



Department of
ENERGY & ENVIRONMENTAL PROTECTION

Comprehensive Open Space Acquisition Strategy

2016-2020 Green Plan

Complete Background Section



www.ct.gov/deep/openspace
www.ct.gov/deep/greenplan

Cover: Winners of the 1st Annual Open Space and Watershed Land Acquisition photo contest held in 2017 by the [Connecticut Land Conservation Council](#), in partnership with the Department of Energy and Environmental Protection. Each photo was taken on land protected under a State open space grant. Photos clockwise from top-left:

Robert Pagini, *Autumnal Mountain Sunrise*

David Heg, *Lower Falls at Mukluk*

Vikie Reski, *Hawk Hill Farm*

Dale Bertoldi, *Greens Farm at Lisa Lane*

Table of Contents

Executive Summary	i
Table of Contents	iv
5-year Action Strategy to Achieve Connecticut’s Open Space Goal	1
Land Acquisition Priorities	6
A. Natural Waters & Drinking Water Resources.....	7
B. Areas Significant to the Coast.....	13
C. Natural Heritage Resources.....	17
D. Natural Resource-based Outdoor Recreation.....	21
Program Administration Priorities	24
1. Strategize Acquisitions for Climate Change Resiliency.....	25
2. Build Partnerships and Public Support for Open Space	27
3. Improve Open Space Data and Tools	36
4. Develop Strategies for Preserving in Perpetuity State-owned Lands of High Conservation Value.....	40
5. Optimize State Open Space Acquisition and Grant Program Operations.....	42
I. Green Plan Background & Purpose.....	46
A. Goals and Measures of Success.....	49
B. Consistency with State & Local Plans of Conservation and Development.....	52
C. Recent Achievements in Connecticut Land Conservation	52
II. Land Protection Challenges	55
A. Economic and Development Pressures	55
B. Land Transfer & Parcelization	56
C. Funding Availability.....	57
D. Stewardship of Protected Lands	61
E. Impacts by Climate Change.....	62
F. Data Needs for Open Space Planning	63
III. Status of Connecticut Open Space.....	66
A. Overall Open Space Goal	66
B. State-held Open Spaces	68
I. Parks & Forests.....	68
II. Wildlife Management and other Natural Heritage Areas.....	70
III. Other DEEP-owned Lands.....	73
IV. Open Space Held by Other State Agencies	74

C. Open Space Held by Land Conservation Partners	76
I. Municipalities	76
II. Non-profit Land Conservation Organizations	78
III. Water Utility Companies	80
D. Statewide Trails & Greenways	82
E. Federally-owned Open Space	85
I. U.S. Fish and Wildlife Service	85
II. U.S. National Park Service	87
III. U.S. Army Corps of Engineers	87
IV. Land Conservation Funding Programs in Connecticut	89
A. State Recreation and Natural Heritage Trust Program	90
I. Cooperators Provision of the Recreation and Natural Heritage Trust Program	94
B. State Open Space and Watershed Land Acquisition Grant Program	96
I. The Natural Heritage, Open Space and Land Acquisition Review Board	100
C. Federal Land Acquisition Funding Programs	101
I. Coastal and Estuarine Land Conservation Program	102
II. Long Island Sound Study Program	103
III. Highland Conservation Act Grant Program	104
IV. Land and Water Conservation Fund	105
V. Recreational Trails Program	106
D. Working Farm and Forest Programs	107
I. Forest Legacy Program	107
II. Natural Resources Conservation Service Programs	109
IV. Connecticut State Farmland Preservation Program	112
V. Purpose of, and Need for, Protected Open Space	113
A. Natural Heritage Resources	113
I. Freshwater and Inland Wetland Habitats	114
II. Coastal Habitats	117
III. Forested Upland Habitats	121
IV. Ridgeline & Declining Upland Habitats	125
B. Drinking Water Resources	130
C. Outdoor Recreational Resources	131
I. Outdoor Recreation Needs	133
D. Open Space in Urban Communities	136

E. Working Farmlands	138
VI. Identifying High Priority Lands for Conservation	141
1. Evaluate Existing Open Space using Geo-spatial Data.....	142
I. The Public Use and Benefit Land Registry	143
2. Apply State and Regional Decision Support Tools.....	147

I. Green Plan Background & Purpose

Recognizing the threat of loss of environmental resources to changes in land use, in 1997 the General Assembly set an ambitious goal of protecting 21 percent of Connecticut's land by year 2023 for public open space¹⁶. With a total of 3,205,760 acres in Connecticut, 673,210 acres must be protected to meet this goal.

Progress has been made on acquiring land for open, but critically-important conservation and recreation lands remain at risk to being lost to development or conversion to other uses. DEEP and its conservation partners must evaluate remaining lands in Connecticut and prioritize the preservation or protection of the lands of highest conservation and recreation value.

The Legislature, when drafting the open space acquisition goals, set targets for the State, acting primarily through DEEP, and DEEP's conservation partners (municipalities, private non-profit land conservation organizations, and water companies whose lands are considered Class I and II water company lands):

- 10% (or 320,576 acres) is to be acquired and held by the State of Connecticut, and
- 11% (or 352,634 acres) is to be acquired and held by land conservation partners.

In order to protect natural heritage and recreation lands for future citizens of the State of Connecticut, DEEP and its partners must coordinate efforts. Certain lands may be best-suited for DEEP management and others may be best-suited for management by a conservation partner. Regardless of ownership, all parties must work together to protect the ecosystem and social benefits provided by open space.

¹⁶ (CGS) Sec. 23-8b

While many groups and individuals support the acquisition and protection of open space, there is little clarity on what constitutes open space. The term “open space” is defined in Statute¹⁷ in context of the tax abatement program commonly referred to as “PA-490.” For the purpose of implementing the conservation efforts outlined in the Green Plan, the following adaptation of the PA-490 definition of open space is provided:

OPEN SPACE

Any area of undeveloped or relatively natural land, including forest land, land designated as wetland under section 22a-30, and not excluding farm land, the preservation or restriction of the use of which would (A) maintain and enhance the conservation of natural or scenic resources, (B) protect natural streams or water supply, (C) promote conservation of soils, wetlands, beaches or tidal marshes, (D) enhance the value to the public of abutting or neighboring parks, forests, wildlife preserves, nature reservations or sanctuaries or other open spaces, (E) enhance public recreation opportunities, or (F) preserve historic sites.

Open space does not mean undeveloped natural land or land with an unofficial passive recreational use. For land to be termed “open space,” it must be preserved or protected for open space use. The Green Plan provides strategies for the preservation and the protection of open space. These terms are not used interchangeably in this plan.

PRESERVED OPEN SPACE

Any area of land that has been acquired and is used for open space purposes.

Includes DEEP’s State Parks, State Forests, and Wildlife Areas, and Class I and II watershed lands

PROTECTED OPEN SPACE

Any area of land with a restriction that would limit its use to open space.

Includes lands subject to conservation restrictions, deed restrictions, or certain reserved rights.

¹⁷ (CGS) Sec. 12-107(b)(c)

When the State measures its success toward reaching the collective open space acquisition goals, only preserved or protected open space is measured. As of December 2015, DEEP held an estimated 257,616 acres, or about 80 percent, of the target for State open space acquisition. DEEP's land conservation partners held a conservatively estimated 243,714 acres, or about 69 percent, of the target for partner open space acquisition. This accounts for a total of 501,330 acres, or about 15 percent of Connecticut's land area held as open space. Overall, Connecticut is 74 percent of the way toward achieving its total open space preservation goal.

The Connecticut Comprehensive Open Space Acquisition Strategy (Green Plan) is a statewide planning document developed by DEEP in partnership with municipalities and numerous conservation organizations to guide land acquisitions towards achieving the state's open space goal. Considering the needs and issues facing the state's residents and environmental resources, the Green Plan:

- Discusses the purpose of, need for, and threats to land conservation in the state;
- Provides an estimate of the acres of land protected by the State and its partners;
- Discusses a system for increasing the accuracy of open space land data;
- Describes the highest priorities for acquisition of land identified to be in greatest need for immediate preservation and the general location of each priority;
- Provides timetables for the acquisition of land by the State and plans for management of such land; and
- Lists Connecticut open space resources to be used for acquisition and management of such land¹⁸.

The first Green Plan was prepared in 2001 and was last revised in 2007. Since 2007, two Public Acts¹⁹ have expanded the scope of the Plan and require that it be updated every five years.

The Plan includes three new components that relate to protected open space in the state: the [Public Use and Benefit Land Registry](#), the identification of the State's highest priority potential

¹⁸ (CGS) Sec. 23-8b

¹⁹ P.A. Nos. [12-152](#) and [14-169](#)

acquisitions, and the establishment of a process to protect currently unprotected State-owned lands.

In updating the Green Plan, DEEP sought guidance and assistance from groups throughout the agency, other state agencies, and the State Natural Heritage, Open Space and Land Acquisition Review Board. DEEP also conducted outreach with regional councils of government, the land conservation community, and the general public (Appendix C). The result of this inclusive, interdisciplinary process is a land acquisition priority framework that is integrated with the ecological values and public use needs identified by key state stakeholders.

A. Goals and Measures of Success

Through year 2020, the State and its land conservation partners should target to acquire a total 11,500 acres as open space: 5,550 acres (48 percent) to be acquired by DEEP and 5,950 acres (52 percent) to be acquired by its partners. Table 1 below lists the conservation focus areas in which DEEP and its partners should direct open space acquisition efforts, based on the highest priority lands detailed in the [5-year action strategy section](#) of this plan.

The acreage goals for conservation focus areas were derived by calculating the land needed to increase land holdings by a certain percentage, where current metrics are available. This percent increase relies on an understanding of the area of lands across the state that are either currently held in protective forms or that remain unprotected and undeveloped. DEEP used the current and best data available to set these acreage targets that comprise the total five-year acquisition goal.

Table 1. Open space land acquisition or protection targets set for DEEP and its Partners through year 2020.			
Open Space Priority	Target Acres	DEEP Acquisitions (Acres)	Partner Acquisitions (Acres)
Natural Waters & Drinking Water Resources	5,000	1,500	3,500
		<i>(30% of Total)</i>	<i>(70% of Total)</i>
Significant Coastal Areas	1,000	300	700
		<i>(30% of Total)</i>	<i>(70% of Total)</i>
Natural Heritage Resources	1,000	750	250
		<i>(75% of Total)</i>	<i>(25% of Total)</i>
Recreational Trails	2,000	500	1,500
		<i>(25% of Total)</i>	<i>(75% of Total)</i>
Other Recreation and Natural Resource Lands Held by DEEP	2,500	2,500	0
		<i>(100% of Total)</i>	
Totals	11,500	5,550	5,950

These acquisition targets set for DEEP and DEEP’s land acquisition partners are not ideal and do not keep the state on track to meeting its overall open space goal by 2023, but declining State, municipal and private resources and acquisitions rates show that they are a stretch but possibly attainable. DEEP has only acquired about 5,865 acres, or 651 acres each year, between 2007 and 2015 (Figure 1). The most acquisitions were made in 2001, the same year the statutory goal to protect 21 percent of the state was established and financial allocations to DEEP for land acquisition were at peak. With this new Green Plan, it is anticipated that efforts and outcomes will increase.

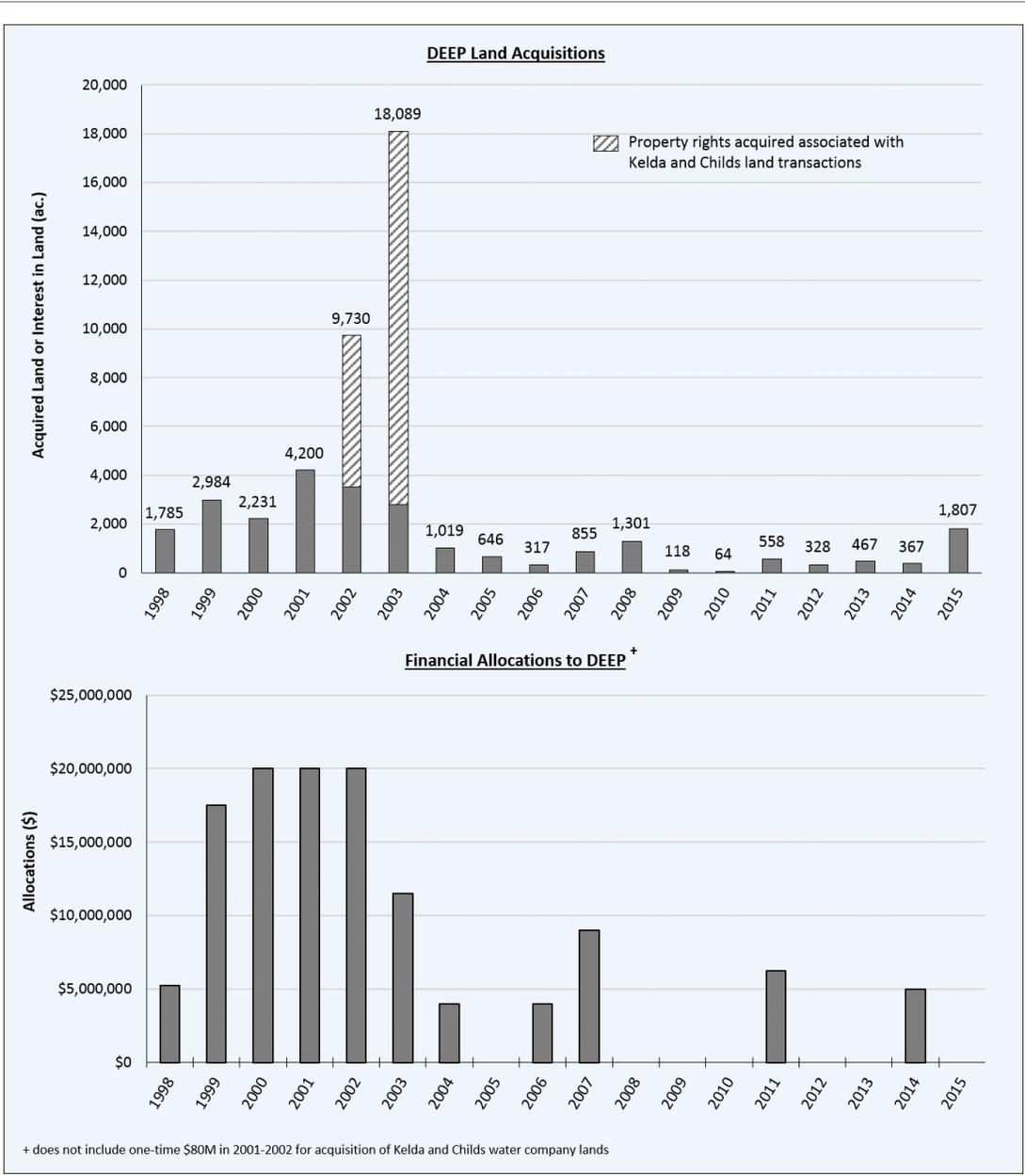


Figure 1. DEEP annual acquisitions for conservation (top) and State financial allocations (bottom) under the Recreation and Natural Heritage Trust Program since 1998. Acreage includes fee simple and conservation easement acquisitions.

B. Consistency with State & Local Plans of Conservation and Development

The State's [Conservation and Development Policies Plan](#)²⁰ serves as a statement of the development, resource management, and public investment policies for Connecticut. The State Office of Policy and Management is required by statute to prepare this plan on conservation and development on a recurring five year cycle.

The efforts of DEEP and the Green Plan to acquire, preserve, and manage open space for clean waters, public health protection, resilient coastal resources, scenic highland areas, fish and wildlife habitat, universally-accessible outdoor public recreation areas, and other resources are consistent with the policies under the current Conservation and Development Policies Plan (Appendix D).

The Conservation and Development Policies Plan specifically calls on state agencies and municipalities to facilitate the expansion of open space through the acquisition of lands and implementation of open space priorities as defined in this Green Plan. To maintain consistency with the State's conservation priorities and increase the likelihood of being awarded a DEEP open space grant, municipalities and other land acquisition partners are encouraged to generate their plans of conservation and development guided by the Green Plan.

C. Recent Achievements in Connecticut Land Conservation

A small selection of the successfully completed or on-going efforts by DEEP and its conservation partners since the Green Plan's last revision in 2007:

- With assistance from bond funding and funding from the [Community Investment Act](#), more than 18,800 acres were acquired or protected under DEEP's land acquisition and open space

²⁰ (CGS) Sec. 16a-24 through 16a-33

grant programs between 2007 and 2015 (Appendix A and B). These programs have moved the State and its partners closer to reaching their total open space goals.

Nearly 13,000 acres were protected under the State [Open Space and Watershed Land Acquisition Grant Program](#), which funded 201 projects in over 50 towns. Many of these grant awards funded the protection of open space located in or near more densely populated areas, thereby providing urban communities greater access to greenspaces.

- **2015:** After fifteen years of negotiations with the seller, DEEP partnered with The Trust for Public Land, The Nature Conservancy, the Town of Old Saybrook, and the Essex Land Trust, with contributions from other groups and private individuals, to successfully protect “The Preserve.” a nearly 1,000-acre coastal forest hosting key habitats and water resources that was once slated to be developed. The property now serves as new public, local open space. DEEP contributed \$1.4 million from its remaining [Land and Water Conservation Fund](#) balance to the total purchase price of about \$8.1 million.
- **2014:** The former Apple Orchard, LLC Property was donated to the State of Connecticut in memory of Dorothy and Bernard Schiro, further protected by a conservation easement held by the Connecticut Forest and Park Association. Now Auerfarm State Park Scenic Reserve, this 40-acre property located in Bloomfield abuts property owned by the local 4-H club. The Schiro family wished to see this valuable property with extensive views of the Hartford skyline preserved for the citizens of Connecticut. The property provides additional scenic greenspace and outdoor recreational opportunities within the greater Hartford area.
- **2013:** DEEP began partnering with the University of Connecticut to produce a publicly accessible GIS map layer of all projects funded to date under the State Open Space and Watershed Land Acquisition Grant Program. Currently undergoing quality assurance and control, this map layer will improve public access to over 30,000 acres of open spaces yet to be shown on any state-level mapping. This massive new dataset will assist future evaluation of open space protection by all.

- **2013:** DEEP worked with Eversource Energy (formerly Northeast Utilities) to extend a Memorandum of Understanding through year 2024 that gives DEEP, municipalities, and land trusts the right of first refusal to acquire parcels on “the Conservation List” should Eversource put them on the market for sale. The list consists of about 375 parcels in 90 municipalities totaling approximately 9,500 acres identified by DEEP as having high value for public recreation, natural resource conservation, and ecological preservation.

The MOU was extended as a part of the State’s settlement of the NU-NSTAR merger. The settlement also formed the [Eversource Land Trust](#), which in 2013 permanently protected 4 parcels totaling 987 acres from the Conservation List (Table 2).

Table 2. Conservation List lands protected by the NU Land Trust in 2013.		
Property Name	Town	Acres
Skiff Mountain	Sharon	800
Kings Island	Enfield	120
Hanover Road	Newtown	54
Bartlett Cove	Waterford	13
Total Acres		987

- **2011:** the State purchased from the Mason family an additional 454 acres adjacent to the 282-acre Belding Wildlife Management Area (WMA). Known as the Tankerhoosen WMA, this acquisition ensures the protection of much of the watershed and entire riparian zone for over 2.5 miles of the Tankerhoosen River. Funded in its entirety by the State [Recreation and Natural Heritage Trust Program](#), this property is one of the largest and most significant open space preservations in Connecticut history. It serves many purposes, including significant habitat for wild trout populations and other wildlife, a living classroom for students within the greater Hartford area, and year-round opportunities for outdoor recreation.
- DEEP continues to build on its list of federal, municipal, and private partners with which it leverages limited resources. For example, in 2008 the 308-acre Deluca Property in Cornwall was purchased for \$3.3 million and added to the Housatonic State Forest: \$492,750 from a federal [Highlands Conservation Act](#) grant, \$100,000 from the Cornwall Conservation Trust, and the remaining balance from the State Recreation and Natural Heritage Trust Program.

II. Land Protection Challenges

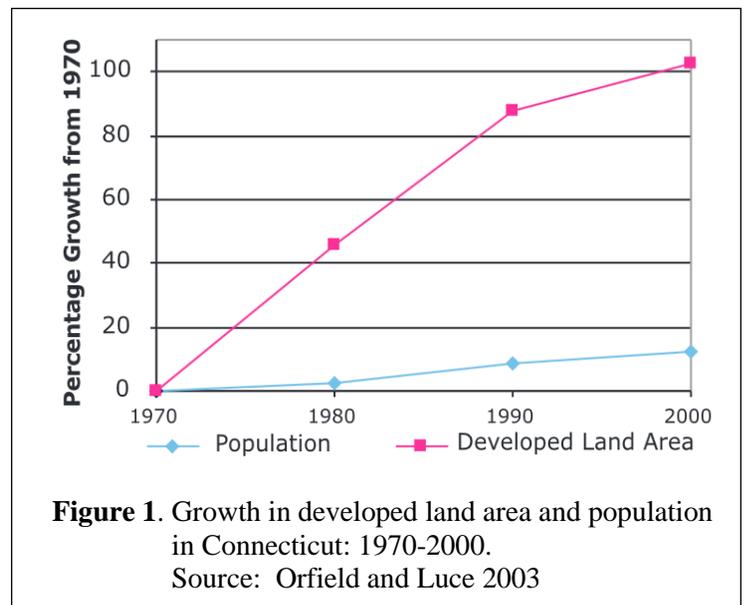
The progress DEEP and its partners have made towards reaching Connecticut's open space goal has not been made without difficulties. A number of challenges persist against both the acquisition of lands for new open space and already-dedicated open space lands.

A. Economic and Development Pressures

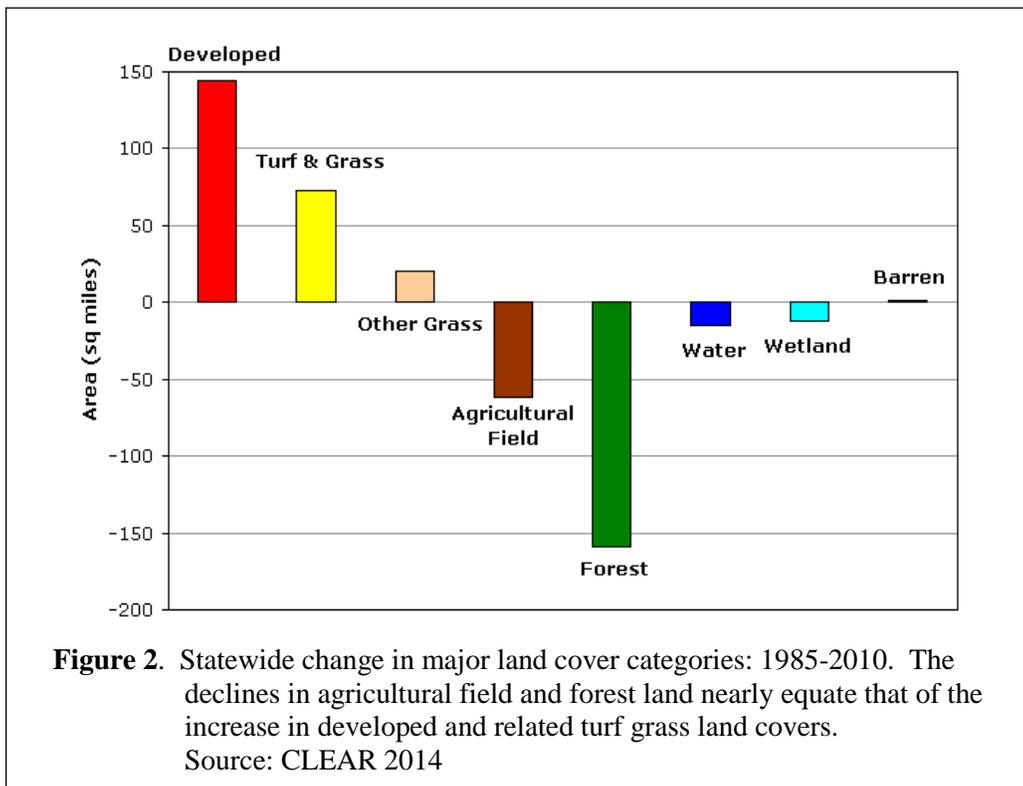
Perhaps the greatest challenges to the conservation of land as open space are economic and land development pressures. Because economic incentives to develop land can outweigh those from conservation purposes, private landowners can be pushed to convert their lands to uses incompatible with open space.

Sprawl development has already impacted statewide environmental and natural resources. A rapid growth of development since the 1970's facilitated a shift of people living in urban centers to suburban areas (Figure 1).

As a consequence of such growth, from 1985 to 2010, Connecticut lost 180 square miles (115,200 acres) of forested land and 62 square miles (39,680 acres) of agricultural fields to development²¹ and related land covers (Figure 2).



²¹ “Developed” is defined by the [UConn Center for Land Use Education and Research](#) as built areas typically associated with commercial, industrial, and residential uses containing impervious surface such as roads, parking areas, and structures and also includes maintained turf/grass.



A recovering economy could spark another burst in land development that places pressure on undeveloped lands. This places an urgency on all aspects of land protection from securing funding, surveying and appraising potential parcels, and to negotiating and closing of transactions to ensure that long-term protection goals are met before desirable properties are converted to other uses. DEEP and its partners recognize this threat and work continuously to prevent the further loss of open space resources.

B. Land Transfer & Parcelization

In the next fifteen to twenty years, significant tracts of lands across Connecticut are going to change hands and potentially uses as older landowners do or do not include conservation in their properties' futures. For example, of the state's 1.8 million acres of forestland, 70 percent is

privately-owned, and of this land 54 percent is owned by individual families in parcels of 10 acres or more.

A study on the attitudes, objectives, and behaviors of private forestland owners conducted by the Yale School of Forestry and Environmental Studies and DEEP's Forestry Division found that there is a significant risk of sale of forestland, with as many as one-third of these landowners willing to sell if offered a reasonable price (Tyrell 2015). Vast amounts of the state's forest are vulnerable to fragmentation, development, and parcelization, or the process of subdividing large parcels of land into smaller parcels.

Not only does parcelization break up the landscape and cost the region valuable natural and public recreational resources, and but it can also make it more difficult for DEEP and its partners to protect land from further fragmentation or development. Depending on factors such as location and market values, when a large tract of land is subdivided, the per-acre cost and the number of willing sellers or entities needed to cooperate in protecting the land increases.

C. Funding Availability

Securing adequate funding to achieve Connecticut's open space goal has been difficult for several years. State bond funds, municipal, federal, and private funding for land conservation purposes are limited. As a result, DEEP has seen a drop in the open space acreage acquired by DEEP and in the number of grants submitted to DEEP's open space grant program.

Per acre costs for land protection (fee simple and easement acquisition) vary significantly based on a number of variables including a landowner's financial flexibility and location, the character and size of a parcel, and current property values at the time of acquisition. Some property acquisitions can be accomplished with minimal per acre cost, while other are much

more expensive. For example, coastal property values are varied and can be more expensive on average than inland non-coastal acquisitions.

Annual average per acre costs to the State over recent years under the [Recreation and Natural Heritage Trust Program](#) (RNHTP), DEEP’s program for purchasing lands that add to the State’s system of Parks, Forests, and Wildlife Management Areas, have been as low as about \$3,481 in 2012 to as high as about \$13,800 in 2008 and 2011 (Table 1). These numbers vary based on property values and on the degree to which properties are acquired by donation, partial donation, or with assistance of other funding entities. Regardless, these averages can be used as a reasonable predictor of cost to the State for acquisition.

Using an average per acre cost of about \$9,000 for properties acquired under the RNHTP between 2007 and 2015, and given the 62,960 acres need to meet the DEEP’s statutory open space goal, total acquisition funding needs for this program would equate over \$566 million between now and 2023.

Table 1. Average cost per acre for lands acquired under the Recreation and Natural Heritage Trust Program and average grant dollars paid by the State per acre protected under the Open Space and Watershed Land Acquisition Grant Program: 2007-2015.

Year	Recreation and Natural Heritage Trust Program	Open Space Grant Program (Financially Completed)
2007	\$5,549	\$4,048
2008	\$13,821	\$5,806
2009	\$11,209	\$3,991
2010	\$10,636	\$5,233
2011	\$13,782	\$4,714
2012	\$3,481	\$2,763
2013	\$4,437	\$2,353
2014	\$5,102	\$2,470
2015	\$8,447	\$4,281

Annual average per acre grant paid by the State under DEEP's [Open Space and Watershed Land Acquisition Grant Program](#) (OSWA) hovered between about \$2,350 in 2013 and \$5,810 in 2008. Using an average per acre grant cost of \$4,107 for DEEP's partners' properties protected under OSWA between years 2007 and 2015, and given the 108,920 acres DEEP's partners need to make their statutory open space goal, total program funding needs for this program up to year 2023 equates to over \$447 million.

Clearly, securing this magnitude of continual open space acquisition funding is idealistic. To make frugal use of currently available resources, DEEP works to ensure that its open space programs are working effectively and efficiently. To maximize resources, DEEP has increasingly pursued the purchase of conservation easements, accepted land donations, sought grants from private groups, and facilitated stronger partnerships with cost-sharing cooperators.

Innovative Land Conservation Funding Mechanisms **Adopting a Local Option to Fund Open Space**

Having a local open space conservation plan in place is an important first step towards strategically protecting lands for clean air, land, and water. Having a local reliable and self-supporting funding stream dedicated to land conservation is an important second, especially in times of tight budgets and uncertain funding opportunities.

[Audubon Connecticut](#), in partnership with several individuals and the [Connecticut Land Conservation Council](#), has organized a statewide effort to support legislation that would create a “local option” to acquire and protect open space. If adopted, this local option, known as “Project Green Space,” would enable towns and cities to choose to collect up to 1% of the assessed value of homes on buyers to support local open space and farmland acquisition projects, as well as park, forest, and trail management projects. Similar local option initiatives to redouble open space funding have been successfully implemented in towns in Massachusetts and New York.

According to Audubon Connecticut, the legislation would have three components:

1. The percentage of the assessment on the value of the home.

The assessment on home purchases would allow for flexibility for local communities and would be up to 1% of the value of a home, imposed only on the buyer.

2. An exclusion level to ensure equity among home buyers.

An exclusion level of the value of a home would be in place to ensure that homeowners are not penalized who cannot afford a locally adopted assessment value. For example, if the exclusion level is \$150,000 and a home is valued at \$320,000, the assessment would be imposed on \$170,000 of the value of the home. If a home is valued at \$150,000 no assessment would be imposed.

3. The range of projects funded.

The legislation would apply to the acquisition of parcels for open space, parks, and farmland preservation. As proposed, the legislation would not include projects like brownfield remediation, building and maintaining sports fields, and local water and sewer projects. Projects could be further defined in each community when the local ordinance is passed by a community.

Because the funds are often not readily available, conservation efforts can be missed opportunities to acquire and preserve land for future generations. Project Green Space could provide municipalities a secured funding source for the acquisition and stewardship of open space and parks. To learn more about Project Green Space and how it could work for your community, contact Genese Leach of Audubon Connecticut at gleach@audubon.org or (301) 704-5235.

D. Stewardship of Protected Lands

The stewardship of open space requires major capital expenditures and management actions to address specific land conditions and ensure the adequate protection of open space lands. When evaluating the acquisition of a parcel of land, DEEP considers the purchase price of the parcel and the long-term associated costs, or carrying costs, of the acquisition, as well, such as dam removal or trails, habitat, or forest management, which can be expensive.

Conservation easements can carry their own costs associated with long-term monitoring requirements. As part of the award agreement and to maintain standing for future grant applications, several federal programs including the [Forest Legacy](#) and [Highland Conservation Act](#) programs require applicants to annually monitor lands for easement enforcement. Because DEEP has limited staff and resources to monitor these lands, the agency seeks partnerships such as those with local land trusts who will assist in fulfilling these requirements.

Illegal encroachments are a significant and costly stewardship challenge to protected open space. Encroachments, or conducting an activity on another party's land that damages or alters the land, vegetation, or other features, includes but are not limited to: removing boundary markers; erecting buildings or other structures; building roads, driveways, or trails; dismantling stone walls; cutting vegetation; installing lawns or utilities; use of unauthorized or unpermitted motorized or all-terrain vehicles; or using, storing, or depositing vehicles, material, or debris.

DEEP works to resolve identified encroachment in a timely and effective manner, as it is imperative to preserve and protect lands held for the public as open space. Response actions can vary depending on the degree, duration, and other factors surrounding the encroachment. Resolution of potential encroachments usually involve title research, survey work, and may require legal action

E. Impacts by Climate Change

Climate change is perhaps the most significant challenge facing Connecticut's natural landscape today. Already, the state's lands and waters, and their associated flora and fauna, are experiencing changes as a result of rising sea levels, warming temperatures, and other consequences.

The Adaptation Subcommittee to the Governor's Steering Committee on Climate Change [published a report in 2010](#) on the impacts of climate change on four areas critical to Connecticut's well-being, including natural resources. This report identifies cold water streams and tidal marshes as some of the most at-risk habitat types to climate change (Adaptation Subcommittee 2010).

The suitability of cold water streams for native fish species such as wild brook trout will decline as water temperatures increase as a result of climate change (Beauchene et al. 2014). In many locations of the state, the critical water temperature threshold for such streams may already be exceeded. In these stream courses, wild brook trout, slimy sculpin, and other dependent fish and wildlife species are susceptible to population declines.

As sea levels rise, tidal wetlands will become submerged, resulting in their loss and simultaneous impairment of beneficial ecosystem benefits such as flood water absorption and fish and wildlife habitat. Together with intensifying storms, sea-level rise will also lead to increased inland flooding. Inland flooding can lead to soil erosion, surface runoff, and stream and river water quality impairment.

The Adaptation Subcommittee followed their 2010 report on climate impacts with the release of the State's [Climate Change Preparedness Plan of 2011](#). This plan reiterates the habitat

types identified in 2010 as at most risk from climate change and provides adaptation strategies to reduce their risk of environmental degradation and increase their resiliency, including land acquisition and protection.

For example, protecting existing core forest next to cold water streams (characterized as unfragmented forested areas relatively far from non-forested areas²²) and lands adjacent to tidal wetlands can connect large habitat linkages, ensure natural vegetated cover needed to maintain cold water streams temperatures, and allow for the migration of tidal wetlands as a result of sea-level rise.

Preparing inland and coastal natural resources for impacts by climate change is a serious and on-going effort that DEEP and its partners work continuously in support of. The Green Plan complements current state planning documents by placing an emphasis on discussing related threats and introducing throughout the document new recommendations to acquire key lands that will serve to protect at-risk habitats and strategize future acquisitions with climate change in mind.

F. Data Needs for Open Space Planning

To best achieve the State's open space goals, DEEP first needs a complete and accurate inventory of how much land in Connecticut has been acquired as open space, where it exists, and of what land use purposes each are comprised. With such an inventory, DEEP and its partners would be equipped to make better and more proactive decisions about the acquisition and stewardship of key lands for conservation and public recreation purposes.

²² CLEAR 2007. [Forest Fragmentation Categories Explained](#), Connecticut's Changing Landscape Study.

Currently, DEEP has only an estimate of land held as open space by its own agency and has no inventory for other state agencies. Landscape-scale conservation planning by DEEP would be improved with information on which farm's development rights are currently held under the Connecticut Department of Agriculture's Farmland Preservation Program. With regard to open space held by DEEP's partners, what estimates the Department has conflict with those derived from other sources, such as the [Land Trust Alliance](#) and the [National Conservation Easement Database](#).

The State open space grant program provides some information about how much and where land is held by municipalities, non-profit land conservation organizations, and water companies. Started in 2013, DEEP is partnering with the University of Connecticut and the [Trust for Public Land](#) to produce a publicly accessible GIS map layer of all acquisition projects awarded open space grants to date. The map layer, which will show where over 30,000 acres of open space is located, is currently being checked for data quality and control.

Other than what is known through administering the open space grants, DEEP has little and outdated information on the total acreage its partners have protected through other means. To attempt to meet this challenge, the [Protected Open Space Mapping Project](#) (POSM) was initiated in 2003 to identify, catalog, and digitally map all dedicated open space in Connecticut by researching records at town halls.

While every attempt is made to gather accurate information, DEEP's estimates are just that. The data collected for POSM was quickly outdated and did not include conservation easements, and the funding has recently ended to complete the project. Furthermore, DEEP is left unaware of future lands that become acquired or protected for conservation by its partners or other private entities.

To help support statewide land acquisition planning, DEEP has developed a pilot [Public Use and Benefit Land Registry](#) (Land Registry). As it becomes populated with information, this pilot system will offer a comprehensive, publicly-accessible geodatabase that provides users with advanced attribute information such as property deed restrictions, acquisition funding sources, and purposes of open space.

The Land Registry, which will incorporate POSM data, state open space grant program data, and information on other lands not owned by DEEP, will be useful in planning future open space protection, trail and outdoor recreation development, and more. Cooperation between DEEP and its land conservation partners will be vital to populating this geodatabase and keeping information up-to-date.

III. Status of Connecticut Open Space

A. Overall Open Space Goal

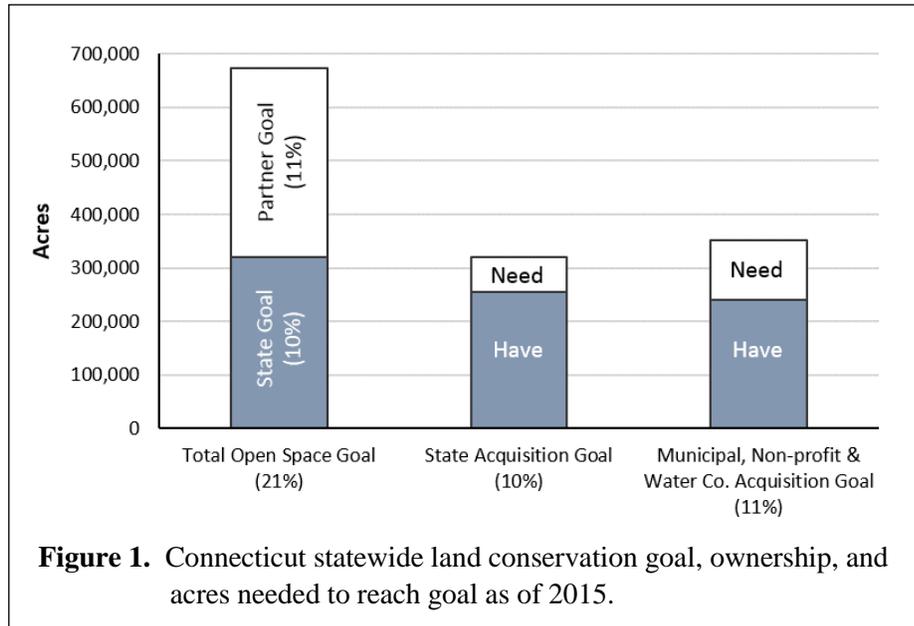
To have 21 percent of Connecticut's land conserved as open space requires 673,210 acres to be held by the State, municipalities, non-profit land conservation organizations, and water companies. As of December 2015, the State (DEEP) held approximately 257,616 acres as open space in its system of Park, Forest, and Wildlife Management Areas. Based on a target of 320,576 acres in total open space holdings, the State held about 80.4 percent of its open space goal.

Of this area, approximately 237,080 acres have been acquired in fee simple ownership. Acquisitions of less-than-fee interests include the purchase of conservation easements and restrictions. The Kelda and Childs water company properties are special acquisitions purchased in 2002 and 2003 and together account for 15,210 acres in conservation easements and restrictions held by DEEP.

As of late 2015, open space acreage held by the State's land conservation partners (municipalities, non-profit land conservation organizations, and water companies) was estimated at a total 243,714 acres. Based on a target of 352,634 acres in total open space holdings for these entities, they held 69.1 percent of their targeted open space goal.

DEEP's estimation of total acres owned by its partners is conservative since they typically do not relay to the Department every time they close on an acquisition. Therefore, DEEP's partners may be closer to their goal than the Department is aware. The open space data collection recommendations in this plan should bring DEEP to a more accurate estimation of lands owned by its partners.

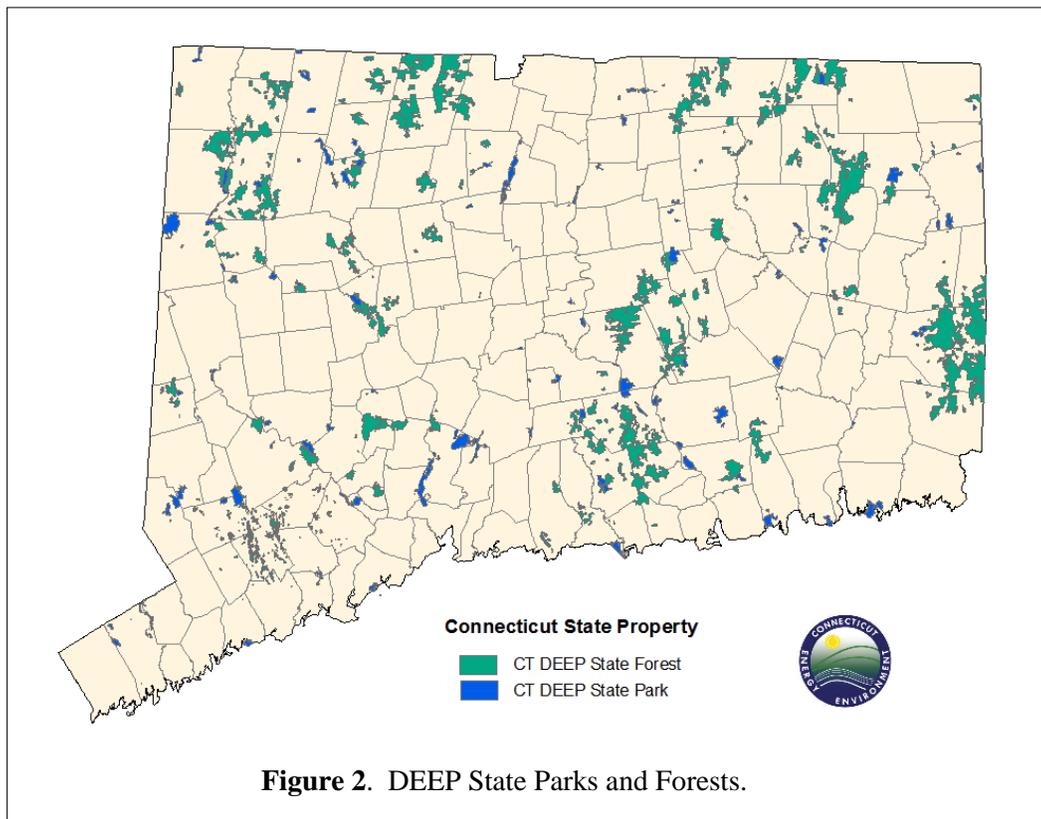
DEEP and its partners held 501,330 acres held as open space at the end of 2015, or 15.4 percent of Connecticut's land area. To meet the overall statutory open space goal, DEEP must acquire an additional 62,960 acres and encourage the acquisition of 108,920 acres by municipalities, non-profit land conservation organizations, and water companies (Figure 1).



B. State-held Open Spaces

I. Parks & Forests

Beginning with Meshomasic State Forest in 1903 and Sherwood Island State Park in 1914, the State of Connecticut has been acquiring land for [public parks and forests](#) for more than a century. As of late 2013, the State Park system includes 107 locations covering over 36,000 acres. In addition, DEEP manages 32 State Forests covering 170,000 acres, many of which are large holdings of more than 10,000 acres (Figure 2).



State Forests help to protect environmental quality and are generally used for sustainable forestry practices and complement State Park outdoor activities such as hiking, cross-country skiing, horseback riding, wildlife viewing, hunting and fishing, and in some cases, swimming,

picnicking, and camping. Accessible parking and picnic tables for individuals with disabilities are available at all State Park and Forest recreation areas. Many Parks and Forests provide additional features such as accessible restrooms, camping, and fishing platforms.

Between 2007 and 2015, 19 acquisitions totaling about 665 acres were added to the State Park system, funded with \$11,740,000 from the State’s Recreation and Natural Heritage Trust Program (RNHTP) and \$2,845,284 from private and federal cost sharing partners (Table 1). During the same period, 46 acquisitions totaling 2,730 acres were added to the State Forest system with \$11,521,593 in funding from the RNHTP and \$2,613,736 from private and federal partners (Table 2).

Table 1. DEEP acquisitions added to the State Park system: 2007-2015.

State Park	Fee Acres	State Cost	Cooperator Share	Cost per Acre
Liebman Property	178.10	\$915,000	NA	\$5,138
Machimoodus	176.70	\$3,200,000	\$1,441,879	\$26,270
Collis B. Huntington	132.48	\$4,000,000	NA	\$30,193
Auerfarm	40.00	\$0	\$750,000	\$18,750
Southford Falls	39.98	\$400,000	\$100,000	\$12,506
West Rock Ridge	37.73	\$225,000	\$170,000	\$10,469
Gillette Castle	19.95	\$0	202,620	10,156
Diana's Pool Water Access	18.24	\$0	\$46,000	\$2,522
Pennwood	4.77	\$575,000	NA	\$120,596
Rocky Neck	4.60	\$200,000	NA	\$43,478
Sleeping Giant	4.04	\$0	\$134,785	\$33,363
Bantam Lake Water Access	2.82	\$1,990,000	NA	\$705,674
Pomeroy	2.30	\$35,000	NA	\$15,217
Humaston Brook	2.23	\$200,000	NA	\$89,686
Sunrise Resort	0.92	\$0	NA	\$0
Totals	664.86	\$11,740,000	\$2,845,284	\$21,937

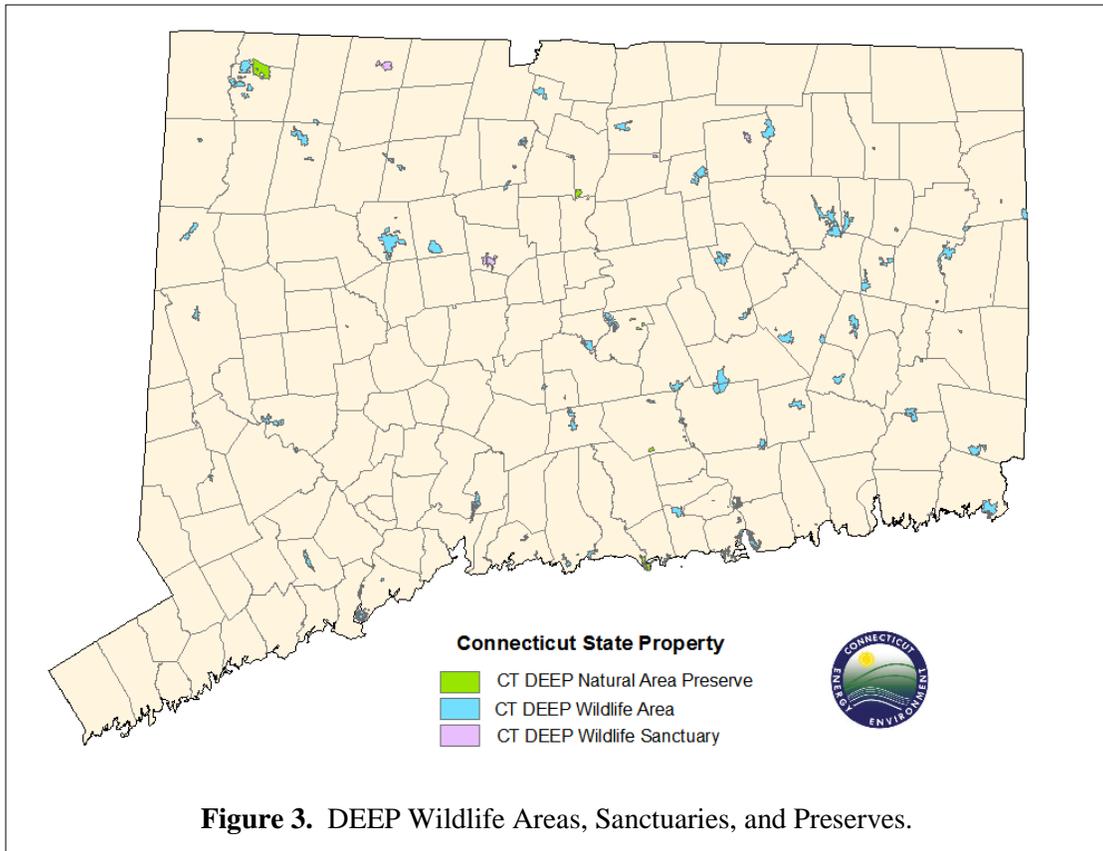
Table 2. DEEP acquisitions added to the State Forest system: 2007-2015.

State Forest	Acres	State Cost	Cooperator Share	Cost per Acre
Salmon River	534.69	\$1,845,591	\$684,408	\$4,732
Pachaug	521.23	\$618,622	\$1,107,328	\$3,311
Meshomasic	411.78	\$1,520,165	NA	\$3,692
Housatonic	373.66	\$3,595,000	\$100,000	\$9,889
Shenipsit	302.19	\$881,215	\$65,000	\$3,131
Natchaug	171.30	\$991,000	NA	\$5,785
American Legion	144.50	\$600,000	NA	\$4,152
Cockaponset	76.69	\$0	\$107,000	\$1,395
Tunxis	74.58	\$320,000	NA	\$4,291
Nehantic	40.00	\$120,000	NA	\$3,000
Nathan Hale	38.43	\$230,000	\$214,000	\$11,553
Naugatuck	26.96	\$800,000	NA	\$29,674
Wyantanuck	13.00	\$0	\$100,000	\$7,692
Massacoe	1.74	\$0	\$236,000	\$135,632
Totals	2,730.74	\$11,521,593	\$2,613,736	\$5,176

II. Wildlife Management and other Natural Heritage Areas

Connecticut’s natural heritage is preserved and managed across over 33,000 acres of State Wildlife Management Areas, Sanctuaries, and Natural Area Preserves (Figure 3). There are over 75 of these natural heritage conservation areas statewide, plus one Coastal Preserve at Bluff Point in the town of Clinton.

DEEP manages over 50 Wildlife Management Areas (WMA) for the conservation and sustainability of wildlife populations, to conduct scientific research, to provide educational programs, in some cases to practice sustainable timber harvesting, and to provide passive recreational activities such as hunting, fishing, and wildlife viewing.



For example, the 282-acre Belding WMA in Vernon contains a diverse mosaic of wildlife habitats including soft and hardwood forests, open meadow, wetlands, streams, and a pond. Fed by cold springs, the Tankerhoosen River runs through the property and hemlocks lining the river keep the water cold enough to sustain significant wild trout populations. The section of the Tankerhoosen River that flows through Belding WMA was designated a Class 1 Wild Trout Management Area in 1993, the first of its kind in Connecticut.

In 2011, the State purchased from the Mason family an additional 450 acres adjacent to the Belding WMA for \$2,965,000, funded entirely by the Recreation and Natural Heritage Trust Program. Known as the Tankerhoosen WMA, this acquisition ensures the protection of much of the watershed and the entire riparian zone for over 2.5 miles of the Tankerhoosen River. The

property serves many purposes, including unique habitat for many wildlife species, a living classroom for students, and opportunities for passive outdoor recreation.

Wildlife Sanctuaries are areas where wildlife is protected and hunting or trapping is not allowed, such as the Shade Swamp Wildlife Sanctuary in Farmington. Natural Area Preserves, such as the Hammonasset Natural Area Preserve in Madison, are State lands that are approved by the Governor as a “natural area.”

Natural Area Preserves are defined by General Statute Sec. 23-5a as “an area of land or water, or land and water, containing, or potentially containing, plant or animal life or features of biological, scientific, educational, geological, paleontological, or scenic value worthy of preservation in their natural condition.”

Between 2007 and 2015, 20 acquisitions totaling about 1,542 acres were added to the State Wildlife Management Area system, funded by \$7,248,047 from the State’s Recreation and Natural Heritage Trust Program (RNHTP) and \$7,000,700 from cost sharing partners (Table 3).

During the same period, two conservation easements were acquired under the USDA-Natural Resources Conservation Service’s Grassland Reserve Program (now the Agricultural Conservation Easement Program) on 29 acres: 15.79 at at Barn Island WMA in Stonington and 13.39 acres in Bloomfield.

These easements require that the parcels to be managed as grassland habitat and at times of the year that allow declining grassland birds, such as bobolinks and savannah sparrows, to nest successfully. In total, the easements cost \$1,756,250 and were funded in part by \$624,250 from RNHTP, \$867,500 from the USDA Natural Resource Conservation Service, and the remainder from the Wintonbury Land Trust and other private contributors.

Table 3. DEEP acquisitions added to the State Wildlife Management Area system: 2007-2015.

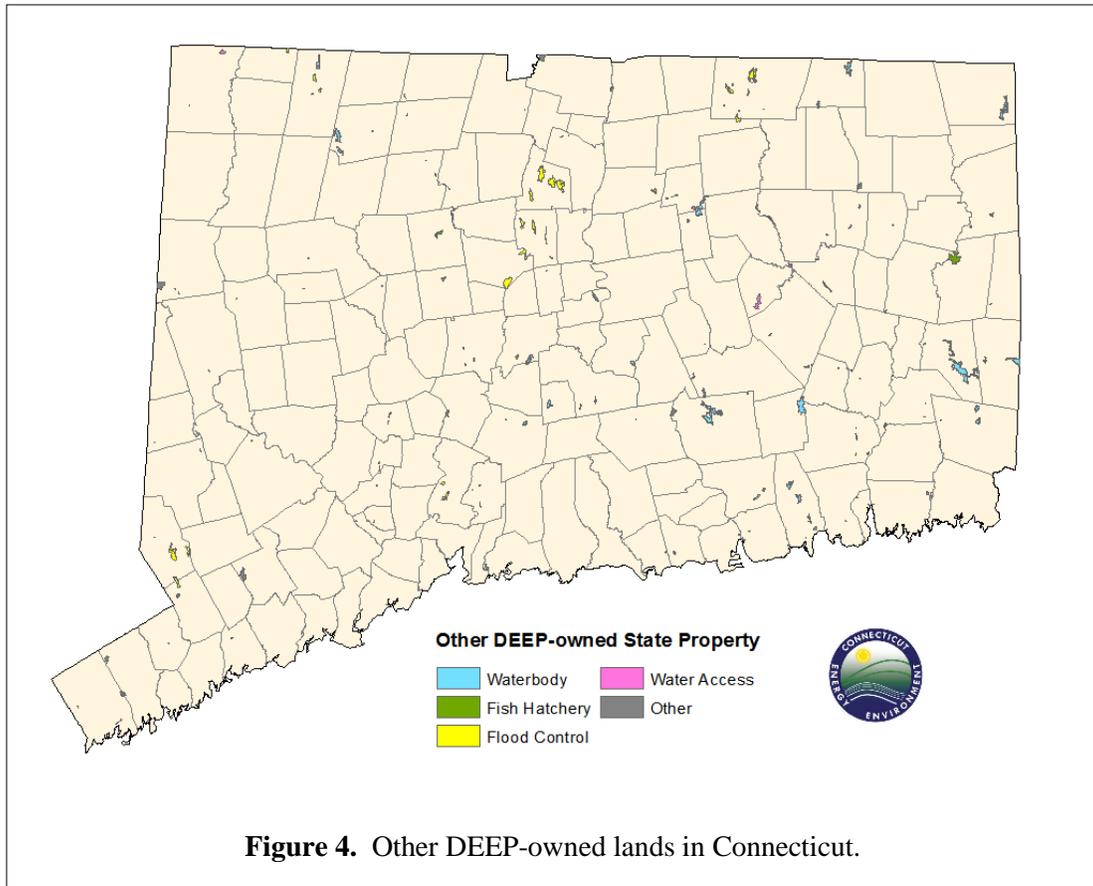
State Wildlife Management Area	Fee Acres	State Cost	Cooperator Share	Cost per Acre
Tankerhoosen	454.30	\$2,965,000	NA	\$6,527
Suffield	270.08	\$3,100,000	NA	\$11,478
Meadow Brook	161.88	\$0	\$290,000	\$1,791
Sciongay Property/Chapman Pond	149.20	\$0	\$1,200,000	\$8,043
Roncari Property	133.30	\$0	\$3,500,000	\$26,257
Franklin Swamp	87.47	\$122,000	\$175,000	\$6,775
Simsbury	56.97	\$0	\$225,000	\$3,949
James V. Spignesi, Jr.	54.70	\$0	\$285,000	\$5,210
Barn Island	54.57	\$894,250	\$900,000	\$32,880
East River Marsh	45.13	\$57,250	\$302,500	\$7,971
Quinnebaug River	20.29	\$60,000	NA	\$2,957
Talbot	19.45	\$24,313	NA	\$1,250
Wangunk Meadows	15.88	\$23,825	NA	\$1,500
Hammock River Marsh	2.80	\$0	\$13,200	\$4,714
Totals	1,542.46	\$7,248,047	\$7,000,700	\$9,238

III. Other DEEP-owned Lands

DEEP owns and provides public access and recreation to numerous inland water bodies and rivers and roughly 140 miles of shoreline and 9 miles of sandy beach along the Connecticut coast. The Department also owns several flood control areas, fish hatcheries, and other areas that have not yet been assigned a specific use category, or that are unique and do not fit into any of the previously described categories (Figure 4).

Flood control areas generally contain dams, related structures, and impoundment areas, and in some cases allow public recreation. DEEP's three major fish hatcheries where fish are either farmed or held for stocking statewide water bodies and waterways are the Quinebaug, Burlington, and Kensington Hatcheries.

Other DEEP-owned areas include the Marine, Eastern, and Western District Headquarter facilities and the Israel Putnam Monument. Not all of the lands in these categories are counted towards the State’s open space goal of protecting 21% of Connecticut, especially DEEP buildings such as operational headquarters and garages.



IV. Open Space Held by Other State Agencies

The State Department of Agriculture (DoAg) [Farmland Preservation Program](#) has a goal of preserving 130,000 acres of farmland, with 85,000 acres of cropland. The objective of program is to secure a food and fiber producing land resource base, consisting primarily of prime and important farmland soils, for the future of agriculture in Connecticut. DoAg protects

farmland through the acquisition of the development rights to, and placing permanent non-agricultural use restrictions on, properties in active agriculture.

As of December 2015, the Farmland Preservation Program has helped DoAg acquire the development rights over more than 41,500 acres on 315 farms. Lands where DoAg has acquired development rights remains in private ownership and are not available to the general public for use without further agreement from the farm owner. Because lands protected from development by DoAg are not maintained for ecological or public outdoor recreational purposes, these lands have not been counted towards the overall State's goal of protecting 21 percent of Connecticut's land area.

Other Connecticut state agencies such as the Departments of Corrections and Mental Health and Addiction Services manage land across the state primarily for operational purposes. DEEP does not have a comprehensive inventory of lands owned by other Connecticut State agencies, nor does it know which of these lands may be of high value for ecological or recreational resource protection. In accordance with the recommendations of this plan, DEEP will be working with other agencies to identify and potentially protect in perpetuity or for some other duration State-owned lands of high conservation value.

C. Open Space Held by Land Conservation Partners

I. Municipalities

Connecticut's cities and towns care deeply about the environmental and cultural resources found on lands within and extending across their borders. Municipal officials, commission members, and residents work together, sometimes in partnership with local land trusts, to garner support and pass bond referendums that secure local funding for open space.

As of December 2015, DEEP estimates that Connecticut's municipalities own about 82,146 acres of land as protected open space. DEEP supports the acquisition of open space by municipalities by administering the State Open Space and Watershed Land Acquisition Grant Program (OSWA). Since the program's inception in 1998, over 135 cities and towns have been awarded funding for the protection of over 30,000 of public open space.

Between 2007 and 2015, 51 municipalities closed on 119 projects preserving 6,895 acres with \$32,672,895 in assistance from OSWA (Table 4). An additional 5 projects were closed in collaboration between municipalities and non-profit land conservation organizations, preserving 576.8 acres with \$1,796,375 in assistance from OSWA (Table 5).

Table 4. Acquisition projects closed by municipalities with partial funding from the State Open Space and Watershed Land Acquisition Grant Program: 2007-2015.			
Year	Projects Closed	Acres Protected	Grant Amount
2007	21	829.02	\$4,581,433
2008	26	1,188.53	\$6,313,245
2009	10	929.39	\$3,885,723
2010	20	1,005.54	\$4,659,000
2011	13	967.83	\$4,937,500
2012	6	317.23	\$1,950,378
2013	7	238.32	\$1,520,900
2014	8	830.41	\$2,229,250
2015	8	588.96	\$2,595,466
Totals	119	6,895.25	\$32,672,895

Table 5. Collaborative acquisition projects completed with partial funding from the State Open Space and Watershed Land Acquisition Grant Program: 2007-2015.			
Conservation Partners	Project Name	Acres Protected	Grant Amount
Town of Somers & Northern Connecticut Land Trust	Whitaker Woods Property	265.10	\$450,000
City of Norwalk & Norwalk Land Trust	White Barn Parcel	5.13	\$450,000
Town of Old Lyme & The Nature Conservancy	Roger Tory Peterson Property	54.26	\$357,675
Town of Somers & Northern Connecticut Land Trust	Trappe Property	138.67	\$275,000
Town of East Haddam & The Nature Conservancy	LeFebvre Property	113.64	\$263,700
Totals		576.80	\$1,796,375

For example, the Whitaker Woods and Trappe Property projects awarded to the Town of Somers were in partnership with the Northern Connecticut Land Trust (NLCT). One of the last intact undeveloped areas in Somers, the Whitaker Woods Property protects land adjacent to the Shenipsit State Forest and existing NCLT property. The project’s acquisition connects to a nearby Blue-Blazed Hiking Trail to create a contiguous recreational trail system.

Two years after closing on the Whitaker Woods Property, the Town of Somers and the NCLT partnered to acquire the Trappe Property to close gaps in other local trails, protect the summit of Bald Mountain Ridge, and safeguard steep slopes, forestland, and several streams important to the natural area’s ecosystem.

Unique Conservation Partnerships in Connecticut
The Lower Connecticut River and Coastal Region Land Trust Exchange

The [Lower Connecticut River and Coastal Region Land Trust Exchange](#) (LTE) is a Regional Conservation Partnership which consists of 14 land trusts representing 17 communities of its coordinating organization, the Lower Connecticut River Valley Council of Governments (RiverCOG).

The LTE performed a geographic information system analysis to produce a series of maps and a natural resource-based [Strategic Conservation Plan](#) for its region. The maps help members of the LTE make better decisions about land protection by identifying and prioritizing lands that, if protected, will preserve water quality, critical habitats, and working landscapes. The LTE plans to update their planning process with further mapping criteria that could be considered in the acquisition of conservation lands, including proximity to existing open spaces and to State Officially Designated Greenways.

As the local municipal planning organization, the RiverCOG will implement the results of the LTE-produced maps to target public outreach and education concerning natural resource protection, best land use and management practices, and land acquisition for open space purposes.

II. Non-profit Land Conservation Organizations

Privately operating, non-profit land conservation organizations (NLCOs) are key allies in State and local land protection efforts. There are 138 land trusts in Connecticut, comprised of over 3,500 active volunteers and over 37,000 members and financial supporters. These and other conservation organizations not only directly acquire land and easements for conservation, but also assist the State and municipalities in open space protection.

As of December 2015, DEEP estimates that NLCOs own about 63,870 acres of open space in Connecticut. However, the Land Trust Alliance reported in its 2010 census that Connecticut land trusts held 99,549 acres in permanently protected open space, and the National Conservation Easement Database reported that in 2014 land trusts held 64,146 acres under easements (LTA 2010; NCED 2014). These disparities emphasize the need for a more accurate open space database administered in cooperation with statewide land conservation partners.

Since the program's inception in 1998, over 60 non-profit land trusts or other conservation organizations have been awarded funding for land acquisition under the State Open Space and Watershed Land Acquisition Grant Program (OSWA). Between 2007 and 2015, 34 NLCOs closed on 74 projects preserving 5,361 acres with \$17,664,509 from OSWA (Table 6).

Table 6. Acquisition projects closed by non-profit land conservation organizations with partial funding from the State Open Space and Watershed Land Acquisition Grant Program: 2007-2015.			
Year	Projects Closed	Acres Protected	Grant Amount
2007	9	626.68	\$1,933,802
2008	14	574.64	\$3,657,150
2009	5	369.54	\$1,289,255
2010	5	217.42	\$1,213,100
2011	10	710.80	\$2,622,842
2012	5	436.56	\$755,200
2013	8	992.55	\$1,375,250
2014	8	711.11	\$1,578,710
2015	10	721.86	\$3,239,200
Totals	74	5,361.16	\$17,664,509

Unique Conservation Partnerships in Connecticut
The Litchfield Hills Greenprint Collaborative

The [Litchfield Hills Greenprint Collaborative](#) is a Regional Conservation Partnership of over two dozen local land trusts and community leaders in 28 towns committed to protecting land of regional significance across northwest Connecticut. Supported by staff at the non-profit Housatonic Valley Association (HVA), members of the Greenprint share a vision of protecting half of the remaining prime farmland, core forestland, and drinking water resources across the Litchfield Hills.

This goal equates to more than 150,000 acres protected, and the Greenprint aims to proactively conserve an additional 70,000 acres by year 2030. To this end, members of the Greenprint shares expertise and GIS tools to leverage resources and help its partners make better decisions about land protection in their region.

A conservation success by the Greenprint was marked by the acquisition of the Itwaka Girl Scout Camp in Norfolk in 2013. Members of the Greenprint worked closely with the Norfolk Land Trust to purchase the property for \$630,000 with \$284,000 in funding from the State Open Space and Watershed Land Acquisition Grant Program, \$157,500 from the U.S. Forest Service Highland Conservation Act grant program, and the remainder from private donations.

III. Water Utility Companies

Connecticut private and quasi-public water utility companies support conserving lands that enhance protections of drinking water supplies. Many Connecticut water companies have been acquiring the land that protects their drinking water sources since their inception in the late 19th and early 20th centuries. They actively seek to acquire appropriate watershed lands that improve or maintain water quality, including steeply sloping lands, large tracts of forest cover near watercourses, floodplains, wetlands, and groundwater recharge areas.

DEEP estimates that Connecticut water companies hold approximately 97,584 acres, which represents nearly 20 percent of all open space ownership in the state. This area of open

space includes over 5,800 acres of Class I and Class II designated lands²³ acquired by DEEP's conservation partners through the Open Space and Watershed Land Acquisition Grant Program.

Water company watershed lands have been historically managed for the protection of public health. The State Department of Public Health (DPH) oversees the use of land owned by water companies through a statutory permitting requirement under CGS section 25-32(b), more commonly known as the Water Company Land laws. Under this set of laws, water companies are prohibited from selling or using their Class I and II lands for residential, commercial or industrial purposes or recreational purposes that involve intense development.

Allowed with DPH permit approval, many water companies provide for passive public recreation on their land holdings. The [Centennial Watershed State Forest](#) is a prime example of water companies working together with DEEP and a non-profit land conservation organization to conserve valuable drinking water supply watershed land and allow access for passive recreation permitted by DPH.

The Aquarion Water Company's reservoirs are surrounded by more than 15,000 acres in the Centennial Watershed State Forest. The State Forest was acquired in 2002 and is managed in partnership by Aquarion, DEEP, and The Nature Conservancy. A hiking permit allows access to 17 miles on the Blue-Blazed Saugatuck and Aspetuck trails, a fishing permit allows freshwater fishing at the Saugatuck, West Pequonnock, and Far Mill reservoirs, and a hunting permit provides access to seasonal deer hunting.

²³ Defined in (CGS) Sec. 25-37c

Unique Conservation Partnerships in Connecticut
South Central Connecticut Regional Water Authority

Water companies are authorized to sell lands they own that are deemed no longer needed for the operation, protection, and maintenance of a public water supply system. After undergoing a required statutory process with the Department of Public Health, many lands sold by water companies have been purchased by the State, municipalities, and land trusts for permanent conservation as open space. For example, the South Central Connecticut Regional Water Authority sold 411 acres of its holdings known as the Racebrook Tract to the Towns of Orange and Woodbridge for conservation, environmental education, and public recreation purposes.

One of the first awards in the program's history, in 2000 the Town of Orange acquired 230 acres of Racebrook Tract with \$450,000 in assistance from DEEP's Open Space and Watershed Land Acquisition Grant Program. In three phases between 2005 and 2010, the Town of Woodbridge was awarded DEEP open space grants totaling over \$1.2 million to acquire an additional 181 acres of the Tract.

This multi-phase, multi-partner watershed land acquisition for open space is exemplary of effective conservation partnerships between a water company and municipalities with funding assistance from the State. As part of the purchase agreements, the South Central Connecticut Regional Water Authority committed to the re-investment of the proceeds from the sales towards the acquisition of additional Class I and Class II designated watershed lands.

The protection of the Racebrook Tract watershed lands served to not only conserve forest and riparian habitat, offer scenic recreation opportunities, and provide region-wide access to open space for the Greater New Haven area, but also resulted in the acquisition and preservation of twice the amount of watershed lands that might otherwise be accomplished.

D. Statewide Trails & Greenways

Trails and many greenways provide passive recreation opportunities, encourage active lifestyles, support tourism, and connect open spaces across the state. Trails and greenways cover over 1,000 miles in Connecticut and run through federal, state, municipal, and private property. More than 825 miles of the state's recreational trails are part of the Blue-Blazed Hiking Trail System managed by the [Connecticut Forest & Park Association](#).

trails, paved and unpaved, are located along abandoned rail, trolley, and canal lines that were purchased by the State as part of a railbanking program. These include the Farmington Canal Heritage Greenway, and the Air Line, Hop River, Moosup Valley, and Larkin State Park Trails.

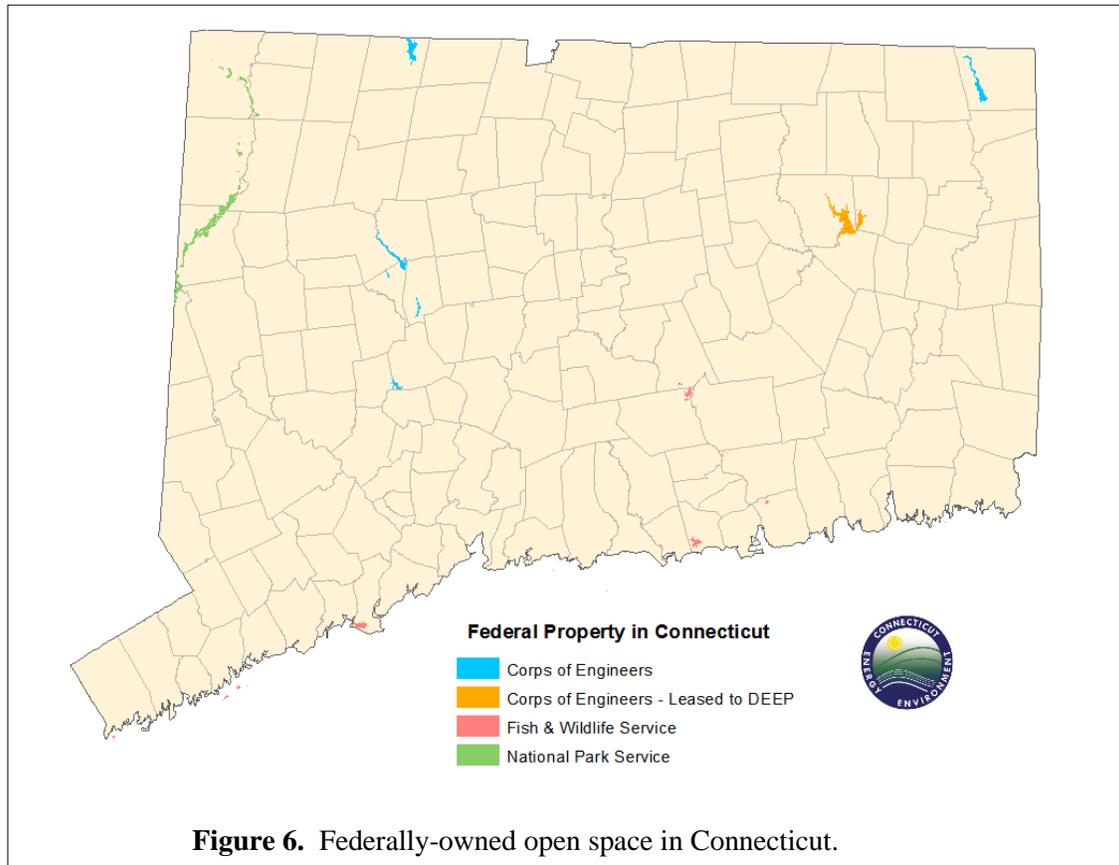
Two examples of multi-state and multi-agency trails are the New England National Scenic Trail and the East Coast Greenway. Much of the Metacomet-Monadnock-Mattabesett Trail System in Connecticut and Massachusetts has been federally-designated as the [New England National Scenic Trail](#). This National Scenic Trail is approximately 215 miles long and crosses 41 communities in central Connecticut and western Massachusetts. Since its federal designation, a 14-mile extension to the Long Island Sound has been added to the route.

The [East Coast Greenway](#) is a National Millennium Trail running 2,900 miles from Florida to Maine, 198 miles of which passes through Connecticut. In 2013, portions of the Air Line and the Hop River State Park Trails in eastern Connecticut were added to the Greenway, helping to promote and connect open space and historic mill towns. To the west, the Greenway connects the cities of Hartford, New Haven, Bridgeport, and Stamford. It also connects and allows users to tour the Farmington Canal Heritage Greenway in Simsbury.

Trails and greenways that are not protected from development through legal means such as deed or conservation easement restrictions do not count towards the State's open space goal of protecting 21 percent of Connecticut's land base. The official designation or recognition of State trails, greenways, and blueways for their ecological and cultural values emphasizes the need and demand to protect and connect these lands as dedicated open space.

E. Federally-owned Open Space

The U.S. National Park Service, Fish and Wildlife Service, and Army Corps of Engineers protect and manage about 10,000 acres in Connecticut for passive outdoor recreation, wildlife habitat, and flood control purposes (Figure 6).



I. U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service owns and administers two National Wildlife Refuges (NWR) in Connecticut: the Stewart B. McKinney NWR and the Silvio O. Conte National Fish and Wildlife Refuge.

Established in 1972, the [Stewart B. McKinney National Wildlife Refuge](#) is Connecticut's first federally-owned conservation land holding. Located within the Atlantic Flyway, the Refuge spans 70 miles of Connecticut shoreline and is comprised of 10 units that encompass more than 1,000 acres of forest, barrier beach, tidal wetland, and fragile island habitats.

In addition to habitat for several species of mammals, insects, and other wildlife, the Stewart B. McKinney NWR provides critical habitat for federally endangered roseate terns, federally threatened piping plovers, and a nesting population of saltmarsh sparrows, which are listed by DEEP as a species of special concern and as 'globally vulnerable' by International Union for Conservation of Nature.

In 1997, the entire Connecticut River watershed was designated as the [Silvio O. Conte National Fish and](#)

[Wildlife Refuge](#). Comprised of 7.2 million acres within the states of Connecticut, New Hampshire, Vermont, and Massachusetts, the Conte Refuge is the nation's only Fish and Wildlife Refuge in the country.

Great Thicket National Wildlife Refuge Proposed for New England and New York

Over the past century, shrubland and young forest across the Northeast have been cleared for development or have grown into mature forests. As this habitat has disappeared, populations of songbirds, mammals, and other wildlife that depend on it have fallen.

The U.S. Fish and Wildlife Service, state agencies, private landowners, and conservation organizations have responded by restoring and protecting shrublands and young forest in our region. DEEP and the USFWS have partnered with private landowners in the Sharon and Ledyard areas to improve habitat for shrubland and young forest wildlife including the New England cottontail. DEEP has also improved habitat in Pachaug State Forest. Despite progress, more protected and managed lands are needed to restore wildlife populations and return balance to northeast woodlands.

In early 2016, the USFWS proposed to establish [Great Thicket National Wildlife Refuge](#), a system of public lands that would be dedicated to managing shrubland habitat and enjoyed by visitors whenever possible. If the proposed Refuge Land Protection Plan is approved, DEEP could begin working with willing and interested landowners to acquire or protect up to 4,000 acres in areas of southeastern New London and western Litchfield counties.

The Conte Refuge protects over 36,000 acres within the Connecticut River watershed and the Service is actively seeking to acquire additional lands throughout the region.

Conte Refuge land in Connecticut currently includes the 31-acre Deadman's Swamp in Cromwell, the 56-acre Roger Tory Peterson Unit in Old Lyme, and the 425-acre Salmon River and 50-acre Whalebone Cove Divisions in Haddam and Lyme. These lands protect biologically diverse habitats that support numerous fish and wildlife species throughout the year.

II. U.S. National Park Service

The U.S. National Park Service (NPS) owns one National Historic Site and one National Scenic Trail in Connecticut. In 2013, these two National landmarks attracted 22,862 visitors and generated \$1,300,000 in economic benefit from tourism (Cullinane et al. 2013). NPS owns and manages the 110-acre Weir Farm National Historic Site in Wilton, one of only 79 National Historic Sites in the NPS system and the only designated National Historic Site in Connecticut.

In partnership with the U.S. Forest Service and the non-profit Appalachian Trail Conservancy, NPS owns and manages the Appalachian National Scenic Trail, a 2,185-mile footpath along the Appalachian Mountains from Georgia to Maine. A 51.6-mile portion of the Appalachian National Scenic Trail runs in Connecticut along ridgelines to the west above the Housatonic River Valley.

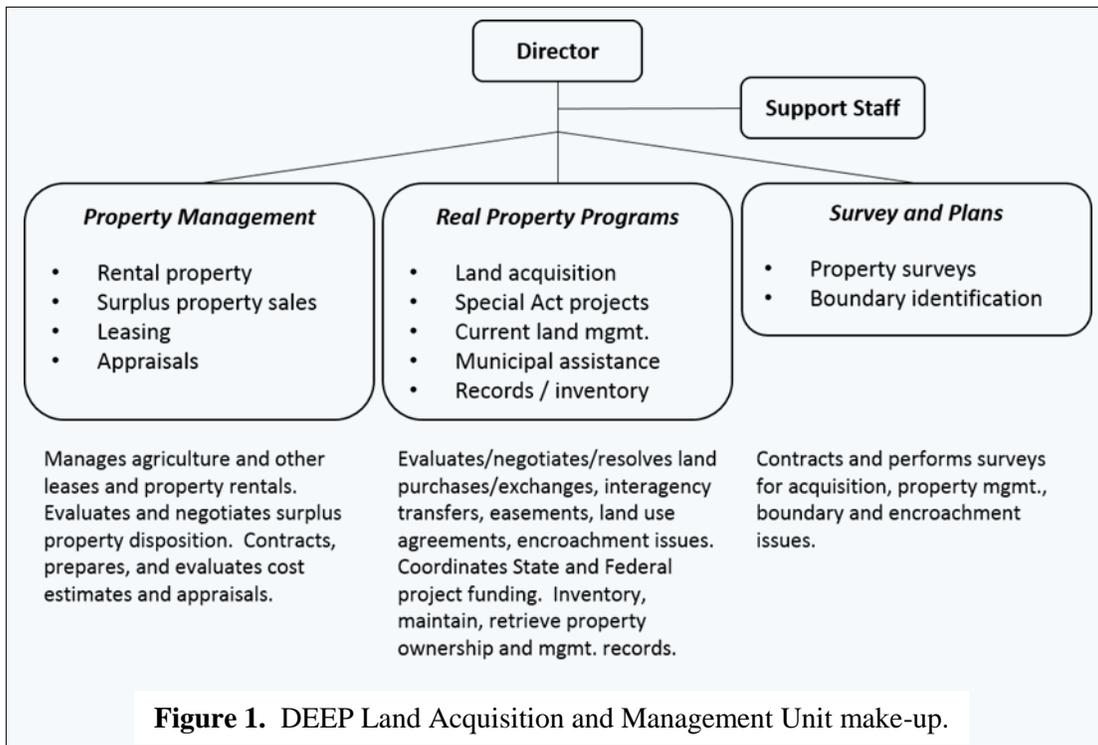
III. U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers own and actively maintain eight large flood control dams and approximately 4,000 acres of associated open space. Six of these sites (Thomaston Dam, Black Rock Dam, Colebrook River Lake, Hancock Brook Lake, Hop Brook Lake, and

Northfield Brook Lake) are located in western or northwestern Connecticut, while the West Thompson and Mansfield Hollow Lakes are located in eastern Connecticut. All of these sites are open to recreational use and collectively attract about one million visitors annually.

IV. Land Conservation Funding Programs in Connecticut

There are three primary land acquisition programs administered by the State of Connecticut. Two of these programs are administered by DEEP while the other is through the State Department of Agriculture. The principle goal of each program is the conservation of undeveloped land. Within the Office of Constituent Affairs and Land Management, DEEP’s Land Acquisition and Management Unit (LAM) implements the agency’s open space policies and programs (Figure 1).



A. State Recreation and Natural Heritage Trust Program

The [Recreation and Natural Heritage Trust Program](#) (RNHTP) is DEEP’s main program for purchasing or conserving lands that add to the State’s system of Parks, Forests, and Wildlife Management Areas for conservation and public use and benefit. The program was established as a pilot project in 1986 with a \$2 million bond authorization and has since become permanent.

The purpose of the RNHTP is to acquire lands that represent the ecological diversity of Connecticut, including natural features such as rivers, mountains, coastal systems, and other natural areas, in order to ensure the preservation and conservation of such land for recreational, scientific, educational, cultural, and aesthetic purposes²⁴.

Between 2007 and 2015, about 5,865 acres in 46 towns were protected through the RNHTP (Table 1). Matching contributions by federal agencies, municipalities, and private and non-profit organizations saved the state over \$16 million in acquisition costs during this time.

Table 1. Summary of projects acquired by DEEP under the State Recreation and Natural Heritage Trust Program between 2007 and 2015. Acreages are for fee simple acquisitions and easements or right of ways are not included. Cooperator share includes the value of land donated to the State for open space conservation.

Year	Projects	Fee Acres	State Cost	Cooperator Share	Cost per Acre	Average Parcel Size (ac)
2007	21	854.72	\$4,293,205	\$450,000	\$5,549	40.70
2008	18	1,300.84	\$16,537,573	\$1,441,879	\$13,821	72.27
2009	4	118.62	\$270,000	\$1,059,620	\$11,209	29.66
2010	4	63.72	\$57,250	\$620,485	\$10,636	15.93
2011	9	557.63	\$6,436,750	\$1,248,250	\$13,782	61.96
2012	8	327.73	\$100,000	\$1,040,750	\$3,481	40.97
2013	6	467.24	\$27,862	\$2,045,138	\$4,437	77.87
2014	8	367.55	\$0	\$1,875,190	\$5,102	45.94
2015	13	1,807.19	\$4,737,000	\$10,528,408	\$8,447	139.01
Totals	91	5,865.25	\$32,429,640	\$16,788,175	\$8,997	64.45

²⁴ (CGS) Sec. 23-73

The State's land acquisition process under the RNHTP occurs through purchase or private donation in several ways including fee simple and easements for access, use, and/or conservation. While there are other land protection methods available, such as the right of first refusal, land exchanges with other public agencies or private non-profit organizations, or the transfer of development rights, these are less frequently used by DEEP.

A potential property for acquisition by the State must be for sale on the open market or the property owner must have expressed interest in the sale or donation of the property. As parcels of land are made available by willing sellers, DEEP assesses their compatibility with the framework and open space priorities established in the Green Plan. A property acquired under the RNHTP should possess one or more of the following:

1. High value for recreation, forestry, fishery, or wildlife conservation, especially if it is near a population center;
2. A prime natural feature of the Connecticut landscape, such as a major river, its tributaries and watershed, mountainous territory, an inland or coastal wetland, a significant littoral or estuarine or aquatic site, or any other important geologic feature;
3. Habitat for native plant or animal species listed as threatened or endangered or of special concern, particularly areas identified as essential habitat for such species;
4. A relatively undisturbed outstanding example of a native ecological community which is now uncommon; or
5. Is threatened with conversion to incompatible uses or contains sacred sites or archaeological sites of state or national importance.

Using a statewide acquisition priority rating system, potential properties for acquisition under the RNHTP are reviewed by a representative panel of experts on water resources, recreation, fisheries, and wildlife throughout the agency to fully evaluate and weight the conservation attributes of each individual parcel.

This rating system, which ranks parcels on a number of factors, such as the factors above, the value and cost, and whether the proposed acquisition borders existing state property, provides the most objective means possible of ensuring that DEEP acquires the most important ecological and recreational places. Properties that service two or more functions rank highly on the rating system.

DEEP relies on bond funding to sustain land acquisitions for open space. Since 1998, the State Bond Commission has allocated more than \$177 million towards the RNHTP. Yearly funding levels for the RNHTP peaked from 2000-2002 following the year the statutory goal to protect 21 percent of the state was established, but have diminished since (Figure 2).

As a result of declining funding allocations for DEEP land acquisitions, the State has had difficulties keeping on track to reaching its share of responsibility for Connecticut's total open space goal. Securing continual funding for the RNHTP will remain a priority for DEEP. Reaching Connecticut's open space goals will require effective cooperation among all land use planning and conservation partners to leverage resources.

With the adoption of this Green Plan, and as discussed in Section VI, DEEP will be working to evaluate lands of high-conservation or recreational value. Equipped with this information, DEEP can be more proactive and will seek to contact land owners to determine if they are interested in selling their land for conservation purposes.

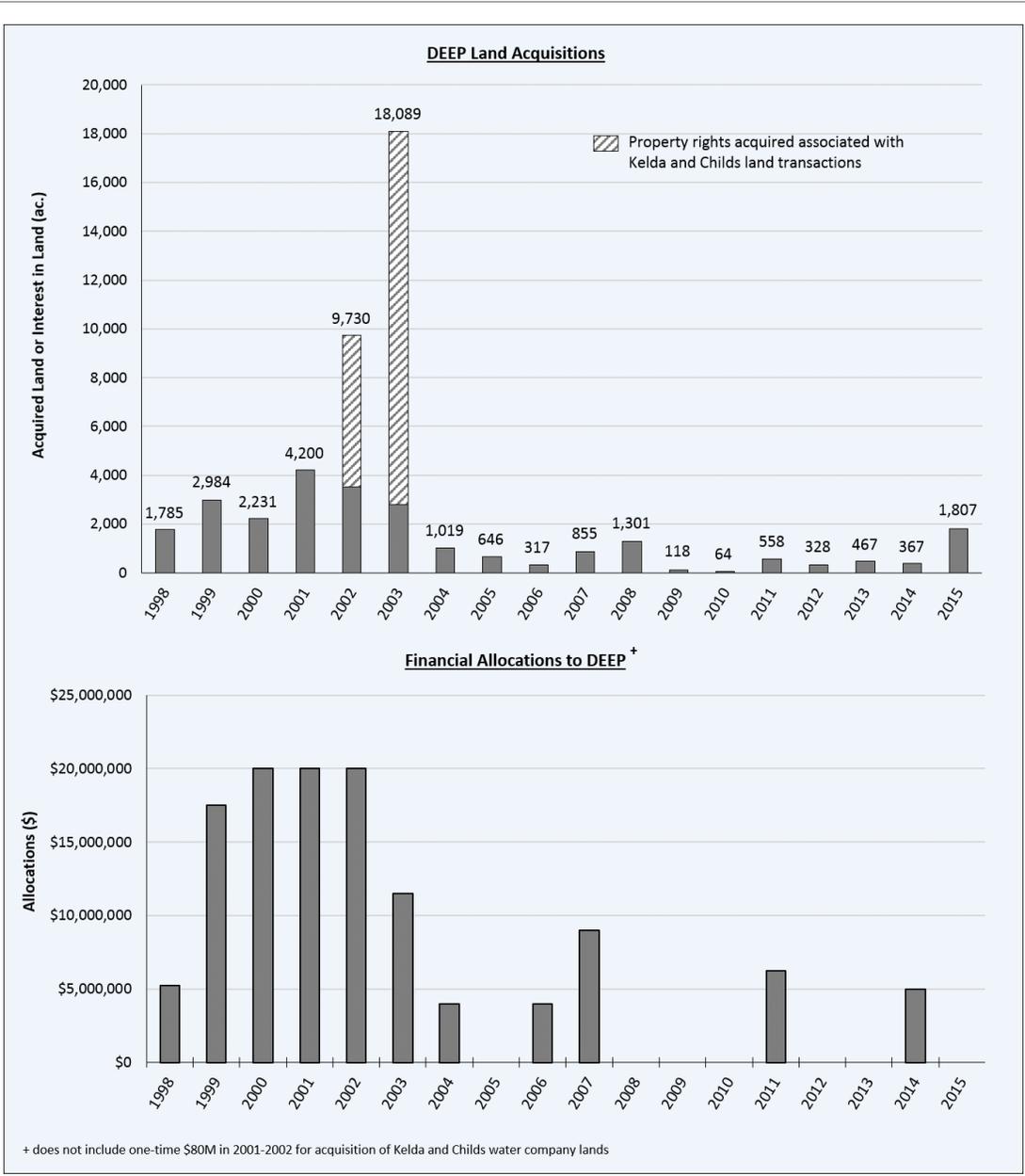


Figure 2. DEEP annual acquisitions for conservation (top) and State financial allocations (bottom) under the Recreation and Natural Heritage Trust Program since 1998. Acreage includes fee simple and conservation easement acquisitions.

I. Cooperators Provision of the Recreation and Natural Heritage Trust Program

Partnering with cooperators, including municipalities, non-profit land conservation organizations, utility companies, and federal and other State agencies, is beneficial to the State for acquiring lands for open space purposes. Cost-sharing cooperators allow DEEP to reduce property acquisition expenses through a statutory provision²⁵ of the RNHTP that requires a minimum investment from cooperators before the state enters into such agreements.

Designed to stretch State funding for new acquisitions and reduce stewardship costs, the Cooperators provision offers a mutual benefit between the State and one or more of its land conservation partners. When the State and a partner (e.g., a municipality or land trust) have a common desire to protect a certain property but either may not have the resources available to do so, this provision allows the State to enter into stewardship agreements between partners, thus sharing the costs of acquisition and land management.

The responsibility for managing properties acquired in this manner is negotiated between DEEP and the contributing partner(s) involved in the transaction, however, the property is owned by the State. In the case of land donations to the State, a cooperator may steward the property while the State maintains ownership. For example, under a stewardship agreement, the Town of Columbia and DEEP jointly manage Mono Pond for natural resource conservation and public passive recreation.

With an understanding that DEEP seeks to actively maintain lands for certain uses such as passive recreation and wildlife habitat, contributing partners must enter into a reasonable management agreement with DEEP regarding specific recreational and other activities allowed on a property bought under the provision program.

²⁵ (CGS) Sec. 23-79

Unique Conservation Partnerships in Connecticut
Coalition Conserves Coastal Grasslands in Stonington

Land conservationists led by DEEP and the Avalonia Land Conservancy worked with the Crowley family to jointly acquire a 16-acre coastal grassland on Wequetequock Cove in the Town of Stonington. The property is adjacent to DEEP's Barn Island Wildlife Management Area, Connecticut's largest and most ecologically significant coastal wildlife management area. The grassland was part of the Crowley family's dairy farm which ceased operation in 1958.

DEEP's coastal land conservation planning process identified the Crowley property in 2005 as an acquisition priority to enhance the protection of Barn Island WMA. The grassland was acquired in 2011, and abuts 48 acres of saltmarsh and coastal forest that was acquired from the Crowley family and added to Barn Island WMA in 2009.

The property's \$1,512,500 purchase price was largely funded by a \$705,000 grant from the USDA-Natural Resource Conservation Service Grassland Reserve Program (now the Agricultural Conservation Easement Program), which requires the property to be maintained as grassland and at times of the year that allow ground-nesting birds to nest successfully. Contributions from an additional eight partnering organizations included DEEP, Avalonia Land Conservancy, Stonington Land Trust, Town of Stonington Conservation Commission, New Haven Bird Club, Connecticut Ornithological Society, Audubon Connecticut, and Sarah Ann Martin Trust.

The collective efforts of these partners permanently protected important lands that provide critical breeding habitat for declining, state-listed songbirds such as the bobolink and saltmarsh sparrow. Connecticut's tidal marshes are home to half of the world's only breeding population of saltmarsh sparrows. Part of a larger 350-acre tidal marsh complex, the property includes the fringes of a 21-acre saltmarsh that is slowly migrating upland into the field in response to sea-level rise at Fishers Island Sound.

Because of the rapid loss of suitable breeding habitat as a result of sea-level rise along the eastern seaboard, the saltmarsh sparrow has been targeted as a conservation priority and may be proposed for federal species conservation listing in the near future.

B. State Open Space and Watershed Land Acquisition Grant Program

The DEEP-administered [Open Space and Watershed Land Acquisition Grant Program](#) (OSWA) leverages state, local, and private funds to create a cooperative open space acquisition program for Connecticut. This program was initiated in 1998 after the General Assembly followed through with a recommendation made by the Governor’s Blue Ribbon Task Force on Open Space, which was organized to examine ways to achieve the then-new state open space goal.

Through OSWA, DEEP awards grants to municipalities and land trusts for the acquisition of open space and to water companies for the acquisition of Class I and II watershed lands²⁶. OSWA is funded by state bonding and the Community Investment Act, a program enacted in 2005 with the passage of [Public Act No. 228](#) to create a dedicated funding source to support four public policy priorities: open space, agricultural preservation, historic preservation, and affordable housing.

Since 1998, DEEP has awarded over \$120 million in open space grant funding towards the protection of over 32,000 acres and 18 urban green and community gardens in 130 cities and towns. Between 2007 and 2015, nearly 13,000 acres in over 51 towns were protected with over \$53 million in funding from OSWA (Table 2). Over 100 acres were protected nearby urban communities, thereby providing public open space access to Connecticut’s more densely populated places.

²⁶ (CGS) Sec. 7-131d

Table 2. Summary of projects closed under the State Open Space and Watershed Land Acquisition Grant Program: 2007-2015.			
Year	Projects Closed	Acres Protected	Grant Amount
2007	31	1,720.79	\$6,965,235
2008	43	1,909.36	\$11,085,820
2009	17	1,452.99	\$5,799,228
2010	26	1,316.01	\$6,887,200
2011	23	1,603.67	\$7,560,342
2012	11	740.33	\$2,045,478
2013	15	1,230.88	\$2,896,150
2014	16	1,541.53	\$3,807,960
2015	19	1,424.46	\$6,098,633
Totals	201	12,940.02	\$53,145,779

In return for grants, the State of Connecticut receives a permanent conservation and public access easement on property acquired through OSWA to ensure that the property is protected and available to residents as open space in perpetuity. Where development rights are to be purchased, the State will become an equal holder of those rights as a substitute for the easement. In the case of land acquired for water supply protection, a water company may jointly hold an easement with the State or a non-profit organization.

Class I watershed land is sometimes exempt from the public access requirement for health and safety reasons. DEEP is also willing to accept limited public access, at the discretion of the Commissioner, when a conservation easement is purchased on land where general public access would be disruptive of agricultural activity.

The OSWA provides municipalities, non-profit land conservation organizations, and water companies with up to 65 percent of either fair market value of development rights or purchase price for property. Projects in distressed municipalities²⁷ or targeted investment communities are provided up to 75 percent of the purchase price (Table 3).

²⁷ Defined in (CGS) Sec. 32-9p(b). A current listing of these communities can be found [here](#).

The passage of [Public Act No. 15-23](#) expanded DEEP's grant awarding policies. Any potential award grantee may use an OSWA grant and a federal grant to fund up to 90 percent of the total cost of fair market value of a project acquisition. When certain conditions exist, the Commissioner may authorize a grantee to use OSWA grant funding and any funds made available by the federal government to fund 100 percent of the fair market value of a project²⁸.

Grants under OSWA are made for the purchase of land that is one or more of the following:

1. Valuable for recreation, forestry, fishing, conservation of wildlife or natural resources;
2. A prime natural feature of the state's landscape, including, but not limited to, a shoreline, a river, its tributaries and watershed, an aquifer, mountainous territory, ridgelines, an inland or coastal wetland, a significant littoral or estuarine or aquatic site or other important geological feature;
3. Habitat for native plant or animal species listed as threatened, endangered or of special concern;
4. A relatively undisturbed outstanding example of a native ecological community which is now uncommon;
5. Important for enhancing and conserving water quality;
6. Valuable for preserving local agricultural heritage; or
7. For cases involving water companies, eligible to be classified as Class I or Class II watershed land.

²⁸ (CGS) Section 7-131g(c)

Table 3. DEEP approval of Open Space and Watershed Land Acquisition Grants.

Grant Sponsor	Acquisition Purpose	Grant Amount Not to Exceed*
Municipality	Open space	65% of fair market value
Municipality	Class I & Class II water supply	65% of fair market value
Distressed municipality or targeted investment community ⁺	Open space	75% of fair market value
Distressed municipality or targeted investment community ⁺	Resource enhancement or protection	50% of cost of such work
Nonprofit land conservation organization	Open space or watershed protection	65% of fair market value
Non-profit land conservation organization and water company (If land is located within a distressed or targeted community)	Open space or watershed protection	75% of fair market value
Water Company	Class I & Class II water supply	65% of fair market value

* Represent the maximum grant award. Awards may be reduced to a lesser percentage or may be reduced to not exceed an administrative cap.

+ A current listing of these communities is found [here](#).

Urban Green and Community Garden Grants

Due to a renewed focus on urban green space and community gardens, distressed municipalities and targeted investment communities are eligible to receive grants to develop or enhance urban open space for public enjoyment and/or environmental education. The promotion of open space in an urban setting may include but it may not be limited to the development of a community garden or reclaiming and enhancing existing open space to allow public use.

Awards are given to those projects that demonstrate the highest ability to benefit urban communities in close proximity to population centers. Since 2007, UGCG has granted over \$1 million in cities including Bridgeport, Bristol, Enfield, Hamden, Hartford, New Haven, New London, Norwalk, Putnam, South Norwalk, and Windham. These grants funded the creation or enhancement of education centers, greenhouses, and ADA-accessible walkways and raised bed gardens for children, persons with disabilities, and senior citizens.

Every project completed with funding assistance from OSWA and the Urban Green and Community Garden Grant programs contribute to the conservation of environmental and cultural resources, ensure universal access whenever possible, and enhance the quality of life of the state and local communities.

I. The Natural Heritage, Open Space and Land Acquisition Review Board

Established by statute and commissioned by the General Assembly, the Recreational and Natural Heritage, Open Space and Watershed Land Acquisition Review Board (Review Board) plays a supportive role in advancing the State towards its open space goals²⁹. The Review Board convenes several times a year to review DEEP grant selection criteria and policies, provide guidance and review of land protection strategies including the Green Plan, and make recommendations to the Commissioner on funding open space grant proposals.

The Review Board also evaluates on an on-going basis the current cost-sharing formula for open space grants and the rules regarding eligibility for the State Urban Green and Community Garden grant program. The purpose of these evaluations is to ensure that important open space conservation projects are not lost to an inability for partners to fund the required local cost-share match.

Lastly, by promoting public participation and investigating the State's conveyance process, the Review Board also serves to ensure that dedicated state-owned open space lands are protected and maintained as lands of high conservation value for natural resource and public use and benefit.

²⁹ (CGS) Sec. 7-131e(b)

C. Federal Land Acquisition Funding Programs

The federal programs discussed below are only a sample of the funding assistance programs that exist to aid the State and its land conservation partners in open space acquisition.

All programs are subject to final congressional appropriations action. DEEP encourages its partners to explore these funding opportunities and more.

Because application requirements may differ among programs, should DEEP's partners choose to apply for federal funding in addition to a State open space grant, they should make sure they understand and fulfill any requirements necessary for those programs, as well as those for the State open space grant.

Partners should also exercise caution to ensure that acceptance of federal funding would not place a restriction on the property that could be in conflict with the State's conservation and public access easement requirements.

Caps Raised for Open Space Projects Funded by Combined State and Federal Grants

Historically, under the State's Open Space and Watershed Land Acquisition Grant Program, the combined amount of federal and state funds used to acquire open space land could not exceed 70 percent of the total cost of fair market value of an acquisition project.

With the passage of new legislation in 2015, should an awardee of a state grant have the opportunity to combine their grant funds with a federal grant award, the total grant, i.e., the combined amount of federal and state funds, can fund up to 90 percent of the total cost of a project.

Moreover, when certain conditions exist, DEEP may authorize a grantee to use grant funding and any funds made available by the federal government to fund 100 percent of the fair market value of a project.

These new caps should encourage DEEP's conservation partners to pursue federal grant matching dollars and help them reach their portion of the state open space goal.

I. Coastal and Estuarine Land Conservation Program

Organization / Agency: The National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management (NOAA-OCRM), administered by DEEP's Office of Long Island Sound Programs.

Program Purpose: To protect important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses, giving priority to lands which can be effectively managed and protected and that have significant ecological value³⁰.

Eligibility: Available program funds are administered through a competitive state grant program. In order to receive CELCP coastal land acquisition funding through the state grant program, coastal states are expected to:

- Develop a [State CELCP Plan](#) for approval by NOAA-OCRM;
- Solicit land acquisition project proposals from stakeholders (e.g., coastal municipalities, land trusts, state agencies) consistent with the conservation priorities outlined in its CELCP Plan;
- Nominate its highest priority coastal land acquisition projects for review by a national project review selection committee; and
- Successfully compete with other coastal state land acquisition project proposals pursuant to a national review committee's ranking process.

Success in Connecticut:

The East River Marsh Complex is an estuarine embayment within the Long Island Sound estuary, one of only 28 estuaries with the U.S. Environmental Protection Agency's National Estuary Program. In 2009, the Town of Guilford purchased approximately 631 acres of open space within this complex, completing one of the largest coastal land projects in the history of the State's coastal management program.

Now known as the East River Preserve, the purchase was significant not only for its size, but also for the protection of coastal forest, inland wetlands, tidal marshes, open fields, and passive recreational use along the East River. Of the 631 acres, 48 acres are protected under two conservation easements jointly held by DEEP. The property was acquired with the assistance of a \$3 million grant from the federal CELCP.

³⁰ Public Law 107-77

II. Long Island Sound Study Program

Organization / Agency: A partnership among the U.S. Environmental Protection Agency and the States of Connecticut and New York.

Program Purpose: The [Long Island Sound Study](#) (LISS) administers several grant programs aimed at uniting a wide range of government agencies, universities, businesses, and community groups in protecting the Sound, giving priority to issues surrounding coastal and estuarine land acquisition and restoration, management planning, water quality monitoring, and public involvement and education.

Eligibility: Depends on the specific LISS grant program, but all projects must implement the goals and recommendations contained in the [Comprehensive Conservation Management Plan for Long Island Sound](#). For example, for the Futures Fund, non-profit organizations, academic institutions, and state, tribal, and local governments are allowed to apply.

Success in Connecticut:

Table 4. Selected State land acquisitions made with assistance from the U.S. Environmental Protection Agency's Long Island Sound Study grants.*					
Year Purchased	Property Name	Town	Grant Award	Acres	Purpose of Acquisition
2009	Crowley I	Stonington	\$650,000	48	Addition to Barn Island Wildlife Management Area
2010	Sheep Farm and Fort Hill Brook Ecosystem Preservation	Groton	\$82,200	63	Cultural heritage and wildlife habitat protection
2010	Griswold Airport	Madison	\$260,000	17	Adjacent with tidal wetlands at Hammonasset Beach State Park
2011	Matson	Stonington	\$250,000	6	Addition to Barn Island Wildlife Management Area
2013	Hansell / Olsen	Voluntown / North Stonington	\$172,138	101	Addition to Pachaug State Forest
2013	Sciongay	Westbrook and Clinton	\$1,200,000	149	Long Island Sound and public water access protection

* Title to properties acquired not necessarily held by DEEP.

III. Highland Conservation Act Grant Program

Organization / Agency: The U.S. Department of the Interior and U.S. Forest Service, administered through the U.S. Fish and Wildlife Service.

Program Purpose: The [Highland Conservation Act](#) provides funding for the acquisition of lands or interest in land that are important for the water, forest, agricultural, wildlife, recreational, and cultural resources of the Highlands Region in the states of Connecticut, New York, New Jersey, and Pennsylvania. The Connecticut Highlands is a triangle around the northwest corner bounded by the state lines to the west and north, from Torrington to Danbury.

Eligibility: The Highland states, or any agency or department of any Highlands state with authority to own and manage land for conservation purposes, may apply to the U.S. Fish and Wildlife Service for acquisition project funding. Applicants may submit individually or jointly for partnership projects. Projects must be consistent with areas identified in the [Connecticut and Pennsylvania 2010 Update](#) as having high resource value.

Success in Connecticut:

Table 5 lists completed acquisition projects in Connecticut which were funded in part by the Highland Conservation Act grants. No funding was allocated for any Highland states in federal fiscal years 2011, 2013, or 2014. In 2015, DEEP was approved for \$750,000 from the program, which the agency is currently allocating towards the acquisitions of the Benton Hill Preserve in Sharon and the West Aspetuck Wetlands in Kent. In various stages of the acquisition process from negotiation to closing, these properties are both located within the program’s “Head of the Highlands Project Area.” DEEP continues to prepare high-ranking projects for future grant application submissions.

Table 5. Federally-administered Highland Conservation Act grants awarded to Connecticut and allocated by DEEP since 2007.						
Year Purchased	Project Name	Town	Acres	Fee or Easement	Grant Award	Total Purchase Price
2008	Deluca	Cannan and Cornwall	308	Fee	\$492,750	\$3,300,000
2008	Naromi	Sherman	80	Easement	\$246,100	\$746,100
2009	Ethel Walker	Simsbury	49	Easement	\$241,666	\$1,890,000
2010	Girl Scout Camp Iwatka	Norfolk	317	Easement	\$157,500	\$315,000
2010	Erich Woods	Winchester	261	Easement	\$170,100	\$910,000
2014	Girl Scout Camp Francis	Kent	249	Easement	\$520,000	\$1,040,000

IV. Land and Water Conservation Fund

Organization / Agency: The U.S. National Park Service, administered by DEEP.

Program Purpose: Provides matching grants to states and local governments for the acquisition and development of public outdoor recreation areas and facilities (as well as funding for shared federal land acquisition and conservation strategies).

The program is intended to create and maintain high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources across the nation. States are required to spend their allotted amounts within three years, otherwise it is returned to the federal government for other uses.

Eligibility: When federal funding is authorized, states including Connecticut receive an annual allocation of grant funds based on a national formula. An Open Project Selection Process is developed by States in order to solicit, rank, and select projects within their borders for nomination to the highly competitive project selection cycle.

To be eligible for grants, States must prepare and regularly update a statewide recreation plan. Connecticut's [Statewide Comprehensive Outdoor Recreation Plan](#) was submitted to the National Park Service in 2011.

Success in Connecticut:

Since 1965, the NPS has awarded Connecticut over \$64.3 million in Land and Water Conservation Fund (LWCF) grants. In 2008, DEEP purchased approximately 143 acres at the former Sunrise Resort in East Haddam with over \$1.9 million in grant funding from the LWCF. The property would become an addition to Machimoodus State Park and protects over 4,700 feet of additional frontage along the Salmon River.

Connecticut's LWCF grant balance in 2013 (\$2,084,408) was used towards the purchase of land or interest in land in 2014 and 2015: "The Preserve," (\$1,400,000) a nearly 1,000-acre coastal forest that DEEP, the Town of Old Saybrook, The Trust for Public Land, The Nature Conservancy, the Essex Land Trust, and other conservation groups collaborated to protect, and the Saner Property in Marlborough (\$684,408). The Saner Property, purchased in fee and added to the Salmon River State Forest, provides recreational opportunities and protection of a major river tributary.

V. Recreational Trails Program

Organization/Agency: The U.S. Department of Transportation Federal Highway Administration, administered through DEEP’s Parks Division.

DEEP expanded the scope of its [Recreational Trails Program](#) (RTP) under terms of Public Act 15-190, which allowed the agency to provide funding for a full range of multi-use trails and greenways projects. This legislation also expanded eligibility for grants so that non-profit organizations are able to receive funds under this program.

Program Purpose: Funds awarded through this program may be used for locally supported trails and trail systems, bikeways, and multiuse paths, including the creation of trails and pathways accessible to authorized motorized vehicle users and people with disabilities. Grant money can be allocated for a variety of purposes, including planning, design, land acquisition, construction, and publications for bikeways, walkways, and greenways, as well as for equipment and trail amenities, such as parking lots, toilet buildings, signs, and benches.

Eligibility: Awards may be made to any private non-profit organization, municipality, federal agency, or tribal government. Grant applications are reviewed by and selected for award by the Connecticut Greenways Council.

Success in Connecticut:

In early 2016, DEEP awarded \$5.8 million for [38 projects](#) to build, expand, or enhance greenways and multi-use trails through its most recent RTP grant round. Table 6 shows a selection of RTP grants made by DEEP to various non-profit groups and a municipality. Additional funded projects can be found by visiting DEEP’s RTP webpage.

Table 6. Recent grants awarded by DEEP under the U.S. Federal Highway Administration’s National Recreational Trails Program.					
Applicant	Year	Project	Federal Share	State/ Local Share	Total Project Cost
Town of Cheshire	2010	3,500-ft extension of the Farmington Canal Trail / East Coast Greenway	\$250,000	\$1,425,000	\$1,675,000
Save Ocean Beach, Inc.	2011	Installation of a 1,000-ft. ADA-compliant connector trail along Alewife Cove	\$43,320	\$10,830	\$54,150
The Last Green Valley, Inc.	2011	To design a network of accessible “blueway” waterfront trails	\$87,100	\$21,775	\$108,875
Town of Colchester	2012	For Airline State Park Trail trailhead parking lot and driveway improvements	\$20,000	\$5,000	\$25,000

D. Working Farm and Forest Programs

I. Forest Legacy Program

Organization / Agency: The U.S. Forest Service, administered through DEEP's Forestry Division with assistance from Land Acquisition and Management Unit.

Program Purpose: Protects working forest lands from conversion to non-forest uses by assisting landowners in placing conservation easement restrictions on their forests, and on the rare occasion, for the purchase of forest land outright.

Eligibility: Property must be a working forest that protects water quality, wildlife habitat, forest products, outdoor recreation, and other public benefits within a designated Forest Legacy Area, threatened by development or conversion to non-forest uses, abut or in close proximity to existing protected spaces, have other unique qualities such as a viewshed or known population of rare, threatened, or endangered species.

The USFS may fund up to 75% of program costs, with at least 25% coming from private, state or local sources (USFS 2014). Projects must have a Forest Stewardship Plan in place before an acquisition closing.

Success in Connecticut:

In addition to the projects listed in the Table 7, DEEP's Forestry Division was approved for the allocation of \$4.42 million in grants during 2015 and 2016 towards the purchase of conservation easements over 1,553 acres of land which comprise the "Whip-Poor-Will Woods Tract." This landscape-scale conservation effort by seven private landowners will increase protected land in the Stafford, Connecticut area by 10 percent, expanding on the existing abutting, or indirectly abutting, 12,960 acres of protected lands. DEEP is currently in various stages of acquiring the seven properties of the Whip-Poor-Will Woods Tract.

Table 7. Completed USFS-Forest Legacy Tracts in Connecticut as of September 30, 2014.

Tract Name	Year Acquired	Fee or Easement	Acres	Purchase Price	Federal Payment Amount
Maplewood Farm	1995	Easement	172	\$210,000	\$210,000
Great Mountain Forest (2 tracts)	2003	Fee & Easement	5,528	\$5,453,000	4,089,000
Housatonic	2000	Fee	204	\$410,000	\$0
Skiff Mountain (6 tracts)	2009	Easement	705	\$8,445,000	\$1,733,000
Pootatuck	2005	Fee	45	\$312,000	\$0
Nepaug	1999	Fee	27	\$45,000	\$0
Mattatuck	1999	Fee	55	\$170,000	\$0
Naugatuck	1999	Fee	27	\$85,000	\$0
Shenipsit	2000	Fee	311	\$597,000	\$0
Salmon River	2000	Fee	158	\$315,000	\$0
Meshomasic (3 tracts)	1999-2000	Fee	128	\$260,000	\$0
Peaceful Hill	2005	Easement	35	\$217,000	\$163,000
Pine Brook	1999	Easement	126	\$100,000	\$100,000
Stonehouse Brook (7 tracts)	2005	Easement	478	\$795,000	\$596,000
Pogmore	1995	Easement	53	\$80,000	\$80,000
Tulmeadow Farm	2011	Easement	73	\$2,830,000	\$1,415,000
Totals:			8,125	\$20,324,000	\$8,386,000

II. Natural Resources Conservation Service Programs

The following are selected programs administered by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) agency to enhance and protect farmland, forestland, and other lands for food production and environmental conservation and benefit.

A. Regional Conservation Partnership Program

Program Purpose: Created by the 2014 Farm Bill, the [Regional Conservation Partnership Program \(RCPP\)](#) is a partner-driven, locally-led approach to conservation. It is not a grant program, but promotes coordination between NRCS and partners to deliver assistance to agricultural producers and private landowners.

Assistance is delivered in accordance with the rules of the NRCS' Environmental Quality Incentive Program (EQIP), Conservation Stewardship Program (CSP), [Agricultural Conservation Easement Program \(ACEP\)](#), and [Healthy Forests Reserve Program \(HFRP\)](#); and in certain areas, the Watershed Operations and Flood Prevention Program.

Applicants identify the specific conservation activity and the appropriate covered program for outcome delivery. For example, to achieve wildlife habitat and agricultural viability objectives, easements through ACEP may be the appropriate program, or in combination with EQIP and CSP. Upon selection of final proposals, NRCS works with lead partners to develop and finalize Partnership Agreements to resource and achieve objectives.

Eligibility: A range of partners are eligible to submit proposals, including agricultural or silvicultural producers, an institution of higher education, or non-profit organization with a history of working with producers. Successful RCPP proposals will bring an array of financial and technical capabilities to projects, will demonstrate experience with working effectively and collaboratively with agricultural producers and private forest landowners, and will present innovative, sustainable, and measurable approaches to achieving conservation goals.

Success in Connecticut:

Table 8. Projects with partners or lead partners in Connecticut and funding under the USDA-NRCS Regional Conservation Partnership Program.

Funding Year	Project Name	Lead Partner	Number of Partners	NRCS Investment
2015/16	Path to Reduce Pathogens in CT Agricultural Runoff	University of Connecticut	4	\$669,000
2015/16	The Young Forest Initiative for At-Risk Species	Wildlife Management Institute	12	\$5,200,000
2014/15	Long Island Sound Watershed RCPP	Connecticut Council on Soil and Water Conservation	7	\$10,000,000
2014/15	Achieving Agricultural Water Security in Connecticut Through RCPP	University of Connecticut	7	\$400,000
2014/15	Improving Soil Health & Water Quality in the Thames River Watershed	The Last Green Valley, Inc.	4	\$400,000
Total				\$16,669,000

B. Healthy Forests Reserve Program

Program Purpose: [The Healthy Forests Reserve Program](#) (HFRP) assists landowners, on a voluntary basis, in restoring, enhancing, and protecting forestland resources on private lands through easements, 30-year contracts and 10-year cost-share agreements. The objectives of HFRP are to promote the recovery of endangered and threatened species under the federal Endangered Species Act, improve plant and animal biodiversity, and enhance carbon sequestration.

Eligibility: Applicants can enroll into 10-year forestland restoration agreements and 30-year or permanent easements for specific conservation actions. Applicants must provide proof of land ownership, or a tenant must provide written concurrence from their landowner of tenancy, for the period of the program restoration agreement or conservation easement.

Cost-Share: NRCS may contribute up to 100% of the fair market value of the land enrolled during the period the land is subject to a conservation easement, less the fair market value of the land encumbered by the easement.

C. Agricultural Conservation Easement Program

Program Purpose: The [Agricultural Conservation Easement Program](#) consolidated three former NRCS programs with the passage of the 2014 Farm Bill: the Farm and Ranch Lands Protection Program, Wetlands Reserve Program, and Grassland Reserve Program (NRCS 2014). It provides financial and technical assistance to purchase conservation easements that protect active agricultural lands and wetland conservation values.

Eligibility: Applicants must have farmland, wetland, or grassland protection plans in place, and they enter into cooperative agreements with the NRCS for the management of these lands. Under the Agricultural Land Easements component of the program, NRCS helps Indian tribes, state and local governments, and private non-profit organizations protect active agricultural lands. Land eligible for agricultural easements includes cropland, rangeland, grassland, pastureland, and non-industrial private forest land.

Under the Wetlands Reserve Easements component, NRCS helps restore, protect, and enhance enrolled wetlands for the enhancement of wildlife habitat, water quality, and opportunities for educational and passive recreational activities. There are several easement and compensation options available for private landowners and Indian tribes to protect wetlands. Additionally, NRCS pays all costs associated with recording the easement, including appraisal, survey, and recording fees.

Cost-Share: Under the Agricultural Land component, NRCS may contribute up to 50% of the fair market value of a conservation easement.

IV. Connecticut State Farmland Preservation Program

Organization / Agency: The Connecticut State Department of Agriculture.

Program Purpose: Protects active farms with the best and most productive agricultural land. It also leases to farmers state-owned agricultural lands with the cooperation of other agencies that may have custody and control of such lands.

Eligibility: Among other criteria, private landowners may apply if their property is an active farm operation, includes a minimum of 30 acres of cropland or is adjacent to a larger parcel, meets a minimum criteria for amount of prime and important farmland soils, and is nearby other active farms. The state may pay up to 100% of the value of the property's development rights, and applicants must meet requirements of the program if federal funding will be used as part of the sale.

Success in Connecticut:

As of December 2015, the Farmland Preservation Program has helped the Department of Agriculture acquire the development rights over more than 41,500 acres on 315 farms. Between 2007 and 2013, 69 farms and over 8,000 acres of active and productive farmland were protected (Table 9). More than half of the lands protected have soils classified as prime and important farmland soils.

Year	Number of Farms	Acres	Cost
2007	11	1,186	\$5,504,372
2008	7	675	\$3,785,198
2009	10	1,370	\$7,179,659
2010	15	1,228	\$6,955,585
2011	16	1,969	\$11,922,061
2012	5	610	\$4,165,574
2013	5	1,170	\$2,738,178
Totals	69	8,208	\$42,250,627

V. Purpose of, and Need for, Protected Open Space

This section briefly describes Connecticut’s critical natural resources and the co-benefits they provide to the environment and the public. Co-benefits, also known as ecosystem services, are the benefits provided to people as a result of intact and functional environmental systems, including, but not limited to air and water purification, plant and animal biodiversity, pollination services, scenic beauty, sense of place, and natural-resource based outdoor recreation and education.

Ultimately, quality public health and welfare cannot be maintained in an environment that does not provide these interconnected ecological, societal, and individual benefits. For example, during a rain storm water infiltrates the ground and becomes cleaned by spongy forest soils, which can then enter the public drinking water supply.

But as forest and natural ground cover is developed into hard, impermeable surfaces, storm water runs over the ground and causes local flooding and pollution to drain into the Long Island Sound. Continued efforts to protect these land cover types and other natural resources will ensure that they are kept healthy and abundant now and for the future.

A. Natural Heritage Resources

Plant, fish and wildlife species are interconnected and create a biodiverse and resilient landscape capable of providing essential ecosystem services for people. The 2015 [Connecticut Wildlife Action Plan](#) provides detailed information on key habitat types, conservation guidelines, and strategies for the maintenance of species populations in the state, including the acquisition of certain lands for the protection of habitat. The sections that follow generally describe some of the state’s important or unique habitats having high value for conservation as open space.

I. Freshwater and Inland Wetland Habitats

Connecticut has approximately 65,000 acres of lakes, ponds, and reservoirs and 5,830 miles of rivers and streams. About 450,000 forested and non-forested inland wetlands are also distributed across the state. These natural water resources provide essential habitat for a large diversity of invertebrates, fish, and other wildlife species such as mink and great blue herons. Many inland wetland types are rare or specialized habitats, providing the only areas in which certain amphibians breed or spend their entire life cycles.

The quality and safety of the state's [drinking water supplies](#) is dependent on functioning freshwater and wetland habitats. Intact wetlands, free-flowing water courses, and vegetated river corridor lands promote water infiltration and protect surface and underground water supplies from increased sedimentation and runoff pollution and contamination.

Freshwater and inland wetland habitats and their associated wildlife are interrelated, sensitive systems which are easily degraded or lost through land development. Over the last 20 years, Connecticut experienced a considerable amount of development on lands that were or next to freshwater resources. A study on statewide land cover changes in riparian corridors by the [Center for Land Use Education and Research](#) found that between 1985 and 2006, Connecticut gained 19,000 acres of developed land within a 300-foot zone



© P. Fusco



© P. Fusco

Virginia Rails (top) and Painted Turtles (bottom) are two of many wildlife species that thrive in clean, intact wetlands.

adjacent to rivers and streams (Wilson and Chester 2011).

As development replaces natural ground cover in riparian zones, the area of impervious surfaces increase. Removal of vegetative cover from these areas causes cold waters to warm, thus rendering habitat unsuitable for native trout, aquatic insects, and other dependent wildlife species. Stream banks become unstable, soils harden, and therefore less rainfall is absorbed into the ground, which causes flooding. Storm water runoff frequently carries sediment and pollutants from paved areas into catch basins, drains, and ultimately the nearest watercourses.

Land conservation can protect freshwater and wetland habitat quality and integrity. The acquisition of lands having high value for conserving freshwater habitat resources, such as forested lands adjacent to rivers, cold water streams, and lakes can serve to create buffers from impacts by water warming, surface runoff pollution, stream flow alterations, and other threats.

Connecticut Key Lands for Conservation Achieving Water Quality through an Integrated Water Resource Management Approach

Surface waters, including rivers, lakes, and Long Island Sound, are important resources for residents, fish and wildlife. DEEP monitors waters for uses such as drinking and fishing, as well as the water quality needed to support these. Monitoring finds some waters which are impaired and need actions to restore their quality. Other waters have good water quality which needs to be maintained or protected.

DEEP is taking a new approach called [Integrated Water Resource Management \(IWRM\)](#) to restore and protect Connecticut's water resources. The approach allows DEEP to identify areas for action plan development based on state-specific concerns, evaluating waters based on ecological, social, and pollution information while considering partnerships and the ability to realize goals. Through a [detailed process](#), DEEP has identified a draft list of watersheds as candidates for developing plans for protection or restoration of water quality. Selected areas will be refined based on public comments and on consideration of resources available to support developing and implementing plans.

Land conservation serves as a powerful action to meet goals in watersheds which have been proposed by DEEP as candidates for water quality protection plans. The protection of undeveloped, natural land cover helps to buffer water quality from excess nutrients, stormwater runoff, and pollutants harmful to drinking water, water-based recreation, and aquatic species.

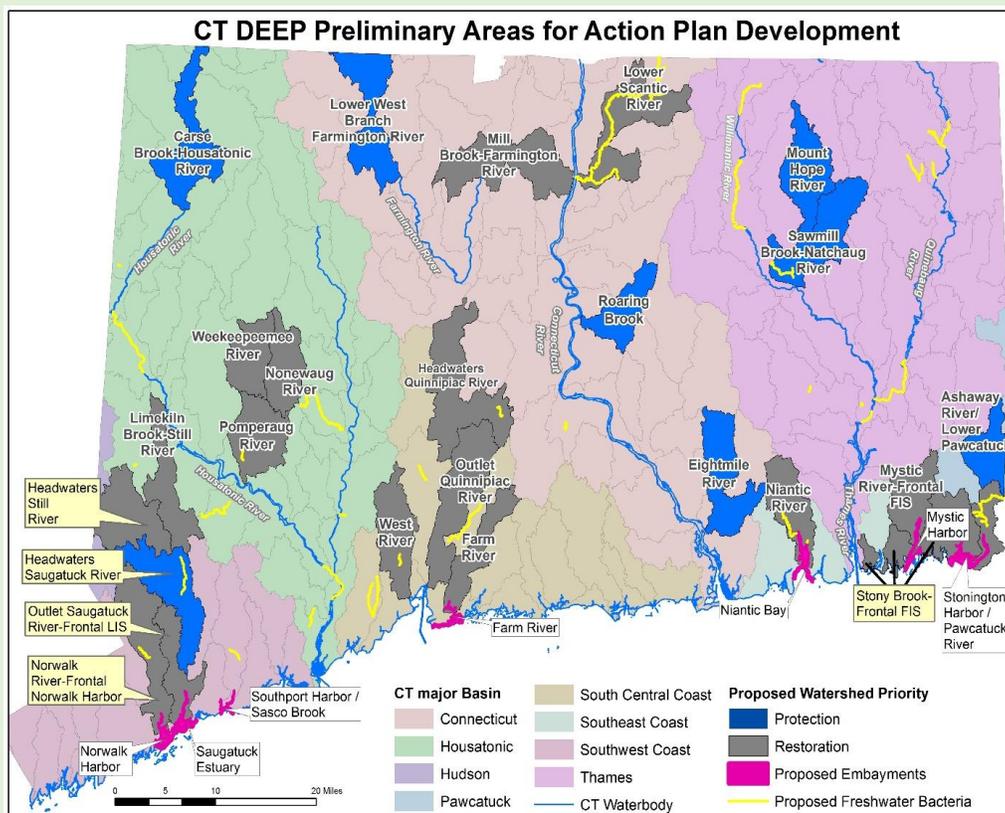
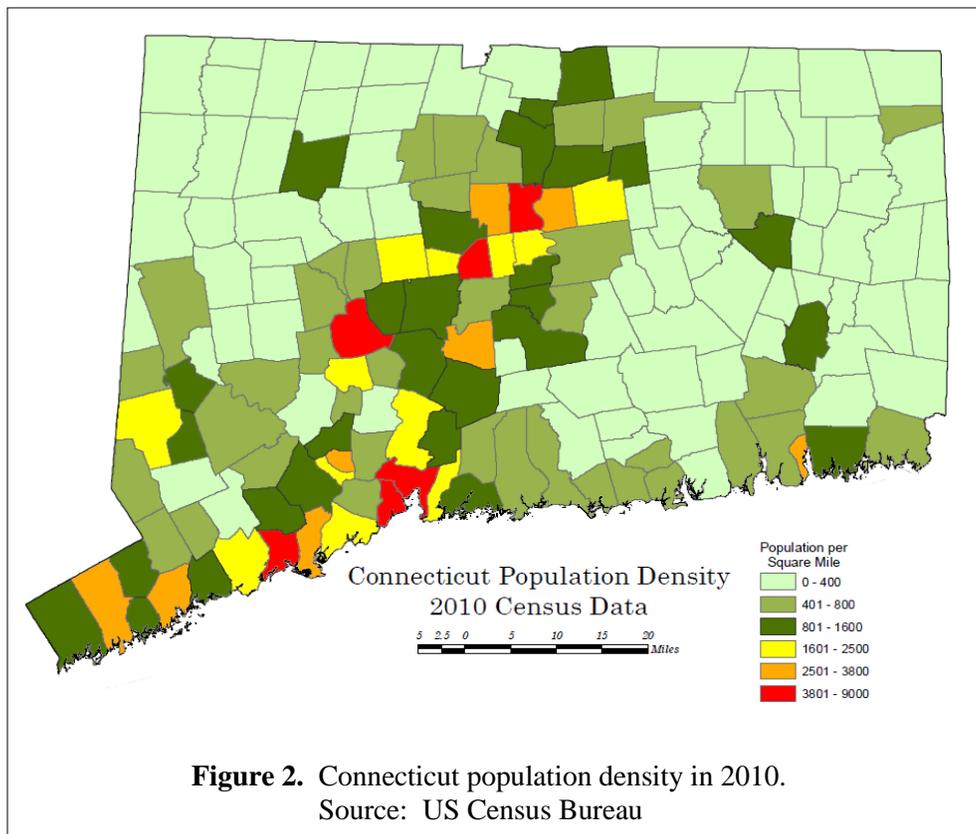


Figure. 1. Proposed selected watersheds prioritized for action plan development.
Map assembled by DEEP Bureau of Water Protection and Land Reuse

II. Coastal Habitats

Coastal habitats including beaches and dunes, tidal wetlands, and estuary embayments provide unique ecosystem benefits, such as feeding and breeding areas for dependent wildlife, water purification, and carbon storage by soil and vegetation. The Long Island Sound is the state's largest coastal natural resource, forming about 250 miles of Connecticut's shoreline and providing habitat to more than 1,300 species of wildlife while also providing recreational benefits to millions of people each year (LISS 2015).

Impacts by climate change and land development all pose difficult challenges to maintaining coastal habitat integrity and ability to function. The coastline hosts the most densely populated towns in Connecticut (Figure 2). To make way for this development and related road construction, impervious surfaces replaced coastal fields, coastal forests, and tidal wetlands, and resulted in the loss of ecosystem services and fish and wildlife species.



Pollution runoff from both developed lands along the shore and farther inland can lead to coastal habitat quality impairment. Storm water runoff, as well as nutrient runoff from wastewater treatment plants and agricultural fields, reach the Sound and frequently cause severe oxygen starved and contaminated conditions that inhibit fish, plants, and wildlife from thriving (LISS 2015).

Compounding issues of pollution, climate change is visibly and measurably impacting the state's coastal resources. Long Island Sound's waters are warming and causing fish and other species communities to shift. These shifts can disturb the overall marine ecosystem and discourage the public from enjoying saltwater fishing and shell fishing opportunities.

Sea-level rise caused by climate change will submerge and affect coastal habitats. Marsh drowning, whereby tidal marshes become flooded more frequently, is a critical threat to the long-term survival of many tidal marsh species. For example, Connecticut's tidal marshes are home to half of the world's only breeding population of saltmarsh sparrows. Because they nest in tidal marsh grasses, tide height and flooding frequency are important drivers of breeding success for these sparrows (Bayard and Elphick 2011; Gjerdrum et al. 2008).

The strategic acquisition and conservation of lands having important natural coastal resources keeps these resources safe, clean, functional, and available for future generations. For instance, the protection of inland unfragmented forest core lands and vegetated stream buffers



helps to absorb and filter water, thus reducing pollution carried downstream into Long Island Sound. The protection of uplands adjacent to the state's existing tidal marshes will be necessary to create and maintain this critical habitat as sea levels rise over time.

Connecticut Key Lands for Conservation **Tidal Marsh Conservation Planning using Sea-level Rise Models**

Salt marshes provide a variety of ecosystem benefits, including buffering developed upland areas from storm surges, storing carbon, filtering pollutants to improve water quality, trapping sediments, and providing habitat for fish, invertebrates, and birds. Despite initiatives over the last 40 years to protect tidal marshes from pollution, dredging, and filling, marsh loss around Long Island Sound has continued. One reason may be the inability of marshes to accumulate sediment and organic matter at a pace equal to sea-level rise (SLR), resulting in marshes that become wetter, erode, and “drown” or transition to unvegetated mudflats or open water.

To learn more and help communities plan for the future of their salt marshes, the potential effect of SLR on Connecticut's tidal marshes was evaluated by applying the Long Island Sound Study's Sea Level Affecting Marsh Model (SLAMM) to Connecticut's coast. SLAMM is a two-dimensional model in which long-term shoreline and habitat class changes are predicted as a function of land elevation, tide range, and sea level rise.

Using four potential SLR scenarios, the model predicts areas that marshes are likely to move or migrate to, changes in total marsh area, and change in habitat types (e.g., high marsh to low marsh) over several time steps from year 2025 to 2100. Predictions of tidal marsh change can also be expressed in terms of likeliness to occur using a combination of SLR rates and other environmental variables used by SLAMM.

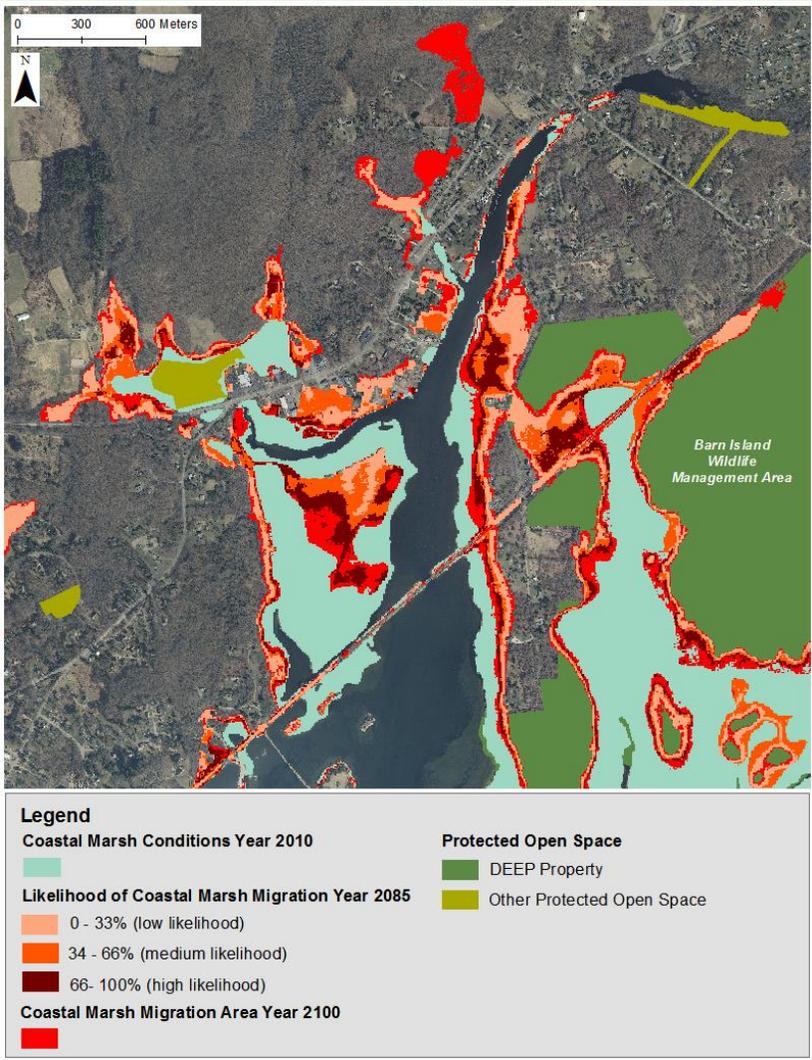
Tidal marsh change projections can help coastal communities identify priority marsh migration conservation areas. By identifying areas predicted to become tidal marsh in the future, DEEP and its conservation partners can target to acquire or protect such areas now. To see how tidal marshes change in a community, the LIS SLAMM Viewer's Basic and All Data versions are available now at www.longislandsoundstudy.net/slamm

More advanced geographic information system users can customize their maps for enhanced marsh migration conservation planning purposes by combining existing protected open space, parcel, and SLAMM data layers (Figure 3). Contact DEEP's Office of Long Island Sound Programs, [Coastal Management Division](#) for updates on SLAMM and links to downloadable data layers.

Figure 3.

Areas within and nearby the Barn Island Wildlife Management Area in Stonington, Connecticut that marshes are predicted by the Sea Level Affecting Marsh Model (SLAMM) to move or migrate to, shown over time steps in year 2085 and 2100. Predictions of tidal marsh change in year 2085 are expressed in terms of likelihood to occur.

Sources: Long Island Sound Study Sea Level Affecting Marsh Model and DEEP Protected Open Space Mapping data layers.



III. Forested Upland Habitats

Upland forest is the predominant land cover type in Connecticut with deciduous, coniferous, and forested wetland habitat communities covering 59 percent of the state. DEEP's 2015 [Forest Action Plan](#) (formerly known as the Forest Resource and Assessment Strategy)³¹, identifies key forest-related issues and priorities to support development of long-term state strategies that will conserve forests from loss or degradation, protect working forestland, and enhance public benefits from trees and forests.



© P. FUSCO

Large-scale and intact forests provide key habitat linkages for common and declining wildlife species, such as thrushes and owls, bobcats, numerous insects, and newts and salamanders. In addition, forests add immensely to the quality of life for the state's residents. The ecosystem benefits this system provides are seemingly endless – forests absorb rainwater and slow runoff, reduce flooding, filter pollutants from the air, water, and soil, regulate air and water temperatures, supply outdoor recreational opportunities, and more.

One of the greatest benefits provided by forests is their ability to sequester or store carbon. Carbon dioxide is a greenhouse gas that contributes to climate change. Trees and other forest vegetation take in carbon from the air and store it within their roots, stems, and leaves. Carbon is sequestered by soils and soil microbiota on the ground floor, as well. Carbon sequestration from the atmosphere by forests reduce the state's greenhouse gas emissions.

³¹ Submitted to the U.S. Department of Agriculture's Forest Service as a requirement for federal funding for land acquisition and other support.

Changes in temperature and precipitation patterns for the region as a result of climate change will shift the distributions of some forest tree species northward or upslope, increase the pest insect or disease outbreaks, and introduce new invasive species and/or intensify the impacts by existing invasive species (Wilkerson et al. 2013). Connecticut's forests are already experiencing such pest insect outbreaks, for example the recently-discovered [southern pine beetle](#). Each of these will not only alter the habitat types available to certain wildlife, but also affect sustainable timber practices conducted by the State and private landowners.



Land conservation today can help to preserve remaining blocks of forestland important to the state's residents and environment. A study on statewide forest fragmentation by the [Center for Land Use Education and Research](#) found that between 1985 and 2006, Connecticut lost 168,960 acres of core forest (forest that is at least 300 feet from a non-forested habitat type) to housing development or other uses (Wilson and Chester 2009). This significant loss or degradation of forestland over only 20 years must not be allowed to continue. If forest development continues at this pace, the landscape's ability to function will be dramatically reduced.

Connecticut Key Lands for Conservation
Core Forest Blocks Benefit Birds & Brook Trout

Core forest is characterized as blocks of forest at least 300 feet away from non-forested land cover types. Much of Connecticut's core forest areas are State Parks and Forests and open space lands held by land conservation organizations. These large, unfragmented areas of trees and associated understory vegetation are important to many plant, animal, and insect populations for food, shelter, and breeding habitat.

Birds are the most common wildlife group within forest communities. Forest birds depend on large tracts of connected forest for migration stopover sites and breeding habitat to raise their young. For example, wood thrush nest in large, deciduous forests with leafy understories. They are considered umbrella species that if are protected for, will indirectly protect many other bird, fish, and wildlife species that make up the forest community, as well.

Forest breeding bird populations are declining due to habitat loss and fragmentation as a result of land development. Development on or nearby cold water streams reduces vegetative cover and increases bank erosion, thus rendering habitat unsuitable for brook trout and other aquatic species. As Connecticut's only native trout species, wild brook trout are important to the state's recreational fishing season and overall fish biodiversity. They are dependent on cold, free-flowing streams, which are kept cool by trees and other vegetated cover along stream corridors.

To aid planners, several remaining core forest blocks have been identified by Audubon Connecticut as focal areas for the conservation of declining interior forest bird species (Figure 4). The acquisition of lands within these areas for open space will help birds and other species and help to buffer habitat from impacts caused by climate change, such as changes in stream water temperature and insect infestations.

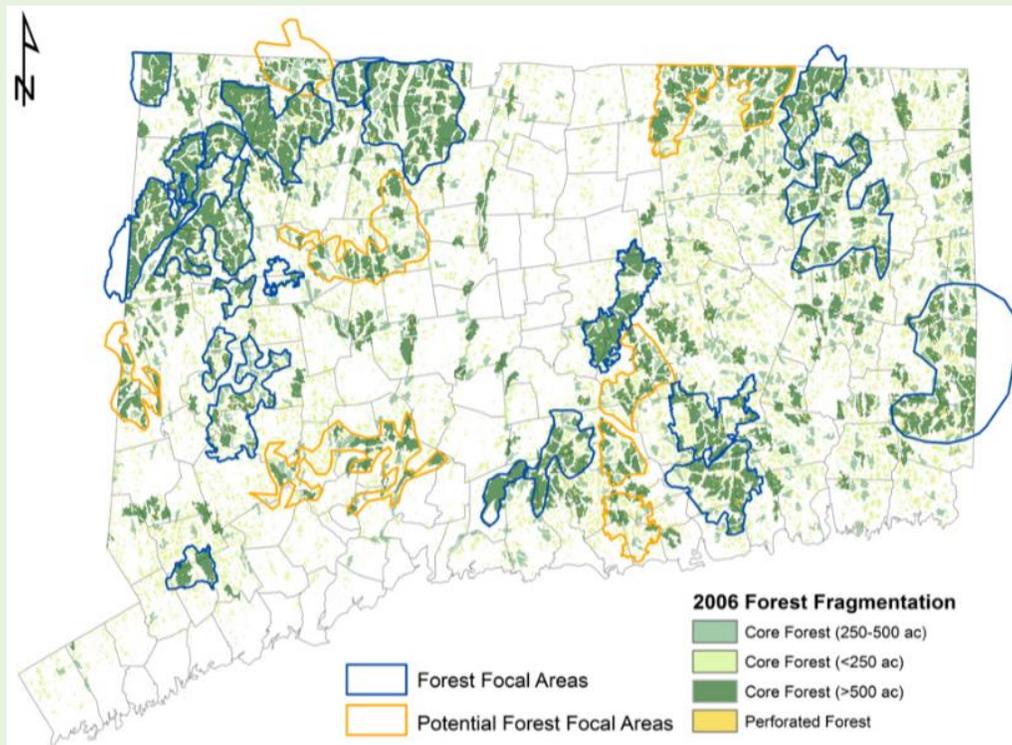


Figure 4. Current and potential forest bird focal areas in Connecticut. Focal areas are concentrated where larger, intact forest tracts remain in the state. Map assembled by Audubon Connecticut.

IV. Ridgeline & Declining Upland Habitats

Upland grasslands and shrublands, sand barrens and sparsely vegetated sand or gravel, and traprock ridges, cliffs, and talus slopes are unique land covers in Connecticut that provide critical habitat for many rare or declining plants, insects, and animals. They also add highly valued scenic diversity to the state's mostly forested landscape.



© J. Sydorciak

Early successional habitats such as warm and cool season grasslands, old fields, and shrublands provide an abundance of food, cover, and shelter for distinct assemblages of wildlife specifically adapted for these habitats, such as Eastern meadowlarks, prairie warblers, and New England cottontail rabbits.

Sand barrens occur in dry sandy areas such as outwash plains and ancient lake deltas, and have poor quality soils which create restrictive growing conditions for most vegetation types. One of the most important functions of sand barrens is their ability to support obligate moth and butterfly, tiger beetle, and other invertebrate species of greatest conservation need.

Early successional and sand barren habitats are among the most imperiled in the world due to habitat loss as a result of a combination of factors including land development or conversion to other uses, natural forest succession, and, in the case of man-made grasslands, intensified agricultural management practices (i.e., heavier grazing or more frequent mowing).



© P. Fusco

Protecting these habitats necessitates acquiring the appropriate lands they exist or can exist on, fostering meaningful relationships with landowners who may help to manage for such lands, and ensuring adequate long-term management to maintain their early successional states. Without these measures, the rare species that depend on these habitats, and the viewsheds these lands afford, will disappear.

Connecticut Key Lands for Conservation

Early Successional Habitats Help Native New England Wildlife

New England cottontails are Connecticut's only native rabbit species and depend on brush, shrubs, thickets, and young forest, generally known as early successional habitat, for food and shelter. The New England cottontail was once common throughout New England and eastern New York, but due to factors including habitat loss, fragmentation, and forest maturation, the range of this rabbit has declined significantly.

In 2006, New England cottontails were designated as a Candidate for Threatened or Endangered Status under the federal Endangered Species Act. To combat their population declines, the [Regional New England Cottontail Initiative](#) was established in 2011, of which DEEP is a partner agency. In Connecticut, this multi-state initiative established twelve core focal areas for New England cottontail conservation. Set within these areas is a goal of creating and/or managing between 19,000 and 24,000 acres of new or existing early successional habitat that could support the rabbit.

The acquisition and active management of lands located within a one-half mile radius of the 122 sites where New England cottontail habitat use has been documented in Connecticut can protect in the long term habitats necessary for these rabbits in our state (Figure 5). Conservation land acquisition and management actions by a wide range of partners including DEEP, other state and federal agencies, municipalities, non-profit organizations, and private landowners helped to keep the New England Cottontail from becoming federally declared as a threatened or endangered species in 2015.

This same habitat created or managed for the New England cottontail helps birds, reptiles, and many more wildlife species that also use early successional habitat during part or all of their life cycles. To help reverse significant population declines faced by the state's shrubland and grassland-nesting birds, Audubon Connecticut has identified broad focal areas where partners may direct land acquisition and management efforts to conserve such habitats should the opportunities arise (Figure 6). For instance, American Woodcock and Prairie Warbler focal areas are based around New England Cottontail restoration focal areas.

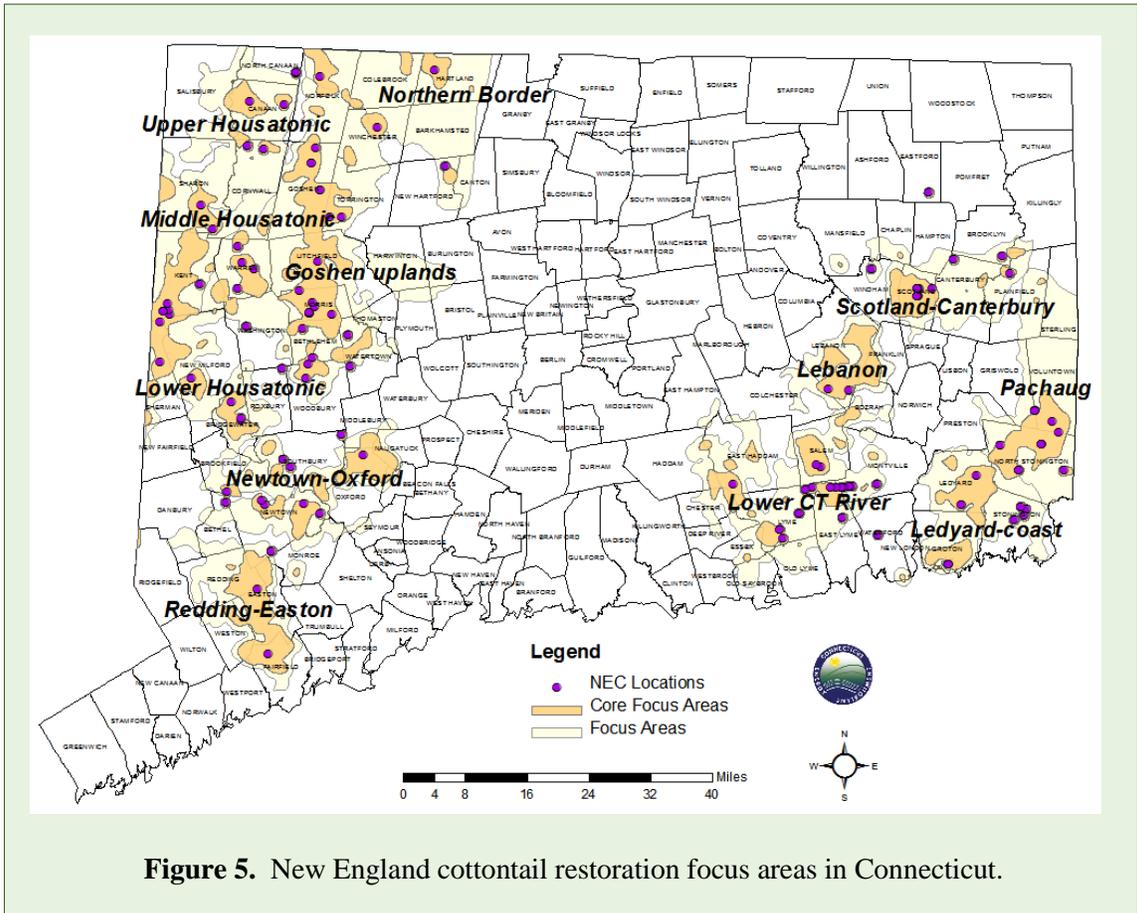
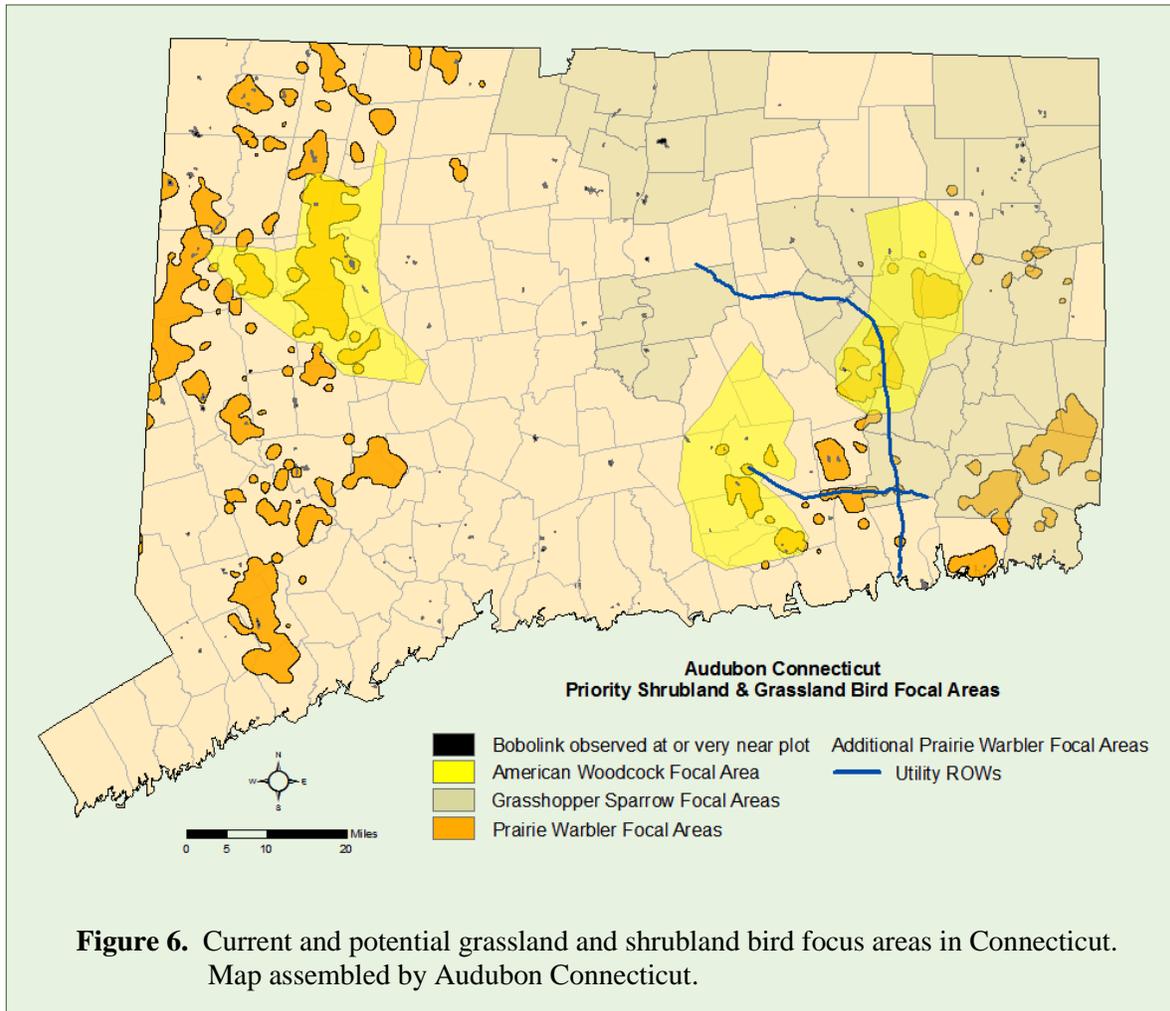


Figure 5. New England cottontail restoration focus areas in Connecticut.



Traprock ridgelines are special for their rust-colored cliffs, forested slopes, and rocky summits for their role in providing critical habitat, clean ground water, outdoor recreation, high aesthetic value, and intriguing natural history. Central Connecticut’s ridgelines were formed over a very long time. Two-hundred million years ago, volcanoes spread lava across the valley floor. The lava cooled into traprock and some of the layers cracked and tilted upward. Erosion washed away thousands of feet of softer brownstone layers, exposing the traprock as long ridge backs standing out above the landscape (DEEP n.d.; Lareau 1997).

Important species of greatest conservation need that depend on traprock ridges, cliffs, or talus slopes include peregrine falcons, timber rattlesnakes, falcate orangetip butterflies, and certain salamanders. Spring wild flowers such as red trillium and Dutchman’s breeches bloom on talus slopes for a short period in the springtime.



Traprock ridgelines also contribute to the state’s quality of freshwater resources. Percolating rainwater filters through traprock and gets delivered to nearby wetlands, reservoirs, and lakes, and



recharges groundwater aquifers. Where publicly allowed, these areas also provide hiking trails with varied scenery, vistas, and rock climbing, all considered some of the best in the state (CFPA 2006; Fasulo 2002).

Residential development along traprock ridges has been attractive since the 1990’s when available and developable land in the valley declined, the cost of land in the valley rose, and ridgeline views grew valuable. Because of their high elevation, ridgelines are also ideal site locations for communication towers and other structures. In some places, traprock is quarried by companies for gravel and rock. Development on ridgelines threatens to degrade water quality, rare wildlife habitat, scenic beauty, and existing or future hiking trails.

With the passage of Public Act Number [95-239](#), the State of Connecticut set a policy of protection for certain traprock ridges with the passage of the Ridgeline Protection Act. This act protects, albeit not in perpetuity, 44 traprock ridge segments in the state by enabling local

governments to enact zoning and conservation regulations to limit residential and commercial use on designated traprock ridges and setback areas.

B. Drinking Water Resources

Connecticut's public drinking water resources include over 150 surface water reservoirs and 4,000 groundwater wells located in primarily urban and suburban areas and serve about 80 percent of the state's population. Of the more than 550,000 acres of watershed land in Connecticut, a third is owned collectively by water companies, the State, and municipalities, and water utility companies. Many water utility companies have been protecting and stewarding their lands for water quality since the late 19th and early 20th centuries.



Surface and underground water quality issues are a public health concern. Water contamination can occur from a variety of sources, including fuel spills and leaks, automotive discharges, pesticide and herbicide application, and fertilizers. Certain pollutants that do not degrade or dissipate readily underground threaten aquifer recharge areas and groundwaters. Drinking water sources located in areas with more land development and less land in water company ownership or protected open space are at higher risk of potential contamination.

Combined with land protection by others and laws administered by the Department of Public Health³², land conservation by water companies is an important aspect of strong watershed management for environmental integrity and safe drinking waters. Protecting lakes, rivers, floodplains, aquifer recharge areas, and forested habitat along such lands controls soil erosion and promotes water infiltration and buffers aquatic resources from runoff and non-point pollution, such as oil from parking lots and lawn fertilizers from neighborhoods.

C. Outdoor Recreational Resources

Connecticut is rich with natural-resource based outdoor recreational activities. DEEP's system of Parks, Forests, Wildlife Management Areas, and water bodies provide a spectrum of recreational opportunities for residents and visitors, from bird watching to hiking, kayaking to hunting, and camping to horseback riding. The State also provides places along the shoreline to visit beaches, go saltwater fishing, and more. In addition to these, statewide trails, greenways, and blueways are used by thousands of walkers, bicyclists, and other users every day.



To extend such opportunities to as many as possible, accessible parking and picnic tables for individuals with disabilities are found at all State Park and Forest recreation areas, and many areas provide additional features such as accessible restrooms, camping, and fishing platforms.

³² The use of land owned by water companies is overseen by the Department of Public Health through a statutory permitting requirement under CGS section 25-32(b), more commonly known as the Water Company Land laws.

The 2011 [Statewide Comprehensive Outdoor Recreation Plan \(SCORP\)](#)³³ quantified the supply and demand of public outdoor recreation areas and activities through a survey to citizens and all 169 municipalities in the state. The supply inventory showed that through its 110 boat launches, 107 State Parks, 32 State Forests, and 44 Wildlife Management Areas, DEEP provides the major share of the natural resource-based supply of outdoor recreation in Connecticut, including 71% of hunting activities, and 26-30% of boating access, camping, fishing, and water sports.

DEEP's Parks, Forests, Wildlife Management Areas, and water bodies are shown to provide significant sources of revenue and well-being for the state's communities. According to [a study by the University of Connecticut](#) on the economic impact of DEEP-managed lands, during 2010, State Forests and Parks hosted more than 8.5 million visitor-days, nearly half of which were at for-fee venues, and generated an estimated \$544 million through tourism activities within Connecticut (Gunther et al. 2011).



At least 2,100 lakes and ponds are available for public recreation and DEEP

stocks an estimated 1 million fish at 2,000 sites across the state, all of which also contribute to the state and local economies. In 2010, DEEP sold and issued 145,799 inland or all waters fishing permits, and anglers spent an estimated \$116 million on fishing expenses. During the

³³ Submitted to the U.S. National Park Service as a requirement for federal funding for park land acquisition and facilities development, maintenance, or upgrade.

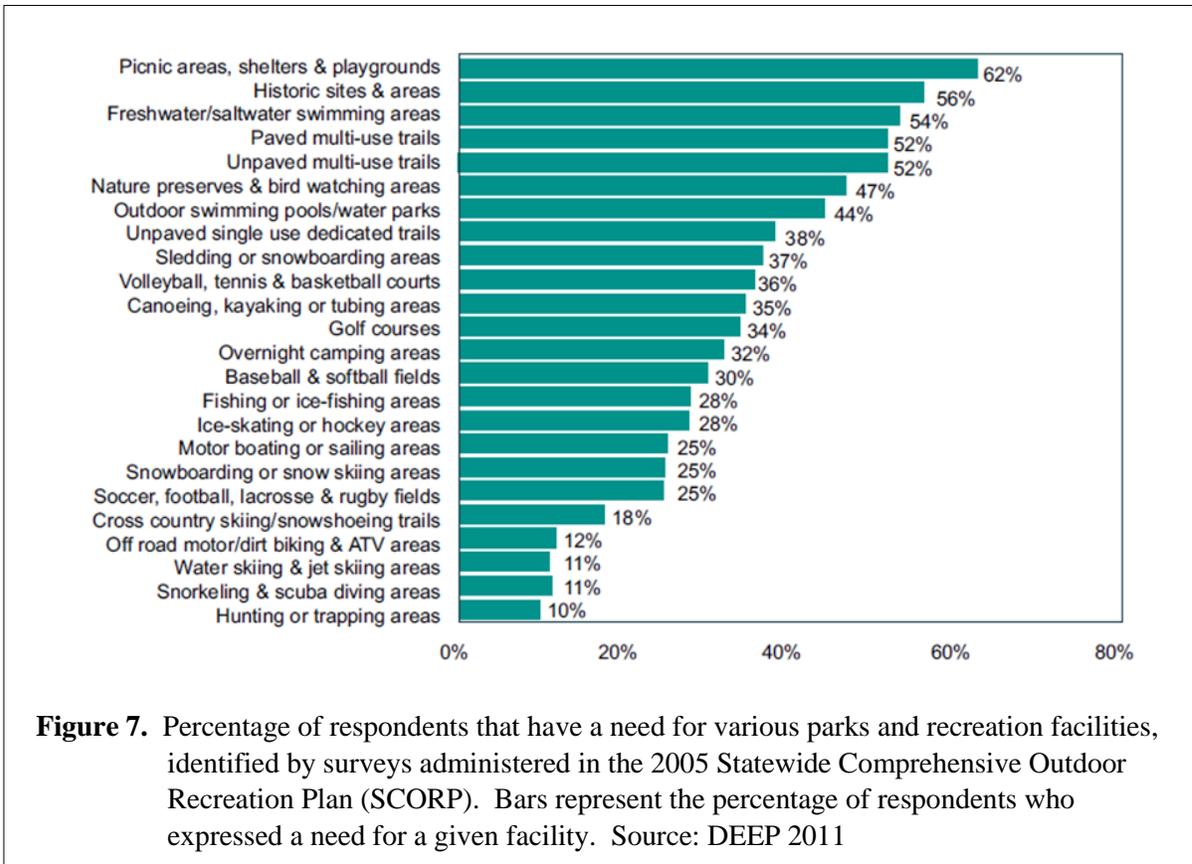
same period, both sportspersons and non-anglers spent an estimated \$36.8 million for recreational boating.

Even some who may not step foot onto DEEP land or participate in these activities indirectly benefit from being neighbors with the agency. According to the study by the University of Connecticut, single family home owners in the state were estimated to derive amenity values of \$270 million annually from overlooking DEEP-managed Parks, Forests and Wildlife Management Areas.

I. Outdoor Recreation Needs

While DEEP offers a variety and abundance of places to enjoy nature, the Department seeks to enhance these experiences and ensure more equitable and plentiful opportunities to be outdoors. The SCORP and similar surveys conducted by DEEP's Office of Long Island Sound Programs found that unmet demands for certain activities, the small-sized and scattered nature of DEEP land holdings, and habitat loss to development pose some challenges for providing public outdoor recreation. Using the results of these surveys, DEEP set priorities aimed at supplying quality outdoor recreation experiences for all of Connecticut's residents.

For example, the acquisition of lands that serve to expand the state's major recreational trail systems and provide additional water access areas are Green Plan priorities. Of the natural resource-based activities DEEP has a mission to provide, respondents to the [2005 SCORP survey](#) expressed a need for, and rated important to develop or enhance, activities associated with water access areas, trails, and nature preserves (Figure 7 and 8). This trend appeared again in the updated SCORP survey in 2011.



In particular, providing public coastal access areas is a high priority of the Green Plan. Coastal State-managed recreation areas are some of Connecticut’s most visited, providing access to Long Island Sound for swimming, boating, fishing, clamming, and other activities. In 2004, DEEP’s Office of Long Island Sound Programs administered a survey to assess the needs and priorities of coastal public use and access. Of those that responded to the survey, 81 and 83

percent indicated a need for additional public access to shoreline wildlife viewing and boating opportunities, respectively (DEEP 2015).

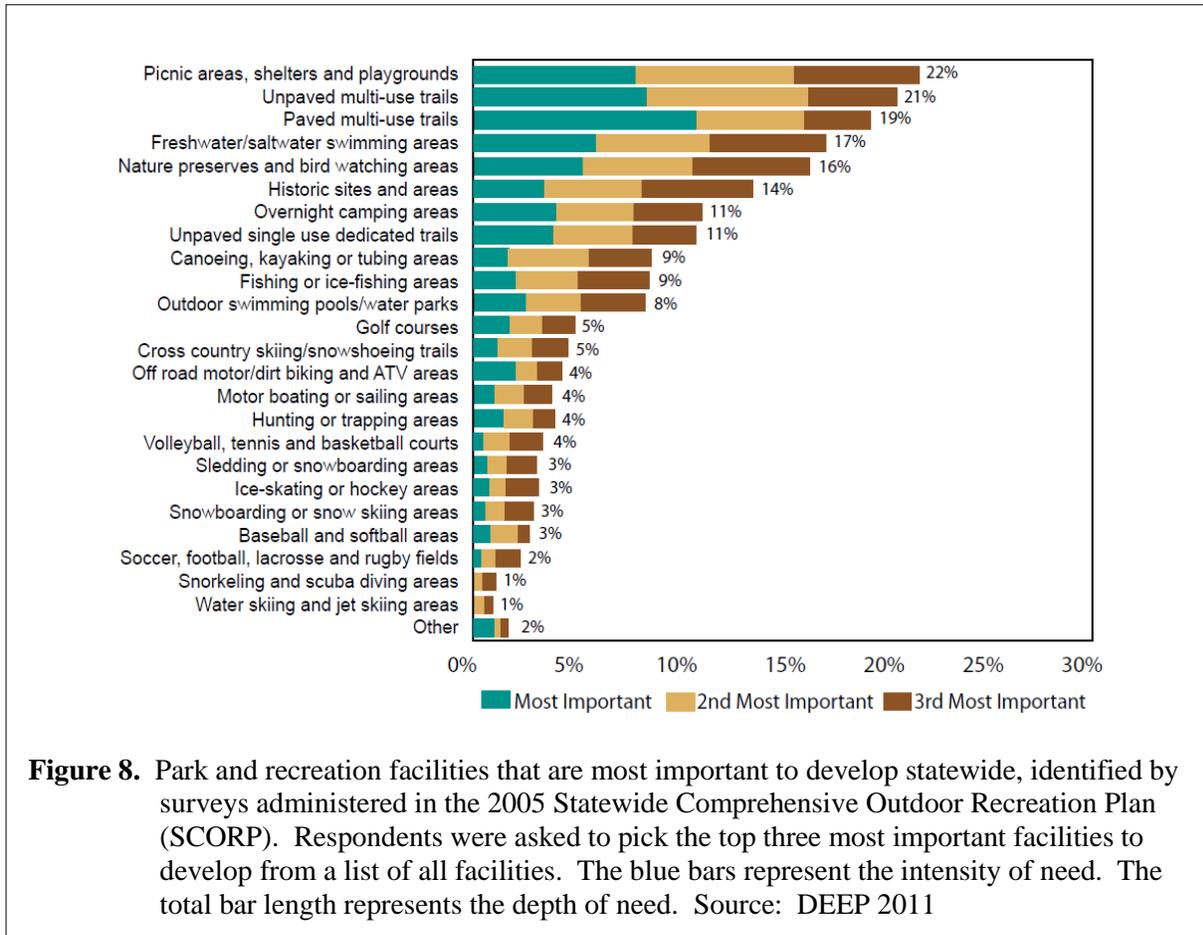


Figure 8. Park and recreation facilities that are most important to develop statewide, identified by surveys administered in the 2005 Statewide Comprehensive Outdoor Recreation Plan (SCORP). Respondents were asked to pick the top three most important facilities to develop from a list of all facilities. The blue bars represent the intensity of need. The total bar length represents the depth of need. Source: DEEP 2011

In order to meet these statewide outdoor recreation demands and others, DEEP and its partners should protect lands and waters with the highest potential to afford them. As they are acquired, DEEP will evaluate lands that are added to State Park, Forest, and other areas to expand recreational opportunities for persons with disabilities, such as creating paths of travel to and from existing accessible features.

D. Open Space in Urban Communities

Connecticut's most densely populated areas are also some of the most vibrant, driving the state's innovation, tourism, and culture. However, the development of cities in terms of infrastructure and transportation has concentrated a disproportionate percentage of potential pollution sources in urban areas that may cause disproportional health impacts on their residents, such as higher risk and incidence of asthma and low birth weight.

The conservation of natural tree and vegetated ground cover in cities removes pollutants from the air, promotes rainwater infiltration, and lowers air temperatures, thereby reducing asthma rates, surface water runoff, and rising energy costs (Nowak and Crane 2002; Nowak et al. 2006). Similarly, urban parks, trails, and riverfront pathways provide a safe and attractive means of physical fitness and disease risk prevention.

In addition to pollution, food insecurity is a concern in urban communities for contributing to high incidences of obesity, diabetes, and other diseases. Some of the state's urban areas are considered "food deserts," or low-income neighborhoods with inadequate access to fresh, healthy, and affordable food, by the U.S. Department of Agriculture. These health impacts can be reduced when natural land covers and community gardens are incorporated into city planning.

In its efforts to ensure that all segments of the state's population has equal access and benefits of its programs and services, DEEP considers urban areas in its land acquisition and open space grant programs project selection criteria. The State



The Town of Bloomfield and the Wintonbury Land Trust acquired Lisa Lane Farm for the creation of an urban farm and community gardens, with partial funding from a DEEP open space grant.

[Open Space and Watershed Land Acquisition](#) and [Urban Green and Community Gardens Grant Programs](#) help to reduce food insecurity, encourage active lifestyles, and strengthen

neighborhood relationships by providing DEEP's land conservation partners with funding towards acquiring new or enhancing existing urban open space, community gardens, and passive outdoor recreation opportunities.



Auerfarm State Park Scenic Reserve in Bloomfield has views of Hartford's skyline and abuts a local 4-H club, providing additional scenic greenspace and outdoor recreation within the greater Hartford area.

The [Recreation and Natural Heritage Trust Program](#) (RNHTP) plays a major role in adding lands to DEEP's system of State Parks, Forests and Wildlife areas, though the bulk of these areas mainly exist outside urban developed areas. This is partly due to the combination of limited available bond funding and the relatively high cost of land in urban areas.

Recommendations made in the new Green Plan should improve the identification of appropriate acquisition opportunities and increase acquisitions of land in urban areas.

One of the most recognized obstacles facing Connecticut's urban populations in accessing open space is a lack of transportation. Many urban residents lack transportation to open space and recreation opportunities often found in rural areas, and public transportation is currently unavailable to certain State Parks or Forests. Linking urban communities to open space within their cities and in other towns is critical because it better connects residents to the public lands they own, diversifies the constituency and support for environmental protection, and ensures equity across the state.

In its efforts to raise awareness about urban environmental issues and public health concerns that disproportionately affect lower income and urban communities, DEEP's [Office of Environmental Justice](#) partners with the Parks Division and youth, agricultural, disability, and other community groups to provide environmental educational programs that bring urban communities to state and local open spaces. For example, each summer, children from urban areas are taken to visit State Parks or Forests to learn about water, air, habitat, wildlife, and more as part of DEEP's [No Child Left Inside®](#) initiative.

A solution to improving public access to open space in populated areas is to acquire more land or vacant lots in urban areas, and to do so proactively within the urban periphery before development in those areas intensifies. Coordinated efforts by the state and federal agencies, cities, and non-profit conservation organizations to convert brownfields into greenspaces serves as another means to improve residents' access to open space and the benefits it provides.

Partnerships among the State of Connecticut, the Environmental Protection Agency, and municipal partners can ecologically revitalize blighted lands in urban areas into scenic recreational and educational greenspaces where residents can find low-impact opportunities to picnic, take walks, watch wildlife, and other passive activities (USEPA 2009). Some lands that are now brownfields in Connecticut could be converted to important wildlife habitat and places where green infrastructure retains and renovates polluted stormwater.

E. Working Farmlands

Connecticut's history of agriculture has shaped the state's bucolic landscapes and a cultural heritage so valued today. Agricultural lands and heritage are major assets that contribute to economic activity and significantly enhance the quality of life for residents and visitors to the

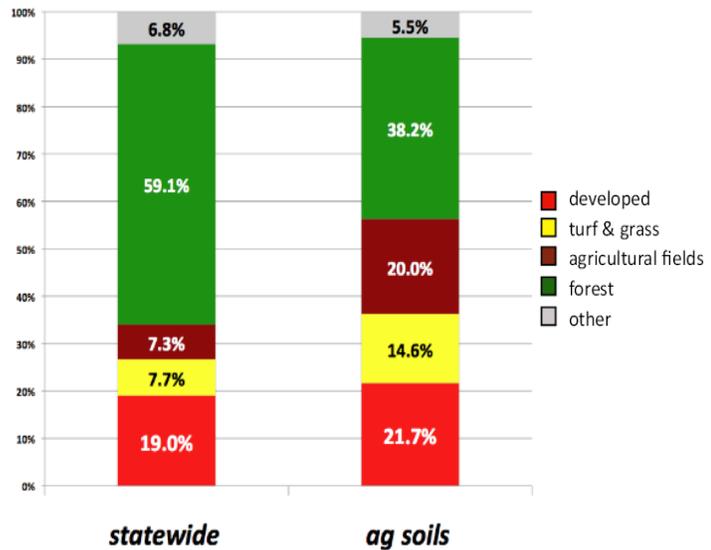
state. The stewardship of Connecticut’s 321,000 acres of cropland, pasture, and farm woodlands provide a host of environmental and social benefits.

Some environmental and social benefits to protecting and stewarding farmlands include reducing reliance of food and other products shipped from long distances, encouraging healthy eating habits, and the provision of nesting habitat for significantly declining grassland bird populations. In addition, preserving barns, stone walls, and open fields help define community identity, rural character, and maintain important links to the state’s history and culture (CT DoAg 2012).

Farmland today is a limited resource in Connecticut, where the population density is high, the pressures to develop land are intense, and the price of farmable land is expensive. In 1910, farmland once covered 68 percent of the state, whereas now it only covers about 7 percent (NASS 2014b, Wilson and Chester 2010).

According to an analysis of statewide land cover change by the Center for Land Use and Education and Research, 39,680 acres of agricultural fields were lost to development and related

Figure 9. Connecticut land cover distribution in 2006. Left: entire state area. Right: land cover types covering prime and important agricultural soils. Source: Wilson and Chester 2010



land covers between 1985 and 2006 (CLEAR 2014). Moreover, in 2006, only about 20 percent of land uses overlying prime or important agricultural soils were agricultural fields (Figure 9).

Next to the availability of what farmable land remains, intergenerational land transfer is a major obstacle to the protection of agricultural lands from development into uses incompatible with open space purposes. Current farmers may pass their lands to their children or relatives who may not share a desire to keep farming. These new farm landowners can be pressured to sell their property to a land developer.

To counter the loss of productive or historical farm and farm woodland to development or other land use changes, DEEP, the State Department of Agriculture, and local non-profit conservation organizations have been working alongside private landowners to plan for the future conservation of their properties. These partnerships are key to effectively protecting or transferring working and retired farmlands to other farmers or landowners who share the same conservation vision for Connecticut's agricultural heritage.



© USDA-NRCS

The USDA-NRCS, DEEP, and Cornwall Conservation Trust purchased a conservation easement to protect the scenic, Housatonic River Valley vista and significant agricultural soils on Cooley Farm, a farm that has been in the Cooley family since about 1940.

VI. Identifying High Priority Lands for Conservation

Connecticut has a statutory responsibility of protecting 21 percent of the state's land area by year 2023. Cumulatively, the State and its land conservation partners hold an estimated total 501,330 acres as open space, or about 15 percent of Connecticut's land area. To advance the acquisition of high quality lands and waters for environmental conservation and public recreation, the Green Plan recommends a two-step process for identifying and prioritizing lands for open space:

1. Evaluate subject property relative to existing open space using geo-spatial map layers available at [Connecticut Environmental Conditions Online](#) and the pilot [Public Use and Benefit Land Registry](#); and
2. Assess site-specific characteristics relative to environmental and recreational open space needs and goals using the Green Plan and state and regional decision support tools.

Lands of high conservation value include parcels containing, protecting, or enhancing environmental and recreational resources identified as priorities for conservation in this Green Plan. Municipalities, non-profit land conservation groups, and water companies interested in applying for a State open space grant should utilize the following sub-sections and refer to the [5-year Action Strategy](#) of this plan to determine if lands they are interested in conserving have, or are capable of having, features that align with the state's open space priorities.

When evaluating a property relative to a specific open space goal or priority identified in this Green Plan, DEEP encourages its partners to seek and evaluate appropriate data sources in relation to their subject parcel. Depending on the priorities sought to be met, the data examples below are some resources that may be useful for evaluating the value of properties for open space protection.

1. Evaluate Existing Open Space using Geo-spatial Data

Like most natural resource conservation groups, DEEP analyzes the spatial relationship of natural features such as topography, habitat, wildlife, water resources, and man-made characteristics such as zoning and land use with the aid of geographic information systems (GIS). Equipped with such information, DEEP can more quickly understand the importance of a particular property for conservation and can proactively seek to protect parcels of significant value.

DEEP uses tools and maps that show the location of statewide public open space, such as the Public Open Space Mapping datalayer on [Connecticut Environmental Conditions Online](#), to assess what extent a parcel(s) of land could help to connect existing open spaces and conserve environmental or recreational resources. These tools are also available to municipalities and the public for viewing or downloading at DEEP's [GIS Data download](#) webpage.

The [Protected Open Space Mapping Project](#) (POSM) was designed to identify and catalog all dedicated open space in Connecticut by researching records at town halls and completing a geodatabase encompassing all 169 municipalities. The open space parcels identified consist of state, federal, municipal, and privately-held open space holdings and includes land or an interest in land acquired to support natural resource-based passive outdoor recreation, forestry and fisheries activities, or other natural resource conservation activities.

Because they do not support natural ecosystems or passive outdoor recreation, parcels that were not mapped under this project include: administrative buildings; athletic fields; cemeteries; country clubs; golf courses; historic homes; housing authorities; landfills; libraries; marinas; museums; parking facilities; post offices; public safety departments; pump house stations; schools; tennis courts; town garages; town halls; and transfer stations. Following data

gathering, the information collected at town halls was quality checked prior to being released for public use.

At present, 143 or 85 percent of municipalities in the state have been researched under POSM. Unfortunately, the data collected by staff from town halls did not include conservation easements, was quickly outdated, and DEEP is left unaware of future lands that become acquired or protected for protection by its partners.

To help meet this challenge, DEEP established the Public Use and Benefit Land Registry (Land Registry)³⁴, a new pilot mapping system that will inventory and eventually show all existing protected open space in Connecticut. The POSM project was an important and substantial undertaking that set a foundation for the Land Registry's construction.

I. The Public Use and Benefit Land Registry

With the passage of Public Act [14-169](#), DEEP was authorized to develop a new component to the State's open space strategy, a GIS database and map viewer system that constitutes the State's [Public Use and Benefit Land Registry](#) (Land Registry). DEEP launched the Land Registry in early 2015 with a pilot map layer consisting of three State Parks: Hammonasset Beach, Bluff Point, and Haystack Mountain State Parks.

Modeled after similar initiatives such as the [National Conservation Easement Database](#), the Land Registry's database will be capable of providing information for lands owned by DEEP, other state agencies, municipalities, land conservation organizations, and state-owned water supply lands. Developed in relation with other statewide geographic data, the Land

³⁴ (CGS) Sec. 23-8e

Registry gathers data to assist in planning for what areas DEEP would like to conserve in the future.

The Land Registry is a publicly-available tool for use in evaluating property relative to existing open spaces and to ensure that the public is informed of what lands have been protected and why those lands have been acquired. The mapping system allows users to query the Land Registry's map layer attribute tables to learn more about protected open space in the state, including purposes of open space, levels of legal protection, specific easements or easements tied to specified locations, acquisition funding sources, right-of-ways, land management plans, and more.

Following uniform standards and practices, documents related to DEEP's ownership of property within the state are recorded in the agency's unit of Land Acquisition and Management and are then scanned into the Land Registry's computer database. To help make this process more efficient and to improve this dataset for users, DEEP should consider requesting applicants to the State's open space grant program to submit digital versions of property surveys.

Depending on the scale at which users view the pilot data layer, varying levels of parcel information will appear. For example, from the largest visible scale open spaces will be shown as unbroken, large polygons, and become delineated into parcels as users zoom into the map (Figure 2).

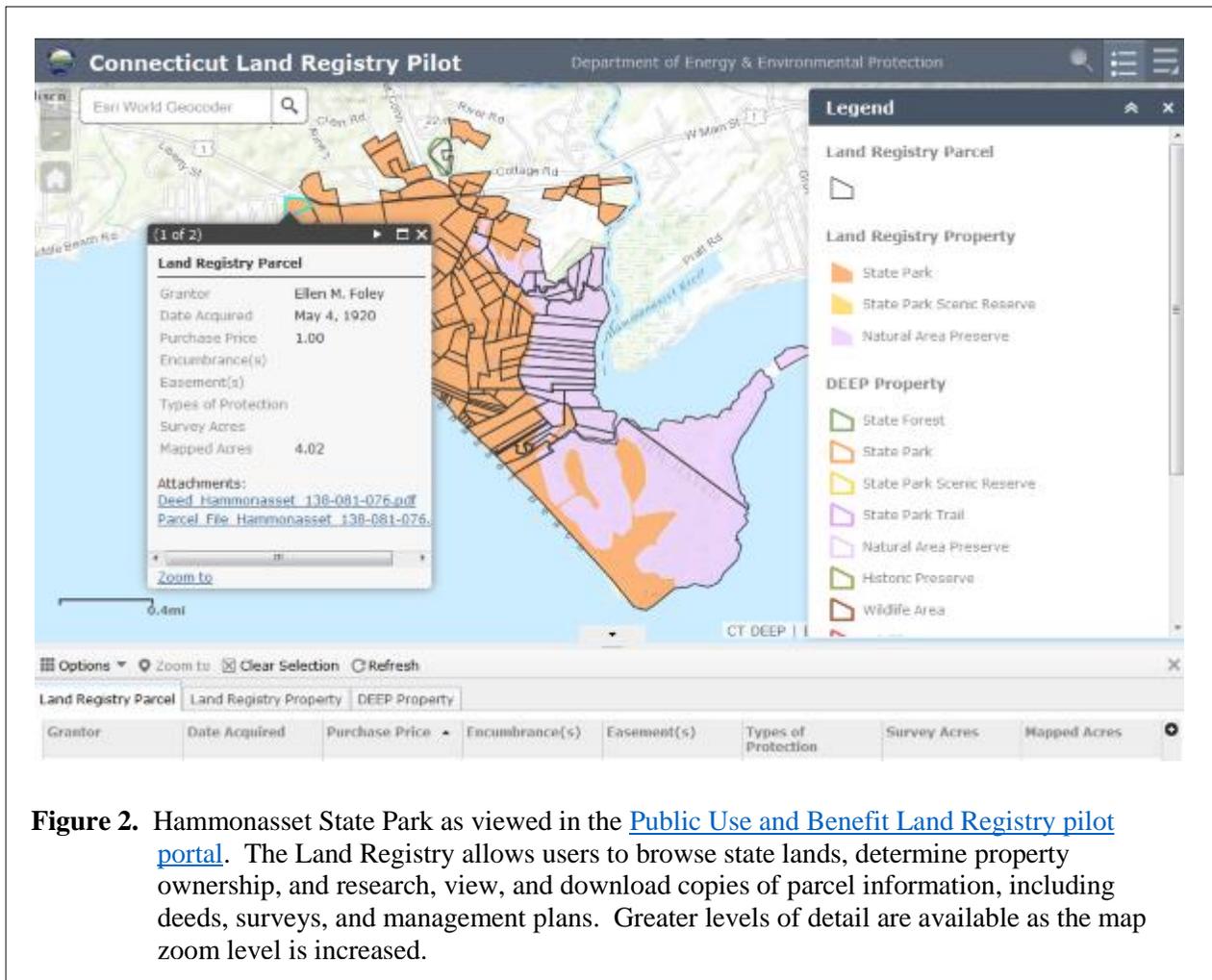


Figure 2. Hammonasset State Park as viewed in the [Public Use and Benefit Land Registry pilot portal](#). The Land Registry allows users to browse state lands, determine property ownership, and research, view, and download copies of parcel information, including deeds, surveys, and management plans. Greater levels of detail are available as the map zoom level is increased.

As DEEP continues to populate the Land Registry, additional DEEP lands will be added. Facility by facility, the parcel data collected through the Protected Open Space Mapping Project will be added until the data layer is replaced by the Land Registry. The Land Registry will then be expanded to include lands protected under the State Open Space and Watershed Land Acquisition Grant Program and other lands held by DEEP’s land conservation partners. Populating the Land Registry with open space data will be a great task and requires the cooperation of many parties.

For the Land Registry to be effective, DEEP will be relying on its partners to help keep statewide open space data up-to-date and accurate. To populate the geodatabase and increase the accuracy of the estimated area of statewide open space, DEEP will evaluate establishing a system that encourages the voluntary submittal of information regarding new acquisitions by its partners³⁵. An example of such a system could include a standardized form that can be filled out by Towns and returned to DEEP for input into the Land Registry.

The completion of the Land Registry will have an immediate impact on protecting Connecticut's natural and cultural resources, defending the importance of DEEP's most highly valued properties, and providing a more comprehensive and transparent open space database for all users. The Land Registry will be a public-private partnership that brings together state agencies, municipalities, and private land conservation groups around a common goal to significantly increase the future amount of open space protected in Connecticut.

Ultimately, acquiring land for open space purposes cannot be accomplished using a rigid approach based strictly on an inventory of high-priority properties. Though multiple conservation priorities generally increase the value of a parcel of interest, parcels need not be contiguous with existing open space or lay within a priority acquisition focus area to be equally important for open space acquisition.

Such parcels may have value if they serve to connect protected areas in the future, or are found to have rare or endangered species or other landscape features that DEEP was unaware existed beforehand. While the Green Plan recommends DEEP and its partners seek to be more proactive in identifying and protecting parcels that may be of high conservation value, it also recognizes the need to remain flexible and acquire lands opportunistically.

³⁵ (CGS) Sec. 23-8b(2)

2. Apply State and Regional Decision Support Tools

The Green Plan refers to existing State plans³⁶ and other related research and spatial datasets for guidance in prioritizing land cover types and public use needs for open space conservation in Connecticut. These documents represent the conservation values of the Green Plan by having identified unmet or underserved open space needs and focus areas with a high likelihood to support certain environmental or recreational resources in Connecticut.

When State plans with relation to open space are used together with the spatial datalayers hosted on [Connecticut Environmental Conditions Online](#), DEEP and its land conservation partners can strategize the protection of the state's most at-risk resources and unmet recreational needs. Generally, higher conservation value is placed on acquiring parcels that can meet multiple state conservation priorities, on parcels that are located within or close to population centers, and parcels capable of providing universal outdoor recreational opportunities in areas underserved by existing activities.

In addition to State planning documents, there is an abundance of recently developed regional conservation planning resources. Besides funding availability and other constraints, a major impediment to effective State land acquisition has been the lack of a single comprehensive evaluation of the most significant potential land acquisition opportunities based on specific open space needs and goals. Currently, a comprehensive tool to help state and regional decision makers identify and prioritize lands to acquire for protection does not exist.

In order to quickly identify potential statewide land acquisition opportunities that best address Connecticut's open space goals, a more focused analysis is needed than that which can be accomplished using available planning resources independently. For example, the Office of

³⁶ See Appendix E for a list of State plans used to identify priority lands of high value for conservation.

Long Island Sound Programs used a weighted-sum overlay based on several ecological criteria to identify acquisition focal areas in the development of the DEEP's [Coastal and Estuarine Land Conservation Program Plan](#).

Through conducting a similar geo-spatial analysis, DEEP's unit of Land Acquisition and Management could produce the first statewide and regional maps of high-priority opportunities for land acquisition. Such maps could be used by DEEP and its partners to proactively target limited time and financial resources to the most important or at-risk lands for conservation or recreation.

Connecticut Key Lands for Conservation
Using a Multi-criteria System to Identify Coastal Areas for Conservation

DEEP's updated [Coastal and Estuarine Land Conservation Program \(CELCP\) Plan](#) was approved in early 2016 by the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management, which allows the Department of Office of Long Island Sound Programs to administer a highly-selective grant program for which federal funding is allocated.

The CELCP Plan's purpose is to protect important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses, giving priority to lands which can be effectively managed and protected and that have significant ecological value.

In order to better identify potential coastal land acquisition opportunities that address Connecticut's CELCP Plan conservation goals, DEEP will implement two conservation planning sub-areas. The first, referred to as the "Project Area," is an area that contains Connecticut's priority coastal conservation values identified in the CELCP Plan, defined by areas not already developed or held as protected open space in 42 coastal and estuarine municipalities.

Using a geographic information systems (GIS) weighted-sum overlay, the CELCP Project Area was further distilled to 'focus areas' that identified unprotected coastal lands with features indicative of the CELCP Plan targeted coastal conservation values. Resulting ranking scores created "hotspots," or areas with significant levels of conservation value (Figure 3). This refining process aimed to target limited resources to high-priority land acquisition opportunities likely to successfully compete in the competitive national CELCP funding process.

DEEP's Office of Long Island Sound Programs launched the CELCP Plan [Focus Area Viewer](#), an online map viewer, to aid in locating coastal land acquisition 'focus areas' most likely to contain priority coastal land conservation values (e.g., core coastal forests). Information provided by the Focus Area Viewer, other DEEP geo-spatial data, and local coastal area land conservation knowledge can be used by DEEP and its partners to identify potential coastal land acquisition priorities.

Figure 3.

DEEP's CELCP Plan 'focus area' map developed for the Town of Westbrook. Based on several ecological criteria, areas in red indicate priority land acquisition for conservation "hotspots."

More detailed views can be explored at the [CELCP Plan Focus Area Viewer](#).

