

ENVIRONMENTAL QUALITY IN CONNECTICUT

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March 2015

Welcome to *Environmental Quality in Connecticut*. This edition explores the condition of Connecticut's environment through 2014.

Notable trends in Connecticut's air, water, land and life are highlighted in *Progress and Problems*.

The 30-plus indicators that depict environmental conditions last year and over the past ten years are summarized in *2014 At a Glance*.

Regular readers of these annual reports will notice significant changes in content and format.

This report will be updated as new data become available. Sign up for e-alerts if you wish to be notified of updates.

The Council on Environmental Quality welcomes your interest, along with any questions, comments or suggestions you might have.





COUNCIL ON ENVIRONMENTAL QUALITY

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March 11, 2015

The Honorable Dannel P. Malloy
Governor of Connecticut
State Capitol
Hartford, CT 06106

Dear Governor Malloy:

I am pleased to submit the Council's report on the condition of Connecticut's environment through 2014.

This report is best read online at www.ct.gov/ceq/AnnualReport.

The data show that restoring Connecticut's air and water quality and conserving its land and wildlife are multi-generational jobs that require unwavering financial and regulatory commitments.

Connecticut continued in 2014 to reap the benefits of past commitments and current practices in five notable areas:

- It was the best year in decades for [air](#) quality.
- More than 90 percent of Long Island [Sound](#) had adequate oxygen levels all year round, equaling 2013's record as the best in decades. This year's report shows that Connecticut's steady investment in sewage treatment improvements have yielded measurable improvements.
- Residents continued their trend of [driving](#) less and taking the bus more often.
- By using less gasoline, Connecticut residents continued their positive trend of reducing [emissions](#) of carbon dioxide, the pollutant that contributes to most of the observable climate change.
- Another path toward fewer emissions: Connecticut residents installed an unprecedented number of solar panels and purchased slightly more [electricity](#) from other renewable sources.

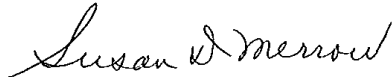
A lack of sustained commitment was evident in other indicators:

- Connecticut is so far off the track toward meeting its [land](#) conservation goals that success is in serious jeopardy. To [get](#) to the mandated goal for state parks, forests and wildlife management areas by 2023, the state will need to preserve more acres *every year* than it preserved in the last ten years combined. [Water quality](#) indicators show the dramatic effect of not preserving fields and forests.
- Some wildlife species, including [turtles](#), are good indicators of ecological conditions. Unfortunately, many show discouraging trends.
- More than 1,200 violations of air, water and other pollution laws were detected by DEEP in 2014. While the Council no longer can assess overall rates of [compliance](#), it is evident that full compliance remains a distant goal.

Connecticut residents set ambitious goals -- most of them decades ago -- for their air, water and wildlife. In some cases, progress slowed just as the goal line seemed within reach. In others (to continue the football analogy) the field turned out to be a lot longer than it seemed initially. In all cases, the Council concludes, progress depends on consistent commitment.

You will find several new indicators and data sets in this year's report. The Council looks forward to providing you with any additional information or assistance that you might request.

Respectfully submitted,



Susan D. Merrow
Chair
Council on Environmental Quality













Improvements and Declines: 2014 at a Glance

A Note About the Role of Climate Change in Connecticut's Progress





This symbol of an overheating globe appears next to indicators that are influenced significantly by global climate change. Higher summertime air and water temperatures and more intense rainfall are countering residents' continuous efforts to improve their environment. Faced with these climate trends, Connecticut will need to take more corrective actions just to maintain current conditions and even greater actions to make genuine progress toward its goals.

This page is a summary of the environmental indicators on which *Environmental Quality in Connecticut* is based. Details can be found on individual indicator pages.

Indicator	2014*	Ten-Year Picture 2005 - 2014*	On Track?
 Good Air Days 	354 Good Air Days Improved from 2013	344 Good Air Days in Average Year	?
 CEQ Air Pollution Index 	31 Index Value Improved from 2013	36 Index Value in Average Year (Smaller = Better)	N.A. (No goal set) Trend is Good
Preserved Land (State Land Only) 	369 Acres	577 Acres Preserved in Average Year	✗
 Forest	No New Data	Core Forests Declining	N.A. (No goal set)
 Farmland	830 Acres	1032 Acres Preserved in Average Year	✗
 Coastal Beach Closings 	3.2 Days Slightly worse than 2013	4 Days Closed in Average Year	?
 Piping Plovers 	102 Birds Improved from 2013	87 Nesting Birds in Average Year	 Goal is 60





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Improvements and Declines: 2014 at a Glance (continued)

Indicator	2014	Ten-Year Picture 2005 - 2014*	On Track?
 Under the Water in Long Island Sound 		Change: Warm-water fish in. Cold-water fish out. Water rising.	
 Water Quality in Long Island Sound 	92 Percent Unchanged from 2013	85 Percent of Sound with Adequate Oxygen in Average Year	
 Rivers, Streams, & Floods 	No New Data	Improvement slow. Floods higher. Stream quality tied to pavement.	
 Bald Eagles	68 Birds Improved from 2013	39 Nesting Birds in Average Year	
 Drinking Water	99.9 Percent	99.6 Percent of Public Water Meeting Standards in Average Year	
 Human Health	No New Data	Trend is Good	N.A. (No goal set)
 Turtles, Bats and Other Residents	Data are not Annual	Long-term Decline	
 Driving Our Cars	23.6 Miles (2013) Improved from 2012	24.3 Miles Driven Per Resident in Average Year (Smaller = Better)	N.A. (No goal set) Trend is Good
 Riding the Bus	11.8 Trips Improved from 2013	10.7 Bus Trips Taken Per Resident in Average Year (Larger = Better)	N.A. (No goal set) Trend is Good

Continued on next page

Improvements and Declines: 2014 at a Glance (continued)

Indicator	2014	Ten-Year Picture 2005 - 2014*	On Track?
 Compliance Inspections	3882 Inspections Declined from 2013	6109 Inspections in Average Year	?
 Recycling	No New Data		✗
 Climate Changers	9.6 Tons (2012) Improved from 2011	11.2 Tons of Carbon Dioxide Emitted Per Resident in Average Year (Smaller = Better)	✓
 Electricity	↑	Most Trends Positive	✓

*For a few indicators, the most recent data are from a year other than 2014, and the ten-year picture covers a slightly adjusted time period because of limits on data availability.

A question mark in the "On Track" column means either that the indicator includes more than one chart and those charts showed mixed results in 2014, that the progress toward a specific goal cannot be assessed because there is no state goal for that indicator, or that the trend's arc defies a conclusive verdict.

Progress and Problems

Restoring Connecticut's air and water quality and conserving its land and wildlife are multi-generational jobs that require unwavering financial and regulatory commitments. Waver, and goals are not met. The summary of 2014 demonstrates this perfectly.

Connecticut continued to reap the benefits of past commitments and current practices in five notable areas:

- It was the best year in decades for [air](#) quality (though Connecticut had more bad-air days than any other New England state, due in part to its location).
- More than 90 percent of Long Island [Sound](#) had adequate oxygen levels all year round, equaling 2013's record as the best in decades. This year's report shows that Connecticut's steady investment in sewage treatment improvements have yielded measurable improvements.
- Residents continued their trend of [driving](#) less and taking the bus more often, practices that contributed to air quality improvements.
- By using less gasoline and electricity, Connecticut residents continued their positive trend of reducing [emissions](#) of carbon dioxide, the pollutant that contributes to most of the observable climate change. (Data for this indicator are updated in this report but not through 2014.)
- Another path toward fewer emissions: Connecticut residents installed an unprecedented number of solar panels, purchased (slightly) more [electricity](#) from other renewable sources and used less electricity per capita. However...

A lack of sustained commitment was evident in these indicators:

- Connecticut is so far off the track toward meeting its [land](#) conservation goals that success is in serious jeopardy. To [get](#) to the mandated goal for state parks, forests and wildlife management areas by 2023, the state will need to preserve more acres *every year* than it preserved in the last ten years combined.
- [Water quality](#) indicators show the dramatic effect of not preserving fields and forests.
- Some wildlife species, including [turtles](#), are good indicators of ecological conditions. Unfortunately, many show discouraging trends.
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Connecticut residents set ambitious goals -- most of them decades ago -- for their air, water and wildlife. In some cases, progress slowed just as the goal line seemed within reach. In others (to continue the football analogy) the field turned out to be a lot longer than it seemed initially. In all cases, progress depends on consistent commitment.

New in This Edition

Changes in Content

- The inland wetlands indicator has been eliminated because of chronic data inadequacies (despite a statutory mandate that all wetlands permit decisions be reported to DEEP monthly).
- As noted in [Progress and Problems](#), Connecticut is not on track to meet its goals for state land conservation. Legislation was adopted in 2012 and 2014 to fill some of the planning gaps. A new page, [To Get Back on Track](#), shows which required steps have been completed, as well as gauges that display the pace of land conservation.
- The [compliance](#) rate indicator, while still reported, has been relegated to a supporting role. The compliance page now focuses on some of the trends gleaned from inspection and violation data. This change was made necessary by a lack of reliable data to assess compliance across the state.
- [The Water in Long Island Sound](#) was renamed and expanded to include a chart showing trends in dissolved nitrogen levels. Previously, the page showed the trend in nitrogen discharges with a hope that a reduction in discharges would result in less nitrogen actually in the Sound's waters. (It did!)
- Population data for cave-dwelling [bats](#) have been added to the *Resident Health* section.
- [Electricity at Home and Work](#) now includes trend data for residential solar panel installations.

Changes in Format

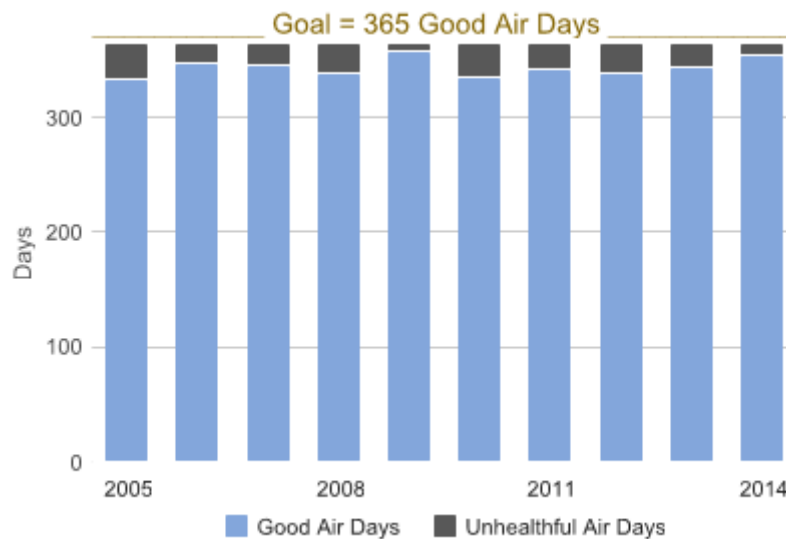
- The *Sound and Shore* section has been reorganized substantially. Beach closings and shellfish bed closings are depicted on one [page](#) because they share a common problem: heavy rains that wash pollution into the Sound. Data about fish and lobster trends are on the same [page](#) as sea level data. The [page](#) on piping plovers has been expanded to include information about other dwellers on the beach.
- Some pages are linked more directly so that a reader can learn, for example, how the rate of land preservation affects aquatic life in streams.
- Trends in driving and bus riding are now on one page, [Driving and Riding](#).
- Several pages are labeled as "Static Pages," indicating a lack of new data since last year's report. Those pages are greatly condensed and include links to the appropriate pages in last year's report. Lack of data is a concern that has been discussed in previous [reports](#).



Good Air Days



There were 354 days in 2014 when every Connecticut city and town had good air, the most since 2009.



The 354 Good Air Days of 2014 were a big improvement over 2013 and the ten-year average.

Levels of ground-level ozone (see below) generally are higher during hot weather. As the climate warms, Connecticut will have to reduce pollution just to maintain current air quality, and reduce it even more to achieve the goal of healthful air every day.

A Good Air Day is a day when every [monitoring station](#) in the state records satisfactory air quality. "Satisfactory air quality" is defined here as air that meets the health-based ambient air quality [standards](#) for all of the following [six pollutants](#): sulfur dioxide, lead, carbon monoxide, particles, nitrogen dioxide and ground-level ozone. While no violations are apparent at the monitoring stations on such days, it is likely that some residents are in fact breathing unhealthful air because of pollution from a local source such as a poorly-burning fireplace or outdoor wood furnace.

Connecticut's goal is to have air that meets health-based standards for all six pollutants. Violations of health-based air quality standards have been eliminated for four of the six pollutants, leaving ground-level ozone and fine particles as the problems.

Ground-level [Ozone](#) is created when nitrogen oxides and organic compounds in the air react in the presence of sunlight. Weather is a major factor in year-to-year fluctuations. Motor vehicles remain a large source of ozone-forming emissions despite improvements in tailpipe standards. Apart from one June day in New Hampshire, Connecticut was the only New England state with unhealthful ozone levels in 2014. Much of Connecticut's ground-level ozone originates in states to the west. Unless emissions in those states are reduced substantially, Connecticut residents may breathe unhealthful air indefinitely.

In typical years, cities and towns in coastal regions of the state see the most bad ozone days. In 2014, the inland city of Middletown and the coastal town of Westport both saw the most days (seven) with unhealthy air.

[Fine particles](#), such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can form when gases emitted from power plants, factories and automobiles react in the air. Violations of the health standard occur mostly in summer and winter, rarely in spring and fall. Most of Connecticut meets the health standard for fine particles, as the technical details of that standard allow the air in the state to exceed the numerical limit for a few days each year and yet remain in compliance with the standard. Connecticut did not see *any* violations of the fine-particle standard in 2012, four days with violations in 2013 and three days in 2014.



Something Else in the Air

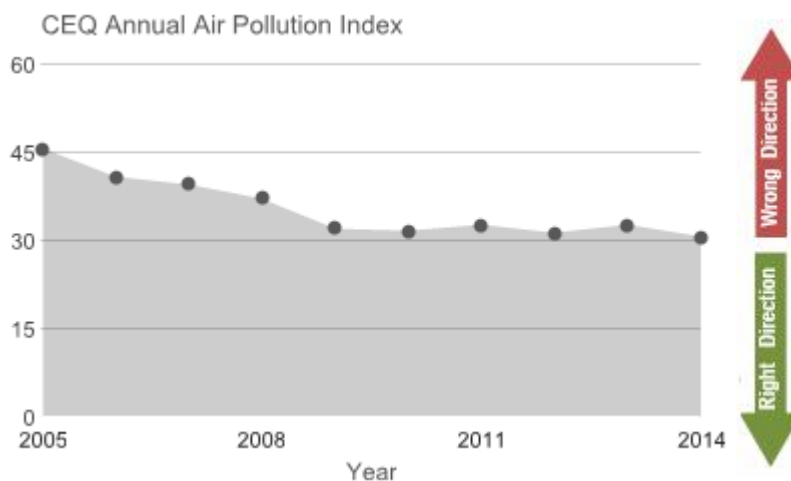
The sight of hundreds of [chimney swifts](#) swirling into the chimney of the [Willimantic Town Hall](#) on a summer evening is a cause for celebration. The chimney swift is one of several bird species that feed entirely on the wing, devouring insects and spiders high in the air. Unfortunately, swifts and other "aerial insectivores" are in a long-term decline. One hypothesis for the decline: the insects that sustain the birds are not as numerous as they once were, or perhaps not as nutritious. Could pesticides or other contaminants be the problem? Read more about the ecology of the air in the Connecticut Audubon Society's 2013 State of the Birds [report](#).

CEQ Annual Air Pollution Index

Average Levels of Air Pollution



There was less pollution in Connecticut's air in 2014.



The chart shows the average level of pollution in Connecticut's air.

Five [air pollutants](#) -- sulfur dioxide, carbon monoxide, particles, nitrogen dioxide and ground-level ozone -- are [measured](#) continuously across the state by DEEP. At the end of every year, the Council calculates the average level of each pollutant on a numerical scale where zero equals no pollution and 100 would represent the "unhealthful" level of the specified pollutant. The Council takes this annual number for each of the five pollutants and averages them to yield the single index value on the chart.

In 2014, the levels of every pollutant except nitrogen dioxide were lower than they were in 2013.

Lead is Out

Until 2012, this indicator charted the combined average level of six pollutants, not five as it now does. The sixth pollutant was lead. In the early 1980s, lead was a serious problem, but unleaded gasoline and other advances have reduced lead levels dramatically. Levels of lead have [dropped so low](#) that in recent years they barely registered in this indicator. By removing lead from this indicator, the Council is declaring victory on behalf of Connecticut residents. (Lead still is monitored by DEEP, so it can be brought back into this indicator if levels rise unexpectedly in future years.)

Technical Notes

Changes were made to this indicator in 2012 and 2014.

2012 Change: The level of particle pollution now reflects only small particles (known as PM_{2.5}, or particles 2.5 microns or smaller), whereas prior to 2012 it used to include larger particles (PM₁₀). The smaller particles are regarded by scientists as being more injurious to human health. As always, all previous years' index data were recalculated to be consistent with current measures.

2014 Changes: To better reflect the federal government's latest health standard for sulfur dioxide, the annual average, used in prior years, was eliminated from this indicator. The sulfur dioxide value now is an average of the maximum one-hour concentration recorded each day at each location. This new value emphasizes the acute effects of sulfur dioxide rather than the chronic effects. A parallel change was made to the nitrogen dioxide values. As always, the index value was recalculated for all previous years; as a result, the index values increased for all previous years. For this particular indicator, however, the actual index values are less important than the direction of the trend.

Land

Preserved Land = Clean Water

Rain that falls on land flows toward the nearest stream. If that land is mostly fields and woods, there is a high probability that the stream will support a full range of aquatic life. If even 12 percent of the land is paved or built upon, then the life in the stream is almost certain to be affected. These revealing statistics are discussed further on the *Rivers, Streams and Floods* [page](#).

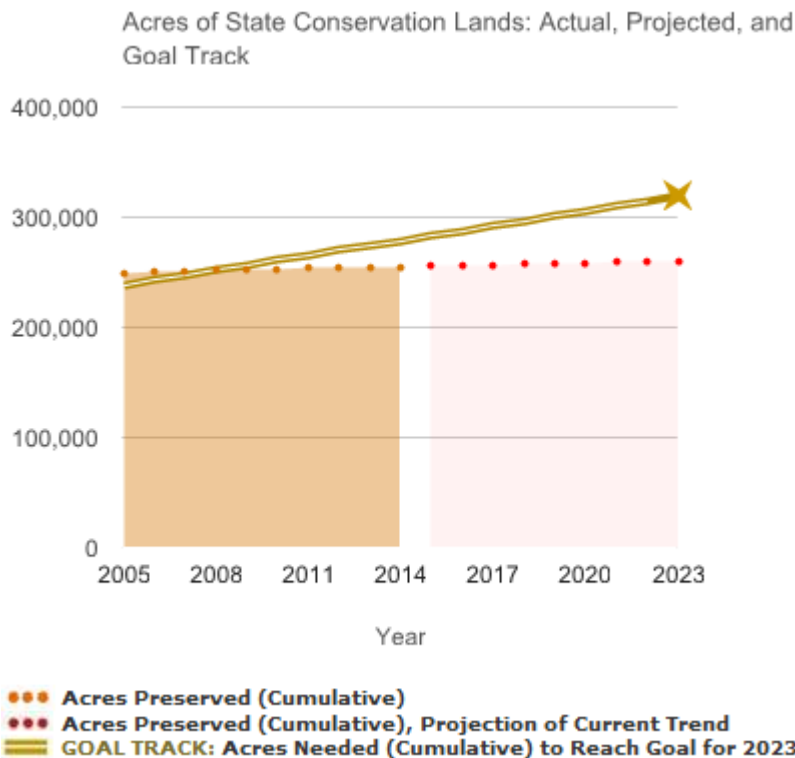
Preserved Land



Connecticut has two land conservation goals for 2023:

Goal #1 State Lands

State parks, forests, wildlife management areas and other state-owned conservation lands shall constitute 10 percent of Connecticut's land area. Progress toward this goal is not on track, with 467 acres preserved in 2013 and 367 acres in 2014 (see chart below).



Goal #2 All Conservation Lands

Land conserved by towns and cities, the state, land trusts and other nonprofit organizations and water utilities shall constitute 21 percent of Connecticut's land area. Nobody knows what that total is today.



[State law](#) sets a goal of conserving 21 percent of Connecticut's land area. [The Green Plan](#), Connecticut's official land conservation plan, establishes 2023 as the target date. That goal includes conservation land owned by towns and cities, land trusts and other nonprofit organizations, water utilities and the state.

The same law sets a goal (10 percent of Connecticut's land area, or about 320,000 acres) for state ownership of land for parks, forests and wildlife areas. Records of state-owned lands are accurate and are charted above. From 1990 to 2004 (not shown), the state acquired about 3,500 acres each year, on average, but the pace of acquisition has slowed since then. To meet its own goal (the gold star on the chart), Connecticut now will need to acquire about 7,100 acres per year, close to the rate of acquisition achieved from 2000 through 2004. More information about the pace of state land preservation can be found on the [To Get Back on Track](#) page.

State grants helped municipalities and land trusts acquire an additional 1,541 acres in 2014. Many acres also are preserved each year by municipalities and land trusts without state grants, but that information is not reported to the state. The Council determined that previous state estimates of the acreage owned by municipalities and nonprofit land trusts were inaccurate. Those estimates, which were reported in some previous editions of *Environmental Quality in Connecticut*, are no longer included in this report.

The absence of an accurate inventory of protected land in Connecticut is a serious deficiency. DEEP has been collecting data from municipal records in a sequential fashion for 14 years; if that effort is ever completed, the earliest-collected data will be well out of date. To make land preservation more strategic and cost-effective, Connecticut needs a reliable and up-to-date registry of the protected lands. An [Act](#) Concerning the State's Open Space Plan, adopted in 2012, should eventually lead to an accurate tally of preserved lands.

How the Goal Track is Calculated

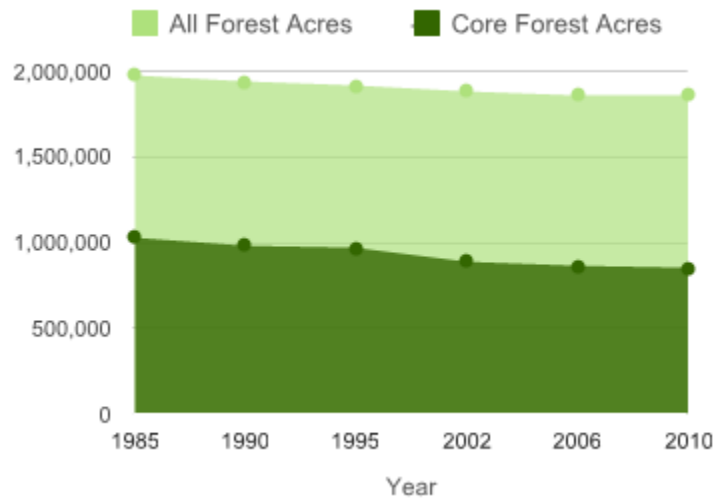
The State of Connecticut has been acquiring land for parks, forests and wildlife conservation for more than a century. In 1997 and again in 1999, it committed itself to the goals stated above. For the state itself, this meant acquiring another 104,000 acres to reach the goal of 321,000 acres (or 10 percent of the land within Connecticut's borders) by 2023. Achieving this goal would have required Connecticut, beginning in 1999, to acquire about 4,500 acres per year (on average), a rate that is depicted as the "Goal Track" on the chart. Because the state has fallen below the Goal Track, it now will need to acquire about 7,100 acres per year. For more information about the pace of preservation, please see the [To Get Back on Track](#) page.

Forest and Forest Birds

Static Page: *With no new data to report, this page has not been updated. Please see [last year's report](#) for the full page.*



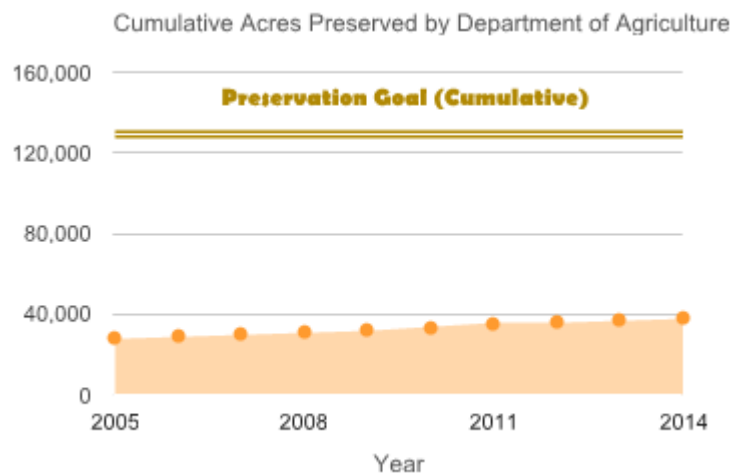
After a century of growth and relative stability, Connecticut's forests -- especially the most valuable core forests -- have been shrinking for three decades.



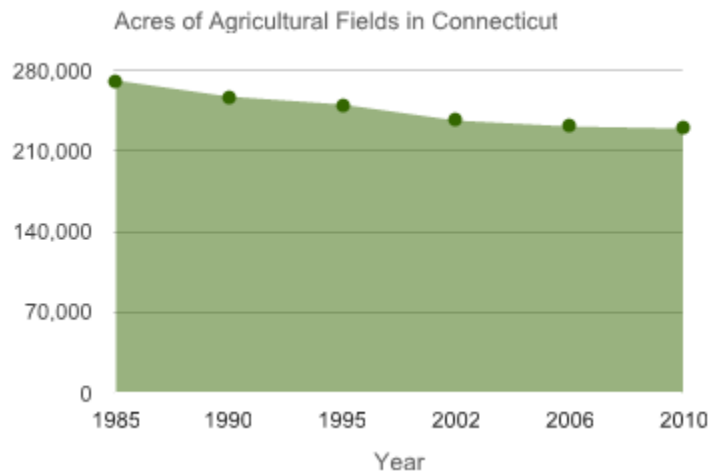
Farmland



Preservation: Connecticut preserved 830 acres of agricultural land on eight farms in 2014, down from 1,170 acres in 2013.



Loss: Farmland loss slowed considerably between 2006 and 2010 (the most recent data available):



The **top chart** shows the cumulative acreage preserved by the Connecticut Department of [Agriculture](#), which began preserving land by acquiring development rights in 1978.

The **bottom chart** presents an estimate of the total area of land used for crops and pasture in Connecticut, developed by the [Center](#) for Land Use Education and Research at the University of

Connecticut using satellite-derived data. It shows that less farmland was lost to development between 2006 and 2010 (the most recent data available) than in prior years, presumably because of the downturn in real estate development associated with the recessionary economy.

More than 1,300 acres were preserved each year from 2009 through 2011. In 2012, six farms participated, preserving 689 acres. The Department of Agriculture attributed the 2012 drop, in part, to the start-up of the Farmland Restoration [Program](#) and the Community Farms Preservation [Program](#), which diverted staff resources.

State bonding and the Community Investment [Act](#) are the main sources of funding. The Department also uses federal funds, and a conflict between state and federal program requirements led to a slowdown; the conflict reportedly has been resolved and the rate of acquisition is predicted to improve.

This indicator does not show agricultural land acquired for preservation by municipalities and nonprofit organizations. Several towns purchased farms in recent years with no state assistance, and those acres are not reported or recorded at the state level. Along with a central registry of preserved open space, Connecticut needs a registry of preserved farmland to help state agencies and other organizations preserve land strategically.

What is the Source of the Goal?

The Connecticut Department of Agriculture adopted a farmland preservation goal -- 130,000 acres in total, with at least 85,000 acres in cropland -- that originally was based on the amount of land needed for food production to sustain Connecticut's population.




Council [projections](#) show the goal being reached in the 22nd century, but in reality there will not be that acreage of agricultural land remaining in the state by the end of the current century if the rate of loss continues as it has for most of the past five decades. Preservation of at least 2,000 acres annually should result in success. During the last ten years, preservation has progressed at half the needed rate. Please see the [To Get Back on Track](#) page for more information.

To Get Back on Track

Milestones

The previous three pages of this section document Connecticut's insufficient progress in land conservation. This page tracks the mandatory milestones which, if met, are expected to get the state's land conservation effort moving forward at a greater pace.

In 2012 and 2014, legislation was adopted and signed (Public Acts [12-152](#) and [14-169](#), respectively) that set specific targets and timeframes for land-conservation planning.

Mandate for DEEP	Deadline	Deadline Met?	Notes on Progress
Prepare comprehensive land conservation strategy (including an estimate of total conservation acreage in the state) <i>CGS Section 23-8(b)</i>	December 2012		Draft outline released in October 2014. Previous plan expired in 2012.
Establish a process for state agencies to identify landholdings that might be valuable for conservation <i>CGS Section 23-8(d)</i>	No specific date		Incomplete
Establish a publicly-accessible registry of conservation lands <i>CGS Section 23-8(e)</i>	January 1, 2015 Quarterly updates thereafter		Project underway

The Pace of Preservation

The gauges below show the differences between the current rates of land preservation and the rates needed to meet the goals Connecticut has set for itself.

Preservation of Land by the State for State Parks, Forests, and Wildlife Management Areas

(Goal = 10% of Connecticut's Land Area)

Average Annual Rate
of State Land Acquisition
Needed to Reach Goal



Average Annual Rate
of State Land Acquisition
Since 2005



Please see the [Preserved Land](#) page for more information about this goal.

Since 2005, the State of Connecticut has added about 5700 acres to its network of state parks, forests and wildlife management areas. Achieving the State's goal would require exceeding that ten-year total every year.

Preservation of Farmland by the State

Average Annual Rate
of Farmland Preservation
Needed to Reach Goal



Average Annual Rate
of Farmland Preservation
Since 2005



Please see the [Farmland](#) page for more information about this goal.

Preservation of Land by Cities, Towns, State, Nonprofit Organizations and Water Utilities

(Aggregate Goal = 21% of Connecticut's Land Area)



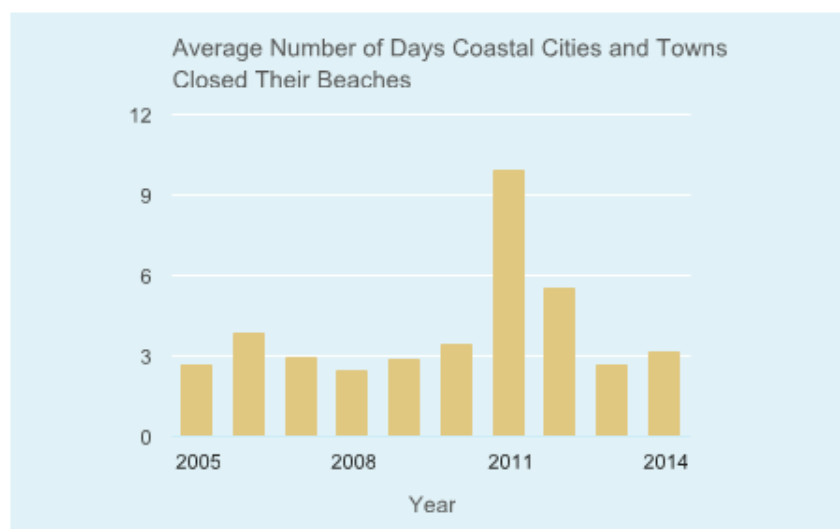
The gap between the goal and the rate of acquisition by these land-conserving organizations is not possible to assess. Acquisition data are not collected by DEEP or any other organization.

Many beaches and shellfish beds are closed when heavy rains carry overflowing sewage and polluted runoff into Long Island Sound.

Swimming



Coastal cities and towns closed their beaches on more days in 2014 than in 2013.



The Council adds up the number of days that each coastal city and town closed one or more of its public beaches, and calculates an average for all the cities and towns with beaches. Because the bathing season is approximately 100 days long, the number of days shown on the chart also equals the percentage of the bathing season when beaches were closed.

The cities and towns on the western half of the state's shoreline usually have a higher frequency of closings, and 2014 was no exception. Fourteen of the 24 coastal towns had beach closings. Of those 14, 10 were located in the western half of the coastline where there are more sewer systems with [overflows](#) and more paved surfaces that send contaminated runoff into the waters.

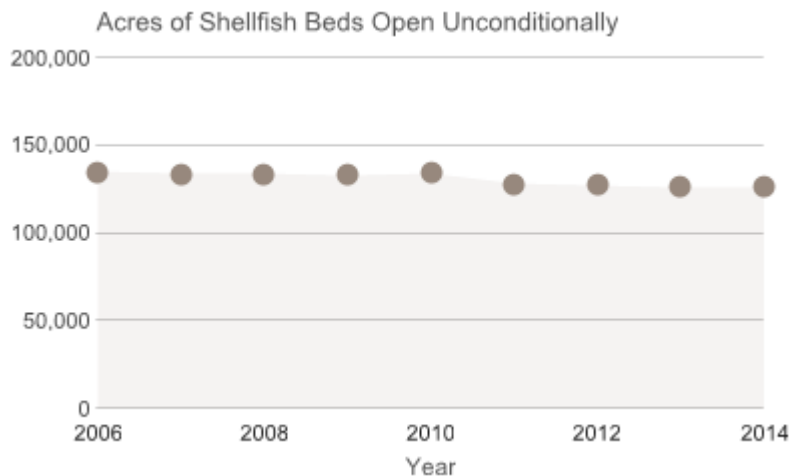
Yearly variations are products of rainfall patterns and unusual incidents such as sewer-line ruptures. The storms of 2011 resulted in many closings. Polluted surface runoff and sewage overflows after rainstorms are the most common sources of bacteria. After heavy rains, health officials must assume that polluted runoff and/or overflows from combined sanitary/storm sewers have raised bacteria levels. Though beaches are regularly monitored for bacteria, test results are not immediate. More closings are initiated preemptively, as a precaution after heavy rain, than are initiated due to actual monitoring results.

The water is tested at beaches from Memorial Day through Labor Day. At other times, the water could be clean or contaminated. Most sewage treatment plants along the coast disinfect their routine effluent discharges all year, but most treatment plants north of I-95 do not disinfect their effluent before May and after September. Connecticut's [goal](#) (see page 82 of linked document) is to eliminate public beach closings caused by bacteria and other pathogens.

Clamming and Oystering



The area of the Sound unconditionally approved for harvesting shellfish was unchanged in 2014.



The Connecticut Department of Agriculture's Bureau of Aquaculture and Laboratory Services [monitors](#) shellfish beds and [classifies](#) them according to their potential for yielding healthful, uncontaminated shellfish. The chart shows the acreage of shellfish beds that are approved for harvesting because they are generally unaffected by pollution. (Even areas that are approved may be closed as a precaution following exceptional rainfalls of three or more inches.) Aquaculture experts have suggested that an increasing volume of runoff from lawns and pavement is flowing further into the Sound, resulting in the gradual shrinkage of the shellfish beds that are fully approved.



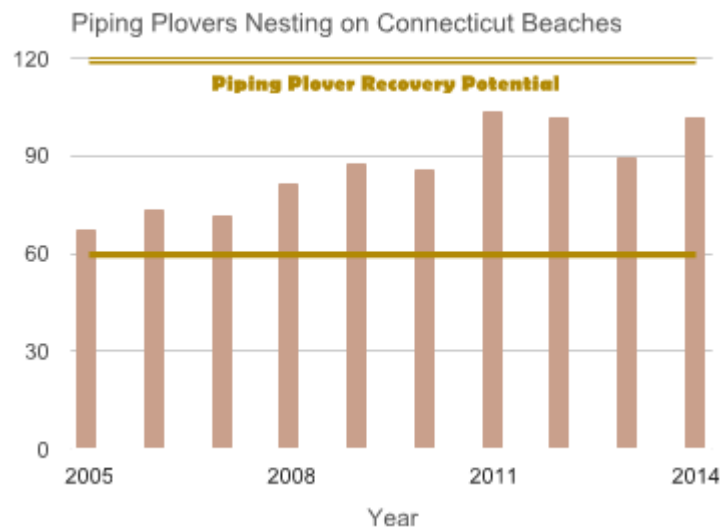
Forecast: More Heavy Rains

Connecticut residents have witnessed a steep [increase](#) in the amount of rain arriving in downpours, especially since the 1980s. While this trend, generally attributed to a changing climate, can be found throughout the country, it is particularly strong in the northeastern states. The 2014 National Climate Assessment predicts this trend to strengthen.

Piping Plovers and Others



The number of plovers nesting on Connecticut's shores rebounded to 2012 levels.



[Piping plovers](#) are small shorebirds that nest only on sandy beaches with sparse vegetation. People, storm tides and predators frequently destroy nests.

Although the number of plovers on Connecticut's beaches now exceeds the initial recovery goal of 60 set in 1986 (the solid gold line on the chart), the species continues in [threatened](#) status at the state and national level.

Nesting adults are counted (and in most cases protected) every spring by hundreds of volunteers working with the Audubon [Alliance](#) for Coastal Waterbirds.

Their habitat is a narrow strip squeezed between a rising Sound and higher ground. The piping plover population is, according to the United States Fish and Wildlife Service, "an indicator of the health of the fragile beach ecosystem." (*Atlantic Coast Piping Plover Revised Recovery [Plan](#)*)

Since protection and monitoring efforts began in 1984, nesting success has improved, resulting in more returning adults in subsequent years. In 2014, 116 chicks were raised by the piping plovers nesting on Connecticut's beaches, a modern record.

The damage from Hurricane Sandy in October 2012, which [rearranged](#) many of the beaches where plovers and other shorebirds usually nested, is suspected as one cause of the decline of 2013.

Other Beach Residents

The protections afforded piping plovers benefit other species, including American oystercatchers and [least terns](#), which also are threatened species in Connecticut.



American Oystercatchers
parent and young



2005 - 2014



Least Terns
still in their eggs



2005 - 2014

The Goal for Piping Plovers

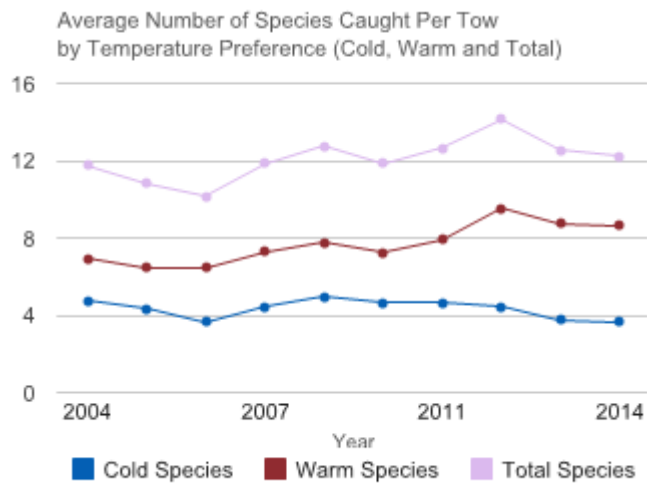
When the federal government listed the piping plover as a threatened species in 1986, Connecticut was home to an estimated 40 nesting adults. The entire population inhabiting the Atlantic coast from Canada to North Carolina was estimated to number about 1,600. An initial recovery goal was set for Connecticut at 60 birds (and 2,400 birds over the plover's entire Atlantic coast range), a level that Connecticut has maintained every year since 2001. The federal government reviewed the goal in 1996 and [revised](#) the overall Atlantic coast goal upward to 4,000 birds; New England's share of the newer target is about 1,200 birds. At that time, scientists estimated Connecticut to have habitat for at least 120 nesting birds (depicted above as the "recovery potential"). The breeding population of Massachusetts has been so successful since then that New England's overall goal has been met. Connecticut, though it does not have a new state-specific goal based on the 1996 revision, still has a way to go to fulfill its potential.



Under the Water in Long Island Sound

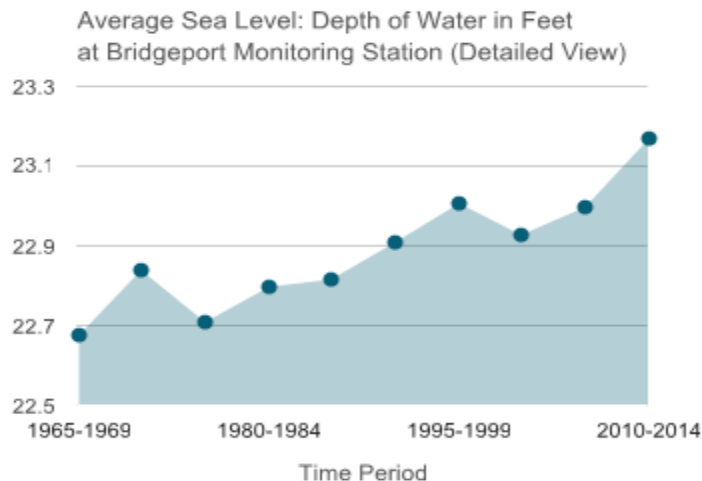


Life in the Sound is changing. Fish species from warmer regions are becoming more common as species adapted to cold water become less common. The water is warming and rising.



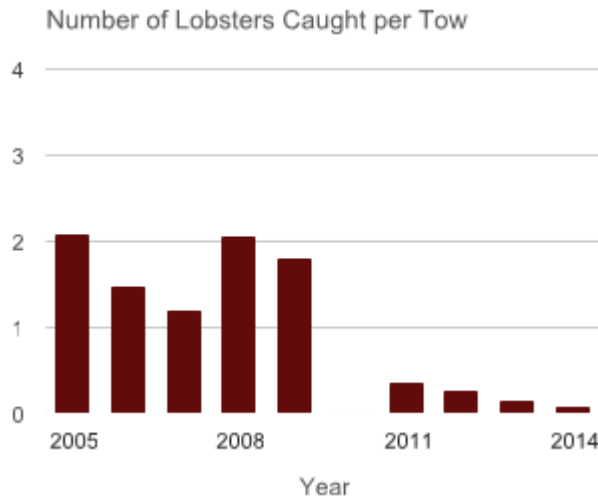
DEEP [surveys](#) marine fish, squid and lobster populations every spring and fall by towing nets from a research vessel. The **top chart** shows the average number of fish species caught in each tow. The well-documented [trend](#) toward species that favor warm water is apparent.

The **chart below** displays average sea level from 1965 to the present at a monitoring station in Bridgeport. Since 1980, sea level has risen [faster](#) along the northeast coast of North America than in most other regions of the globe.





The lobster population of Long Island Sound has failed to recover.



This chart shows the number of lobsters caught in the average tow during DEEP’s fall survey of marine life. The number caught in 2014 was the lowest ever. The steep decline of recent years is the nadir of a [well-documented](#), decade-long decline in the lobster population that also is evident in a dramatic drop in commercial lobster landings during the same period (not shown). Throughout the 1990s (not shown on the chart), researchers generally caught between seven and eleven lobsters per tow, with a spike to nearly 20 in 1997. [Researchers](#) are focusing on a combination of four possible causes for the dramatic downturn in lobster populations since 1999: disease, changes in water quality, changes in climatic conditions and human impacts to the Sound. Research to date suggests that a trend toward warmer water temperatures is an important factor in the decline.

The average temperature of the water in Long Island Sound has been [rising](#), with the surface temperature rising slightly faster than the bottom water. Hypoxia is most likely to be a problem when the surface water is much warmer than the deep water during the summer.

The changes in marine life, temperature and sea level are signs of a warming Sound. The Long Island Sound Study is working on a "sentinel" monitoring [strategy](#) that will track changes in the Sound related to climate change. If successful, that strategy will help Connecticut residents understand the changes in the Sound more fully. In the meantime, change is ongoing and Connecticut will need to pay close attention, as gradual change can become sudden change.

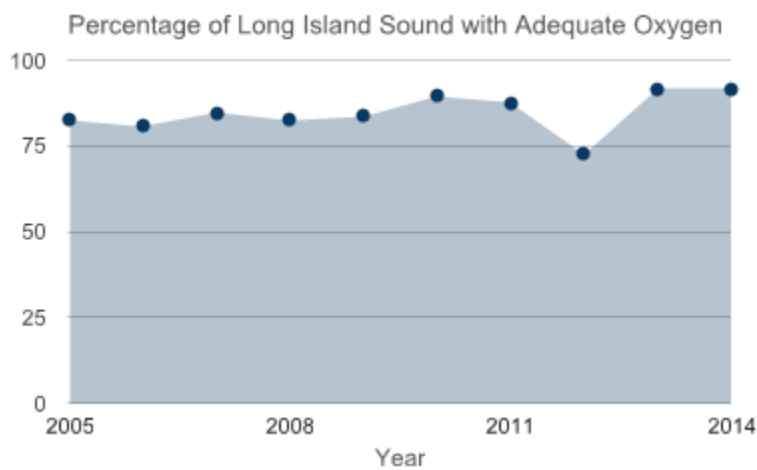
Technical Notes

1. The cold-adapted species shown on the top chart are those that prefer water temperatures below 60 degrees Fahrenheit. The warmer-adapted species prefer water ranging from 55 to 72 degrees Fahrenheit.
2. Data for 2010 are absent from the marine species and lobster charts because repairs to the research vessel *John Dempsey* precluded the fall Long Island Sound trawl survey of marine life.
3. The bottom chart shows the average level of the Sound at a point in Bridgeport, expressed as the number of feet above a submerged reference point.

The Water in Long Island Sound



During 2013 and 2014, oxygen conditions in Long Island Sound were the best since 1997.

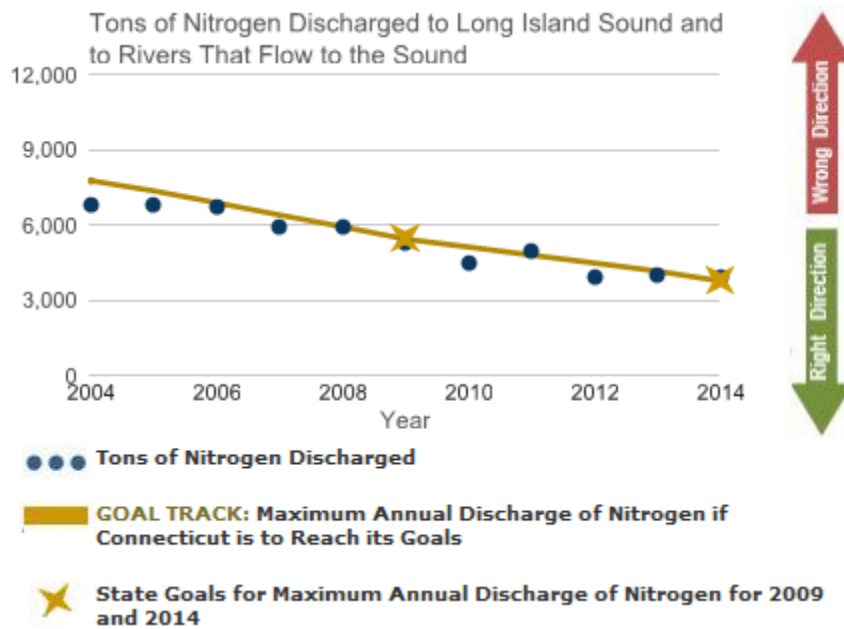


Marine life requires oxygen. The percentage of Long Island Sound that has adequate oxygen all year long is shown in the chart above.

During the summer, some areas of the Sound experience hypoxia, which is a condition in the water where oxygen levels are not adequate to fully support desirable forms of life, including fish and lobsters. Hypoxia occurs when the nitrogen in pollution stimulates excessive growth of aquatic plants, which die and get consumed by oxygen-using bacteria. Connecticut's goal is to "eliminate the adverse impacts of hypoxia resulting from human activities." Hypoxia occurs predominantly in the western portions of the Sound. Weather greatly influences hypoxia, making year-to-year changes less important than long-term trends. Detailed [reports](#) that include maps of the extent and duration of hypoxia in Long Island Sound are produced annually by the Department of Energy and Environmental Protection.



Nitrogen discharges increased in 2013 and 2014.



Connecticut’s investments in nitrogen-removal technology at sewage treatment plants have been successful.

The chart tracks the amount of nitrogen discharged by 80 sewage treatment facilities across Connecticut, two large coastal industrial facilities and a small group of industrial sources in the Naugatuck River watershed. The sewage treatment plants include those along the coast and many more that discharge to rivers that flow to the Sound. Connecticut’s investments in nitrogen-removal technology at many of those plants have been successful. The nitrogen discharges of New York, which lags Connecticut in nitrogen control, are not shown.

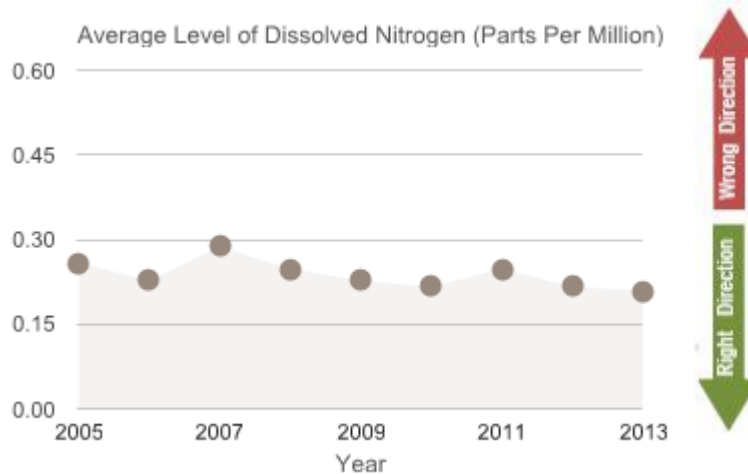
To reduce the nitrogen inputs that cause hypoxia, Connecticut and New York adopted a comprehensive management [plan](#) in 1994, and built upon that plan with an expanded agreement in 2002.

Connecticut’s share of the total nitrogen pollution in Long Island Sound is about one-third, and New York’s is two-thirds. In 2001, the federal Environmental Protection Agency approved the New York and Connecticut joint plan for implementing a Total Maximum Daily Load ([TMDL](#)). The TMDL is the maximum amount of pollutants that can be discharged while still allowing water quality standards to be attained.

Despite the greater nitrogen discharges of 2013 and 2014, DEEP reports that Connecticut met the goal for "trade-equalized load," which takes into account the distance of inland treatment plants from Long Island Sound.



New! As Connecticut reduced the amount of nitrogen discharged into the Sound, the level of dissolved nitrogen in the water followed suit.



This chart shows the average level of nitrogen in the water of Long Island Sound. Levels have improved as Connecticut has reduced its nitrogen discharges.

Large uncontrolled quantities of nitrogen enter Long Island Sound when rainfall carries fertilizer from residents' [lawns](#) along with the pollutants that have accumulated on [pavement](#).

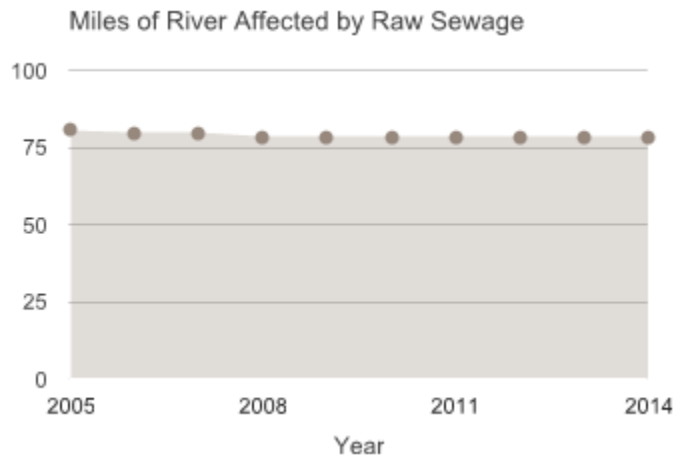
Technical Notes

1. The top chart shows the area of Long Island Sound that had adequate oxygen levels throughout each year. The sampling area (2700 square kilometers) does not include the whole Sound (3400 square kilometers). The areas not sampled are shallow waters (less than two meters deep) near shore, which generally do not experience hypoxia; bays; the eastern end of the Sound, which is not expected to experience hypoxia; and an area in the far western end, which probably becomes hypoxic in most years.
2. Hypoxia was redefined by DEEP in 2011. Areas of the Sound are now considered hypoxic where a liter of water contains less than 3.0 mg of dissolved oxygen. This is the criterion that was used prior to 2004. From 2004 through 2010, DEEP used 3.5 mg/l as the determining level. The threshold was returned to the 3.0 level in 2011 to be consistent with the definitions used by New York and the Long Island Sound Study. Data for all previous years have been recalculated to show the area of the Sound having adequate oxygen under the current definition (that is, at least 3.0 mg/l).
3. The nitrogen in the bottom chart is Total Dissolved Nitrogen.

Rivers, Streams and Floods



About 80 miles of rivers are polluted by overflows of raw sewage.



In 15 Connecticut cities and towns, sanitary sewers were built in combination with storm sewers. When it rains, these combined systems carry more water than their treatment facilities can handle, and a combination of stormwater and untreated sewage overflows directly into the rivers and Long Island Sound.

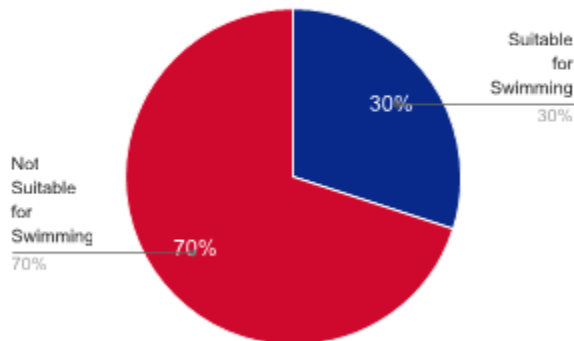
Several of the combined sewer systems have been completely or partly separated since 1990, reducing the volume of untreated sewage in rivers. Four cities that still contain multiple combined-sewer overflows -- Bridgeport, Hartford, New Haven and Norwich -- have reduced the number of overflow points, but about a hundred remain. Two other cities, Norwalk and Waterbury, have reduced their overflows to periods of exceptionally wet weather. During very heavy rains, the sewage treatment systems of many other municipalities, even those without combined sanitary and storm sewers, are overwhelmed and spill untreated or poorly-treated sewage to rivers and harbors. Regrettably, scientists [predict](#) climate change to yield more frequent high-intensity rainfall events in Connecticut.

DEEP maintains an interactive [map](#) showing the exact locations where sewage is known to overflow into waterways. The [law](#) that led to the map also required DEEP to publish notices of actual overflow events starting in 2014, but that deadline was not met.

Connecticut's goal is to eliminate the effects of raw sewage discharges from combined sewer systems. Progress is slow because of the extraordinary [expense](#) of separating the sewers.

Throughout the state, about **30 percent** of assessed river miles are classified as being clean enough for swimming and other water contact sports.

Percentage of Assessed Rivers & Streams (1184 Miles)
Suitable for Contact Recreation



Nearly 1200 miles were assessed by DEEP as to their safety for swimming and other recreation. About 356 miles (30 percent) are clean enough to fully support contact recreation.

In most sections of rivers and streams, bacteria levels are higher, at least some of the time, than what is considered safe for a person swimming or playing in the water. Detailed information is contained in the 2014 Integrated Water Quality [Report](#) submitted by DEEP to the federal government. The [2011](#) edition of that report estimated the percentage of fully safe rivers to be about 11, while the [2008](#) edition of that report estimated the percentage to be 15.

A separate statistical analysis performed by DEEP estimates that 47 percent of [wadeable](#) streams (which are streams shallow enough to be sampled using methods that involve wading) are suitable for recreation that involves contact with the water.

Apparent fluctuations in year-to-year results are probably due to limitations in data collection and not to widespread changes in water quality. The conclusion of all the analyses is that the water in most Connecticut streams and rivers might not always be safe for swimming and similar activities.

The ecological health of a stream depends very much on a single factor: the percentage of the land in its watershed that is paved.

In nearly all cases, a stream that has *less* than 12 percent of its watershed covered by impervious surfaces will fully support aquatic life (shown as **blue**). Impervious surfaces are largely pavement and rooftops.



If watershed is **less** than 12% paved

In all cases, streams where *more* than 12 percent of the watershed is impervious will **not** fully support aquatic life (shown as **red**).



If watershed is **more** than 12% paved

The watershed of a stream is all of the land from which water flows to the stream. For illustration, think of a stream as the drain of a bathtub; the watershed is the entire bathtub.

A random sample of 99 streams conducted by DEEP found that aquatic life is measurably affected when impervious surfaces -- largely pavement and rooftops -- cover 12 percent or more of the stream's watershed. *No stream fully supported aquatic life if this 12-percent threshold was exceeded.*

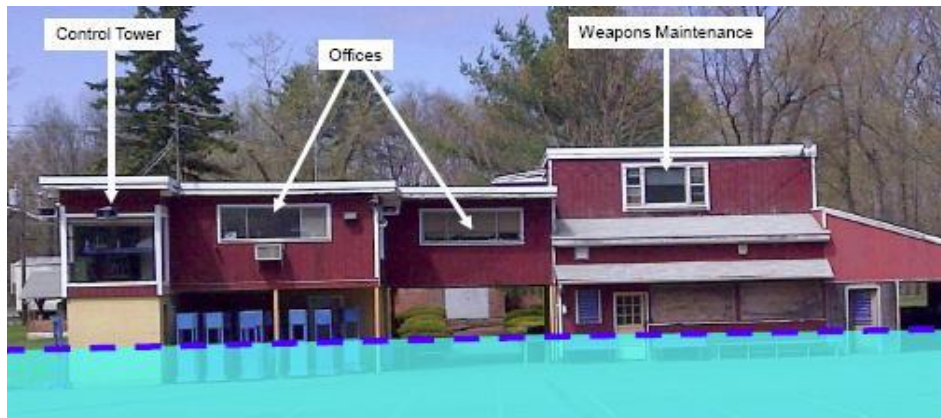
Additional [analyses](#) produced similar conclusions and point to the importance of keeping impervious surfaces to a minimum and reducing the runoff that flows directly from such areas into waterways.

There are hundreds of streams where the water is very clean, and many of these have been documented by volunteers working with DEEP's River Bioassessment by Volunteers ([RBV](#)) program. RBV enlists more than 500 students and adults to sample the aquatic life in more than 90 streams. In 2013, 33 out of 137 specific sampling locations -- the highest portion to date -- were found to harbor the types of insects and other life forms that signal a healthy ecosystem.

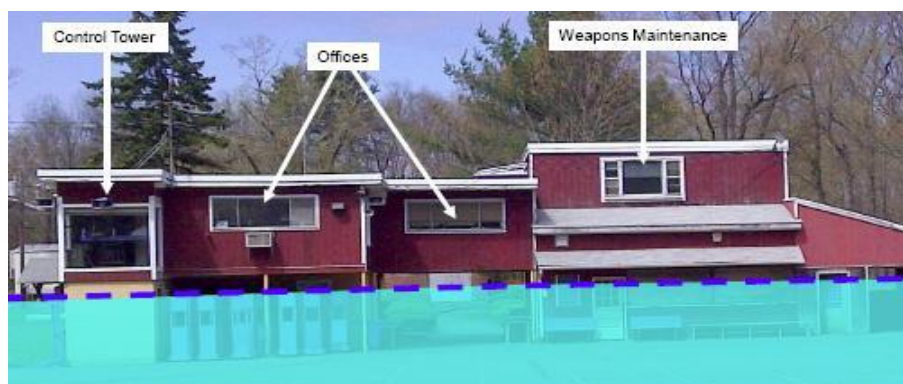
On many rivers, floods are more frequent and damaging than they used to be.

This apparent consequence of a changing climate costs the public money. As an example, the Connecticut Department of Emergency Services and Public Protection's Division of State Police is seeking a new site for its firearms training facility. While the current site near the Farmington River in Simsbury has been vulnerable to flooding for decades, the twenty-first century has seen rising waters.

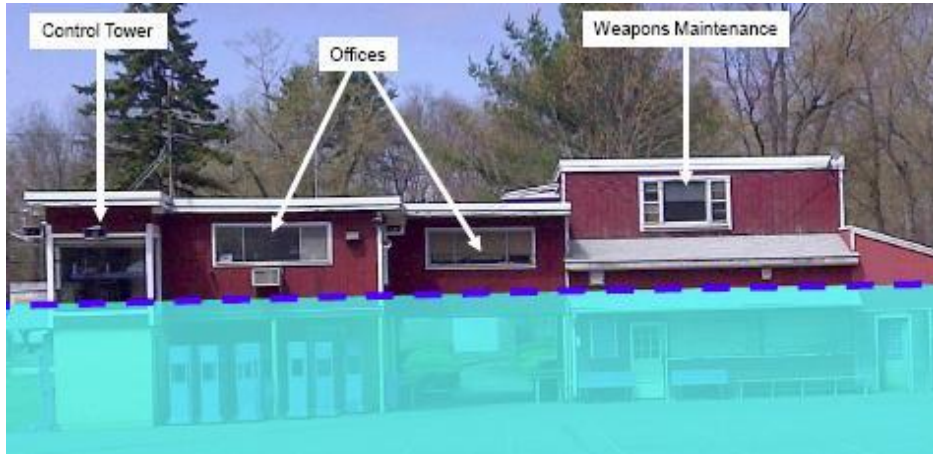
The shaded area depicted in the photograph below was the average annual level of flooding, until recently.



Then, this was the water level in 2006, 2008 and 2010:



The water was even higher in 2007 (not shown). Then, in 2011, the year of Tropical Storm Irene, high water reached the upper floors and severely damaged the facility:



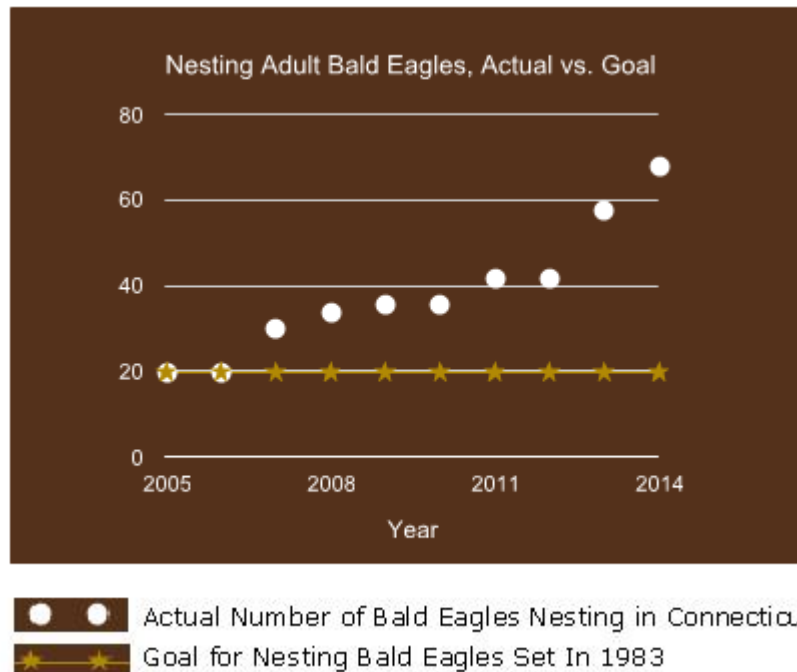
This is just one illustration of how the rainfall and flood maps used for planning and engineering throughout Connecticut will need to be revised to reflect a changing climate.

(Photographs courtesy of the Department of Construction Services)

Bald Eagles



Another banner year for nesting bald eagles.



[Bald eagles](#) stopped breeding in Connecticut in the 1950s. The species declined throughout the lower 48 states and was declared endangered in 1967. A variety of environmental conditions harmed the eagle, including the widespread use of certain chemicals ([chlorinated hydrocarbons](#)) that accumulated in its prey (mostly fish). When those chemicals were banned and polluted waterways were improved, the bald eagle was able to reproduce again. Young eagles were reintroduced into nearby states in the 1980s, and a pair found their way to Connecticut in 1991 and successfully raised a family in 1992. In 2000 there were known to be eight nesting adults. Many more have since found acceptable nesting habitat on land protected by government and private landowners including utility companies and land trusts. DEEP monitors the eagles with the assistance of the Bald Eagle Study Group and other volunteers.

The population of bald eagles is included as an indicator because the eagle is representative of species, especially predators, that share similar habitat requirements: large areas of relatively undisturbed land near rivers or lakes where the birds can find adequate supplies of fish and other prey that are – very importantly – only minimally contaminated.

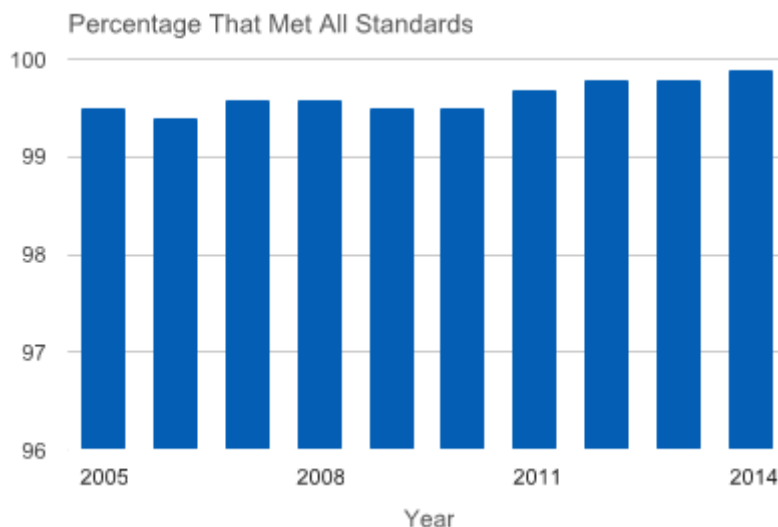
Bald eagles can be seen fairly frequently where for decades they were scarce. On one morning in March of 2013, for example, 15 bald eagles were [reported](#) by experienced birdwatchers at Wethersfield Cove, only three miles from the State Capitol. More than 140 eagles spent the winter of 2014-2015 in Connecticut, mostly along rivers.

The federal government [removed](#) the bald eagle from its list of threatened and endangered species in 2007. In 2010, Connecticut changed the eagle's in-state status from endangered to [threatened](#).

Public Drinking Water



A new record: 99.9 percent of the water delivered by public water systems in 2014 met all health standards.



Every public water system submits monthly [quality reports](#) to the Department of Public Health. This indicator shows the percentage of monthly reports that demonstrate full compliance, after weighting the reports to account for the number of people served by each system. Though long-term problems occur, they are rare in large systems, with the exception of the downturn in 2005 and 2006 caused by short-term problems in larger systems. This indicator would show greater fluctuations if the larger utilities failed to deliver good water. The most commonly encountered contaminants include bacteria and byproducts of disinfection, with an assortment of other chemicals and radioactive substances.

Data are not completely comparable across all states, but federal [reports](#) suggest that Connecticut is among the very best in delivery of safe water from public supplies. This excellent record can be attributed to many factors, including Connecticut's policy of not permitting direct discharges of pollution into streams that flow to drinking water reservoirs.

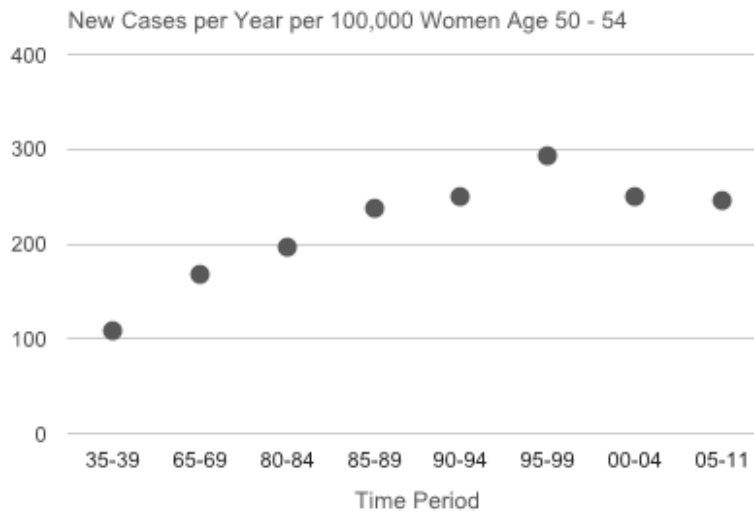
About 85 percent of people in Connecticut are supplied by the public water systems included in the chart above. The other 15 percent rely on private wells, which are not monitored by any government agency and are not counted in this indicator. An unknown but significant number of private wells are contaminated by pollution or naturally-occurring toxins such as arsenic. Residents who drink from private wells are not required to test their water, so the number of those people who drink contaminated water cannot be measured.

Static Page: With no new data to report, this page has not been updated. Please see [last year's report](#) for the full page.

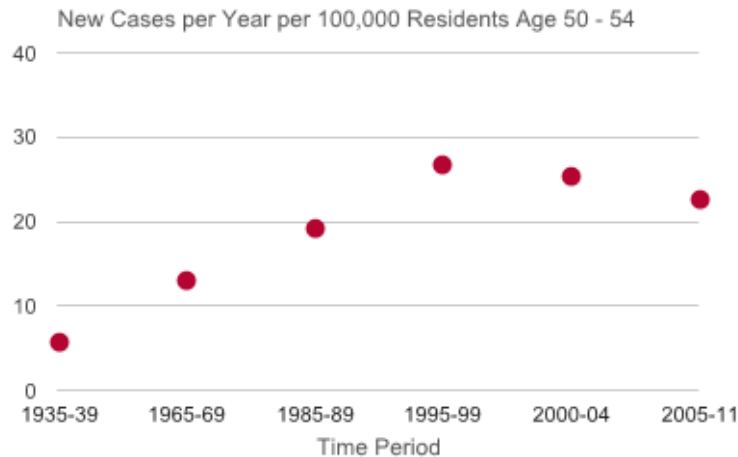
Breast Cancer in Connecticut



Connecticut has the highest incidence of breast cancer among the 50 states, but has seen improvement since a peak in the late 1990s.



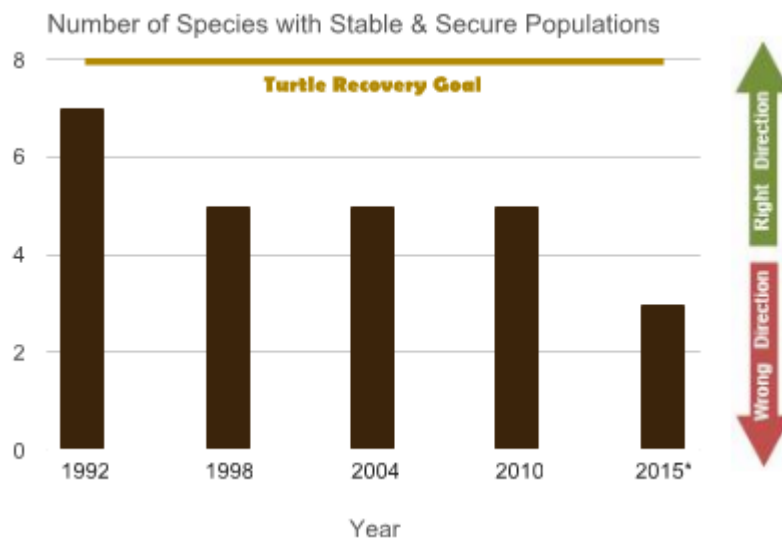
Non-Hodgkin's Lymphoma



Resident Turtles



Five of the eight turtle species that live year-round in Connecticut are on the latest list of species that are endangered, threatened or of special concern.



*The number for 2015 is preliminary and based on a draft revision to the list of species that are endangered, threatened or of special concern. Please read below for additional information.

Turtles are excellent indicators of ecological health. They live long lives, reproduce slowly and decline in number when their habitat declines. This indicator includes the eight species of turtle that live in Connecticut (but not the four marine species that visit Long Island Sound in summer, all of which also are threatened or endangered).

Through 2014, five resident [turtle species](#) were *not* classified as endangered, threatened or of special concern: common musk turtle, common snapping turtle, northern diamondback terrapin, eastern painted turtle and spotted turtle. The rare and/or declining species were the bog turtle (endangered), eastern box turtle and wood turtle (both state species of special concern).

If adopted, the [2015 list](#), currently being reviewed as a draft by the public, will classify two more species of turtle as being of special concern: northern diamondback terrapin and spotted turtle.

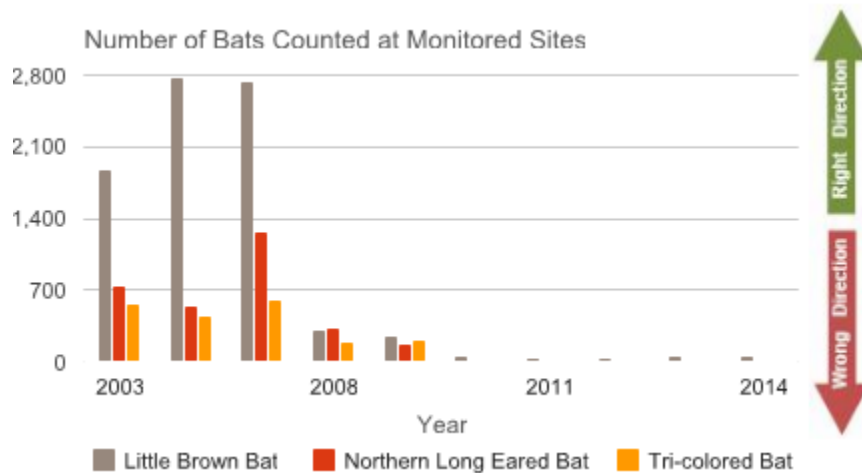
Classification and protection of endangered species in Connecticut dates back to 1989 and the adoption of "An Act Establishing a Program for the Protection of Endangered and Threatened Species." The Department of Environmental Protection published the first [list](#) of Connecticut's Endangered, Threatened and Special Concern Species in 1992. At that time, only the bog turtle was on the list. The wood turtle and the eastern box turtle joined the list in 1998 as species of special concern.

The goal for all endangered and threatened species is for recovery of their populations to a stable, sustainable level.

Bats



The three most common cave-dwelling bat species have declined catastrophically.



The chart above depicts the winter populations of three cave-dwelling bat species at caves monitored by the Department of Energy and Environmental protection. (At one of the caves, the decline was so complete that monitoring ceased in 2011).

A fungal disease called White Nose Syndrome (WNS) has been associated with the demise of cave-dwelling bats. It is not known if WNS is the cause of the mortality or only an associated symptom. WNS has been documented throughout the northeast states.

The catastrophic decline has led to a regulatory [proposal](#) to list all three species as endangered in Connecticut.

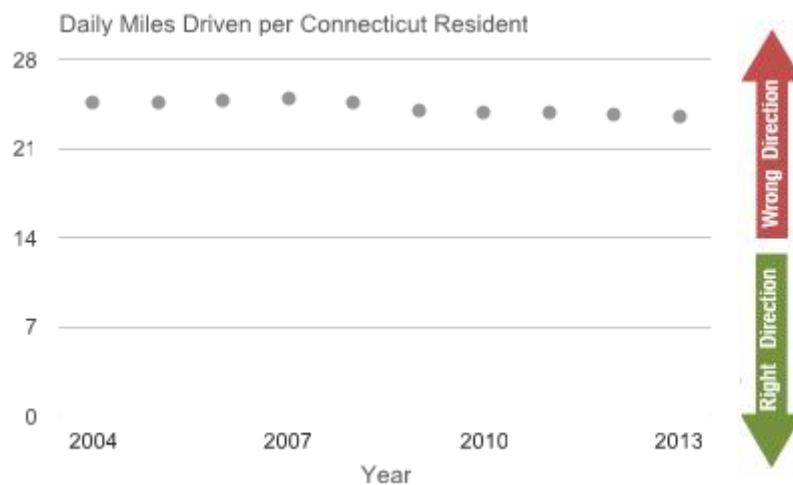
Bats are mammals, but the Connecticut Audubon Society included a review of these ecologically-important aerialists in their [2013](#) report on the State of the Birds.

Not all bats live or hibernate in caves. Many live in trees, and future editions of this report will include population trends for those species (some of which also are on the list of species that are endangered, threatened or of special concern).

Driving



Trend reversal: Nearly every year for 25 years, the average Connecticut resident drove more miles than he or she did in the previous year. That trend shifted into reverse in 2008.



Driving a car, truck or sport utility vehicle is one of the most environmentally harmful activities a Connecticut resident will engage in personally. Impacts are direct (air pollution, oil leakage, etc.) and indirect (creating demand for new roads). The Department of Transportation estimates the total miles driven each year in Connecticut. Every year from 2000 through 2007, the average Connecticut resident drove more miles than in previous years. The reasons for the decades of increasing auto use are complex and include the fact that most new development was accessible only by private vehicle. A decline in miles driven began in 2008 and has continued through 2014. The Connecticut trend has followed the [national trend](#) for driving. The national trend toward driving less is being led by the 16-to-34-year-old segment of the population.

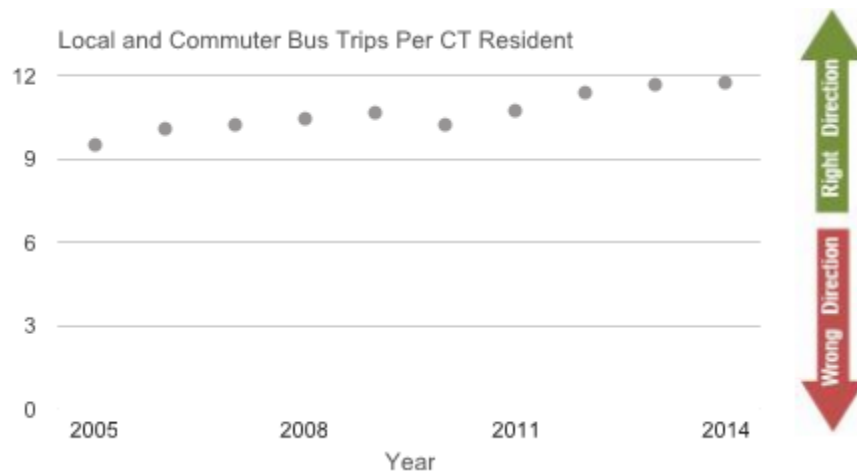
When residents began to drive less, their gasoline consumption decreased** and pollution was reduced.

** [FY 2015 Midterm Economic Report of the Governor](#), Office of Policy and Management, February 5, 2014. P.47.

Riding



The average Connecticut resident is taking the bus more often.



The number of in-state local and commuter bus trips taken by the average resident has been on an upward trend since 2005. [Riding a bus](#) is just one way to avoid the negative environmental consequences of driving a car. Ridership data are collected by the Department of Transportation. The number for 2014 is an estimate.

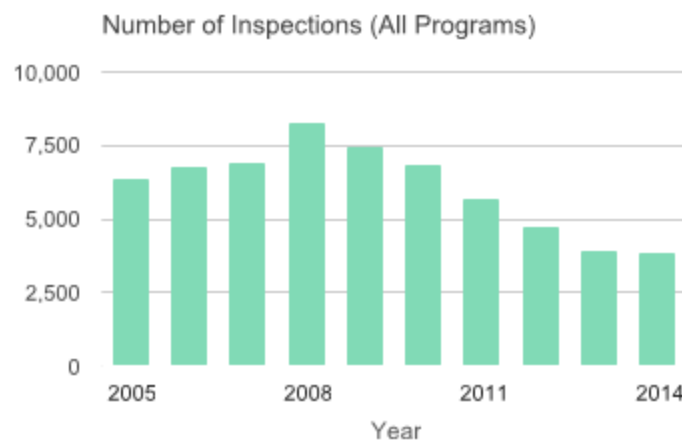
* Personal impact indicators illustrate trends in behavior or practices that can be expected to influence the condition of tomorrow's air, water, land and wildlife.

Compliance

What Are the Trends?

- Every year, DEEP detects more than a thousand violations of air, water and other pollution laws.
- Of the 1,000-plus Notices of Violation (NOVs) issued each year, about 800 go to businesses (not including medical offices, which are counted separately). More than 60 percent of those businesses are gas stations, convenience stores, car repairers and other companies that handle petroleum. (See [below](#) for a more complete accounting of the parties who receive NOVs, including homeowners, medical offices, schools, municipalities and other entities that are not counted here as "businesses.")
- The enormous role that petroleum plays in Connecticut's economy is reflected in the burden it places on DEEP's workload.
- After petroleum, the potential pollutant that has been the subject of the most violation notices over the last two years is radiation (10 to 20 percent of the total).
- More than 90 percent of detected violations result in no financial penalty.

The number of inspections conducted by DEEP is at an all-time low.



Who is breaking Connecticut's environmental laws, and how is the environment affected?

To answer this question, the Council reviewed the 3,000-plus Notices of Violation (NOVs)** issued by DEEP in the last three years. The conclusions of the first analysis are summarized in an April 2012 staff [memo](#) and the violators are characterized in a series of [charts](#). The overwhelming majority of businesses where violations were found were small companies, and most violations were related to the storage, transport or distribution of petroleum. The largest group, by far, were gas stations and convenience stores. Only seven percent of NOVs were issued to manufacturers with more than 20 employees, fewer than the number issued to individual citizens.

The Council's [review](#) of the 1,098 NOVs issued in 2013 found similar data. The number of violations was the largest in more than ten years. Again, the largest portion were related to violations of laws pertaining to the storage or distribution of petroleum, and most of the laws broken were aimed at reducing the risk that pollution (from spills, discharges, leaks, etc.) would occur in the future. This was true again in 2014, when more than 1,200 NOVs were issued.***

The Unresponsive: Three Examples

Explorations of program-specific permitting and enforcement data often reveal a common theme: scofflaws are everywhere.

1. A [report](#) published by the Council in March, 2014 tabulated the frequency with which alternative sewage treatment facilities failed to submit required monitoring reports, and found that fewer than half of the facilities submitted all required reports. It also concluded that "DEEP issued no Notices of Violation (NOVs) to operators of ATS facilities in 2011 or 2012, despite many facilities' failures to submit reports or meet permit limits. The consequence for reporting full compliance, reporting noncompliance or failing to report is the same in all instances."

2. In 2013, at least one third of the radiation-related NOVs were issued for failure to register radioactive materials or x-ray devices. The *majority* of the facilities receiving those NOVs failed to respond in a timely manner and received follow-up NOVs from DEEP. The entities who appear to have ignored DEEP's notices include state agencies and universities, municipalities, major corporations and smaller businesses such as recycling facilities and veterinary clinics.

3. In December 2013, DEEP issued an NOV to a waste treatment facility that cited 50 violations of that facility's effluent permit limits; it was sent with a cover letter that stated: "In October 2012, the Department provided compliance assistance and visited the facility to identify potential corrective actions capable of improving compliance with the respective permit. In accordance with this initiative, [the facility] was to provide quarterly progress reports to the Department. A report was received in December 2012...This was the only report provided..."****

DEEP closed that NOV in March 2014, relying on the company's certified compliance statement. The company paid no penalty for its violations nor for failing to submit required reports.

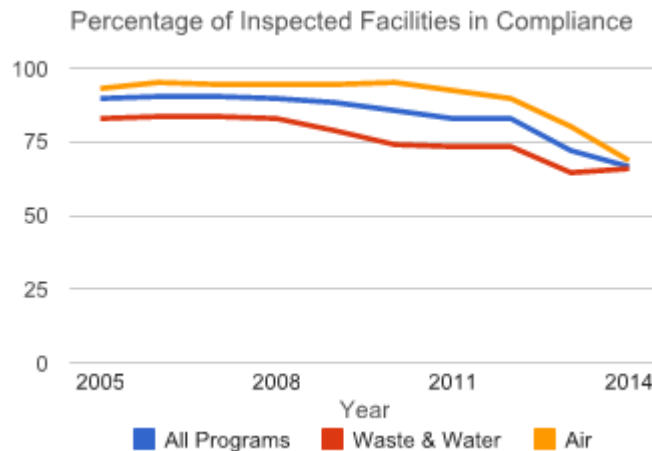
Compliance and Environmental Quality

The role of compliance has changed. For decades, the extent to which people, companies and government complied with environmental laws had an immediate effect on the condition of the state's environment. As compliance improved, so did the air, water, wildlife and other natural resources. With a few notable exceptions, such as some municipal sewage treatment facilities that still pollute large bodies of water from time to time, the current environment owes more to past compliance efforts than to current ones. According to the Council's analysis of enforcement data (see above), most violations and enforcement actions now relate to the prevention of petroleum leaks and spills. In contrast to those, many sites that are not violating any laws contribute enormous amounts of pollution to rivers and streams every time it rains. Compliance and enforcement remain important for maintaining an inhabitable state, but no longer should Connecticut residents expect higher compliance rates to lead to dramatic improvements in statewide environmental indicators.

The Changing Tools of Enforcement

DEEP, faced with diminishing staff resources, has streamlined enforcement procedures in some programs and issued notices to more violators. Electronic submission of reports by permit-holders in some programs also has allowed for more targeted enforcement. To use the well-worn police-and-speeders analogy, this would be concentrating a smaller police force on the roads where speeding is believed to be most prevalent, with the result of more tickets being issued. But targeted enforcement alone might not explain the larger number of violations. Numerous studies have shown that the average speed on highways increases when drivers believe there are no police looking for speeders. Is there an analogous increase in environmental violations when there are fewer inspections being conducted?*****

In past years, the Council calculated a statewide rate of compliance that was based on the ratio of violations to inspections. Because of the additional ways in which violations now are detected, the Council has abandoned that indicator as a reliable portrayal of compliance trends. When that compliance rate -- specifically, the percentage of inspections that found full compliance with pertinent regulations -- is calculated using 2014***** data, it shows continuation of an apparent downward trend in compliance (see chart below). However, the meaning of the calculated rate has become unclear and is no longer employed as a meaningful indicator. A more reliable indicator would be based on random sampling of regulated facilities, but no such system for measuring overall compliance is in place.



Despite gaps and ambiguities in the data, it is clear that Connecticut -- government, businesses and residents together -- has failed to achieve the goal of full compliance.

*Personal Impact indicators illustrate trends in behavior or practices that can be expected to influence the condition of tomorrow's air, water, land and wildlife.

**Notices of Violation (NOVs) are informal enforcement tools, generally issued whenever DEEP detects one or more violations at a facility. They carry no financial penalty. The recipient has 30 days to respond. They can be issued for relatively minor or major violations; in cases of the latter type, the recipient might also receive an order, which might carry a financial penalty. NOVs typically outnumber orders by a factor of five or more in any year. NOVs are good indicators of trends in violations because almost all violations found through inspections result in NOVs.

***The number of inland wetlands violations is very small because the summaries above include only NOVs issued by DEEP. Most inland wetlands activity is regulated by municipalities. The number of violations detected by municipal inland wetlands and watercourses agencies is unknown, but probably is in the dozens in most years.

****This excerpt is from DEEP correspondence that has been compiled, along with compliance data for the three hazardous waste treatment facilities in Connecticut, in a [compliance overview](#) prepared by the Rivers Alliance of Connecticut.

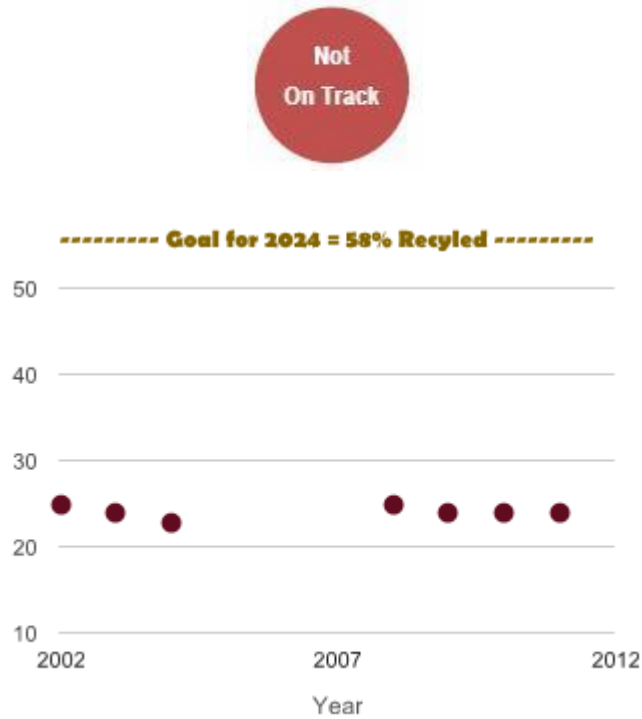
*****The analogy between speeders and environmental violators is imperfect at best. Speeders hope to avoid a ticket that comes with a significant financial penalty. A Notice of Violation (NOV) issued by DEEP, on the other hand, carries no financial penalty.

*****For this indicator only, years pertain to federal fiscal years (i.e., October 1 through September 30), not calendar years.

Personal Impact*

Static Page: With no new data to report, this page has not been updated. Please see [last year's report](#) for the full page.

Recycling Rate



Current Trend vs. the Goal

State Goal for Recycling Rate



Average Recycling Rate Since 2004

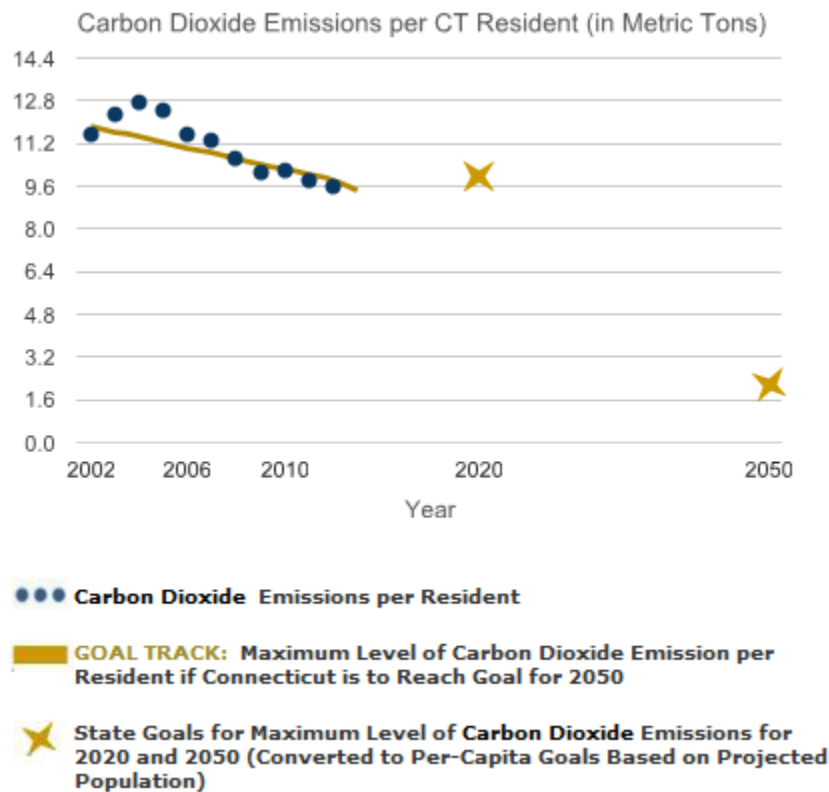


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Climate Changers



Connecticut residents are meeting the 2020 goal for carbon dioxide emissions.



Certain gases in the air function like the glass of a greenhouse: they allow the sun's energy to pass through the atmosphere to the ground, then trap the heat that radiates from the ground. These gases often are called "greenhouse gases." Worldwide, a [build-up](#) of greenhouse gases is contributing to the ongoing rise in temperature. Carbon dioxide is not the only greenhouse gas nor even the most powerful, but carbon dioxide emissions are far greater in quantity than the others. The chart above shows the total amount of carbon dioxide emitted from the burning of petroleum, natural gas and coal in Connecticut divided by the population.

How the Goal Track is Calculated

[State law](#) sets two goals for greenhouse gas emissions: reduce statewide emissions to 10 percent below 1990 levels by 2020 and 80 percent below 2001 levels by 2050. The chart above shows emissions *per Connecticut resident*, not total emissions. The goals on the chart have been adjusted to account for the growth in population that is projected for 2020 and 2050. Many more people are projected to be living in Connecticut in 2020 and 2050, so the average resident will have to work that much harder to reduce carbon dioxide emissions if the statewide goal is to be met.

Connecticut's goals are in line with national and international estimates of the extent carbon dioxide emissions from industrialized nations will need to be reduced in order to limit the rise in global mean temperature to no more than 3.6 degrees Fahrenheit (2.0 degrees Celsius) above preindustrial temperatures.

Current Trend vs. the Goal Track

Average Annual Per-Capita Reduction in Carbon Dioxide Emissions Needed to Reach Goal for 2050



Average Annual Per-Capita Reduction in Carbon Dioxide Emissions Since 2001



Most human-generated carbon dioxide results from the combustion of fuels in houses, businesses, power plants and vehicles (the largest source). Connecticut is more energy-efficient than the nation as a whole, and thus the average Connecticut resident's contribution to global climate change is less than the average American's.

The most recent data available are from 2012.

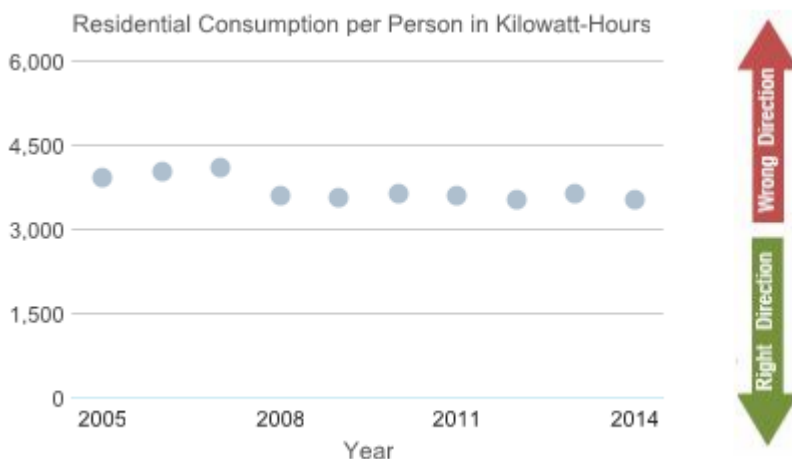
*Personal Impact indicators illustrate trends in behavior or practices that can be expected to influence the condition of tomorrow's air, water, land and wildlife.

Electricity at Home and Work

At Home:



The average Connecticut resident used less electricity at home in 2014 than in any recent year.



Efficiency at Home (Top Chart): The average Connecticut household has been consuming less electricity since the peak usage year of 2007, despite small reversals in 2010 and 2013. Nonetheless, peak demand remains excessive. According to the Connecticut [Siting Council](#), peak demand occurs during hot, humid summer days when residents use air conditioning. Most Connecticut consumers do not purchase the most efficient air conditioners. (Appliance purchasing data previously was tracked in this report but became unavailable in 2010.) Excessive electricity consumption in the summertime has had significant environmental consequences. On the hottest days, Connecticut’s base-load power plants are unable to meet the additional demand, and older petroleum-fueled plants are brought online. Because they are used sporadically, many of these older plants are permitted to operate with no pollution control equipment. As a result, state residents generate the most air pollution on the hottest summer days when air quality is already bad.

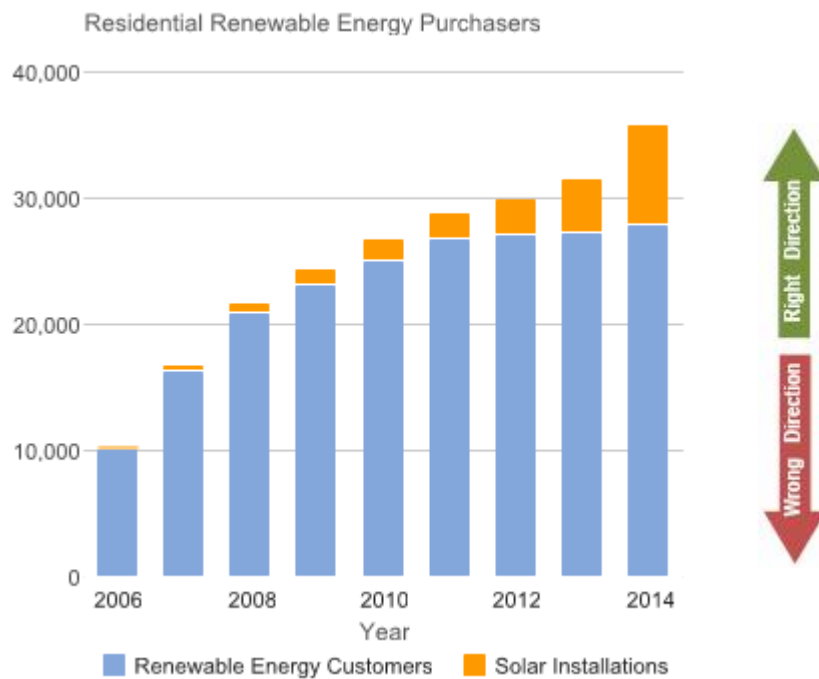
The vast majority of Connecticut’s electricity is generated from nuclear energy and the combustion of natural gas, oil and other fuels. Hydropower, wind, solar and other renewable resources are small but growing sources of electricity. Each source, renewable or not, has its own negative environmental consequences. Reducing those consequences will require Connecticut households to use electricity more efficiently. Such efficiency can be attained in part with [ENERGY STAR appliances](#).

Note: The number for 2014 is subject to future revision, as consumption data for December are estimates.

Personal Impact*



The rate at which customers have been signing up to buy electricity from renewable sources has slowed, but the installation of solar panels is accelerating.



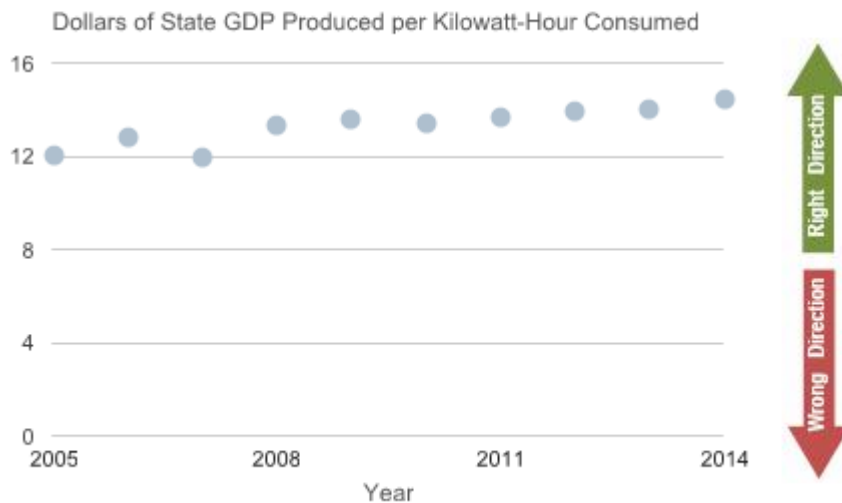
The [CTCleanEnergyOptions](#) program enables customers to purchase electricity from renewable sources, especially wind. Participation grew steadily until 2011. The electricity that actually enters these houses is not necessarily from renewable sources. The consumer who elects this option is paying for the generation of renewable electricity on the regional electric grid, which in turn reduces the amount of electricity that otherwise would be generated by power plants.

Legislation adopted in 2011 ([PA 11-80](#), Section 106) set a goal of 30 megawatts of new photovoltaic capacity installed on residential properties by the end of 2022. The Residential Solar Investment [Program](#) of the Connecticut Green [Bank](#) (formerly the Clean Energy Finance and Investment Authority) reports that this goal was exceeded some time in 2014. Thousands of Connecticut homes (shown in gold on the chart) now use the sun to generate much of their own electricity.

Electricity At Work:



Connecticut's economy continued to expand while consuming less electricity.



The chart shows the trend in the efficiency with which Connecticut's economy uses electricity to produce goods and services. Connecticut's businesses generally have been using less electricity to produce a unit of goods or services. [State Gross Domestic Product](#) (GDP) represents the total value of goods and services produced within the state in a single year. In 2013, the federal [Bureau of Economic Analysis](#) put Connecticut's GDP at \$249 billion (current dollars). When adjusted for inflation, that amount is a 0.9 percent increase from 2012. At the same time, industrial and commercial electricity consumption in Connecticut increased by only 0.4 percent.

The Council investigated the question of whether the apparent long-term improvement in efficiency might have been caused by a shift in Connecticut's economy from energy-intensive manufacturing to financial services and other business sectors that consume less energy. That shift probably has been a factor. Manufacturing GDP grew from 2004 through 2011 (the most complete data available at the time of this analysis) at a slower rate than the overall state GDP, while the financial and health care sectors expanded at a faster rate. The latter sectors probably use less electricity to create a dollar of GDP in comparison to manufacturing, so their increasing importance to the state's economy could make the overall business sector appear more energy-efficient.

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Activities of the CEQ in 2014

Research and Reports

The Council published its annual report, *Environmental Quality in Connecticut*, in May 2014. That report highlighted several clear trends, both positive and negative, as well as "the long-standing problems of archaic information systems and insufficient data." A presentation of the report's major conclusions can be viewed here: <http://ct-n.com/ondemand.asp?ID=10310>

For the first time, the Council published its annual report before all of the data for the previous year were available. Because the report is published on the Council's website, with no printed copies, the Council decided it could publish its annual reports earlier in the year and publish an update when the lagging data materialize. In 2014, the final update was published in July.

The Council is required to recommend legislation for "remedying the deficiencies of existing programs and activities," and submits those to the governor each January.

The Council investigated the apparent upturn in the number of proposals to use state park, forest and wildlife management lands for other purposes, and concluded that state conservation lands are not protected sufficiently. This led to the [publication](#) of *Preserved But Maybe Not: The Impermanence of State Conservation Lands* in January 2014.

From time to time the Council asks staff to prepare updates to previous reports. One example is a staff review of the compliance rate for alternative sewage treatment systems, which the Council had last looked at in 2007. The result was a special [report](#), *Testing the Effluent: Some Systems Pass, Some Don't, and Some Won't Say*, published in March 2014.

Review of State Projects and Programs

All agencies submit their environmental impact evaluations (EIEs) of proposed projects for the Council's advice. In 2014, the Council met with several agencies to discuss a highway interchange and commercial development project that involved several agencies; that discussion is leading to improvements in evaluating the impacts of multi-agency projects.

The Council submitted detailed recommendations regarding an EIE which it found to be greatly deficient; the project did not go forward.

For some years, the Council has been working to help modernize the Connecticut Environmental Policy Act (CEPA) in the pursuit of more concise and less expensive EIEs. Council staff participated in meetings with other agencies to further those objectives. At its September monthly meeting, the Council discussed with Commissioner of Energy and Environmental Protection Rob Klee and other DEEP staff the need to update the archaic CEPA regulations, which are under DEEP's jurisdiction and have not been amended since the 1970s.

The Connecticut Siting Council solicits the CEQ's comments on applications and petitions. The CEQ submitted comments on two proposed projects in 2014 where important resources could have been affected.

Citizen Complaints

As noted in reports of the past four years, citizens of Haddam have spoken repeatedly to the Council about contamination of land and groundwater that has existed in their community for more than 30 years. The Council decided to follow this case closely to learn why the start of remediation in some communities is delayed for decades (if it ever occurs). In September 2012, the Council submitted a detailed [letter](#) to Governor Dannel P. Malloy to update him on the problems in Haddam "and the broader problems made evident by this case." In November 2013, the Superior Court ruled that the owner of a former industrial facility in the community was indeed required to abide by DEEP's requirements. Investigation of the site continues but, to date, there is no remedial activity.

The following are examples of the many other complaints investigated in 2014:

- A state grant for a proposed sewer project appeared to be progressing without environmental reviews.
- An inquiry about reports related to a DEEP-issued wetlands permit led to the discovery that the required compliance reports were not being submitted.
- Questions about illegal tree-cutting and historical dumping on state conservation lands led to a Council recommendation for more public notice of the resolution of encroachments.
- Officials of a municipality expressed concern over the frequency and potential impacts of pesticide applications to ponds, over which the town appeared to have little or no jurisdiction.

The Council researched all of the complaints it received and offered recommendations to the relevant state agencies, where warranted.

Advice from the Public

At its regular monthly meetings, the Council heard from many people and organizations, including DEEP, Office of Policy and Management, University of Connecticut, Environment Northeast, Friends of Connecticut State Parks, Trout Unlimited, Rivers Alliance of Connecticut, Environment and Human Health, Inc. and others.

The Council instituted a new feature at the beginning of each month's agenda: a "citizen comment period" where any person may address the Council for a few minutes on items not on the agenda. Several individuals and organizations found this to be a productive way to bring significant environmental concerns to the Council's attention. Water resource planning was a popular topic in 2014.

When its recommendations for legislation were in draft form, the Council solicited comment from the public and received dozens of useful replies.

Many people across the state expressed their concerns during 2014. The Council worked to address them all, and truly appreciates the efforts people made to bring environmental problems to light. The Council looks forward to helping citizens and agencies solve the challenges of 2015 and beyond.



2014 was the CEQ's 43rd Year

Council Duties

The duties of the Council on Environmental Quality are described in Sections [22a-11 through 22a-13](#) of the Connecticut General Statutes.

The Council is a nine-member board that works independently of the Department of Energy and Environmental Protection (except for administrative functions). The Chairman and four other members are appointed by the Governor, two members by the President Pro Tempore of the Senate and two by the Speaker of the House. The Council's primary responsibilities include:

1. Submittal to the Governor of an annual report on the status of Connecticut's environment, including progress toward goals of the statewide environmental plan, with recommendations for remedying deficiencies of state programs.
2. Review of state agencies' construction projects.
3. Investigation of citizens' complaints and allegations of violations of environmental laws.
4. Review of environmental impact evaluations that state agencies prepare for major projects under the Connecticut Environmental Policy Act ([CEPA](#)).
5. Publication of the [Environmental Monitor](#), the site where all state agencies must post their scoping notices and environmental impact evaluations under CEPA. The *Environmental Monitor* also is the official publication for notice of intent by state agencies to sell or transfer state lands.

Acknowledgments

The Council appreciates the assistance of the many people in the Departments of Agriculture, Energy and Environmental Protection, Transportation and Public Health and the Connecticut Siting Council who provided data.

The Council especially thanks the many citizens, businesses, and organizations who offered information and viewpoints to the Council throughout the year.

Some of the data regarding compliance at hazardous waste treatment facilities were presented to the Council by the Rivers Alliance of Connecticut early in 2015.

The Council also appreciates the work of its Executive Director, Karl Wagener, and Environmental Analyst Peter Hearn in drafting this report for review by the Council and preparing the final version for publication.

The Council notes the valuable contributions of two interns, Allison Hall (Miami University, Ohio) and Jonathan Bauer (Central Connecticut State University); their research contributed greatly to this report.

Image Credits: The symbol used to denote indicators affected by climate change was created by Tracey Saxby, Integration and Application Network, University of Maryland Center for Environmental Science.

The photograph of the chimney swift on the Good Air Days page was taken by Julian Hough. The Council greatly appreciates his generosity in allowing its use in this report.

CEQ Members in 2014

Susan D. Merrow, Chair

Resident and former First Selectman of East Haddam. Member, East Haddam Conservation Commission. Member, Connecticut Advisory Committee, Trust for Public Land. Board Member, Eightmile River Wild and Scenic Coordinating Committee; Former President, Connecticut Conference of Municipalities. Former President, National Board of Directors, Sierra Club. Author, *One for the Earth: Journal of a Sierra Club President*. Board Member, Connecticut League of Conservation Voters. Former Trustee, Connecticut River Watershed Association.

Janet P. Brooks

Resident of Middletown. Attorney with law office in East Berlin with a practice in environmental, administrative and land use law. Member of the Connecticut Bar Association Planning & Zoning Section and Environment Section. Co-author of *Connecticut Environmental Protection Act*, Volume 15 of the Connecticut Practice Series published by Thomson West. Formerly Assistant Attorney General in the Environment Department of the Connecticut Attorney General's (AG's) Office for 18 years enforcing the state's environmental laws running the gamut from noise, odor, water pollution, air pollution, pesticides to habitat protection and preservation of land. While at the AG's Office, coordinated the wetlands appeal practice and developed the legal training for wetlands commissioners for DEEP's annual training. Recipient of 1984 German Marshall Fund grant to study the effect of citizen participation on hazardous waste clean-ups in four European countries. Based on those experiences, authored a chapter published in *America's Future in Toxic Waste Management: Lessons from Europe*. Staff Attorney for five years at the Connecticut Fund for the Environment, Inc., representing citizens groups in administrative and court proceedings. Began practice of law assisting the Middletown City Attorney in the city's opposition to the utility company's burning of PCB waste oil within the city boundaries.

Lee E. Dunbar

Resident of Mansfield. Retired. Previously, Assistant Director, Bureau of Water Management and Land Re-Use, Planning and Standards Division, Connecticut Department of Environmental Protection. Responsible for developing scientifically defensible water quality standards and criteria to protect human health and aquatic life. Developed and implemented environmental monitoring and assessment methods. Participated in the development of regulations to better manage stream flow in Connecticut streams affected by water withdrawals and diversions. Oversaw the development of regulatory programs including the Total Maximum Daily Load (TMDL) Program, Nitrogen Trading Program, and Water Quality-based Discharge Permitting Program. Awarded Lifetime Achievement Environmental Merit Award by the U.S. EPA in 2010 for significant contributions to environmental awareness and problem solving. Board Member, Eastern Connecticut Forest Landowners Association. Board Member, Wolf Den Land Trust.

Karyl Lee Hall

Resident of Branford. Attorney with the Connecticut Legal Rights Project. Formerly with Murtha, Cullina, the Connecticut Fund for the Environment and Connecticut Legal Services. Chair, Branford Conservation Commission. Board Member, Connecticut League of Conservation Voters, Co-chair, Scenic Roads Advisory Committee for Routes 146 and 77. Member, Advisory Board, Branford Land Trust. Vice President, Citizens for Branford's Environment, 2002-2009. Connecticut Bar Association Pro Bono Service Award, 2003. Former Co-chair, State Implementation Plan [for Air Management] Revision Advisory Committee.

Alison Hilding

Resident of Mansfield. Long-time advocate for the environment and children, viewing clean air and clean water as important dimensions of child advocacy. Member, Connecticut Commission on Children, 2003 to present; Executive Board since 2008, Secretary since 2012. Founding member, Mansfield's Citizens for Responsible Growth. Background in financial management; worked for NYNEX in areas of capital budgeting for growth and modernization. Manages artistic estate of an American Modern artist.

Michael W. Klemens

Resident of Salisbury. Educated in the United States (University of Connecticut) and the United Kingdom, Dr. Michael W. Klemens is a trans-disciplinary practitioner. Formally trained as a herpetologist, his current practice spans conservation biology, land-use planning, and empowering communities through the understanding and use of scientific data. Working at the interface of human societies and the natural world, he engages a diversity of stakeholders to explore how to create patterns of development that are ecologically resilient, economically viable, and socially equitable. More than three decades of field work have been concentrated in the northeastern United States. Through the support of the MacArthur Foundation he spent several years in east Africa, working with indigenous institutions to build capacity in biodiversity assessment and application of those data to protected area management, as well as studying the ecological impacts and economic mechanisms of the wildlife trade. His publications include the definitive study of Connecticut's amphibians and reptiles and over 100 scientific papers. In 1979 he joined the scientific staff of the American Museum of Natural History, where he continues collections-based research on amphibian and reptile biodiversity. He serves as a consultant to various government agencies, as well as municipalities, not-for-profit organizations, and developers and is in his second elected term to the Salisbury Planning and Zoning Commission, most recently (and currently) as its Chairman.

Former Members Who Served During 2014**James O'Donnell** (*member through October 2014*)

Resident of Noank (Groton). Professor of Marine Sciences and Joint Professor of Physics, University of Connecticut. Executive Director, Connecticut Institute for Resilience and Climate Adaptation. Master of Science and Ph.D. in Oceanography. Elected to Connecticut Academy of Science and Engineering. Has served as a Director of the North East Regional Association of Coastal Ocean Observing Systems and the Middle Atlantic Coastal Ocean Observing Regional Association. Appointed as one of Connecticut's representatives to the Bi-State Commission on Long Island Sound.

Richard Sherman (*member through January 2015*)

Resident of Chaplin. Architectural designer and construction manager of earth sheltered, passive solar and energy efficient residences. Former CEQ Representative to the Route 6 Advisory Committee (during previous term on CEQ). Charter Member, Transit Alliance of Eastern CT, and Citizens for a Sensible Six. Former Organizer, the Progress and Equity Partnership. Member of CEPA Working Group, League of Conservation Voters of CT. Former President, Northeast Chapter of ACLU-CT Board of Directors. Member of Peoples Action for Clean Energy (PACE) and Northeast Sustainable Energy Association (NESEA). Former Chair, Mansfield Transportation Advisory Committee. Former President, Mansfield Commonground. Member, Mansfield Planning and Zoning Design Review Panel. Former Chair, Mansfield Democratic Town Committee. Host and producer of the radio show, "A Distant Shore" on WHUS (91.7 FM, Storrs). Former Public Affairs Director of WHUS. Stopover host, American Tour d'Sol solar electric car race.