Gastropods                        | D-17 |
| Vascular Plants                   | D-18 |
| Fungi                             | D-31 |
| Lichens                           | D-35 |
| Invasive and Other Problem Plants | D-37 |



*Carlisle's best-known rare plant is Viola brittoniana (Britton's or the Coast Violet).*

## Appendix D: Wild Animals, Plants, and Other Organisms in Carlisle

These wildlife lists are works in progress compiled by local wildlife experts and amateur naturalists. Additions to the 2005 list were provided by Alan Ankers, Tom Brownrigg, Peter Burn, Kay Fairweather, John Keating, Steve Kirk, Steve Tobin, Sally Zielinski, and others. Susan Emmons provided the original Biodiversity wildlife list.

### Birds

| COMMON NAME                    | GENUS AND SPECIES            |
|--------------------------------|------------------------------|
| <i>Loons</i>                   |                              |
| Common Loon                    | <i>Gavia immer</i>           |
| <i>Grebes</i>                  |                              |
| Pied-billed Grebe              | <i>Podilymbus podiceps</i>   |
| <i>Cormorants</i>              |                              |
| Double-crested Cormorant       | <i>Phalacrocorax auritus</i> |
| <i>Bitterns and Herons</i>     |                              |
| American Bittern               | <i>Botaurus lentiginosus</i> |
| Black-crowned Night Heron      | <i>Nycticorax nycticorax</i> |
| Cattle Egret                   | <i>Bubulcus ibis</i>         |
| Great Blue Heron               | <i>Ardea herodias</i>        |
| Little Blue Heron              | <i>Egretta caerulea</i>      |
| Great Egret                    | <i>Ardea alba</i>            |
| Green Heron                    | <i>Butorides virescens</i>   |
| Snowy Egret                    | <i>Egretta thula</i>         |
| <i>American Vultures</i>       |                              |
| Turkey Vulture                 | <i>Cathartes aura</i>        |
| <i>Geese, Swans, and Ducks</i> |                              |
| American Black Duck            | <i>Anas rubripes</i>         |
| Blue-winged Teal               | <i>Anas discors</i>          |
| American Wigeon                | <i>Anas americana</i>        |
| Green-winged Teal              | <i>Anas crecca</i>           |
| Mallard                        | <i>Anas platyrhynchos</i>    |
| Northern Pintail               | <i>Anas acuta</i>            |
| Bufflehead                     | <i>Bucephala albeola</i>     |
| Common Goldeneye               | <i>Bucephala clangula</i>    |
| Common Merganser               | <i>Mergus merganser</i>      |
| Hooded Merganser               | <i>Lophodytes cucullatus</i> |
| Ring-necked Duck               | <i>Aythya collaris</i>       |
| Wood Duck                      | <i>Aix sponsa</i>            |
| Canada Goose                   | <i>Branta canadensis</i>     |
| Brant                          | <i>Branta bernicla</i>       |
| Greater White-fronted Goose    | <i>Anser albifrons</i>       |
| Mute Swan                      | <i>Cygnus olor</i>           |
| Snow Goose                     | <i>Chen caerulescens</i>     |

*Kites, Eagles, and Hawks*

Bald Eagle  
Golden Eagle  
Osprey  
Red-shouldered Hawk  
Broad-winged Hawk  
Red-tailed Hawk  
Rough-legged Hawk  
Northern Goshawk  
Cooper's Hawk  
Sharp-shinned Hawk  
Northern Harrier or Marsh Hawk

*Haliaeetus leucocephalus*  
*Aquila chrysaetos*  
*Pandion haliaetus*  
*Buteo lineatus*  
*Buteo platypterus*  
*Buteo jamaicensis*  
*Buteo lagopus*  
*Accipiter gentilis*  
*Accipiter cooperii*  
*Accipiter striatus*  
*Circus cyaneus*

*Falcons*

American Kestrel  
Merlin  
Peregrine Falcon

*Falco sparverius*  
*Falco columbarius*  
*Falco peregrinus*

*Pheasants and Turkeys*

Ring-necked Pheasant  
Ruffed Grouse  
Wild Turkey

*Phasianus colchicus*  
*Bonasa umbellus*  
*Meleagris gallopavo*

*Quail*

Northern Bobwhite

*Colinus virginianus*

*Rails, Gallinules, and Coots*

Virginia Rail  
Sora

*Rallus limicola*  
*Porzana carolina*

*Cranes*

Sandhill Crane

*Grus canadensis*

*Plovers and Lapwings*

Killdeer

*Charadrius vociferous*

*Sandpipers and Allies*

American Woodcock  
Common Snipe (Wilson's Snipe)  
Lesser Yellowlegs  
Greater Yellowlegs  
Dunlin  
Least Sandpiper  
Semipalmated Sandpiper  
Pectoral Sandpiper  
Solitary Sandpiper  
Spotted Sandpiper  
Upland Sandpiper

*Scolopax minor*  
*Gallinago delicata*  
*Tringa flavipes*  
*Tringa melanoleuca*  
*Calidris alpina*  
*Calidris minutilla*  
*Calidris pusilla*  
*Calidris melanotos*  
*Tringa solitaria*  
*Actitis macularia*  
*Bartramia longicauda*

*Gulls, Terns, and Allies*

Great Black-backed Gull  
Herring Gull  
Iceland Gull

*Larus marinus*  
*Larus argentatus*  
*Larus glaucoides*

|                           |                                   |
|---------------------------|-----------------------------------|
| Ring-billed Gull          | <i>Larus delawarensis</i>         |
| <i>Pigeons and Doves</i>  |                                   |
| Mourning Dove             | <i>Zenaida macroura</i>           |
| Rock Dove (Rock Pigeon)   | <i>Columba livia</i>              |
| <i>Cuckoos and Allies</i> |                                   |
| Black-billed Cuckoo       | <i>Coccyzus erythrophthalmus</i>  |
| Yellow-billed Cuckoo      | <i>Coccyzus americanus</i>        |
| <i>Typical Owls</i>       |                                   |
| Barred Owl                | <i>Strix varia</i>                |
| Eastern Screech Owl       | <i>Megascops asio</i>             |
| Great Horned Owl          | <i>Bubo virginianus</i>           |
| Northern Long-eared Owl   | <i>Asio otus</i>                  |
| Northern Saw-whet Owl     | <i>Aegolius acadicus</i>          |
| Snowy Owl                 | <i>Nyctea scandiaca</i>           |
| <i>Goatsuckers</i>        |                                   |
| Common Nighthawk          | <i>Chordeiles minor</i>           |
| Whip-poor-will            | <i>Caprimulgus vociferus</i>      |
| <i>Swifts</i>             |                                   |
| Chimney Swift             | <i>Chaetura pelagica</i>          |
| <i>Hummingbirds</i>       |                                   |
| Ruby-throated Hummingbird | <i>Archilocus colubris</i>        |
| Rufous Hummingbird        | <i>Selasphorus rufus</i>          |
| <i>Kingfishers</i>        |                                   |
| Belted Kingfisher         | <i>Ceryle alcyon</i>              |
| <i>Woodpeckers</i>        |                                   |
| Downy Woodpecker          | <i>Picoides pubescens</i>         |
| Hairy Woodpecker          | <i>Picoides villosus</i>          |
| Northern Flicker          | <i>Colaptes auratus</i>           |
| Pileated Woodpecker       | <i>Dryocopus pileatus</i>         |
| Red-bellied Woodpecker    | <i>Melanerpes carolinus</i>       |
| Red-headed Woodpecker     | <i>Melanerpes erythrocephalus</i> |
| Yellow-bellied Sapsucker  | <i>Sphyrapicus varius</i>         |
| <i>Tyrant Flycatchers</i> |                                   |
| Ash-throated Flycatcher   | <i>Myiarchus cinerascens</i>      |
| Great Crested Flycatcher  | <i>Myiarchus crinitus</i>         |
| Eastern Kingbird          | <i>Tyrannus tyrannus</i>          |
| Eastern Phoebe            | <i>Sayornis phoebe</i>            |
| Eastern Wood-Pewee        | <i>Contopus virens</i>            |
| Olive-sided Flycatcher    | <i>Contopus cooperi</i>           |
| Least Flycatcher          | <i>Empidonax minimus</i>          |
| Alder Flycatcher          | <i>Empidonax alnorum</i>          |
| Willow Flycatcher         | <i>Empidonax traillii</i>         |
| Yellow-bellied Flycatcher | <i>Empidonax flaviventris</i>     |
| <i>Shrikes</i>            |                                   |
| Northern Shrike           | <i>Lanius excubitor</i>           |

*Vireos*

Blue-headed Vireo  
Yellow-throated Vireo  
Philadelphia Vireo  
Red-eyed Vireo  
Warbling Vireo

*Vireo solitarius*  
*Vireo flavifrons*  
*Vireo philadelphicus*  
*Vireo olivaceus*  
*Vireo gilvus*

*Jays, Magpies, and Crows*

Blue Jay  
American Crow  
Fish Crow  
Common Raven

*Cyanocitta cristata*  
*Corvus brachyrhynchos*  
*Corvus ossifragus*  
*Corvus corax*

*Larks*

Horned Lark

*Eremophila alpestris*

*Swallows*

Tree Swallow  
Northern Rough-winged Swallow  
Bank Swallow  
Barn Swallow

*Tachycineta bicolor*  
*Stelgidopteryx serripennis*  
*Riparia riparia*  
*Hirundo rustica*

*Titmice*

Black-capped Chickadee  
Tufted Titmouse

*Poecile atricapilla*  
*Baeolophus bicolor*

*Nuthatches*

Red-breasted Nuthatch  
White-breasted Nuthatch

*Sitta canadensis*  
*Sitta carolinensis*

*Creepers*

Brown Creeper

*Certhia americana*

*Wrens*

Carolina Wren  
Winter Wren  
House Wren  
Marsh Wren

*Thryothorus ludovicianus*  
*Troglodytes troglodytes*  
*Troglodytes aedon*  
*Cistothorus palustris*

*Kinglets*

Golden-crowned Kinglet  
Ruby-crowned Kinglet

*Regulus satrapa*  
*Regulus calendula*

*Gnatcatchers*

Blue-gray Gnatcatcher

*Poliophtila caerulea*

*Bluebirds and Thrushes*

American Robin  
Fieldfare  
Eastern Bluebird  
Gray-cheeked Thrush  
Hermit Thrush  
Swainson's Thrush  
Veery  
Wood Thrush

*Turdus migratorius*  
*Turdus pilaris*  
*Sialia sialis*  
*Catharus minimus*  
*Catharus guttatus*  
*Catharus ustulatus*  
*Catharus fuscescens*  
*Hylocichla mustelina*

*Mimic Thrushes*

Brown Thrasher  
Gray Catbird  
Northern Mockingbird

*Toxostoma rufum*  
*Dumetella carolinensis*  
*Mimus polyglottos*

*Starlings*

European Starling

*Sturnus vulgaris*

*Wagtails and Pipits*

American Pipit

*Anthus rubescens*

*Waxwings*

Cedar Waxwing

*Bombycilla cedrorum*

*Wood-Warblers*

Blue-winged Warbler  
Golden-winged Warbler  
Tennessee Warbler  
Orange-crowned Warbler  
Nashville Warbler  
Northern Parula  
Yellow Warbler  
Chestnut-sided Warbler  
Magnolia Warbler  
Cape May Warbler  
Black-throated Blue Warbler  
Yellow-rumped Warbler  
Black-throated Green Warbler  
Blackburnian Warbler  
Pine Warbler  
Prairie Warbler  
Palm Warbler  
Bay-breasted Warbler  
Blackpoll Warbler  
Black-and-White Warbler  
American Redstart  
Worm-eating Warbler  
Ovenbird  
Northern Waterthrush  
Louisiana Waterthrush  
Kentucky Warbler  
Connecticut Warbler  
Mourning Warbler  
Common Yellowthroat  
Hooded Warbler  
Wilson's Warbler  
Canada Warbler  
Yellow-breasted Chat

*Vermivora pinus*  
*Vermivora chrysoptera*  
*Vermivora peregrina*  
*Vermivora celata*  
*Vermivora ruficapilla*  
*Parula americana*  
*Dendroica petechia*  
*Dendroica pensylvanica*  
*Dendroica magnolia*  
*Dendroica tigrina*  
*Dendroica caerulescens*  
*Dendroica coronata*  
*Dendroica virens*  
*Dendroica fusca*  
*Dendroica pinus*  
*Dendroica discolor*  
*Dendroica palmarum*  
*Dendroica castanea*  
*Dendroica striata*  
*Mniotilta varia*  
*Setophaga ruticilla*  
*Helmitheros vermivora*  
*Seiurus aurocapillus*  
*Seiurus noveboracensis*  
*Seiurus motacilla*  
*Oporornis formosus*  
*Oporornis agilis*  
*Oporornis philadelphia*  
*Geothlypis trichas*  
*Wilsonia citrina*  
*Wilsonia pusilla*  
*Wilsonia canadensis*  
*Icteria virens*

*Tanagers*

Scarlet Tanager

*Piranga olivacea*

*Sparrows and Allies*

American Tree Sparrow

*Spizella arborea*

Clay-colored Sparrow

*Spizella pallida*

Chipping Sparrow

*Spizella passerina*

Field Sparrow

*Spizella pusilla*

Dark-eyed Junco

*Junco hyemalis*

Fox Sparrow

*Passerella iliaca*

Lincoln's Sparrow

*Melospiza lincolni*

Rufous-sided Towhee (Eastern Towhee)

*Pipilo erythrophthalmus*

Savannah Sparrow

*Passerculus sandwichensis*

Snow Bunting

*Plectrophenax nivalis*

Song Sparrow

*Melospiza melodia*

Swamp Sparrow

*Melospiza georgiana*

Vesper Sparrow

*Poocetes gramineus*

White-crowned Sparrow

*Zonotrichia leucophrys*

White-throated Sparrow

*Zonotrichia albicollis*

*Cardinals and Allies*

Blue Grosbeak

*Passerina caerulea*

Indigo Bunting

*Passerina cyanea*

Northern Cardinal

*Cardinalis cardinalis*

Dickcissel

*Spiza americana*

Rose-breasted Grosbeak

*Pheucticus ludovicianus*

*Blackbirds, Orioles, and Allies*

Baltimore Oriole

*Icterus galbula*

Orchard Oriole

*Icterus spurius*

Bobolink

*Dolichonyx orizvorus*

Brewer's Blackbird

*Euphagus cyanocephalus*

Brown-headed Cowbird

*Molothrus ater*

Common Grackle

*Quiscalus quiscula*

Eastern Meadowlark

*Sturnella magna*

Red-winged Blackbird

*Agelaius phoeniceus*

Rusty Blackbird

*Euphagus carolinus*

*Fringilline Finches*

American Goldfinch

*Carduelis tristis*

Common Redpoll

*Carduelis flammea*

Pine Siskin

*Carduelis pinus*

Evening Grosbeak

*Coccothraustes vespertinus*

House Finch

*Carpodacus mexicanus*

Purple Finch

*Carpodacus purpureus*

Pine Grosbeak

*Pinicola enucleator*

White-winged Crossbill

*Loxia leucoptera*

*Old World Sparrows*

House Sparrow

*Passer domesticus*

## **Amphibians**

### **COMMON NAME**

American Toad  
Fowler's Toad  
Bullfrog  
Wood Frog  
Green Frog  
Leopard Frog  
Pickerel Frog  
Spring Peeper  
Gray Tree Frog  
Red-spotted Newt  
Blue-spotted Salamander  
Spotted Salamander  
Four-toed Salamander  
Red-backed Salamander

### **GENUS AND SPECIES**

*Bufo americanus*  
*Bufo fowleri*  
*Rana catesbeiana*  
*Rana sylvatica*  
*Rana clamitans*  
*Rana pipiens*  
*Rana palustris*  
*Pseudacris crucifer*  
*Hyla versicolor*  
*Notophthalmus viridescens*  
*Ambystoma laterale*  
*Ambystoma maculatum*  
*Hemidactylum scutatum*  
*Plethodon cinereus*

## **Reptiles**

### **COMMON NAME**

#### *Snakes*

Eastern Milk Snake  
Garter Snake  
Northern Brown Snake  
Northern Ringneck Snake  
Northern Water Snake  
Ribbon Snake

### **GENUS AND SPECIES**

*Lampropeltus triangulum triangulum*  
*Thamnophis sirtalis*  
*Storeria dekayi dekayi*  
*Diadophis punctatus*  
*Nerodia sipedon*  
*Thamnophis sauritus*

#### *Turtles*

Blanding's Turtle  
Eastern Box Turtle  
Eastern Painted Turtle  
Snapping Turtle  
Musk Turtle  
Spotted Turtle  
Wood Turtle

*Emydoidea blandingii*  
*Terrapene carolina*  
*Chrysemys picta*  
*Chelydra serpentina*  
*Sternotherus odoratus*  
*Clemmys guttata*  
*Glyptemis insculpta*

## **Mammals**

### **COMMON NAME**

#### *Marsupials*

Virginia Opossum

### **GENUS AND SPECIES**

*Didelphus virginiana*

#### *Shrews and Moles*

Short-tailed Shrew  
Hairy-tailed Mole  
Eastern Mole  
Star-nosed Mole

*Blarina brevicauda*  
*Parascalops breweri*  
*Scalopus aquaticus*  
*Condylura cristata*

*Rabbit*

Eastern Cottontail

*Sylvilagus floridanus*

*Squirrel and Chipmunk*

Eastern Chipmunk

*Tamias striatus*

Woodchuck

*Marmota monax*

Gray Squirrel

*Sciurus carolinensis*

Red Squirrel

*Tamiasciurus hudsonicus*

Northern Flying Squirrel

*Glaucomys sabrinus*

*Beaver*

American Beaver

*Castor canadensis*

*Mouse, Vole, and Muskrat*

White-footed Mouse

*Peromyscus leucopus*

House Mouse

*Mus muscula*

Southern Red-backed Vole

*Clethrionomys gapperi*

Meadow Vole

*Microtus pennsylvanicus*

Norway Rat

*Rattus norvegicus*

Muskrat

*Ondatra zibethicus*

*Porcupine*

Porcupine

*Erithizon dorsatum*

*Coyote, Wolf, Fox*

Coyote

*Canis latrans*

Gray Fox

*Urocyon cinereoargenteus*

Red Fox

*Vulpes vulpes*

*Bear*

Black Bear

*Ursus americanus*

*Raccoon*

Raccoon

*Procyon lotor*

*Mustelids*

Fisher

*Martes pennanti*

Ermine

*Mustela erminea*

Long-tailed Weasel

*Mustela frenata*

Mink

*Mustela vison*

Striped Skunk

*Mephitis mephitis nigra*

River Otter

*Lontra canadensis*

*Deer and Moose*

White-tailed Deer

*Odocoileus virginianus*

Moose

*Alces alces*

*Felines*

Bobcat

*Lynx rufus*

*Bats*

Little Brown Bat

*Myotis lucifugus*

Big Brown Bat

*Eptesicus fuscus*

Eastern Red Bat

*Lasiurus borealis*

## Fish<sup>1</sup>

| COMMON NAME              | GENUS AND SPECIES                     |
|--------------------------|---------------------------------------|
| Goldfish*                | <i>Carassius auratus auratus</i>      |
| Common Carp*             | <i>Cyprinus carpio</i>                |
| Golden Shiner            | <i>Notemigonus crysoleucas</i>        |
| Bridle Shiner            | <i>Notropis bifrenatus</i>            |
| Spottail Shiner          | <i>Notropis hudsonius</i>             |
| Common Shiner            | <i>Luxilus cornatus</i>               |
| Blacknose Dace           | <i>Rhinichthys atratulus</i>          |
| Fallfish                 | <i>Semotilus corporalis</i>           |
| White Sucker             | <i>Catostomus commersonii</i>         |
| Creek Chubsucker         | <i>Erimyzon oblongus</i>              |
| White Catfish*           | <i>Ameiurus catus</i>                 |
| Yellow Bullhead          | <i>Ameiurus natalis</i>               |
| Brown Bullhead           | <i>Ameiurus nebulosus</i>             |
| Redfin Pickerel          | <i>Esox americanus americanus</i>     |
| Northern Chain Pickerel* | <i>Esox niger</i>                     |
| Northern Pike*           | <i>Esox lucius</i>                    |
| Tiger Muskellunge        | <i>Esox lucius x Esox masquinongy</i> |
| Rainbow Smelt            | <i>Osmerus mordax</i>                 |
| Rainbow Trout*           | <i>Oncorhynchus mykiss</i>            |
| Brown Trout              | <i>Salmo trutta</i>                   |
| Brook Trout*             | <i>Salvelinus fontinalis</i>          |
| Banded Killifish         | <i>Fundulus diaphanous</i>            |
| White Perch              | <i>Morone americana</i>               |
| Banded Sunfish           | <i>Enneacanthus obesus</i>            |
| Redbreast Sunfish        | <i>Lepomis auritus</i>                |
| Green Sunfish            | <i>Lepomis cyanellus</i>              |
| Pumpkinseed              | <i>Lepomis gibbosus</i>               |
| Bluegill                 | <i>Lepomis machrochirus</i>           |
| Smallmouth Bass          | <i>Micropterus dolomieu</i>           |
| Largemouth Bass*         | <i>Micropterus salmoides</i>          |
| Black Crappie*           | <i>Pomoxis nigromaculatus</i>         |
| Swamp Darter             | <i>Etheostoma fusiforme</i>           |
| Yellow Perch*            | <i>Perca flavescens</i>               |

---

<sup>1</sup> Fish species marked with an asterisk (\*) have been observed in Carlisle by local residents. All the fish on the list are currently known to occur in the Concord River drainage area, which includes Carlisle, but some may not have been sighted in Carlisle. (Hartel, Karsten E., David B. Halliwell, and Alan E. Launer, *Inland Fishes of Massachusetts*. Massachusetts Audubon Society, Lincoln, MA, 2002.)

## Arthropods

### COMMON NAME

#### *Butterflies*

Little Wood Satyr

Inornate Ringlet (Common Ringlet)

Blue-eyed Grayling (Common Wood Nymph)

Northern Pearly Eye

Appalachian Brown

Eyed Brown

Red Admiral

American Lady

Painted Lady

Eastern Comma

Question Mark

Mourning Cloak

Compton Tortoiseshell

Pearl Crescent

Baltimore Checkerspot

Great Spangled Fritillary

Variiegated Fritillary

Silver-bordered Fritillary

Red Spotted Purple

White Admiral

Monarch

Eastern Pine Elfin

Banded Hairstreak

White M Hairstreak

American Copper

Bronze Copper

Spring Azure

Eastern Tailed Blue

Orange Sulfur

Clouded Sulfur

Cabbage White

Dusted Skipper

Northern Cloudywing

Silver-spotted Skipper

Hoary Edge

Juvenal's Duskywing

Common Sootywing

Least Skipper

Long Dash

Tawny-edged Skipper

Peck's Skipper

Little Glassywing

### GENUS AND SPECIES

*Megisto cymela*

*Coenympha tullia (inornata)*

*Cercyonis pegala*

*Enodia anthedon*

*Satyrodes appalachia*

*Satyrodes eurydice*

*Vanessa atalanta*

*Vanessa virginiensis*

*Vanessa cardui*

*Polygonia comma*

*Polygonia interrogationis*

*Nymphalis antiopa*

*Nymphalis vaualbum*

*Phyciodes tharos*

*Euphydryas phaeton*

*Speyeria cybele*

*Euptoieta claudia*

*Boloria selene*

*Limenitis arthemis astyanax*

*Limenitis arthemis arthemis*

*Danaus plexippus*

*Callophrys niphon*

*Satyrium calanus*

*Parrhasius m-album*

*Lycaena phlaeas americana*

*Lycaena hyllus*

*Celastrina ladon*

*Cupido comyntas*

*Colias eurytheme*

*Colias philodice*

*Pieris rapae*

*Atrytonopsis hianna*

*Thorybes pylades*

*Epargyreus clarus*

*Achalarus lyciades*

*Erynnis juvenalis*

*Pholisora catullus*

*Ancyloxypha numitor*

*Polites mystic*

*Polites themistocles*

*Polites peckius*

*Pomeius verna*

Dun Skipper  
European Skipper  
Broad-winged Skipper  
Eastern Tiger Swallowtail  
Spicebush Swallowtail  
Black Swallowtail  
Common Buckeye

*Euphytes vestris*  
*Thymelicus lineola*  
*Poanes viator*  
*Papilio glaucus*  
*Papilio troilus*  
*Papilio polyxenes*  
*Junonia coenia*

*Moths*

Elder Shoot Borer Moth  
Leaf Crumpler Moth  
Clemens Grass Tubeworm Moth  
Luna Moth  
Green Marvel Moth  
Pink-spotted Hawk Moth  
Virginia Creeper Clearwing Moth  
Copper Underwing  
Small Magpie Moth  
Pale Gray Bird-dropping Moth  
Polyphemus Moth  
Yellowheaded cutworm  
Yellow Three-spot  
Yellow-collared Slug Moth  
Milky Urola Moth  
Oak Besma  
Acorn Moth  
Promethea Moth  
Silver-Spotted Fern Moth  
Pale Beauty  
Northern Pine Looper Moth  
Epione Underwing  
Underwing  
Waved Sphinx  
Sooty-winged Chalcoela Moth  
Soybean Looper Moth  
Yellow-collared Scape Moth  
Black-dotted Brown  
Little White Lichen Moth  
Drab Condylolomia Moth  
Barberry Geometer  
Bent-Line Carpet  
Sweetfern Geometer  
Delicate Cynia  
Virginia Creeper Sphinx Moth  
Grape Leaf Folder Moth  
Darker Diacme Moth  
Harlequin Webworm Moth

*Achatodes zea*  
*Acrobasis indigenella*  
*Acrolophus popeanella*  
*Actias luna*  
*Agriopodes fallax*  
*Agrius cingulata*  
*Albuna fraxini*  
*Amphipyra pyramidoides*  
*Anania hortulata*  
*Antaeotricha leucillana*  
*Antheraea polyphemus*  
*Apamea amputatrix*  
*Apamea helva*  
*Apoda y-inversum*  
*Argyria lacteella*  
*Besma quercivoraria*  
*Blastobasis glandulella*  
*Callosamia promethea*  
*Callopietria cordata,*  
*Campaea perlata*  
*Caripeta piniata*  
*Catocala epione*  
*Catocala sp.*  
*Ceratomia undulosa*  
*Chalcoela iphitalis*  
*Chrysodeixis includens*  
*Cisseps fulvicollis*  
*Cissusa spadix*  
*Clemensia albata*  
*Condylolomia participalis*  
*Coryphista meadii*  
*Costaconvexa centrostrigaria*  
*Cyclophora pendulinaria*  
*Cynia tenera*  
*Darapsa myron*  
*Desmia funeralis*  
*Diacme adipaloides*  
*Diathrausta harlequinialis*

|                                |                                 |
|--------------------------------|---------------------------------|
| Recondite Webworm Moth         | <i>Diathrausta reconditalis</i> |
| Julias Dicymolomia Moth        | <i>Dicymolomia julianalis</i>   |
| Curve-lined Angle              | <i>Digrammia continuata</i>     |
| Pink-fringed Dolichomia Moth   | <i>Dolichomia binodulalis</i>   |
| Yellow-fringed Dolichomia Moth | <i>Dolichomia olinalis</i>      |
| Arched Hooktip Moth            | <i>Drepana arcuata</i>          |
| Rosy Maple Moth                | <i>Dryocampa rubicunda</i>      |
| The Small Engrailed            | <i>Ectropis crepuscularia</i>   |
| Pondside Pyralid Moth          | <i>Elophila icciusalis</i>      |
| Milkweed Tussock Moth          | <i>Euchaetes egle</i>           |
| Beautiful wood-nymph           | <i>Eudryas grata</i>            |
| Lesser Grapevine Looper Moth   | <i>Eulithis diversilineata</i>  |
| Pandorus Sphinx                | <i>Eumorpha pandorus</i>        |
| Sharp-angled Carpet            | <i>Euphyia intermediata</i>     |
| Common Eupithecia Moth         | <i>Eupithecia miserulata</i>    |
| Purplebacked cabbageworm       | <i>Evergestis pallidata</i>     |
| Masters Dart                   | <i>Feltia herilis</i>           |
| Subgothic Dart                 | <i>Feltia subgothica</i>        |
| Gray Furcula                   | <i>Furcula cinerea</i>          |
| Boxwood Leaf-tier Moth         | <i>Galasa nigrinodis</i>        |
| The Wedgling                   | <i>Galgula partita</i>          |
| Common Gluphisia               | <i>Gluphisia septentrionis</i>  |
| Banded Tussock Moth            | <i>Halysidota tessellaris</i>   |
| Clymene Moth                   | <i>Haploa clymene</i>           |
| Lecontes Haploa                | <i>Haploa lecontei</i>          |
| Harris Three-spot              | <i>Harrisimemna trisignata</i>  |
| Grapeleaf Skeletonizer         | <i>Harrisina americana</i>      |
| Snowberry Clearwing            | <i>Hemaris diffinis</i>         |
| Hummingbird Clearwing          | <i>Hemaris thysbe</i>           |
| Cecropia Moth                  | <i>Hyalophora cecropia</i>      |
| One-Spotted Variant            | <i>Hypagyrtis unipunctata</i>   |
| Baltimore Bomolocha            | <i>Hypena baltimoralis</i>      |
| Dimorphic Bomolocha            | <i>Hypena bijugalis</i>         |
| Green Cloverworm Moth          | <i>Hypena scabra</i>            |
| Giant Leopard Moth             | <i>Hypercompe scribonia</i>     |
| Painted Lichen Moth            | <i>Hypoprepia fucosa</i>        |
| Clover Hayworm Moth            | <i>Hypsopygia costalis</i>      |
| Common Idia                    | <i>Idia aemula</i>              |
| American Idia                  | <i>Idia americalis</i>          |
| Orange-spotted Idia            | <i>Idia diminuendis</i>         |
| Julias Idia                    | <i>Idia julia</i>               |
| Rotund Idia                    | <i>Idia rotundalis</i>          |
| Bent-Line Gray                 | <i>Iridopsis larvaria</i>       |
| Hemlock Looper                 | <i>Lambdina fiscellaria</i>     |
| Southern Pine Sphinx           | <i>Lapara coniferarum</i>       |
| Ambiguous Moth                 | <i>Lascoria ambigualis</i>      |

Yellow-shouldered Slug Moth  
White Spring Moth  
Gypsy Moth  
Common Lytrosis  
Common Angle  
Five-spotted Hawk Moth  
(Tomato Hornworm)  
Canadian Melanolophia  
Signate Melanolophia  
Elegant Grass-veneer Moth  
Armyworm Moth  
Gray Half-Spot  
Horned Spanworm Moth  
Red-bordered Emerald Moth  
Double-toothed Prominent  
Lucerne Moth  
The Gem  
Dark-spotted Palthis  
Faint-spotted Palthis  
Eastern Panthea  
Blinded Sphinx Moth  
Maple Looper Moth  
Juniper Geometer  
Titian Peales Pyralid Moth  
Brown Angle Shades Moth  
Common Tan Wave  
Small Bird-dropping Moth  
Large Maple Spanworm  
Porcelain Gray  
Pink-spotted Dart  
Plume Moth sp.  
Bicolored Pyrausta Moth  
Wooly Bear  
White-spotted Redectis Moth  
Yellow-spotted Renia Moth  
Many-spotted Scoparia Moth  
Large Lace-border Moth  
Northern Selenia  
Lesser Maple Spanworm  
Great Ash Sphinx  
Yellow Wooly Bear  
Wavy-lined Emerald Moth  
Southern Emerald Moth  
Psychedelic Jones Moth  
Celery Leaf-tier Moth  
Straight-lined Argyria Moth

*Lithacodes fasciola*  
*Lomographa vestaliata*  
*Lymantria dispar*  
*Lytrosis unitaria*  
*Macaria aemulataria*  
  
*Manduca quinquemaculata*  
*Melanolophia canadaria*  
*Melanolophia signataria*  
*Microcrambus elegans*  
*Mythimna unipuncta*  
*Nedra ramosula*  
*Nematocampa resistaria*  
*Nemoria lixaria*  
*Nerice bidentata*  
*Nomophila nearctica*  
*Orthonama obstipata*  
*Palthis angulalis*  
*Palthis asopialis*  
*Panthea furcilla*  
*Paonias excaecatus*  
*Parallelia bistriaris*  
*Patalene olyzonaria*  
*Perispasta caeculalis*  
*Phlogophora periculosa*  
*Pleuroprucha insulsaria*  
*Ponometia erastrionides*  
*Prochoerodes lineola*  
*Protoarmia porcelaria*  
*Pseudohermonassa bicarnea*  
*Family Pterophoridae*  
*Pyrausta bicoloralis*  
*Pyrrharctia isabella*  
*Redectis vitrea*  
*Renia flavipunctalis*  
*Scoparia basalis*  
*Scopula limboundata*  
*Selenia alciphearia*  
*Speranza pustularia*  
*Sphinx chersis*  
*Spilosoma virginica*  
*Synchlora aerata*  
*Synchlora frondaria*  
*Thaumato-grapha jonesi*  
*Udea rubigalis*  
*Vaxi critica*

|                            |                                 |
|----------------------------|---------------------------------|
| Joyful Holomelina          | <i>Virbia laeta</i>             |
| Lunate Zale                | <i>Zale lunata</i>              |
| Variable Zanclognatha Moth | <i>Zanclognatha laevigata</i>   |
| <i>Damselflies</i>         |                                 |
| Aurora Damsel              | <i>Chromagrion conditum</i>     |
| Big Bluet                  | <i>Enallagma durum</i>          |
| Eastern Forktail           | <i>Ischnura verticalis</i>      |
| Eastern Red Damsel         | <i>Amphiagrion saucium</i>      |
| River Jewelwing            | <i>Calopteryx aequabilis</i>    |
| Ebony Jewelwing            | <i>Calopteryx maculata</i>      |
| Familiar Bluet             | <i>Enallagma civile</i>         |
| Fragile Forktail           | <i>Ischnura posita</i>          |
| Turquoise Bluet            | <i>Enallagma divigans</i>       |
| Stream Bluet               | <i>Enallagma exsulans</i>       |
| New England Bluet          | <i>Enallagma laterale</i>       |
| Northern Bluet             | <i>Enallagma cyathigerum</i>    |
| Orange Bluet               | <i>Enallagma signatum</i>       |
| Lilypad Forktail           | <i>Ischnura kellicotti</i>      |
| Rambur's Forktail          | <i>Ischnura ramburii</i>        |
| Skimming Bluet             | <i>Enallagma germinatum</i>     |
| Slender Spreadwing         | <i>Lestes rectangularis</i>     |
| Common Spreadwing          | <i>Lestes sponsa</i>            |
| Elegant Spreadwing         | <i>Lestes inaequalis</i>        |
| Swamp Spreadwing           | <i>Lestes vigilax</i>           |
| Variable Dancer            | <i>Argia fumipennis</i>         |
| <i>Dragonflies</i>         |                                 |
| Ashy Clubtail              | <i>Gomphus lividus</i>          |
| Unicorn Clubtail           | <i>Arigomphus villosipes</i>    |
| Lilypad Clubtail           | <i>Arigomphus furcifer</i>      |
| Beaverpond Baskettail      | <i>Epiptera canis</i>           |
| Black Saddlebags           | <i>Tramea lacerata</i>          |
| Black-shouldered Spinyleg  | <i>Dromogomphus spinosus</i>    |
| Blue Dasher                | <i>Pachydiplax longipennis</i>  |
| Chalk-fronted Corporal     | <i>Ladona julia</i>             |
| Common Baskettail          | <i>Epiptera cynosura</i>        |
| Common Green Darner        | <i>Anax junius</i>              |
| Common Sanddragon          | <i>Progomphus obscurus</i>      |
| Common Whitetail           | <i>Plathemis lydia</i>          |
| Dot-tailed Whiteface       | <i>Leucorrhinia intacta</i>     |
| Eastern Amberwing          | <i>Perithemis tenera</i>        |
| Eastern Pondhawk           | <i>Erythemis simplicicollis</i> |
| Four-spotted Skimmer       | <i>Libellula quadrimaculata</i> |
| Golden-winged Skimmer      | <i>Libellula auripennis</i>     |
| Frosted Whiteface          | <i>Leucorrhinia frigida</i>     |
| Hudsonian Whiteface        | <i>Leucorrhinia hudsonica</i>   |
| Lancet Clubtail            | <i>Gomphus exilis</i>           |

Prince Baskettail  
Ruby Meadowhawk  
Shadow Darner  
Slaty Skimmer  
Painted Skimmer  
Spangled Skimmer  
Harlequin Darner  
Lance-tipped Darner  
Green-striped Darner  
Swamp Darner  
Twelve-spotted Skimmer  
Twin-spotted Spiketail  
Arrowhead Spiketail  
Band-winged Meadowhawk  
White-faced Meadowhawk  
Widow Skimmer  
Yellow-legged Meadowhawk  
Calico Pennant  
Halloween Pennant  
Petite Emerald  
Racket-tailed Emerald

*Beetles*

Lily Leaf Beetle  
Red Milkweed Beetle  
Scarab Beetle  
Blister Beetle  
Diurnal Firefly  
Six-spotted Tiger Beetle  
Swamp Milkweed Beetle  
Goldsmith Beetle  
Burying Beetle  
Asian Ladybug  
Snail-eating Beetle  
Sap-feeding Beetle  
Handsome Fungus Beetle  
Northeastern Pine Sawyer  
Spotted Lady Beetle  
Eyed Elater  
Japanese Beetle  
Two-spotted Lady Beetle  
Convergent Lady Beetle  
Horned Fungus Beetle  
Ragweed Leaf Beetle  
Dogbane Beetle  
Billbug (weevil)  
Oriental Beetle

*Epithea princeps*  
*Sympetrum rubicundulum*  
*Aeshna umbrosa*  
*Libellula incesta*  
*Libellula semifasciata*  
*Libellula cyanea*  
*Gomphaeschna furcillata*  
*Aeshna constricta*  
*Aeshna verticalis*  
*Epiaeschna heros*  
*Libellula pulchella*  
*Cordulegaster maculata*  
*Cordulegaster obliqua*  
*Sympetrum semicinctum*  
*Sympetrum obtrusum*  
*Libellula luctuosa*  
*Sympetrum vicinum*  
*Celithemis elisa*  
*Celithemis eponina*  
*Dorocordulia lepida*  
*Dorocordulia libera*

*Lilioceris lili*  
*Tetraopes tetrophthalmus*  
*Osmoderma scabra*  
*Meloe sp.*  
*Ellychnia corrusca*  
*Cicindela sexguttata*  
*Labidomera clivicollis*  
*Cotalpa lanigera*  
*Nicrophorus tomentosus*  
*Harmonia axyridis*  
*Sphaeroderus stenostomus*  
*Glischrochilus fasciatus*  
*Endomychus biguttatus*  
*Monachamus notatus*  
*Coleomegilla maculata*  
*Alaus oculatus*  
*Popillia japonica*  
*Adalia bipunctata*  
*Hippodamia convergens*  
*Bolitotherus cornutus*  
*Zygogramma suturalis*  
*Chrysochus auratusus*  
*Sphenophorus australis*  
*Anomala orientalis*

|                                              |                                                                                |
|----------------------------------------------|--------------------------------------------------------------------------------|
| Eye-spotted Lady Beetle                      | <i>Anatis mali</i>                                                             |
| Net-winged Beetle                            | <i>Calopteron reticulatum</i>                                                  |
| Pennsylvania Leatherwing                     | <i>Chauliognathus pennsylvanicus</i>                                           |
| Carrion Beetle                               | <i>Necrophila americana</i>                                                    |
| Larder Beetle                                | <i>Dermestes lardarius</i>                                                     |
| Klamathweed Beetle                           | <i>Chrysolina sp</i>                                                           |
| Locust Borer                                 | <i>Megacyllene robiniae</i>                                                    |
| Broad-necked Root Borer                      | <i>Prionus laticollis</i>                                                      |
| Odontocorynus Weevil                         | <i>Odontocorynus sp.</i>                                                       |
| Pinching Beetle                              | <i>Lucanus capreolus</i>                                                       |
| Graphisurus Beetle                           | <i>Graphisurus fasciatus</i>                                                   |
| Diving Beetle                                | <i>Dytiscidae family</i>                                                       |
| Bumble Flower Beetle                         | <i>Euphoria inda</i>                                                           |
| Antelope Beetle                              | <i>Dorcus parallelus</i>                                                       |
| N/A (a species of Long-horned Flower Beetle) | <i>Leptura subhamata</i>                                                       |
| N/A (a species of Long-horned Flower Beetle) | <i>Anthophylax cyaneus</i>                                                     |
| <i>Bugs</i>                                  |                                                                                |
| Western Conifer Seed Bug                     | <i>Leptoglossus occidentalis</i>                                               |
| Giant Water Bug                              | <i>Lethocerus americanus</i>                                                   |
| Water Strider                                | <i>Gerris remigis</i>                                                          |
| Buffalo Treehopper                           | <i>Ceresa sp</i>                                                               |
| Ragweed Leafhopper                           | <i>Entylia carinata</i>                                                        |
| Red-banded Leafhopper                        | <i>Graphocephala coccinea</i>                                                  |
| Predaceous Stink Bug                         | <i>Stiretrus anchorago</i>                                                     |
| Green Stink Bug                              | <i>Acrosternum hilare</i>                                                      |
| Lyric Cicada                                 | <i>Tibicen lyricen</i>                                                         |
| Thread-legged Bug                            | <i>Emesaya brevipennis</i>                                                     |
| <i>Flies</i>                                 |                                                                                |
| Phantom Midge larva                          | <i>Chaoborus sp.</i>                                                           |
| Cluster Fly                                  | <i>Pollenia sp.</i>                                                            |
| March Fly                                    | <i>Bibio femoratus</i>                                                         |
| Thick-headed Fly                             | <i>Myopa sp.</i>                                                               |
| Black Fly                                    | <i>Simulium sp.</i>                                                            |
| American Horse Fly                           | <i>Tabanus americanus</i>                                                      |
| Deer Fly                                     | <i>Chrysops callidus</i>                                                       |
| Blue Bottle Fly                              | <i>Calliphora vomitoria</i>                                                    |
| House Fly                                    | <i>Musca domestica</i>                                                         |
| Fruit Fly                                    | <i>Drosophila sp.</i>                                                          |
| Mosquito                                     | <i>Culex sp., Ochlerotatus sp., Culiseta sp.,<br/>Anopheles sp., Aedes sp.</i> |
| <i>Ants, Wasps, Bees, and Sawflies</i>       |                                                                                |
| Black Carpenter Ant                          | <i>Camponotus pennsylvanicus</i>                                               |
| Little Black Ant                             | <i>Monomorium minimum</i>                                                      |
| Eastern Velvet Ant                           | <i>Dasymutilla occidentalis</i>                                                |
| Bald-faced Hornet                            | <i>Dolichovespula maculata</i>                                                 |
| Giant Ichneumon Wasp                         | <i>Megarhyssa atrata</i>                                                       |

|                                |                                         |
|--------------------------------|-----------------------------------------|
| Grass-carrier Wasp             | <i>Isodontia sp.</i>                    |
| Oak Galls                      | <i>Cynipidae</i>                        |
| Beetle-hunting Wasp            | <i>Cerceris fumipennis</i>              |
| Northern Paper Wasp            | <i>Polistes fuscatus</i>                |
| Cicada-killer                  | <i>Sphecius sp</i>                      |
| European Paper Wasp            | <i>Polistes dominulus</i>               |
| Thread-waisted Wasp            | <i>Ammophila sp.</i>                    |
| Potter wasp                    | <i>Eumenes sp. (possibly fraternus)</i> |
| Eastern Yellow Jacket          | <i>Vespula maculifrons</i>              |
| Honey Bee                      | <i>Apis mellifera</i>                   |
| Eastern Carpenter Bee          | <i>Xylocopa virginica</i>               |
| American Bumble Bee            | <i>Bombus pensylvanicus</i>             |
| European Wool-carder Bee       | <i>Anthidium manicatum</i>              |
| Plasterer Bee                  | <i>Colletes inaequalis</i>              |
| Sweat Bee                      | <i>Halictidae family</i>                |
| Argid Sawfly                   | <i>Arge humeralis</i>                   |
| <i>Other Insects</i>           |                                         |
| Katydid                        | <i>Pterophylla camellifolia</i>         |
| Chinese Mantis                 | <i>Tenodera aridifolia sinensis</i>     |
| Walkingstick Insect            | <i>Diapheromera femorata</i>            |
| Springtail                     | <i>Collembola</i>                       |
| Brown Mantidfly                | <i>Climaciella brunnea</i>              |
| Pine Tree Cricket              | <i>Oecanthus pini</i>                   |
| Fishfly                        | <i>Chauliodes rastricornis</i>          |
| European Earwig                | <i>Forficula auricularia</i>            |
| <i>Arachnids</i>               |                                         |
| Dog Tick                       | <i>Dermacentor variabilis</i>           |
| Deer Tick                      | <i>Ixodes sp.</i>                       |
| Jumping Spider                 | <i>Phidippus audax</i>                  |
| Black and Yellow Garden Spider | <i>Argiope aurantia</i>                 |
| Funnel Web Spider              | <i>Agelenidae family</i>                |
| Daddy Long-legs                | <i>Caddo agilis</i>                     |
| Mites                          | <i>Poecilochirus sp.</i>                |
| <i>Other Arthropods</i>        |                                         |
| Crayfish                       | <i>Cambarus bartoni</i>                 |
| Fairy Shrimp                   | <i>Eubbranchipus vernalis</i>           |
| <b>Gastropods</b>              |                                         |
| <b>COMMON NAME</b>             | <b>GENUS AND SPECIES</b>                |
| White-lipped Snail             | <i>Neohelix albolibris</i>              |

## Vascular Plants<sup>2</sup>

### Clubmosses and Relatives (Lycophytes)

#### COMMON NAME

##### *Huperziaceae*

Shining Fir-moss

##### *Lycopodiaceae*

Ground-pine, Princess pine

Southern Ground-cedar

Slender Ground-cedar

Staghorn Clubmoss

#### GENUS AND SPECIES

*Huperzia lucidula*

*Dendrolycopodium obscurum*

*Diphasiastrum digitatum*

*Diphasiastrum tristachyum*

*Lycopodium clavatum*

### Ferns and Horsetails (Monilophytes)

#### COMMON NAME

##### *Dennstaedtiaceae*

Hay-scented Fern

Bracken

##### *Dryopteridaceae*

Spinulose Wood-fern

Crested Wood-fern

Intermediate Wood-fern

Marginal Wood-fern

Christmas-fern

##### *Equisetaceae*

Field-horsetail

##### *Onocleaceae*

Ostrich-fern

Sensitive Fern

##### *Osmundaceae*

Interrupted Fern

Royal Fern

Cinnamon Fern

##### *Polypodiaceae*

Rock Polypody

##### *Pteridaceae*

Maidenhair-fern

##### *Schizaeaceae*

Climbing Fern

##### *Thelypteridaceae*

New York Fern

Marsh-fern

##### *Woodsiaceae*

Northern Lady-fern

#### GENUS AND SPECIES

*Dennstaedtia punctilobula*

*Pteridium aquilinum* var. *latiusculum*

*Dryopteris carthusiana*

*Dryopteris cristata*

*Dryopteris intermedia*

*Dryopteris marginalis*

*Polystichum acrostichoides*

*Equisetum arvense*

*Matteuccia struthiopteris* ssp. *pennsylvanica*

*Onoclea sensibilis*

*Osmunda claytoniana*

*Osmunda regalis* var. *spectabilis*

*Osmundastrum cinnamomeum*

*Polypodium virginianum*

*Adiantum pedatum*

*Lygodium palmatum*

*Parathelypteris noveboracensis*

*Thelypteris palustris* var. *pubescens*

*Athyrium angustum*

<sup>2</sup> Terminology, punctuation and capitalization based on *The Vascular Plants of Massachusetts: A County Checklist, Natural Heritage & Endangered Species Program*, First Revision 2011

## Conifers (Gymnosperms)

### COMMON NAME

#### *Cupressaceae*

Atlantic White Cedar  
Common Juniper  
Eastern Red Cedar  
Arbor Vitae

#### *Pinaceae*

Balsam Fir  
Tamarack  
Norway Spruce  
Black Spruce  
Spruce  
Red Pine  
Pitch-pine  
White Pine  
Scotch Pine  
Eastern Hemlock

### GENUS AND SPECIES

*Chamaecyparis thyoides*  
*Juniperus communis* var. *depressa*  
*Juniperus virginiana* var. *virginiana*  
*Thuja occidentalis*

*Abies balsamea*  
*Larix laricina*  
*Picea abies*  
*Picea mariana*  
*Picea* sp.  
*Pinus resinosa*  
*Pinus rigida*  
*Pinus strobus*  
*Pinus sylvestris*  
*Tsuga canadensis*

## Flowering Plants (Angiosperms)

### Magnoliid Complex (Primitive Flowering Plants)

### COMMON NAME

#### *Aristolochiaceae*

Wild Ginger

#### *Ceratophyllaceae*

Coontails

#### *Lauraceae*

Spicebush  
Sassafras

#### *Nymphaeaceae*

Yellow Water-lily, Cow-lily  
White Water-lily, Fragrant Water-lily  
Tuberous Water-lily

### GENUS AND SPECIES

*Asarum canadense*  
*Ceratophyllum* sp.  
*Lindera benzoin*  
*Sassafras albidum*  
*Nuphar variegata*  
*Nymphaea odorata*  
*Nymphaea tuberosa*

## Monocots (Flowering Plants: Monocots)

### COMMON NAME

#### *Acoraceae*

Sweet Flag

#### *Alismataceae*

Common Arrowhead, Duck-potato

#### *Araceae*

Woodland Jack-in-the-pulpit  
Duckweed  
Duckweed  
Arrow-arum

### GENUS AND SPECIES

*Acorus americanus*  
*Sagittaria latifolia* var. *obtusata*  
*Arisaema triphyllum* ssp. *triphyllum*  
*Lemna minor*  
*Lemna* sp.  
*Peltandra virginica*

|                          |                                                        |
|--------------------------|--------------------------------------------------------|
| Skunk-cabbage            | <i>Symplocarpus foetidus</i>                           |
| <i>Asparagaceae</i>      |                                                        |
| Asparagus                | <i>Asparagus officinalis</i>                           |
| <i>Colchiaceae</i>       |                                                        |
| Wild Oats                | <i>Uvularia sessilifolia</i>                           |
| <i>Cyperaceae</i>        |                                                        |
| Woodland-sedge           | <i>Carex blanda</i>                                    |
| Button-sedge             | <i>Carex bullata</i>                                   |
| Awned Sedge              | <i>Carex crinita</i> var. <i>crinita</i>               |
| Northern Stalked Sedge   | <i>Carex debilis</i> var. <i>rudgei</i>                |
| Lakeside Sedge           | <i>Carex lacustris</i>                                 |
| Woolly-fruited Sedge     | <i>Carex lasiocarpa</i> ssp. <i>americana</i>          |
| Hop-sedge                | <i>Carex lupulina</i>                                  |
| Sallow Sedge             | <i>Carex lurida</i>                                    |
| Hare's-foot Sedge        | <i>Carex ovalis</i>                                    |
| Pennsylvania Sedge       | <i>Carex pennsylvanica</i>                             |
| Tussock-sedge            | <i>Carex stricta</i>                                   |
| Swan's Sedge             | <i>Carex swanii</i>                                    |
| Fox-sedge                | <i>Carex vulpinoidea</i>                               |
| Threeway Sedge           | <i>Dulichium arundinaceum</i> var. <i>arundinaceum</i> |
| Slender Spike-rush       | <i>Eleocharis tenuis</i> var. <i>tenuis</i>            |
| Dark Green Bullsedge     | <i>Scirpus atrovirens</i>                              |
| Wool-grass               | <i>Scirpus cyperinus</i>                               |
| Georgia Bulrush          | <i>Scirpus georgianus</i>                              |
| Sedge                    | <i>Cyperaceae</i> sp.                                  |
| <i>Hemerocallidaceae</i> |                                                        |
| Orange Day-lily          | <i>Hemerocallis fulva</i>                              |
| <i>Iridaceae</i>         |                                                        |
| Crocus                   | <i>Crocus</i> sp.                                      |
| Northern Blue Flag       | <i>Iris versicolor</i>                                 |
| Stout Blue-eyed Grass    | <i>Sisyrinchium angustifolium</i>                      |
| Eastern Blue-eyed Grass  | <i>Sisyrinchium atlanticum</i>                         |
| Meadow Blue-eyed Grass   | <i>Sisyrinchium montanum</i> var. <i>crebrum</i>       |
| <i>Juncaceae</i>         |                                                        |
| Soft Rush                | <i>Juncus effusus</i>                                  |
| Common Wood-rush         | <i>Luzula multiflora</i> ssp. <i>multiflora</i>        |
| <i>Liliaceae</i>         |                                                        |
| Trout-lily               | <i>Erythronium americanum</i> ssp. <i>americanum</i>   |
| Canada Lily              | <i>Lilium canadense</i>                                |
| Indian Cucumber-root     | <i>Medeola virginiana</i>                              |
| <i>Melanthiaceae</i>     |                                                        |
| Nodding Trillium         | <i>Trillium cernuum</i> var. <i>cernuum</i>            |
| Purple Trillium          | <i>Trillium erectum</i>                                |
| False Hellebore          | <i>Veratrum viride</i>                                 |
| <i>Orchidaceae</i>       |                                                        |
| Pink Lady's-slipper      | <i>Cypripedium acaule</i>                              |

|                               |                                                 |
|-------------------------------|-------------------------------------------------|
| Downy Rattlesnake-plantain    | <i>Goodyera pubescens</i>                       |
| Ragged-fringed Orchid         | <i>Platanthera lacera</i>                       |
| Nodding Ladies' -tresses      | <i>Spiranthes cernua</i>                        |
| <i>Poaceae</i>                |                                                 |
| Marsh Bentgrass               | <i>Agrostis stolonifera</i>                     |
| Sweet Vernalgrass             | <i>Anthoxanthum odoratum</i>                    |
| Canada Bluejoint or Reedgrass | <i>Calamagrostis canadensis var. canadensis</i> |
| Slender Woodreed              | <i>Cinna latifolia</i>                          |
| Orchard-grass                 | <i>Dactylis glomerata</i>                       |
| Large Crab-grass              | <i>Digitaria sanguinalis</i>                    |
| Crab-grass                    | <i>Digitaria sp.</i>                            |
| Hair-fescue                   | <i>Festuca filiformis</i>                       |
| Red Fescue                    | <i>Festuca rubra</i>                            |
| Coastal Mannagrass            | <i>Glyceria obtusa</i>                          |
| Fowl Mannagrass               | <i>Glyceria striata</i>                         |
| Rice Cut-grass                | <i>Leersia oryzoides</i>                        |
| Deer-tongue                   | <i>Dichanthelium clandestinum</i>               |
| Timothy                       | <i>Phleum pratense</i>                          |
| Kentucky Blue-Grass           | <i>Poa pratensis</i>                            |
| Little Bluestem               | <i>Schizachyrium scoparium var. scoparium</i>   |
| Nodding Foxtail               | <i>Setaria faberi</i>                           |
| Yellow Foxtail                | <i>Setaria pumila ssp. pumila</i>               |
| Green Foxtail                 | <i>Setaria viridis</i>                          |
| Shining Wedgegrass            | <i>Sphenopholis nitida</i>                      |
| Wild Rice                     | <i>Zizania aquatica var. aquatica</i>           |
| <i>Pontederiaceae</i>         |                                                 |
| Pickerel-weed                 | <i>Pontederia cordata</i>                       |
| <i>Potamogetonaceae</i>       |                                                 |
| Ribbon-leaf Pondweed          | <i>Potamogeton epihydrus</i>                    |
| Floating Pondweed             | <i>Potamogeton natans</i>                       |
| Pondweed                      | <i>Potamogeton sp.</i>                          |
| <i>Ruscaceae</i>              |                                                 |
| Canada Mayflower              | <i>Maianthemum canadense</i>                    |
| False Solomon's Seal          | <i>Maianthemum racemosum ssp. racemosum</i>     |
| Giant Solomon's Seal          | <i>Polygonatum biflorum</i>                     |
| Solomon's Seal                | <i>Polygonatum pubescens</i>                    |
| <i>Smilacaceae</i>            |                                                 |
| Sawbrier                      | <i>Smilax glauca</i>                            |
| Carrion-flower                | <i>Smilax herbacea</i>                          |
| Common Greenbrier             | <i>Smilax rotundifolia</i>                      |
| <i>Typhaceae</i>              |                                                 |
| Bur-reed                      | <i>Sparganium sp.</i>                           |
| Narrow-leaved Cat-tail        | <i>Typha angustifolia</i>                       |
| Common Cat-tail               | <i>Typha latifolia</i>                          |

## Tricolpates (Flowering Plants: Most Dicots)

### COMMON NAME

#### *Adoxaceae*

Black Elderberry  
Maple-leaf Viburnum  
Northern Arrow-wood  
Nannyberry  
Wild Raisin

#### *Amaranthaceae*

Pigweed, Lamb's Quarters

#### *Anacardiaceae*

Staghorn-sumac  
Poison-ivy  
Poison-sumac

#### *Apiaceae*

Fool's Parsley  
Wild Sarsaparilla  
Queen Anne's Lace  
Swamp-pennywort

#### *Apocynaceae*

Spreading Dogbane  
Downy Swamp-milkweed  
Common Milkweed  
Orange Milkweed  
Milkweed  
Black Swallow-wort  
Periwinkle

#### *Aquifoliaceae*

Winterberry

#### *Asteraceae*

Yarrow  
Yarrow  
Ragweed  
Pussytoes  
Aster  
Swamp Beggar-ticks  
Canada Thistle  
Tall Flat-topped White Aster  
Daisy-fleabane  
Horseweed, Hogweed, Butterweed  
Rough Fleabane, Lesser Daisy-fleabane  
Rough Aster  
Showy Aster  
Grass-leaf Flat-topped Goldenrod,  
Common Flat-top

### GENUS AND SPECIES

*Sambucus nigra* ssp. *canadensis*  
*Viburnum acerifolium*  
*Viburnum dentatum* var. *lucidum*  
*Viburnum lentago*  
*Viburnum nudum* var. *cassinoides*

*Chenopodium album*

*Rhus hirta*  
*Toxicodendron radicans* ssp. *radicans*  
*Toxicodendron vernix*

*Aethusia cynapium*  
*Aralia nudicaulis*  
*Daucus carota*  
*Hydrocotyle americana*

*Apocynum androsaemifolium*  
*Asclepias incarnata* ssp. *pulchra*  
*Asclepias syriaca*  
*Asclepias tuberosa*  
*Asclepias* sp.  
*Cynanchum louiseae*  
*Vinca minor*

*Ilex verticillata*

*Achillea millefolium* ssp. *millefolium*  
*Achillea* sp.  
*Ambrosia artemisiifolia*  
*Antennaria neglecta*  
*Aster* sp.  
*Bidens connata*  
*Cirsium arvense*  
*Doellingeria umbellata*  
*Erigeron annuus*  
*Erigeron canadensis*  
*Erigeron strigosus* var. *strigosus*  
*Eurybia radula*  
*Eurybia spectabilis*  
  
*Euthamia graminifolia*

|                                              |                                                                               |
|----------------------------------------------|-------------------------------------------------------------------------------|
| Atlantic Joe-Pye-weed                        | <i>Eutrochium dubium</i>                                                      |
| Spotted Joe-Pye-weed                         | <i>Eutrochium maculatum</i>                                                   |
| Joe-Pye-weed                                 | <i>Eutrochium sp.</i>                                                         |
| Divaricate Sunflower                         | <i>Helianthus divaricatus</i>                                                 |
| Orange Hawkweed                              | <i>Hieraceum aurantiacum</i>                                                  |
| King-devil                                   | <i>Hieraceum caespitosum</i>                                                  |
| Mouse-ear Hawkweed                           | <i>Hieraceum pilosella</i>                                                    |
| Hawkweed                                     | <i>Hieraceum sp.</i>                                                          |
| Yellow Wild Lettuce                          | <i>Lactuca canadensis</i>                                                     |
| Oxeye-daisy                                  | <i>Leucanthemum vulgare</i>                                                   |
| Climbing Hempweed                            | <i>Mikania scandens</i>                                                       |
| Sweet Everlasting                            | <i>Pseudognaphalium obtusifolium</i>                                          |
| Black-eyed Susan                             | <i>Rudbeckia hirta var. pulcherrima</i>                                       |
| Fall-dandelion, Hawkbit                      | <i>Scorzoneroideis autumnalis ssp. autumnalis</i>                             |
| Canada Goldenrod                             | <i>Solidago canadensis var. canadensis</i>                                    |
| Late Goldenrod                               | <i>Solidago gigantea</i>                                                      |
| Early Goldenrod                              | <i>Solidago juncea</i>                                                        |
| Gray Goldenrod                               | <i>Solidago nemoralis ssp. nemoralis</i>                                      |
| Downy Goldenrod                              | <i>Solidago puberula var. puberula</i>                                        |
| Rough-stemmed Goldenrod                      | <i>Solidago rugosa</i>                                                        |
| Goldenrod                                    | <i>Solidago sp.</i>                                                           |
| Bushy, Long-stalked Aster, Rice-button Aster | <i>Symphyotrichum dumosum</i>                                                 |
| Tall White or Panicked Aster                 | <i>Symphyotrichum lanceolatum ssp. lanceolatum</i><br><i>var. lanceolatum</i> |
| Calico Aster, Goblet Aster                   | <i>Symphyotrichum lateriflorum</i>                                            |
| New England Aster                            | <i>Symphyotrichum novae-angliae</i>                                           |
| New York Aster                               | <i>Symphyotrichum novi-belgii</i>                                             |
| Bristly Aster, Swamp Aster                   | <i>Symphyotrichum puniceum var. puniceum</i>                                  |
| Small White Aster                            | <i>Symphyotrichum racemosum</i>                                               |
| Dandelion                                    | <i>Taraxacum officinale</i>                                                   |
| Yellow Goat's Beard                          | <i>Tragopogon pratensis</i>                                                   |
| New York Ironweed                            | <i>Vernonia noveboracensis</i>                                                |
| <i>Balsaminiaceae</i>                        |                                                                               |
| Orange Jewelweed                             | <i>Impatiens capensis</i>                                                     |
| <i>Berberidaceae</i>                         |                                                                               |
| Japanese Barberry                            | <i>Berberis thunbergii</i>                                                    |
| European Barberry                            | <i>Berberis vulgaris</i>                                                      |
| May-apple                                    | <i>Podophyllum peltatum</i>                                                   |
| <i>Betulaceae</i>                            |                                                                               |
| Black Alder                                  | <i>Alnus glutinosa</i>                                                        |
| Speckled Alder                               | <i>Alnus incana ssp. rugosa</i>                                               |
| Smooth Alder                                 | <i>Alnus serrulata var. subelliptica</i>                                      |
| Yellow Birch                                 | <i>Betula alleghaniensis</i>                                                  |
| Black Birch                                  | <i>Betula lenta</i>                                                           |
| Paper-birch                                  | <i>Betula papyrifera</i>                                                      |
| Gray-birch                                   | <i>Betula populifolia</i>                                                     |

|                        |                                                    |
|------------------------|----------------------------------------------------|
| Ironwood               | <i>Carpinus caroliniana</i> ssp. <i>virginiana</i> |
| American Filbert       | <i>Corylus americana</i>                           |
| <i>Bignoniaceae</i>    |                                                    |
| Catalpa, Cigar Tree    | <i>Catalpa</i> sp.                                 |
| <i>Boraginaceae</i>    |                                                    |
| True Forget-me-not     | <i>Myosotis scorpioides</i>                        |
| <i>Brassicaceae</i>    |                                                    |
| Garlic-mustard         | <i>Alliaria petiolata</i>                          |
| Winter-cress           | <i>Barbarea vulgaris</i>                           |
| Hoary Alyssum          | <i>Berteroa incana</i>                             |
| Shepherd's Purse       | <i>Capsella bursa-pastoris</i>                     |
| Cress                  | <i>Cardamine</i> sp.                               |
| Cow-cress              | <i>Lepidium campestre</i>                          |
| Water-cress            | <i>Nasturtium officinale</i>                       |
| Charlock               | <i>Sinapis arvensis</i>                            |
| Tower-mustard          | <i>Turritis glabra</i>                             |
| <i>Campanulaceae</i>   |                                                    |
| Cardinal-flower        | <i>Lobelia cardinalis</i>                          |
| <i>Caprifoliaceae</i>  |                                                    |
| Morrow Honeysuckle     | <i>Lonicera morrowii</i>                           |
| Tatarian Honeysuckle   | <i>Lonicera tatarica</i>                           |
| Honeysuckle            | <i>Lonicera</i> sp.                                |
| <i>Caryophyllaceae</i> |                                                    |
| Field-chickweed        | <i>Cerastium arvense</i>                           |
| Mouse-ear Chickweed    | <i>Cerastium fontanum</i> ssp. <i>vulgare</i>      |
| Ragged Robin           | <i>Lychnis flos-cuculi</i> ssp. <i>flos-cuculi</i> |
| Grove-sandwort         | <i>Moehringia lateriflora</i>                      |
| Soapwort               | <i>Saponaria officinalis</i>                       |
| Evening Lychnis        | <i>Silene latifolia</i> ssp. <i>alba</i>           |
| Red Sand-spurrey       | <i>Spergularia rubra</i>                           |
| Common Stitchwort      | <i>Stellaria graminea</i>                          |
| Common Chickweed       | <i>Stellaria media</i>                             |
| <i>Celastraceae</i>    |                                                    |
| Oriental Bittersweet   | <i>Celastrus orbiculatus</i>                       |
| Winged Euonymus        | <i>Euonymus alatus</i>                             |
| European Spindle Tree  | <i>Euonymus europaea</i>                           |
| <i>Clethraceae</i>     |                                                    |
| Sweet Pepper-bush      | <i>Clethra alnifolia</i>                           |
| <i>Convolvulaceae</i>  |                                                    |
| Hairy Bindweed         | <i>Calystegia pellita</i> ssp. <i>pellita</i>      |
| Morning Glory          | <i>Calystegia sepium</i>                           |
| Upright Bindweed       | <i>Calystegia spithamea</i>                        |
| Love-vine              | <i>Cuscuta gronovii</i> var. <i>gronovii</i>       |
| Dodder                 | <i>Cuscuta</i> sp.                                 |
| <i>Cornaceae</i>       |                                                    |
| Flowering Dogwood      | <i>Benthamidia florida</i>                         |

|                                                                 |                                                      |
|-----------------------------------------------------------------|------------------------------------------------------|
| Bunchberry                                                      | <i>Chamaepericlymenum canadense</i>                  |
| Black Gum or Tupelo                                             | <i>Nyssa sylvatica</i>                               |
| Silky Dogwood                                                   | <i>Swida amomum</i> var. <i>amomum</i>               |
| Pale Dogwood                                                    | <i>Swida amomum</i> var. <i>schuetzeana</i>          |
| Gray Dogwood                                                    | <i>Swida racemosa</i>                                |
| Red Osier Dogwood                                               | <i>Swida sericea</i>                                 |
| <i>Crassulaceae</i>                                             |                                                      |
| Live-forever                                                    | <i>Hylotelephium telephium</i> ssp. <i>telephium</i> |
| <i>Cucurbitaceae</i>                                            |                                                      |
| Wild Balsam-apple                                               | <i>Echinocystis lobata</i>                           |
| <i>Droseraceae</i>                                              |                                                      |
| Spatulate-leaved Sundew                                         | <i>Drosera intermedia</i>                            |
| Round-leaved Sundew                                             | <i>Drosera rotundifolia</i>                          |
| <i>Elaeagnaceae</i>                                             |                                                      |
| Autumn-olive                                                    | <i>Eleagnus umbellata</i> var. <i>parvifolia</i>     |
| <i>Ericaceae</i>                                                |                                                      |
| Leatherleaf                                                     | <i>Chamaedaphne calyculata</i>                       |
| Striped Pipsissewa                                              | <i>Chimaphila maculata</i>                           |
| Pipsissewa                                                      | <i>Chimaphila umbellata</i> ssp. <i>cisatlantica</i> |
| Mayflower                                                       | <i>Epigaea repens</i>                                |
| Wintergreen                                                     | <i>Gaultheria procumbens</i>                         |
| Black Huckleberry                                               | <i>Gaylussacia baccata</i>                           |
| Sheep-laurel                                                    | <i>Kalmia angustifolia</i> var. <i>angustifolia</i>  |
| Mountain-laurel                                                 | <i>Kalmia latifolia</i>                              |
| Maleberry                                                       | <i>Lyonia ligustrina</i>                             |
| Indian Pipe                                                     | <i>Monotropa uniflora</i>                            |
| Glossy Shinleaf                                                 | <i>Pyrola americana</i>                              |
| Swamp-azalea                                                    | <i>Rhododendron viscosum</i>                         |
| Low Sweet Blueberry, Late Sweet Blueberry,<br>Lowbush Blueberry | <i>Vaccinium angustifolium</i>                       |
| Highbush-blueberry                                              | <i>Vaccinium corymbosum</i>                          |
| Black Highbush-blueberry                                        | <i>Vaccinium fuscatum</i>                            |
| Large Cranberry                                                 | <i>Vaccinium macrocarpon</i>                         |
| Small Cranberry                                                 | <i>Vaccinium oxycoccos</i>                           |
| Early Sweet Blueberry                                           | <i>Vaccinium pallidum</i>                            |
| <i>Fabaceae</i>                                                 |                                                      |
| Hog-peanut                                                      | <i>Amphicarpaea bracteata</i>                        |
| Yellow Wild Indigo                                              | <i>Baptisia tinctoria</i>                            |
| Honey Locust                                                    | <i>Gleditsia triacanthus</i>                         |
| Birdsfoot-trefoil                                               | <i>Lotus corniculatus</i>                            |
| Black Locust                                                    | <i>Robinia pseudoacacia</i>                          |
| Palmate Hop-clover                                              | <i>Trifolium aureum</i>                              |
| Red Clover                                                      | <i>Trifolium pratense</i>                            |
| White Clover                                                    | <i>Trifolium repens</i>                              |
| Bird-vetch                                                      | <i>Vicia cracca</i> ssp. <i>cracca</i>               |
| Narrow-leaved Vetch                                             | <i>Vicia sativa</i>                                  |

*Fagaceae*

American Chestnut  
American Beech  
White Oak  
Swamp White Oak  
Scarlet Oak  
Scrub-oak  
Chestnut-oak  
Pin-oak  
English Oak  
Red Oak  
Black Oak

*Castanea dentata*  
*Fagus grandifolia*  
*Quercus alba*  
*Quercus bicolor*  
*Quercus coccinea*  
*Quercus ilicifolia*  
*Quercus montana*  
*Quercus palustris*  
*Quercus robur*  
*Quercus rubra*  
*Quercus velutina*

*Geraniaceae*

Wild Geranium  
Herb-Robert

*Geranium maculatum*  
*Geranium robertianum*

*Grossulariaceae*

Garden Red Currant  
Currant/Gooseberry

*Ribes rubrum*  
*Ribes sp.*

*Hypericaceae*

Orange Grass  
Common St. John's-wort

*Hypericum gentianoides*  
*Hypericum perforatum*

*Juglandaceae*

Bitternut-hickory  
Pignut  
Shagbark-hickory  
Butternut

*Carya cordiformis*  
*Carya glabra*  
*Carya ovata*  
*Juglans cinerea*

*Lamiaceae*

Gill-over-the-ground  
Henbit  
American Water horehound  
Catnip  
Heal-all  
Marsh-skullcap

*Glechoma hederacea*  
*Lamium amplexicaule var. amplexicaule*  
*Lycopus americanus*  
*Nepeta cataria*  
*Prunella vulgaris*  
*Scutellaria galericulata*

*Lythraceae*

Purple Loosestrife

*Lythrum salicaria*

*Melastomataceae*

Northern Meadow-beauty

*Rhexia virginica*

*Moraceae*

White Mulberry

*Morus alba*

*Myricaceae*

Sweet-Fern  
Sweet Gale

*Comptonia peregrina*  
*Myrica gale*

*Myrsinaceae*

Starflower  
Swamp-candles

*Lysimachia borealis*  
*Lysimachia terrestris*

*Oleaceae*

White Ash  
Black Ash  
Ash  
Common Lilac

*Fraxinus americana*  
*Fraxinus nigra*  
*Fraxinus sp.*  
*Syringia vulgaris*

*Onagraceae*

Enchanter's Nightshade  
Common Evening-primrose

*Circaea canadensis ssp. canadensis*  
*Oenothera biennis*

*Orobanchaceae*

Indian Paint-brush  
One-flowered Cancer-root

*Castilleja exserta ssp. exserta*  
*Orobanche uniflora*

*Oxalidaceae*

Common Yellow Wood-sorrel  
Wood Sorrel

*Oxalis stricta*  
*Oxalis sp.*

*Papaveraceae*

Celandine  
Squirrel-corn  
Dutchman's Breeches  
Bloodroot

*Chelidonium majus*  
*Dicentra canadensis*  
*Dicentra cucularia*  
*Sanguinaria canadensis*

*Phytolaccaceae*

Pokeweed

*Phytolacca americana var. americana*

*Plantaginaceae*

White Turtlehead  
Butter-and-eggs  
Blue Toadflax  
Bracted Plantain  
Ribgrass Plantain  
Common Plantain, White Man's Foot  
Corn-speedwell  
Common Speedwell  
Thyme-leaf Speedwell

*Chelone glabra*  
*Linaria vulgaris*  
*Nuttallanthus canadensis*  
*Plantago aristata*  
*Plantago lanceolata*  
*Plantago major*  
*Veronica arvensis*  
*Veronica officinalis*  
*Veronica serpyllifolia ssp. serpyllifolia*

*Polygalaceae*

Fringed Polygala  
Purple Milkwort

*Polygala paucifolia*  
*Polygala sanguinea*

*Polygonaceae*

Japanese Knotweed  
Water Smartweed  
Carey's Knotweed  
Willow-weed Smartweed, Nodding Smartweed,  
Dock-leaf  
Chinese Smartweed  
Lady's Thumb  
Arrow-leaf Tearthumb  
Sheep-sorrel  
Curly Dock

*Fallopia japonica*  
*Persicaria amphibia*  
*Persicaria careyi*  
*Persicaria lapathifolia*  
*Persicaria longiseta*  
*Persicaria maculosa*  
*Persicaria sagittata*  
*Rumex acetosella ssp. pyrenaicus*  
*Rumex crispus ssp. Crispus*

*Portulacaceae*

Spring-beauty  
Common Purslane

*Claytonia sp.*  
*Portulaca oleracea*

*Ranunculaceae*

Doll's Eyes  
Wood-anemone  
Marsh-marigold  
Virgin's Bower  
Goldthread  
Tall Buttercup  
Bulbous Buttercup  
Yellow Water-crowfoot  
Creeping Buttercup  
Early Meadow-rue  
Tall Meadow-rue

*Actaea pachypoda*  
*Anemone quinquefolia*  
*Caltha palustris*  
*Clematis virginiana*  
*Coptis trifolia*  
*Ranunculus acris*  
*Ranunculus bulbosus*  
*Ranunculus flabellaris*  
*Ranunculus repens*  
*Thalictrum dioicum*  
*Thalictrum pubescens*

*Rhamnaceae*

Glossy Alder-buckthorn  
Common Buckthorn  
Buckthorn

*Frangula alnus*  
*Rhamnus cathartica*  
*Rhamnaceae sp.*

*Rosaceae*

Downy Shadbush, Downy Serviceberry  
Shadbush  
Black Chokeberry  
Chokeberry  
Hawthorn  
Shrubby Cinquefoil  
Wild Strawberry  
Apple  
Silvery Cinquefoil  
Dwarf Cinquefoil  
Three-finger  
Rough-fruited Cinquefoil  
Old Field Cinquefoil  
Cinquefoil  
Fire-cherry  
Black Cherry  
Choke-cherry  
Cherry  
Pasture-rose  
Multiflora Rose  
New England Rose  
Swamp rose  
Common Blackberry  
Northern Dewberry  
Bristly Dewberry  
Red Raspberry

*Amelanchier arborea*  
*Amelanchier sp.*  
*Aronia melanocarpa*  
*Aronia sp.*  
*Crataegus sp.*  
*Dasiphora floribunda*  
*Fragaria virginiana*  
*Malus sp.*  
*Potentilla argentea*  
*Potentilla canadensis*  
*Potentilla norvegica*  
*Potentilla recta*  
*Potentilla simplex*  
*Potentilla sp.*  
*Prunus pensylvanica var. pensylvanica*  
*Prunus serotina var. serotina*  
*Prunus virginiana var. virginiana*  
*Prunus sp.*  
*Rosa carolina ssp. carolina*  
*Rosa multiflora*  
*Rosa nitida*  
*Rosa palustris*  
*Rubus allegheniensis*  
*Rubus flagellaris*  
*Rubus hispidus*  
*Rubus idaeus*

|                                                  |                                                   |
|--------------------------------------------------|---------------------------------------------------|
| European Mountain-ash                            | <i>Sorbus aucuparia</i>                           |
| Meadowsweet                                      | <i>Spiraea alba</i> var. <i>latifolia</i>         |
| Steeple-bush                                     | <i>Spiraea tomentosa</i>                          |
| <i>Rubiaceae</i>                                 |                                                   |
| Buttonbush                                       | <i>Cephalanthus occidentalis</i>                  |
| Cleavers                                         | <i>Galium aparine</i>                             |
| Field-madder                                     | <i>Galium mollugo</i>                             |
| Marsh-bedstraw                                   | <i>Galium palustre</i>                            |
| Tricleft Bedstraw, Northern Three-lobed Bedstraw | <i>Galium trifidum</i> ssp. <i>trifidum</i>       |
| Bedstraw                                         | <i>Galium</i> sp.                                 |
| Bluets, Quaker Ladies, Innocence                 | <i>Houstonia caerulea</i>                         |
| Partridge-berry                                  | <i>Mitchella repens</i>                           |
| <i>Rutaceae</i>                                  |                                                   |
| Japanese Corktree                                | <i>Phellodendron amurense</i>                     |
| <i>Salicaceae</i>                                |                                                   |
| Big-toothed Aspen                                | <i>Populus grandidentata</i>                      |
| Trembling Aspen                                  | <i>Populus tremuloides</i>                        |
| Large Pussy-willow                               | <i>Salix discolor</i>                             |
| Willow                                           | <i>Salix</i> sp.                                  |
| <i>Sapindaceae</i>                               |                                                   |
| Striped Maple                                    | <i>Acer pensylvanicum</i>                         |
| Norway Maple                                     | <i>Acer platanoides</i>                           |
| Red Maple                                        | <i>Acer rubrum</i>                                |
| Silver Maple                                     | <i>Acer saccharinum</i>                           |
| Sugar-maple                                      | <i>Acer saccharum</i> var. <i>saccharum</i>       |
| <i>Saxifragaceae</i>                             |                                                   |
| Foamflower                                       | <i>Tiarella cordifolia</i> var. <i>cordifolia</i> |
| <i>Scrophulariaceae</i>                          |                                                   |
| Moth-mullein                                     | <i>Verbascum blattaria</i>                        |
| Common Mullein                                   | <i>Verbascum thapsus</i>                          |
| <i>Solanaceae</i>                                |                                                   |
| White Thorn-apple, White Jimson Weed             | <i>Datura stramonium</i>                          |
| Bittersweet Nightshade, Deadly Nightshade        | <i>Solanum dulcamara</i>                          |
| <i>Ulmaceae</i>                                  |                                                   |
| American Elm                                     | <i>Ulmus americana</i>                            |
| Slippery Elm                                     | <i>Ulmus rubra</i>                                |
| Elm                                              | <i>Ulmus</i> sp.                                  |
| <i>Urticaceae</i>                                |                                                   |
| Stinging Nettle                                  | <i>Urtica dioica</i>                              |
| <i>Verbenaceae</i>                               |                                                   |
| Hoary Vervain                                    | <i>Verbena stricta</i>                            |
| <i>Violaceae</i>                                 |                                                   |
| Britton's Violet, Coast-violet                   | <i>Viola brittoniana</i>                          |
| Lance-leaf Violet                                | <i>Viola lanceolata</i> ssp. <i>lanceolata</i>    |
| Wild Violet                                      | <i>Viola pallens</i>                              |

Bird's Foot Violet  
Violet  
*Vitaceae*  
Porcelain-berry  
Virginia Creeper  
Fox-grape  
Grape

*Viola pedata*  
*Viola sp.*  
  
*Ampelopsis heterophylla var. brevipedunculata*  
*Parthenocissus quinquefolia*  
*Vitis labrusca*  
*Vitis sp.*

## Fungi

| COMMON NAME                            | GENUS AND SPECIES                  |
|----------------------------------------|------------------------------------|
| Wood Mushroom                          | <i>Agaricus silvaticus</i>         |
| Orange Peel                            | <i>Aleuria aurantia</i>            |
| Cleft-foot Amanita                     | <i>Amanita brunescens</i>          |
| Strangulated Amanita                   | <i>Amanita ceciliae</i>            |
| Coker's Amanita                        | <i>Amanita cokeri</i>              |
| Crenulate Amanita                      | <i>Amanita crenulata</i>           |
| Yellow Patches Amanita                 | <i>Amanita flavoconia</i>          |
| Yellow Blusher                         | <i>Amanita flavorubescens</i>      |
| Tawny Grisette Amanita                 | <i>Amanita fulva</i>               |
| Yellow-orange Fly Amanita              | <i>Amanita muscaria</i>            |
| Gunpowder Lepidella                    | <i>Amanita onusta</i>              |
| Panther Amanita                        | <i>Amanita pantherina</i>          |
| Blusher Amanita                        | <i>Amanita rubescens</i>           |
| Common Grisette Amanita                | <i>Amanita vaginata</i>            |
| Destroying Angel                       | <i>Amanita virosa</i>              |
| Volvate Amanita                        | <i>Amanita volvata</i>             |
| N/A                                    | <i>Angelina rufescens</i>          |
| Black Knot of Cherry Flask-fungus      | <i>Apiosporina morbosa</i>         |
| Honey Mushroom                         | <i>Armillaria mellea complex</i>   |
| Russell's Bolete                       | <i>Boletellus russellii</i>        |
| Spotted Bolete                         | <i>Boletus affinis</i>             |
| Red-cracked Bolete                     | <i>Boletus chrysenteron</i>        |
| King Bolete                            | <i>Boletus edulis</i>              |
| Frost's Bolete                         | <i>Boletus frostii</i>             |
| Bent-foot Bolete                       | <i>Boletus longicurvipes</i>       |
| Ornate-stalked Bolete                  | <i>Boletus ornatipes</i>           |
| Pale Bolete                            | <i>Boletus pallidus</i>            |
| Sensitive Bolete                       | <i>Boletus sensibilis</i>          |
| N/A                                    | <i>Boletus subluridellus</i>       |
| Red-mouth Bolete                       | <i>Boletus subvelutipes</i>        |
| Berkeley's Polypore                    | <i>Bondarzewia berkeleyi</i>       |
| Black Jelly Drops                      | <i>Bulgaria inquinans</i>          |
| Yellow tuning fork                     | <i>Calocera viscosa</i>            |
| Stalked Puffball in Aspice             | <i>Calostoma cinnabarina</i>       |
| N/A                                    | <i>Calvatia craniiformis</i>       |
| Giant Puffball                         | <i>Calvatia gigantea</i>           |
| N/A                                    | <i>Camarops petersii</i>           |
| Golden Chanterelle, Common Chanterelle | <i>Cantharellus cibarius</i>       |
| Cinnabar-red Chanterelle               | <i>Cantharellus cinnabarinus</i>   |
| Small Chanterelle                      | <i>Cantharellus minor</i>          |
| Coral Slime-mold                       | <i>Ceratiomyxa fruticulosa</i>     |
| Blue stain fungus                      | <i>Chlorociboria aerugenescens</i> |
| Yellow Stain                           | <i>Chlorosplenium chlora</i>       |

|                                                  |                                             |
|--------------------------------------------------|---------------------------------------------|
| Collybia jelly                                   | <i>Christiansenia mycetophila</i>           |
| Crown-tipped Coral Fungus                        | <i>Clavicornia pyxidata</i>                 |
| Gray Coral Fungus                                | <i>Clavulina cinerea</i>                    |
| Crested Coral Fungus                             | <i>Clavulina cristata</i>                   |
| Golden Spindles                                  | <i>Clavulinopsis fusiformis</i>             |
| Forest Funnelcap                                 | <i>Clitocybe gibba</i>                      |
| Anise-scented Clitocybe                          | <i>Clitocybe odora</i>                      |
| Little Brown Collybia                            | <i>Collybia alkaliverens</i>                |
| Oak-loving Collybia                              | <i>Collybia dryophila</i>                   |
| N/A                                              | <i>Collybia luxurians</i>                   |
| Spotted Collybia                                 | <i>Collybia maculata</i>                    |
| Tuberous Collybia                                | <i>Collybia tuberosa</i>                    |
| Shiny Cinnamon Polypore                          | <i>Coltricia cinnamomea</i>                 |
| White Dunce-cap                                  | <i>Conocybe lactea</i>                      |
| Woolly-stalked Coprinus, Woolly-stalked Inky-cap | <i>Coprinus lagopus</i>                     |
| Snowy inkcap                                     | <i>Coprinus niveus</i>                      |
| N/A                                              | <i>Cordyceps longisegmentis</i>             |
| Golden thread cordyceps                          | <i>Cordyceps ophioglossoides</i>            |
| Corrugated Cort                                  | <i>Cortinarius corrugatus</i>               |
| Viscid Violet Cort                               | <i>Cortinarius iodes</i>                    |
| Black Trumpet                                    | <i>Craterellus fallax</i>                   |
| N/A                                              | <i>Crepidotus applanatus</i>                |
| Soft Stumpfoot                                   | <i>Crepidotus mollis</i>                    |
| Zoned Crinipellis                                | <i>Crinipellis zonata</i>                   |
| White-egg Bird's-nest Fungus                     | <i>Crucibulum laeve</i>                     |
| N/A                                              | <i>Cyathus stercoreus</i>                   |
| Golden-scruffy Collybia                          | <i>Cyptotrama asprata</i>                   |
| Orange Jelly-fungus, Witches' Butter             | <i>Dacrymyces palmatus</i>                  |
| Thick-maze Oak Polypore                          | <i>Daedalea quercina</i>                    |
| Thin-maze Flat Polypore                          | <i>Daedaleopsis confragosa</i>              |
| Carbon balls                                     | <i>Daldinia concentrica</i>                 |
| Hairy fairy cups                                 | <i>Dasyscyphus virgineus</i>                |
| Aborted Entoloma                                 | <i>Entoloma abortivum</i>                   |
| Amber Jelly Roll                                 | <i>Exidia recisa</i>                        |
| Beefsteak Polypore                               | <i>Fistulina hepatica</i>                   |
| Tinder Polypore                                  | <i>Fomes fomentarius</i>                    |
| N/A                                              | <i>Fomitopsis spraguei</i>                  |
| Hairy rubber cup                                 | <i>Galiella rufa</i>                        |
| Artist's Polypore, Artist's Conk                 | <i>Ganoderma applanatum</i>                 |
| Varnished conk                                   | <i>Ganoderma lucidum</i>                    |
| Hen of the Woods                                 | <i>Grifola frondosa</i>                     |
| Little Gym                                       | <i>Gymnopilus penetrans</i>                 |
| N/A                                              | <i>Gymnopus subnudus</i>                    |
| Cedar-apple rust                                 | <i>Gymnosporangium juniperi-virginianae</i> |
| Ash-tree Bolete                                  | <i>Gyrodon merulioides</i>                  |
| Thick-Stalked False Morel                        | <i>Gyromitra fastigiata</i>                 |

|                                          |                                                  |
|------------------------------------------|--------------------------------------------------|
| Chestnut Bolete                          | <i>Gyroporus castaneus</i>                       |
| Ribbed-stalked cup                       | <i>Helvella acetabulum</i>                       |
| Leaflike oyster                          | <i>Hohenbuehelia petaloides</i>                  |
| N/A                                      | <i>Hydnellum scrobiculatum</i>                   |
| False Chanterelle                        | <i>Hygrophoropsis aurantiaca</i>                 |
| Yellow-centered Waxy Cap                 | <i>Hygrophorus flavodiscus</i>                   |
| Sulphur Tuft Mushroom                    | <i>Hypholoma fasciculare</i>                     |
| Yellow cushion Hypocrea                  | <i>Hypocrea gelatinosa</i>                       |
| N/A                                      | <i>Hypocrea pulvinata</i>                        |
| Amanita Mold                             | <i>Hypomyces hyalinus</i>                        |
| Lobster Mushroom                         | <i>Hypomyces lactifluorum</i>                    |
| N/A                                      | <i>Hypomyces lateritius</i>                      |
| Red Cushion Hypoxylon, Beech Hypoxylon   | <i>Hypoxylon fragiforme</i>                      |
| Coffee bean fungus                       | <i>Hysterium pulicare</i>                        |
| N/A                                      | <i>Inocybe taquamenonensis</i>                   |
| Milk-white toothed polypore              | <i>Irpex lacteus</i>                             |
| Waxy Laccaria, Common Laccaria           | <i>Laccaria laccata</i>                          |
| Purple-gilled Laccaria                   | <i>Laccaria ochropurpurea</i>                    |
| N/A                                      | <i>Lactarius chrysorrheus</i>                    |
| Corrugated-cap Milky                     | <i>Lactarius corrugis</i>                        |
| Deceptive Milky                          | <i>Lactarius deceptivus</i>                      |
| Hygrophorus Milky                        | <i>Lactarius hygrophoroides</i>                  |
| Chocolate Milky                          | <i>Lactarius lignyotus</i>                       |
| N/A                                      | <i>Lactarius luteolus</i>                        |
| Peppery Milky                            | <i>Lactarius piperatus</i>                       |
| N/A                                      | <i>Lactarius quietus</i>                         |
| Velvet Lactarius                         | <i>Lactarius subvellerus</i>                     |
| Yellow Latex Milky                       | <i>Lactarius vinaceorufescens</i>                |
| Voluminous-latex Milky                   | <i>Lactarius volemus</i>                         |
| Chicken of the Woods                     | <i>Laetiporus cincinnatus</i>                    |
| Sulphur Shelf Polypore, Chicken Mushroom | <i>Laetiporus sulphureus</i>                     |
| Train wrecker                            | <i>Lentinus lepideus</i>                         |
| Ochre jelly club                         | <i>Leotia lubrica</i>                            |
| Reddening Lepiota                        | <i>Lepiota americana</i>                         |
| Parasol Mushroom                         | <i>Lepiota procera</i>                           |
| Gem-studded Puffball                     | <i>Lycoperdon perlatum (gemmatum)</i>            |
| Parasol                                  | <i>Macrolepiota procera</i>                      |
| Fairy Threads                            | <i>Macrotyphula juncea</i>                       |
| Pin-wheel Marasmius, Horsehair Marasmius | <i>Marasmius rotula</i>                          |
| Garlic Marasmius                         | <i>Marasmius scorodonius</i>                     |
| Orange Pinwheel Marasmius                | <i>Marasmius siccus</i>                          |
| Platterful Mushroom                      | <i>Megacollybia (Tricholomopsis) platyphylla</i> |
| Blackening polypore                      | <i>Meripilus sumstini</i>                        |
| Trembling Merulius                       | <i>Merulius tremellosus</i>                      |
| Swamp Beacon                             | <i>Mitrula paludosa</i>                          |
| Morel                                    | <i>Morchella esculenta</i>                       |

|                                                   |                                           |
|---------------------------------------------------|-------------------------------------------|
| Yellow-stalked Mycena                             | <i>Mycena epipterygia</i>                 |
| Bleeding Mycena                                   | <i>Mycena haematopus</i>                  |
| Coral Spot                                        | <i>Nectria cinnabarina</i>                |
| Straight-stalk Pinkgill                           | <i>Nolanea (Entoloma) strictius</i>       |
| N/A                                               | <i>Omphalina ectypoides</i>               |
| Jack-o-lantern                                    | <i>Omphalotus olearius</i>                |
| Late Fall Oyster Mushroom                         | <i>Panellus serotinus</i>                 |
| Night Light                                       | <i>Panellus stipticus</i>                 |
| Velvet-footed Pax                                 | <i>Paxillus atrotomentosus</i>            |
| Dye-maker's Polypore                              | <i>Phaeolus schweinitzii</i>              |
| Ravenel's Stinkhorn                               | <i>Phallus ravenelii</i>                  |
| N/A                                               | <i>Phellodon confluens</i>                |
| Sharp Scaly Pholiota                              | <i>Pholiota squarrosoides</i>             |
| Hat Thrower                                       | <i>Pilobolus crystallinus</i>             |
| Birch Polypore                                    | <i>Piptoporus betulinus</i>               |
| Dead man's foot                                   | <i>Pisolithus tinctorius</i>              |
| N/A                                               | <i>Pithya cupressina</i>                  |
| Oyster Mushroom                                   | <i>Pleurotus ostreatus</i>                |
| Fawn Mushroom, Deer Mushroom                      | <i>Pluteus cervinus</i>                   |
| Dryad's Saddle                                    | <i>Polyporus squamosus</i>                |
| Pendulous-disc polypore                           | <i>Porodisculus pendulus</i>              |
| Common Psathyrella, Suburban Psathyrella          | <i>Psathyrella candolleana</i>            |
| Witches Broom/blueberry                           | <i>Pucciniastrum goeppertianum</i>        |
| Tacky Green Russula                               | <i>Russula aeruginea</i>                  |
| Short-stalked White Russula                       | <i>Russula brevipes</i>                   |
| Green-quilt Russula                               | <i>Russula crustosa</i>                   |
| Swamp Russula                                     | <i>Russula flava</i>                      |
| Fragile Russula, Fragile Brittlelegill            | <i>Russula fragilis</i>                   |
| Fragrant Russula                                  | <i>Russula fragrantissima</i>             |
| Blackish-red Russula                              | <i>Russula krombholzii (atropurpurea)</i> |
| Purple-bloom Russula                              | <i>Russula mariae</i>                     |
| N/A                                               | <i>Russula rubescens</i>                  |
| Variable Russula                                  | <i>Russula variata</i>                    |
| Green Russula, Green Brittlelegill                | <i>Russula virescens</i>                  |
| Scaly Tooth-Fungus                                | <i>Sarcodon imbricatus</i>                |
| Scarlet cup                                       | <i>Sarcoscypha austriaca</i>              |
| Split Gill Mushroom                               | <i>Schizophyllum commune</i>              |
| N/A                                               | <i>Scleroderma cepa</i>                   |
| Pigskin Poison Earthball, Pigskin Poison Puffball | <i>Scleroderma citrinum</i>               |
| Eyelash Fungus                                    | <i>Scutellinia scutellata</i>             |
| Cauliflower mushroom                              | <i>Sparassis spathulata</i>               |
| Spongy Toothed Polypore                           | <i>Spongipellis pachyodon</i>             |
| Crowded Parchment                                 | <i>Stereum complicatum</i>                |
| False Turkey-tail                                 | <i>Stereum ostrea</i>                     |
| Old Man of the Woods                              | <i>Strobilomyces floccopus</i>            |
| Wine Cap                                          | <i>Stropharia rugoso-annulata</i>         |

Chicken-fat Suillus  
 Dotted Stalk Suillus  
 Painted Bolete  
 Turkeytail  
 Yellow Witches' Butter Jelly-fungus  
 Jellied False Coral  
 Violet Toothed-Polypore  
 Black Earth Tongue  
 Decorated Mop  
 Plums and custard  
 Black Velvet Bolete  
 Chrome-footed Bolete  
 Bitter Bolete  
 N/A  
 White Cheese Polypore  
 Corn Smut  
 Lilac Bolete  
 Fuzzy-foot, Golden Trumpets  
 Rooted Collybia  
 Dead Man's Fingers Flask-fungus  
 Ceramic parchment

*Suillus americanus*  
*Suillus granulatus*  
*Suillus pictus*  
*Trametes versicolor*  
*Tremella lutescens (mesenterica)*  
*Tremellodendron pallidum*  
*Trichaptum biforme*  
*Trichoglossum farlowii*  
*Tricholomopsis decora*  
*Tricholomopsis rutilans*  
*Tylopilus alboater*  
*Tylopilus chromapes*  
*Tylopilus felleus*  
*Tylopilus rubrobrunneus*  
*Tyromyces chioneus*  
*Ustilago maydis*  
*Xanthoconium separans*  
*Xeromphalina campanella*  
*Xerula furfuracea*  
*Xylaria polymorpha*  
*Xylobolus frustulatus*

## Lichens

### COMMON NAME

Brown Cobblestone Lichen  
 Tiny Button Lichen  
 Frosted Comma Lichen  
 Sunken Disc Lichen  
 Cinder Lichen  
 Sunken Disc Lichen  
 Burred Horsehair Lichen  
 Sulphur Rock Firedot Lichen  
 Lemon Candle-flame Lichen  
 Hidden Gold-speck Lichen  
 Powdery Gold-speck Lichen  
 Common Gold-speck Lichen  
 Spiny Heath Lichen  
 Sea-storm Lichen  
 Green Reindeer Lichen  
 Stalkless Cladonia  
 Common Powderhorn  
 British Soldiers  
 Many-forked Cladonia  
 Mealy Pixie-cup  
 Lipstick Lichen  
 Fence-rail Cladonia

### GENUS AND SPECIES

*Acarospora fuscata*  
*Amandinea punctata*  
*Arthonia caesia*  
*Aspicilia caesiocinerea*  
*Aspicilia cinerea*  
*Aspicilia verrucigera*  
*Bryoria furcellata*  
*Caloplaca flavovirescens*  
*Candelaria concolor*  
*Candelariella aurella*  
*Candelariella efflorescens*  
*Candelariella vitellina*  
*Cetraria arenaria*  
*Cetrelia chicitae*  
*Cladina mitis*  
*Cladonia apodocarpa*  
*Cladonia coniocraea*  
*Cladonia cristatella*  
*Cladonia furcata*  
*Cladonia grayi*  
*Cladonia macilenta*  
*Cladonia parasitica*

|                                        |                                    |
|----------------------------------------|------------------------------------|
| Thorn Cladonia                         | <i>Cladonia uncialis</i>           |
| Streamside Stippleback Lichen          | <i>Dermatocarpon luridum</i>       |
| Pink Earth Lichen                      | <i>Dibaeis baeomyces</i>           |
| Golden Moonglow Lichen                 | <i>Dimelaena oreina</i>            |
| Aggressive Crater Lichen               | <i>Diploschistes scruposus</i>     |
| Boreal Oakmoss Lichen                  | <i>Evernia mesomorpha</i>          |
| Rock Greenshield Lichen                | <i>Flavoparmelia baltimorensis</i> |
| Common Greenshield Lichen              | <i>Flavoparmelia caperata</i>      |
| Common Script Lichen                   | <i>Graphis Scripta</i>             |
| Common Clam Lichen                     | <i>Hypocenomyce scalaris</i>       |
| Hooded Tube Lichen                     | <i>Hypogymnia physodes</i>         |
| N/A                                    | <i>Julella fallaciosa</i>          |
| Common Toadskin Lichen                 | <i>Lasallia papulosa</i>           |
| Mortar Rim-lichen                      | <i>Lecanora dispersa</i>           |
| Bumpy Rim-lichen                       | <i>Lecanora hybocarpa</i>          |
| Mealy Rim-lichen                       | <i>Lecanora strobilina</i>         |
| Fused Rim-lichen                       | <i>Lecanora symmicta</i>           |
| Mapledust Lichen                       | <i>Lecanora thysanophora</i>       |
| N/A (a species of Dust Lichen)         | <i>Lepraria caesioalba</i>         |
| Zoned Dust Lichen                      | <i>Lepraria neglecta</i>           |
| Abraded Camouflage Lichen              | <i>Melanelia subaurifera</i>       |
| Erratic Dot Lichen                     | <i>Micarea erratica</i>            |
| N/A (a species of Saucer Lichen)       | <i>Ochrolechia arborea</i>         |
| Bottlebrush Shield Lichen              | <i>Parmelia squarrosa</i>          |
| Hammered Shield Lichen                 | <i>Parmelia sulcata</i>            |
| Alternating Dog-lichen                 | <i>Peltigera didactyla</i>         |
| Field Dog-lichen                       | <i>Peltigera rufescens</i>         |
| Bitter Wart Lichen                     | <i>Pertusaria amara</i>            |
| Pin Lichen                             | <i>Phaeocalicium polyporeum</i>    |
| Powder-tipped Shadow Lichen            | <i>Phaeophyscia adiastrata</i>     |
| Pompon Shadow Lichen                   | <i>Phaeophyscia pusilloides</i>    |
| Orange-cored Shadow Lichen             | <i>Phaeophyscia rubropulchra</i>   |
| Hooded Rosette Lichen                  | <i>Physcia adscendens</i>          |
| Hoary Rosette Lichen                   | <i>Physcia aipolia</i>             |
| Mealy Rosette Lichen                   | <i>Physcia millegrana</i>          |
| Star Rosette Lichen                    | <i>Physcia stellaris</i>           |
| Common Coal-dust Lichen                | <i>Polysporina simplex</i>         |
| Smoky-eye Boulder Lichen               | <i>Porpidia albocaerulescens</i>   |
| N/A (a species of Sulphur-dust Lichen) | <i>Psilolechia lucida</i>          |
| Rough Speckled Shield Lichen           | <i>Punctelia rudecta</i>           |
| N/A (a species of Crimson Dot Lichen)  | <i>Pyrrhospora varians</i>         |
| Sinewed Ramalina Lichen                | <i>Ramalina americana</i>          |
| Dusky Map Lichen                       | <i>Rhizocarpon obscuratum</i>      |
| Scattered Rock-posy Lichen             | <i>Rhizoplaca subdiscrepans</i>    |
| N/A                                    | <i>Trapelia involuta</i>           |
| Fringed Wrinkle-lichen                 | <i>Tuckermanopsis americana</i>    |

Smooth Rock Tripe  
Bristly Beard Lichen  
Common Beard Lichen (Old Man's Beard)  
Peppered Rock-shield Lichen  
Elegant Sunburst Lichen  
Bare-bottomed Sunburst Lichen

*Umbilicaria mammulata*  
*Usnea hirta*  
*Usnea subfloridana*  
*Xanthoparmelia conspersa*  
*Xanthoria elegans*  
*Xanthoria fulva*

### **Invasive<sup>3</sup> and Other Problem Plants**

#### **Species on the Invasive Plant Atlas of New England (IPANE) 2009 List**

| <b>COMMON NAME</b>   | <b>GENUS AND SPECIES</b>                                    |
|----------------------|-------------------------------------------------------------|
| Norway Maple         | <i>Acer platanoides</i>                                     |
| Garlic-mustard       | <i>Alliaria petiolata</i>                                   |
| Porcelain-berry      | <i>Ampelopsis heterophylla</i> var. <i>brevipedunculata</i> |
| Oriental Bittersweet | <i>Celastrus orbiculatus</i>                                |
| Black Swallow-wort   | <i>Cynanchum louiseae</i>                                   |
| Burning Bush         | <i>Euonymus alatus</i>                                      |
| Japanese Knotweed    | <i>Fallopia japonica</i>                                    |
| Glossy Buckthorn     | <i>Frangula alnus</i>                                       |
| Morrow Honeysuckle   | <i>Lonicera morrowii</i>                                    |
| Purple Loosestrife   | <i>Lythrum salicaria</i>                                    |
| Common Buckthorn     | <i>Rhamnus cathartica</i>                                   |
| Black Locust         | <i>Robinia pseudoacacia</i>                                 |
| Multiflora Rose      | <i>Rosa multiflora</i>                                      |

#### **Other Problem Native Species**

|                   |                                                    |
|-------------------|----------------------------------------------------|
| Northern Dewberry | <i>Rubus flagellaris</i>                           |
| Poison Ivy        | <i>Toxicodendron radicans</i> ssp. <i>radicans</i> |

---

<sup>3</sup> The National Invasive Species Management Plan (NISMP) defines an “*invasive species*” as “a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” IPANE includes only introduced species.

**Appendix E**  
**Template for Email Sent to the Conservation Administrator**  
**of Each of the Six Contiguous Towns:**  
**Acton, Bedford, Billerica, Chelmsford, Concord, Westford**

APPENDIX

**E**

## **Appendix E: Template for Email Sent to the Conservation Administrator of Each of the Six Contiguous Towns: Acton, Bedford, Billerica, Chelmsford, Concord, Westford**

Dear ...

Thank you for agreeing to meet with me to discuss issues related to Open Space and Recreation (OS&R) planning. As I mentioned in our phone conversation, we have begun the process of updating Carlisle's OS&R Plan and to that end are reaching out to our neighboring towns to gather information and to explore how we might work cooperatively for our mutual benefit. In our upcoming meeting, I am interested in discussing the following issues that are potentially of common interest and concern:

- ***Identifying shared significant resources*** – Significant shared natural resources are those with common boundaries, including view sheds, surface waters, drinking water resources, and open land (including open land connections); We are interested in discussing respective plans and approaches for both maintaining conservation and recreation values on parcels that are already protected, as well as undeveloped parcels that are not currently protected. Other shared recreation resources to discuss would include recreation facilities and programs that our towns currently share.
- ***Local/regional current and future influencing factors*** – Identify known and anticipated activities that could strain open space/recreation-related resources and therefore should be incorporated into the planning process. For example, proposed or planned development projects, or any activities in towns upstream that could directly or indirectly affect our respective towns.
- ***Exploring new opportunities for sharing resources/technical expertise*** – Items such as cooperative efforts to control invasive species; recent policy developments and compatibility (e.g., rules for “Other Power-Driven Mobility Devices”); deer population issues and options; management issues and strategies for protecting rare and threatened species; recreation programs for seniors and other town residents.

I look forward to meeting with you on \_\_\_\_\_ at \_\_\_\_\_. This information sharing is not only a key component to the open space planning process, but also a wonderful opportunity to explore ways in which our towns might work together to achieve our common goals. Thank you again for your interest and cooperation.

Sincerely,

Sylvia Willard  
Carlisle Conservation Administrator

**Appendix F****ADA Access Self-Evaluation and Compliance with ADA Requirements**

|                                                              |     |
|--------------------------------------------------------------|-----|
| ADA Self-Evaluation Summary                                  | F-1 |
| Designation of ADA Coordinator                               | F-4 |
| Personnel Policy: ADA Grievance Procedure                    | F-5 |
| Statement of compliance: ADA and EEO Employment Practices    | F-6 |
| Personnel Policy: Equal Employment Opportunity               | F-7 |
| Statement of Non-discrimination: Employment Practices        | F-8 |
| Examples of Notices Advertising Positions with EEO Notations | F-9 |

## **Appendix F: ADA Access Self-Evaluation and Compliance with ADA Requirements**

### **Summary**

The accessibility of Town facilities was determined through the self-evaluation process for this plan by the Town Administrator, who is also the Town ADA coordinator. He worked in coordination with the administrators, chairs, and board members for the Council on Aging and the Recreation Commission to evaluate programs offered by the Town and the buildings where the programs take place. Public lands, trails, and parking areas were evaluated by the Conservation Commission Administrator, a member of the Trails Committee, and a disabled town resident. A meeting was held with with representatives of the disabled community and members of the Town's ADA Task Force (see Section 7, Need to Increase Handicapped Accessibility). The three churches in town and the library were included in the self-evaluation process. Great Brook Farm State Park (GBFSP) was evaluated by park officials. The self-evaluations were reviewed and preliminary transition plans were developed as required. The self-evaluations identified additional areas that need to be surveyed; transition plans will need to be developed further. Completed self-evaluation forms and transition plans are kept on file in the town offices of the Conservation Commission and the Town Administrator.

### **Current Accessibility in Carlisle**

Carlisle has made many improvements to its Open Space and Recreation facilities to make the town more accessible. As noted in Section 6, asphalt pathways have been constructed, radiating from the Town Center along its major routes connecting with some of the town's open lands and other public facilities. Efforts to expand the pathways system should be encouraged. There is a handicapped-accessible trail of compacted stone dust on conservation land adjacent to the Estabrook Woods and the senior housing development at Malcolm Meadows, which currently needs repair. An ADA-compliant pathway currently under construction by the developer of a housing development along Cross Street will provide wheelchair access on an asphalt surface through a wooded area with stream crossings and a vernal pool. Discussions with representatives of the disabled community highlighted the need for ongoing maintenance of the pathways and trimming of adjacent shrubs and poison ivy. Other accessible trails exist in GBFSP, as do interpretive programs that accommodate the disabled. Accessible restroom facilities exist in two locations in GBFSP and at the recreation fields on the Banta-Davis Land. A running track and other paths within Banta-Davis are also accessible. All buildings used for programs hosted by the Recreation Commission and the Council on Aging provide accessible restrooms and comply with ADA.

As noted in Section 7, the new pool facility in Concord, used by many Carlisle residents, is fully accessible and houses a state-of-the-art warm therapy pool with lifts.

Buildings and facilities for public use are limited in Carlisle. It is a small community and efficiently uses its publicly accessible buildings for many purposes. The main evening meeting rooms in Town Hall are used for daytime exercise sessions and drawing classes. The library hosts events in the Hollis Room on the third floor, accessible via elevator. The churches host lectures, luncheons, and concerts. The school hosts indoor walking for seniors and after-school programs for youth. An accessible common room in the senior housing complex near the Town Center is used occasionally by the Council on Aging for lectures, meals, and other gatherings.

New construction on the Carlisle Schools campus, including elevators to all levels and reconstruction of the play areas, has brought the entire campus up to ADA standards.

### **Potential for Water Access**

Several areas could accommodate accessible facilities for access to water views and for fishing. The service road to Greenough Pond could provide access to the top of the dam containing the pond. The Bose property on the edge of the Concord River, recently acquired by the Carlisle Conservation Foundation (CCF), could provide accessibility for views of the river and fishing. Signage and maintenance plans for the parking areas and access roads should be considered for both locations. The Cranberry Bog also has service roads that may support accessible activities, although the road surface would need resurfacing and available parking would require designated handicapped parking spaces. At GBFSP, there are locations that have accessible paved parking, paved pathways, and landings adjacent to ponds and streams. On the Benfield Conservation Land, the wildlife viewing platform has an accessible ramp, but the unpaved trail leading through the fields to the platform would require considerable work to stabilize the surface adequately, especially during wet seasons. As part of the housing complex on the adjacent roadfront parcel, parking spaces designated for trail users, including a handicapped space, will be built at the beginning of the trail.

### **Trails and Conservation Lands**

As noted above, Malcolm Meadows has a trail fully accessible to wheelchairs, but the trail needs repair. Some of the conservation lands such as the Cranberry Bog, Foss Farm, and GBFSP have service roads that can accommodate OPDMDs; further evaluation is needed to determine whether they can be modified to accommodate wheelchairs with appropriate tires. Because the community gardens at Foss Farm are accessible by automobile, a garden plot is being provided to TILL Central in Billerica, a vocational program of TILL (Toward Independent Living and Learning) to allow disabled program participants to garden in Carlisle. The surface of the handicapped parking spot at Foss needs resurfacing and regrading.

Parking areas providing access to the trails are limited and have generally not been among the Town's top priorities for maintenance. Many gravel lots exhibit ponding of water. Hardpack surfacing is needed in many areas to make the lots wheelchair accessible.

Where handicapped-parking spaces are made available, appropriate signage will also be necessary. Kiosks in parking areas need to be surveyed to determine the adequacy of the adjacent ground surface and the height and angle of all kiosk signage. Some kiosks, including the one on the Greenough parking area, will need to be relocated or to have new access trails created.

Trail signage—although dimensionally routed and with high contrast backgrounds—was placed according to older standards from the Appalachian Mountain Club and does not account for ADA height requirements. Many signs have been placed at or above 60 inches above ground level to account for growth of underbrush and for visibility in the forest. Initial efforts to make signage more accessible to persons in wheelchairs should be concentrated on the few trails that are accessible. Additional access to information can be provided by adding QR (quick-response) codes at appropriate heights on existing posts; these codes, when scanned by a cell phone or other hand-held device, provide direct access to a specific web page with trail or site

information. Further recommendations for improving signage accessibility are included in the transition plan.

### **Interpretive Programs and Alternative Experiences**

Interpretive programs are held by most of the land groups in town. The Carlisle Trails Committee, Carlisle Conservation Foundation, Carlisle Land Stewards, and the Carlisle Conservation Commission all lead guided walks and talks throughout the year. Several programs have been held in the library. Efforts should be made to continue to provide alternative programs in accessible locations. The Town should also make an effort to make all such programs more accessible for individuals with a range of disabilities through trained interpreters, technologies, or devices as necessary and appropriate.

### **Other Power-Driven Mobility Devices**

As noted in Section 3, Carlisle undertook an evaluation of existing lands, developed regulations for those areas where vehicular access could be allowed, and shared the regulations with surrounding towns.

All trails were surveyed for terrain type and suitability for use for the OPDMD regulations. The trails were grouped into three categories: Service Trails, allowing access to OPDMDs no more than 36 inches wide; Wide Single-Track Trails, allowing access to OPDMDs no more than 26 inches wide and wheels no greater than 6 inches wide; and Narrow Single Track Trails, including all trails not designated as Service or Wide Single-Track Trails, which are off limits to OPDMDs.

Simultaneously, terrain type and slope were evaluated due to the numerous tree roots, wetland areas, and large bedrock outcroppings or boulders which impede accessibility and that cannot reasonably be mitigated. A list of trails and assessments of terrain are on file with the Conservation Commission and the ADA Coordinator.

### **Communication**

As noted in Section 7, a major focus of the meeting held with members of the ADA Task Force and representatives of the disabled community is the need for more and better channels of communication between the disabled community and Town officials. The Task Force will look into implementing regular outreach to the disabled community and a possible website link to provide opportunities for questions to be asked and answered and other feedback to be provided.

### **Individuals Involved in the Self-Evaluation Process**

The Committee is grateful to the assistance of many individuals involved in the self-evaluation process, including Elaine Bojanic, Steve Carlin, Thomas Dunkers, Ray Faucher, Betsy Fell, Tom Fitzpatrick, David Flannery, Tim Goddard, Terry Golson, David Klein, John Luther, Michael Malcos, George Mansfield, Holly Mansfield, Sylvia Willard, and John Williams.



Town Administrator  
Tel. (978) 371-6688

# Town of Carlisle

Office of

## BOARD OF SELECTMEN

66 WESTFORD STREET  
CARLISLE, MASSACHUSETTS 01741  
TEL. (978) 369-6136



Fax. (978) 318-0098

December 20, 2012

Re: Designation of ADA Coordination

To Whom It May Concern:

This letter shall serve as notice that Carlisle Town Administrator Timothy D. Goddard has been duly designated and appointed as the Town ADA Coordinator for the purpose of compliance with the Americans with Disabilities Act.

Please feel free to contact this office with any questions.

Sincerely,

Peter M. Scavongelli, Chairman  
Carlisle Board of Selectmen

## 21.0 Americans with Disabilities Act

21-1. *Policy.* The Town of Carlisle does not discriminate on the basis of disability in the admission or access to, or treatment or employment in, its programs or activities. The Town's ADA Coordinator has been designated to monitor compliance with the non-discrimination requirements in the Section 504 regulations and the Americans with Disabilities Act regulations as implemented by the Equal Employment Opportunity Commission and the Department of Justice.

21-2. *Grievance Procedure.* The following grievance procedure is established to meet the requirements of the Americans with Disabilities Act. It may be used by any employee who wishes to file a complaint alleging discrimination on the basis of disability in employment practices and policies or the provision of services, activities, programs, and benefits by the Town of Carlisle.

(a) The complaint should be in writing and contain information about the alleged discrimination such as name, address, telephone number of complainant and location, date and description of the problem. Reasonable accommodations, such as personal interviews or a tape recording of the complainant, will be made available for persons with disabilities who are unable to submit a written complaint.

(b) The complaint should be submitted by the grievant and/or his/her designee as soon as possible but no later than 60 calendar days after the alleged violation to the Carlisle Board of Selectmen and the ADA Coordinator.

(c) Within fifteen calendar days after receipt of the complaint, the ADA Coordinator will meet the complainant to discuss the complaint and possible resolutions. Within 15 calendar days after the meeting, the ADA Coordinator will respond in writing, and where appropriate in a format accessible to the complainant such as audiotape. The response will explain the position of the Town of Carlisle and offer options for substantive resolution of the complaint.

(d) If the response of the ADA Coordinator does not satisfactorily resolve the issue, the complainant and/or his/her designee may appeal the decision of the ADA Coordinator within 15 days after receipt of the response to the Board of Selectmen or their designee.

(e) Within 15 calendar days after receipt of the appeal, the Carlisle Board of Selectmen or their designee will meet with the complainant to discuss the complaint and possible resolutions. Within 15 calendar days after this meeting the Board of Selectmen or their designee will respond in writing, and where appropriate in a format accessible to the complainant, such as audiotape, with a final resolution of the complaint.

(f) All complaints received by the ADA Coordinator, appeals to the Carlisle Board of Selectmen or their designee, and responses from the ADA Coordinator and the Carlisle Board of Selectmen or their designee will be kept by the Town of Carlisle for at least three years.



Town Administrator  
Tel. (978) 371-6688

# Town of Carlisle

Office of

## BOARD OF SELECTMEN

66 WESTFORD STREET  
CARLISLE, MASSACHUSETTS 01741  
TEL. (978) 369-6136



Fax. (978) 318-0098

December 20, 2012

To Whom It May Concern:

As Town Administrator/ADA Coordinator for the Town of Carlisle, I hereby attest to the fact that the Town's employment practices are in compliance with the Americans with Disabilities Act with respect to the following: Recruitment, Personnel Actions, Leave Administration, training, testing, needed exams/questionnaires, social and recreational programs, fringe benefits, collective bargaining agreements and wage and salary administration.

Additionally, I have attached to this statement a copy of the Town's Personnel Policy regarding Equal Employment Opportunity.

Sincerely,

  
Timothy D. Goddard  
Town Administrator

### **36.0 Equal Employment Opportunity**

36-1. *Policy.* The Town of Carlisle commits itself to the principles and practices of equal employment opportunity, in compliance with Titles VI and VII of the Civil Rights Act of 1964; Executive Order No. 227 as amended; MGL Chapter 151B; and all other applicable Federal and State laws and regulations.



Town Administrator  
Tel. (978) 371-6688

# Town of Carlisle

Office of

## BOARD OF SELECTMEN

66 WESTFORD STREET  
CARLISLE, MASSACHUSETTS 01741  
TEL. (978) 369-6136



Fax. (978) 318-0098

### MEMORANDUM

TO: File

FROM: Timothy D. Goddard, Town Administrator *TDG*

RE: Equal Employment Opportunity

DATE: December 20, 2012

---

Attached please find examples of notices advertising positions available within the past three years and the notations that the Town of Carlisle is an Equal Employment Opportunity/Affirmative Action employer.

The Town of Carlisle does not discriminate in its' employment practices on the basis of disability. Public Notices and other information is made available in accessible format upon request.

Town Administrator  
Town of Carlisle

The town of Carlisle (population 5, 539, budget \$22,775,351) is currently seeking qualified applicants for the position of Town Administrator. The current Town Administrator is retiring after 9 years. The primary responsibilities involve overseeing and coordinating the activities of the town government including financial oversight and implementing policy as established by the five member Board of Selectmen. This position also serves as the town's Personnel Administrator and the town's Chief Procurement Officer. A minimum BS/BA degree is required; a Master's degree in public administration or equivalent; knowledge of Mass. General Laws; and, collective bargaining experience are desired. Qualified candidates will have a minimum of five years of municipal management experience or any equivalent combination of education and experience. The successful candidate must have strong oral and written skills, significant personnel management experience, and a proven track record in effective leadership. Send resume to: Town Administrator Search Committee, 66 Westford St., Carlisle, MA 01741 or email to [TAsearch@carlisle.mec.edu](mailto:TAsearch@carlisle.mec.edu) by June 30, 2009. EOE

### **CHIEF OF POLICE – CARLISLE, MASSACHUSETTS**

**The Town of Carlisle, MA, population 5,000 is seeking experienced candidates for the position of Police Chief. The Police Chief is appointed by the Board of Selectmen and supervises a staff of 9 full time and 10 part time officers. The current budget is \$1.2 million. Candidates must possess unquestioned integrity, a thorough knowledge of police administration, and proven management and leadership skills. Minimum requirements include 15 years police experience, including no less than 7 years of supervisory experience, the rank of lieutenant, a bachelor's degree in Criminal Justice or related field, master's preferred. Competitive salary and excellent benefits, 3 Résumé copies must be received no later than 4/01/11 by: Timothy Goddard, Town Administrator, 66 Westford Street, Carlisle, MA 01741. The successful candidate must be able to obtain certification from the Massachusetts Municipal Police Training Committee. EEO/AA**

COA Director

The Town of Carlisle is seeking qualified applicants for the full-time position of Council on Aging Director. Applicant should have a Master's degree in human services, social work, gerontology or related field and at least three years of experience working with senior citizens, writing grants and managing staff. Applicant must be able to perform professional, administrative and supervisory work to develop and implement COA programs and services to address the needs of and enhance the quality of life of the town's senior population. Call the Town Administrator at 978-371-6688 or email [tgoddard@carlisle.mec.edu](mailto:tgoddard@carlisle.mec.edu) for detailed job description or additional information. Resumes must be received by noon on June 1, 2012. EOE/AA

**Appendix G**  
**Recreation Commission Plans for the Banta-Davis Land**

APPENDIX  
**G**



**Above, Existing Banta-Davis Recreation Facilities** approved at 1998 Town Meeting: One Little League field, one softball field, one soccer/multi-purpose field

**Below, Proposed Buildout of Banta-Davis Recreation Facilities** to provide for current and future recreation needs: Two additional Little League fields, one additional multi-purpose field, four tennis courts, additional parking, seating areas, covered picnic pavilion, walking paths, and cross-country course through the woods.



## Appendix G: Recreation Commission Plans for the Banta-Davis Land

Given the need for more fields in Carlisle, the Recreation Commission (RecCom) is concerned about proposals to use the location of existing recreation facilities on the Banta-Davis Land for municipally supported affordable housing. In addition to the reduction in land for current and future recreation needs, housing at Banta-Davis may limit activities at existing town playing fields. **Aside from facilities on school property, the Town currently has no in-town alternative for recreation facilities.**

**RecCom is committed to the full build-out of the Banta-Davis land as the Town's outdoor recreation facility in accordance with a multi-phase plan first presented at Town Meeting in 1998.** Phase 1, funded in 1998 and then constructed, included one Little League field, one adult softball field, one soccer field, bleachers, an irrigation well, and a parking area. Given the documented need for additional fields and facilities, plans for Phase 2 were presented at 2006 Town Meeting fulfilling the 1998 plan, with two additional Little League fields, a second soccer/multi-purpose field, four new tennis courts, and expanded parking and drop-off areas. The 2006 plans added paved ADA-compliant walking paths connecting the proposed new fields, a covered picnic pavilion, and a cross-country course through the adjacent woods to enhance the experiential feel of the site as a park in the community. Both the 1998 and 2006 plans were supported by the Board of Selectmen and the Finance Committee. The 2006 plan was approved at Town Meeting but fell just short of the necessary votes at the ballot box a week later. The budget impact of two new schools during difficult financial times has put the plans on hold, but in the interim, the need for expansion on Banta-Davis has increased.

Banta-Davis will soon be linked to the Spalding athletic fields with an ADA-compliant boardwalk for which CPA funding was approved at 2013 Town Meeting. The boardwalk will provide safe transit for parents and athletes between the adjoining fields and will eliminate the need to walk between the two facilities on the curving, main road with limited shoulders.

**Their central location makes Banta-Davis and Spalding Field an ideal site for the town's outdoor recreation facility, as it abuts the Carlisle Schools property, providing convenient access for student athletes both during and after school. The consolidated facility also provides efficiencies for maintenance and infrastructure, including irrigation and parking.**

Some have suggested siting recreation fields and facilities on scattered sites in residential neighborhoods in town, but scattered siting would require duplicating infrastructure and would increase maintenance costs substantially. Aside from the environmental impact of the construction of the fields themselves, the additional clearing required for parking and the impact of irrigation wells would conflict with the town's environmental priorities. The additional cost for acquiring land and maintaining fields and facilities would unnecessarily strain the Town's limited financial resources. In addition, the increased traffic in residential neighborhoods, the inevitable parking alongside our narrow roads, and the inevitable conflicts between organized sports and the quiet enjoyment of neighboring residents further preclude scattered siting as a reasonable option.

**Appendix H**  
**Recreation Commission: Grievance Policy: Equal Access**

APPENDIX

**H**

## **Appendix H: Recreation Commission: Grievance Policy: Equal Access**

### **CARLISLE RECREATION COMMISSION** **GRIEVANCE POLICY FOR THE GENERAL PUBLIC**

#### **Equal Access to Facilities and Activities**

1. The Recreation Commission is committed to providing maximum opportunity to receive citizen comments, complaints and to resolve grievances or inquiries.

#### **Administrative Level**

2. The Program Director and/or Administrative Director will be available during office hours to meet with citizens and employees to discuss complaints.
3. When a complaint, grievance or request for program policy interpretation or clarification is received either in writing, through a meeting or telephone call, every effort will be made to create a record regarding the name, address, phone number, nature of the complaint, and program policy interpretation, clarification or resolution.
4. All complaints, grievances or request for program policy interpretation will be responded to by telephone or in writing within ten working days.
5. If the issue is not resolved at this level, it will progress to the Commission level.

#### **Recreation Commission Level**

6. Complaints can be forwarded to any member of the Recreation Commission either in writing or by telephone. The Recreation Commission will respond to the complaint either by telephone or in writing within ten days. If the issue is not resolved at this level, it will progress to the Board of Selectmen level.

#### **Board of Selectmen Level**

7. If the grievance is not satisfactorily resolved, citizens will be informed of the opportunity to meet and speak with the Board of Selectmen of their complaint.

**Appendix I**  
**Carlisle Planning Board: Development Standards**

APPENDIX

**I**

# Appendix I: Carlisle Planning Board: Development Standards

“General Development Standards,” excerpt from Attachment A to the Town of Carlisle Subdivision and other Special Permit development Rules & Regulations from the Planning Board

## **Attachment A** **Development Standards**

### **I. General Development Standards**

**A. Introduction:** All land development projects in Carlisle shall, as applicable to particular projects and properties, conform to current zoning and land use regulatory standards, including, but not limited to, the Carlisle Zoning Bylaws, the Subdivision Rules and Regulations, the Common Driveway Rules and Regulations, the Conservation Cluster Rules and Regulations and the Senior Residential Open Space Community (“SROSC”) Rules and Regulations adopted by the Planning Board, the Water Supply and Sewage Disposal Regulations adopted by the Board of Health, and the Wetlands Protection Bylaws and Regulations adopted by Town Meeting and the Conservation Commission (collectively, “Land Use Standards”).

In keeping with over 200 years of development history in Carlisle, new development should be consistent with the immediate neighborhood, make a concerted effort not to detract from existing homes and land development patterns, and assure that development will not adversely impact the environment, particularly the private water sources exclusively relied upon by Carlisle residents. The Town has limited water resources, and has no piped water system—but rather, all homes, businesses, and municipal users rely on individual on-site water wells—and no public wastewater treatment system. Two-acre zoning (one acre in the Town Center) is thus important to the Town of Carlisle to protect water availability and quality. Further, Carlisle has a small population of barely over 5,500 people, a limited tax base, no public transit, and lacks the roadway and utility infrastructure required to support commercial development or other dense development. As a result, the Planning Board must be sensitive to the burden and impact of any increase in housing density.

### **B. Developments shall:**

1. **Minimize**, to the extent possible, the following:
  - (a) Alteration of ground water, septic water levels or chemical constituents;
  - (b) Alteration or relocation of water ways and drainage patterns;
  - (c) Disruption, reduction of capacity, contamination, and other adverse effects on existing on site and off site drinking water wells;
  - (d) Any use of groundwater for irrigation of landscaping;
  - (e) Alteration of existing, natural grades, and overall volume of cut and fill;
  - (f) Area over which existing vegetation will be disturbed, especially if within 200 feet of a river, pond or stream, or having a slope of more than 15%;
  - (g) Removal of trees greater than eight inches (8”) in diameter, measured at four feet (4’) above ground;
  - (h) Soil loss or instability during and after construction;
  - (i) Alteration or disturbance of land within any flood plain or wetlands area;
  - (j) Blockage of trails or potential trails;
  - (k) Disturbance of important wildlife habitats or corridors, outstanding botanical features, or scenic or historic features;
  - (l) Removal of existing stone walls, whether along the boundary of the Development or within the Development;

- (m) Visual prominence of man-made elements which are not necessary for safety or orientation including visibility of building sites from existing streets and existing protected open space;
- (n) Blockage of vistas through new development; and
- (o) Number of driveways exiting onto existing streets.

2. Maximize, to the extent possible, the following:

- (a) Preservation of uncontaminated water resources for drinking water and preservation of legal and practical functionality of existing drinking water wells and existing septic systems;
- (b) Recharge of the underlying water aquifer;
- (c) Visual prominence of natural features of the landscape;
- (d) Legal and physical protection of views from public ways and existing protected open space;
- (e) Connections via publicly accessed trails to and between protected open space and other trails;
- (f) Buffers for and connections among existing protected open spaces;
- (g) Wildlife corridors;
- (h) Preservation of: (a) stone walls, by locating Lot and Parcel boundaries along the existing line of the walls; and (b) scenic points as identified in the Massachusetts Landscape Inventory and historic sites as identified by the Massachusetts Historical Commission, by incorporating them within public open space or easements as provided by the relevant regulation(s); and
- (i) Curvilinear street patterns;

C. Units per acre: As noted above, all land development projects in Carlisle shall, as applicable, conform to current zoning—including density—requirements.

D. Architecture: Detached and attached housing units should be designed to reduce overall visual massing and to blend compatibly with the landscape and with surrounding single-family residential neighborhoods. Building design, including exterior materials, should be in harmony with and enhance the town's existing and historic architectural traditions. The appearance of a gated community is discouraged. The architecture should also provide visual and acoustical screening of HVAC units.

E. Site planning, Height, Set-Backs, Screening, Landscaping, and Lighting: All developments should provide visual screening consistent with the density and setback requirements included within the Zoning Bylaws and incorporated into the engineering design standards of the Carlisle Subdivision Rules and Regulations, Conservation Cluster Regulations and SROSC Regulations, as applicable. An adequate vegetative buffer should be provided to minimize the visual impact of the development from existing roadways, from protected open space, and from existing and future housing development. Similarly, all developments should rely on and protect the natural features of the site such as open meadow, woodland, hillsides, rock outcroppings, water bodies, open vistas, valuable habitat and wildlife corridors, existing and potential trail connections which can provide public accessibility to open space, and buffers for and connections among existing protected open spaces through careful siting of roadways and structures. Exterior lighting should not impact adjacent residential areas or degrade wildlife habitat. The project design should to the extent possible preserve the existing and natural landscaping, and additional landscaping should be provided using water efficient plantings of a variety of native species to minimize and if possible eliminate irrigation and to provide visual and noise screening of the development from

the street, abutting properties and protected open space. Building height should conform to the requirements of the Zoning Bylaws. Safe and convenient entrance and exit from the proposed development to public streets is required. There should be appropriate street access for the size of the development.

F. Open Space: Consistent with the requirements of the Carlisle Zoning Bylaws and regulations, including, but not limited to the Subdivision Rules and Regulations, the SROSC Regulations, and Conservation Cluster Regulations, as applicable, all developments should to the extent possible set aside, for perpetual protection, sufficient open space to serve the needs of the project residents and ensure that the proposed project is integrated within the existing neighborhood. Open Space is defined as land that is not covered with buildings, roadways, parking or any other structure or impervious surface. Open Space should be selected to provide for recreation purposes and/or to maximize the value of wildlife habitat, should be contiguous to the extent required to preserve significant habitat, should be configured to maximize and preserve large blocks of undisturbed land and should encourage passive recreational opportunities for residents and the public where possible. Open Space should predominantly be left in a natural, undisturbed state. Landscaping of Open Space areas should utilize native vegetation to the extent practical, and should complement the values and functions of the natural resources on the site. In any developments proposed to be denser than underlying zoning would otherwise allow, Open Space is critical to protect the private water sources exclusively relied upon by residents in Carlisle.

G. Development Infrastructure: To avoid adverse environmental and public health impacts, to avoid costly and potentially severe impacts and liability to the applicant, future owners and renters at the development, and abutters from a future failure of on-site and/or off-site drinking water supply wells and wastewater disposal systems (such impacts potentially including but not limited to revocation of the project's and/or abutters' certificates of occupancy for failure to have a safe drinking water supply), and to avoid costly future maintenance problems for future owners and renters at the project, the Board requires compliance with all applicable local Board of Health regulations governing wastewater disposal and water supply development as applied by the Board of Health. The Planning Board will endeavor to coordinate its consideration of applications before it with the Board of Health either through the processes described in Attachment B or otherwise.

H. Green Development Practices: All developments should, to the greatest extent practicable, include strategies for environmentally responsible design as formalized in Leadership in Energy and Environmental Design (LEED) standards, NAHB Model Home Building Guidelines or the ICC National Green Building Standard, all of which minimize the depletion of natural resources; control erosion and minimize impact on natural areas; use native and water efficient plants in landscaping; increase energy efficiency in construction and operations; conserve water through use of efficient fixtures and appliances and irrigation systems using rainwater and greywater; and use environmentally "friendly" materials. To this end, the development should incorporate Low Impact Design (LID) techniques to the greatest extent practicable. The greater the density of the development, the more important the use of these techniques becomes to protecting the environment and on site and off site individual water wells, which are the exclusive source of drinking water for all residents, businesses and municipal users in Carlisle.

**Appendix J**  
**Conservation and Recreation Projects Receiving**  
**Community Preservation Act Funds**

APPENDIX

**J**

## **Appendix J: Conservation and Recreation Projects Receiving Community Preservation Act Funds (by year of Town Meeting vote)**

Carlisle adopted the state's Community Preservation Act (CPA) in 2001. Town citizens elected to levy a 2% surcharge on real estate taxes, excluding the first \$100,000 in assessed value, for three uses: open space (conservation and recreation), historic preservation, and community housing. Conservation and recreation projects receiving funding are listed below.

### **2004**

Benfield Land *To purchase 26 acres as Open Space  
and 19.23 acres for athletic fields  
and community housing*

### **2006**

Trail Improvements *To cover materials, supported by  
donated design and labor*

Bruce Freeman Rail Trail *To design Carlisle portion of Trail*

### **2007**

Signage for Conservation Lands *To repair and provide new signage to  
encourage respect for Town land and  
to ensure Town's rights to enforce  
restrictions*

Demolition of Greenough Cottage *To remove deteriorating structure that is  
potential hazard on conservation land*

Footpaths *To construct pedestrian footpath  
system radiating from Town Center*

### **2009**

Open Space & Recreation Plan *To fund mapping, printing, other expenses*

### **2010**

Restoration of Cranberry Bog House *To support agriculture and, by extension,  
preserve water rights associated with  
Cranberry Bog operation*

Trail Improvements *To cover materials, supported by  
donated design and labor*

Bruce Freeman Rail Trail *To design Carlisle portion of Trail*

### **2012**

Mark and Rachel Page Elliott River Preserve *To acquire the Conservation Restriction*

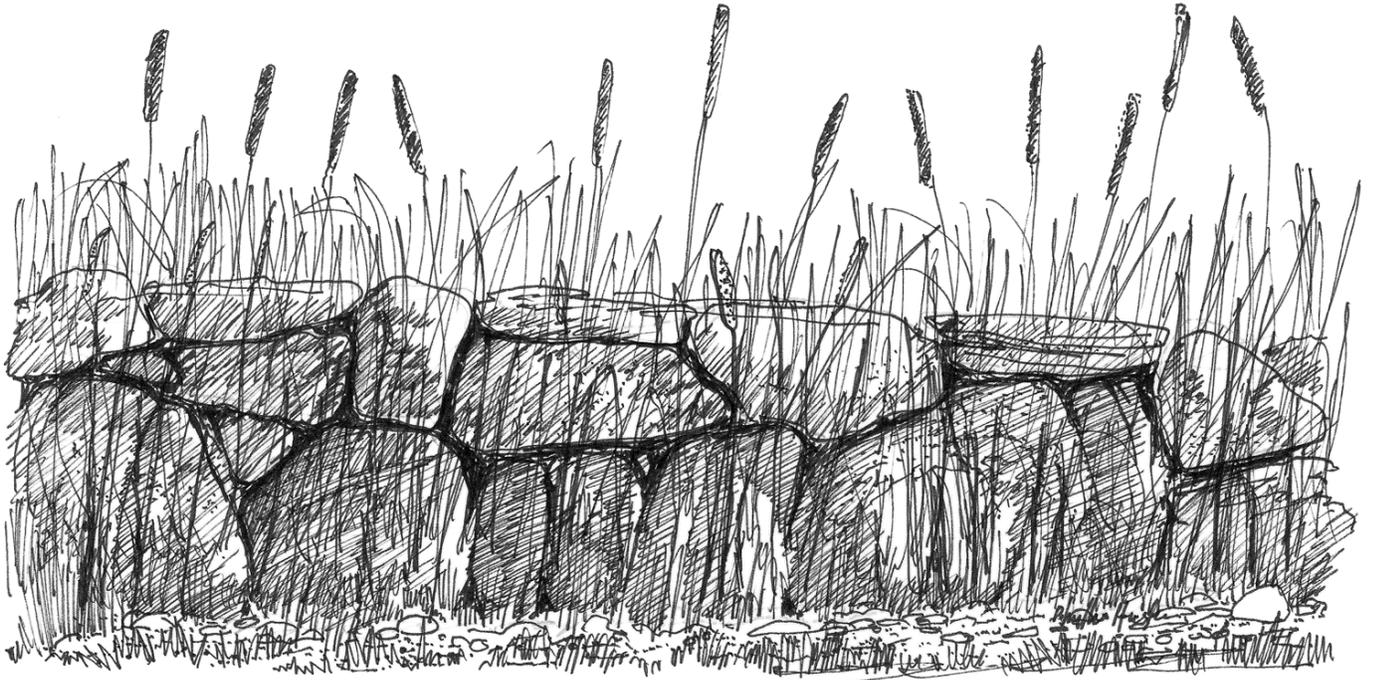
### **2013**

Mark and Rachel Page Elliott River Preserve *To acquire the Conservation Restriction*

Boardwalk from Banta-Davis to Spalding Field *To connect recreation fields and  
walking paths*

## Section 12: Maps

- Map 1: Regional Context
- Map 2: Environmental Justice (*not required*)
- Map 3: Zoning Districts
- Map 4: Soils and Geologic Features
- Map 5: Unique Features
- Map 6: Water Resources
- Map 7: Inventory of Open Space
- Map 8: Seven-Year Action Plan
- Map 9: Unprotected Private Parcels ( $\geq 10$  acres) Priority Rankings
- Map 10: Trail Network
- Map 11: Historical Map
- Map 12: Development and Land Protection Over Time



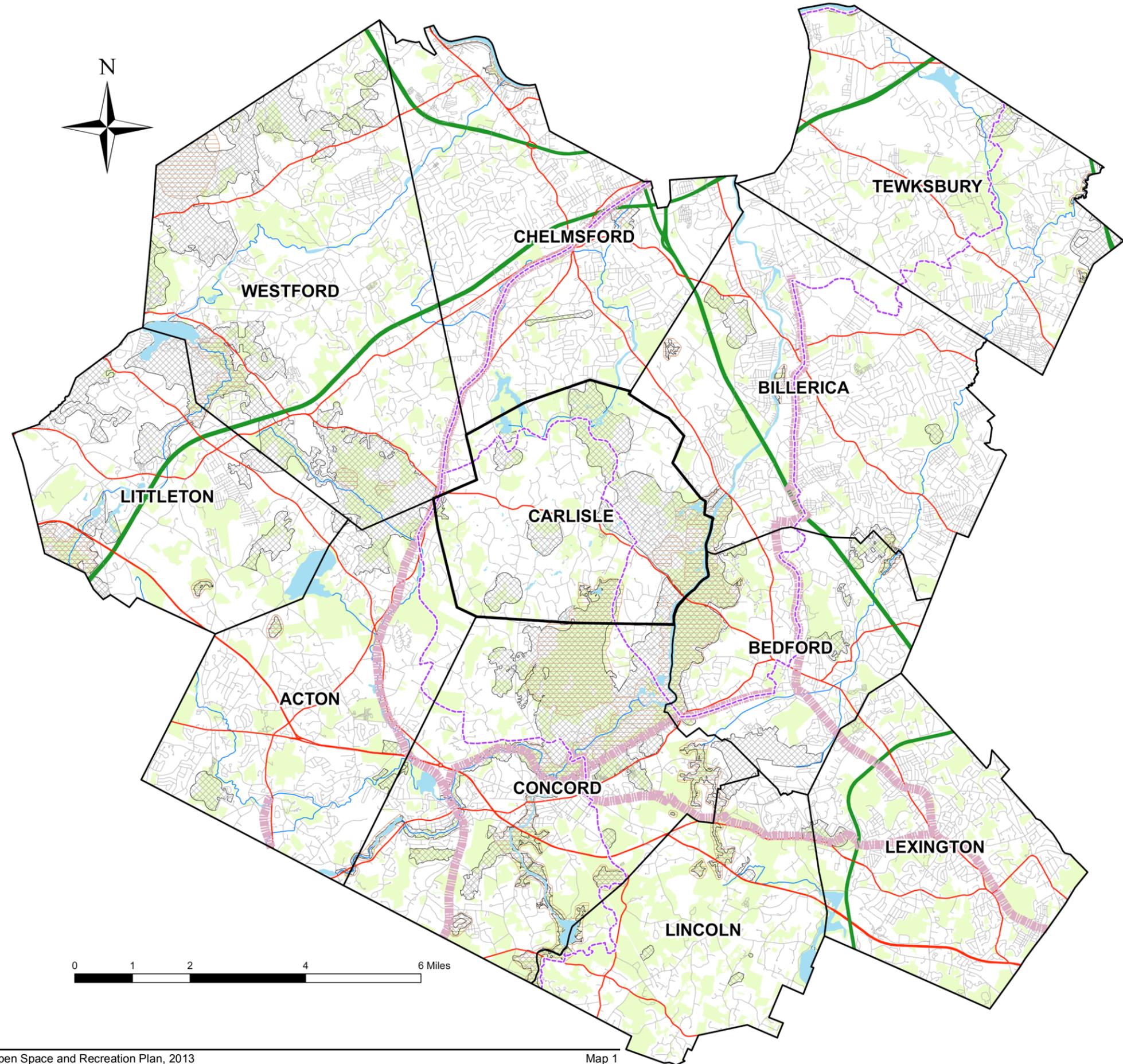
# Map 1 Regional Context

Carlisle is bordered by the six towns of Acton, Bedford, Billerica, Chelmsford, Concord, and Westford. Carlisle shares various natural resources with these towns, including the Concord River, Great Meadows National Wildlife Refuge, Greater Estabrook Woods, the Cranberry Bog Conservation Land, and other open space parcels, roads and trails, streams and watersheds.

Carlisle is in the Sudbury, Assabet, and Concord Rivers watershed.

## Legend

-  Bay Circuit Trail (proposed circuit)
-  Bicycle Trails
-  Highways
-  Major Roads
-  Streets
-  Rivers and Streams
-  Lakes and Ponds
-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape
-  Open Space



# Map 2

## Environmental Justice

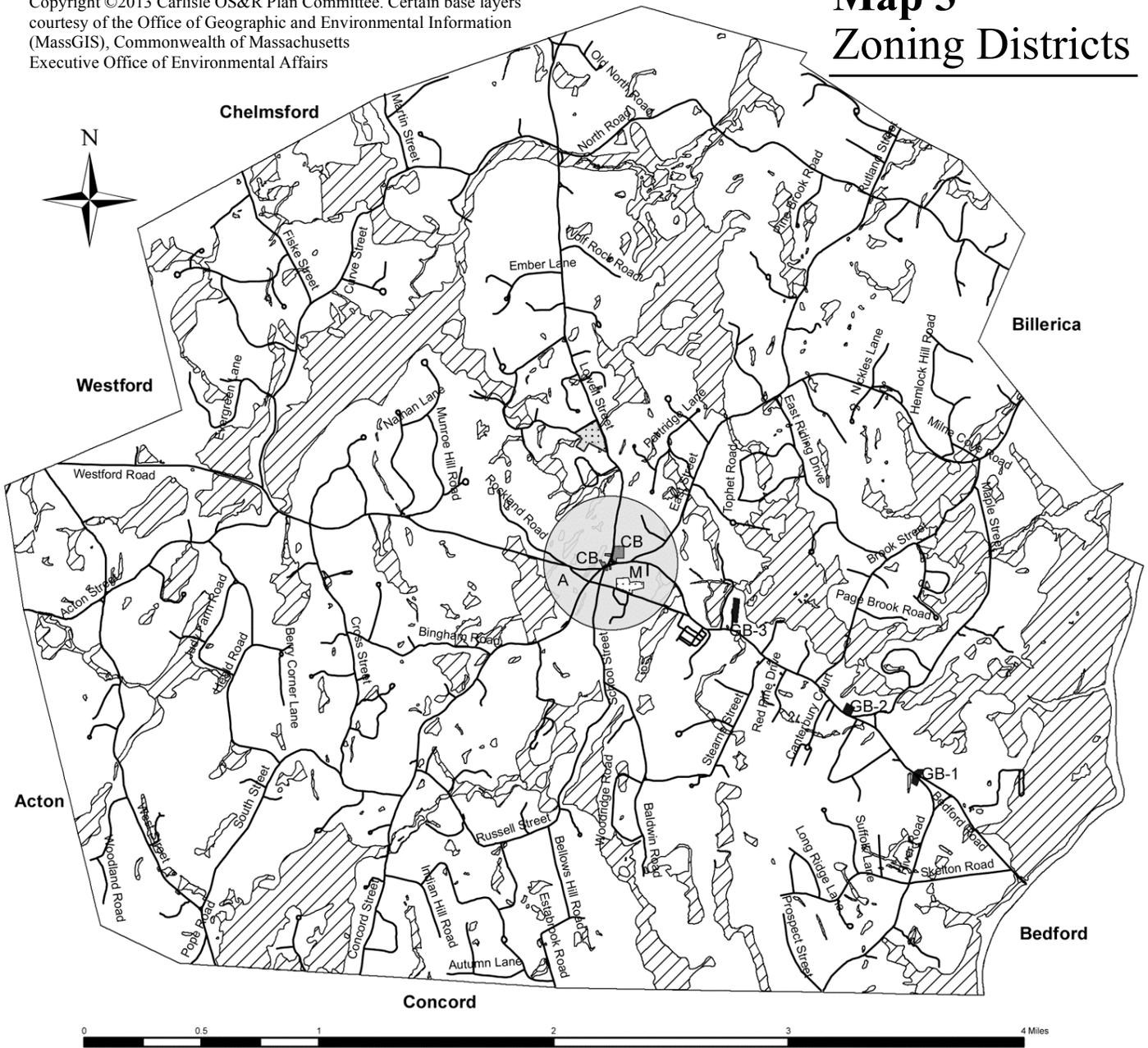
---

Because Carlisle does not have Environmental Justice (EJ) populations, this map is not required and therefore is not included.

The Commonwealth's 2008 "Open Space and Recreation Planner's Workbook" includes this description of its EJ Policy.

"Since 2002, the Executive Office of Energy and Environmental Affairs (EOEEA) has been implementing an Environmental Justice Policy to help ensure that all Massachusetts residents experience equal protection and meaningful involvement with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits. This policy was instituted recognizing that communities across the Commonwealth, particularly those densely populated urban neighborhoods in and around the state's older industrial areas, are facing many environmental challenges associated with Massachusetts' industrial legacy. Residents in these predominantly low-income and minority communities—nearly 29% of the state population—lack open space and recreational resources and often live side-by-side numerous existing large and small sources of pollution and old abandoned, contaminated sites, which can pose risks to public health and the environment."

# Map 3 Zoning Districts

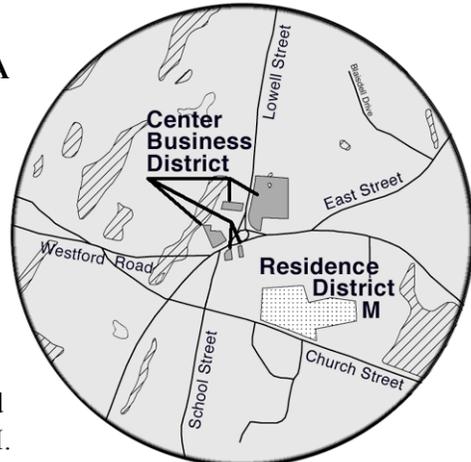


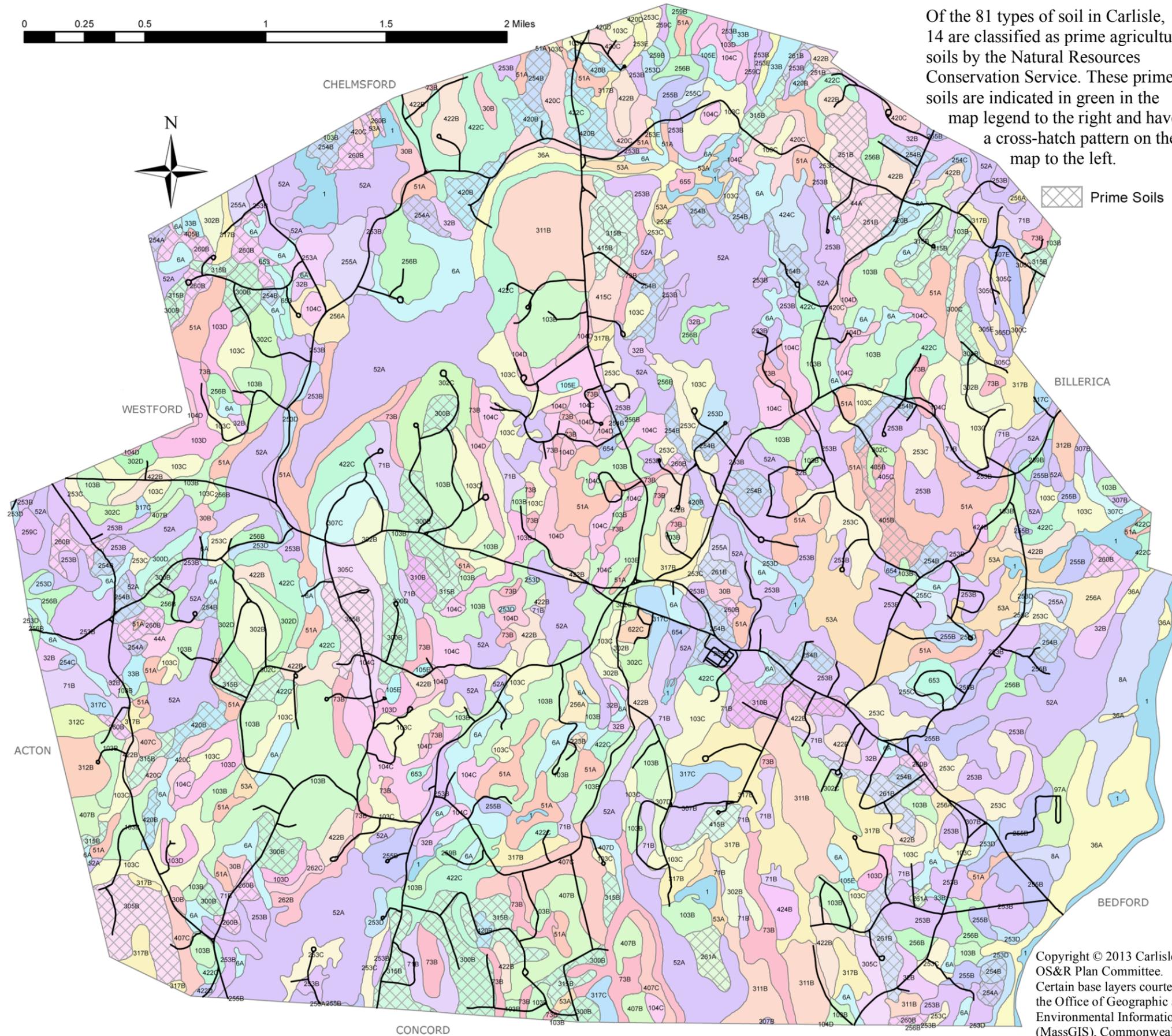
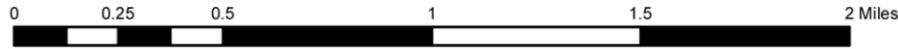
### Legend

- Roads
- Zoning Districts**
- General Residence District A
- General Residence District B
- Residence District M
- Center Business District
- General Business District
- Wetland Flood Hazard (Overlay District)
- Solar Photovoltaic Facility Overlay District

### Detail of General Residence District A

General Residence District A is the area within a circle with a radius of 1500 feet from the Soldiers Monument in the Center of Town, excluding the Center Business District and Residence District M.





Of the 81 types of soil in Carlisle, 14 are classified as prime agricultural soils by the Natural Resources Conservation Service. These prime soils are indicated in green in the map legend to the right and have a cross-hatch pattern on the map to the left.

 Prime Soils

## Map 4 Soils and Geologic Features

### SOILS LEGEND FOR CARLISLE MASSACHUSETTS

- 1 Water
- 103B Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes
- 103C Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes
- 103D Charlton-Hollis-Rock outcrop complex, 15 to 25 percent slopes
- 104C Hollis-Rock outcrop-Charlton complex, 3 to 15 percent slopes
- 104D Hollis-Rock outcrop-Charlton complex, 15 to 25 percent slopes
- 105E Rock outcrop-Hollis complex, 3 to 35 percent slopes
- 223B Scio very fine sandy loam, 3 to 8 percent slopes
- 251B Haven silt loam, 3 to 8 percent slopes
- 253A Hinckley loamy sand, 0 to 3 percent slopes
- 253B Hinckley loamy sand, 3 to 8 percent slopes
- 253C Hinckley loamy sand, 8 to 15 percent slopes
- 253D Hinckley loamy sand, 15 to 25 percent slopes
- 253E Hinckley loamy sand, 25 to 35 percent slopes
- 254A Merrimac fine sandy loam, 0 to 3 percent slopes
- 254B Merrimac fine sandy loam, 3 to 8 percent slopes
- 254C Merrimac fine sandy loam, 8 to 15 percent slopes
- 255A Windsor loamy sand, 0 to 3 percent slopes
- 255B Windsor loamy sand, 3 to 8 percent slopes
- 255C Windsor loamy sand, 8 to 15 percent slopes
- 256A Deerfield loamy sand, 0 to 3 percent slopes
- 256B Deerfield loamy sand, 3 to 8 percent slopes
- 259B Carver loamy coarse sand, 3 to 8 percent slopes
- 259C Carver loamy coarse sand, 8 to 15 percent slopes
- 260B Sudbury fine sandy loam, 3 to 8 percent slopes
- 261A Tisbury silt loam, 0 to 3 percent slopes
- 261B Tisbury silt loam, 3 to 8 percent slopes
- 262B Quonset sandy loam, 3 to 8 percent slopes
- 262C Quonset sandy loam, 8 to 15 percent slopes
- 300B Montauk fine sandy loam, 3 to 8 percent slopes
- 300C Montauk fine sandy loam, 8 to 15 percent slopes
- 300D Montauk fine sandy loam, 15 to 25 percent slopes
- 302B Montauk fine sandy loam, 3 to 8 percent slopes, extremely stony
- 302C Montauk fine sandy loam, 8 to 15 percent slopes, extremely stony
- 302D Montauk fine sandy loam, 15 to 25 percent slopes, extremely stony
- 305B Paxton fine sandy loam, 3 to 8 percent slopes
- 305C Paxton fine sandy loam, 8 to 15 percent slopes
- 305D Paxton fine sandy loam, 15 to 25 percent slopes
- 305E Paxton fine sandy loam, 25 to 35 percent slopes
- 307B Paxton fine sandy loam, 3 to 8 percent slopes, extremely stony
- 307C Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony
- 307D Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony
- 307E Paxton fine sandy loam, 25 to 35 percent slopes, extremely stony
- 30B Raynham silt loam, 0 to 5 percent slopes
- 310B Woodbridge fine sandy loam, 3 to 8 percent slopes
- 311B Woodbridge fine sandy loam, 3 to 8 percent slopes, very stony
- 312B Woodbridge fine sandy loam, 3 to 8 percent slopes, extremely stony
- 312C Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony
- 315B Scituate fine sandy loam, 3 to 8 percent slopes
- 317B Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony
- 317C Scituate fine sandy loam, 8 to 15 percent slopes, extremely stony
- 32B Wareham loamy fine sand, 0 to 5 percent slopes
- 33B Raypol silt loam, 0 to 5 percent slopes
- 36A Saco mucky silt loam, 0 to 1 percent slopes
- 405B Charlton fine sandy loam, 3 to 8 percent slopes
- 405C Charlton fine sandy loam, 8 to 15 percent slopes
- 407B Charlton fine sandy loam, 3 to 8 percent slopes, extremely stony
- 407C Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony
- 407D Charlton fine sandy loam, 15 to 25 percent slopes, extremely stony
- 415B Narragansett silt loam, 3 to 8 percent slopes
- 415C Narragansett silt loam, 8 to 15 percent slopes
- 420B Canton fine sandy loam, 3 to 8 percent slopes
- 420C Canton fine sandy loam, 8 to 15 percent slopes
- 420D Canton fine sandy loam, 15 to 25 percent slopes
- 422B Canton fine sandy loam, 3 to 8 percent slopes, extremely stony
- 422C Canton fine sandy loam, 8 to 15 percent slopes, extremely stony
- 422D Canton fine sandy loam, 15 to 25 percent slopes, extremely stony
- 424B Canton fine sandy loam, 3 to 8 percent slopes, extremely bouldery
- 424C Canton fine sandy loam, 8 to 15 percent slopes, extremely bouldery
- 44A Birdsall mucky silt loam, 0 to 1 percent slopes
- 51A Swansea muck, 0 to 1 percent slopes
- 52A Freetown muck, 0 to 1 percent slopes
- 53A Freetown muck, ponded, 0 to 1 percent slopes
- 622C Paxton-Urban land complex, 3 to 15 percent slopes
- 653 Udorthents, sandy
- 654 Udorthents, loamy
- 655 Udorthents, wet substratum
- 6A Scarborough mucky fine sandy loam, 0 to 3 percent slopes
- 71B Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony
- 73B Whitman fine sandy loam, 0 to 5 percent slopes, extremely stony
- 8A Limerick silt loam, 0 to 3 percent slopes
- 97A Suncook loamy sand, 0 to 3 percent slopes

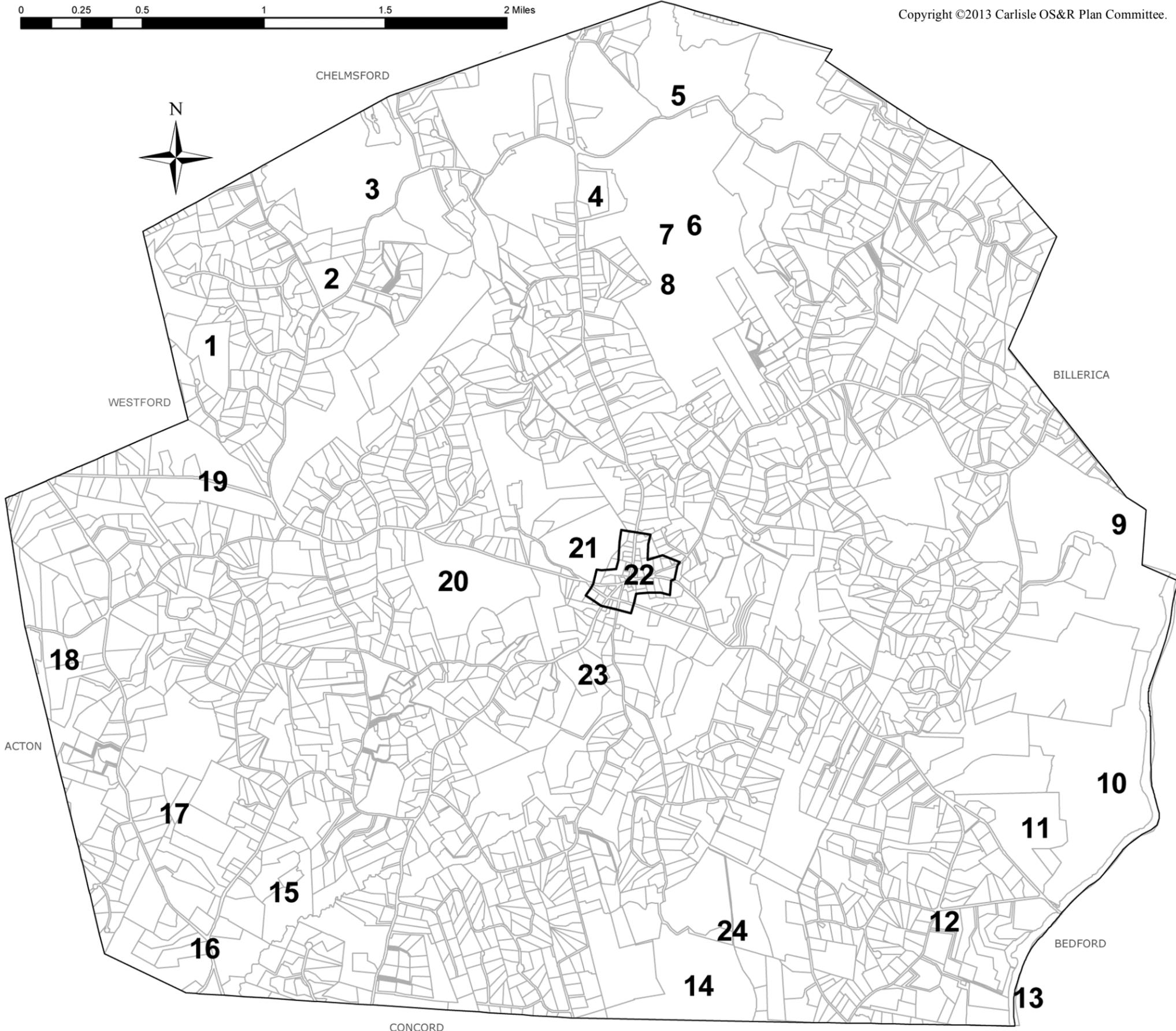
Copyright © 2013 Carlisle OS&R Plan Committee.  
Certain base layers courtesy of the Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

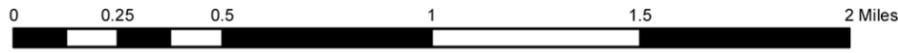


Copyright ©2013 Carlisle OS&R Plan Committee.

# Map 5 Unique Features

- 1. Carlisle Pines**  
Section of Great Brook Farm State Park (GBFSP), small stand of ancient white pines exceptional for their size and grandeur
- 2. Hutchins and Robbins Fields**  
Protected open land under active agriculture
- 3. Cranberry Bog**  
Northernmost active cranberry bog in Massachusetts, on protected open land
- 4. Black Brook Farm**  
Exceptional open field, agricultural, and historic building vista along Lowell Road adjacent to GBFSP
- 5. Great Brook Farm State Park**  
Includes an active dairy farm, a x-country skiing concession, an ice cream stand, open vistas, and miles of trails
- 6. Tophet Swamp**  
Extensive wooded wetland
- 7. Glacial Esker**  
Impressive example of ice age action within GBFSP
- 8. Wolf Rock**  
Large glacial erratic
- 9. Greenough Pond**  
Scenic water body on Greenough Conservation Land
- 10. Great Meadows National Wildlife Refuge (GMNWR)**  
Open and wooded area bordering the Concord River
- 11. Foss Farm**  
Woods and fields with community gardens, trails, pony rings, dog sled trails, x-country skiing
- 12. Elliott Farm**  
Historic farm property with scenic bluff overlooking the Concord River and adjacent to GMNWR
- 13. Concord River**  
Extensive riverine environment designated a Wild and Scenic River
- 14. Estabrook Woods**  
With its surrounding protected properties in both Carlisle and Concord, the most extensive wild forested region in eastern Massachusetts
- 15. Benfield Lands**  
Protected open field with a vista including the Spencer Brook meadows and a wildlife observation platform
- 16. Lime Kiln**  
Historic lime kiln and stone pit located at the intersection of West and South Streets
- 17. Twin Peaks Vernal Pool**  
Scenic vernal pool located near the Twin Peaks trail
- 18. Valentine Farm**  
Privately owned large farm with hay fields and grazing cattle
- 19. Sorli Farm**  
Privately owned large farm featuring bucolic vistas
- 20. Towle Field**  
Large protected open fields with bordering woods including hiking & x-country skiing trails & a fine example of a turtle rock
- 21. Castle Rock**  
A large outcropping on the Town-owned Conant Land, which also features extensive woodland with hiking trails
- 22. Historic District**  
Area in the Town Center preserving the rural appearance of Carlisle's hub
- 23. Clark Farm**  
Exceptional open-field vista near the Town Center
- 24. Two Rod Road**  
A trail along an old road to Concord dating from the early 1700s, laid out to specifications that it be two rods wide





Copyright ©2013 Carlisle OS&R Plan Committee.  
 Certain base layers courtesy of the Office of Geographic and  
 Environmental Information (MassGIS), Commonwealth of  
 Massachusetts Executive Office of Environmental Affairs.

# Map 6 Water Resources

## Legend

— Roads

▭ Drainage Sub-basins - Dec 2007

**Hydrography 1:25,000 - Feb 2010**

— Perennial Stream

- - - Intermittent Stream

— Shoreline

- - - Ditch/Canal

**Wellhead Protection Areas - Jul 2011**

○ Zone 1

▣ Zone 2

**Public Water Supply Water Rights Area**

▭ (O'Rourke)

**DEP Wetlands 1:12,000 - Jan 2009**

▭ Marsh/Bog

▭ Wooded marsh

▭ Cranberry Bog

▭ Open Water

**FEMA Q3 Flood Zones - Jul 1997**

▭ A

▭ AE

▭ X500

\* NHESP Certified Vernal Pools

\* Potential Vernal Pools

**Aquifers - July 2007**

▭ Low Yield ( < 50 gpm )

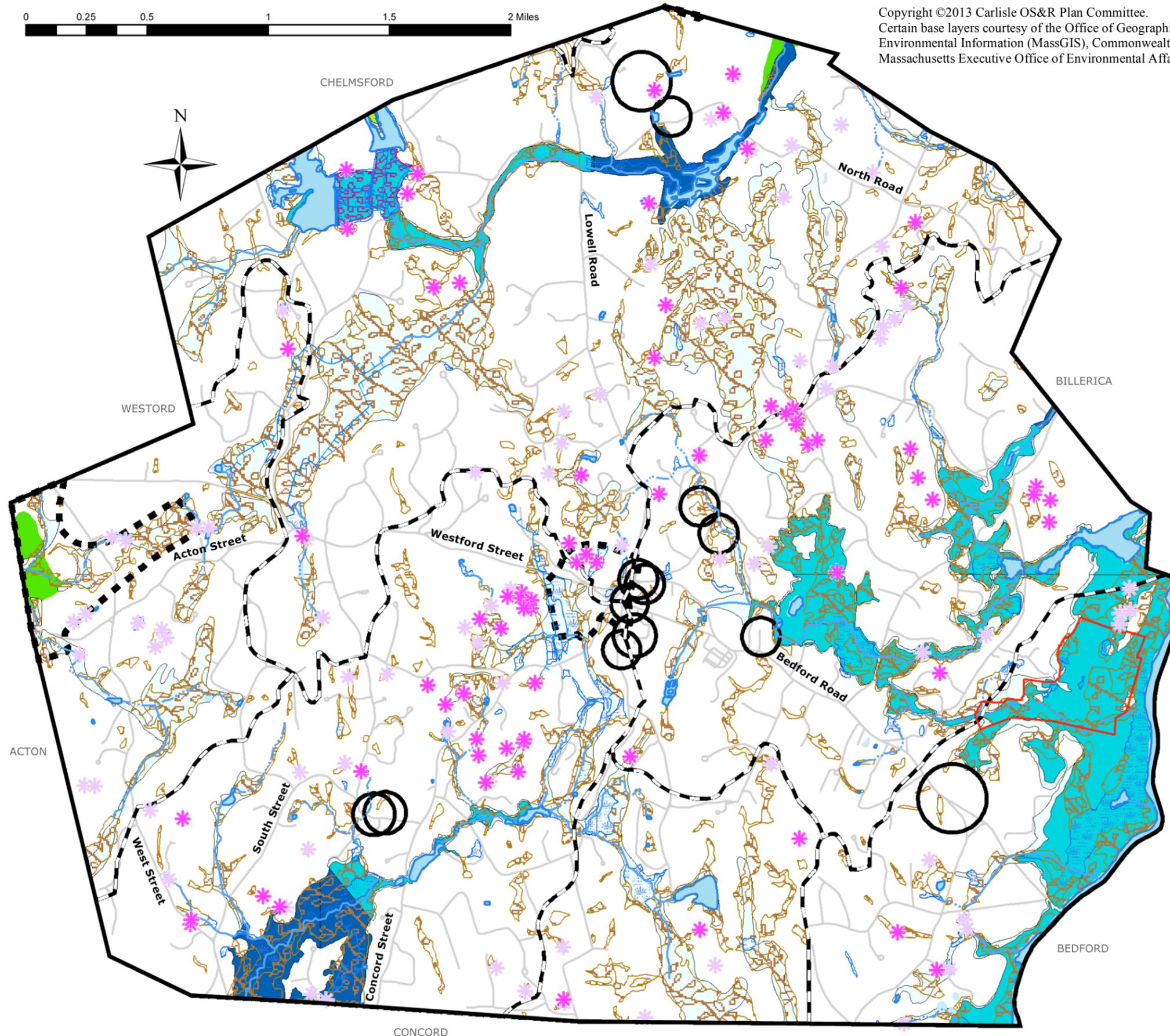
▭ Medium Yield ( 50-300 gpm )

**Key to FEMA Q3 Flood data**

A An area inundated by 100-year flooding for which no BFEs (Base Flood Elevations) have been determined

AE An area inundated by 100-year flooding for which BFEs have been determined

X500 An area inundated by 500-year flooding; an area inundated by 1500-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding



# Map 7 Inventory of Open Space

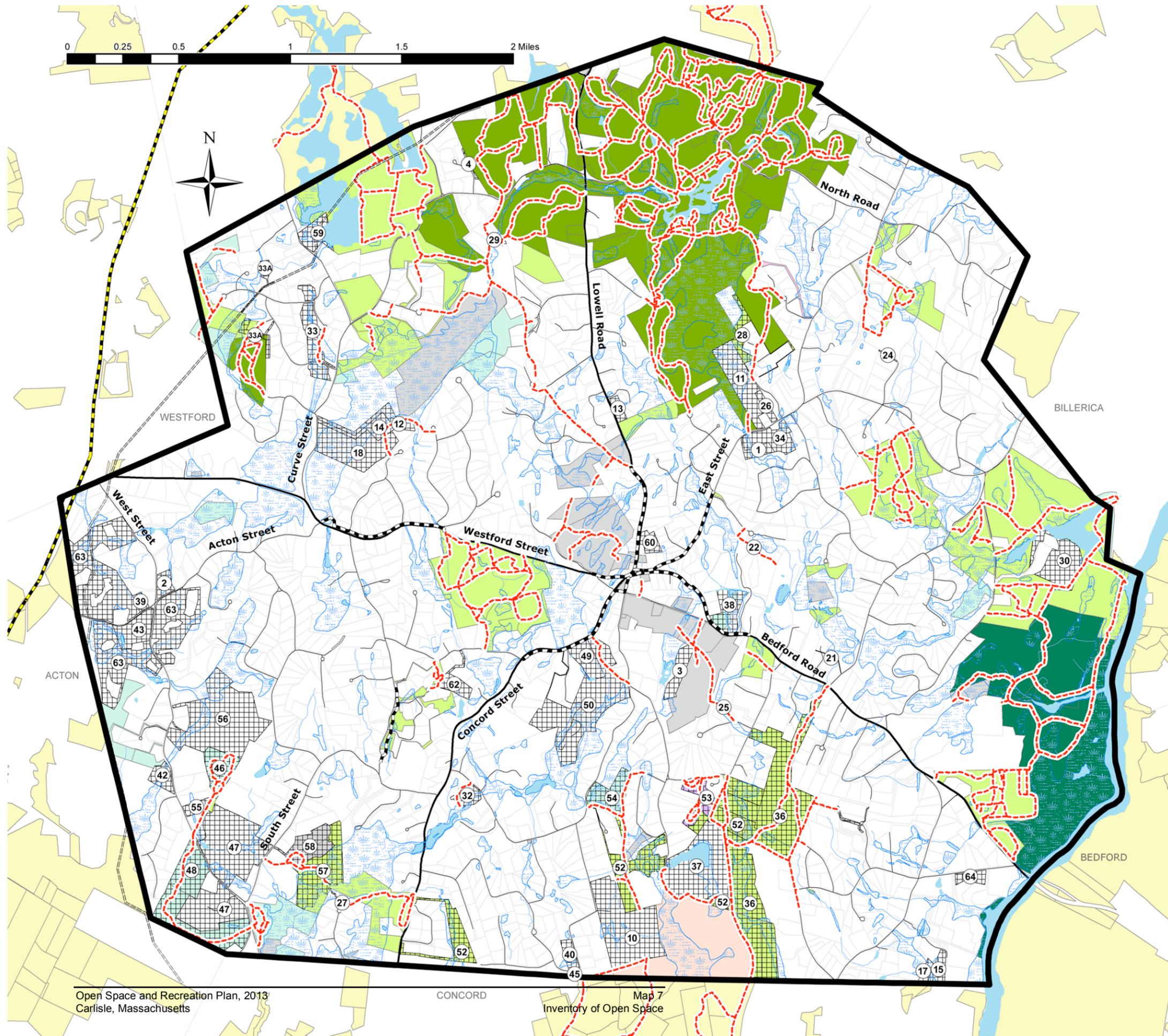
Protected open spaces are lands that are permanently committed for conservation or recreation purposes or both. They include public holdings of the Carlisle Conservation Commission and the Commonwealth and Federal governments and private holdings of the Carlisle Conservation Foundation (CCF), Harvard University, and The Trustees of Reservations.

Protected open space also includes private properties with permanent conservation restrictions (CRs) and open space created by conservation cluster developments.

Unprotected open space consists of public and private properties that are not designated for conservation or recreation and includes land in Chapter 61, 61A, or 61B.

## Legend

- Pathways
- Bruce Freeman Rail Trail
- Gas Pipeline
- Trails
- Water
- Carlisle Conservation Foundation
- Commonwealth of MA - Great Brook Farm SP
- Harvard University - Estabrook Woods
- Homeowners Assoc - Great Brook Estates
- Town of Carlisle - Conservation Commission
- The Trustees of Reservations
- United States - Great Meadows NWR
- Conservation Restriction
- Municipal Use/Unprotected Town-owned
- Protected Out of Town



**CRANBERRY BOG**

Facilitate long-term extension of Cranberry Bog Agricultural Lease, 2015; Coordinate with Chelmsford re: water rights 2013-2019; Work to make Bog paths accessible to OPDMDs, 2015-2019

**NORTHWEST CORNER**

Seek trail connections from Carlisle Pines State Forest to the MacAfee Trail, with connection to Westford and Chelmsford trails and the Bruce Freeman Rail Trail, 2013-2018

**CONANT LAND**

Seek permanent CR, 2013-2017

**TOWN COMMON**

Develop ongoing maintenance plan, 2013-2015

**SORLI FARM**

Work with landowners to protect the vistas and make trail connections to nearby protected lands, 2013-2019

**BRUCE FREEMAN RAIL TRAIL**

Support completion of trail, work with neighboring towns for more parking, 2014-2015

**TOWLE LAND**

Continue efforts to control poison ivy and invasive buckthorn, 2013-2019

**WESTERN BORDER**

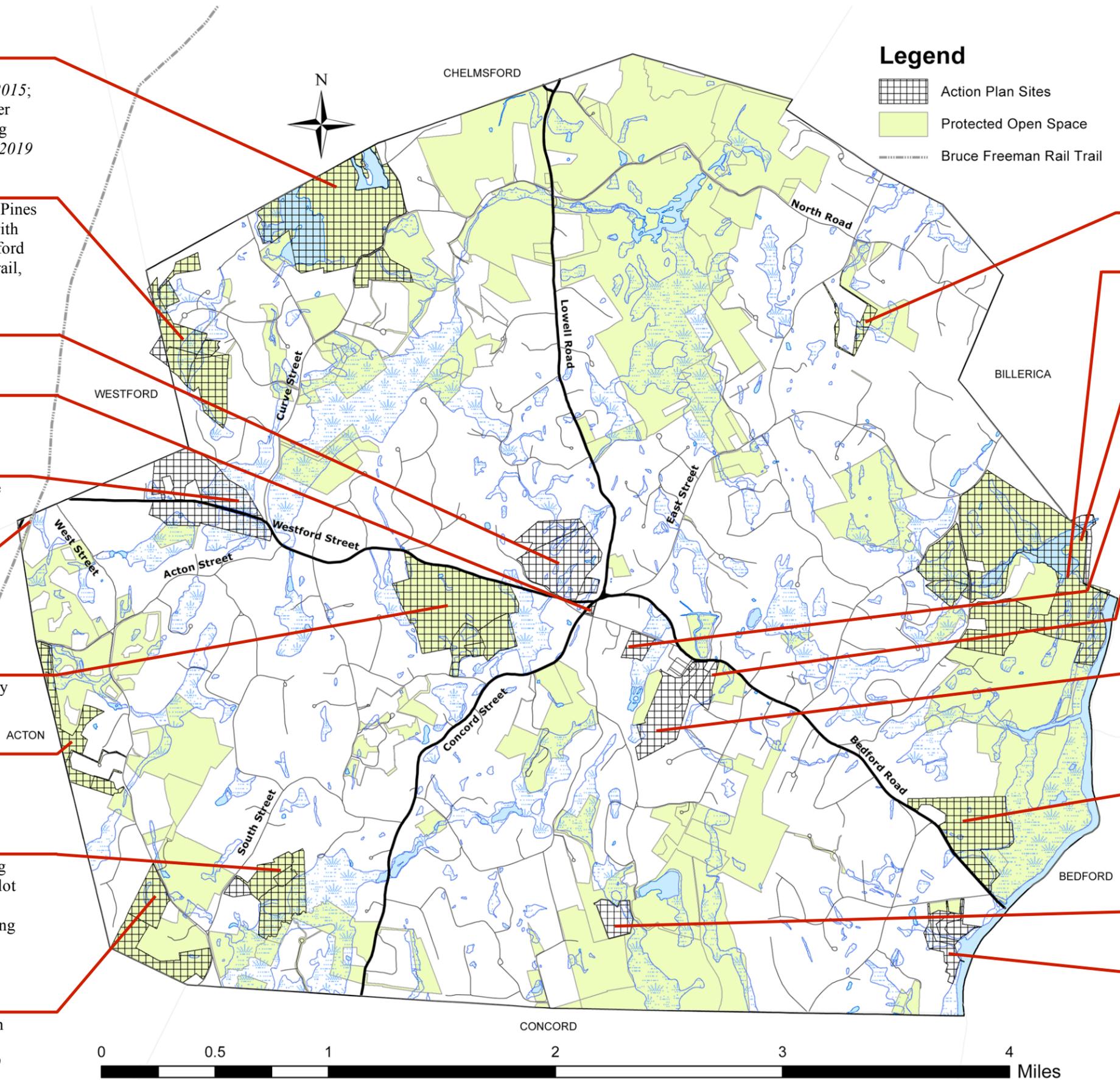
Seek trail connections from these CCF lands to Acton's Spring Hill and Robbins Mill areas, 2013-2019

**BENFIELD CONSERVATION LAND**

Complete trail linkages from housing development and dedicated parking lot after completion of housing, 2014; Coordinate responsibilities for funding maintenance of land with housing stakeholders, 2013-2019

**BEN'S WOODS**

Seek trail connection to conservation land in Acton, 2013-2014; Monitor invasives control project, 2013-2019



# Map 8 Seven-Year Action Plan

High-priority initiatives from Section 9 of the Town of Carlisle 2013 Open Space and Recreation Plan are shown on this map.

**RANGEWAY CONSERVATION LAND**  
Construct new boardwalk for trail, 2013

**GREENOUGH DAM**  
Decide whether to repair or remove dam, then obtain funding, through CPA if feasible, to carry out decision, 2013-2019

**GREENOUGH BARN**  
Develop Management Plan for preservation, safety, and protection from vandalism, 2013-2014

**SPALDING FIELD**  
Use CPA funding to construct boardwalk to link school playing fields to Banta-Davis recreation fields, 2014

**GOFF PROPERTY**  
Evaluate site for possible Community Center or Rec Center or other recreation facilities, 2013-2014

**BANTA-DAVIS LAND**  
Evaluate feasibility for needed expansion of recreation fields and facilities, including one all-purpose artificial turf field and four tennis courts, 2013

**FOSS FARM**  
Monitor invasives control and edge restoration projects, 2013-2019; Construct new boardwalk for new trail, completed 2013

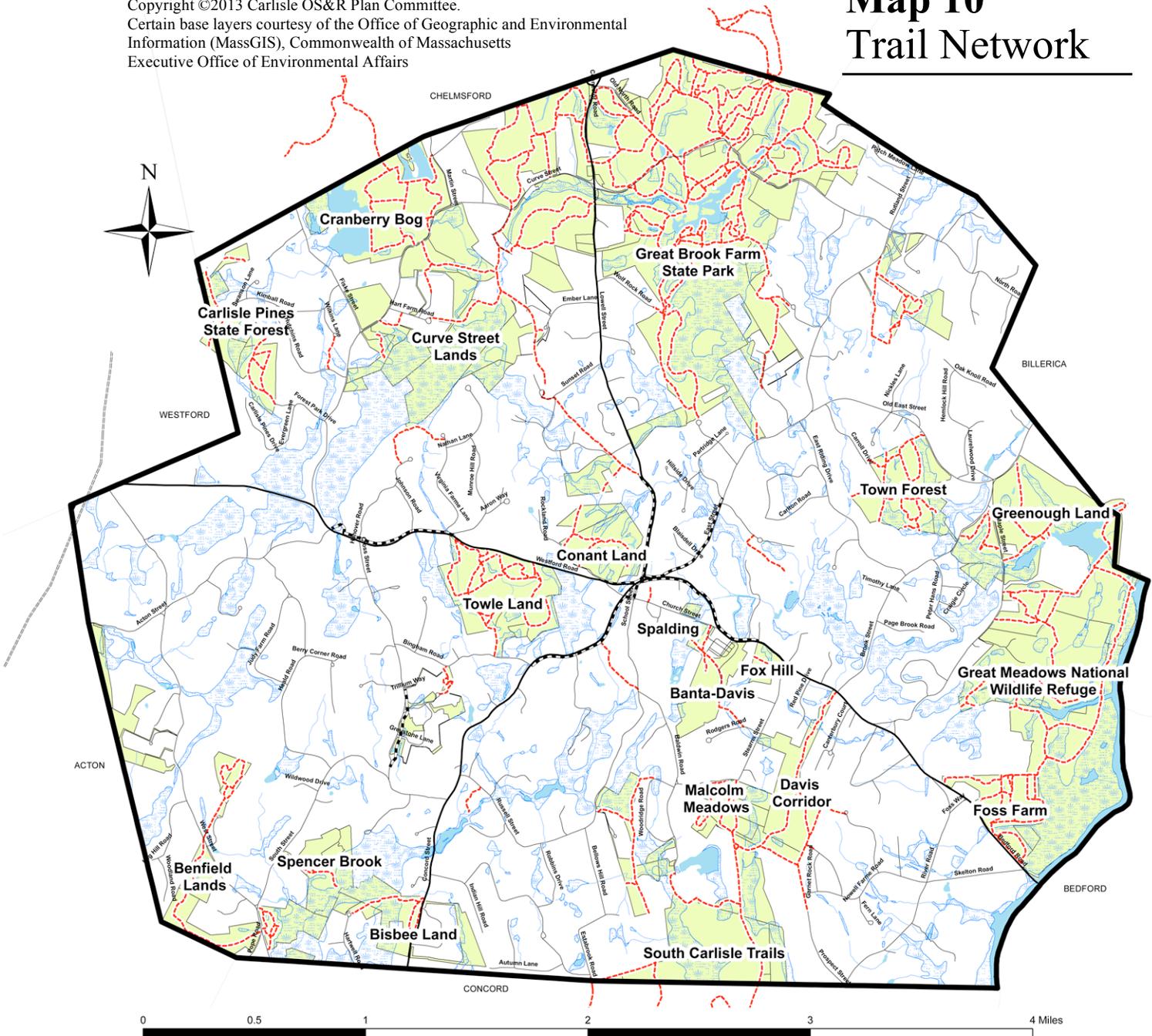
**FLANNERY PROPERTY**  
Seek protection of key parcel, 2017-2019

**ELLIOTT PROPERTY**  
Complete parking and trails, and coordinate with USFWS on possible canoe landing, 2013-2015

OPDMD = Other Power-Driven Mobility Device  
CR = Conservation Restriction  
CCF = Carlisle Conservation Foundation  
CPA = Community Preservation Act  
USFWS = United States Fish and Wildlife Service



# Map 10 Trail Network

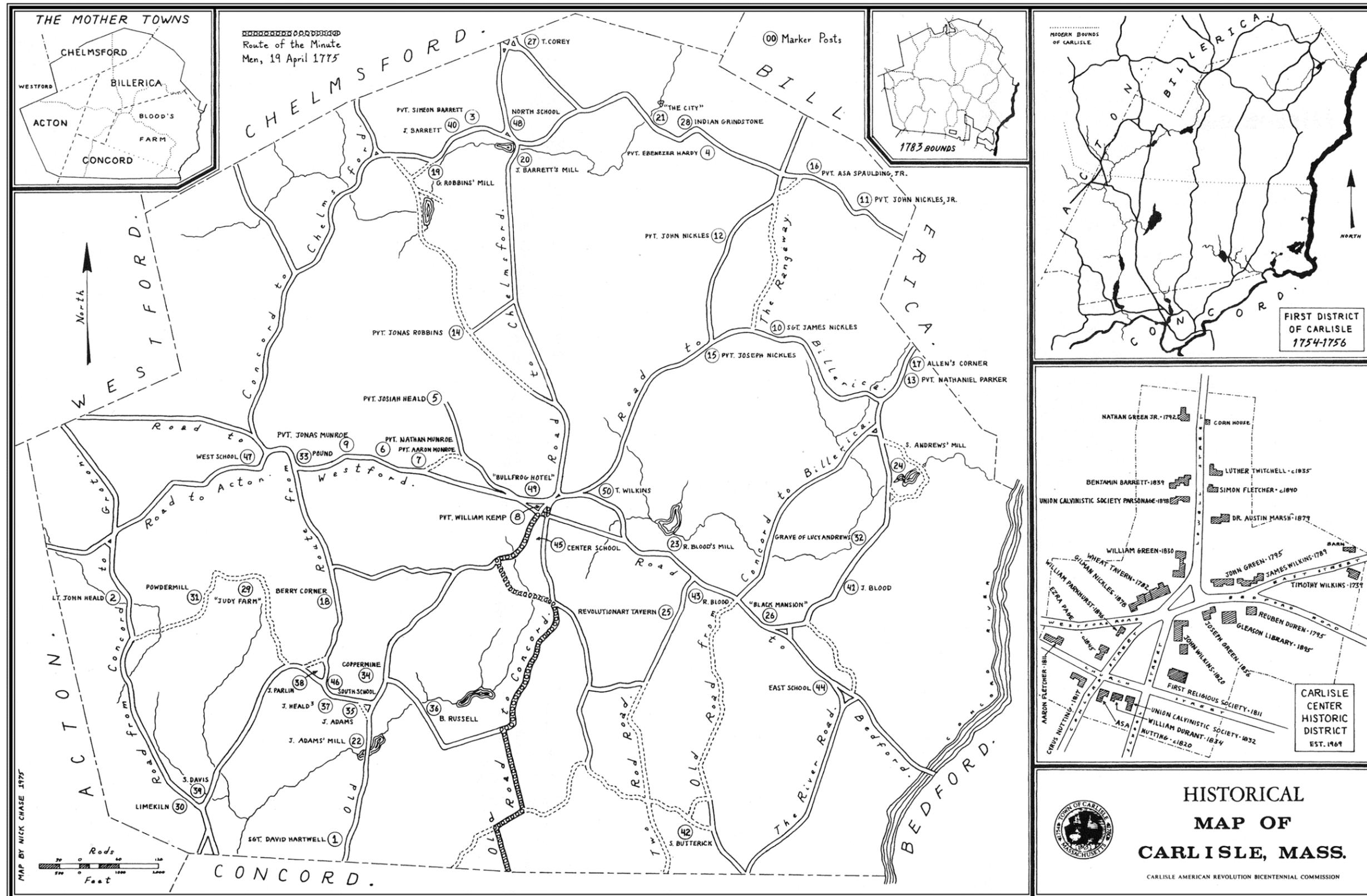


## Legend

- Pathways
- Bruce Freeman Rail Trail
- Carlisle Trails

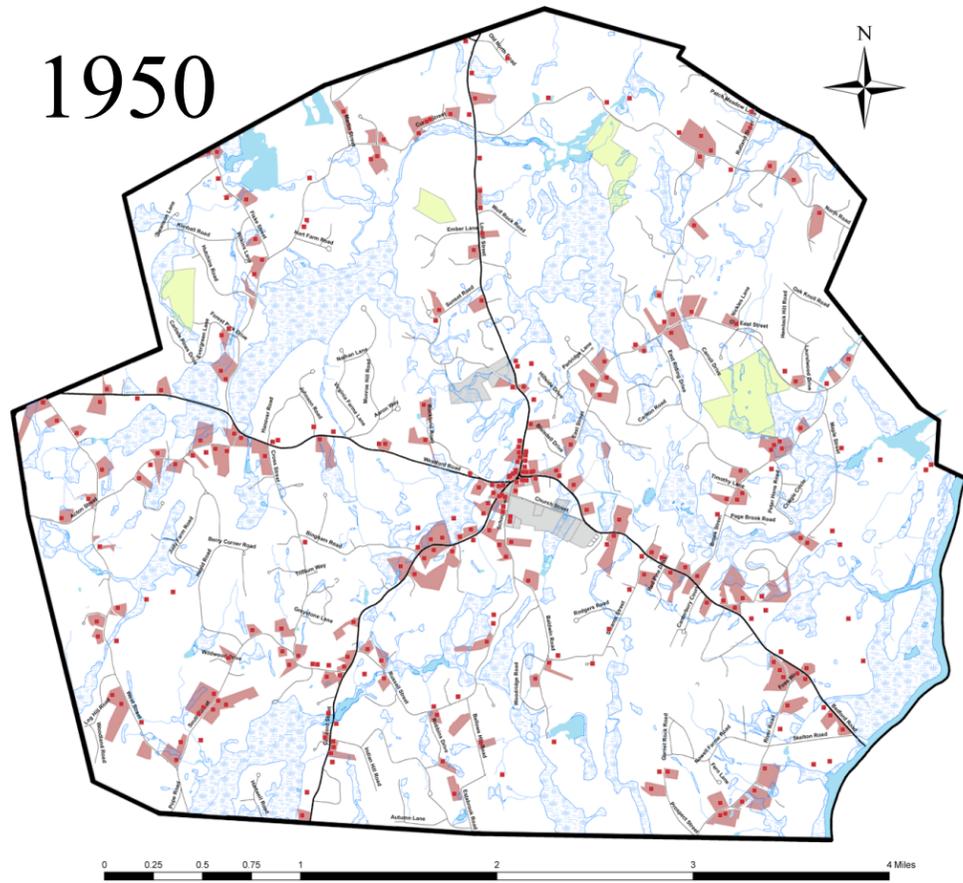
The Carlisle Trails Committee extensively revised its trails book, *Trails in Carlisle*, in 2010. All trails were walked and entered on the GIS (Geographic Information System) using GPS (Global Positioning System) technology. Special features of trails and land parcels are noted in the text. The trail book is available at Carlisle Town Hall and at Ferns Country Store. Trail maps are also available electronically from the Trails Committee's website, <http://CarlisleTrails.pbworks.com>.

# Map 11 Historical Map

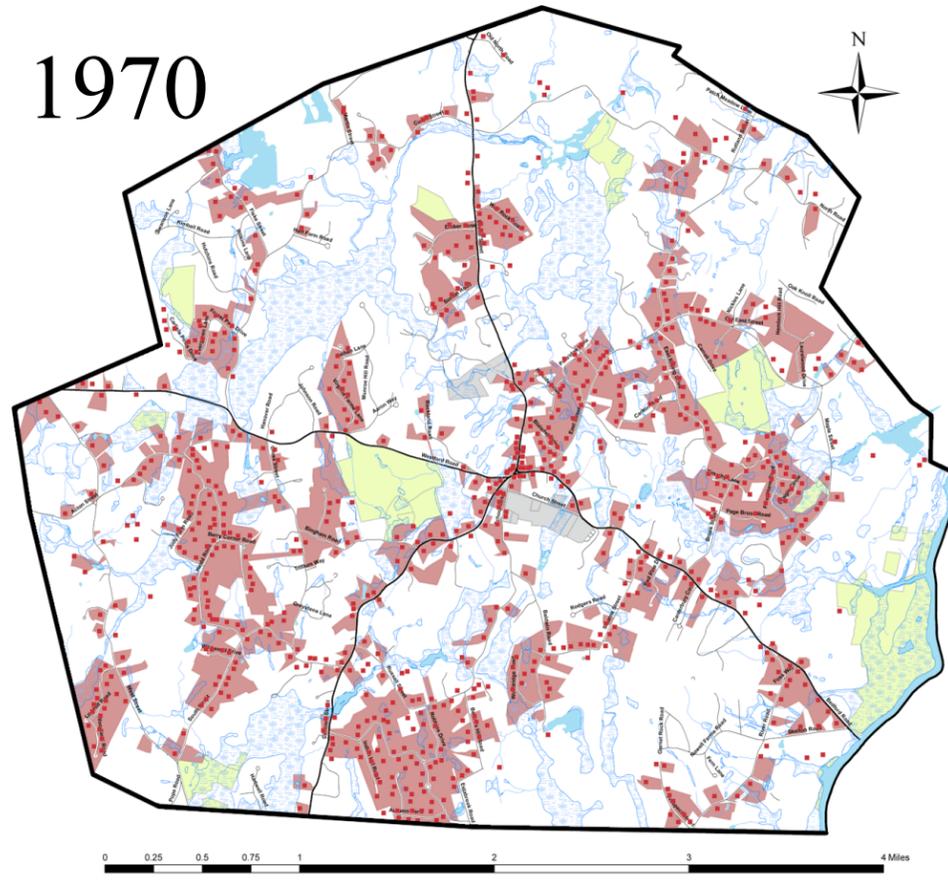


This map was prepared by Edward N. Chase for the Carlisle American Revolution Bicentennial Commission in 1975. It shows, clockwise from upper left, the "Mother Towns," the neighboring towns from which Carlisle was created; historic roads, the Route of the Minutemen, 19 April 1775, and 50 historic marker posts installed by the Bicentennial Commission; the 1783 Town bounds; the First District of Carlisle, 1754-1756; and the Carlisle Center Historic District, established in 1969.

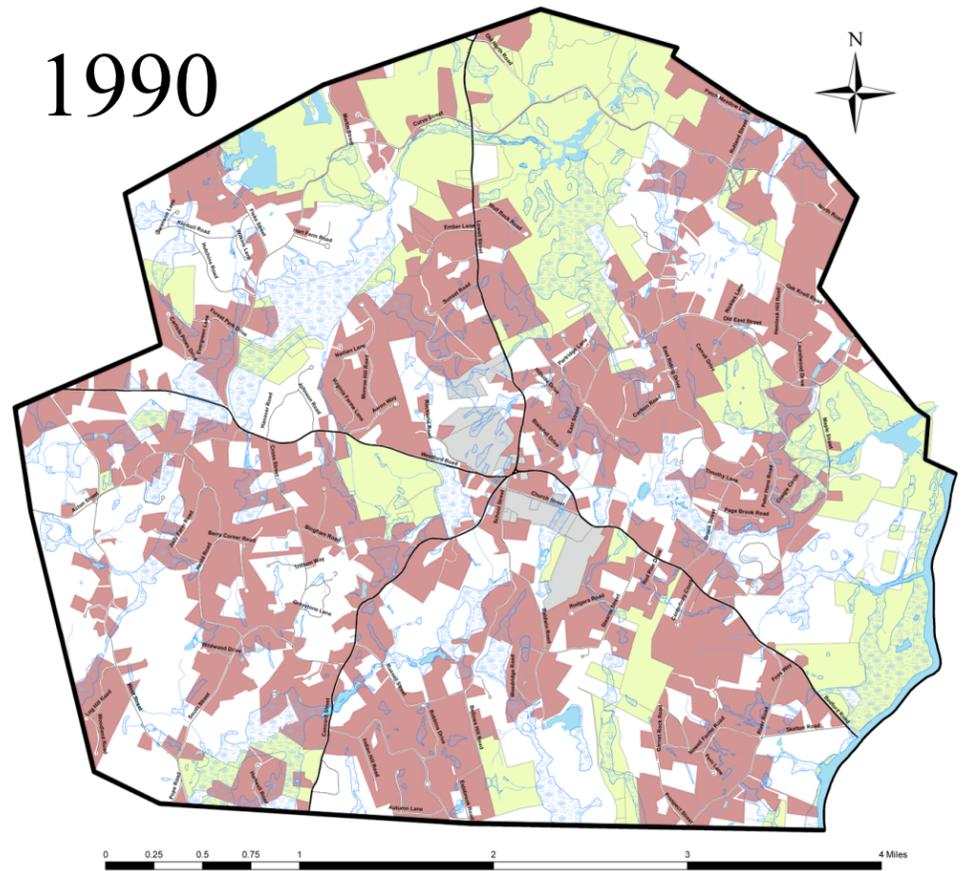
1950



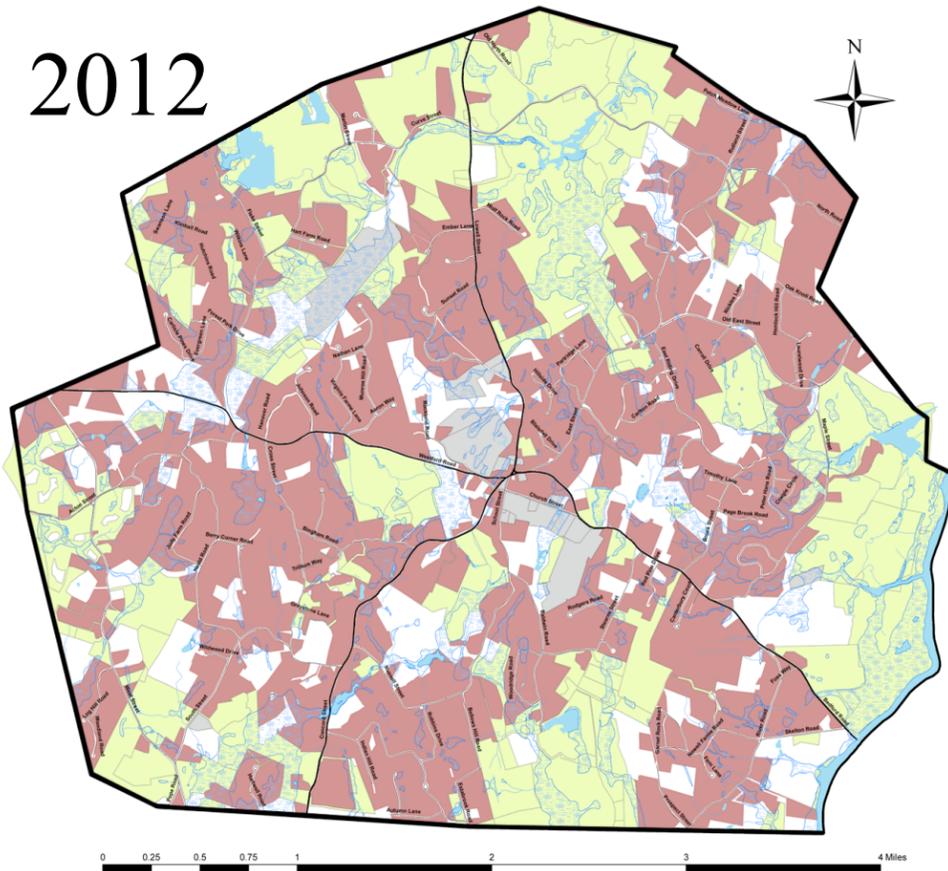
1970



1990



2012



## Map 12 Development and Land Protection Over Time

These maps show the transformation of Carlisle from a mostly forested and rural farming community with a population of less than 900 in 1950 to a population of about 5,000 in 2012. The maps also show the results of efforts of federal, state, and local governments as well as local private conservation organizations to set aside parcels for conservation purposes. As development has increased over time, so has the amount of land permanently protected as open space. Along with state and federally protected lands, Carlisle in 2012 has 34% or 3,362 of its 9,913 acres protected from development.

The 2012 map can be used as a planning tool to assess the parcels still virtually undeveloped as to their development potential and their importance as potentially protected open space to preserve water and other natural resources and to create linkages in wildlife corridors and trails.

*Note: These four maps are based on the best available data from the Assessors' listings of earliest sales by parcel and from Planning Board files of dates of subdivision approvals. Development data from earlier years is harder to track and therefore somewhat less reliable. Accordingly, the parcels on the 1950 and 1970 maps have been supplemented with approximate locations of houses (small red squares) taken from U.S. Geological Survey (U.S.G.S.) maps, circa 1950 and 1970, respectively.*

*In addition, the maps are based on a current (2012) parcel database, so a large tract that may have had a single dwelling, perhaps a farmhouse, in 1950, may be shown as what is the current smaller building lot in approximately the location of the original dwelling (confirmed in many cases by the square from the U.S.G.S. maps). The 1950 map actually gives a more accurate picture of the extent of development because large parcels in the 1950s and earlier were mostly wooded or farmland. A typical large parcel may have been subdivided one or more times in the intervening half century as the town has become more densely developed, from less than 60 people per square mile in 1950 to more than five times that density today.*

*The 2012 map shows recently subdivided tracts as fully developed; although some lots in these developments remain unbuilt, the land has been transformed through development infrastructure of roads and stormwater drainage. All currently unprotected parcels of 10 acres or more are shown as undeveloped, even though they may have a single family home, due to their development potential, whether through subdivision or as a 40B.*

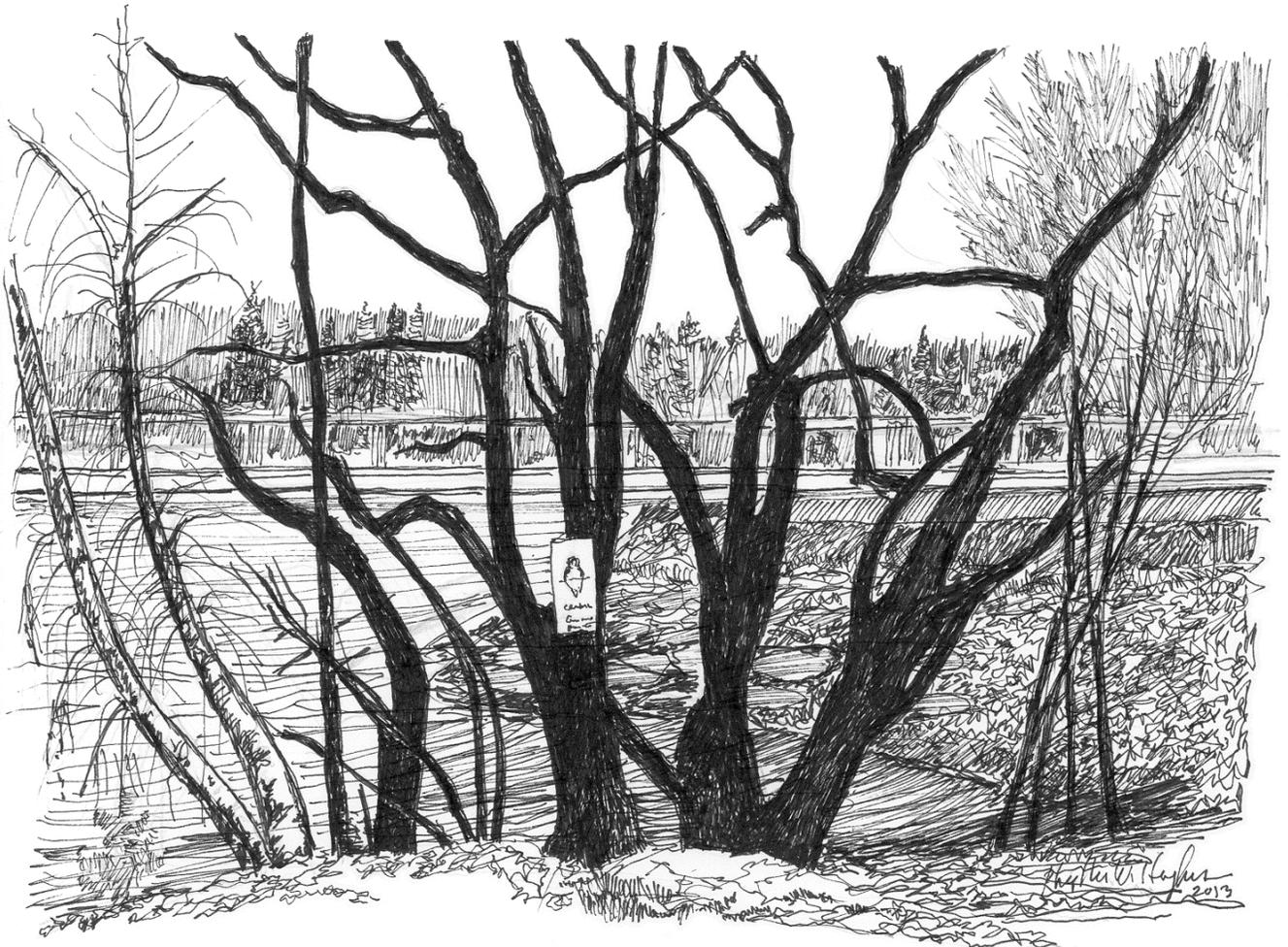
*All four maps show current (2012) roads to aid with orientation.*

### Legend

- Developed parcel as of date of map
- Protected parcel as of date of map
- Municipal parcel as of date of map

## Section 13: Tables

- Table 1: Town-owned Conservation Lands
- Table 2: Town Acquisitions for Conservation
- Table 3: Commonwealth and Federal Lands in Carlisle
- Table 4: Carlisle Conservation Foundation (CCF) Lands
- Table 5: Properties with Conservation Restrictions (CRs)
- Table 6: Lands in 61, 61A, or 61B
- Table 7: Seven-Year Action Plan Private Property Protection Priority List
- Table 8: Open Space Created by Conservation Cluster Developments
- Table 9: Properties of the Greater Estabrook Woods in Carlisle
- Table 10: Town-owned Conservation and Recreation Properties and Facilities in Carlisle
- Table 11: Accessibility of Conservation and Recreation Properties and Facilities



*View of the Route 225 bridge across the Concord River from the recently acquired CCF-owned Bose property that abuts the Great Meadows National Wildlife Refuge and provides informal access for fishing on the river at the eastern border of Carlisle*

**Table 1: Town-owned Conservation Lands (as of 31 December 2012)**

| Land Name                            | Location                            | Acres         | Protection* |   |   |   | CR  | Map-Parcel-Lot                                            |
|--------------------------------------|-------------------------------------|---------------|-------------|---|---|---|-----|-----------------------------------------------------------|
|                                      |                                     |               | A           | B | C | D |     |                                                           |
| Benfield Cons. Land                  | South Street                        | 25.68         | •           |   |   |   | #57 | 5-7-4A                                                    |
| Bisbee Land                          | Lowell Street                       | 34            | •           | • |   |   |     | 4-24A-0                                                   |
| Buttrick Woods Conservation Land     | Lowell Street                       | 13.97         | •           | • |   |   | #52 | 4-20-A                                                    |
| Carr Land                            | off Bellows Hill Road               | 6.08          | •           | • |   |   | #52 | 2-12-1                                                    |
| Cranberry Bog                        | Curve Street                        | 151           | •           | • |   |   |     | 30-2-0; 31-15-0                                           |
| Davis Corridor                       | Bedford Road to Estabrook Woods     | 126.4         | •           | • | • |   | #36 | 2-1-0; 2-2A-0; 2-5-0; 2-6-0; 2-7-0; 2-8-0; 9-15-0; 9-26-0 |
| Deacon Land                          | off Baldwin Road                    | 7.51          | •           | • |   |   | #52 | 2-13-0; 9-38-A; 9-38-B                                    |
| Fisk Meadow                          | off Lowell Street                   | 11.60         | •           | • |   |   |     | 27-6-0                                                    |
| Foss Farm                            | Bedford Road                        | 55.20         | •           | • | • | • |     | 11-5-0                                                    |
| Fox Hill                             | Bedford Rd./Stearns St              | 11.22         | •           | • |   |   |     | 14-9-0                                                    |
| Gage Woodland                        | off Lowell St/Ember Ln              | 14            | •           |   |   |   |     | 31-2-0                                                    |
| Grt Brk Estates OS #1                | Rutland Street                      | 3.67          | •           |   |   |   |     | 26-18-G                                                   |
| Greenough Land                       | Maple Street                        | 255.00        | •           | • | • | • |     | 12-2-0; 13-87-0; 24-3-0                                   |
| Greystone Crossing Conservation Land | off Cross Street                    | 14.33         |             | • |   |   |     | 7-38-A; 7-38-B; 7-38-C; 7-38-D                            |
| Hart Farm Cons. Land                 | off Curve Street                    | 13.54         | •           | • |   |   |     | 28-12-Y                                                   |
| Heidke Parcel                        | next to Town Forest                 | 8.19          | •           | • |   |   |     | 24-28-0                                                   |
| Hutchins Field                       | Curve Street                        | 16.00         | •           | • | • |   | APR | 28-2-Y                                                    |
| Ice Pond Cons. Land                  | next to GBFSP                       | 7.05          | •           | • |   |   | #28 | 26-6K-OS                                                  |
| Keystone Link                        | off South Street                    | 1.0           | •           |   |   |   |     | 5-46-0                                                    |
| MacAfee Land                         | next to Carlisle Pines State Forest | 15.00         | •           | * |   |   |     | 29-4-0                                                    |
| Macone Property                      | off Brook Street                    | 3.00          | •           | • |   |   |     | 13-8-6                                                    |
| Malcolm Land                         | Stearns Street                      | 22.90         | •           | • | • |   | #52 | 9-25-A; 9-27-1C; 9-28-B                                   |
| Mannis Land                          | off Aldershot Lane                  | 27.88         | •           | • |   |   |     | 36-22-0; 36-37-7; 36-38-8; 36-39-9                        |
| Rangeway Cons. Land                  | off Rutland Street                  | 8.15          |             | • |   |   |     | 36-26-1                                                   |
| Robbins Field                        | Curve Street                        | 18.45         | •           | • | • |   | APR | 28-8-8A; 28-8-9A; 28-8-10A                                |
| Rockstrom Cons. Land                 | off School Street                   | 7.55          | •           | • |   |   | #52 | 2-14-4                                                    |
| Sachs Greenway                       | off Baldwin Road                    | 9.34          | •           | • |   |   | #52 | 2-10-9; 2-10-X                                            |
| Swanson Family Land                  | Tall Pines Lot 10                   | 2.99          | •           | • |   |   |     | 29-6-10                                                   |
| Swanson Land                         | off Curve Street                    | 20.00         | •           | • |   |   |     | 28-9-0                                                    |
| Towle Land                           | Westford Street                     | 120.90        | •           | • | • | • |     | 15-23-0; 15-24-0; 15-25-0; 15-45-0                        |
| Town Forest                          | East Street                         | 71            | •           |   |   |   |     | 23-66-0                                                   |
| <b>Total Acres</b>                   |                                     | <b>1102.6</b> |             |   |   |   |     |                                                           |

\* Protection - Properties subject to permanent protection because:

**A-** Acquired by Town Meeting, voted to be managed by the Conservation Commission by Town Meeting, and permanently protected under Article 97 of the Massachusetts Constitution.

**B-** Acquired for conservation under MGL Ch 40 s.8C, or created as open space through the Carlisle Conservation Cluster Bylaw, or by gift.

**C-** Acquired with Commonwealth of Massachusetts Self-help funds or with state APR funds.

**D-** Acquired with Commonwealth Self-help funds and the Federal Land and Water Conservation Fund.

APR = Agricultural Preservation Restriction, CR = Conservation Restriction, GBFSP = Great Brook Farm State Park, OS = Open Space

**Table 2: Town Acquisitions for Conservation (as of 31 December 2012)**

| Year Acquired | Parcel                   | Land Name                            | Acres  | Purpose at Acquisition | Funding Source |
|---------------|--------------------------|--------------------------------------|--------|------------------------|----------------|
| 1968          | Towle                    | Towle Land                           | 94.40  | Cons/Rec               | T, S, F        |
| 1969          | Ryan                     | Towle Land                           | 1.5    | Cons                   | Gift           |
| 1970          | Metivier                 | Towle Land                           | 13.50  | Cons                   | T, S           |
| 1971          | Clark/Foss               | Towle Land                           | 3.00   | Cons                   | T, S           |
| 1971          | Carr/Warren              | Towle Land                           | 10.00  | Cons                   | T, S           |
| 1971          | Foss                     | Foss Farm                            | 55.20  | Cons/Rec               | T, S, F        |
| 1973          | Greenough                | Greenough Land                       | 255    | Cons/Rec               | T, S, F        |
| 1973          | Swanson                  | Swanson Land                         | 20.00  | Cons                   | Gift           |
| 1974          | Davis                    | Davis Corridor                       | 108.4  | Cons                   | T, S           |
| 1974          | Davis                    | Davis Corridor                       | 1.6    | Cons                   | Gift           |
| 1977          | Carruthers               | Davis Corridor                       | 2.35   | Cons                   | T, S           |
| 1977          | Clark                    | Davis Corridor                       | 3.4    | Cons                   | T, S           |
| 1978          | Hodgman                  | Davis Corridor                       | 10.6   | Cons                   | Town           |
| 1978          | Heidke                   | Heidke Parcel                        | 8.19   | Cons                   | Gift           |
| 1980          | Leelman-Anderson         | Fox Hill                             | 11.22  | Cons                   | Town           |
| 1981          | Fisk                     | Fisk Meadow                          | 11.60  | Cons                   | Gift           |
| 1982          | Mannis                   | Mannis Land                          | 27.88  | Cons                   | Gift           |
| 1986          | Lowell Cranberry Bog     | Cranberry Bog                        | 151.00 | Cons/Rec               | Town           |
| 1987          | Bisbee                   | Bisbee Land                          | 34.00  | Cons/Rec               | Town           |
| 1992          | Macone                   | Macone Land                          | 3.00   | Cons                   | Deed           |
| 1994          | Town Forest              | Town Forest                          | 71     | Cons                   | Deed           |
| 1994          | Gage Woodland            | Gage Woodland                        | 14.00  | Cons                   | Gift           |
| 1994          | MacAfee                  | MacAfee Land                         | 15.00  | Cons                   | Gift           |
| 1996          | Malcolm                  | Malcolm Land                         | 22.90  | Cons                   | T, S, Deed     |
| 1997          | Ice Pond                 | Ice Pond Conservation Land           | 7.05   | Cons                   | Deed           |
| 1997          | Carr                     | Carr Land                            | 6.08   | Cons                   | Town           |
| 1997          | Deacon                   | Deacon Land                          | 7.51   | Cons                   | Town           |
| 1997          | Sachs                    | Sachs Greenway                       | 8.35   | Cons                   | Town           |
| 1997          | Sachs Parcel X           | Sachs Greenway                       | 0.99   | Cons                   | Town           |
| 1998          | Rockstrom                | Rockstrom Conservation Land          | 7.55   | Cons                   | Deed           |
| 1998          | Swanson                  | Swanson Family Land                  | 3      | Cons                   | Gift           |
| 1999          | Wang-Coombs              | Hutchins Field                       | 16     | Cons/Ag                | Town           |
| 1999          | Wang-Coombs              | Robbins Field                        | 18.45  | Cons/Ag                | Town           |
| 2000          | Buttrick Woods           | Buttrick Woods Conservation Land     | 13.97  | Cons                   | Deed           |
| 2000          | Hart Farm                | Hart Farm Conservation Land          | 13.54  | Cons                   | Deed           |
| 2000          | Great Brook Estates      | Great Brook Estates OS Parcel #1     | 3.67   | Cons                   | Deed           |
| 2004          | Benfield Parcel A, Lot 4 | Benfield Conservation Land           | 25.68  | Cons                   | Town (CPA)     |
| 2006          | Greystone Crossing       | Greystone Crossing Conservation Land | 14.33  | Cons                   | Deed           |
| 2007          | Chestnut Estates         | Rangeway Conservation Land           | 8.15   | Cons                   | Deed           |
| 2009          | Bow Tie Lot              | Keystone Link                        | 1.0    | Cons                   | Town           |

Cons = Conservation, Rec = Recreation, Ag = Agriculture, OS = Open Space

T = Town, S = Commonwealth of Massachusetts, F = Federal, Deed = Deed from Cluster Zoning, CPA = Community Preservation Act

**Table 3: Commonwealth and Federal Lands in Carlisle**

| <b>Owner</b>                         | <b>Name</b>                                                                                                     | <b>Acres</b> |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------|
| <b>Commonwealth of Massachusetts</b> | Great Brook Farm State Park (GBFSP)<br>(includes 22-acre Carlisle Pines State Forest,<br>administered by GBFSP) | 998          |
| <b>U.S. Government</b>               | Great Meadows National Wildlife Refuge                                                                          | 321          |
| <b>Total Acres</b>                   |                                                                                                                 | <b>1,319</b> |

**Table 4: Carlisle Conservation Foundation (CCF) Lands (as of 31 December 2012)**

| Land Name                                                          | Location                      | Year(s) Acquired | Acres         | CR  | Map-Parcel-Lot         |
|--------------------------------------------------------------------|-------------------------------|------------------|---------------|-----|------------------------|
| <b>CARLISLE</b>                                                    |                               |                  |               |     |                        |
| Spencer Brook Reservation                                          | off West Street               | 1960, 1962       | 31.5          |     | 5-11-0, 5-12-0, 5-14-0 |
| Pages Brook Reservation                                            | off Maple Street              | 1966             | 6             |     | 13-86-0                |
| Ryan                                                               | off Acton Street              | 1967             | 9             |     | 18-14-0                |
| Swanson Land                                                       | Curve Street                  | 1979             | 2.8           |     | 19-38B-0               |
| Bates Farm Lot                                                     | Bedford Road                  | 1982             | 6             | #38 | 22-73-G                |
| Ember Lane Cluster                                                 | end of Ember Lane             | 1985             | 20.85         |     | 27-8-A&B               |
| Pines Woodlot                                                      | off Curve Street              | 1986             | 10.4          |     | 29-3-0                 |
| Suffolk Lane Lot                                                   | Suffolk Lane                  | 1991             | 0.24          |     | 10-28-P                |
| Clark Woodlot                                                      | off Morse Road                | 1995             | 8.8           |     | 27-9-0                 |
| Malcolm Preserve (w/TTOR)                                          | Stearns Street                | 1996             | 10.61         | #53 | 9-29-1A                |
| Holmes-Avery                                                       | off Kimball Road              | 1997             | 5.37          |     | 29-32-10E              |
| Poole Swamp                                                        | School Street                 | 1998             | 14.5          | #54 | 8-1-0                  |
| Fleming Open Space                                                 | off 662 West Street           | 1999, 2001       | 5.52          |     | 6-63-A                 |
| Erickson                                                           | off 237 Fiske Street          | 2000             | 3.79          |     | 29-19-A                |
| Ben's Woods                                                        | off West Street and Pope Road | 2000, 2005       | 48.68         | #48 | 5-17-X, 5-19-B         |
| Benfield Hill                                                      | off West Street               | 2000, 2005       | 12.5          | #46 | 6-52-0, 6-53-0         |
| Taylor                                                             | off West Street               | 2001             | 3.42          |     | 6-61-2                 |
| Pannell                                                            | West Street                   | 2001             | 11.53         |     | 6-66-1 & 6-60-X        |
| Cote-Foster                                                        | Acton Street – Acton Line     | 2004             | 5.47          |     | 17-23-35               |
| McCormick Connector                                                | off Bellows Hill Road         | 2004             | 0.18          | #10 | 2-24-1                 |
| Bose Property                                                      | Bedford Road                  | 2012             | 0.21          |     | 11-8A-0                |
| <b>Carlisle Total</b>                                              |                               |                  | <b>217.37</b> |     |                        |
| <b>BILLERICA</b>                                                   |                               |                  |               |     |                        |
| Greenough                                                          | off Pauline Road              | 1972             | 8.22          |     | 93-1-0                 |
| <b>WESTFORD</b>                                                    |                               |                  |               |     |                        |
| MacAfee Land                                                       | off Westford line             | 1989             | 0.73          |     |                        |
| <b>Approximate Total</b>                                           |                               |                  | <b>226.33</b> |     |                        |
| CR = Conservation Restriction, TTOR = The Trustees of Reservations |                               |                  |               |     |                        |

**Table 5: Properties with Conservation Restrictions (CRs) (as of 31 December 2012)**

| Year | CR# | Grantor                                        | Grantee | Acres                | Town land | Land Trust owned/public | Private              | Comments                         |
|------|-----|------------------------------------------------|---------|----------------------|-----------|-------------------------|----------------------|----------------------------------|
| 1974 | 1   | J. & W. Davis                                  | Town    | 17.50                |           |                         | 17.50                | amended by CR #34                |
| 1975 | 2   | Valentine & Bridges                            | Town    | 4.00                 |           |                         | 4.00                 |                                  |
| 1975 | 3   | Bickford & Simonds                             | Town    | 8.10                 |           |                         | 8.10                 |                                  |
| 1976 | 4   | E.W. Chase                                     | Town    | 0.54                 |           |                         | 0.54                 |                                  |
| 1976 | 5   | A.E. Benfield                                  | Town    | [12.50] <sup>1</sup> |           | [12.50] <sup>1</sup>    |                      | superseded by CR #46             |
| 1977 | 6   | A.E. Benfield                                  | Town    | [16.01] <sup>1</sup> |           | [16.01] <sup>1</sup>    |                      | superseded by CR #48             |
| 1978 | 10  | E. & J. Bartlett                               | Town    | 49.30                |           | 0.18                    | 49.12                |                                  |
| 1979 | 11  | J.R. Yonts, M.W. Davis                         | Town    | 23.20                |           |                         | 23.20                |                                  |
| 1981 | 12  | Grant & Helene Wilson                          | CCF     | 9.90                 |           |                         | 9.90                 |                                  |
| 1982 | 13  | Four Seasons Development                       | Town    | 3.01                 |           |                         | 3.01                 | Local CR, recalled from state    |
| 1982 | 14  | Grant & Helene Wilson                          | CCF     | 9.00                 |           |                         | 9.00                 |                                  |
| 1983 | 15  | Charles R. Rolando                             | Town    | 5.70                 |           |                         | 5.70                 |                                  |
| 1983 | 17  | C.R.Rolando, Riverloft Tr.                     | Town    | 2.50                 |           |                         | 2.50                 |                                  |
| 1983 | 18  | Grant & Helene Wilson                          | CCF     | 27.50                |           |                         | 27.50                |                                  |
| 1988 | 21  | L.J. Selig Company, Inc.                       | Town    | 0.20                 |           |                         | 0.20                 |                                  |
| 1988 | 22  | Carlisle Dev. Co., Inc.                        | Town    | 0.31                 |           |                         | 0.31                 | trail easement                   |
| 1989 | 23  | Fleming Corp.                                  | Town    | 1.40                 |           |                         | 1.40                 |                                  |
| 1989 | 24  | H.Raymond Goodman, Trustee                     | Town    | 0.25                 |           |                         | 0.25                 | trail easement                   |
| 1992 | 25  | Dudley & Bonnie Cunningham                     | Town    | 0.17                 |           |                         | 0.17                 | trail easement                   |
| 1990 | 26  | Mary-Wynne Berrong Davis                       | Town    | 3.00                 |           |                         | 3.00                 | w/trail easement                 |
| 1991 | 27  | Hayes Farm Partnership                         | Town    | 0.54                 |           |                         | 0.54                 | trail easement, trail incomplete |
| 1991 | 28  | Charles Boiteau                                | Town    | 7.61                 | 7.05      |                         | 0.56                 | Local CR, Town-owned             |
| 1992 | 29  | Senkler                                        | Town    | 2.40                 |           |                         | 2.40                 | trail easement                   |
| 1995 | 30  | Fifield & Susan Workum                         | Town    | 21.40                |           |                         | 21.40                |                                  |
| 1996 | 32  | Duane & Signy Johnstone                        | Town    | 6.00                 |           |                         | 6.00                 | w/trail easement                 |
| 1996 | 33  | John M. Swanson & William Costello, Trustees   | Town    | 19.40                |           |                         | 19.40                |                                  |
| 1996 | 33A | same as above                                  | Town    | 3.50                 |           |                         | 3.50                 | Local CR, w/public trails        |
| 1997 | 34  | James C. Davis, Jr. & Mary-Wynne Berrong Davis | Town    | [12.21] <sup>2</sup> |           |                         | [12.21] <sup>2</sup> | amended CR#1                     |
| 1996 | 35  | John W. Ballantine                             | Town    | [6.00] <sup>3</sup>  |           |                         | [6.00] <sup>3</sup>  | w/trail easement                 |
| 1997 | 36  | Town                                           | TTOR    | 126.40               | 126.40    |                         |                      | Davis Corridor                   |
| 1998 | 37  | Jonathan & Winifred Sachs                      | TTOR    | 44.40                |           |                         | 44.40                |                                  |
| 1999 | 38  | Seawright/Shohet/ Knight/CLT                   | CCF     | 13.60                |           | 6.00                    | 7.60                 | Bates Farm                       |
| 1999 | 39  | George S. Reichenbach                          | CCF     | 2.30                 |           |                         | 2.30                 |                                  |
| 1999 | 40  | Arthur & Elizabeth Milliken                    | TTOR    | 4.40                 |           |                         | 4.40                 |                                  |
| 2000 | 42  | Fred A. Rundlett                               | CCF     | 5.80                 |           |                         | 5.80                 |                                  |
| 2001 | 43  | John & Elizabeth Valentine                     | CCF     | 10.20                |           |                         | 10.20                |                                  |
| 2002 | 44  | Janet Lovejoy                                  | NEFF    | [20.20] <sup>4</sup> |           |                         | [20.20] <sup>4</sup> |                                  |
| 2001 | 45  | Nielsen & Baker Realty Trust                   | TTOR    | 0.75                 |           |                         | 0.75                 | w/trail easement                 |

CCF = Carlisle Conservation Foundation; TTOR = The Trustees of Reservations; CLT = Carlisle Land Trust; NEFF = New England Forestry Foundation

*continued on next page*

**Table 5: Properties with Conservation Restrictions (CRs) (as of 31 December 2012) (continued)**

| <i>continued from previous page</i> |     |                                           |                              |                      |              |                         |                      |                                                                                    |
|-------------------------------------|-----|-------------------------------------------|------------------------------|----------------------|--------------|-------------------------|----------------------|------------------------------------------------------------------------------------|
| Year                                | CR# | Grantor                                   | Grantee                      | Acres                | Town land    | Land Trust owned/public | Private              | Comments                                                                           |
| 2005                                | 46  | Cornish/Getchell, So. St. Nom. Trust      | Town                         | 12.50                |              | 12.50                   |                      | supersedes CR #5; Benfield Hill                                                    |
| 2005                                | 47  | Cornish/Getchell, So. St. Nom. Trust      | CCF                          | 72.41                |              |                         | 72.41                |                                                                                    |
| 2005                                | 48  | Cornish/Getchell, So. St. Nom. Trust /CCF | Town                         | 48.68                |              | 48.68                   |                      | portion supersedes CR #6; Ben's Woods                                              |
| 2003                                | 49  | Dorothy E. Clark, et al.                  | CCF                          | 9.70                 |              |                         | 9.70                 |                                                                                    |
| 2003                                | 50  | Grant M. Wilson                           | CCF                          | 54.00                |              |                         | 54.00                | w/trail easement                                                                   |
| 2002                                | 51  | Janet Lovejoy                             | NEFF                         | [35.70] <sup>4</sup> |              |                         | [35.70] <sup>4</sup> |                                                                                    |
| 2004                                | 52  | Town of Carlisle                          | TTOR                         | 67.35                | 67.35        |                         |                      | Estabrook Woods Buffer Lands                                                       |
| 2004                                | 53  | CCF/TTOR                                  | Town                         | 10.61                |              | 10.61                   |                      | Malcolm Preserve                                                                   |
| 2004                                | 54  | CCF                                       | Town                         | 14.5                 |              | 14.5                    |                      | Poole Swamp                                                                        |
| 2004                                | 55  | Parker/Baxter                             | CCF                          | 3.60                 |              |                         | 3.60                 |                                                                                    |
| 2007                                | 56  | Janet Lovejoy                             | NEFF                         | 63.43                |              |                         | 63.43                | amends & expands CRs #44 and #51                                                   |
| 2007                                | 57  | Town of Carlisle                          | CCF                          | 25.68                | 25.68        |                         |                      | Benfield Cons. Land                                                                |
| 2007                                | 58  | Town of Carlisle                          | CRT                          | 15.23                |              | 15.23                   |                      | CRT = Carlisle Recreation Trust                                                    |
| 2007                                | 59  | Ballantine                                | Town                         | 10.43                |              |                         | 10.43                | supersedes & expands CR #35; provides trail Easement, canoe landing, not yet built |
| 2006                                | 60  | Hilton                                    | CCF                          | 4.3                  |              |                         | 4.3                  | portions of 2 lots                                                                 |
| 2007                                | 62  | Stalker                                   | CCF                          | 5.62                 |              |                         | 5.62                 | public trail access                                                                |
| 2008                                | 63  | Valentine                                 | CCF                          | 105.0                |              |                         | 105.0                | public trail access, trail not yet built                                           |
| 2011                                | 64  | Richardson                                | Town                         | 4.1                  |              |                         | 4.1                  |                                                                                    |
|                                     |     | <b>Total acreages</b>                     |                              | <b>961.4</b>         | <b>226.5</b> | <b>107.7</b>            | <b>627.2</b>         |                                                                                    |
| 2000                                | *   | Ira Gould & Betsy Goldenberg              | Gt. Bk. Estates Home. Assoc. | 2.05                 |              |                         | 2.05                 | Recorded restriction/ Homeowners association                                       |
| 2001                                | *   | Town of Carlisle                          | Comm. of Mass.               | 34.45                | 34.45        |                         |                      | State Agricultural Preservation Restriction; Hutchins and Robbins Fields           |
| 1997                                | *   | Harvard College                           | TTOR                         | 94.63                |              |                         | 94.63                | Recorded Statement of Public Charitable Obligation; Estabrook Woods                |
|                                     |     | <b>Grand total acreages</b>               |                              | <b>1092.5</b>        | <b>260.9</b> | <b>107.7</b>            | <b>723.9</b>         |                                                                                    |

CCF = Carlisle Conservation Foundation; TTOR = The Trustees of Reservations; NEFF = New England Forestry Foundation  
<sup>1</sup> Acres in CRs #5 & #6 are not included in total acreages because they are included in the total acres in CRs #46 & #48, respectively.  
<sup>2</sup> Acres in CR #34 are not included in total acreages because they are included within the total acres in CR #1.  
<sup>3</sup> Acres in CR #35 are not included in total acreages because they are included within the total acres in CR #59.  
<sup>4</sup> Acres in CRs #44 & #51 are not included in total acreages because they are included within the total acres in CR #56.  
 \* Not technically a Conservation Restriction, but is provided with protection similar to a CR.

**Table 6: Lands in 61, 61A, or 61B**

| Owner                           | Location                       | 61 (acres)*   | 61A (acres)*  | 61B (acres)* | Map-Parcel-Lot                                    |
|---------------------------------|--------------------------------|---------------|---------------|--------------|---------------------------------------------------|
| Larsen                          | South Street                   | 16.00         |               |              | 5-56-X                                            |
| Cox                             | Wildwood Drive                 | 15.60         |               |              | 6-27-0                                            |
| Taylor                          | West Street                    | 62.44         |               |              | 6-48-X                                            |
| Talbot                          | Russell Street                 | 21.00         |               |              | 8-16-C                                            |
| Woodward/Doutriaux              | Bedford Road                   | 44.93         |               |              | 10-4-X                                            |
| Zoll                            | Baldwin Road,<br>School Street | 36.41         |               |              | 14-35-7, 14-36-0,<br>14-40-0, 14-43-6             |
| Reichenbach                     | West Street                    | 13.83         |               |              | 18-6-X                                            |
| Bay State Investment Trust      | Rockland Road                  | 59.90         |               |              | 20-4-X                                            |
| Senkler                         | off Curve Street               | 10.71         |               |              | 31-13-X                                           |
| Endicott                        | Prospect Street                |               | 12.05         |              | 1-22-A-0                                          |
| Hensleigh                       | West Street                    |               | 7.58          |              | 6-45-Y                                            |
| Taylor, J.                      | West Street                    |               | 2.53          |              | 6-46-Y                                            |
| Darling/MacCormack              | Cross Street                   |               | 8.03          |              | 7-21-A-1                                          |
| Woodward, D.                    | Bedford Road                   |               | 12.20         |              | 10-3-B                                            |
| Woodward, D.                    | Bedford Road                   |               | 2.05          |              | 10-17-Y                                           |
| House 3 Realty                  | Concord Street                 |               | 20.02         |              | 15-13-4                                           |
| Clark Farm LLC                  | Concord Street                 |               | 7.57          |              | 15-14-0                                           |
| Hamilton Family                 | Concord Street                 |               | 19.50         |              | 15-30-0                                           |
| Palmer                          | off Concord Street             |               | 5.00          |              | 15-34-Y                                           |
| Valentine                       | Acton Street                   |               | 24.89         |              | 17-18-15, 17-18-16,<br>17-18-17                   |
| Valentine                       | Acton & West Streets           |               | 5.46          |              | 17-19-14                                          |
| Valentine                       | Acton Street                   |               | 40.81         |              | 17-22-8, 17-22-9,<br>17-22-10, 17-22-11           |
| Valentine                       | Acton Street                   |               | 43.20         |              | 17-24-1, 17-24-2,<br>17-24-3, 17-24-4,<br>17-24-5 |
| Valentine                       | Acton & West Streets           |               | 17.67         |              | 18-23-6, 18-23-7                                  |
| Sorli                           | Westford Street                |               | 26.10         |              | 18-1-0                                            |
| Sorli                           | Westford Street                |               | 42.60         |              | 18-42-Y                                           |
| 201 Bedford Rd Partnership      | Bedford Road                   |               | 13.84         |              | 22-68-Y                                           |
| Shohet                          | Bedford Road                   |               | 9.90          |              | 22-69-E                                           |
| Japp                            | Bedford Road                   |               | 8.00          |              | 22-81-0                                           |
| Nosowitz/McNally                | Maple Street                   |               | 21.20         |              | 24-4-Y                                            |
| Blanchette                      | Rutland Street                 |               | 12.45         |              | 26-20-1                                           |
| Walsh                           | School Street                  |               |               | 5.01         | 8-1F-Z                                            |
| Jewell                          | Stearns Street                 |               |               | 2.00         | 14-14-2                                           |
| Jewell                          | Stearns Street                 |               |               | 4.50         | 14-17-21                                          |
| Zoll                            | Baldwin Road                   |               |               | 2.00         | 14-40-0                                           |
| Boiteau                         | Aberdeen Drive                 |               |               | 6.74         | 26-6L-Z                                           |
| Urban                           | North Road                     |               |               | 3.00         | 35-16-Z                                           |
| Urban                           | North Road                     |               |               | 18.41        | 35-21-Z                                           |
| Wraywood Realty Trust           | off Rutland Street             |               |               | 14.00        | 35-22-11                                          |
| <b>Total Acreage in Chapter</b> |                                | <b>280.82</b> | <b>362.65</b> | <b>55.66</b> |                                                   |

\*Acreage listed is only the area of the property in Chapter 61, 61A, or 61B, not necessarily the entire parcel acreage.

**Table 7: Seven-Year Action Plan Private Property Protection Priority List (≥10 acres, rounded)**

| Rank                                                                                                                                                                                                                                                                                                                                                  | Map 9 ID# | Owner                  | Location               | Acres         | 61 | 61A | 61B | Map-Parcel-Lot          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------|------------------------|---------------|----|-----|-----|-------------------------|
| 1                                                                                                                                                                                                                                                                                                                                                     | 1         | Elliott                | River Rd./Skelton Rd.  | 36.37         |    |     |     | 1-1-1A,1-1-1B,1-1-A2    |
| 1                                                                                                                                                                                                                                                                                                                                                     | 2         | West Isle/Kimball      | off Bedford Road       | 29.24         |    |     |     | 22-74-0                 |
| 1                                                                                                                                                                                                                                                                                                                                                     | 3         | Woodward/<br>Doutriaux | Bedford Road           | 44.93         | x  |     |     | 10-4-X                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 4         | Kiel                   | South Street           | 14.30         |    |     |     | 5-9-A                   |
| 1                                                                                                                                                                                                                                                                                                                                                     | 5         | Hannaford              | Prospect Street        | 25.77         |    |     |     | 2-4-0                   |
| 1                                                                                                                                                                                                                                                                                                                                                     | 6         | Anderegg               | Bedford Road           | 38.90         |    |     |     | 11-1-0                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 7         | Sorli                  | Westford Street        | 70.70         |    | p   |     | 18-1-0,18-42-Y          |
| 1                                                                                                                                                                                                                                                                                                                                                     | 8         | Talbot                 | Russell Street         | 36.00         | p  |     |     | 8-16-C                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 9         | Woodward, D.           | Bedford Road           | 14.20         |    | p   |     | 10-3-B                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 10        | 201 Bedford Rd Part    | Bedford Road           | 13.84         |    | x   |     | 22-68-Y                 |
| 1                                                                                                                                                                                                                                                                                                                                                     | 11        | Erickson               | Lowell Street          | 12.16         |    |     |     | 33-7-0                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 12        | White                  | South Street           | 13.64         |    |     |     | 7-8A-Z                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 13        | Frizzell               | East Riding Drive      | 19.55         |    |     |     | 23-58-0                 |
| 1                                                                                                                                                                                                                                                                                                                                                     | 14        | Bose                   | Skelton Road           | 10.60         |    |     |     | 11-8-6                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 15        | Hamilton               | Concord Street         | 21.50         |    | p   |     | 15-30-0                 |
| 1                                                                                                                                                                                                                                                                                                                                                     | 16        | Williams               | West Street            | 15.64         |    |     |     | 5-47-0                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 17        | Bay State Inv Trust    | Rockland Road          | 59.90         | x  |     |     | 20-4-X                  |
| 1                                                                                                                                                                                                                                                                                                                                                     | 18        | Zoll                   | School St./Baldwin Rd. | 42.60         | p  |     | p   | 14-40-0,14-43-6,14-35-7 |
| 1                                                                                                                                                                                                                                                                                                                                                     | 19        | Flannery               | off Baldwin Road       | 13.0          |    |     |     | 2-11-0                  |
|                                                                                                                                                                                                                                                                                                                                                       |           |                        |                        | <b>532.54</b> |    |     |     |                         |
| 2                                                                                                                                                                                                                                                                                                                                                     | 20        | Urban                  | North Road             | 21.41         |    |     | x   | 35-21-Z, 35-19-0        |
| 2                                                                                                                                                                                                                                                                                                                                                     | 21        | Rotondo                | Concord Street         | 22.80         |    |     |     | 8-10-B                  |
| 2                                                                                                                                                                                                                                                                                                                                                     | 22        | Ansara /Arnold         | Lowell Street          | 12.60         |    |     |     | 21-6-0                  |
| 2                                                                                                                                                                                                                                                                                                                                                     | 23        | Fields                 | Bedford Road           | 11.96         |    |     |     | 22-88-K, 22-88-L        |
| 2                                                                                                                                                                                                                                                                                                                                                     | 24        | The Four Corners       | West Street            | 11.08         |    |     |     | 17-25-4                 |
| 2                                                                                                                                                                                                                                                                                                                                                     | 25        | Japp                   | Bedford Road           | 10.00         |    | p   |     | 22-81-0                 |
| 2                                                                                                                                                                                                                                                                                                                                                     | 26        | Skelton Rd. LLC        | Skelton Road           | 14.03         |    |     |     | 1-2-A1,1-2-A2,1-2-A3    |
| 2                                                                                                                                                                                                                                                                                                                                                     | 27        | Zinke/Taylor           | Concord Street         | 10.00         |    |     |     | 4-3-0                   |
| 2                                                                                                                                                                                                                                                                                                                                                     | 28        | Meehan                 | Concord Street         | 12.00         |    |     |     | 4-11-0,4-21-0           |
| 2                                                                                                                                                                                                                                                                                                                                                     | 29        | Youn                   | Russell Street         | 10.89         |    |     |     | 8-18-1                  |
| 2                                                                                                                                                                                                                                                                                                                                                     | 30        | Wraywood               | off Rutland Street     | 14.00         |    |     | x   | 35-22-11                |
| 2                                                                                                                                                                                                                                                                                                                                                     | 31        | Cox                    | Wildwood Drive         | 21.00         | p  |     |     | 6-27-0                  |
| 2                                                                                                                                                                                                                                                                                                                                                     | 32        | Campbell               | River Road             | 9.80          |    |     |     | 1-7A-2                  |
| 2                                                                                                                                                                                                                                                                                                                                                     | 33        | Joss                   | South Street           | 11.80         |    |     |     | 4-40-BB                 |
| 2                                                                                                                                                                                                                                                                                                                                                     | 34        | Larsen Estate          | South Street           | 16.00         | x  |     |     | 5-56-X                  |
|                                                                                                                                                                                                                                                                                                                                                       |           |                        |                        | <b>218.41</b> |    |     |     |                         |
| <p>x = total property, p = partial property; Acreage is entire property acreage. Where properties listed are in Chapter 61, 61A, or 61B, they are marked with an x when the entire property is in Chapter. They are marked with a p when only part of the property is in Chapter.</p> <p style="text-align: right;"><i>continued on next page</i></p> |           |                        |                        |               |    |     |     |                         |

**Table 7: Seven-Year Action Plan Property Protection Priority List (≥10 acres, rounded) (continued)**

*continued from previous page*

| Rank                                                                                                                                                                                                                                                                                                              | Map 9 ID# | Owner                    | Location          | Acres         | 61 | 61A | 61B | Map-Parcel       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------|-------------------|---------------|----|-----|-----|------------------|
| 3                                                                                                                                                                                                                                                                                                                 | 35        | Blanchette               | Rutland Street    | 12.45         |    | x   |     | 26-20-1          |
| 3                                                                                                                                                                                                                                                                                                                 | 36        | Endicott                 | Prospect Street   | 14.05         |    | p   |     | 1-22A-0          |
| 3                                                                                                                                                                                                                                                                                                                 | 37        | Taylor                   | West Street       | 20.00         |    |     |     | 6-57-0           |
| 3                                                                                                                                                                                                                                                                                                                 | 38        | Cramer                   | Shady Brook Lane  | 15.89         |    |     |     | 22-79-BC         |
| 3                                                                                                                                                                                                                                                                                                                 | 39        | Longley                  | Nickles Lane      | 18.37         |    |     |     | 25-15-2          |
| 3                                                                                                                                                                                                                                                                                                                 | 40        | Briscoe                  | East Street       | 12.00         |    |     |     | 25-21-C          |
| 3                                                                                                                                                                                                                                                                                                                 | 41        | Danis/Andon              | Applegrove Lane   | 10.40         |    |     |     | 5-48-X           |
| 3                                                                                                                                                                                                                                                                                                                 | 42        | Carter                   | Brook Street      | 12.60         |    |     |     | 13-4-6           |
| 3                                                                                                                                                                                                                                                                                                                 | 43        | Dawson                   | River Road        | 9.60          |    |     |     | 1-9-3A           |
| 3                                                                                                                                                                                                                                                                                                                 | 44        | Koning                   | Acton Street      | 13.08         |    |     |     | 16-49-3          |
| 3                                                                                                                                                                                                                                                                                                                 | 45        | Wilson                   | Curve Street      | 12.32         |    |     |     | 19-39-X,19-40-10 |
| 3                                                                                                                                                                                                                                                                                                                 | 46        | Lind                     | Mill Pond Lane    | 14.49         |    |     |     | 31-13A-0         |
| 3                                                                                                                                                                                                                                                                                                                 | 47        | Hernandez                | West Street       | 10.16         |    |     |     | 6-50-0           |
|                                                                                                                                                                                                                                                                                                                   |           |                          |                   | <b>175.41</b> |    |     |     |                  |
| 4                                                                                                                                                                                                                                                                                                                 | 48        | Reichenbach              | West Street       | 13.83         | x  |     |     | 18-6-X           |
| 4                                                                                                                                                                                                                                                                                                                 | 49        | Senkler                  | off Curve Street  | 10.71         | x  |     |     | 31-13-X          |
| 4                                                                                                                                                                                                                                                                                                                 | 50        | Hensleigh/Quinn          | West Street       | 12.11         |    | x   |     | 6-45-Y,6-45-0    |
| 4                                                                                                                                                                                                                                                                                                                 | 51        | Renfroe                  | South Street      | 18.30         |    |     |     | 7-40-0           |
| 4                                                                                                                                                                                                                                                                                                                 | 52        | Brem                     | Long Ridge Road   | 11.84         |    |     |     | 1-72-33K         |
| 4                                                                                                                                                                                                                                                                                                                 | 53        | Spanbauer/<br>O'Sullivan | School Street     | 10.81         |    |     |     | 8-27E-8          |
| 4                                                                                                                                                                                                                                                                                                                 | 54        | Jewell                   | Stearns Street    | 10.00         |    |     | x   | 14-14-2,14-17-21 |
| 4                                                                                                                                                                                                                                                                                                                 | 55        | Brophy                   | West Street       | 10.25         |    |     |     | 6-66-0           |
| 4                                                                                                                                                                                                                                                                                                                 | 56        | Battista                 | North Road        | 13.10         |    |     |     | 36-20-0          |
| 4                                                                                                                                                                                                                                                                                                                 | 57        | Bakewell                 | Rutland Street    | 10.60         |    |     |     | 36-24D-3D        |
| 4                                                                                                                                                                                                                                                                                                                 | 58        | Koski                    | Nathan Lane       | 10.06         |    |     |     | 20-23-0          |
| 4                                                                                                                                                                                                                                                                                                                 | 59        | Lucier                   | North Road        | 11.00         |    |     |     | 36-7B-8          |
| 4                                                                                                                                                                                                                                                                                                                 | 60        | Valchuis                 | Berry Corner Lane | 13.42         |    |     |     | 6-1-0            |
| 4                                                                                                                                                                                                                                                                                                                 | 61        | Darling/<br>MacCormack   | Cross Street      | 10.03         |    | p   |     | 7-21-A           |
|                                                                                                                                                                                                                                                                                                                   |           |                          |                   | <b>166.06</b> |    |     |     |                  |
| <p><b>x</b> = total property, <b>p</b> = partial property; Acreage is entire property acreage. Where properties listed are in Chapter 61, 61A, or 61B, they are marked with an <b>x</b> when the entire property is in Chapter. They are marked with a <b>p</b> when only part of the property is in Chapter.</p> |           |                          |                   |               |    |     |     |                  |

**Table 8: Open Space Created by Conservation Cluster Developments**

| Development                                                                                                                                                                                                                                                                                                        | Year | Number of Lots | Total Acreage | Open Space Acreage | Percent (%) Protected | CR  | Open Space Owner                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------|---------------|--------------------|-----------------------|-----|---------------------------------------------------------------------|
| Ember Lane                                                                                                                                                                                                                                                                                                         | 1983 | 5              | 35            | 20.8               | 59                    |     | CCF                                                                 |
| Clark Farm                                                                                                                                                                                                                                                                                                         | 1986 | 4              | 80            | 43                 | 54                    | #50 | House 3 Realty Trust                                                |
| Ice Pond                                                                                                                                                                                                                                                                                                           | 1989 | 7              | 23            | 7.05               | 30                    | #28 | Town                                                                |
| Fifield Workum                                                                                                                                                                                                                                                                                                     | 1992 | 3              | 30            | 21.4               | 70                    | #30 | Greenough Pond Realty Trust                                         |
| Rockstrom                                                                                                                                                                                                                                                                                                          | 1998 | 3              | 17            | 7.55               | 44                    | #52 | Town                                                                |
| Buttrick Woods                                                                                                                                                                                                                                                                                                     | 1999 | 13             | 43            | 13.97              | 32                    | #52 | Town                                                                |
| High Woods                                                                                                                                                                                                                                                                                                         | 1999 | 5              | 17.6          | 5.52               | 31                    |     | CCF                                                                 |
| Hart Farm Estates*                                                                                                                                                                                                                                                                                                 | 2000 | 12             | 44            | 13.54              | 31                    |     | Town                                                                |
| Great Brook Estates                                                                                                                                                                                                                                                                                                | 2000 | 6              | 18.9          | 5.72               | 30                    | **  | GBE 1 (3.67 acres) – Town<br>GBE 2 (2.05 acres) – Homeowners Assoc. |
| Greystone Crossing                                                                                                                                                                                                                                                                                                 | 2006 | 15             | 47.3          | 14.33              | 30                    |     | Town                                                                |
| Chestnut Estates                                                                                                                                                                                                                                                                                                   | 2007 | 7              | 25.9          | 8.15               | 31                    |     | Town                                                                |
| <b>Total</b>                                                                                                                                                                                                                                                                                                       |      | <b>80</b>      | <b>381.7</b>  | <b>161.03</b>      | <b>42</b>             |     |                                                                     |
| CCF = Carlisle Conservation Foundation; CR = Conservation Restriction; GBE = Great Brook Estates<br>* An additional 65 acres of open space was donated to the Town in 2000 in conjunction with this development.<br>** Not technically a Conservation Restriction, but is provided with protection similar to a CR |      |                |               |                    |                       |     |                                                                     |

**Table 9: Properties of the Greater Estabrook Woods in Carlisle**

| <b>Owner</b>                                     | <b>Name</b>                      | <b>Acres</b> |
|--------------------------------------------------|----------------------------------|--------------|
| <b>Town of Carlisle</b>                          | Malcolm Land                     | 22.90        |
|                                                  | Carr Land                        | 6.08         |
|                                                  | Deacon Land                      | 7.51         |
|                                                  | Rockstrom Conservation Land      | 7.55         |
|                                                  | Sachs Greenway                   | 9.34         |
|                                                  | Buttrick Woods Conservation Land | 13.97        |
|                                                  | Davis Corridor                   | 126.40       |
|                                                  | <b>Total Town Acres</b>          | <b>194.0</b> |
| <b>Carlisle Conservation Foundation</b>          | Poole Swamp                      | 14.50        |
|                                                  | Malcolm Preserve (with TTOR)     | 10.61        |
|                                                  | <b>Total CCF Acres</b>           | <b>25.1</b>  |
| <b>Private Owner with Permanent Restrictions</b> | Bartlett Farm                    | 49.3         |
|                                                  | Sachs                            | 44.4         |
|                                                  | Harvard College                  | 94.63        |
|                                                  | Milliken                         | 4.4          |
|                                                  | Nielsen/Baker                    | 0.8          |
|                                                  | <b>Total Private Acres</b>       | <b>193.5</b> |
| <b>Greater Estabrook Woods</b>                   | <b>Total Acreage</b>             | <b>412.6</b> |
| TTOR = The Trustees of Reservations              |                                  |              |

**Table 10: Town-owned Conservation and Recreation Properties and Facilities in Carlisle**

| Name of Property                     | Managed by     | Current Use                                                                                                                      | Description/Condition                                                                                                    | Rec Potential               | Public Access                                                                             | Grant Type                    | Zoning | Degree of Protection                |
|--------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------|-------------------------------|--------|-------------------------------------|
| Banta-Davis Land                     | RecCom, School | Baseball field, softball field, all-purpose field, track, fitness cluster; reserved rights for municipal use/school expansion.   | Partially undeveloped, well-maintained athletic fields and track                                                         | Yes, more active rec fields | Paved road from Bedford Rd, gravel parking lot, from Church St & Spalding Field via trail | Town                          | B      | None                                |
| Benfield Conservation Land           | ConsCom        | Hiking, bird watching, viewing platform; well/leach field for affordable housing.                                                | Open meadow (mowed periodically), wetlands, woods                                                                        | Passive rec.                | From South St via trail/service road, parking planned on Lot 1                            | Town (CPA)                    | B, WFH | Article 97, CR                      |
| Benfield Rec Land                    | RecCom         | Wildlife habitat                                                                                                                 | Forested rough terrain; land not developed                                                                               | Active rec                  | From South St via trail; parking planned on Lot 1                                         | Town                          | B      | CR held by Rec Trust                |
| Bisbee Land                          | ConsCom        | Ag license; rough forested trail                                                                                                 | Field, wetlands, forest                                                                                                  | Passive rec                 | From Concord St, roadside parking                                                         | Town                          | B, WFH | Art 97, Ch.40 S.8C                  |
| Buttrick Woods Cons Ld               | ConsCom        | Wildlife corridor                                                                                                                | Rural woodland                                                                                                           | Passive rec                 | Allowed but no access built yet from Concord St                                           | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C; CR              |
| Carlisle School                      | School         | Corey Gym, paved play plaza, Carlisle Castle, playground, tennis courts (all used by RecCom)                                     | Recent renovation and new construction                                                                                   | Active rec                  | From School St & Church St, parking on Church St & school parking lot                     | Town, State                   | A      | N/A                                 |
| Carr Land                            | ConsCom        | Rough trail                                                                                                                      | Rural woodlands, stream                                                                                                  | Passive rec                 | From Bellows Hill Rd & Rockstrom Land via trail                                           | Town                          | B      | Art 97, Ch.40 S.8C; CR              |
| Center Park                          | Selectmen      | Walking, sitting on benches; parking                                                                                             | Landscaped; CPA funds for improvements                                                                                   | Passive rec                 | From Lowell St, small parking lot                                                         | Town; pvt for landscape       | CB     | None                                |
| Conant Land                          | Selectmen      | Trails, XC skiing, youth and educational activities; watershed protection                                                        | Forested very rough terrain, wetlands, vernal pool                                                                       | Passive rec                 | From Rockland Rd & Town Hall via trails, parking at Town Hall                             | Town                          | B, WFH | None                                |
| Cranberry Bog                        | ConsCom        | Ag lease, house/barn for Ag use/residence; trails for horses, hiking, XC skiing, dog walking; interpretative signs               | Historic bog house recently stabilized, dike breach repaired.                                                            | Passive rec                 | From Curve St & Fiske St, Some parking along Curve St, a few spaces at bog house          | Town (CPA for bog house work) | B, WFH | Art 97, Ch.40 S.8C                  |
| Davis Corridor                       | ConsCom        | Rough trails for hiking, XC skiing, horses                                                                                       | Rural woodlands, swamps, stream, vernal pool                                                                             | Passive rec                 | From Bedford Rd, Stearns St, & Knollwood development, parking at Malcolm Meadows          | Town, State, Deed/gift        | B, WFH | Art 97; Ch.40 S.8C; CR              |
| Deacon Land                          | ConsCom        | Wildlife habitat                                                                                                                 | Wetland, rural woodland, marsh                                                                                           | Passive rec                 | None developed                                                                            | Town                          | B, WFH | Art 97, Ch.40 S.8C, CR              |
| Diment Park (at School)              | RecCom         | Tot lot playground                                                                                                               | Minor repairs scheduled                                                                                                  | Active rec                  | From Church St                                                                            | Town                          | A      | None                                |
| Fisk Meadow                          | ConsCom        | Ag license, farmland                                                                                                             | Field, forested wetland                                                                                                  | Passive rec                 | From Lowell St                                                                            | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Foss Farm                            | ConsCom        | Ag license, fields, pony rings, community gardens, trails, nature walks, sled-dog training, Scout activities; interpretive signs | NHESP species of special concern; State-listed Native American site; invasive plant removal pilot project                | Passive rec                 | From Bedford Rd, large sand-gravel parking lot                                            | Town, State, Federal          | B, WFH | Art 97, Ch.40 S.8C, Exec. Order 193 |
| Fox Hill                             | ConsCom        | Ag license, hay field, vegetables and fruit trees; school XC training                                                            | Cultivated open field, edge clearing, forest margin, forested wetlands                                                   | Passive rec                 | From Stearns St                                                                           | Town                          | B, WFH | Art 97, Ch.40 S.8C                  |
| Gage Woodland                        | ConsCom        | Trails, wildlife habitat                                                                                                         | Rural woodland, upland forest                                                                                            | Passive rec                 | From GBFSP, access easement over private land                                             | Deed/gift                     | B      | Art 97                              |
| Grt Brk Estates O.S. #1              | ConsCom        | Rough trails connected to state park trails                                                                                      | Rural woodland                                                                                                           | Passive rec                 | Via trail; no parking                                                                     | Deed/gift                     | B      | Art 97                              |
| Greenough Land                       | ConsCom        | Trails, nature walks, XC skiing, horses, Ag license; interpretive signage                                                        | Failing dam, deteriorating barn; vista, woodland, fields, ponds, rare species habitat, vernal pool                       | Passive rec                 | From Maple St via 5 trails, from GMNWR via 2 trails, 2 small gravel parking lots          | Town, State, Federal          | B, WFH | Art 97, Ch.40 S.8C, Exec. Order 193 |
| Greystone Crossing Conservation Land | ConsCom        | Trail, pathway                                                                                                                   | Rural woodland, rough terrain                                                                                            | Passive rec                 | From Bingham Rd, Cross St, & Greystone development                                        | Deed/gift                     | B      | Art 97, Ch.40 S.8C                  |
| Hart Farm Cons Land                  | ConsCom        | Rough trails                                                                                                                     | Forested wetlands, vernal pool                                                                                           | Passive rec                 | Trailhead parking on Hart Farm Rd                                                         | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Heidke Land                          | ConsCom        | Short dead-end trail from Town Forest                                                                                            | Wetland                                                                                                                  | Passive rec                 | From Brook St, Town Forest, no developed access                                           | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Hutchins/Robbins Fields              | ConsCom        | Ag license                                                                                                                       | Fields                                                                                                                   | No (APR)                    | Roadside parking on Curve St                                                              | Town, State                   | B      | Art 97, Ch.40 S.8C; APR             |
| Ice Pond Cons Land                   | ConsCom        | Short trail                                                                                                                      | Forested wetlands                                                                                                        | Passive rec                 | From Ice Pond Rd & Aberdeen Dr                                                            | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C; CR              |
| Keystone Link                        | ConsCom        | Trail                                                                                                                            | Forest                                                                                                                   | Passive rec                 | From West St via trail                                                                    | Town                          | B      | Art 97, Ch.40 S.8C                  |
| MacAfee Land                         | ConsCom        | Rough forested trail                                                                                                             | Forest                                                                                                                   | Passive rec                 | From Kimball Rd via trail                                                                 | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Macone Property                      | ConsCom        | Wildlife habitat                                                                                                                 | Swampland                                                                                                                | Passive rec                 | None                                                                                      | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Malcolm Land                         | Town           | Trails                                                                                                                           | Forest                                                                                                                   | Passive rec                 | From Malcolm Meadows parking area via trail                                               | Town, State, Deed/gift        | B, WFH | Art 97, Ch.40 S.8C                  |
| Mannis Land                          | ConsCom        | Rough trails                                                                                                                     | Forested wetlands and uplands, vernal pool                                                                               | Passive rec                 | From North Rd & Rutland St                                                                | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Rangeway Cons Land                   | ConsCom        | Trail                                                                                                                            | Rural woodlands, vernal pool                                                                                             | Passive rec                 | From Chestnut Estates development via trail                                               | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Rockstrom Cons Land                  | ConsCom        | Rough trail                                                                                                                      | Rural woodland, wetland                                                                                                  | Passive rec                 | From School St via trail                                                                  | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C; CR              |
| Sachs Greenway                       | ConsCom        | Rough trail, hiking, biking, XC skiing                                                                                           | Rural woodland, wetland                                                                                                  | Passive rec                 | From Baldwin Rd via trail                                                                 | Town                          | B, WFH | Art 97, Ch.40 S.8C; CR              |
| Spalding Field                       | RecCom, School | 3 ball fields (also used for soccer, field hockey)                                                                               | Well-maintained athletic fields                                                                                          | Passive rec                 | From Church St, parking spaces, trail to Banta-Davis                                      | Town                          | B      | None                                |
| Swanson Land                         | ConsCom        | Rough trail                                                                                                                      | Wetland                                                                                                                  | Passive rec                 | Not developed for trails                                                                  | Deed/gift                     | B, WFH | Art 97, Ch.40 S.8C                  |
| Swanson Family Land                  | ConsCom        | Rough trails                                                                                                                     | Rural woodland                                                                                                           | Passive rec                 | From Barnes Pl via trail, limited parking                                                 | Deed/gift                     | B      | Art 97, Ch.40 S.8C                  |
| Towle Land                           | ConsCom        | Trails, walking, XC skiing, nature walks; Ag license for maple tree tapping                                                      | Upland forest, some wetland, vernal pools, large field w/poison ivy, invasive buckthorn; deteriorating dam; mowed fields | Passive rec                 | From Westford St, parking lot; From Bingham Rd via trail, roadside parking                | Town, State, Federal          | B, WFH | Art 97, Ch.40 S.8C                  |
| Town Forest                          | ConsCom        | Trails, hiking, camping                                                                                                          | Slash and downed trees/limbs after storms; NHESP rare species and core habitat, vernal pools, wetland, forest plantation | Passive rec                 | From East St via trail, roadside parking                                                  | Town                          | B, WFH | Article 97                          |
| Town Hall                            | Town           | Meeting rooms used by RecCom for classes                                                                                         | Limited space                                                                                                            | Classes                     | From Westford St, parking lot                                                             | Town                          | A      | N/A                                 |

Grt Brk Estates O.S. #1 = Great Brook Estates Open Space Parcel #1; Ld = Land; Ag = Agricultural; Rec = Recreation; Cons = Conservation; Com = Commission; XC = Cross-country; CPA = Community Preservation Act; NHESP = Natural Heritage & Endangered Species Program; APR = Agricultural Preservation Restriction  
 GMNWR = Great Meadows National Wildlife Refuge; GBFSP = Great Brook Farm State Park; CR = Conservation Restriction; A = Residence District A; B = Residence District B; CB = Central Business District; WFH = Wetland/Flood Hazard District

**Table 11: Accessibility of Conservation and Recreation Lands in Carlisle**

| Name of Property                     | Accessibility |       |              |     | Comments                                                                                                                    | Survey date      | Transition Plan                                                                                                                                                                                                | Schedule | Responsible Parties                |
|--------------------------------------|---------------|-------|--------------|-----|-----------------------------------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------|
|                                      | Parking       | Signs | OPDMD        | Alt |                                                                                                                             |                  |                                                                                                                                                                                                                |          |                                    |
| Banta-Davis Land                     | Yes           | No    | 1&2          | Yes | Generally accessible fields; accessible portable toilet                                                                     | 2013-2014        | Regrade parking; mark HP spaces; improve signage as necessary; evaluate ramps for exercise course                                                                                                              | TBD      | RecCom, Schools, DPW               |
| Benfield Conservation Land           | No            | No    | NA           | Yes | Service road & field trail; field wet and not accessible for thin-wheeled vehicles in spring                                | 2014-2015        | Develop signage after completion of housing                                                                                                                                                                    | TBD      | ConsCom                            |
| Benfield Rec. Land                   | No            | No    | NA           | Yes | Not scheduled for development                                                                                               |                  | None                                                                                                                                                                                                           |          |                                    |
| Bisbee Land                          | No            | Yes   | 2            | No  | Trail is in hay field; rest is rough terrain & wetland                                                                      | Fall 2013        | Evaluate parking and possible ramp from parking area; evaluate signage needs                                                                                                                                   | TBD      | ConsCom, DPW                       |
| Buttrick Woods Conservation Land     | No            | No    | NA           | No  | Not developed; wildlife corridor only                                                                                       |                  | None                                                                                                                                                                                                           |          |                                    |
| Carlisle School                      | Yes           | Yes   | 1            | Yes | Parking and play areas are accessible; lower parking lot access scheduled for accessibility upgrade                         |                  | Repaving of lower lot and accessibility improvements scheduled                                                                                                                                                 | TBD      | Schools, DPW                       |
| Carr Land                            | No            | No    | NA           | No  | Landlocked parcel; access trails rough, wet, steep                                                                          |                  | None                                                                                                                                                                                                           |          |                                    |
| Center Park                          | Yes           | No    | NA           | Yes | Small park with grass surface; accessible parking lot                                                                       |                  | None                                                                                                                                                                                                           |          |                                    |
| Conant Land                          | Yes           | Yes   | 2            | Yes | Access on grass trail to memorial garden; rest is steep                                                                     |                  | Evaluate kiosk and signage                                                                                                                                                                                     | TBD      | ConsCom, LSC, DPW, BOS             |
| Cranberry Bog                        | Yes           | Yes   | 1            | Yes | Interpretive signage; potential for accessible use with service roads between bog areas, but needs compactible surface      | Summer-fall 2013 | Regrade parking and service roads; make interpretive signage accessible; amend rounded gravel surface on dike access road/trail for firmer surface                                                             | TBD      | ConsCom, LSC, DPW, Bog leaseholder |
| Davis Corridor                       | No            | No    | 1&2          | Yes | Rocky, with wetlands & forest terrain; difficult to access; some trails with many roots                                     |                  | None                                                                                                                                                                                                           |          |                                    |
| Deacon Land                          | No            | No    | NA           | No  | Mostly wetland landlocked parcel; no trails                                                                                 |                  | None                                                                                                                                                                                                           |          |                                    |
| Diment Park                          | Yes           | Yes   | NA           | Yes | For children age 2 and under, in need of repair                                                                             |                  | Consider improving accessibility, even if not ADA-compliant, during repairs                                                                                                                                    | TBD      | RecCom                             |
| Fisk Meadow                          | No            | Yes   | NA           | No  | Conservation only; totally wetland; no access; no trails                                                                    |                  | None                                                                                                                                                                                                           |          |                                    |
| Foss Farm                            | Yes/No        | Yes   | 1&2          | Yes | Sandy service road to Community Gardens is difficult for thin-wheeled vehicles; land mostly flat; HP parking area is sandy  | Summer 2013      | Resurface HP parking area; regrade service road from HP parking area to trail; trim shrubs near signage kiosk; evaluate additional signage needs; create wheelchair-accessible raised bed in community gardens | TBD      | ConsCom, LSC, DPW                  |
| Fox Hill                             | No            | No    | 3            | No  | Hay field and garden; dirt & tall grass; hard to navigate                                                                   |                  | None                                                                                                                                                                                                           |          |                                    |
| Gage Woodland                        | No            | No    | NA           | No  | Landlocked parcel; partial trail with many roots and stones                                                                 |                  | None                                                                                                                                                                                                           |          |                                    |
| Grt Brk Estates O.S. #1              | No            | No    | NA           | No  | A steep, single track trail leading to GBFSP                                                                                |                  | None                                                                                                                                                                                                           |          |                                    |
| Greenough Land                       | Yes           | Yes   | 2            | No  | Access thru Billerica possible for fishing and picnic area, but parking, dam, and barn repairs needed                       | 2013-2015        | Regrade parking and create HP spot with signage; move existing signage to make accessible                                                                                                                      | TBD      | ConsCom, LSC, DPW, BOS             |
| Greystone Crossing Conservation Land | No            | No    | 1 (path-way) | No  | Accessible paved pathway along Cross Street; trail access via easements on private roads; trail is rough and steep in parts |                  | Evaluate signage                                                                                                                                                                                               | TBD      | Trails Committee                   |
| Hart Farm Conservation Land          | Yes           | No    | NA           | No  | Trails in woods are often wet, with many roots; stone wetland crossing is uneven                                            |                  | None                                                                                                                                                                                                           |          |                                    |
| Heidke Land                          | No            | Yes   | NA           | No  | Parcel is all wetland, no access; wildlife corridor                                                                         |                  | None                                                                                                                                                                                                           |          |                                    |
| Hutchins/Robbins Fields              | No            | No    | NA           | No  | Plowed field rough, not suitable for vehicles                                                                               |                  | None                                                                                                                                                                                                           |          |                                    |
| Ice Pond Cons Land                   | No            | Yes   | NA           | No  | Trail to GBFSP is single track w/roots/rocks                                                                                |                  | None                                                                                                                                                                                                           |          |                                    |
| Keystone Link                        | No            | Yes   | NA           | Yes | Landlocked parcel; connects steep trail segments                                                                            |                  | None                                                                                                                                                                                                           |          |                                    |
| MacAfee Land                         | No            | Yes   | NA           | No  | Single-track wood chip trail, soft & wet with roots                                                                         |                  | None                                                                                                                                                                                                           |          |                                    |
| Macone Property                      | No            | No    | NA           | NA  | Landlocked wetland parcel                                                                                                   |                  | None                                                                                                                                                                                                           |          |                                    |
| Malcolm Land                         | Yes           | Yes   | 1            | Yes | Accessible trail needs repairs/weeding; paths OK for wheelchairs, not motorized vehicles                                    | Summer 2013      | Repair wood sides of trail as needed; improve signage                                                                                                                                                          | TBD      | ConsCom, TTOR                      |
| Mannis Land                          | No            | No    | NA           | No  | Wet in places; loose soils, ledge outcroppings                                                                              |                  | None                                                                                                                                                                                                           |          |                                    |
| Rangeway Cons Land                   | No            | No    | 2            | No  | Terrain, ledge, and wetlands preclude access                                                                                |                  | None                                                                                                                                                                                                           |          |                                    |
| Rockstrom Cons Land                  | No            | Yes   | NA           | No  | Steep, narrow & sometimes wet, with boulders and ledge                                                                      |                  | None                                                                                                                                                                                                           |          |                                    |
| Sachs Greenway                       | No            | No    | NA           | No  | Trail wet and overgrown with stones and roots                                                                               |                  | None                                                                                                                                                                                                           |          |                                    |
| Spalding Field                       | Yes           | No    | 1            | Yes | Sports fields; accessible boardwalk under development                                                                       |                  | Evaluate signage; engineer & construct boardwalk through wetlands to recreation facilities at Banta-Davis                                                                                                      | TBD      | RecCom, Schools, Trails            |
| Swanson Land                         | No            | No    | NA           | No  | No access; mostly wetland                                                                                                   |                  | None                                                                                                                                                                                                           |          |                                    |
| Swanson Family Land                  | Yes           | No    | NA           | No  | Trail to Carlisle Pines State Park is rocky and narrow                                                                      |                  | None                                                                                                                                                                                                           |          |                                    |
| Towle Land                           | Yes           | Yes   | 2            | Yes | Parking lot uneven, does not lead to accessible trail; field may be accessible; trails in woods steep with ledge & roots    | Summer-fall 2014 | Regrade parking lot; investigate location for possible new parking area near farmer's entrance for better access to field; evaluate signage and kiosk; evaluate access to field; treat poison ivy              | TBD      | ConsCom, LSC, DPW, BOS             |
| Town Forest                          | No            | No    | 2            | No  | Trails wide with smooth woodland surfaces, mostly free of rocks & roots; steep entry trail from road precludes access       |                  | None                                                                                                                                                                                                           |          |                                    |
| Town Hall                            | Yes           | No    | NA           | Yes | Building accessible; paved parking with HP spaces                                                                           | Summer 2014      | Evaluate signage and make accessible as necessary                                                                                                                                                              | TBD      | ConsCom, DPW                       |

Accessibility of Parking and Signs = Subjective judgment on accessibility of these elements if they exist; OPDMD = Other Power-Driven Mobility Device accessibility (Trails assessed thus far limited to Town Conservation Lands: 1 = Service Trail; 2 = Wide Single Track Trail; 3 = Narrow Single Track Trail); Alt = Alternate program (guided walk or education program) held on the subject property in past 5 years; Grt Brk Estates O.S. #1 = Great Brook Estates Open Space Parcel #1; NA = Not applicable; TBD = To be determined; HP = Handicapped Parking; GBFSP = Great Brook Farm State Park; Rec = Recreation; Cons = Conservation; Com = Commission; DPW = Department of Public Works; LSC = Land Stewardship Committee; BOS = Board of Selectmen; TTOR = The Trustees of Reservations

