

Environmental Quality in Connecticut



Council on Environmental Quality

2005 Annual Report

STATE OF CONNECTICUT
COUNCIL ON ENVIRONMENTAL QUALITY

June 15, 2006

The Honorable M. Jodi Rell
Governor of Connecticut
State Capitol
Hartford, CT 06106

Dear Governor Rell:

I am pleased to submit the Council's Annual Report on the status of Connecticut's environment for 2005.

The Council uses a set of graphs, or environmental indicators, to chart long-term trends and yearly progress. These indicators help us to identify specific challenges that will require greater attention in the years ahead. Upon review of the indicators, the Council sees a need to refocus state efforts toward reducing and recycling waste, preserving land, meeting clean water goals, and improving compliance with environmental laws.

In addition, the Council again calls attention to Connecticut's biggest environmental challenge: How can we encourage a pattern of development that is more harmonious with the state's natural landscape?

The Council looks forward to working on these challenges in the coming year. As always, the Council stands ready to provide you with any additional information or assistance that you might request.

Respectfully,



Thomas F. Harrison
Chairman

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Introduction

This year's report illustrates three facts about Connecticut:

- Most environmental indicators show gradual long-term improvement in Connecticut's air and water.
- Connecticut hit a bump in 2005 when most indicators showed declines or no change.
- Several indicators show a need for greater attention to stubborn problems.

In most years, the Council finds the state's environment to be improving slowly but surely. The yearly improvement generally is too small to be noticed by most people, but over time the subtle changes add up and the result is a better Connecticut.

Though most long-term trends still are positive, the past year showed few improvements. Air quality declined in 2005, and most other indicators showed little change. Land conservation has slowed over several years to put the state's long-term goals in jeopardy.

A slowdown in Connecticut's environmental progress might be inevitable. The "leading indicators" used by the Council to anticipate potential problems have not been positive for several years. These include recycling rates, vehicle use, bus ridership and rates of compliance with environmental laws. As explained below, all of these indicators have consequences in the real world, but they are often delayed.

Land is the key

Connecticut's landscape needs attention, according to several indicators. The race for open space continues, but the conservation rate has slowed. If the state's goal is deferred too far into the future, Connecticut runs the risk of missing the goal completely for the reason that the undeveloped land will not be there to conserve when the state is prepared to conserve it. This outcome already can be projected for agricultural land. At the rates of development and preservation of the past seven years, the total area of farmland in the state will fall below the preservation goal decades before that goal could be reached.

The trend in forest land requires particular attention. Some time in the past few years, the area of forest used for development began to exceed the growth of "new" forest on old farmland. This had not happened in decades. With no remaining reservoir of abandoned farm fields in the state, the future of forests from this date forward will depend on the rate of preservation through acquisition and, more importantly, on the pattern of future development.

Consequences

Two very recent reports by independent organizations show the consequences of current land conservation and development trends. In *The State of the Birds** published by the Connecticut Audubon Society, scientists conclude that dozens of bird species, from cuckoos in the woods to meadowlarks in the fields, are declining. They are declining because they depend on specialized habitats – grasslands, shrublands, deep forests, coastal beaches – that are all shrinking. The only birds thriving are those that adapt well to suburban environments, such as cardinals and chickadees. The bird populations of the future will reflect Connecticut's landscape, and the current trend of replacing distinct habitats with a uniform suburban habitat will put many more species in danger.

*Eastern Brook Trout: Status and Threats*** carries a parallel message. Despite Connecticut's many successes in controlling sewage and industrial discharges, the great majority of trout streams are impaired significantly by such things as higher water temperatures and road sand – symptoms of development in the watersheds of trout streams. This conclusion is consistent with the Department of Environmental Protection's (DEP's) estimate that many more miles of rivers and streams are affected by runoff from developed areas than from sewage and industrial pollution combined. The runoff makes its way to Long Island Sound as well, and a rainy spring can set up the sound for a summer of low oxygen.

Whether the problem is air quality, wildlife or water pollution, much of the solution lies in the better use and conservation of Connecticut's land. The state has been slowing, not increasing, its conservation of land. But the direct conservation of land through acquisition is only one component of any solution. The central problem is that current patterns of development turn forest, field and coastline into a statewide plain of lawns, structures and pavement. The new landscape includes small patches of woods that do not function as true forests and streams that carry water but not trout.

The current pattern of development inevitably puts more vehicles on the road, as mass transit cannot serve the spread-out destinations. The new traffic, including the truck traffic required to serve this pattern, affects the air and water.

Clearly, many of the state's environmental challenges require fresh attention, and none is so challenging as the current pattern of development. The solution is not clear, but the consequences of doing nothing are.

The delay between action and consequences

There are a few encouraging signs of progress in this year's report:

- Seven miles of the Quinebaug River were taken off the list of waters that receive raw sewage following the completion of Jewett City's multi-year effort to eliminate overflows from its sewer system.
- Rates of breast cancer and non-Hodgkin's lymphoma declined for the first time since the Council started to include human health indicators in its annual reports. (The most recent year covered by the cancer data is 2002.)
- Development claimed fewer acres of inland wetlands. (The most recent year covered by the data is 2004.)
- Bald eagles continued their comeback, with ten pairs building nests, a number unseen for at least fifty years.

The common thread among these positive signs is that they are all dividends of investments or decisions made years or even decades ago. Fortunately, we can point to several new initiatives that have the potential to yield environmental improvements years from now:

- Several state projects are planned to improve train and bus service.
- Connecticut joined the Regional Greenhouse Gas Initiative which is intended to reduce emissions that cause global climate change. Climate change, specifically warming, is important to Connecticut for many reasons. In general, cooler summers are better than hot ones for Long Island Sound and Connecticut's air quality, and warming trends work against the state's environmental improvement efforts.
- Public Act 05-228 will provide money for agricultural land and open space conservation using revenue from new land-record recording fees collected by municipal clerks.

There are many others, but the three above are mentioned because they relate directly to the challenges discussed previously. In general, the Council does not report on new legislation or appropriations until the results can be measured. Results can be delayed for years or decades, which is why the indicators are so important. Past actions, good or bad, eventually show up as progress or decline. It is difficult to project the results of current efforts, but the leading indicators and the land indicators lead the Council to focus on the following questions:

- How can Connecticut reinvigorate its efforts to reduce and recycle waste? The failure to meet the state's recycling goal by 2000 has had real consequences, including millions of additional miles traveled by diesel trucks hauling garbage to other states.
- What is the best way to get the state's open space and farmland preservation efforts back on track toward their respective goals?
- Will the state's Clean Water Fund be adequate to meet the state's goals for all rivers and Long Island Sound? How will the state reduce the amount of nitrogen and other pollutants that flow to the sound from pavement and lawns?
- Is the DEP equipped to help raise compliance rates above 90 percent?
- How can Connecticut encourage a pattern of development that is more harmonious with the state's natural landscape? This remains the state's biggest environmental challenge. State government's role in the solution must include cooperating with municipal governments, revising tax policies, targeting transportation and other infrastructure investments strategically, and leading the way to a common purpose. There are numerous ideas and successful efforts scattered across the state. The DEP has announced a landscape stewardship initiative that could gather lessons from the successes and help to point the way.

The indicators in this report show where Connecticut needs to focus its attention. The indicators themselves are visible symptoms of underlying trends and do not always show what needs to be done. Each challenge requires thorough analysis followed by action.

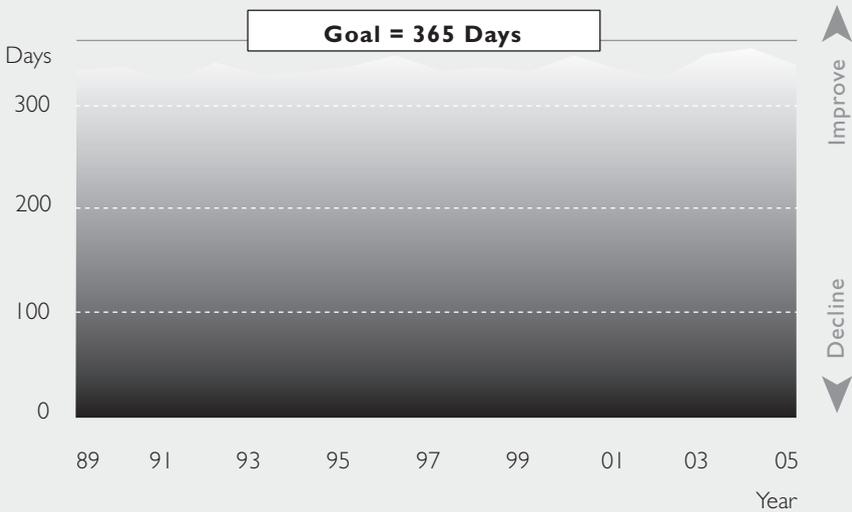
Footnotes

* Connecticut State of the Birds 2006, published by the Connecticut Audubon Society, can be viewed on-line at www.ctaudubon.org.

** Eastern Brook Trout: Status and Threats, Connecticut and Rhode Island, produced in 2006 by Trout Unlimited for the Eastern Brook Trout Joint Venture (a partnership that includes The Nature Conservancy, Trust for Public Land, Connecticut DEP and 28 other organizations), can be viewed on-line at www.brookie.org.

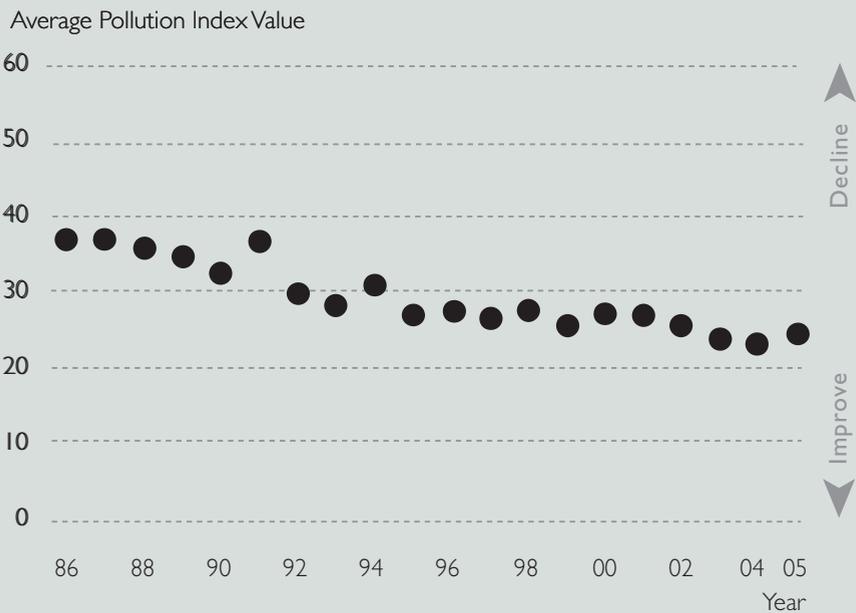
Good Air Days

Connecticut's air meets all daily health-based standards except on sunny summer days when levels of ground-level ozone violate the standard. After two relatively good years, 2005 brought about 20 days of unhealthy air.



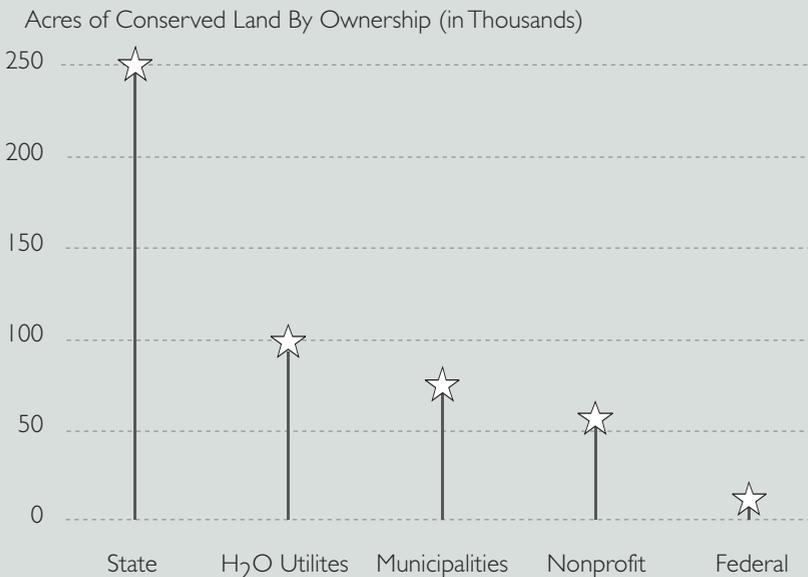
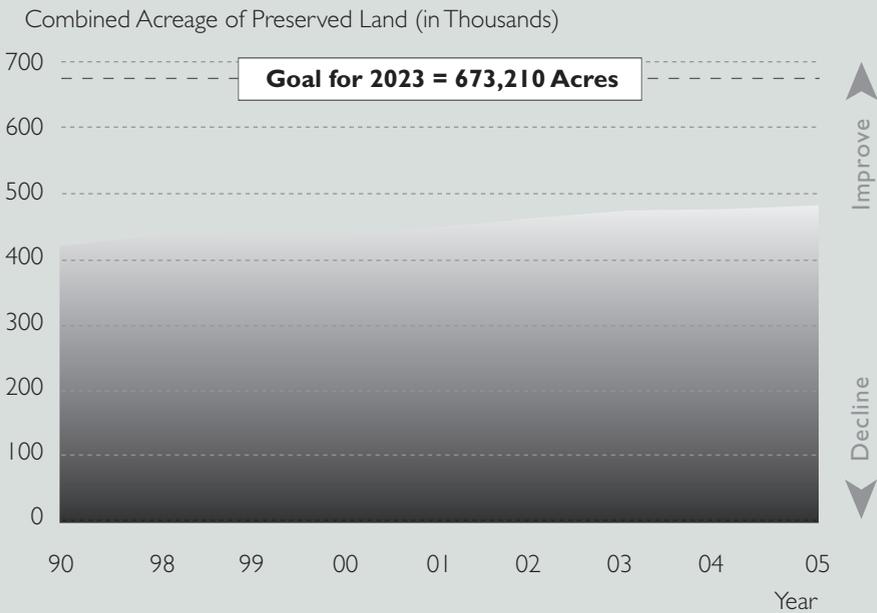
Clearing the Air

Connecticut's air improved gradually over two decades, but not in 2005.



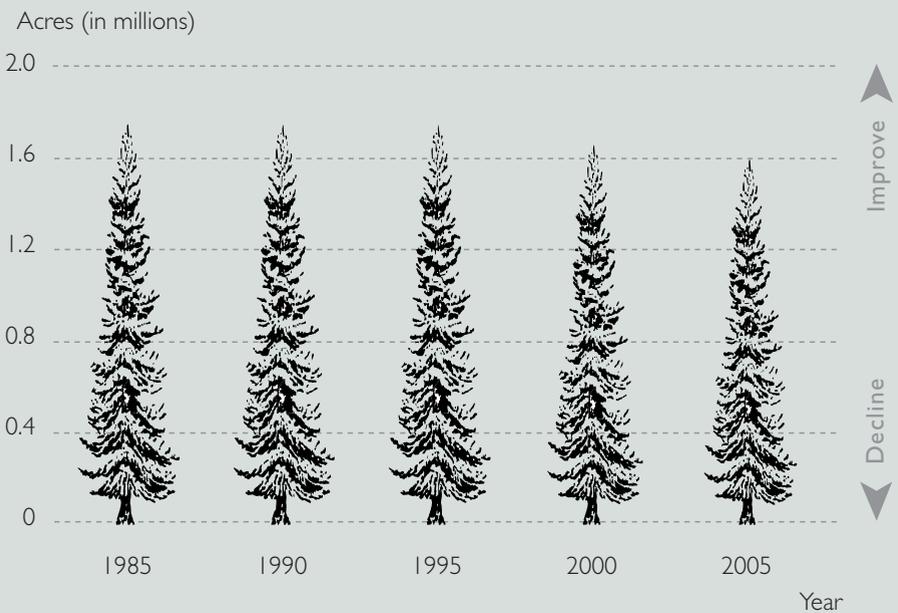
Preserved Land

Connecticut has preserved an average of 8,000 acres since 2000, including about 6,000 in 2005. To meet the goal for 2023, more than 10,000 acres must be preserved every year.



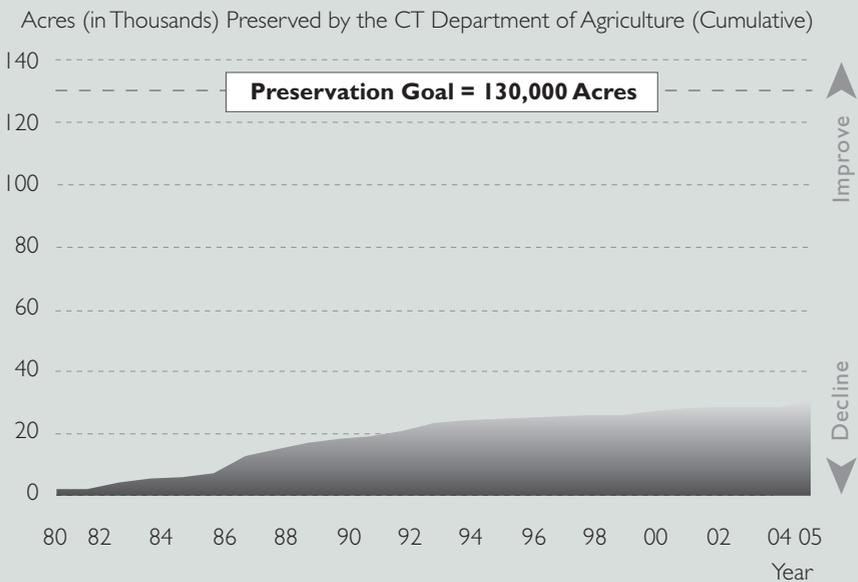
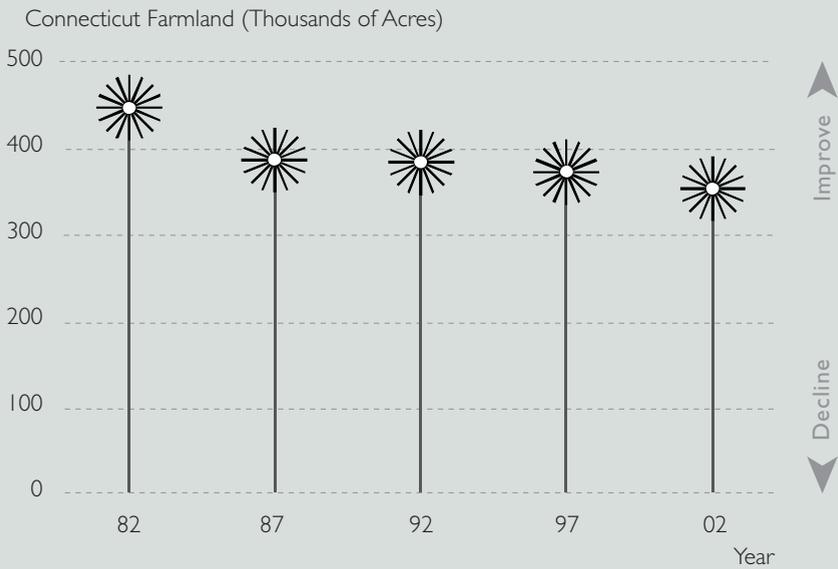
Forest

After a century of growth and relative stability, Connecticut's forests are shrinking.



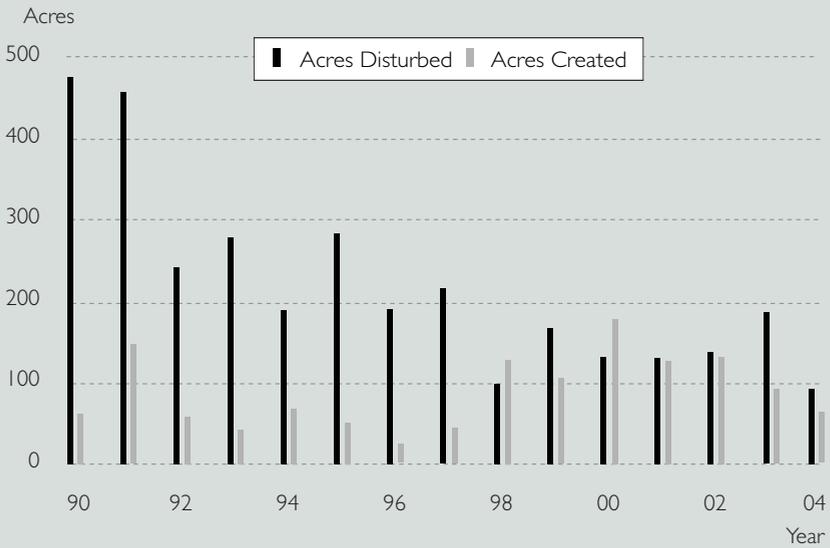
Farmland

Without substantial acceleration in the pace of farmland preservation, Connecticut's preservation goal will never be reached.

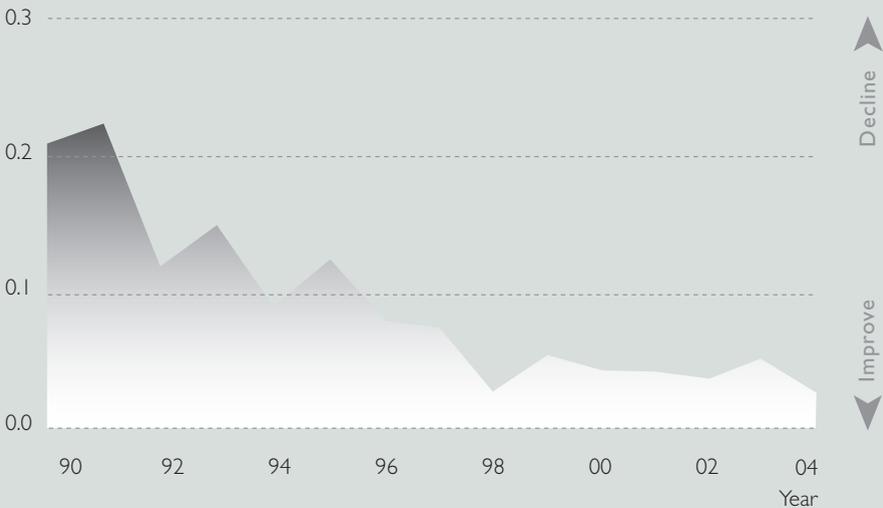


Inland Wetlands

After fairly steady improvement from 1990 through 1998, disturbances of inland wetlands have kept a more constant pace over the last six years.



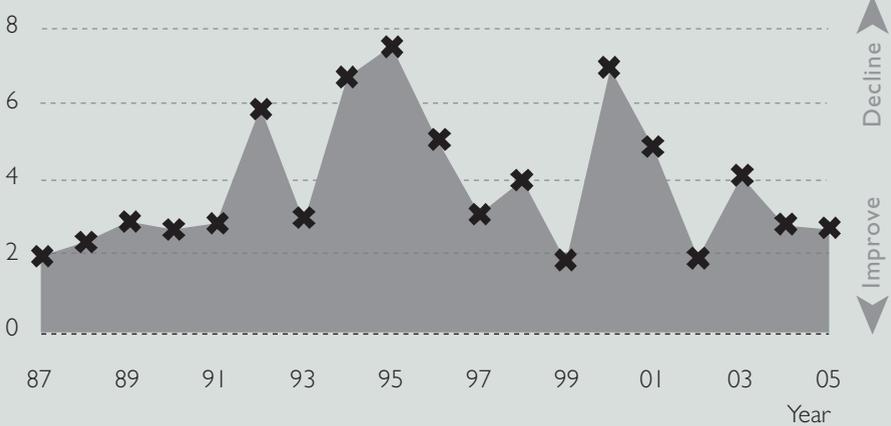
Acres of Inland Wetlands Affected by the Average Permit Issued by DEP & the 170 Municipal Wetlands Agencies



No Swimming at the Beach

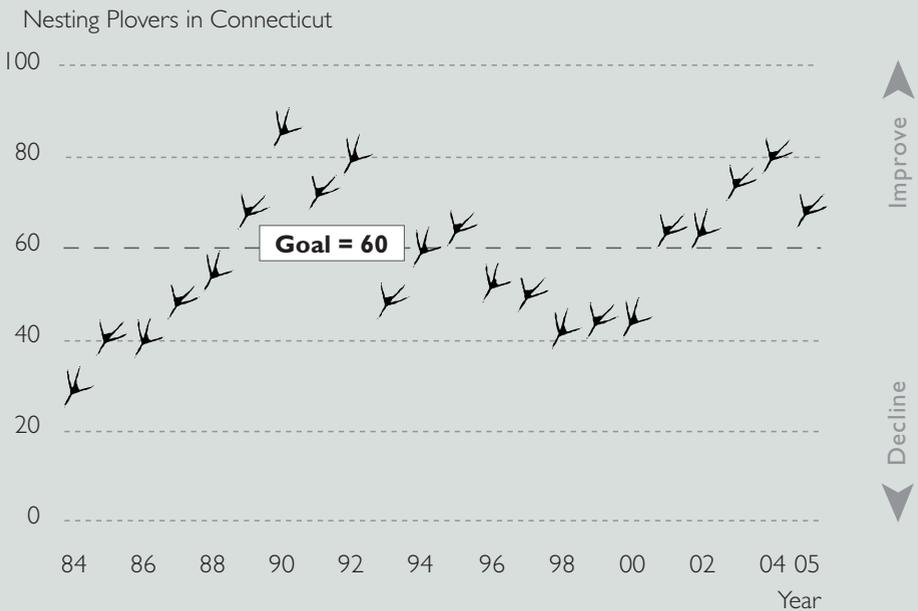
Many coastal towns and cities must close their beaches after heavy rains because of the pollutants that are washed into Long Island Sound.

Average Coastal City/Town Closed Its Beaches This Many Days



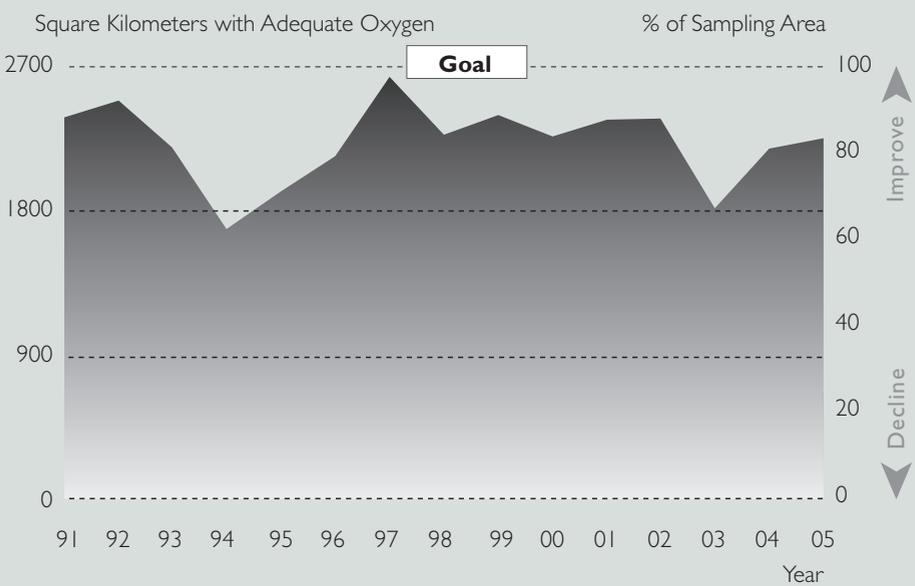
Piping Plovers on the Beach

Sixty-eight of these small, threatened shorebirds nested on 11 coastal beaches in 2005, a slight decline from 2004.



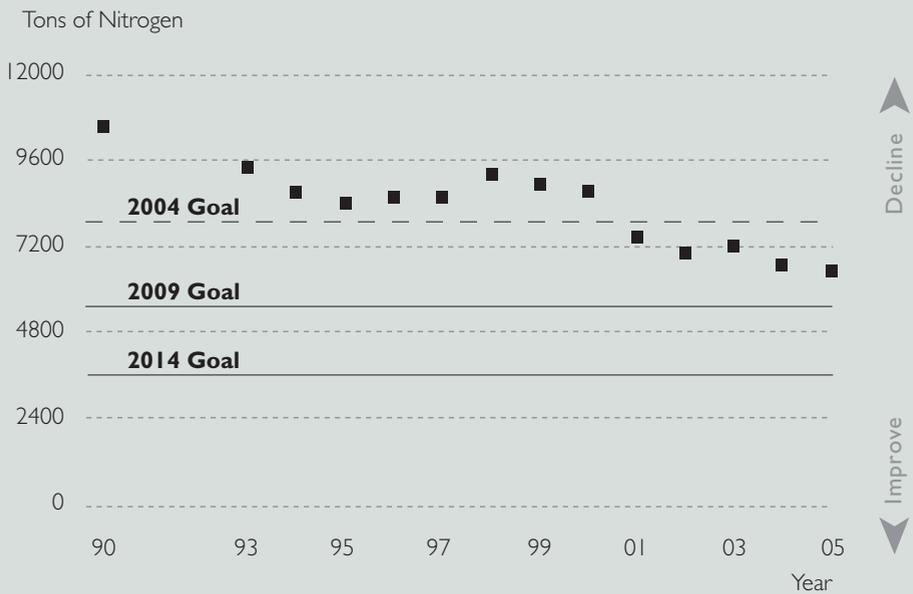
Oxygen in Long Island Sound

The area of western Long Island Sound that was affected by hypoxia (oxygen levels too low to support aquatic life) was about average in 2005.



Nitrogen in Long Island Sound

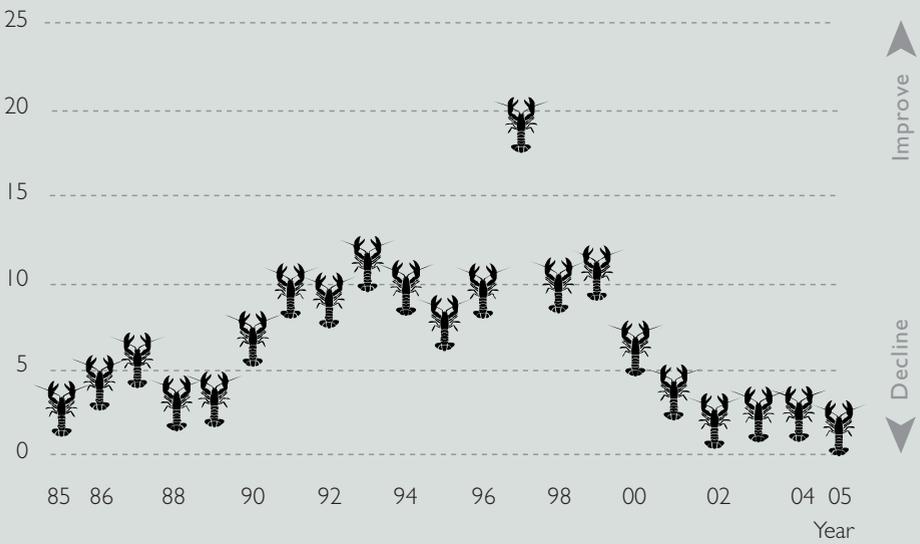
Connecticut's campaign to reduce nitrogen from sewage treatment plants and large factories is going well.
 Next up: runoff from cities and lawns.



Lobsters

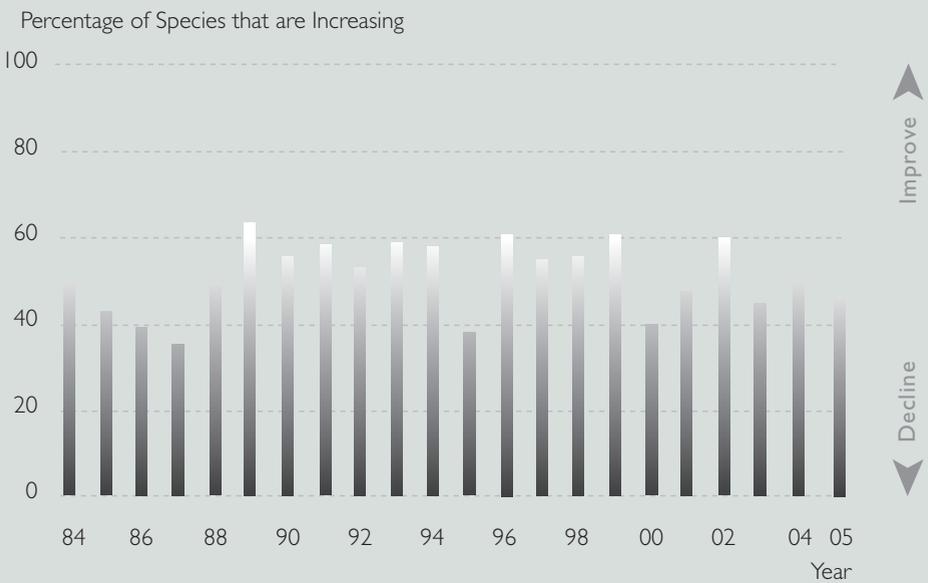
The lobster population of Long Island Sound was never lower.

Number of Lobsters Caught per Tow in Research Vessel Nets



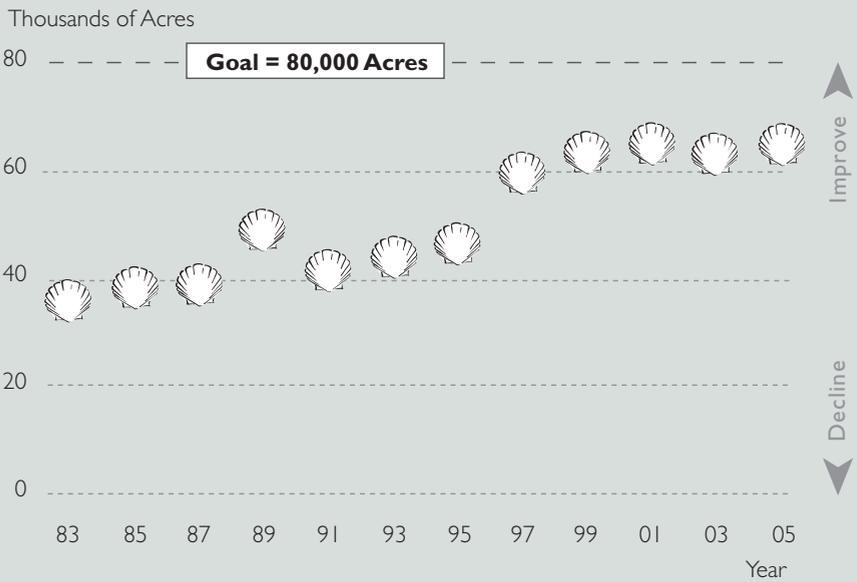
Seafood Sampler

Fewer than half of the 40 marine species sampled in Long Island Sound were found to have growing populations in 2005.



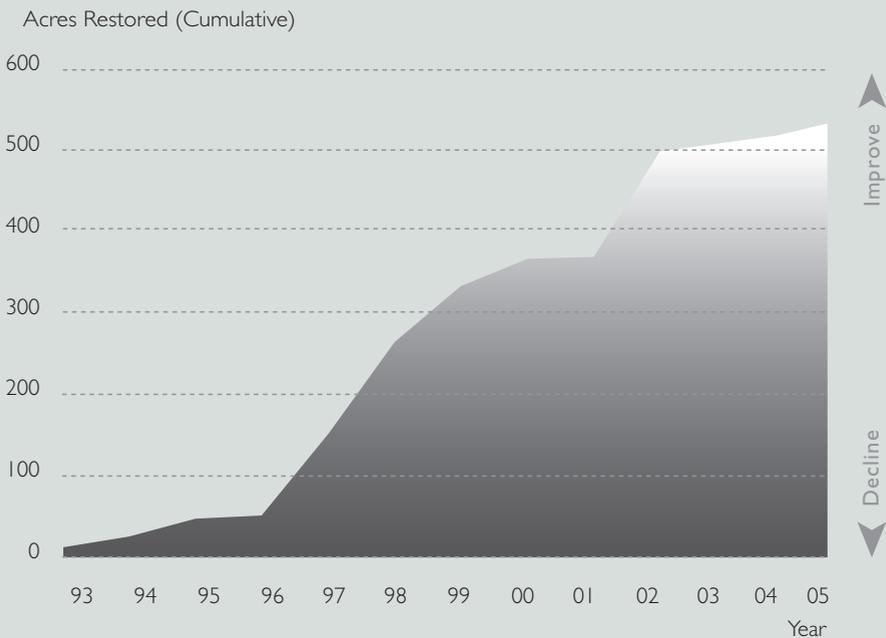
Clean Shellfish Beds

Cleaner water has allowed the opening of more acreage.



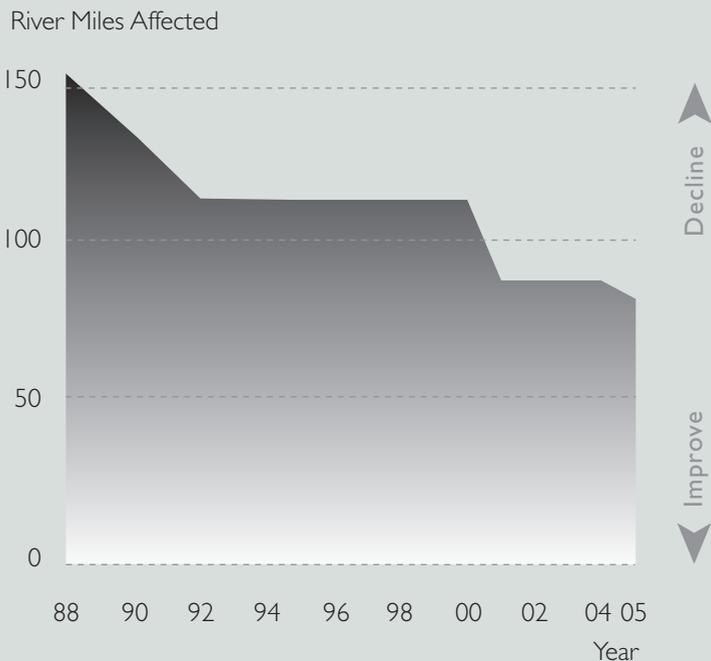
Reviving Tidal Wetlands

Each year, less than one acre of tidal wetlands is lost to permitted development (not shown here), while on average more than 40 acres of degraded acres are restored.



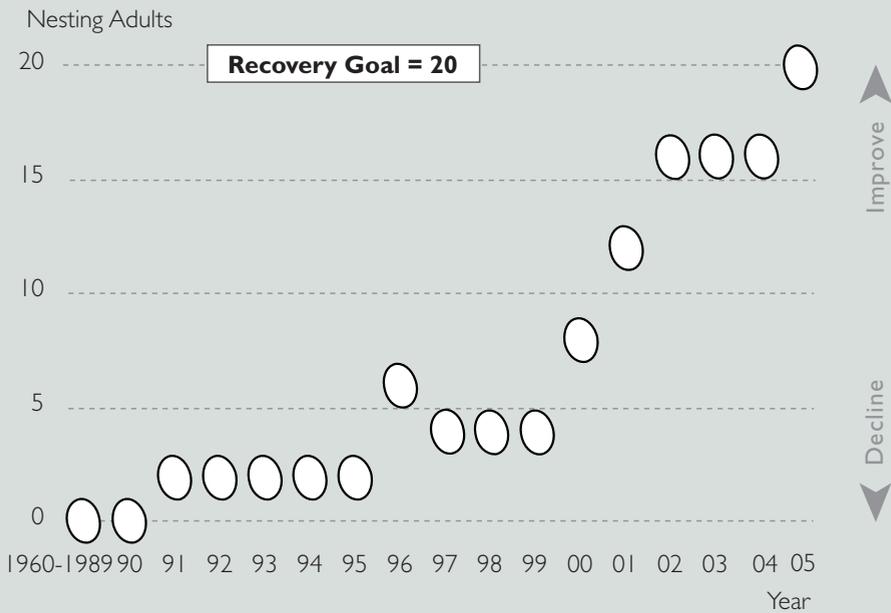
Sewage Overflows

When it rains, raw sewage spills from cities' sewer systems because they were built with storm and sanitary sewers combined. Gradually, cities have been separating their sewer systems to prevent these overflows. In 2005, seven miles of the Quinebaug River were protected from raw sewage overflows with the completion of a project in Jewett City.



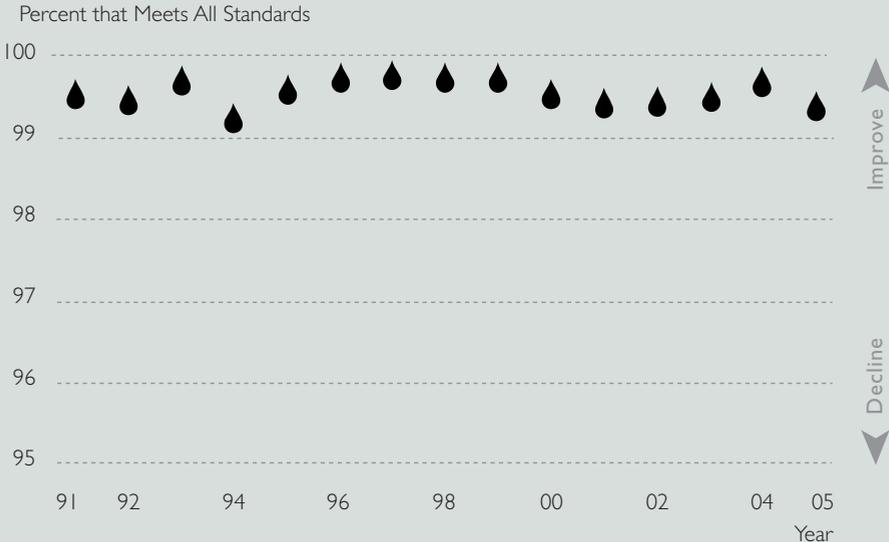
Bald Eagles

Bald eagles continue their comeback.
The chemical pollutants that interfered with
their reproduction have been controlled.



Drinking Water

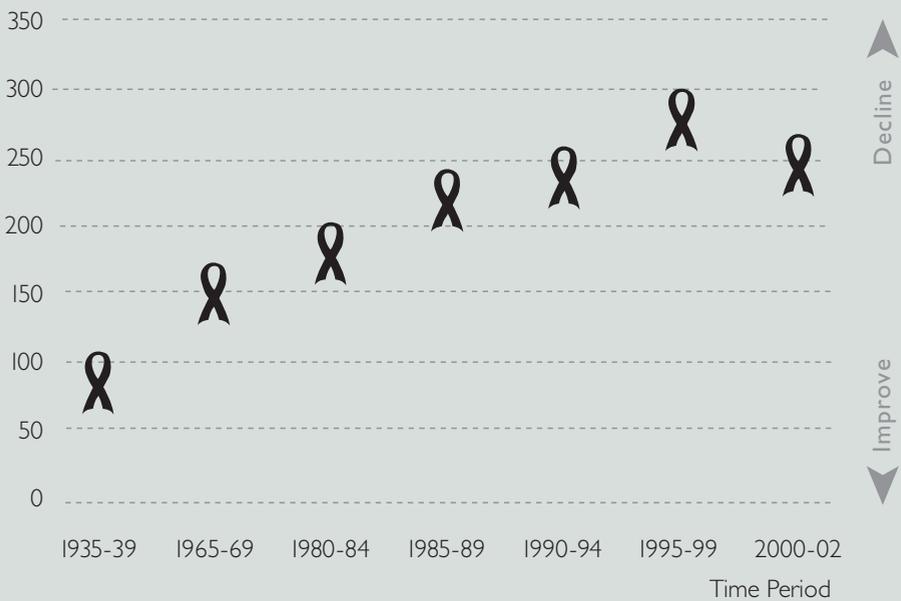
Most large water companies delivered water that met all standards in 2005, but a few short-term problems led to a small decline.



Breast Cancer in Connecticut

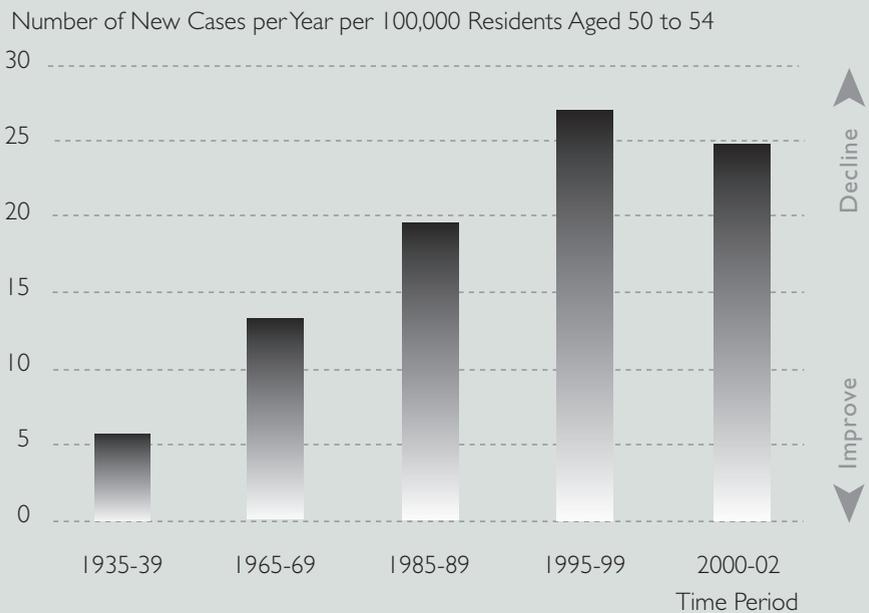
Connecticut has the third highest incidence of breast cancer among the 50 states, but has seen improvement since a peak in the late 1990's.

Number of New Cases per Year per 100,000 Women Aged 50 to 54



Non-Hodgkin's Lymphoma

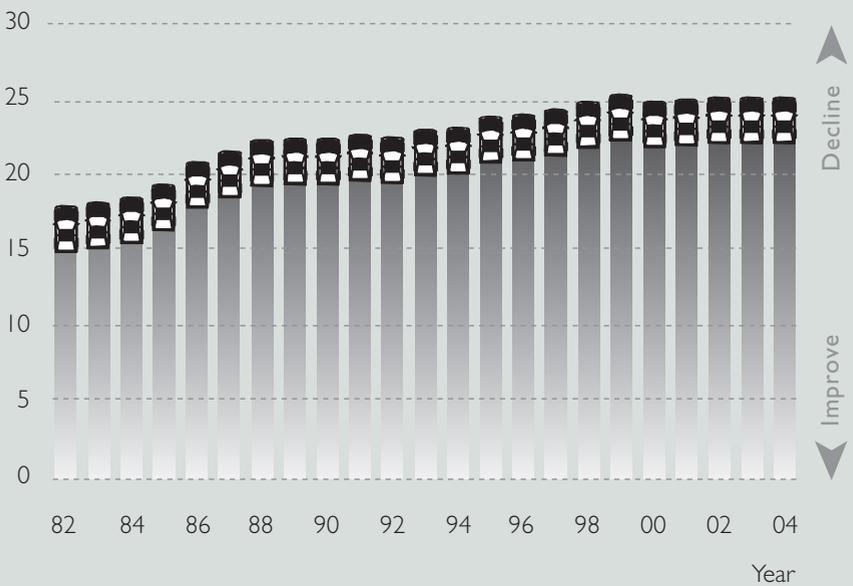
The reasons for the marked increase in this cancer are not well understood, but some reports cite exposure to certain fertilizers, pesticides and other chemicals as potential factors. Rates might have peaked in the late 1990's.



Driving Our Cars

The average Connecticut resident drives more miles nearly every year, but this trend might be leveling off.

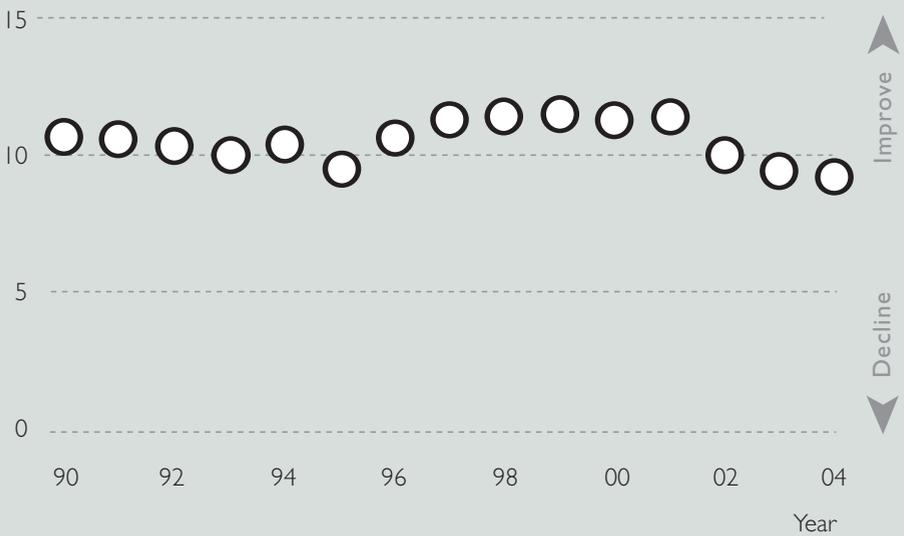
Miles per Day per Person



Taking the Bus

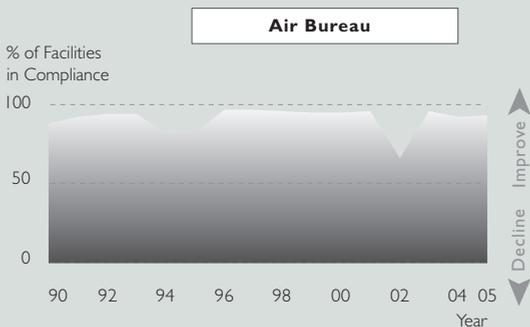
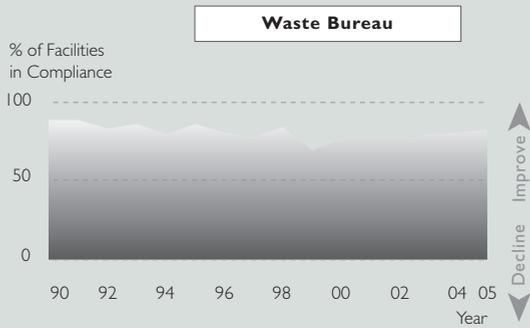
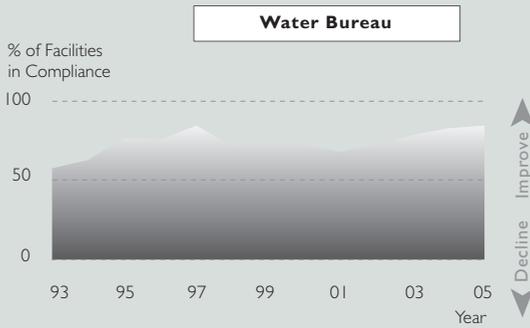
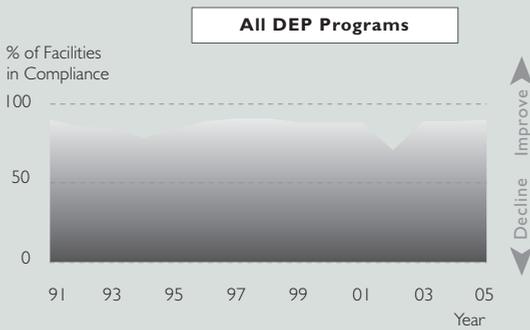
The average Connecticut resident takes 20% fewer bus trips now than in 2001.
 Fares were increased in 2004 and 2005.

Bus Trips per CT Resident



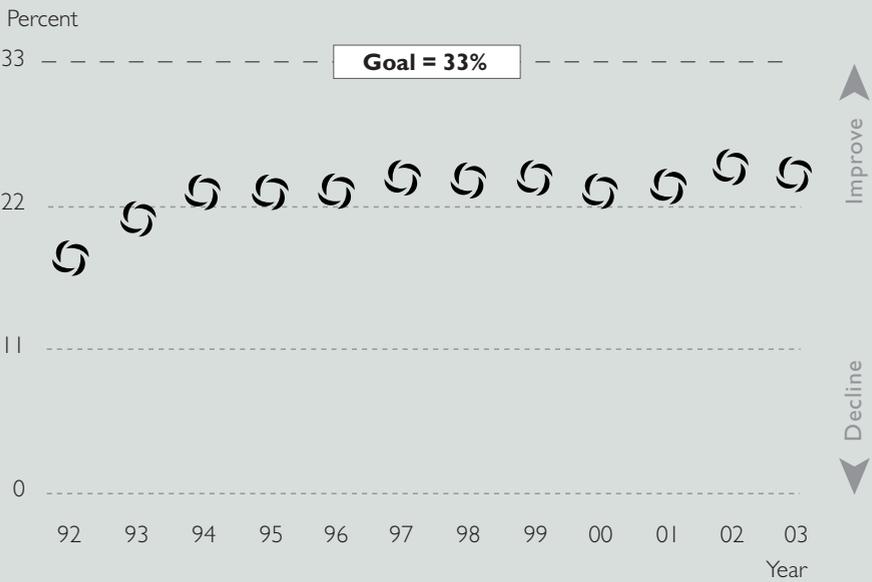
In Full Compliance

From 2003 through 2005, inspectors found about 89% of facilities in compliance with pertinent regulations, the same rate as in 1996. Inspections have declined about 9% annually.



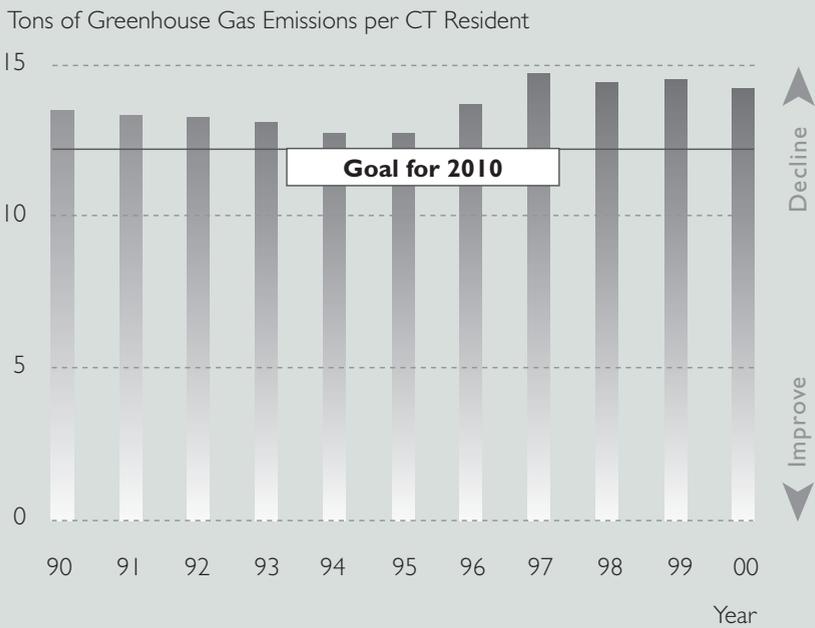
Recycling

In 1993, Connecticut set a recycling goal for 2000 which it has not yet met.



Climate Watch

In 2004, Connecticut set an ambitious goal to reduce emissions of “greenhouse gases,” primarily carbon dioxide, that trap heat in the earth’s atmosphere and alter the global climate. New data are expected later in 2006.



PART II: Details

The previous section of this report shows important environmental trends at a glance. The following pages contain more complete descriptions of each indicator and the sources of the data used.

Air

Good Air Days (page 6)

On a Good Air Day, 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, particulates, nitrogen oxides, and ground-level ozone. Connecticut’s goal is to have air that meets all health-based standards every day by the year 2010. Violations of the health-based air quality standards have been nearly eliminated for all pollutants except ground-level ozone, which is created when nitrogen oxides and volatile organic compounds react in the presence of sunlight. Motor vehicles remain a major source of ozone-forming emissions despite improvements in tailpipe standards. Much ground-level ozone originates in states to Connecticut’s west. While 2003 and 2004 saw the greatest number of good air days in many years, 2005 was not as good as there were 20 days when health standards were violated.

There is one new consideration for 2005 and beyond. In December 2004, the federal government declared that Fairfield and New Haven counties failed to attain the standard for fine particulates (less than 2.5 micrometers in diameter). This declaration was based on those counties’ proximity to New York City. There have been no violations of the daily standard for fine particulates in Connecticut, and this indicator has not been affected by the new federal classification. However, the daily standard for fine particulates is likely to be made more stringent in future years.

Technical note: Ambient air quality standards occasionally are changed by the federal government, which theoretically could affect the year-to-year consistency of this indicator. When a change occurs, this indicator’s usefulness is maintained by recalculating historical data so all years are presented as if today’s standards had been in effect all along.

Clearing the Air (page 7)

Six air pollutants -- sulfur dioxide, lead, carbon monoxide, particulates, nitrogen oxides, and ground-level ozone -- are measured across the state by the DEP. At the end of every year, the Council expresses the average level of each pollutant on a numerical scale, where zero equals no pollution and 100 represents the “unhealthful” level of the specified pollutant. The Council then takes the annual numbers for each of the six pollutants and averages them to yield the single index value on this graph. Levels of lead in the air have dropped so low that they barely register in this indicator. Following several years of measurable improvement, 2005 was the first year since 1994 to see all of the pollutants (excluding lead) get worse.

Farm, Forest, Wetland

Preserved Land (page 8)

State law (C.G.S. 23-8(b)) sets a goal of conserving 21% of Connecticut's land area. In 1998, Governor John Rowland established 2023 as the target date for meeting this goal. The graph titled "Combined Acreage of Preserved Land" displays progress toward the 21% goal. Current acreage of each type of land is shown in the chart labeled "Acres of Conserved Land by Ownership." The types of land are:

- state-owned forests, parks, and wildlife areas
- Class I and II watershed lands owned by water utilities
- estimated municipal open space
- estimated nonprofit lands (land trusts, The Nature Conservancy, etc.)
- federal conservation land.

In 2002, there was a shift in land ownership from water utilities to the state when the DEP purchased 5,471 acres of Class II and III water company land to ensure its preservation. Conservation easements were purchased on 9,025 acres of Class I land. From 2000 through 2003, land preservation continued at a pace that kept Connecticut on track toward its 2023 goal, but acquisition slowed in 2004 and again in 2005.

Forest (page 9)

Most of Connecticut's forests were cleared for agriculture and industry in the 19th century and then allowed to regenerate. From 1960 to 2000, the overall acreage of forests did not change much, even with the rapid spread of roads, housing and commercial development. According to the U.S. Forest Service, the spread of forests on abandoned farms equaled the conversion of forested land to other uses. The 21st century has brought a change, with forest acreage now declining.

This indicator shows the total acreage of forests in Connecticut that occur in patches larger than 50 acres. Property boundaries are not considered; a patch might be owned by one landowner or many. About 93 percent of the forested acres in Connecticut occur in these larger patches (i.e., those greater than 50 acres). By excluding the smaller patches we remove from consideration the many thousands of "forest" patches that are an acre or two in size. While wooded patches as small as one acre are counted by the U.S. Forest Service, these are often the trees in residents' back yards and cannot be considered fully functioning forests, and therefore are not included here. Data are obtained from the U.S. Forest Service, which estimates forest acreage annually. This is a new data source; prior to 2004, the Service measured Connecticut's forests once a decade. The new annual analyses have a greater potential for errors, but these will be corrected in subsequent years.

Note: This is a new indicator, replacing the forest indicator used through 2004 that was based in part on forest classification data connected to Public Act 490 (preferential property tax rates for forest land). Those data are no longer being collected by the DEP because of statutory changes and staff reductions, and will no longer be available. Your comments on this new indicator are welcome.

Farmland (page 10)

The graph titled “Connecticut Farmland” illustrates the total acreage of land in Connecticut farms, as counted by the U.S. Department of Agriculture (DOA). The inventory is conducted quinquennially. The next inventory is expected to reflect a loss of several thousand acres. To preserve land for future agricultural use, the state DOA purchases the development rights to farmland (from volunteer sellers only). This keeps the land in private ownership with severe restrictions on future nonagricultural development. The number of “Acres Preserved by the CT Department of Agriculture” has slowed significantly. Seven farms were preserved in 2002 through the DOA’s Farmland Preservation Program. No farms were preserved in 2003. Nine farms totaling about 1100 acres were approved for preservation funding in 2004, and the six approved in 2005 totaled 666 acres.

If the development and preservation rates of the last seven years continue, Connecticut will never meet its preservation goal. Mathematical projections show the goal being reached in the late 22nd century, but by the end of the current century there will not be that much agricultural land left in the state. Public Act 05-228 is expected to generate up to six million dollars per year for agricultural land preservation.

Inland Wetlands (page 11)

The “Acres Disturbed and Created” graph shows the acreage of wetlands disturbed by development and the number of those acres replaced by human-made wetlands. “Disturbed” wetlands are those affected directly by human activity, which can range from total destruction (when the wetlands are filled and built upon) to conversion from one type to another (as, for example, from shallow swamp to open water). No attempt is made here to evaluate the success of the created wetlands or their value relative to the natural wetlands altered. There is no goal for wetlands conservation. Inland wetlands are estimated to cover about 450,000 acres, or about 15% of Connecticut’s surface. Some of the ups and downs in wetlands loss since 1990 are directly related to changes in the economy and the number of applications received. However, the graph showing the “Area of Inland Wetlands Affected by the Average Permit Issued” indicates that wetlands agencies had also become more conservative since 1990. Municipal wetland agency members and staff have many more opportunities for state-sponsored training than they did in 1990, though some commissions have ignored the legal requirement to have at least one member attend training. More than 95 percent of the development activity in and around wetlands is regulated by municipalities with minimal oversight or supervision by the DEP.

Sound and Shore

No Swimming at the Beach (page 12)

Connecticut’s goal is to eliminate beach closings caused by discharges of untreated or poorly treated sewage, the most common cause of elevated bacteria levels. After rain storms, runoff and overflows from combined sanitary/storm sewers are presumed to contaminate the water, prompting towns to close beaches automatically as a precaution. The Council adds up the number of days that each city and town closes one or more of its public beaches, and calculates an average for each year. Yearly variations are products of rainfall patterns and incidents such as sewer-line ruptures. The dry summer of 2002 brought far fewer closings, but significant rainfall in 2003 elevated the number of closings. In 2005, rainfall, sewage spills and boat discharges led to some beaches being closed for several days in the western half of the state.

Piping Plovers on the Beach (page 13)

Piping plovers are small shorebirds that nest on sandy, vegetation-free beaches. Human intrusion, storm tides, and predators frequently destroy nests. Nesting adults are counted and in most cases protected every spring by the DEP and volunteers working with The Nature Conservancy. The piping plover's status is "threatened." The protections afforded these plovers also benefit other nesting species, including least terns, which are also threatened in Connecticut. Since protection and monitoring efforts began in 1984, nesting success has improved, resulting in more returning adults in subsequent years. Yearly variations can occur when adult birds move from one state to another. Diminishing habitat and more disturbances are forcing many birds to nest within the vegetation zone and below the storm tide line where predation and washout took a toll in 2002. There was an increase in plovers in 2003, with nests in two locations that had not been used in recent years, and again in 2004 when birds nested in three new locations. In 2005, however, birds did not return to the new sites.

Oxygen in Long Island Sound (page 14)

Hypoxia is the condition in the water when oxygen levels are too low to support desirable forms of life, including fish and lobsters. (For this indicator, hypoxia is defined as less than or equal to 3 mg/l of dissolved oxygen.) Hypoxia occurs when the nitrogen in pollution stimulates excessive growth of aquatic plants, which die and are consumed by oxygen-using bacteria. Connecticut's goal is to "eliminate the adverse impacts of hypoxia resulting from human activities." All of the hypoxia has occurred in the western two-thirds of the Sound. Weather greatly influences hypoxia, making year-to-year changes less important than long-term trends. Mild winters followed by relatively cool summers result in fairly uniform water temperatures and less hypoxia in the depths. The second largest area of hypoxia was observed in 2003, and scientists believe it is attributable to an expansive brown algae bloom in the western end of the sound, which was most likely fueled by a large amount of rain (and nitrogen-bearing runoff) early in the summer. A cool beginning to the summer of 2004 led to less hypoxia, and favorable weather led to another small improvement in 2005 (but see technical note, below). 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 progress in reducing nitrogen pollution is illustrated in the Nitrogen indicator.

The graph shows the area of Long Island Sound that had adequate oxygen levels throughout the 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; embayments; 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.

Technical note: In 2004, the DEP redefined hypoxia to include waters with less than or equal to 3.5 mg/l of dissolved oxygen (replacing the older 3.0 mg/l standard). There has not been time to recalculate past years' data to reflect the new standard, so this indicator still uses the older 3.0 mg/l standard. If the new standard were applied to the graph, it would show 2005 to be worse than 2004.

Nitrogen in Long Island Sound (page 15)

The amount of nitrogen dumped into Long Island Sound and its tributaries affects oxygen levels in the water. Overall, Connecticut's share of the total nitrogen pollution in Long Island Sound is about one-third, and New York's is two-thirds. In April 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. Connecticut's target for 2014 is 3837 tons (or less) of nitrogen per year. This indicator tracks the nitrogen discharged to the Sound and major rivers by 79 sewage treatment plants, 3 large coastal industrial facilities, and a group of industrial sources in the Naugatuck River watershed. Connecticut's investments in nitrogen-removal technology have been successful. The goal for 2004 was met three years ahead of schedule. The next milestone is a goal of 5505 tons (or less) in 2009. There are large uncontrolled quantities of nitrogen entering Long Island Sound in the rain that runs off lawns and pavement.

Lobsters (page 16)

The lobster is the third most economically important commercial marine species in Connecticut (behind hard clams and sea scallops). The DEP samples lobster populations every autumn by towing nets from a research vessel at randomly selected sites throughout Long Island Sound. Researchers are focusing on a combination of four possible causes for the dramatic downturn since 1999: disease and immune response, 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 of lobsters. While the lobster population appeared to stabilize in 2003, the autumn 2005 trawl yielded the lowest number in at least 20 years.

Seafood Sampler (page 17)

The DEP samples marine fish and invertebrates every spring and fall by towing nets from a research vessel. This indicator includes lobster, squid, and 38 species of fish and shows general trends in their collective populations. In 2005, less than half of these 40 species were above their long-term averages, which means the majority showed a short-term decline. Scientists are unsure of the reasons behind the fluctuations of the last few years. One possible explanation for the decline of some prey species is the population growth of striped bass and other predators. There also appears to be a decline in some colder-water species as warm-water species increase.

Clean Shellfish Beds (page 18)

Connecticut met its goal of having 60,000 acres open by the year 2000, which are far fewer acres than were open a hundred years ago. The primary impediments to opening more acres are the presence of sewage discharges and the need to conduct frequent monitoring to satisfy federal health-assurance requirements. Beds are counted as open when they are clean enough and monitored sufficiently. The dramatic increase in 1997 was attributed largely to a decade-long increase in the commercial value of Connecticut's harvest, which prompted investments in expansion. Expansion has been a cooperative venture of industry and state government. Water quality and monitoring improvements led to modest expansion in 1998 and 1999, even as the industry saw oyster stocks depleted by disease in 1998. The expansion of shellfish beds in 2000 reflected even greater interest in the oyster industry as some lobstermen, responding to declining lobster populations, switched to harvesting oysters. The slight decrease in 2003 reflected a 15-month moratorium on new leases and fluctuations in the acreage of private beds. In 2004, progress resumed, and many shellfish beds that were already open with restrictions were upgraded because of better water quality and monitoring. Aquaculture experts believe 80,000 acres is a realistic target.

Reviving Tidal Wetlands (page 19)

Restoration includes work performed by the state as well as by coastal landowners required by the DEP to restore wetlands as conditions of their permits. Restoration acreage is counted only where tidal flow has been restored permanently, and does not include minor enhancements or simple vegetation management. Tidal wetlands are estimated to cover 17,500 acres of Connecticut, though no precise inventory has been completed. Connecticut's goal is to produce net increases in tidal wetlands acreage and function. In 2002, more than 100 acres were restored, mostly associated with the Connecticut and Quinnipiac Rivers. In 2005, about 40 acres were brought back to life in Stratford and Old Saybrook. Restoration has been outpacing development: with the exception of 1995, less than one acre of tidal wetlands has been lost each year to permitted development.

Ospreys (discontinued)

The indicator for ospreys has been retired and replaced by one for bald eagles. The osprey population still is a good indicator of certain aspects of the coastal environment, but the DEP no longer counts them. Their numbers increased to nearly 400 in 2002 from fewer than 20 in 1974. The osprey was removed from the state list of endangered, threatened and special concern bird species in the 1990's.

Rivers and Reservoirs

Sewage Overflows (page 20)

In fourteen Connecticut cities and towns, sanitary sewers were built in combination with storm sewers. During storms, these systems carry more water than their treatment facilities can handle, and a combination of storm water and untreated sewage overflows directly to the rivers and Long Island Sound. Several of these combined sewer systems have been completely or partly separated since 1990, reducing the impact of untreated sewage on rivers. The improvement in 2001 can be attributed to the completion of projects in the towns of Waterbury and Naugatuck. It also reflects greater precision in the DEP's data collection and analysis. 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. In 2005, the Jewett City project was completed, eliminating overflows of raw sewage into the Quinebaug River.

Bald Eagles (page 21)

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 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 1980's, and a pair found their way to Connecticut in 1991 and successfully raised a family in 1992. Several more pairs have since found acceptable nesting habitat on land protected by government and private landowners including utility companies. The DEP monitors the eagles with the assistance of the Bald Eagle Study Group and other volunteers. The bald eagle is listed as endangered in Connecticut and threatened nationally, but eagle population growth has prompted the federal government to propose removing it from the federal list. The Northern States Bald Eagle Recovery Plan established a goal for Connecticut of 20 breeding birds (10 nests), which was reached for the first time in 2005. 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 prey that are – very importantly – only minimally contaminated.

Drinking Water (page 22)

Every public water utility 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 utility. Though long-term problems persist, they occur most frequently with small systems serving relatively few households. This indicator would show greater fluctuations if the larger systems failed to deliver good water. As in most years, the contamination problems of 2005 occurred mostly in small systems, but a few short-term problems in large systems caused this indicator to show a small downturn.

Human Health

Breast Cancer in Connecticut (page 23)

Number of new cases per year per 100,000 women aged 50 to 54

Of every 100,000 women in the state aged 50 to 54, a number will discover each year that they have breast cancer. That number is depicted in this graph. To minimize year-to-year fluctuations, groups of years are averaged together. (In other words, each data point on the graph shows the number of new cases in a single year, but that year is actually the average of several years.) While some breast cancers are linked to genetic factors, most are associated with non-genetic factors including diet, reproductive history, lifestyle, and external agents. There are numerous studies connecting certain chemicals and other environmental factors to breast cancer. These factors, if significant, do not appear to be as important statistically as a woman's own reproductive history, but it is important to note that breast cancer rates vary greatly in different parts of the country. Among the fifty states and Washington, D.C., Connecticut has the third highest incidence of breast cancer. (Source: American Cancer Society) There is little doubt that some of the increase since 1980 is attributable to better detection methods. But better detection, which might save lives by allowing for earlier treatment, cannot be responsible for all of the apparent increase in new cases. In 2000 through 2002 (the most recent years for which data are available), the rate of new cases showed improvement for the first time.

Non-Hodgkin's Lymphoma (page 24)

Number of new cases per year per 100,000 residents aged 50 to 54

Non-Hodgkin's lymphoma is a cancer of the lymphatic system. It begins in the lymphoid tissue which contains lymphocytes, white blood cells that help the body fight infections. Lymphocytes travel throughout the body and can carry abnormal lymphocytes, spreading the cancer. The data for this indicator are from the Department of Public Health's Tumor Registry, which records all known cancer cases in the state. Non-Hodgkin's lymphoma has increased markedly since record keeping began. The reasons are not well understood, though the rise of Acquired Immune Deficiency Syndrome (AIDS) since the 1980s accounts for some cases. Several studies also cite environmental factors, including exposure to certain fertilizers, pesticides, and chemicals. In 2000 through 2002 (the most recent years for which data are available), the rate of new cases showed improvement for the first time.

Leading Environmental Indicators...

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

Driving Our Cars (page 25)

Driving a car, truck or sport utility vehicle is probably the most environmentally harmful activity a Connecticut resident will engage in personally. Impacts are direct (air pollution, oil leakage, etc.) and indirect (stimulating demand for new roads). The Department of Transportation estimates the total miles driven each year in Connecticut. Nearly every year, the average Connecticut resident drives more miles than in the previous year. The reasons are complex and include the fact that most new development is accessible only by private vehicle.

Taking the Bus (page 26)

Riding a bus is just one alternative to the negative environmental consequences of driving a car. Ridership data are collected by the Department of Transportation. There was a 20% decline in per capita bus ridership from 2001 through 2005. Fares were increased in 2004 and 2005.

In Full Compliance (page 27)

This indicator shows the approximate percentage of inspections performed by the DEP that found the inspected facilities in full compliance with pertinent environmental laws and regulations. The sharp downturn in 2002 was due to a large number of violations in one air quality program (Stage II Vapor Recovery at gas stations). Most other programs in the Air Bureau showed compliance rates greater than 90%, but more than 1,000 gas stations had Stage II violations, characterized by the DEP as mostly minor labeling and record-keeping deficiencies. Short-term downturns might not reflect serious problems if the long-term trend is toward full compliance. Overall, compliance rates rarely have been better than 90%. The number of inspections conducted by the DEP has declined every year since 1997 (with the exception of 2004, when there was a minimal increase caused by a spike in contracted inspections of gas stations). Inspections declined sharply again in 2005. The relationship between the number of inspections and rate of compliance is not clear. The stability of the compliance rate in the face of ever-diminishing staff resources might be regarded as a success for the DEP. However, some industrial sectors require fewer inspections than they did a decade ago because the number of active facilities has declined. Regardless of the relationship of compliance to inspections, the failure of the state to advance toward the goal of full compliance is apparent.

Recycling (page 28)

The General Assembly established a goal of reducing and recycling 40% of Connecticut's municipal solid waste stream by the year 2000; the DEP has calculated that this would require 33% of the waste to be recycled (with the other 7% disappearing through waste reduction). This goal was not met, and the consequences have been enormous: hundreds of thousands of tons of waste are shipped out of state each year, putting thousands of diesel trucks on the highways for trips of hundreds of miles.

Technical note: In 2002, the DEP changed the way its data are calculated. In the past, numbers were based solely on annual municipal recycling reports. Now they are based on recycling facility market reports as well as the municipal reports. This more accurate data probably accounts for the small increase in the statewide average that year. If some composting were also counted, the number probably would be higher. Because of staff reductions at the DEP, data for the years after 2003 are not available. Regardless of the fine points of the data, this indicator shows that progress appears to have halted.

Climate Watch (page 29)

Certain gases in the air function like the glass of a greenhouse: they allow the sun's energy to pass through, then trap the heat that radiates from the ground. They often are called "greenhouse gases." Worldwide, a build-up of greenhouse gases is causing temperatures to rise. Carbon dioxide is the greenhouse gas emitted in greatest volume, but it is not the most powerful. Methane and other less common gases have much greater ability to trap heat. In 2003, the Department of Environmental Protection and other organizations estimated Connecticut's emissions of all greenhouse gases for the years 1990 through 2000. The quantity of each gas was adjusted according to the strength of its greenhouse characteristics and then reported in a common unit, the Metric Ton of Carbon Dioxide Equivalents. By statute (C.G.S. 22a-200b), the next comprehensive inventory shall be completed later in 2006.

A state law adopted in 2004 (P.A. 04-252) established goals for future greenhouse gas emissions: return to 1990 levels by 2010, cut back another 10% by 2020, and ultimately achieve a reduction of 75% to 85% from 1990 levels at a date still to be determined. The graph on page 29 shows the average Connecticut resident's share of greenhouse gas emissions. The goal line on the graph shows the reduction in the average resident's share of emissions that must be achieved if the 2010 goal is to be reached. Because there probably will be at least 300,000 more people living in Connecticut in 2010 than there were in 1990, the per capita emissions will have to go below 1990 levels to reach a total state emission level equal to 1990. Most of the carbon dioxide comes from the combustion of fuels in houses, businesses, power plants, and vehicles, and the last of these is the largest source. Connecticut is more energy-efficient than the nation as a whole, and the average Connecticut resident's contribution to global climate change is less than the average American's.

Activities of the Council on Environmental Quality in 2005

The Council is charged with identifying deficiencies in state environmental programs and recommending legislation for correcting them. Many such deficiencies are discovered by citizens who then bring them to the Council's attention for further analysis and action. The past year was a particularly busy one. Just a few of the interesting problems brought by citizens to the Council in 2005 include:

- **Abuse of Preserved Lands:** Representatives of the Farmington Land Trust described the deliberate destruction of trees on one of its preserves by a neighboring property owner. Though the large ash trees were more than a century old, their value as lumber or firewood was estimated to be only four hundred dollars. Under the relevant state law, which was first adopted in 1726, the land trust could recover only up to three times that value – not even enough to recover the costs of legal action.

The Farmington case proved to be the tip of the proverbial iceberg. The state was found to have dozens of encroachments (illegal activities, structures, or roads) in its parks and forests. A volunteer of the Farmington Land Trust and the Land Trust Service Bureau surveyed nearly all of the land trusts in the state and discovered that the majority had suffered encroachments. Very often the organizations did not pursue legal action because of the cost and the meager damages available under the law. In a July 2005 decision on another case involving tree cutting on a nature preserve, the state Supreme Court confirmed that trees had no value under the law beyond their value as wood “severed from the land,” which in that case was minimal.

The Council concluded that existing law did not provide adequate compensation to land conservation organizations and was of almost no use as a deterrent in this era of expensive real estate. Evidently, too many people were content to enhance their own properties substantially by damaging preserved lands and to pay the nominal damages. In December, the Council published *Preserved But Not Protected*, which documented these problems and recommended corrective legislation. Early in 2006, the General Assembly considered several bills to fix these problems, and passed a very important bill that should greatly increase damage awards for future encroachments. Some additional work remains to be done, such as amending the law that allows people to re-open and pave discontinued roads that run through state parks and land trust preserves.

- **Surplus State Lands:** A resident of southeastern Connecticut spoke at a Council meeting to point out that the state was planning to transfer at least 250 acres of undeveloped land out of state ownership without a review of the natural resources that were present on the property. The property had been offered to the DEP several years before, as required by statutes guiding surplus land disposition, but there was no evidence that the property had ever been examined. The DEP had no specific use for the property, but no one determined if the property might harbor important natural resources that might merit conservation regardless of who owned the land. The Council's recommendation to complete a review of the parcel's natural resources while the land was still in state ownership was rejected by the Department of Public Works. The Council also recommended legislation to provide for environmental review of state-owned lands before they are transferred out of state ownership.

- **Wetlands:** After receiving a detailed complaint about a town's apparent inaction when a pond or wetland had been filled without a permit, the Council referred the matter to the DEP, as prescribed by Section 22a-13 of the Connecticut General Statutes. About one year later, the DEP wrote to the town to seek additional information. The DEP has only two staff persons in its Inland Wetlands Management section, and delays of this length are not unusual. The Council is reviewing the workload to determine what additional resources might be needed for this important statewide program.

- **Fenton River:** When students returned to the University of Connecticut Storrs campus in September 2005, the additional demand for water caused the University to pump so much water from wells near the Fenton River that the river, which was already low because of extended dry weather, dried up completely. Several organizations and local officials presented information to the Council about the problem. The University has already made some planned changes to its water supply system, and the Fenton River system has been undergoing a multi-year study that scientists and state officials hope will prescribe more conservative management. The incident illustrated long-term several problems, including:

1. A water company or other supplier can pump water at a rate below what is allowed under its state registration, but this rate can still pump a nearby waterway dry. This is a chronic problem throughout Connecticut that has received some attention but will need more.
2. If less water is pumped from the Fenton River wells, more will be pumped from the Willimantic River wellfield, which could in turn affect that river. The Council is monitoring efforts to study the Willimantic River system.

3. Responsibility for the University's water system is spread among various entities, and citizens with expert knowledge of the rivers do not necessarily know where to turn to involve themselves in important decisions. By most accounts, the University has been working to inform the public of all developments, but as the University's water system is not legally a water company, responsibilities are less clear than in most areas of the state affected by large water supply systems.

- **Mowing Tidal Wetlands:** Residents occasionally submit evidence of possible environmental violations, only to be told that the activity is not actually covered by any law. An example from 2005 is a photograph of tidal wetlands that were mown (presumably by a nearby homeowner) all the way to the edge of the water. The Council learned that mowing is not a regulated activity under the state's tidal wetlands program.

The Word From Torrington

The Council periodically holds public forums in different parts of the state to find out what aspects of the environment are most on residents' minds. The information presented at these forums has been extremely useful to the Council in setting priorities and in assessing where the biggest problems lie.

In September, the Council heard from numerous citizens and public officials at Torrington City Hall. The issue mentioned most often was the need to preserve more open space and farmland. This is consistent with the results of virtually every forum held by the Council across Connecticut over the past eight years.

Two concerns that were mentioned more often in Torrington than in other parts of the state include invasive plant species, especially as they threaten lakes in that area, and the Department of Transportation's practice of filling roadside areas with sweepings and other debris in order to dispose of it.

Another prevalent issue raised by several speakers in Torrington is the desire for more assistance from the state in the regulation and conservation of inland wetlands. As the Council has heard repeatedly, the volunteers who serve on municipal inland wetlands and watercourses agencies are continually called upon to make decisions on wetlands applications when most of the information they receive is from the applicant's own consultants. Many officials and citizens have suggested that the state should provide more support to these many hundreds of volunteer commission members. Several specific suggestions have been offered, and the Council is including this information in its review of the adequacy of the state's inland wetlands program.

The Council heard many other concerns at Torrington in September and from people across the state throughout the year. While the complaints can stack up from time to time, the Council works to address them all, and truly appreciates the efforts people make to bring environmental problems to light.

Reviewing State Projects

The Council may advise any state agency on its projects. Generally, the Council does this when it reviews an Environmental Impact Evaluation for a capital project, or in response to complaints such as those raised above. Among the state-funded projects on which the Council submitted comments in 2005 was a sewer project that had the effect of subsidizing suburban sprawl. The DEP does not have enough money in its Clean Water Fund to correct all existing sewage problems, yet projects intended to accommodate new development outside of city or town centers sometimes get state funds from other sources, such as the Small Town Economic Assistance Program (STEAP). In addition to its comments on the project, the Council recommended to the Office of Policy and Management that the STEAP be revised to provide for environmental review before grants are approved by the State Bond Commission, in order to comply with the Connecticut Environmental Policy Act.

In February 2005, the Council wrote to the Office of Policy and Management and the DEP to recommend amending the Connecticut Environmental Policy Act regulations. The Act itself was amended substantially by the General Assembly in 2002, and the regulations, which have never been amended since their adoption in 1978, need to be brought up to date. The Council hopes to assist in this effort in 2006.

The Council looks forward to helping citizens and agencies solve new challenges in 2006.

CEQ MEMBERS

Thomas F. Harrison (Chairman) Resident of Avon. Retired partner of the Hartford-based law firm of Day, Berry & Howard LLP. Chairman, Avon Board of Finance. Board of Directors, Connecticut League of Conservation Voters. Executive Committee and Past Chairman, Environmental Law Section, CT Bar Association. Board of Directors and Former Chair, CT Chapter, Air & Waste Management Association. Board of Directors, National Audubon Society/Connecticut. Environmental Professionals Organization of CT. Small Business Compliance Advisory Panel, CT Department of Environmental Protection. CT Environmental Forum. Adjunct Instructor of Environmental Law, Rensselaer Polytechnic Institute (Hartford Graduate Center). Former Member, Avon Inland Wetlands Commission.

M. Howard Beach Resident of Simsbury. Conservation Officer / Zoning Compliance Officer, Town of Simsbury. Member, Simsbury Conservation / Inland Wetlands Commission from 1980 to 2004, Chairman from 1994 to 2004. Member, Board of Directors, The Farmington River Watershed Association. Life Member and past Board Member, Simsbury Land Conservation Trust. Founding Member, Farmington Valley Biodiversity Project. Member, Town of Simsbury Open Space Committee, 1999 to 2004. Member, CT Developers Council. Member, Government Affairs Committee, Simsbury Chamber of Commerce. In 2004, completed a Masters Degree in Environmental Law at Vermont Law School.

John M. Mandyck Resident of West Hartford. Vice-President of Government and International Relations, Carrier Corporation. Directs public policy and environmental sustainability activities on domestic and international levels. Former Director of Government Relations for the Greater Syracuse Chamber of Commerce. Member, Board of Visitors, Syracuse University College of Arts and Sciences.

Susan B. Mendenhall Resident and Mayor of Ledyard and Four-Term Town Councilor. Member, Land Use/Planning/Public Works Committee. Former Member, Finance Committee. Council Liaison to Inland Wetlands and Watercourses Commission, Zoning Commission, Ledyard Emergency Planning Council. Former Council Liaison to Senior Citizens Commission, Economic Development Commission, Board of Education. Past Member, Board of Directors of The Connecticut Institute for Municipal Studies. Member, Property Tax Reform Commission. Former Stock Trader, Investment Corporation of Virginia. Former Tax Consultant. Member, Navy League.

Earl W. Phillips, Jr. Resident of Middle Haddam, village of East Hampton. Partner with the law firm of Robinson & Cole LLP and Chair of its Environmental Practice. Executive Committee, Environmental Section of the CT Bar Association. Member, past and present DEP Advisory Committees, including E-2000, Waste, and Water. Executive Steering Committee (15 years), CBIA Environmental Policies Council and past Chairman of its Hazardous Waste Section. Multiple publications, including: *Brownfields Law and Practice: The Cleanup and Redevelopment of Contaminated Land*, CT Chapter (Matthew Bender), *Environmental Law Practice Guide*, Connecticut Chapter (Matthew Bender). Past Adjunct Instructor of Environmental Law, Wesleyan University, University of Connecticut, and Rensselaer Polytechnic Institute (Hartford Graduate Center). Former Chairman, Environmental Section, National Institute of Municipal Law Officers.

Richard Sherman Resident of Mansfield Center. 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. 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.

Norman VanCor Resident of Harwinton. Owner of Buy Safe Home Inspection, LLC. Served in United States Marine Corp in Viet Nam. Awarded the Navy Cross, Vietnamese Cross of Gallantry and other decorations. One of first ten inductees to CT Veterans Hall of Fame. Former Director, Yankee Energy in sales, marketing, government relations, communications. Founding member and President Emeritus, Quinnipiac River Watershed Association. Former member Rivers Advisory Committee. Former Chairman, Southington Conservation Commission. Former host of radio program on environmental topics. Former President, Southington Water Works. Former member, Board of Directors of Operation Fuel. Active Pheresis donor at American Red Cross with over 31 gallons of whole blood and platelet donations. Volunteer Hunter Safety Instructor for the DEP Conservation Education Program. Certified Master Gardener.

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COUNCIL ON ENVIRONMENTAL QUALITY

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 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.

In addition, under the Connecticut Environmental Policy Act (CEPA) and its attendant regulations, the Council on Environmental Quality reviews Environmental Impact Evaluations that state agencies develop for major projects. The Council publishes the Environmental Monitor (<http://www.ct.gov/ceq/monitor.html>), the official publication for state project information under CEPA.

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Acknowledgments

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