Water Protection Series

"The health of our waters is the principal measure of how we live on the land."

A Toolkit for Communities

Protecting Land to Safeguard Connecticut's Drinking Water

THE TRUST for PUBLIC LAND
CONSERVING LAND FOR PEOPLE

Mission Statement

The Trust for Public Land conserves land for people to enjoy as parks, gardens and other natural places, ensuring livable communities for generations to come.

Cover photo (left) by: Jerry and Marcy Monkman
Cover photo (right) by: Eric Swanson

Cover quotation by: Luna Leopold, professor emeritus, Department of Landscape Architecture, University of California, Berkeley.

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the following organizations:

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Acknowledgments

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Connecticut's drinking water supplies are precious. We hope that this publication will help communities, individuals, agencies, and organizations throughout the state to more effectively protect these irreplaceable resources for present and future generations.

Whitney Hatch
Regional Director

Tim Northrop
State Director

Glossary

Aquifer. An underground layer of rock, gravel, or sediment containing water.

Aquifer Protection Area. A designated area consisting of well fields or areas of groundwater contribution and recharge. There are 128 such areas in Connecticut.

Groundwater. Water pooling in a saturated layer beneath the ground's surface.

Nonpoint Source Pollution. Water runoff that gathers contaminants—such as oil and sand from roadways, agricultural chemicals from farmland, and nutrients and toxic materials from urban and suburban areas—before entering groundwater and surface water supplies.

Public Water Supply System. Any water company supplying water daily, at least 60 days of the year, to 15 or more customers or 25 or more people.

Public Water Supply Watershed. Land from which water drains into a public drinking water supply.

Reservoirs. A pond, lake, or basin, either natural or artificial, for the storage, regulation, and control of water.

Riparian Corridors. Areas along rivers and streams that protect water resources by filtering polluted runoff and stabilizing stream banks and channels.

Source Water. Untreated water from streams, rivers, lakes, or aquifers used to supply private wells and public drinking water.

Watershed. The land area from which water drains into a stream, reservoir, or river.

Water Supply Source. A spring, stream, brook, river, lake, pond, well, or aquifer from which drinking water is drawn.

Executive Summary

South Central Connecticut Regional Water Authority

Forestland surrounding this New Haven–area drinking water reservoir naturally filters pollutants from drinking water supplies. Protecting undeveloped land around reservoirs and within aquifer recharge areas is essential to maintaining clean and safe drinking water.

Part One: Protecting the Source

Assuring drinking water quality in the long term depends on the preservation of watershed and aquifer lands. This is particularly evident in Connecticut, where population growth and sprawling development increasingly threaten undeveloped lands that act as natural filters for local water supplies.

As forestland and other natural areas in Connecticut continue to be cleared and developed on a large scale, drinking water sources must be buffered from an ever-growing stream of polluted runoff from nonpoint sources, such as parking lots, roads, and housing developments. Systematic protection of these lands is complicated by the state's elaborate water supply system, which involves hundreds of private and public water utilities, several state agencies, and dozens of local governments.

To prevent contaminants from reaching the tap, Connecticut uses a multibarrier approach that includes treatment, distribution system integrity, and source water protection. A critical tool in the effort to protect drinking water sources is land conservation, which is uniquely effective in preventing the degradation of water quality and can also offer long-term cost savings.

Decisions about landuse over the next several decades will be particularly significant, since nearly half of the land buffering drinking water supplies is currently unprotected and susceptible to development. The management of remaining land will have an enduring effect on drinking water quality and public health.

The state has made notable strides in its efforts to protect watershed lands in recent years, making significant investments in land conservation, expanding tax incentives for land donations, and strengthening regulations that restrict water company sales of land. Further progress is threatened, however, by drastic state budget cuts proposed for land conservation and watershed protection in the 2004 fiscal year.

In addition, only a small minority of local governments currently dedicate resources to conserving land as a means of safeguarding local drinking water supplies. And most water utilities are focused more on meeting federal and state regulatory requirements and improving distribution systems than on investing in land conservation for source protection.

Renewed and refocused commitment at the state, water utility, and local levels is essential to the protection of threatened land surrounding groundwater and surface water supplies. As a national conservation organization, the Trust for Public Land (TPL) supports land conservation initiatives that specifically target drinking supply sources, and offers the following recommendations to its public and private partners in Connecticut.

Connecticut State Government

- The state—the governor and the legislature—should continue its commitment to fund land conservation initiatives that target watershed protection, even in light of current fiscal constraints.
- The state should adjust the distribution and allocation of the Open Space and Watershed Land Acquisition Grant Program to provide water utilities the same land conservation funding incentives as land trusts and local governments.
- The state should reinstate the full 100 percent corporate tax credit available for donations or bargain sales of conservation land.
- The state should fully utilize SWAP program data to set priorities for funding land conservation projects that protect drinking water sources.
- The state should enact strong aquifer protection regulations.
- Over time, the state should explore the use of federal funds from the Drinking Water State Revolving Fund and the Clean Water State Revolving Fund to address nonpoint source pollution strategies, including land conservation, after major point sources have been addressed.

Water Utilities

- Water utilities should actively promote land conservation as a source protection strategy by helping the state craft meaningful incentives for land conservation, encouraging municipalities to pursue source protection efforts, and promoting the development of local watershed land protection plans.
- Water utilities should increase their financial commitment to conserving land for source protection.
- Water utilities should leverage their resources by partnering with the state, municipalities, and nonprofit organizations.

Local Governments

- Municipalities should define a vision for protecting water supply areas and incorporate the protection of aquifer and watershed lands into their plans of conservation and development.
- Municipalities should dedicate local funding to conservation efforts in drinking water supply watersheds and take advantage of nonmunicipal funding opportunities.
- Municipalities should develop local watershed and aquifer protection regulations that guide development and minimize the potential for adverse impact on water supplies. Municipalities should do this proactively, rather than wait for the state to adopt regulations.

Part Two: A Toolkit For Communities

Local landuse planners, town officials, and other decision makers play a fundamental role in the effort to safeguard drinking water supplies. With these community leaders in mind, TPL has designed a four-part process to help communities increase their effectiveness in this area:

1. Develop a Conservation Vision for Drinking Water Supply Areas.

This is a road map for the protection of water supply lands, the creation of which includes the following steps:

- Review existing plans for drinking water protection.
- Inventory current and potential drinking water resources.
- Determine landownership.
- Identify potential threats to drinking water supplies.
- Set conservation goals and priorities.
- Build partnerships.

2. Protect Open Space and Water Supply Lands.

A community must assess the most effective ways of protecting targeted lands and design acquisition and easement strategies accordingly.

3. Secure Conservation Funds.

Funding from a variety of sources at the federal, state, local, and private levels helps towns and cities successfully implement their conservation visions.

4. Manage Water Supply Lands.

Stewardship of open space and watershed lands requires careful planning and adequate funding.

Designing and implementing a local watershed vision is a significant undertaking that requires the participation of local leaders, the public, neighboring communities, as well as partners from the state, water utilities, and nonprofit organizations. By utilizing existing resources and forging strong partnerships, Connecticut towns and cities can implement a watershed vision that ensures clean drinking water now and for future generations.

Jerry and Marcy Monkman

Area residents explore the Treetops Estate along the Mianus River, an important drinking water source for residents of lower Fairfield County. The roughly 100-acre property in Greenwich and Stamford was protected in 2001, thanks to a coalition of public and private partners, including the Trust for Public Land. Partnerships among state agencies, water utilities, nonprofit organizations, and local governments are often essential to protecting land that buffers drinking water supplies.

Introduction

Harrison Shull

A fisherman plies the waters of the Housatonic River in West Cornwall. The river's watershed spans three states, encompassing most of western Connecticut and supplying drinking water to residents of a number of communities.

With 3.4 million people living on 3.2 million acres, Connecticut is one of the smallest and most densely populated states in the United States. People living in such proximity generate a concentration of human activity that profoundly impacts the natural environment. In no area is this more evident than in the supply of drinking water.

Unlike many states that draw drinking water from a few isolated reservoirs, Connecticut pulls its water from a web of groundwater and surface water sources in rural and suburban communities. In all, roughly 16 percent of the state's total area—some 530,000 acres—drains into public drinking water supply watersheds.[1] Aquifer protection areas account for another 3 percent.[2] These source water lands are found in 128 of the state's 169 towns, inextricably linking people, the land, and drinking water.[3]

The protection of watershed lands is critical for the majority of Connecticut residents who rely on reservoirs for drinking water. Aquifer protection is important for the many people whose water is drawn from public water supply wells. Privately owned wells also serve a significant population and, while they are not the focus of this report, can benefit from the protection of Connecticut's watershed and aquifer lands.

Ideally, all lands buffering drinking water supplies would be permanently protected. In reality, Connecticut water utilities, the state, and municipalities own roughly 33 percent of watershed lands.[4] Another 19 percent is already developed for commercial, industrial, residential, or agricultural purposes.[5] This leaves nearly half of the watershed lands—more than a quarter of a million acres—without permanent protection and potentially susceptible to development. What happens to these remaining lands will directly impact the quality of Connecticut's drinking water sources—and public health.

This report highlights the ways the state, water utilities, and local governments can protect critical watershed lands with a focus on:

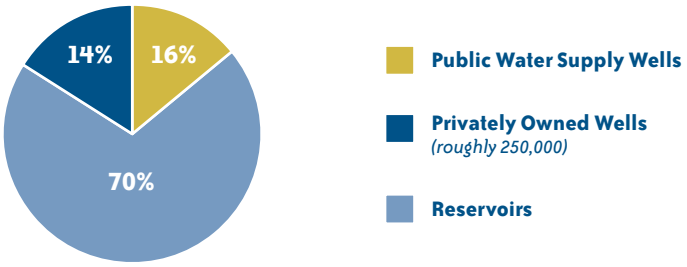
- exploring current threats to Connecticut's drinking water supply,
- identifying the extent to which current statutory and regulatory measures provide for protection of public water supply watersheds, as well as high-yield aquifers,

- explaining the relationship between protecting open space and maintaining water quality, and
- offering recommendations to promote land conservation in drinking water supply areas.

Since the flow of Connecticut's water crosses political boundaries (one community's reservoir is often located in another's jurisdiction, for example), this report also emphasizes the importance of strong regional planning and cooperation. Finally, the toolkit section provides local officials, volunteers, and advocates with a resource for creating, funding, and implementing a vision for the protection of drinking water supply lands.

Nearly half of Connecticut's watershed lands—more than a quarter of a million acres—are without permanent protection and potentially susceptible to development.

*How Do Connecticut Residents Get Their Water?**

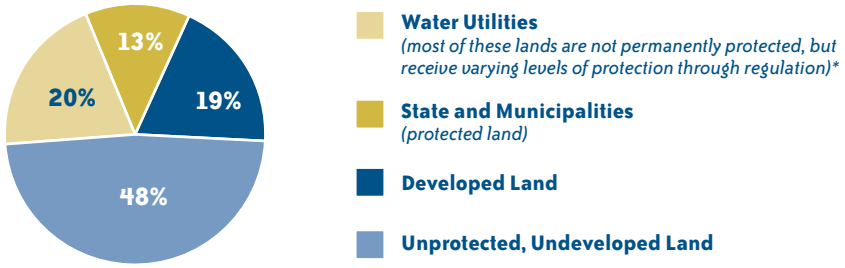


Source: Connecticut Department of Environmental Protection, Report to the General Assembly on State Water Allocation Policies Pursuant to Public Act 98-224; January 2000.

* Connecticut's 3,017 active public water systems (PWS), which are regulated by the Department of Public Health's Drinking Water Supplies Division, are classified as either community or noncommunity water systems. Community water systems serve at least 25 residents year-round. Roughly 84 percent of the state's population is served by community water systems. Noncommunity water systems are broken down into two subcategories referred to as either nontransient or transient systems. Nontransient, non-community water systems regularly serve at least 25 of the same people over six months of the year at places such as schools and office buildings. Transient, noncommunity water systems supply water to places such as gas stations, restaurants, or campgrounds where people do not remain for long periods of time. This report deals solely with community water systems.

Source: Department of Public Health's Introduction to the Drinking Water Division, www.dph.state.ct.us/BRS/water/Fact_Sheets/wss_info_int.pdf, 2003.

Estimated Ownership of Drinking Water Supply Lands



* Lands protected under Connecticut Government Statutes, Sections 25–32. Source: Department of Public Health, Drinking Water Division, Source Water Protection Assessment Program.

Part One: Protecting the Source

South Central Connecticut Regional Water Authority

This reservoir in southern Connecticut has been used as a drinking water source since 1862. Due to extensive development within its watershed, the lake suffers from polluted storm water runoff, high rates of algal growth, and sediment buildup. Development within a watershed creates a dual threat to water quality. As natural lands are degraded, their buffering capacity is reduced. And as development spreads in these areas, land and water pollution increases.

The Threats to Clean Water

A look at recent growth trends—specifically the shift of people from urban centers to suburban areas—helps illustrate the vulnerability of Connecticut's remaining watershed and aquifer lands and the potential impact of development. Over the past several decades, the populations of cities such as New Haven, Bridgeport, and Hartford have steadily declined. In fact, the last census revealed that Hartford had the biggest percentage population drop among large cities nationwide.[6] Growth did occur, however, in many outlying communities, creating an exurban migration largely accommodated by sprawling development patterns. This type of growth places unprecedented pressure—in the form of road construction, forest clearing, and subdivision development—on the landscapes and natural resources of rural and suburban areas, including lands that protect drinking water sources.

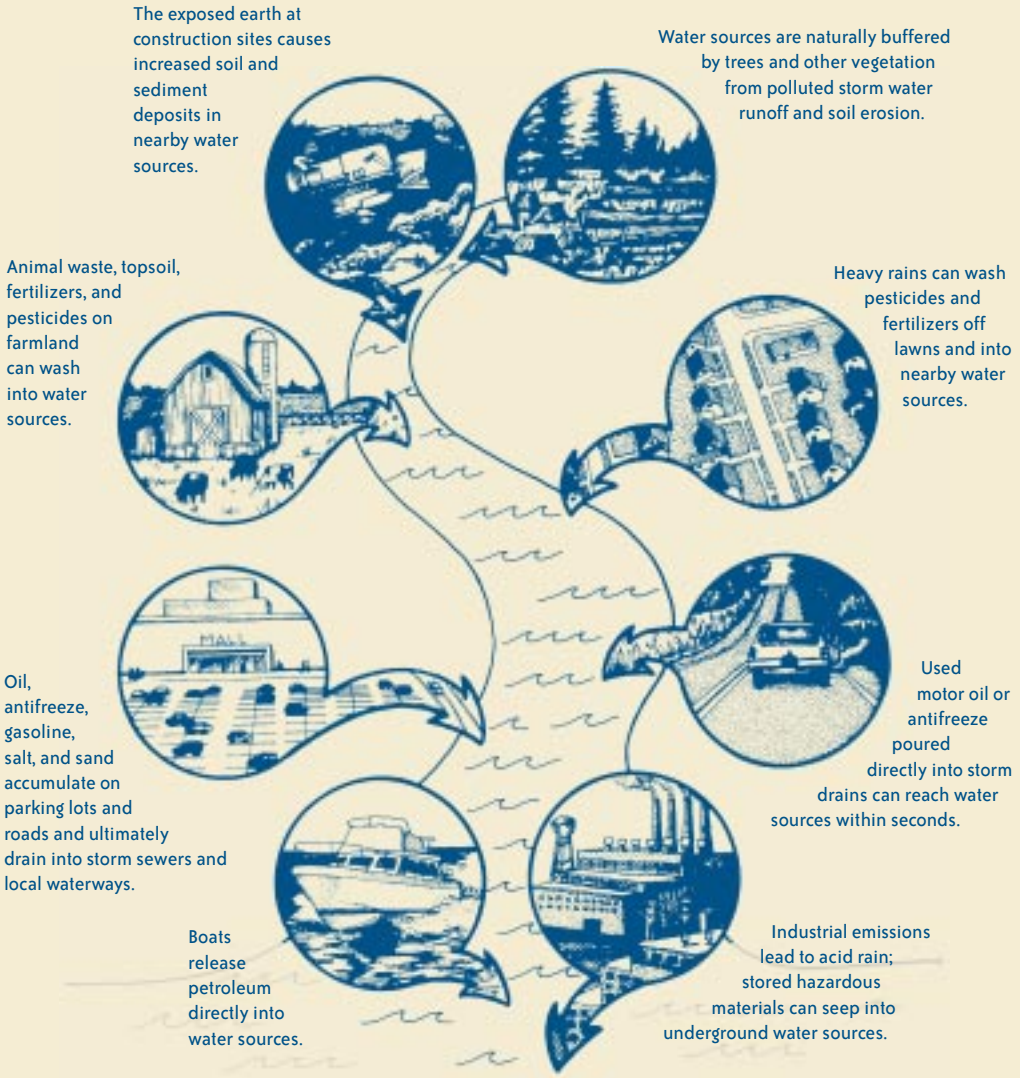
The paving of Connecticut's open lands increases levels of polluted runoff from so-called *nonpoint sources*, such as parking lots, roadways, and housing subdivisions. Polluted runoff from these areas, often containing oil, toxic metals, pesticides, and other contaminants, can flow into surface water supplies or underground aquifers. With development comes fragmentation of Connecticut's forestland, which comprises 60 percent of the state's open space.[10] Here, increased nonpoint source pollution poses a particular threat. Forestland is a critical natural water filter and buffer for the state's water supplies, trapping sediment, chemicals, and other pollutants.

State regulations can effectively safeguard public water supplies from most so-called *point sources* of pollution, including sewage discharges and industrial waste. Yet nonpoint source pollution is notoriously difficult to combat and can

Growth in Connecticut

- Between 1982 and 1997 Connecticut was among the ten states with the highest rate of land lost to development.[7]
- More than 60 percent of the state's fastest-growing towns have populations of fewer than 10,000 people.[8]
- Seventy-four percent of Connecticut's wetlands are gone and 97 percent of the coastline is developed.[9]

POLLUTANTS FROM NONPOINT SOURCES



Long Island Soundkeepers

pose serious threats to water quality and public health. Once considered free of pollutants, Connecticut's groundwater is now vulnerable to a variety of contaminants associated with incompatible landuses.[11] Potential contamination from microbial agents—bacteria, viruses, and protozoan parasites such as *Giardia* and *Cryptosporidium*—is also a potential concern in the state. Understanding the long-term health risks associated with emerging contaminants, such as volatile organic compounds, synthetic organic chemicals, and pesticides introduced into the environment from nonpoint sources, is a challenging and continually evolving effort.

For Connecticut residents, this means that despite the state's stringent regulation of point sources, the threat posed to drinking water supplies by nonpoint source pollution will increase as more and more land is developed. Moreover, if current proposals to dramatically reduce state funding for land conservation are effective, and if local communities do not increase their level of commitment, many valuable properties will likely be lost to development over the next decade.

The Benefits of Land Conservation as a Strategy for Source Protection

Delivering high-quality drinking water depends on a multiple-barrier approach that includes source water protection, treatment, and distribution system integrity.

- *Source water protection* includes land preservation and proactive landuse regulation, as well as landuse monitoring, on-site field inspections, planning, and emergency spill response. These activities prevent pathogens and pollutants from entering the water in the first place.
- *Treatment*, through filtration and disinfection, removes most pathogens and pollutants that are present in the water.
- *And distribution systems* that keep transmission pipes and other infrastructure sound and up-to-date help prevent further contamination and temporary disruption of service.

Connecticut law calls for a combination of these three strategies to protect public drinking water. Recently, in response to changing regulatory requirements, water utilities have focused primarily on infrastructure upgrades and treatment processes, such as chlorination, filtration, and aeration.[12] This is largely due to federal Safe Drinking Water Act mandates that require water utilities to invest in filtration and treatment upgrades. As a result, utilities have fewer resources to purchase watershed lands. Land prices in some watersheds and aquifer protection areas, including several in Fairfield County, are also prohibitively high, while other watersheds are already heavily developed.

Treatment and filtration, however, have limitations. While these approaches *reduce* the amount of contaminants present in a water supply, they do not *prevent* contaminants from entering the water in the first place. If new forms of contamination emerge, treatment measures must be expanded—often at great expense—to respond to these new threats. In addition, there is a greater understanding of the potential health risks associated with some of today's disinfectant and treatment processes, including risks from long-term exposure to by-products produced from the interaction between chlorine and organic matter.[13]

Protecting watershed lands can minimize the amount of filtration and treatment required. And although land acquisition is costly, it can provide significant long-term financial benefits. According to one Environmental Protection Agency (EPA) study, prevention measures cost communities an average of five times less—and up to 200 times less—than addressing drinking water contamination.[14] Preliminary findings from a study by the South Central Connecticut Regional Water Authority also indicate that investments in open space protection help contain treatment costs in Connecticut.[15]

Although regulating watershed lands is an important component of source protection, acquiring land through purchase or conservation easement guarantees the most complete and permanent protection. The American Water Works Association views watershed protection as key to protecting drinking water. An association study found that "the most effective way to ensure the long-term protection of water supplies is through landownership by the water supplier and its cooperative public jurisdictions."[16]

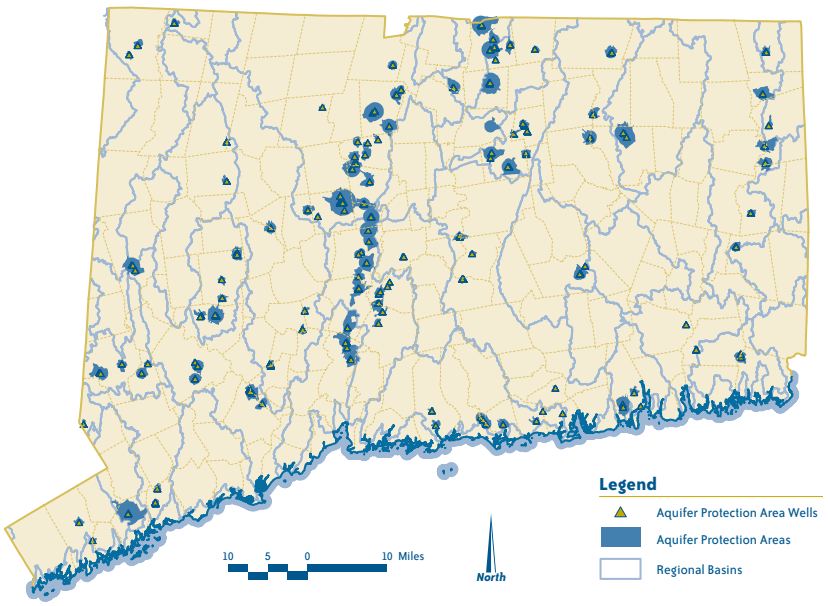
The threat posed to drinking water supplies by nonpoint source pollution will increase as more and more land is developed in drinking water supply watersheds and aquifer recharge zones.

The Benefits of Open Space Protection

In addition to buffering drinking water supplies, land conservation provides communities with a variety of economic and environmental benefits, including:

- enhancing property values and generating tax revenues,
- attracting businesses and boosting tourism,
- improving air quality and controlling erosion,
- preserving community character and improving quality of life, and
- providing recreational opportunities and expanding a community's nonmotorized transportation network.

Connecticut Aquifer Protection Areas and Wells



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Recent Trends—Conserving Land for Source Protection

In recent years, the state of Connecticut, water utilities, and local governments have made considerable headway in the effort to protect open space, including significant land around drinking water supplies. As Governor John Rowland noted in 2001, these partners "have worked together to acquire more land than in any comparable time in history."

Still, a quarter of a million acres of watershed land are largely unprotected and susceptible to development. In addition, the state's current budget problems have resulted in recent cuts to the Department of Environmental Protection's (DEP) land acquisition programs, threatening to stall public and private watershed protection efforts at all levels.

An understanding of recent trends—accomplishments and obstacles—is essential to meeting the challenges ahead. The following section reviews efforts by the state, water utilities, and local governments in the area of land conservation for source protection.

Connecticut State Government

Funding

In 1998, state leaders pledged to protect 21 percent of Connecticut's land mass—673,210 acres—as open space by 2023.[17] Since then, roughly 47,000 acres of land have been permanently protected by acquisition or easements by the state, land conservation organizations, and Connecticut municipalities.[18] Much of this land is located in public water supply watersheds.

To reach its ambitious goal, the state of Connecticut has spent more than $213 million, including $80 million to secure the Kelda property, the largest land acquisition in the state's history (see sidebar on page 13). Such funding represents a significant improvement from previous years, during which Connecticut trailed most New England states in per capita spending on open space.

To leverage funding from other sources, the state created the Open Space and Watershed Land Acquisition Grant Program. This initiative is administered by DEP, which provides grants for water utilities, municipalities, and nonprofit organizations to purchase land for water supply watershed and open space protection. This program has had a major impact on watershed

protection, with 61 percent of the open space grants awarded by DEP between 1998 and 2002 going to acquire land that helps protect drinking water sources.[19] Additionally, tax incentives were created by the state to encourage water utilities and other corporate landowners to donate or sell undeveloped lands to conservation groups at a discount.

However, recent cuts proposed by Governor Rowland and the General Assembly would drastically reduce funding for both of these state programs, eliminating many opportunities to protect valuable open space and watershed lands. Currently, proposed funding cuts are being considered for all state open space progams from 2003 through 2005, including the Recreation and Natural Heritage Trust Program and the Farmland Preservation Program.

State-directed federal programs could provide additional funds for land conservation in Connecticut. The Clean Water State Revolving Fund (CWSRF), the Nonpoint Source Grant Program (NPS, Section 319), and the Drinking Water State Revolving Funds (DWSRF) are federal grant programs that give states broad discretion in how they fund water quality protection and may be used for the conservation of lands that protect drinking water supplies. There is no limit on the amount of CWSRF and NPS grant dollars that can be used for acquisition of such lands, while states may dedicate up to 10 percent of DWSRF capitalization funds annually toward this end. Although other states use these federal dollars to help fund the protection of watershed and aquifer lands, Connecticut currently does not.

State Policy Changes and Initiatives

In addition to expanding conservation funding, the state strengthened regulations governing the protection of water utility–owned lands. Most notably, the state passed legislation in 2000 requiring that permanent conservation easements be placed on Class II water utility lands as a condition of their sale (see appendix 2 for land classification definitions).[20]

The state has also continued working to establish regulations to protect groundwater supply wells. In 1989, the state created the Aquifer Protection Program, requiring water utilities to delineate protection areas around the 128 major public water supply wells in the state. DEP then drafted municipal landuse regulations designed to protect the aquifer areas by banning activities that could pollute underground water.[21] These regulations have yet to be adopted, due in part to economic development concerns on the part of some communities and businesses.

Currently, proposed funding cuts are being considered for all state open space progams from 2003 through 2005.

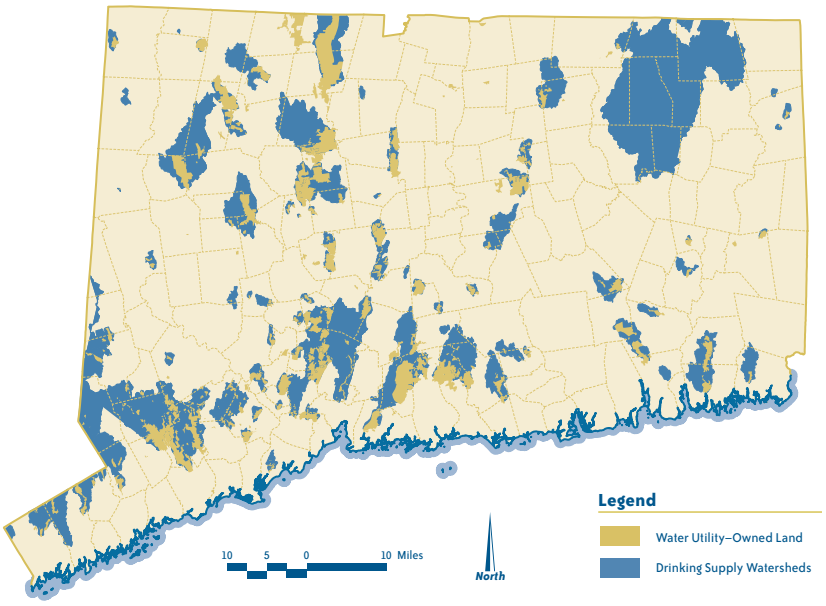
Susan Lapides

Residents explore the Great Hill Reservoir in Oxford and Seymour. State funds were critical in leveraging local funding in 1998 to protect this former drinking water supply and nearly 750 acres of surrounding land, including an important aquifer recharge zone. Similar efforts to protect critical aquifer recharge areas and other lands that buffer drinking water supplies were stalled in 2003 as a result of dramatic state budget cuts.

In addition to regulatory changes, the Department of Public Health (DPH) released its Source Water Assessment Program (SWAP) reports in May 2003. SWAP, which is part of the 1996 amendments to the Safe Drinking Water Act, calls for the assessment and protection of all public drinking water supply sources throughout the United States.[22] Connecticut's SWAP reports are a key tool for understanding threats to local drinking water supplies and for identifying areas most appropriate for permanent conservation.

Water utilities are playing a comparatively small role in the conservation of new lands that buffer drinking water supply areas, when compared with the state and municipalities.

Connecticut Drinking Supply Watersheds



The Trust for Public Land

Emphasis is now on using the assessment results to improve source water protection.

Water Utilities

Water utilities play a central role protecting water supplies through landuse planning, water quality monitoring, on-site field inspections, education and pollution abatement programs, and emergency spill response. Yet, in general, Connecticut's water utilities are not investing significantly in conservation of new lands for drinking water source protection. Whether they are privately or publicly owned, their primary emphasis is on meeting regulatory requirements and minimizing increases in water rates.[23]

Since the state inaugurated its Open Space and Watershed Land Acquisition Grant Program in 1998, however, it has helped spur water utilities to invest a modest amount in this area. During the past five years, the South Central Connecticut Regional Water Authority—with its unique mission of providing drinking water and managing open space—purchased approximately 1,200 acres of open space and conservation easements over more than 300 acres. During the same time period, the state's other large water utilities purchased a total of just over 500 acres for watershed protection.[24] Several communities with smaller municipally owned utilities, such as Wallingford and Manchester, have also purchased drinking supply watershed lands with assistance from the state grant program.

In addition, as municipalities and land trusts have become increasingly active in land conservation, they have at times requested and received assistance from water utilities. To date, several utilities, including the former Connecticut-American Water Company and South Central Connecticut Regional Water Authority, have worked in partnership with cities and towns to conserve open space that protects drinking water supplies, typically receiving conservation easements in exchange for their investments.

Overall, however, water utilities are playing a comparatively small role in the conservation of new lands that buffer drinking water supply areas, when compared with the state and municipalities. Since 1998, the state has helped fund the protection of more than 19,000 acres of land that directly safeguards drinking water supplies.[25] By contrast, during this time period water utilities purchased land or conservation easements over roughly 2,000 acres.[26]

The biggest change in water company practices in recent years has been in the area of land sales. Revenues from land sales have helped water utilities meet regulatory mandates and, in the case of privately owned companies, maintain and increase shareholder profits. Between 1991 and 1997, water utilities sold nearly 2,000 acres of Class III land, much of it for development such as housing, roads, and commercial or industrial parks.[27] Class III lands can be sold by utilities because they are located off the watershed area of an active supply source (see appendix 2 for land classification definitions).

Often these lands provide oases of green in an increasingly developed landscape, include important habitat for wildlife, offer opportunities for low-impact recreation, and help maintain scenic views and community character. Class III lands can also include former drinking water reservoirs (and associated watershed lands) that have been formally abandoned by water utilities. Some citizens and advocacy groups question the wisdom of developing land surrounding abandoned reservoirs and thus permanently degrading their water quality and eliminating their potential use as future drinking water supplies.

Since 1998, however, increased state funding for land protection has provided opportunities for water utilities to sell land or conservation easements to DEP and a growing number of municipalities. Incentives for these sales, as well as for land donations, were heightened by recent passage of state tax benefits for donating or selling land at a discount for permanent conservation. In addition, legislation enacted in 1998 gave the state, municipalities, and land trusts the right to negotiate Class III land purchases from water utilities before the land could be offered to for-profit buyers.

As a result, 96 percent of the roughly 3,000 acres of Class III land sold by water utilities between 1998 and 2003 were purchased by municipalities, land trusts, or the state for permanent conservation, while the remaining 4 percent was purchased for other public purposes, such as schools and fire stations.[28]

Endangered Lands Coalition's Work to Protect Water Quality

Connecticut's Endangered Lands Coalition, organized by the Connecticut Fund for the Environment, is a coalition of elected officials, nonprofit organizations, and individuals dedicated to improving the regulation of watershed lands. The purpose of the coalition is "to ensure safe, clean drinking water for our citizens while permanently protecting our water supplies and open spaces for future generations." The coalition accomplishes this by focusing on three major areas:

- pursuing regulatory measures to permanently protect existing water utility land,
- preserving reservoirs by changing regulations that allow water utilities to abandon reservoirs and sell surrounding land, and
- creating incentives for water utilities to protect land.

Rich Pomerantz

In 2001, Birmingham Utilities sold this property, roughly 570 acres in Ansonia and Seymour around Quillinan Reservoir, to the Department of Environmental Protection. Thanks to regulatory changes and the allocation of significant state funding, over the past five years most lands sold by water utilities have been purchased by the state, municipalities, and land trusts for permanent conservation as open space.

* Since 1988, 18 reservoirs and 3,600 acres of associated reservoir watershed lands have been abandoned. Once abandoned, the reservoir and surrounding water company watershed lands can be sold. Abandonment permits are granted if the water company can document that the water source is no longer needed to meet the needs of its own customers and no longer consistent with its water supply plan. No new reservoirs have been built in the past four decades and are not likely to be built in the foreseeable future.

In addition to selling Class III lands for conservation, water utilities have sold significant Class II lands, and easements over Class I lands, for permanent protection. The 2002 Kelda land conservation project, for example, protected land in all three classes (see sidebar on page 13). Following on the heels of the Kelda land acquisition, four of the largest private water utilities with land holdings have entered into separate Memorandums of Understanding with DEP, agreeing to a voluntary two-year moratorium on land sales, while DEP assesses the value of these land holdings as open space and develops strategies to secure funding.[29]

Local Governments

Regional growth pressures and expanded state support have helped jump-start local conservation efforts in Connecticut. In all, 76 municipalities have taken advantage of the state's Open Space and Watershed Land Acquisition Grant Program and more have plans to seek funding in the future. More than half of these communities have used the grant funds to conserve land that protects drinking water.[30]

Some Connecticut municipalities have also secured their own conservation funds, using general fund appropriations, voter-approved general obligation bonds, and other financing tools. Since 1997, nearly $80 million in local conservation and

Connecticut Town Watershed/Aquifer Protection Survey Results

Adopted aquifer protection regulations	**36%**
Local zoning ordinances that define the types of activity that can occur within a public drinking water source protection area, including aquifer and watershed areas	**46%**
Local design standards or prohibitions for the use or storage of dangerous or hazardous materials in a public drinking water source protection area	**49%**
Fund the purchase of property or development rights to ensure local control of landuse activities within public drinking water source protection areas	**20%**
Local coordination of site plan reviews for drinking water source protection areas with public water suppliers	**55%**
Maintain and use watershed and aquifer protection area maps provided by public water supply systems	**56%**
Participate in public education activities related to local environmental issues, drinking water source protection, and the creation of special zoning districts	**46%**

Survey conducted by the State of Connecticut Department of Public Health, Drinking Water Division, summer 2002. Of the state's 169 towns, 140 (82 percent) participated in the survey.

The quality of the next generation's drinking water depends on decisions made today. Protecting forestland and other undeveloped open space in drinking water supply watersheds and aquifer recharge zones is one of the most effective ways to safeguard drinking water supplies from nonpoint source contamination, because these lands play a critical role in filtering out pollutants. Funding from federal, state, local, and private sources will be needed to achieve this goal throughout Connecticut.

park bonds has been approved, although it is unknown how much of this funding was used to protect drinking water supply lands.[31]

Some municipalities are working in partnership with land trusts to acquire important watershed lands. Many local land trusts, which in the past pursued only donations of land, are now active purchasers. Some land trusts are also helping communities create conservation plans, secure funding, and facilitate partnerships among the state, municipalities, and private parties. In all, 12 of the 42 land trusts that received state open space grants (28 percent) used the funds to protect drinking water supply lands.[32]

A number of municipalities are also creating new open space plans that outline detailed criteria for land protection and acquisition. However, few are integrating watershed protection into both their local conservation plans and zoning regulations. According to the Connecticut DPH survey, an estimated 46 percent of all towns have adopted local ordinances that define the types of activities that can occur within a public drinking water source protection area, and only 36 percent have adopted aquifer protection regulations (see table on page 12).

Jeff Becker

Land surrounding the Saugatuck Reservoir in Easton was conserved as part of the 15,300-acre Kelda Lands Project, a groundbreaking achievement for the Department of Environmental Protection and its public and private partners. The largest land conservation purchase in the state's history, the project will help protect drinking water quality, preserve wildlife habitat, and provide recreational opportunities.

The Kelda Lands Project

In 2002, the governor, general assembly, Department of Environmental Protection (DEP), Kelda/Aquarion Company, The Nature Conservancy, and the Connecticut Fund for the Environment joined forces with numerous public agencies and private groups to protect some 15,300 acres of public water supply buffer land from potential development—a groundbreaking initiative for Connecticut. The protected lands were owned by the Kelda Group, parent company of Aquarion and its former subsidiary, Bridgeport Hydraulic Company. Located in 29 towns, these lands will continue to provide drinking water quality protection benefits, as well as open space and recreational opportunities to citizens throughout southwestern Connecticut.

The $90 million transaction was structured in two phases: the Class II and Class III watershed lands were purchased outright by DEP from the Kelda Group; the Class I lands, which Aquarion continues to own, were placed under a permanent conservation easement (see appendix 2 for information about water utility land classifications). This easement prevents future development and allows certain low-impact public recreational activities. Under the agreement, the Connecticut chapter of The Nature Conservancy also acquired ownership of or easements on much of the property. A blend of private and public dollars funded the purchase, including $80 million in state funding, $10 million in private funds, and a bargain sale from the Kelda Group, which reduced the total cost by $103 million.

Recommendations for Action

Unprecedented effort and commitment from a broad array of partners are required to protect Connecticut's watershed lands and drinking water supplies for future generations. To support source protection in Connecticut, the Trust for Public Land offers the following recommendations for action:

Connecticut State Government

Now more than ever, ongoing leadership, expanded regulatory requirements, and strong financial and technical support from the state are critical. Currently, funding cuts proposed for the 2004 fiscal year threaten to undermine important watershed and aquifer protection efforts. To lessen this threat:

- The state should continue its commitment to land conservation funding for watershed protection, even in light of current fiscal constraints. Specifically, full funding for the Open Space and Watershed Land Acquisition Grant Program and the Recreation and Natural Heritage Program should be restored following cuts instituted in 2003.
- The state should adjust the Open Space and Watershed Land Acquisition Grant Program to give water utilities the same land conservation funding incentives as land trusts and local governments. Water utilities are now limited to grants of up to 40 percent of the purchase price of land classified as Class I or Class II property. Municipalities and nonprofits are eligible for grants of up to 50 percent of fair market value for the acquisition of open space and 65 percent for lands that meet Class I or Class II criteria.[33]
- The state should permit 100 percent use of corporate conservation tax credits. Existing corporate tax credits were reduced in 2002 to 70 percent of a company's tax liability. Use of corporate conservation tax credits has had significant implications for watershed protection. For example, the Kelda purchase was made possible, in part, because the Kelda Group received a tax credit for its substantial bargain sale.
- The state should fully utilize SWAP program data to set priorities for funding land conservation projects that protect drinking water sources. Completion of the assessments—a major accomplishment for the state—allows for more meaningful planning at the state, regional, and local levels.
- The state should enact strong aquifer protection regulations. Connecticut has a classification system to regulate land around drinking water supply reservoirs, but nothing comparable exists for important groundwater

Susan Lapides

The Farmington Land Trust and the Trust for Public Land helped the town of Farmington protect 53 wooded acres, including this 15-acre spring-fed reservoir, which once supplied drinking water to town residents. TPL works with communities across the state to protect land surrounding active drinking water supplies as well as former and potential sources of clean drinking water.

resources. Groundwater supplies serve roughly 30 percent of the state's population, a percentage that will likely increase in the future given the difficulty of creating new reservoirs.

- Over time, the state should explore the use of federal funds from the Drinking Water State Revolving Fund and the Clean Water State Revolving Fund to address non-point source pollution strategies, including land conservation, after major point sources have been addressed. Although some states currently take advantage of the flexibility within these programs to fund land conservation, Connecticut does not.

Water Utilities

Greater leadership from water utilities is needed to advance the conservation of critical water supply watershed and aquifer protection lands. Specifically:

- Water utilities should actively promote land conservation as a source protection strategy by helping the state craft meaningful incentives for land conservation, encouraging municipalities to pursue source protection efforts, and promoting the development of local watershed land protection plans.
- Water utilities should increase their financial commitment to conserving land for source protection. In the past five years, seven of the state's ten largest utilities have made modest investments in the acquisition of water supply watershed or aquifer protection land.[34] All Connecticut water utilities should focus their efforts on the conservation of critical lands and work with municipalities to develop effective land protection plans.
- Water utilities should leverage their resources by partnering with the state, municipalities, and nonprofits. To date, a handful of water companies, including South Central Connecticut Regional Water Authority and the former Connecticut American Water Company, have joined forces with municipalities, nonprofits, and the state to conserve land near drinking water sources. These water companies have used limited contributions to leverage public and private funding toward the acquisition of critical lands. In exchange, they have received conservation easements over the most sensitive land, ensuring both permanent protection and appropriate management. This model approach should be adopted more widely by water utilities throughout the state.

Local Governments

The state and water utilities cannot do all that is necessary to protect drinking water supply watersheds. If cities and towns want to ensure their drinking water is protected, they must make source protection a high local priority. This means forging partnership with the state, utilities, and nonprofit organizations and identifying and funding the protection of critical local source water lands at the local level.

- Municipalities should define a vision for the protection of water supply areas and incorporate the protection of aquifer and watershed lands into both open space plans and plans of conservation and development. Using data now available from the SWAP program, municipalities can more easily locate drinking water sources and identify the threats to these lands. Existing water supply and regional development plans should also be used to assess the impact of development and identify potentially threatened lands.
- Municipalities should dedicate local funding and continue to take advantage of DEP's Open Space and Watershed Land Acquisition Grant Program to protect drinking supply watershed land and aquifer recharge areas.
- Municipalities should develop watershed and aquifer protection regulations that guide development and minimize the potential for adverse impact on water supplies, rather than wait for the state's proposal to be adopted. They should also review existing public health, wetland, and zoning regulations; ensure that these regulations are compatible with protection goals; and use available enforcement powers to protect watershed lands and water quality.

If cities and towns want to ensure their drinking water is protected, they must make source protection a high local priority.

Conclusion

Much progress has been made in protecting Connecticut's watershed land during the past five years. New state funding has enabled the Department of Environmental Protection, local governments, nonprofit organizations, and water utilities to permanently protect thousands of acres within public water supply watershed and aquifer areas. Important new regulations have also been introduced, including the requirement that Class II lands be protected by a conservation easement as a condition of sale. However, this progress is threatened by state budget cuts, which eliminate or drastically reduce the Open Space and Watershed Land Acquisition Grant Program and the Recreation and Natural Heritage Program. Renewed funding is essential for future protection of source water lands.

The cooperation and dedication of all stakeholders—state and local governments, water utilities, and nonprofit organizations—are essential to meet these challenges. Local governments, in particular, play a tremendous role in this endeavor. As local landuse decision makers, Connecticut's cities and towns must drive the conservation process—planning for protection, securing financing, and acquiring and managing watershed lands. By implementing a strategic local watershed protection vision, communities can protect their water quality now and for future generations. They can also protect scenic open space lands that help define the character of the area and provide a host of economic, environmental, health, and quality-of-life benefits.

The second part of this handbook is designed to help local officials, volunteers, and advocates—those at the center of landuse decision making—plan and carry out land conservation activities to protect active and potential sources of clean drinking water. It specifically encourages communities to think about planning up front for growth and open space protection in order to ensure that important watershed and open space lands are permanently protected.

Part Two: A Toolkit for Communities

Stephen H. Broderick

Residents of Ashford, Eastford, Hampton, and Chaplin review resource maps as part of a public meeting organized by the Green Valley Institute. Creating an open process and encouraging public participation are critical in the effort to develop a broadly supported local conservation vision.

To assist communities with the nuts and bolts of local watershed and aquifer protection through land conservation, the Trust for Public Land has developed the following four-step process:

1. Develop a Conservation Vision for Drinking Water Supply Areas

- Review existing plans for drinking water protection.
- Inventory water resources.
- Identify potential threats to water supplies.
- Build partnerships.
- Establish conservation goals and priorities.

2. Protect Open Space and Water Supply Lands

- Assess the most effective ways of protecting targeted lands, including regulatory and nonregulatory measures and acquisition and easement strategies.

3. Secure Conservation Funds

- Identify and obtain local, state, federal, and private funding for land protection.

4. Manage Water Supply Lands

- Carefully plan and fund the stewardship of protected open space and watershed lands.

References to additional information (organizations and publications) are made throughout this Toolkit. To access a directory of these resources, including contact information, visit www.tpl.org/connecticut and click on the publications box.

Develop a Conservation Vision for Drinking Water Supply Areas

Any comprehensive effort to protect critical watershed and aquifer protection lands starts by creating a conservation vision. This entails identifying local drinking water resources, assessing current and potential threats to water supply lands, setting conservation priorities, and reaching out to key partners.

The following six steps are designed to guide municipal officials and local advocates through this process:

1. Review existing plans for drinking water protection.
2. Inventory current and potential drinking water resources.
3. Determine landownership.
4. Identify potential threats to drinking water supplies.
5. Set conservation goals and priorities.
6. Build partnerships.

Keep in mind that the complexity of the process will vary considerably from community to community depending on the water delivery mechanism: there are about 600 water companies of all sizes in Connecticut, including private companies, regional water authorities, municipal utilities, and homeowners associations.[35] These water companies manage more than 3,400 public water supply systems.[36]

Visioning Step 1: Review Existing Plans

Some of the more important state, regional, and local planning documents to examine include:

State Planning Documents

- **Source Water Assessment Program (SWAP) Reports.** SWAP is a statewide effort to:
  - delineate source water areas for wellheads and surface water bodies used for public drinking water supply,
  - inventory potential sources of contamination in the delineated source water areas, and
  - assess the relative susceptibility of each public drinking water source to contamination.

The final state report, released in May 2003, is publicly available on the Department of Public Health's Web site. Chief elected officials for each municipality also have accompanying maps delineating source water areas.

- **Conservation and Development Policies Plan for Connecticut, 1998–2003.** This plan guides Connecticut's growth, environmental protection, and economic development actions. It provides a policy and planning framework for the capital and operational investment decisions of state government, which influence the growth and development of the state.

Regional Planning Documents

- **Regional plans of development.** Many of the 15 regional planning organizations in Connecticut have produced regional plans of development, which may include information about water quality/supply planning issues. Consulting these plans is especially helpful if your municipality's drinking water comes from another community or, alternatively, if your municipality supplies water to neighboring communities.
- **Long-range water supply plans and water resource studies.** Connecticut law requires water companies serving 1,000 people or more to produce long-term water supply plans that meet projected demand over the next 50 years. Copies of these plans are on file at the Department of Public Utility Control (DPUC), DPH, and your regional planning organization. Each municipality may request a copy to keep on file at the city hall or town office. While these plans are often enormous and full of detail, they contain important maps and other information relevant to planning land conservation activities. Condensed versions, or redacted plans, may also be filed at the DPUC.
- **Land trust plans.** Land trusts are a good source of information about conservation efforts in a community. Local or regional land trusts often have their own land conservation priorities that may coincide with the municipality's open space goals.

Local Planning Documents

- **Local plans of conservation and development.** These are the basic road maps establishing the municipality's goals for development, growth, and open space protection. These plans, which are required by the state, often include important maps showing the municipality's natural resources. Some plans include open space priorities and acquisition criteria. They may also present future plans for residential housing, industrial development, and

transportation—all of which can have a significant impact on drinking water supplies.

- **Zoning maps and zoning and subdivision regulations.** Zoning maps and zoning and subdivision regulations define the types of development allowed in a particular area. These are available online or at a municipality's planning and zoning or landuse office. Links to zoning and subdivision regulations in some communities are available from the Connecticut chapter of the American Planning Association.
- **Open space plans.** Many communities include open space protection goals in their plans of conservation and development. In addition, approximately one-quarter of Connecticut municipalities have developed stand-alone open space plans to outline a strategy for undeveloped land. The open space committee or conservation commission usually produces these plans, often with input from a local land trust. The plans may provide maps showing undeveloped land, permanently protected land, and high-priority parcels for acquisition. Typically, open space goals and criteria for the prioritization of specific parcels are also included.
- **Buildout analysis.** Using Geographic Information Systems (GIS), some communities have evaluated the amount of buildable land within their community and the impact of potential development. The Nonpoint Education for Municipal Officials (NEMO), a University of Connecticut Cooperative Extension System project, uses landuse and land cover data that have been interpreted from satellite imagery for buildout analyses. NEMO also conducts watershed water quality analyses and provides "how-to" information about the process on its Web site.

Visioning Step 2: Inventory Current and Potential Drinking Water Resources

Identifying and mapping drinking water resources is the next step. Consider the following questions when taking inventory of drinking water sources.

Does my municipality's drinking water come from surface or groundwater sources?

Your community may receive its drinking water from a reservoir, which is fed by a variety of upstream water bodies, including rivers, streams, lakes, and wetlands. If the reservoir lies in your municipality, the upstream water bodies are most likely located in other communities. Alternatively, your drinking water may come from a reservoir in another community, which, in turn, is influenced by waterways in your jurisdiction.

Groundwater, which flows underneath the earth in aquifers and is pumped to the surface through wells, may also be an important source. In this case, your municipality may again face multijurisdictional issues, as aquifers often span large geographic areas underground.[37]

What are the public water supply watersheds and aquifer protection areas in my community?

SWAP reports contain much of this information and are available at DPH's Web site. (Detailed mapping information may present security concerns and is therefore not currently available.) Watershed and aquifer protection areas can also be identified using maps available through DEP.

If one of the larger water utilities serves your municipality, it will probably also have maps of the water supply watersheds and aquifer protection areas—both for active and emergency sources of drinking water. In addition, the local water board, health departments, and inland wetlands commission may be helpful sources of information.

Where will my community's future drinking water come from?

Most future drinking water supplies will likely come from new groundwater wells rather than from the construction of new reservoirs.[38] For this reason, communities should focus particular attention on identifying potential groundwater supplies and protecting critical recharge areas from inappropriate development.

Water companies serving more than 1,000 people produce long-term water supply plans for meeting projected drinking water demands. Those communities with public water supply systems serving fewer than 1,000 people should check with the water supplier and, in a few cases, the local water board to determine whether future drinking water plans have been developed.

What is the most effective way to collect and analyze information?

Geographic Information System (GIS) technology—a computer-based tool that allows you to view multiple "layers" of information simultaneously—is invaluable for analyzing and

Communities should focus particular attention on identifying potential groundwater supplies and protecting critical recharge areas from inappropriate development.

Local Collaboration on Successful Mapping Pilot Project

The eastern Connecticut towns of Ashford, Eastford, Hampton, and Chaplin comprise roughly two-thirds of the Natchaug River watershed. While the population of these four communities is fairly small (none has a population greater than 6,000), local landuse decisions impact thousands more living downstream who get their drinking water from the Natchaug, Fenton, and Mount Hope river basins.

As a pilot project of the Green Valley Institute, all four towns underwent a collaborative resource inventory mapping exercise, using GIS technology, to help guide future planning activities. The project entailed mapping all vulnerable and at-risk water, agricultural, and wildlife/forest resources. Participants were given GIS training and other technological resources in order to undertake future work independently. A poster-size map of each town was developed, as well as a comprehensive map showing all commonly held resources among the towns, including watersheds.

The process of conducting the natural resource inventory raised awareness and generated substantial public support for watershed protection. Today these communities continue their efforts to identify and prioritize lands using the data derived through the mapping exercise. Two of the towns have established independent conservation commissions to advance their open space work, and three of the four towns are incorporating research into their local plans of conservation and development.

inventorying watersheds. It depicts natural features, such as topography and vegetation, as well as man-made characteristics, such as ownership and landuse.[39] GIS provides communities with the technology to undertake more advanced planning, such as buildout analyses, showing the impacts of future development. These analyses visually depict how projected growth will impact water quality and water quantity.[40]

Municipalities that have access to GIS can download general watershed and water resource data from the University of Connecticut's MAGIC Web site or purchase environmental data CD sets from the DEP store. Municipalities without access to GIS have several options: **1.** hire outside consultants that have GIS capabilities, **2.** apply for technical assistance grants to obtain GIS software and training, or **3.** order paper maps from state or regional planning organizations.

Visioning Step 3: Determine Landownership

The first step in determining landownership and landuses is to overlay a map of your community's water supplies or aquifers with the municipal parcel map and a zoning map—from the tax assessor's office and the planning and zoning commission, respectively. Unfortunately, relatively few communities have computerized parcel and zoning maps, which may make the process of overlaying maps somewhat time-consuming. Landownership can be determined by using the parcel map in combination with the ownership information housed at the tax assessor's office.

Conservation lands owned by state and federal agencies, municipalities, and land trusts should be identified, along with any watershed lands or aquifer protection areas owned by water companies. In the case of water utility–owned lands, holdings are not permanently protected unless a conservation easement has been placed on them. Without this safeguard, Class III lands can be sold for development, and if the supply is abandoned, Class I and Class II lands can be reclassified and sold for development (see appendix 2 for definitions of watershed land classifications).

Visioning Step 4: Identify Potential Threats to Drinking Water Supplies

Understanding the major threats to drinking water supply lands is an essential part of determining which lands are the most critical to protect. Consulting key planning documents and human resources is helpful in identifying such threats.

- **Source Water Assessment Program (SWAP) reports.** In addition to delineating source areas, these reports inventory potential sources of contamination and assess the likelihood of a source water area becoming contaminated.

Nonpoint Source Management Resources

There are a variety of nonpoint source pollution prevention and management resources available to local officials.

- **Nonpoint Education for Municipal Officials (NEMO)**, a project of the University of Connecticut, educates local officials about how to address nonpoint source pollution in order to better protect water quality and integrate watershed protection into their open space and comprehensive plans.
- **The state DEP's Nonpoint Source Management Program**, consistent with Environmental Protection Agency (EPA) guidance, is leading a national pilot program to monitor nonpoint source pollution at residential development sites.
- ***The Long Island Sound Study***, part of the National Estuary Program, has research and best management practice information available to help protect Long Island Sound and its waters.

- **Consumer Confidence Report.** This report provides information about sources of drinking water, potential threats, and protection efforts. It is available from your town water board or local water utility.
- **Annual Watershed Survey.** A public water system using surface water as an active source of supply must conduct a sanitary survey of the watershed at least annually. A report must be submitted to DPH by March 1 each year. The report lists any violations found during the inspection such as failing septic systems, illegal discharges, and erosion problems. Local health districts/town sanitarians are notified of the violations in order to take corrective action.
- **Future development plans.** Zoning ordinances and the municipality's plan for conservation and development should be reviewed to determine whether any growth activities are slated to occur in areas that are near public water supply watersheds. The planning board should have all proposed subdivisions on file.

Visioning Step 5: Set Conservation Goals and Priorities

Clearly defined goals and a system of evaluating potential properties for protection are essential to producing an effective watershed protection vision.

Establish General Conservation Goals

Conservation goals depend on local needs, challenges, and opportunities. Some general conservation goals to consider in relation to safeguarding drinking water supplies include the protection of:

- aquifer recharge zones,
- wetlands and riparian corridors that contribute to drinking water supplies,
- steep slopes that drain into drinking water supplies,
- small streams, ponds, and vernal pools within the immediate watershed of drinking water supplies,
- forestland that serves as a natural water filter for drinking water supplies, and
- floodplains and natural drainage areas that impact drinking water supplies.

For communities that control their own wells and reservoirs, the process of prioritizing watershed lands for protection is fairly straightforward, because it will be relatively clear which drinking water sources are most important for the community.

For communities served by large water companies, the process is more complicated. Water companies can abandon supplies if they decide that they are no longer needed for public water supply purposes. As a result, communities that invest in land protection around water supplies will want assurances from the water utility that the supplies will not be abandoned and sold in the foreseeable future.

On the other hand, if a water utility is abandoning a local supply, the community may want to consider purchasing the land to preserve wildlife habitat, increase recreational opportunities, and protect community character. In some cases, communities have purchased abandoned supplies in order to maintain their full range of options for providing drinking water in the future.

Prioritize Specific Properties

Once a community has identified general conservation goals, the next step is to identify the specific parcels that warrant the most attention.

If a water utility is abandoning a local supply, the community may want to consider purchasing the land to preserve wildlife habitat, increase recreational opportunities, and protect community character.

Criteria for prioritizing parcels may be broadly defined, according to general guidelines, goals, or land features; or quite specific, according to a detailed ranking of factors or a numeric points system. These criteria are especially important when a property comes on the market and a community must decide whether or not to pursue it. Some general criteria to consider include:[41]

- **To what extent does the land help protect existing and/or potential public water supplies?**
  - Is the parcel within a source water area?
  - If yes, would it meet the criteria for Class I or Class II land, if it were owned by a water utility (see appendix 2 for land classification definitions)?
  - Is the land located within a potential drinking water watershed or a potential aquifer or wellhead protection area?
- **Does the land help protect water quality, in general?**
  - Does it contain forests or forested wetlands?
  - Does it contain soil characteristics that are important for groundwater quality?
  - Does it provide a buffer from existing or proposed development?
  - Does it help to prevent erosion and/or polluted runoff?
  - Does it protect small stream networks or a significant tributary stream?
  - Does it help to maintain high water quality and quantity?
- **Does the community support the protection of this land?**
  - Does it dovetail with complementary objectives for protecting wildlife habitat, scenic views, and recreation areas set forth in the community's plan of conservation and development or open space plan?
  - Do neighboring property owners and members of the community support the protection of this land?
- **How urgent is it to protect this property?**
  - Is there an imminent risk of development for this property?
  - Has surrounding land been acquired for development or already developed?
  - Does local zoning encourage development of this property?
  - Does the landowner's age, health, or financial circumstances add urgency?

In the course of creating a drinking watershed protection plan, communities are likely to develop a list of high-priority privately held lands. When to share this information with the public is an important consideration. Releasing plans too early can have unintended consequences, such as increasing the price of targeted lands or straining relationships with landowners. For this reason, some communities choose to make public only the criteria that will be used to consider potential properties, rather than publish a list of top-priority parcels.

Pilot Program Targets Watershed Lands

The EPA's Source Water Stewardship Demonstration Project is designed to demonstrate the effectiveness of using land conservation and forest management to protect drinking water sources in several selected watersheds. Although Connecticut is not yet participating, an innovative 18-month pilot program is under way in the Nashua River watershed, on the border between New Hampshire and Massachusetts. The Nashua River Watershed Association and the Trust for Public Land (TPL) are partners in the initiative.

Central to the demonstration project is a computer model that shows how pollutants move through the watershed. The model also predicts how future development and other landuse changes will likely impact drinking water. Created by the University of Massachusetts, these models help communities identify and prioritize conservation areas within the watershed, including those lands that will benefit most from sustainable forestry management techniques.[42]

Project organizers hope the techniques and approaches used in the program will serve as a model for communities across the country. Communities participating in the initiative will be featured and promoted nationally by both EPA and TPL via case studies that highlight best management practices for drinking water protection.

Visioning Step 6: Build Partnerships

Water supplies in Connecticut often cross many municipal boundaries. Because water flows according to topography, not political borders, the need for partnerships and regional collaborations within public water supply watersheds is critical. Important groups to engage include water utilities, regional planning organizations, local governments, nonprofit organizations, and the public.

Top Priority: Critical Public Water Supply Watershed Areas

When prioritizing watershed areas for conservation, municipalities should follow a stringent set of criteria, like those used to define water utility–owned Class I and Class II lands:

- land within 250 feet of a reservoir or public water supply source;
- land within 100 feet of a tributary stream and stream overflow area;
- areas within 200 feet of groundwater wells;
- an identified direct recharge area of an aquifer now in use or available for future use;
- land with slopes of 15 percent or greater adjacent to rivers, streams, or watershed lands;
- land with soil depth to bedrock of 20 inches or less or poorly drained and very poorly drained soils, as defined by the U.S. Department of Agriculture's Natural Resources Conservation Service, that are contiguous to lands described above; and
- land that may be completely off a public drinking water supply watershed but that is within 150 feet of a distribution reservoir or a first-order stream tributary to a distribution reservoir.

Water Utilities

As stewards of roughly 20 percent of public water supply watershed lands in Connecticut, water utilities can provide expertise, information, and sometimes funding to help protect additional watershed land. They also document threats to water supplies by performing annual watershed inspections, water quality monitoring, and other technical surveys. When available, this information can help make the case for watershed protection with the public and elected officials.[43] Water utilities may also be willing to play a role in the public outreach and education process.

A number of water utilities have contributed to high-priority land protection projects by purchasing conservation easements. In 2000, the South Central Connecticut Regional Water Authority worked with the town of Woodbridge to protect headwaters of the Wepawang River. The former Connecticut American Water Company (now part of Aquarion Water Company of Connecticut) played a similar role in protecting two properties in Stamford and Greenwich on the Mianus River, an important drinking water supply.

State Agencies

State agencies help municipalities protect land that supplies drinking water by providing funds, planning support, and training programs. Specifically, DEP administers the Open Space and Watershed Land Acquisition Grant Program, which provides funds to municipalities and nonprofit land conservation organizations for the protection of open space and watershed lands. DEP Bureau of Water Management manages federal clean water fund grants, provides training and education programs for municipal officials in the area of aquifer protection, and works with municipal officials to develop sewage disposal plans.

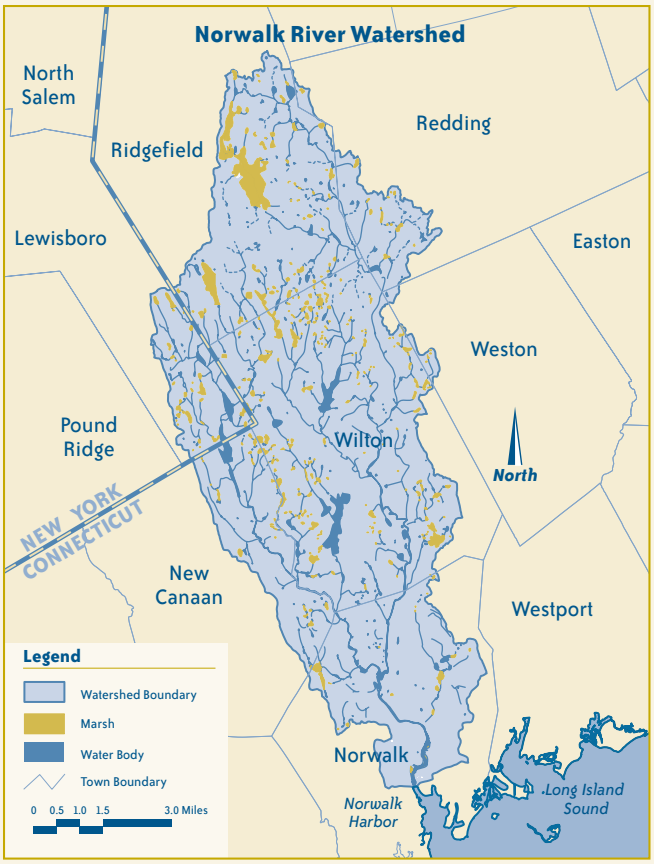
Regional Planning Organizations

Connecticut has 15 regional planning organizations (RPOs) that address a broad range of governmental and public challenges through the voluntary participation of their member municipalities. The information available on open space and watershed protection varies by RPO, depending on the organization's particular emphasis.

Local and Regional Partners Protecting Norwalk River Watershed

The Norwalk River Watershed spans seven Connecticut townships and roughly 40,000 acres in southern Connecticut and New York. Communities within the watershed joined the state and federal governments, nonprofit organizations, and concerned citizens in 1996 to form the Norwalk River Watershed Initiative (NRWI), a group committed to improving both the water quality and the quality of life within the watershed. The group is now recognized statewide and nationally for its research, education, and pollution prevention programs that address the various threats to the watershed, including storm water runoff, riverbank destruction, plant and habitat loss, septic storage tank leakage, and flooding.

Some 90 percent of the town of Wilton lies within the Norwalk River watershed. Most residents receive water from their own wells, although some homes are served by the neighboring town's water department and others by Aquarion Company. The town has signed onto the NRWI's action plan and has taken a particularly aggressive approach to one action item—the preservation of open space. After a decade without any land conservation activities, the town's efforts were jump-started in 1996 with the revision of its Plan of Conservation and Development. That year, the town's Conservation Commission drafted chapters of an open space plan and identified and prioritized properties of value based on established criteria such as connectivity, size, wildlife habitat, and other important elements.



The plan received strong political support and a budget appropriation of $165,000 for land acquisition—a small but important amount that helped to generate momentum and attract matching funds. Public support grew as important lands were targeted throughout the town, and a public education campaign explained the costs and benefits of the conservation plan. By the end of the effort, voters responded enthusiastically by approving an $8 million conservation bond by a 94 percent margin in 1999, generating funds for the protection of five targeted properties totaling 172 acres. Included was property along the Norwalk River that provides recreational opportunities and protects the river's riparian buffer. A year later, voters approved a $4 million bond by an 85 percent margin to protect two properties—all while tens of millions of dollars were being appropriated for school expansions.

The success of Wilton's open space and watershed protection program can be easily traced: town leaders established a thorough process for the selection of ecologically important open space and watershed lands, sought public input, worked closely with neighboring towns, and leveraged state matching funds. In addition to its conservation program, the town has established aquifer protection regulations, developer set-aside requirements, and conservation subdivision regulations to mitigate the impact of new growth on watershed lands.

Local Governments

It is essential to forge relationships with source protection stakeholders within your community. To achieve this goal, it may be important to create a local or regional task force to guide the design and implementation of a watershed protection vision. In addition, consider building regional partnerships with officials in any neighboring communities that share your community's public water supply watershed. Important municipal players include:

- **Municipal Officials:** the town council, board of selectmen, or aldermen; the water pollution control authority or other appropriate health board (may be local or regional); the tax assessor; and officials from parks and recreation, public works, and finance departments; and
- **Local Commissions:** inland wetlands/conservation, planning, zoning, and economic development.

Nonprofit Organizations

Land trusts, watershed associations, and other nonprofit organizations can be invaluable partners in the design, funding, and implementation of a conservation and water supply land protection vision. During the planning stage, these partners can provide technical support, facilitate public participation, and help define conservation goals. With a vision in place, nonprofit groups and land trusts can then help secure funds from individuals, businesses, and foundations, many of which have policies against awarding grants directly to governmental agencies. Finally, some nonprofits can help communities negotiate land conservation transactions. Potential partners include:

- **Local Land Trusts:** Connecticut's 123 local land trusts work to protect and manage important natural areas such as open space, watersheds, forestland, farmland, and wildlife habitat.[44] In addition to protecting open space, many of these organizations can assist with creating local open space plans and educating the public.
- **National/Statewide Organizations:** Groups such as the Trust for Public Land, The Nature Conservancy, American Farmland Trust, and others can provide assistance with technical issues and, in some cases, planning and real estate transfers. TPL has helped nearly two dozen Connecticut municipalities permanently conserve important open space.
- **River and Watershed Groups:** There are numerous state and local nonprofit groups working to protect Connecticut's rivers and watersheds. The Rivers Alliance of Connecticut, a statewide organization that coordinates watershed planning, promotes public policy, strengthens grassroots organizing, and facilitates cooperative programs with land trusts and watershed groups. Rivers Alliance can also identify other river and watershed resources and organizations working in different communities.
- **Education Entities:** The Center for Land Use Education and Research (CLEAR), part of the University of Connecticut, provides information, education, and assistance to landuse decision makers on how to better protect natural resources while accommodating economic growth. NEMO, a division of CLEAR, educates local officials about landuse and watershed issues, as well as the use of GIS.

The Public

Communities should strive to create an open and inclusive process that educates the public about the importance of water supply land protection and addresses public conservation priorities. Public opinion polling is an invaluable tool for assessing public priorities. A series of informational meetings can also be useful to inform community leaders and the general public about the benefits of conservation to drinking water quality and solicit input.

Consider the creation of a citizens task force or advisory committee to help secure local support and generate momentum. This committee can guide the land conservation process, from designing a vision through managing the land. The committee should be as diverse as possible, representing landowners, local businesses, governmental officials, water utilities, developers, and potential donors.

Communities should strive to create an open and inclusive process that educates the public about the importance of water supply land protection and addresses public conservation priorities.

Protect Open Space and Water Supply Lands

This section provides an overview of the steps involved in completing a conservation transaction, focusing on the purchase of land outright and the acquisition of conservation easements. It also highlights the partnership role that nonprofits can play in the municipal acquisition process.[45] While not the focus of this report, land can also be protected using a variety of regulatory and zoning techniques.

Land Conservation Methods

Conserving land in water supply watersheds and aquifer protection areas is the most effective way to permanently buffer drinking water supplies. To determine the best strategy for preserving a particular piece of land, some basic questions need to be answered at the outset:

Conserving land in water supply watersheds and aquifer protection areas is the most effective way to permanently buffer drinking water supplies.

Acquisition Issues

- Is the landowner willing and able to either donate or sell to the municipality/land trust?
- If so, can the municipality, on its own or in partnership with other public agencies and land conservation organizations, secure the funds necessary to purchase the property?
- Does the town need to acquire the land outright for management purposes or should the purchase of a conservation easement be considered instead?
- Does the town have adequate funding and resources to assume long-term management of the land?

Complicating Factors in the Transaction

- Does the property have any potential environmental hazards on or near it?
- Is the entire property suitable for conservation or are there existing buildings or other pieces of the land that should be sold privately?
- Is the property subject to any lien or encumbrance that would require action prior to closing or compromise its use as open space in the future?
- Are there any encroachments, easements, or boundary disputes that could affect ownership and management?

Some of the more common methods for protecting open space and watershed lands include:[46]

Fee Simple Purchase

The most straightforward method of land acquisition is to purchase property outright, acquiring all the rights to the property and the title to it. This approach puts the municipality in full control of the property but has the disadvantage of being relatively expensive.

Conservation Easement/Purchase of Development Rights

The acquisition of a conservation easement either entirely eliminates or greatly restricts the type and amount of development that may occur on the property, and can also include provisions for appropriate management and public access. The buyer, in turn, accepts responsibility for monitoring the property to ensure that the

Westbrook Residents Support Conservation Planning and Funding

Community involvement and the mobilization of resources were instrumental to open space planning efforts in the town of Westbrook. The planning process was initiated at several strategic planning workshops, held as part of the revision of the town's conservation and development plan. Following these workshops, the town's Planning Commission distributed a survey to Westbrook citizens that focused on the future of the town. Ninety-seven percent of survey respondents considered natural resource and open space protection important issues, while 88 percent agreed that funding open space was very important. Backed by this widespread public support, the town's Conservation Commission drafted an open space ordinance, which established procedures for the town to acquire open space. Criteria for prioritizing open space properties were subsequently developed at three workshops and two public hearings.

The public demonstrated its support for the town's conservation efforts in January 2002, when voters approved a $2.2 million open space bond. Working cooperatively with the Trust for Public Land, the town has used local funds to leverage $890,500 in funding from the state Open Space and Watershed Land Acquisition Grant Program.

landowner complies with the terms of the easement. The purchase of conservation easements is less expensive than outright fee purchases.

Lease of Conservation Lands

A lease typically provides exclusive use or access rights to a property for a set period of time. This arrangement can be attractive because it offers a trial period to manage the property, build public support for long-term protection, and cultivate a relationship with the landowner. A "lease-option," which gives the lessee the option to purchase the land at the end of the lease, may also be negotiated.

Selling Existing Buildings and/or Remnant Parcels to Finance the Project

Sometimes a property may comprise several parcels, not all of which are suited for permanent conservation. For example, some land may be outside the water boundary. In these situations, it may make sense to consider selling existing buildings and/or the least environmentally sensitive portions of the property to a private buyer and protecting the remainder. Private sales can help subsidize the preservation of the remaining land.

Donations

Donating land for conservation purposes typically provides the landowner with significant tax benefits. A landowner can make an outright donation, allowing for immediate protection, or defer the donation through a bequest or reserved life estate. In the case of a bequest, the landowner retains ownership until death and does not benefit from income tax deductions. In the case of a life estate, the landowner donating the property retains it for lifetime use.

Right of First Refusal/Right of First Offer

If the landowner is not willing or able to sell the property immediately, it may be possible to negotiate a contractual right of first refusal or right of first offer that might enable the property to be acquired at a future time. A right of first refusal requires a landowner to sell the property for the same price and terms that the landowner is willing to accept from a third party. A right of first offer guarantees the right to make an offer to purchase the property before a landowner can sell the property to a third party, and also prevents the landowner for selling to a third party at a lower price than was offered.

Eminent Domain

If land is needed for a public purpose such as a school or road, it may be taken by government. The owner is compensated for the value of the property.[47] Although it is rarely the ideal option, eminent domain may be an appropriate option for securing extremely critical and threatened watershed lands. While it provides government with a tool to acquire targeted properties when other acquisition techniques are unworkable, the potential costs in terms of acquisition, litigation, and public relations can be high.

Acquiring Property

The actual process of acquiring land varies greatly with each transaction, but is often complex and typically involves some financial risk. This section touches on each of the major steps in the process, including negotiating with landowners and completing any necessary appraisals, title work, environmental assessments, and surveys.

Landowner Negotiations

If the desired property is already on the market, a clear opportunity will exist to begin negotiations. If a high-priority property is not on the market, the first step will be to approach the landowner to determine whether he or she will consider a sale and to learn as much as possible about the landowner's goals and financial needs. If possible, approach him or her through friends or acquaintances. In most cases, the two major points of negotiation will be price and timing. Flexibility and creativity can often be essential in designing a transaction that meets a landowner's particular needs while also achieving conservation objectives.

Appraisal

An appraisal is extremely helpful in evaluating a property's fair market value. There are several types of appraisal reports, which provide varying levels of information:

- An opinion of value or restricted appraisal, the least expensive option, is a rough value estimate that relies heavily on the experience and background knowledge of the appraiser.

- A summary report gives the value estimate and information to support the appraiser's conclusion.
- A self-contained narrative appraisal, the most comprehensive approach, involves a complete analysis of general economic conditions, specific property data, and the reasoning leading to the value estimate.[48]

As an alternative, a market analysis can be performed, which is less accurate than an appraisal. It involves analyzing the property's value by looking at the prices of similar properties sold recently.

Title Report and Insurance

The term "title" refers to the accumulation of rights of owners and others in real property. A title search examines the current state of title for the property, including deeds, easements, covenants, or liens affecting property, and any defects in the title. Title insurance, which is available to owners of land and holders of conservation easements, protects the insured from any loss due to defects in the title that occurred prior to the time the policy was issued, other than those identified in the policy.

Environmental Assessment

This review of a property's environmental condition is very important to ensure that the property is not contaminated. Because anyone in the chain of title can be liable for cleanup costs, it is important to discover any environmental problems before a decision is made to acquire the land.

Town Takes Multipronged Approach to Watershed Protection

Located in the heart of eastern Connecticut, Mansfield, like many towns, has a complex water supply network. In all, the town is served by two large water utilities, 17 small community water systems, and individual private water supply wells, most fed by the Fenton and Willimantic River watersheds.[49]

On its southern border, the neighboring town of Windham operates a municipal-owned water utility, which draws its water from the Willimantic Reservoir, located in Mansfield. The Windham public water system serves about 750 residential dwelling units and a commercial district in southern Mansfield. Located in north-central Mansfield is the main campus of the University of Connecticut (Storrs-Mansfield), which has well fields in the Fenton and Willimantic River watersheds. The university operates its own water supply system that also provides public water to proximate municipal facilities and some adjacent commercial and residential uses.

Mansfield has an active open space acquisition program and requires developers to make open space dedications in conjunction with new landuse applications. In 1990, residents approved a $1 million bond referendum—funds that were supplemented with more than $1.7 million in general appropriations over the last decade and $300,000 in grants from the state Department of Environmental Protection. Many of the properties purchased by the town, including an important piece of property next to the Willimantic reservoir, are within the watersheds of the reservoir and public drinking water wells.

Citizen participation has been instrumental to the success of Mansfield's open space acquisition program, guiding the identification and prioritization of land. The town has developed management plans for each of its acquired properties, which include land improvements and, in many cases, plans for passive recreation.

On the regulatory side, the town's zoning practices have evolved considerably in recent years to minimize the impact of new development on groundwater and surface water. To plan for future demand, which is expected to exceed supply, the town recently completed a water supply plan that assessed the town's water quality, existing water sources, future demand, and potential groundwater sources and water system interconnections with neighboring utilities. A similar study is in process at the University of Connecticut, and town officials anticipate working closely with the university to address future water supply issues.

Survey

A survey is a map showing the measurements, area, boundaries, and contours of a property. You'll need a survey if the existing deed contains an insufficient property description. Federal and state grant programs often have survey requirements.

The complexity of the land acquisition process requires the participation of experienced real estate professionals. While it may be possible to arrange for assistance on a pro bono basis or at reduced rates, it is always essential to have qualified, professional support.

Working with Nonprofits

Nonprofits, from local land trusts to national conservation organizations like the Trust for Public Land and The Nature Conservancy, vary tremendously in their size and capacity, but all offer partnership opportunities for municipalities. These partnerships can often be useful in bringing as many sources of funding to a project as possible. In addition, some nonprofits will assist municipalities with negotiating the transaction, helping to adjust timing, price, and land configuration to meet the needs of all parties.[50]

Some of the specific roles nonprofits can play include:

Negotiations

Asking a nonprofit to take the lead in negotiations can make sense if a city or town is concerned about conflicts that might arise from the municipality acting as both regulator and purchaser of a piece of property. In addition, nonprofits can play a useful role as an independent third party if negotiations between a landowner and a municipality have reached an impasse.[51] For small communities with limited staff capacity, assistance with negotiations may be particularly attractive.

Timing

All too often, the process involved in approving local funding makes it difficult to meet a landowner's timing requirements. Some nonprofits, such as TPL, will act on behalf of a municipality to purchase or otherwise secure land temporarily until funding is assembled for the purchase.

Funding

Involving a nonprofit partner can open up opportunities to attract private funding to help offset the cost of a particular purchase. In addition, nonprofits can often assist in helping negotiate a bargain sale from the landowner, apply for state and federal grants, or sell a portion of the property, such as an existing house, privately.[52]

Management

In some cases, nonprofit organizations are willing and able to assist municipalities with land management and/or easement monitoring. Some nonprofits will use volunteers to perform these tasks, while others have professional staff. If paid assistance is needed, nonprofits typically have more flexibility than local governments when it comes to the bidding and hiring process.

Secure Conservation Funds

There are a variety of potential financing techniques available to Connecticut municipalities interested in protecting watershed lands—from federal and state grants to local taxes and bonds. By tapping into as many of these options as possible, communities can leverage their funds and avoid relying on a single, potentially unpredictable funding source.

Public support and participation are essential throughout the design and implementation of a watershed protection vision. This is particularly important when it comes to paying for land with local tax dollars. A citizens advisory committee or task force can help a community gain support for local conservation funding. The Trust for Public Land's Conservation Finance program also works with state and local governments across the country to help design successful conservation funding measures.

A citizens advisory committee or task force can help a community gain support for local conservation funding.

Municipal Sources

Connecticut municipalities have four main tools available to pay for open space acquisition projects: general obligation bonds, revenue bonds, general fund appropriations, and fee programs. Cities with redevelopment agencies can also use tax increment financing.

General Obligation Bonds

Since 1997, nearly two dozen Connecticut towns have passed general obligation bonds generating more than $80 million for open space acquisition. General obligation bonds typically require a property tax increase to cover the cost of the bond. They generally must be recommended by the Board of Finance or similar body and then approved by the legislative body (e.g., Town Meeting). In some cases, a bond measure may be sent to public referendum, in which case a majority vote is required for passage. It's important to note that municipalities cannot incur indebtedness greater than 2.25 times the annual revenue from property taxes.[53]

Revenue Bonds

Municipal revenue bonds are backed by a specific revenue stream, such as user fees, fees collected in-lieu-of an open space dedication, or taxes levied specifically for a project. Revenue bonds are usually easier to approve, but costlier to repay than general obligation bonds. Voter approval is not typically required, as the government is not obligated to repay the debt if the revenue stream does not flow as expected. Unlike general obligation bonds, revenue bonds are not constrained by debt ceilings. They are rarely used, however, to fund municipal land conservation in Connecticut.

Common Local Financing Options in Connecticut

Method	Definition	Pros	Cons
General obligation bonds	Loan taken out by a city or county against the value of the taxable property	• Allows for immediate purchase of open space, locking in land at current prices • Distributes the cost of acquisition over time	• Incurs interest costs through borrowing • Voter approval required • Property tax Increase
General fund revenues (property taxes)	Revenue derived from real property taxes or from fees	• Steady source of revenue • Relatively easy to administer • Tax burden fairly broadly distributed • Small increases create substantial funding • Popular with voters when focused on compelling land conservation needs	• Competition from other public purposes • Small amounts of funding typically available
Open space fee	One-time fee paid by developers in some Connecticut locales (in-lieu-of open space dedication)	• Nexus between taxing new development and protecting open space	• Fees typically do not raise large sums of money

General Fund Appropriations

Land conservation projects can also be funded with appropriations from a municipality's general fund. In recent years, several communities have appropriated money for open space acquisition, including North Branford, Roxbury, Shelton, and Woodstock. Use of such property tax–generated funds carries no borrowing costs and is often attractive to debt-resistant voters and public officials. On the other hand, funds must typically be accumulated over several years to pay for expensive land acquisitions.

If a town does not spend open space funds within a given year, they may be deposited into one of several nonlapsing funds, which will carry over to the next budget year. These include:

- **Land Acquisition Fund**, earmarked for open space, recreation, or housing purposes.
- **Open Space Preservation Fund**, earmarked for acquisition of land, easements, or development rights for protection of natural resources, low-impact recreation, and agriculture.
- **Agricultural Land Preservation Fund**, earmarked for acquisition of development rights on agricultural properties.

Open Space Dedication/Fee in-Lieu-of Open Space Dedication

Under Connecticut law, planning and zoning commissions may require developers to dedicate a certain amount of land for open space as part of the development process. Many communities, such as Bethany, for example, have used the open space dedication provision as a preservation tool.

Alternatively, developers may be required to pay a cash fee, which is used to purchase land elsewhere in the community for open space purposes.[54] Scores of Connecticut municipalities, including Shelton and North Branford, collect fees in-lieu-of open space dedication. Many also dedicate penalties received when properties are removed from the current use tax program. Unlike dedications, which often result in protection of small and disjointed parcels, collecting fees and penalties gives communities the flexibility to focus all available resources on protecting high-priority properties. Since these methods do not generate large sums of money, however, they are often insufficient to fund large land acquisition projects.

Tax Increment Financing

Tax increment financing (TIF) is a mechanism available to repay bonds issued to finance development or redevelopment projects. The purpose of TIF is to stimulate economic revival of blighted urban, suburban, and occasionally even rural neighborhoods. Under TIF, the assessed value of the properties within a specified area is fixed, and any additional incremental revenue generated from increased assessed value goes into a special fund that can be used to fund open space acquisition for parks or issue bonds. TIF has been approved in the city of Stamford to help fund the Mill River Park. This financing tool has the advantage of funding projects without draining general revenues. The disadvantage is that lenders charge a higher interest rate for bonds backed by TIF revenues than for general obligation bonds issued by the city.[55]

State Sources

In addition to outright acquisition of open space and conservation easements by DEP, the state of Connecticut encourages open space preservation through the following key initiatives:

- open space acquisition grant programs,
- tax incentives for corporate landowners,
- and the Farmland Preservation Program, which purchases conservation easements from farmers.

Open Space Acquisition Grant Programs

Recreation and Natural Heritage Trust Program

Launched in 1986, this program provides funding to DEP for open space acquisitions, particularly for land that contributes to the state's system of parks and forests and/or provides key links in greenway and trail systems. The program enables outside groups, typically municipalities or nonprofit organizations, to assist the state in acquiring properties. A cost-sharing agreement allows each party to leverage available funding to meet the purchase price, with the outside group providing at least 15 percent in matching funds. Land purchased under this program is owned by the state but may be managed by local governments.[56] The legislature authorized $102.5 million for the program during fiscal years 1998–2003, but future funding is uncertain due to a recent proposal to eliminate funding for the program in fiscal year 2004.

Open Space and Watershed Land Acquisition Grant Program

Created in 1998 and administered by DEP, this program provides grants to:

- municipalities and nonprofit land conservation organizations for open space acquisition, and
- water companies to acquire Class I or Class II water supply land. Lands acquired through this program are subject to permanent conservation easements held by DEP.

Grants are made to municipalities and nonprofit land conservation organizations for up to 50 percent of the land's fair market value. For nonprofits and public agencies working in "targeted investment areas" or "distressed municipalities" or purchasing Class I or Class II lands, grants may be up to 65 percent of fair market value (see appendix 2 for land classification definitions).[57] Grants are awarded to water companies for up to 40 percent of fair market value.

This program has protected some 10,600 acres to date, and the state's $46 million in grants has leveraged $58 million from private and public sources. Funding for this state program, determined each year by the General Assembly, is also in jeopardy for fiscal year 2004.

Charter Oak Open Space Trust

Established in 1999 and administered by DEP, this program awards matching grants to municipalities and nonprofits for acquisition of open space or conservation easements. The trust receives a portion of state surplus funds, up to a maximum of $50 million, and is thus funded only when the state has a budget surplus. Matching grants are awarded on the following basis:

- 60 percent of the purchase price for land in densely populated municipalities,
- 50 percent of the purchase price for land in a drinking supply watershed that would be Class I or Class II land if owned by a water company, and
- 50 percent of the purchase price of land owned by an electric distribution company or electric supplier.

Tax Incentives

Corporate Business Tax Credits

- **Donation of land for open space.** Since 1999, Connecticut has offered a corporate business tax credit for donations of open space land, interests in land, or conservation easements to the state, a municipality, or a nonprofit land conservation organization. Donated land must be permanently preserved as open space. The credit is equal to 50 percent of the fair market value of the gift, which may be an outright gift of land or a gift of a portion of the land's value, in the form of a bargain sale. The credit may be carried forward for up to ten years.[58]
- **Capital gains deduction for open space land sales.** In 1999, the General Assembly passed

Campaign to Save the Treetops Property Attracts Widespread Support

In 2002, a coalition of public and private partners worked together to secure funding to protect the Treetops estate in Greenwich and Stamford from imminent development. With help from the Trust for Public Land, the state of Connecticut purchased 94 acres and a conservation easement over an adjacent 15 acres from International Paper. Additional conservation easements were also purchased by both municipalities and the former Connecticut-American Water Company.

A variety of public and private partners supporters funded the $11.5 million project, including the state of Connecticut, the city of Stamford, the town of Greenwich, and more than 1,400 private donors. To raise the private funds, TPL joined forces with the Greenwich Land Trust and the Stamford Land Conservation Trust to launch the *100 Days to Save Treetops Campaign*.

Because it lies along the Mianus River—the primary source of drinking water for 130,000 residents of lower Fairfield County and parts of New York—the Treetops property plays a critical role in buffering local drinking water supplies. It also connects to other protected open space and is home to several rare and declining species, including the eastern box turtle, spotted salamander, and fairy shrimp.

a statute allowing corporations to deduct the following prior to paying state income taxes: the value of any capital gain realized from the sale of land, an interest in land, or a conservation easement to the state, a municipality, or a nonprofit land conservation organization for permanent protection as open space. This deduction is also available for the sale of land to a water utility, if the land will be permanently protected as open space or designated as Class I or Class II watershed land.

- **Neighborhood Assistance Act Tax Credit Program.** The Neighborhood Assistance Act offers tax credits of 60 percent to corporations that give donations of at least $250 to municipalities or nonprofit corporations for the permanent protection of open space. Funds may be used for the purchase of land, interests in land, or conservation easements. The maximum credit allowed for any business is $75,000 annually.[59]

Current Use Taxation—Public Act 490

Connecticut law allows farm, forest, or open space land larger than 25 acres to be assessed based on its current use rather than on its fair market value, for purposes of local property taxation. Established in 1963, Public Act 490 has helped many Connecticut landowners maintain their land as open space, forestland, and farmland. Without current use value assessment, many landowners would be forced to sell their land due to escalating property taxes. If land is subsequently taken out of the open space, forestland, or farmland classification, the landowner may be subject to a penalty.[60]

Farmland Preservation Program

Since 1974, the Connecticut Department of Agriculture has helped preserve farmland by acquiring development rights to agricultural properties. Landowners voluntarily apply to the program, with funding priority given to farms having a high percentage of prime farmland soils and to those in established farm communities. If a farm application meets the minimum scoring criteria, the state will negotiate a purchase price for the value of the development rights based on an appraisal. Connecticut ranks among the lowest in New England in per capita spending on farmland and, as a result, this program has been chronically underfunded. In 2002, the program had reached 22 percent of its goal to conserve 130,000 acres of farmland.[61]

Federal Sources

The availability of most federal conservation funds fluctuates annually depending on the political and economic climate and budget allocations. Some federal funds are administered by federal agencies, while others are administered by state agencies. Municipalities are eligible for the following programs:

North American Wetlands Conservation Act (NAWCA)

This program, which is administered by the U.S. Fish and Wildlife Service, promotes voluntary public-private partnerships to conserve wetland ecosystems for waterfowl and other migratory birds. NAWCA and matching funds may be used only for wetlands acquisition, creation, enhancement, and/or restoration. The maximum grant size is $50,000 for the small grants program and $1 million for the large grants program.

Farm and Ranchland Protection Program (FRPP)

Administered by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), this program provides federal matching funds of up to 50 percent to states, municipalities, and nonprofit organizations acquiring conservation easements over active agricultural properties. The cooperating entity acquires, manages, and enforces the easement.[62] Proposals are selected through a competitive process to protect the most agriculturally important properties. Interested municipalities should contact the state NRCS office or district conservationist.

Forest Legacy Program

Administered by the U.S. Forest Service, this program provides federal matching funds of up to 75 percent to states for the purchase of conservation easements, or in some cases outright acquisition, of high-priority forestland. The 25 percent of nonfederal monies can include state, municipal, and private funds. Municipalities and land trusts can work with private landowners to submit applications to the Department of Environmental Protection, Division of Forestry.

Projects are ranked based on a set of criteria including the degree of threat, property size, proximity to protected land, and other factors. Congress directly earmarks funding for specific projects, based on the priorities of each state and the comments of the U.S. Forest Service. Applications should be submitted approximately two years in advance, if possible.

Transportation Efficiency Act for the 21st Century (TEA-21)

Administered by the U.S. Department of Transportation, TEA-21 is a six-year transportation funding bill that includes monies for the following types of transportation enhancement projects, in addition to traditional road building: land acquisition and infrastructure development of pedestrian and bike trails; provisions of safety and educational activities for pedestrians and bicyclists; historic preservation; conversion of railway corridors to trails, scenic, or historic highway programs; and water pollution mitigation. The program is administered in Connecticut through the state Department of Transportation (DOT). Municipalities work with their regional planning organization to submit applications to DOT, which chooses projects based on local and regional priorities.

Nonprofit conservation partners can be particularly instrumental in helping to raise funds from private foundations, corporations, and individuals.

Coastal and Estuarine Land Conservation Program

Created in 2002 and administered by the National Oceanic and Atmospheric Administration (NOAA), this program funds grants to states and local governments for the cost of land acquisition and restoration in a state's coastal zone. Federal funds must be matched by nonfederal funds, including cash, in-kind contributions, or other acquisitions. This is a relatively new program, and although NOAA recently drafted guidelines, to date, grants have been appropriated by Congress through federal earmarks. To pursue a grant, municipalities should contact their congressional delegation or state coastal zone manager.

Private Sources

Private funds from foundations, corporations, water utilities, and individuals can provide an important boost to local or regional open space protection efforts. These funds can leverage public monies while building local support and enthusiasm for land conservation projects. Like federal and state funds, however, private dollars are best relied on as supplements to municipal funding.

Partnerships are incredibly important in attracting private funds. Municipal officials should develop relationships early on with organizations and individuals that can assess the potential for raising private contributions. These partners may include corporate leaders, experienced community volunteers, local land trusts, or regional and national nonprofits.

Nonprofit conservation partners can be particularly instrumental in helping to raise funds from private foundations, corporations, and individuals. The tax status of these organizations allows donors to make tax-deductible donations, and many foundations and corporations prefer to make grants to nonprofits rather than to government entities. Nonprofit partners also often have the staff, expertise, and infrastructure to plan and execute effective fundraising campaigns.

Municipalities do have the ability, however, to create special foundations to support conservation efforts. These foundations can be a useful vehicle for raising private donations. Developing such a foundation should be considered if your community is embarking on a series of projects without a nonprofit partner.

What follows is a brief summary of guidelines for raising private funds for land acquisition. Each project and community is unique, and it is difficult to make broad recommendations. If you are planning a campaign of significant size, it may be well worth the cost to engage a private fundraising consultant to help prepare and execute your campaign.

Foundations

The most promising foundation sources for local efforts will be community based, since large national foundations do not generally give to local projects, unless there is a special connection between the foundation and your community.

To identify potential foundation prospects, helpful resources include the Foundation Center, Environmental Grantmakers, and the Connecticut Council of Philanthropy, which provides a searchable online database of more than 1,600 Connecticut grantmaking foundations, corporate foundations, and corporate giving programs. Next look carefully at the annual reports and press coverage of local nonprofits and projects to learn about funders who support initiatives in your community. Finally, determine specifics such as grant application procedures and timing, and proceed

Nonprofit Partner Secures Acquisition Funds

In the town of Washington, a plan to convert a 300-acre aquifer recharge area into a 120-unit condominium complex was averted when the Steep Rock Land Trust successfully intervened and negotiated an agreement to purchase the land. In the ensuing months, the Steep Rock Land Trust raised $1.5 million to protect the property: $450,000 from the DEP Open Space and Watershed Land Acquisition Grant Program, $500,000 from the town of Washington, and $550,000 in private donations. This conservation success was also made possible by the landowner's willingness to sell the property for $2 million less than its appraised value.

accordingly. It is important to keep in mind that most small foundations should be treated almost as individuals, with personal contact and cultivation strategies.

Corporations

The best corporate prospects will also be locally based or have large local operations. As with foundations, it is essential to develop a case for why a particular company should support your project. It is also important to identify one corporation that will commit to the project early, as it is often easier to approach subsequent potential donors by saying, "Company X is committed to supporting this at the $5,000 level, can you do the same?"

Try to make contact at the highest corporate level possible, ideally through a board member or the chief operating officer. Before meeting, find out how many employees are locally based and how close the project is to their facilities. It is also important to develop a strategy to acknowledge the company's support, as it will likely want to receive press coverage and other public relations benefits if it makes a contribution.

Individuals

When it comes to securing individual donations, a fundraising committee is key. This group of influential community members must be willing to identify and solicit donors from their contacts—friends, family, neighbors, business associates, and so on—and potentially recruit others to raise money.

The committee's first step is to develop a list of potential supporters. Cast as wide a net as possible and determine the best strategy for soliciting specific donations from each contact. Ask the following questions when identifying potential supporters:

- Who will benefit the most from this project?
- Who are the closest neighboring property owners?
- Who are the most committed conservationists in the community?
- Are there families with long histories in the community who would be motivated to support this project?
- Are there any individuals who are not full-time residents who might be interested in supporting the campaign?

Major gifts should be solicited in face-to-face meetings. Save the mail campaign for last, when only a small fundraising gap remains. Before launching the campaign, provide committee members and potential donors with a case statement that explains why the project is important and the difference private donations will make. Likewise, formal training for committee members and volunteers in asking for major gifts will prove invaluable.

Manage Water Supply Lands

Once a municipality has acquired a tract of watershed land, it is faced with the significant task of owning and managing the land. In almost every case, the development of a long-term management plan will be essential to determine the most appropriate use of the property. For properties with significant natural and biological resources, it may also make sense to include a resource stewardship plan as part of a management plan. Management responsibilities and concerns to consider include:

- conducting general maintenance, such as brush clearing, upkeep of buildings, mowing of fields, and boundary maintenance;
- patrolling the site, preventing trespass and vandalism, enforcing local and state laws, controlling public access, and posting signs;
- providing for appropriate public access and conducting community outreach;
- responding to natural events, such as erosion, flooding, and fire;
- procuring appropriate insurance coverage;
- determining staffing needs, the management roles of partners, and short- and long-term management costs; and
- evaluating potential revenues that could offset management costs, such as park entrance fees, harvesting contracts, or agricultural leases.

Resources are available to help communities develop land management plans. DEP's Division of Forestry provides free technical advice and assistance to owners of forestland, including individuals, municipalities, and conservation groups. In addition, the University of Connecticut's Cooperative Extension System has experts available free of charge in such areas as forestry stewardship, wildlife habitat management, and wetlands and water quality management. Water utilities also have expertise in the management of watershed lands. Finally, the nonprofit Center for Natural Lands Management has developed a computer program that analyzes the natural resource characteristics and stewardship needs of a property, determines management tasks, and estimates costs of managing a piece of property.

Special Water Supply Land Management Concerns

Lands in public water supply watersheds and aquifer protection areas are typically managed differently than other open space lands because of the need to protect the drinking water supply. A good resource stewardship plan will effectively consider all the major threats to the resource and propose measures to address them. Strategies for long-term management of these lands might include:

- minimizing the long-term cumulative effect of nutrients and sediments on reservoirs or tributaries;
- providing the best possible forest cover throughout the watershed;
- replacing deciduous trees with conifers in order to reduce tannins and humics that give rise to disinfections by-product precursors;
- minimizing or mitigating nonpoint sources of water pollution;
- limiting recreational and other landuses in order to protect water quality;
- using best management practices (BMPs) in forestry operations;
- protecting and restoring significant wildlife species and habitats;
- preserving any significant cultural or archaeological resources;
- fostering use of the land for educational or research purposes;
- providing flexibility to accommodate unanticipated future drinking water needs; and
- helping private landowners in the area promote long-term protection of undeveloped properties, especially forestland.

Careful planning, budgeting, and funding, as well as strong technical expertise, are required to implement a plan for the long-term stewardship of lands surrounding drinking water sources. Once again, partnerships can be important for communities during this phase. Federal and state agencies, neighboring municipalities, nonprofit land trusts, community groups, water utilities, and professional contractors can all provide critical expertise and resources.

Conclusion

Connecticut's high-density population, sprawling growth, and intricate web of groundwater and surface water sources add complexity to the already challenging task of maintaining clean drinking water. In addition, a significant amount of watershed lands—more than a quarter million acres statewide—remains unprotected and potentially susceptible to development, threatening the future availability of safe drinking water.

As local landuse decision makers, municipalities have a unique opportunity to play a leadership role in the effort to protect drinking water sources. A growing number of communities are rising to the challenge, both through regulations and investments in land conservation. Yet these communities represent a small minority, and significantly increased involvement by others is needed to achieve the broadly shared public goal of ensuring plentiful and clean drinking water.

All Connecticut communities should define and implement a vision for the protection of water supplies that identifies critical lands and secures funding for their acquisition and long-term management. Investing in land conservation to protect drinking water sources offers communities a number of benefits:

- **A cost-effective way to ensure clean water.** For those communities that supply their own water, the cost of preventing contamination of public water supplies through the protection of watershed lands is often, in the long term, significantly less than that of treatment.
- **A way to manage growth and preserve quality of life.** Open space and watershed lands not only protect our water and public health, they offer recreational benefits, provide for wildlife habitat, and preserve community character.

Success in this endeavor depends on intensive planning, strong local leadership, and significant resources. It also requires the support and partnerships of the state, water utilities, non-profit organizations, and neighboring jurisdictions. Only by taking the initiative and forging these alliances can communities protect their drinking water today and for future generations.

Appendix 1

Connecticut Department of Public Health Drinking Water Division Laws and Regulations Governing the Protection of Public Water Supply Watersheds

State laws and regulations specifically:

- Prohibits sewage discharge within a public water supply watershed area (C.G.S. 22a-417).
- Requires local conservation and development plans and zoning regulations to consider the impact of proposed developments on existing and potential public water supply watersheds (C.G.S. 8-2 and 8-23).
- Allows the Department of Public Health to review and comment on proposed development projects within public water supply watershed areas (C.G.S. 25-32f).
- Mandates water supply planning on a regional basis. Regulations detail the creation of the regional water supply plan. Individual water supply plans are part of this regional process (C.G.S. 25d-33j).
- Mandates various separating distances from a potential source of pollution to the edge of an established watercourse within a public water supply watershed or aquifer recharge area (Public Health Code Regulation Section 19-13-B32).
- Requires an applicant to either the municipal planning and zoning commission, board of appeals, or the inland wetlands commission to notify the water utility of a proposed development if the proposal is within the water utility's public water supply watershed area. The water utility thus has the opportunity to provide comments to the municipality regarding the development proposal (C.G.S. 8-3i and C.G.S. 22a-42f).
- Regulates the sale and/or change of use of water utility–owned lands, along with most critical watershed lands (i.e., Class I land). [Less critical water utility–owned lands, defined as Class II land, is allowed to be sold with restrictions or present use changed through a permit process.] (Public Health Code Regulations, Section 25-32dc-1 et seq. and Section 25-37d-1 et seq.)
- Regulates the sale and abandonment of a public water supply source (C.G.S 25-33k, 25-331 and 25-33m).
- Prohibits certain activities and regulates recreational activities allowed on watershed and aquifer areas (C.G.S. 25-43 and 25-43c).
- Requires a water utility having an active water source of supply under its control to conduct a sanitary survey of the watershed and report the results of this survey to the Department of Public Health annually. (Public Health Code Regulation Section 12-13 B102(b).
- Allows injunction for abatement of sources of pollution (C.G.S 25-51).

Appendix 2

Department of Public Health
Public Health Code

Classification of Water Company Lands

25-37c-2. *Establishment of criteria for classification of water company owned land*

The criteria for determining the proper identification and classification of the three classes of water company owned lands set forth in Section 25-37c of the General Statutes are as follows:

(a) Class I land includes all land owned by a water company which is either:
- (1) within two hundred and fifty feet of high water of a reservoir or one hundred feet of all watercourses as defined in agency regulations adopted pursuant to Sec. 25-37c-1 of the General Statutes;
- (2) within the areas along watercourses which are covered by any of the critical components of a stream belt;
- (3) land with slopes fifteen percent (15%) or greater without significant interception by wetlands, swales and natural depressions between the slopes and the watercourses;
- (4) within two hundred feet of groundwater wells;
- (5) an identified direct recharge area or outcrop of aquifer now in use or available for future use; or
- (6) an area with shallow depth to bedrock, twenty inches or less, or poorly drained or very poorly drained soils as defined by the United States Soil Conservation Service that is contiguous to land described in subdivisions (3) or (4) of this subsection and that extends to the top of the slope above the receiving watercourse.

(b) Class II land includes all land owned by a water company which is either
- (1) on a public drinking supply watershed which is not included in Class I or
- (2) completely off a public drinking supply watershed and which is within one hundred and fifty feet of a distribution reservoir or a first-order stream tributary to a distribution reservoir.

The Class II land defined above is characterized by the following criteria:

(1) Category 1. Land which is either:
- i. Not classified in Class I with slopes fifteen percent (15%) or greater with significant interception by wetlands, swales and natural depressions between the slopes and the watercourses; or
- ii. land from which surface runoff directly enters an identified aquifer recharge or outcrop area supplying used or future wells; or
- iii. an area with shallow to bedrock, twenty (20) inches or less, poorly drained, and very poorly drained soils.
- iv. on watersheds for future reservoirs which would fall into category 1 if the watershed were used for drinking water supply.

(2) Category 2. Land which is either:
- i. Not classified in Category 1 with slopes less than fifteen percent (15%) without significant interception by wetlands, swales, and natural depressions, between the slopes and the watercourses; or
- ii. on watersheds for future reservoirs which would fall into Category 2 if the watershed were used for drinking water supply.

(3) Category 3. Land which is either:
- i. Not listed in Categories 1 or 2 with slopes less than fifteen percent (15%) with significant interception by wetlands, swales, and natural depressions between the slopes and the watercourses; or
- ii. on watersheds for future reservoir(s) which would fall into Category 3 if the watershed were used for drinking water supply.

(4) Category 4. Land which is:
- i. Completely off public drinking supply watersheds and which is within 150′ of a distribution reservoir or a first-order stream tributary to a distribution reservoir.

(c) Class III land includes all land owned by a water company which is:
- (1) Unimproved land off public drinking water supply watersheds and beyond 150′ from a distribution reservoir or first-order stream tributary to a distribution reservoir.

(Effective February 6, 1980.)

Endnotes

1. Analysis by Kevin Case, Farmington River Watershed Association, based on Department of Environmental Protection (DEP) Environmental GIS Data for Connecticut, DEP Bulletin 37, 2003.
2. Lori Mathieu, Connecticut Department of Public Health, and Robert Hust, Connecticut Department of Environmental Protection, "Drinking Water Supply Source Protection in Connecticut," presented at Connecticut's Drinking Water Source Protection Strategies Forum, April 29, 2003.
3. Analysis by Kim Danley, Trust for Public Land, based on Environmental Data for Connecticut, Department of Environmental Protection Bulletin 37, July 2003.
4. The Connecticut Department of Public Health provided the following information on watershed landownership for public water systems (PWS):
   • watershed area in Connecticut = 520,525 acres
   • watershed owned by PWS = 103,483 acres
   • state and municipal land in watershed = 66,932
5. These data are based on Geographic Information System analysis assessed by the Source Water Assessment Program using LANDSAT satellite imagery developed by the University of Connecticut.
6. Mike Swift, "Hartford Bucked the Growth Trend," *Hartford Courant*, April 3, 2001, p. A1.
7. Connecticut Conference of Municipalities, *Smart Growth: Fostering Economic Development and Connecticut's Quality of Life*, number 02-04, www.ccm-ct.org/advocacy/2001-2002/ppr100102.html.
8. Ibid.
9. Thomas E. Dahl, *Wetlands: Losses in the United States 1780s to 1980s* (Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service; Jamestown, ND: Northern Prairie Wildlife Research Center, www.npwrc.usgs.gov/resource/othrdata/wetloss/wetloss.htm, 1990).
10. U.S. Department of Agriculture, Forest Service, and Connecticut Department of Environmental Protection, Division of Forestry, *Trends in Connecticut's Forests: A Half Century of Change* (Hartford and Newtown Square, Pa.: U.S. Department of Agriculture, Forest Service, Connecticut Department of Environmental Protection, www.fs.fed.us/ne/newtown_square/brochures/pdfs/state_forests/ct_forest.pdf, 2001).
11. Connecticut Office of Policy Management, Conservation and Development Policies Plan, 1998–2003 (Hartford: Connecticut Office of Policy and Management, www.opm.state.ct.us/pdpd3/physical/c&dplan-rec/WaterSup.htm, October 31, 2001).
12. U.S. Environmental Protection Agency, *Executive Summary: 1999 Drinking Water Infrastructure Needs Survey*, www.epa.gov/safewater/needs/99execsum.pdf.
13. *Identifying Future Drinking Water Contaminants*, based on the 1998 Workshop on Emerging Drinking Water Contaminants, National Research Council (Washington, D.C., National Academies Press, 1998), p. 30.
14. U.S. Environmental Protection Agency, *Introduction to EPA's Drinking Water Source Protection Programs*, www.epa.gov/ogwdw000/dwa/electronic/swp/swp.pdf. For this study, the communities' "contamination costs" included remediation activities, replacing water supplies, and providing interim water. Their "prevention costs" included delineating a prevention area, identifying sources of contamination, developing an initial management plan, and planning for alternative water supplies and other responses in case of emergency.
15. South Central Connecticut Regional Water Authority, presentation entitled "Utility Strategy for Protection and Acquisition of Public Drinking Water Source Lands," presented by Tom Chaplik at Connecticut's Drinking Water Source Protection Strategies Forum, April 29, 2003.
16. *American Water Works Association Journal*, reporting on the results of a 1991 study by the American Water Works Association Research Foundation (Denver: American Water Works Association Research Foundation, 1991).
17. Connecticut Department of Environmental Protection, "DEP Awards $4.9 Million in First Open Space Grants to Municipalities," www.dep.state.ct.us/whatshap/press/1999/as0203.htm.
18. State of Connecticut Open Space Grants Ceremony program, April 8, 2003. This number includes 16,196 acres that have been protected using state grant fund monies. In addition to the Open Space Grants, the DEP has acquired 30,506 acres since 1998, including 15,300 acres that were protected in a single transaction, using state bond proceeds and private funds raised by The Nature Conservancy.
19. Kim Danley, Trust for Public Land, research conducted in cooperation with the Department of Environmental Protection and the Department of Public Health, July 2003. The 47,000 acres listed here were protected through a variety of partners as a result of the state's initiative.
20. Connecticut Government Statutes, Section 25–32(e).

21. Christopher Hoffman, "State Proposed Aquifer Protection Law," *New Haven Register*, May 31, 2000, p. A3.

22. State of Connecticut, Department of Public Health, Drinking Water Division, "Fact Sheet: Information About Connecticut's Source Water Assessment Program," www.dph.state.ct.us/BRS/Water/SWAP/SWAPHANDOUT.doc.

23. All water utilities are regulated by DPH and DEP with respect to water quality and water sources. Privately owned companies are also regulated by the Department of Public Utilities Control to ensure a balance between the interests of their rate-payers and their shareholders. Publicly owned water utilities, which may be either municipal or regional, answer to the governing bodies and citizens of the cities or towns that "own" them.

24. The water utilities that have acquired land for watershed protection include Aquarion, Birmingham Utilities, Bristol Water Company, Connecticut Water Company, City of Meriden, Metropolitan District Commission, and Torrington Water Company. This information comes from interviews by the Trust for Public Land with officials at the state's ten largest water utilities in June/July 2003. The utilities' land holdings represent approximately 82 percent of all water utility–owned land in Connecticut.

25. This figure represents 13,425 acres of Class I and Class II lands from the 15,300-acre Kelda purchase and 5,800 acres of watershed land acquired through state grant funding.

26. This information comes from interviews by the Trust for Public Land with officials at the state's ten largest water utilities in June/July 2003. The utilities' land holdings represent approximately 82 percent of all water utility–owned land in Connecticut.

27. Peter Forbes and Julie Iffland, *An Ounce of Prevention: Land Conservation and the Protection of Connecticut's Water Quality* (New Haven: Trust for Public Land, 1998), p. 3.

28. This information comes from interviews by the Trust for Public Land with officials at the state's ten largest water utilities in June/July 2003. The utilities' land holdings represent approximately 82 percent of all water utility-owned land in Connecticut.

29. Connecticut Water, Birmingham Utilities, Torrington Water, and Aquarion Water referred to in this section collectively own approximately 14,300 acres of land.

30. Kim Danley, Trust for Public Land, research conducted in cooperation with the Department of Environmental Protection and the Department of Public Health, July 2003.

31. Summary of results from *Voters Invest in Parks and Open Space, 1998, 1999, 2000* (Washington, D.C.: Land Trust Alliance, 1998–2000) and LandVote 2001 (Washington, D.C., and San Francisco: Land Trust Alliance and Trust for Public Land, 2001).

32. Kim Danley, Trust for Public Land, research conducted in cooperation with the Department of Environmental Protection and the Department of Public Health, July 2003.

33. Open Space and Watershed Land Acquisition Grant Program (Connecticut Government Statutes: Section 7–131d to 7–131k, inclusive), Connecticut Department of Environmental Protection, dep.state.ct.us/rec/opensp31.htm.

34. These data come from interviews by TPL with officials at the state's ten largest water utilities in June/July 2003. Land holdings by these utilities represent approximately 82 percent of all water utility–owned land.

35. Connecticut Office of Policy Management, Conservation and Development Policies Plan, 1998–2003, p. 3.

36. Connecticut Department of Public Health, *Drinking Water Division, Fact Sheet: Information About Connecticut's Source Water Assessment Program (SWAP)* (Hartford: Connecticut Department of Public Health, May 2003), p. 1.

37. While this report focuses primarily on the protection of public water supplies, it is also important to understand the public's reliance on private wells and the potential impact of source protection on the quality of well water. DPH does not directly regulate private wells. This responsibility rests with local health directors, who permit all private wells and septic systems and who receive assistance and technical support from the state. It should be noted that in some areas, individuals are drilling several wells for private use and irrigation purposes, which can impact neighboring systems and fire ponds.

38. Surface supplies, such as large reservoir systems, have historically provided most of Connecticut's public drinking water. Yet these supplies can require costly treatment and the dedication of extensive land areas. As the state becomes increasingly urbanized, communities are turning to public wells to meet new demand. Robert Hust and James Murphy, *Protecting Connecticut's Groundwater: A Guide for Local Officials*, DEP Bulletin no. 26 (Hartford: Connecticut Department of Environmental Protection, April 1997), p. 1.

39. Charles Convis, *Land Trust Geography* (Washington, D.C.: Land Trust Alliance and GreenInfo Network, 2001).

40. It is also important to understand the limitations of GIS mapping, including somewhat limited availability and varying degrees of scale and accuracy. For instance, overlays from some sources of data may not be completely compatible with others.

41. Much of this information is drawn from "Model Criteria for Setting Land Protection Priorities," created by a work group of the Connecticut-based Land Preservation Alliance, 2000.

42. Trust for Public Land, "Nashua Watershed to Benefit from EPA Grant (MA, NH)," www.tpl.org/tier3cd.cfm?content item id+8200&folder id=260, April 17, 2002.

43. James M. Doenges et al., Land Tech Consultants, Inc., *Protecting Connecticut's Water-Supply Watersheds: A Guide for Local Officials* (Hartford: Capital Region Council of Governments, January 1993), p. 39. Copies available from the Connecticut Department of Environmental Protection, Bureau of Water Management, the Connecticut Department of Health Services Water Supply Section, and the Connecticut Department of Environmental Protection.

44. Land Trust Alliance, "New Help for Connecticut," www.lta.org/regionallta/ne_ct_exchange.htm, March 2003.

45. For more in-depth information about buying land for conservation purposes, see Trust for Public Land and Land Trust Alliance, *Doing Deals: A Guide to Buying Land for Conservation* (San Francisco: Trust for Public Land; Washington, D.C.: Land Trust Alliance, 1995). This report can be ordered online at www.lta.org.

46. Ibid, p. 153.

47. Janet Diehl and Thomas S. Barrett, *The Conservation Finance Handbook, Managing Land Conservation and Historic Preservation Easement Programs* (San Francisco and Washington, D.C.: Trust for Public Land and the Land Trust Alliance, 1988), p. 131.

48. Trust for Public Land and Land Trust Alliance, *Doing Deals*, p. 124.

49. Milone and MacBroom, Inc., "Mansfield Water Supply Study and Water Supply Plan," www.miloneandmacbroom.com/water_supply.htm.

50. William Poole, "Preserving Urban and Suburban Gardens and Parks: Trust for Public Land and Its Partners," in *Land Conservation Through Public/Private Partnerships*, ed. Eve Endicott (Washington, D.C.: Island Press, 1993).

51. Ibid.

52. Trust for Public Land and Land Trust Alliance, *Doing Deals*, p. 63.

53. Connecticut General Statutes 7-369, 7-371, and 7-374.

54. The fee may not exceed 10 percent of the fair market value of the land to be subdivided, prior to approval of the subdivision.

55. "Tax Increment Financing," Connecticut Office of Legislative Research Report 2001-R-0737, September 2001.

56. Connecticut Department of Environmental Protection, *The Connecticut Green Plan: Open Space Acquisition Fiscal Years 2001–2006,* July 2001.

57. Ibid.

58. Connecticut General Statutes 12-217dd and Connecticut Department of Revenue Services, *Guide to Connecticut Business Tax Credits*, Informational Publication 2001(17) (Hartford: Connecticut Department of Revenues Services, November 2001).

59. Connecticut Department of Revenue Services, *Questions and Answers on the Connecticut Neighborhood Assistance Act Tax Program* (Hartford: Connecticut Department of Revenue Services, March 31, 1999).

60. Doenges et al., *Protecting Connecticut's Water Supply Watersheds*, p. 9.

61. American Farmland Trust Northeast Regional Office, www.farmland.org/northeast/connecticut.htm.

62. U.S. Department of Agriculture, "Farmland Protection Program Connecticut Summary" (Washington, D.C.: U.S. Department of Agriculture, Natural Resources Conservation Service, December 2001).

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