Environmental Quality in Connecticut

Hidden Valley Preserve
Shepaug River, Washington Depot

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Hartford, CT 06106
portal.ct.gov/ceq

The 2023 Annual Report of the Council on Environmental Quality

STATE OF CONNECTICUT

COUNCIL ON ENVIRONMENTAL QUALITY

May 7, 2024

The Honorable Ned Lamont
Governor of Connecticut
State Capitol
Hartford, CT 06106

Governor Lamont:

The Council is pleased to submit *Environmental Quality in Connecticut* for 2023, as authorized by Connecticut General Statutes (CGS), Section 22a-12. The Council was established on June 25, 1971 by Public Act 872. This report uses over forty indicators of environmental health and human activity to illustrate environmental trends, both positive and negative, for the 2023 calendar year. As required, the Council has also included recommendations for "remedying the deficiencies of existing programs and activities, together with recommendations for legislation". The Council's annual report indicates both improvement in some areas of environmental quality and regression in others.

Though this report can be printed, it is designed to be read as an online document on the Council's website. Online, the values on its charts will appear under the reader's cursor and the reader can access the many supplemental documents which are hyperlinked within it. "Quick Summary" boxes above most of the charts show the data trends for the past year and past decade.

In sending this report, the Council wishes, also, to acknowledge your efforts through the Governor's Council on Climate Change and leadership to address the State's serious climate challenge. The Council's annual report notes that greenhouse gas emissions from in-state sources, such as the electric power sector and the transportation sector, continue to be a significant concern.

I would be remiss if I did not reiterate our concern for the two open Council seats that might threaten the Council's ability to achieve a quorum in 2024, thereby effectively prohibiting the conduct of further business.

It remains my personal privilege to serve the people of the State in this capacity and I look forward to any input or suggestions which you may have to inform the Council's work.

Respectfully submitted,

Keith Ainsworth, Esq.
Acting Chair

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Executive Summary

Generally, Connecticut's environment is better than it was ten years ago and significantly better than when the Council was created over 52 years ago. While the state's air and water quality have improved in the intervening 52 years, the warming of Connecticut's climate threatens to undermine the environmental progress of past decades. In 2023, Connecticut experienced periods of very bad air quality that was primarily associated with wildfires in Canada and the western United States. Connecticut continues to be the New England state with the worst ozone pollution. There was also a significant amount of precipitation during the summer months that increased surface water runoff and combined sewer overflows impacting water quality. The area of hypoxic conditions in Long Island Sound was approximately 28 percent greater than the previous ten-year average, and the number of closures and advisories for Connecticut's coastal beaches was approximately 21 percent greater than the previous ten-year average.

Connecticut's changing climate is creating compatible loci for invasive species, like the Asian tiger mosquito, and impacting the distribution and abundance of native species, which can have negative economic, ecological, and public health impacts. This is already evident in the near collapse of Connecticut's lobster harvest. Animals, such as forest birds, turtles, and bats, and native plants will diminish as their habitat is impacted by development or transforms and becomes less habitable. However, there is room for optimism. Populations of eagles, osprey, and piping plover have increased over the last few decades due, in part, to successful reintroduction programs, and habitat protection measures. And while there has been a shift to more warm-adapted finfish species in Long Island Sound, overall finfish diversity in the Sound remains high.

While the Governor and the Legislature have been leaders in addressing the state's serious climate challenge, greenhouse gas emissions (GHG) from in-state sources, such as the electric power sector and the transportation sector, continue to be a significant concern. In fact, total GHG emissions for all economic sectors increased by approximately seven percent from 2020 to 2022. Achieving the emission reduction goals set forth in several public acts will be difficult without drastic reductions in per capita greenhouse gas emissions. Efforts to promote renewable energy, such as solar, and electric-drive vehicles (EVs) have been successful; however, it is estimated that the number of EVs registered represents less than two percent of all registered vehicles in the state. Additional efforts to reduce the amount of solid waste, and the consumption of energy through energy conservation and the more efficient use of energy, should be prioritized over developing new sources of electric generation. Further, nature based solutions, such as the preservation of open space land and farmland and forest management/urban forestry can help to combat climate change, reduce flood risk, improve water quality, protect wetlands and habitats, reduce urban heat, and improve the quality of life for Connecticut's residents.

A detailed list of recommendations with specific action items can be found on the Recommendations page.

Introduction – Understanding "Environmental Quality in Connecticut"

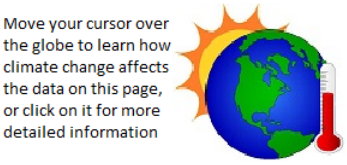
The Annual Report of the Council on Environmental Quality for 2023

published May 7, 2024

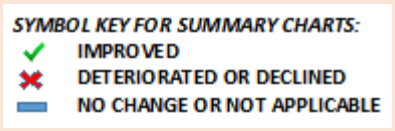
Welcome to *Environmental Quality in Connecticut*. As required by Connecticut General Statutes Section 22a-12(a), the council shall submit annually to the Governor an environmental quality report, which shall set forth: (1) the status of the major environmental categories including, but not limited to, the air, the water and the land environment; (2) current and foreseeable trends in the quality, management and utilization of the environment and the effects of such trends on the social, economic and health requirements of the state; (3) the adequacy of available natural resources for fulfilling human and economic requirements of the state in the light of projected population pressures; (4) a review of the programs and activities of the state and local governments and private organizations, with particular reference to their effect on the environment and on the conservation, development and utilization of natural resources, including, but not limited to, programs and measures of local governments implemented pursuant to subsection (d) of Section 22a-244b; (5) a program for remedying the deficiencies of existing programs and activities, together with recommendations for legislation; and (6) the progress towards achievement of the goals and objectives established in the state-wide environmental plan. This edition addresses the statutory requirements noted above and documents the condition of Connecticut's environment primarily during the 2023 calendar year.

This annual report is designed to be read online to allow use of the navigation buttons to move from section to section within it or to find the topics of interest in the Index. Online, the values on the charts will appear under the cursor.

The majority of Connecticut's key environmental indicators are strongly affected by a changing climate. The symbol at right (example) identifies indicators that are so affected or those that affect the climate. For the online edition, running your cursor over the symbol will reveal a brief statement of the indicator's connection to climate that is also linked to more information. For the printed version, please refer to "Climate Notes" at the end of this annual report.



Summary Key for Indicators: Each page in the report has an environmental theme. Where an indicator shows change over time, there will usually be a summary key to allow for a quick evaluation of the status of that indicator. The top line is the indicator's status for the most recent year; the second line shows the current year's status compared to the ten-year trend; and the third line shows whether the indicator is on track to meet its goal, if applicable.



The asterisks in the body of the text refer to clarifying information found in the "Technical Note" section on most pages. The endnotes identify the primary source of the information.

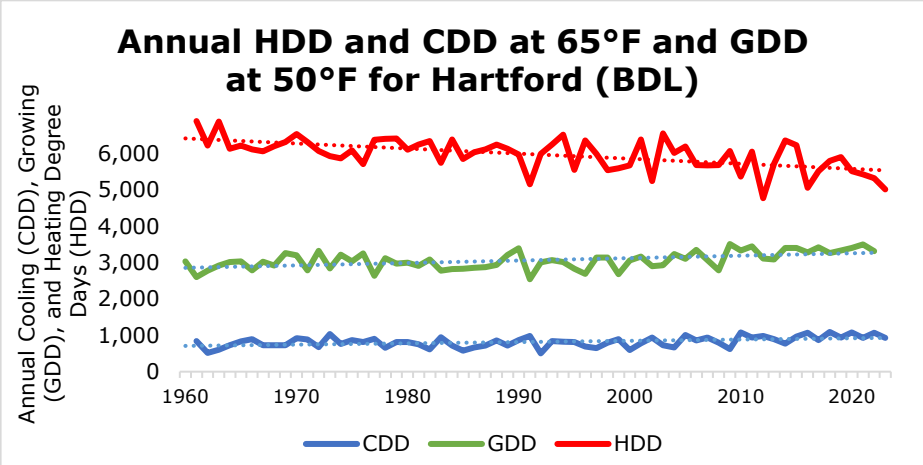
There may be updates to the 2023 annual report if data become available that were not available at publication. Sign up for e-alerts to receive a notice when updates are published. The Council welcomes your comments and questions.

The Climate Challenge*

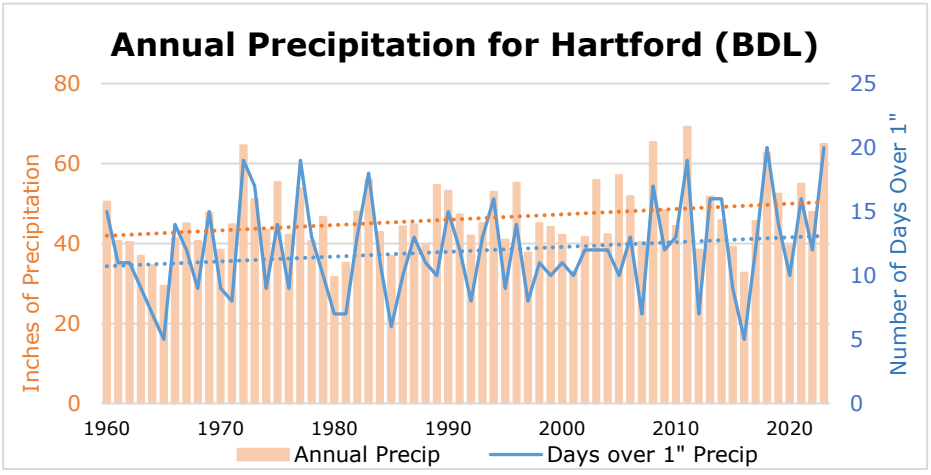
Nearly every environmental indicator in the 2023 annual report has a tie to the climate. The trend over more than sixty years suggests that Connecticut's climate is getting warmer, and precipitation is increasing.

The state's warming climate is evidenced by increasing annual average temperature, precipitation, annual cooling degree days (CDD) and growing degree days (GDD) and decreasing annual heating degree days (HDD).[1]

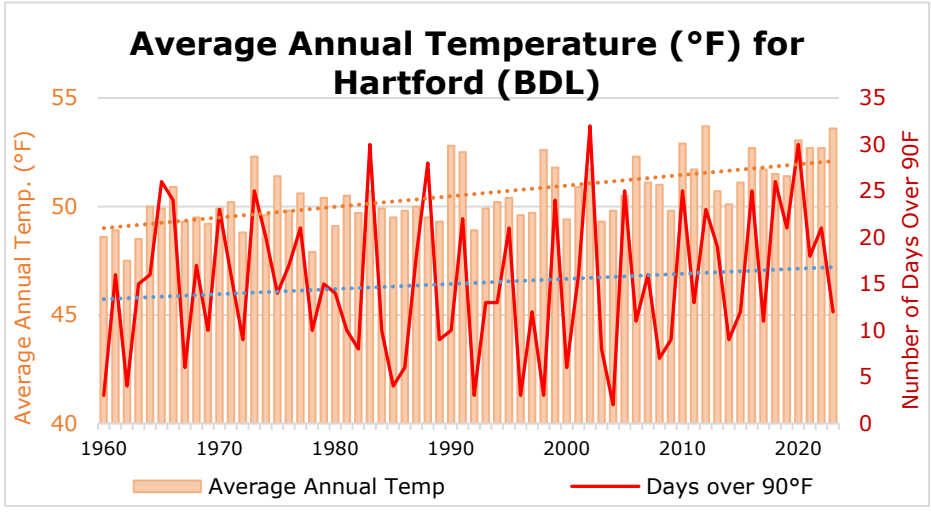
The trend for annual HDD is decreasing while the trends for annual CDD and GDD are increasing from 1961 to present. HDD for 2023 (5,015) was 16.2 percent less than the annual average since 1961, while CDD (931) and GDD (3,314) for 2023 were 13.7 and 8.3 percent greater, respectively, than the annual average since 1961.



Annual precipitation for 2023 (64.9") was 41.6 percent greater than the annual average since 1960 (45.8"). The number of days in 2023 (20) with rainfall greater than one inch was 70 percent greater than the annual average (11.8) since 1960. It is predicted that as the climate warms, severe weather events, such as drought conditions and extreme rainfall, might become more frequent.[2]



Annual average temperature for 2023 (53.6 degrees Fahrenheit (°F)) was 6.1 percent greater than the annual average since 1960 (50.5°F) and the number of days greater than 90°F (12) was 21 percent less than the annual average (15.1) since 1960. For 2023, the average winter temperature was 20 percent higher than the previous 60-year average.



Technical Note: *Weather data measured at Bradley International Airport (BDL).

Climate Changers

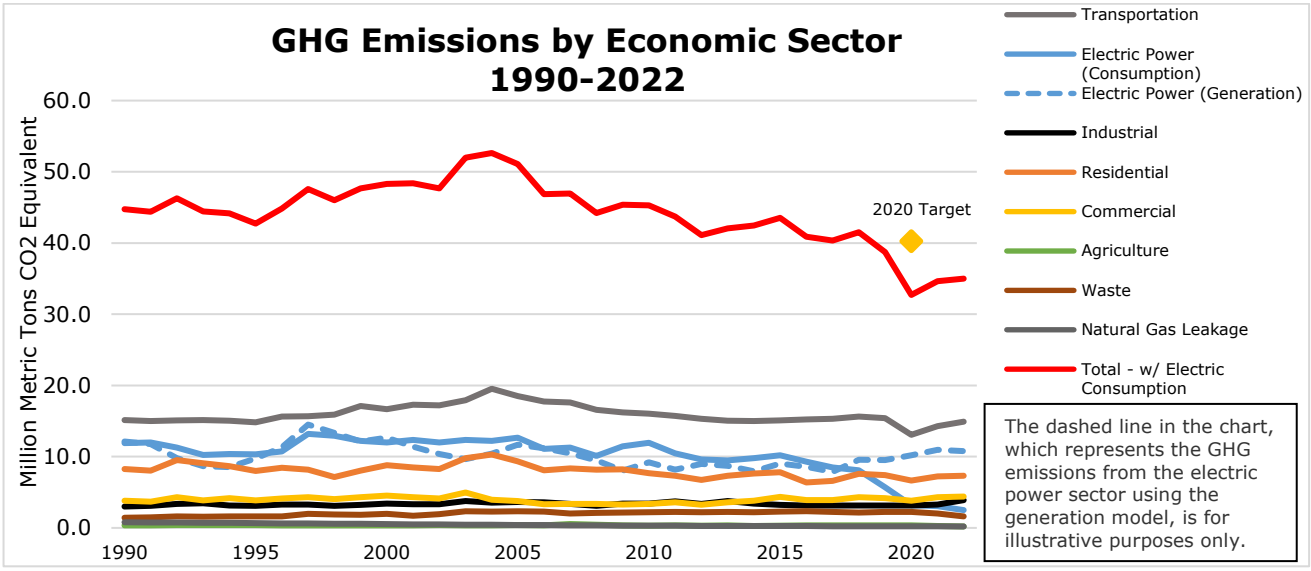
QUICK SUMMARY:

✗ COMPARED TO LAST REPORT

✓ COMPARED TO 10 YR. AVERAGE

✗ ON TRACK TO MEET GOAL

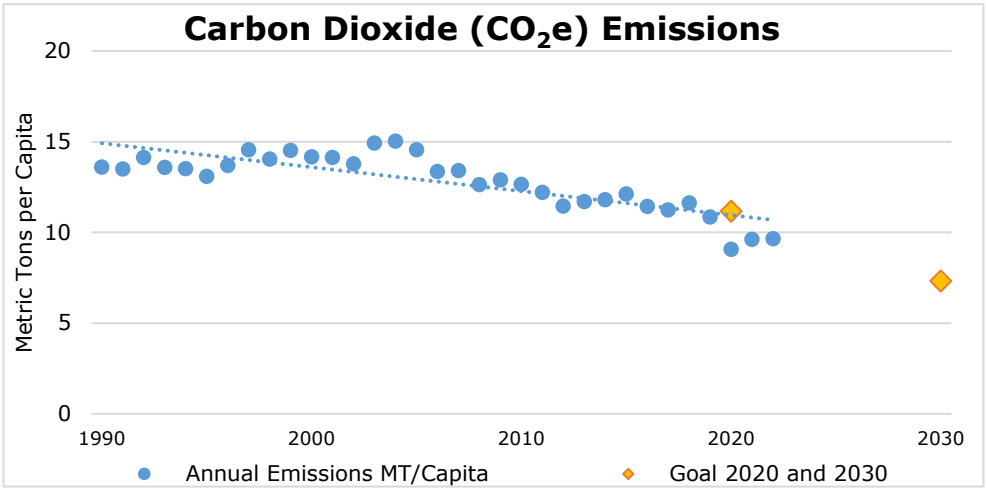
Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information



Using the electric consumption model, it is estimated that total GHG emissions in 2022 (most recent data available) for all economic sectors increased by approximately seven percent from 2020 levels (data from last report) to 35 million metric tons of carbon dioxide equivalents ($MMTCO_2e$*). However this total was approximately 12 percent less than the previous ten-year average. The transportation sector is estimated to have accounted for the most GHG emissions in 2022 at approximately 43 percent, while the residential, commercial, and industrial sectors accounted for approximately 21 percent, 13 percent, and 11 percent, respectively. From 2020 to 2022, the largest increases in GHG emissions were seen in the industrial (24.6 percent), commercial (15 percent), and transportation sectors (14 percent).

Using the electric generation model, it is estimated that total GHG emissions in 2022 (most recent data available) for all economic sectors increased by approximately nine percent from 2020 levels (data from last report) to 43.26 MMTCO2e. The transportation sector still accounted for the highest percentage of GHG emissions at 34 percent, but the percent of emissions from the electric power sector ranked second at 25 percent.[3]

Per capita GHG emissions in 2022 (most recent data available) were estimated at 9.65 metric tons, using the electric consumption model. The goals on the chart have been adjusted to account for actual (2020) and projected (2030) population in Connecticut.



In order to meet the GHG emissions reduction goal for 2030, significant reductions of per capita GHG emissions will be needed. The needle in the chart depicts the average annual per capita reduction (0.12 metric tons) of GHG emissions for 1990-2021, using the electric consumption model. Going forward, the annual per capita reduction needed to achieve the 2030 goal, based on the projected population, is approximately 0.29 metric tons.

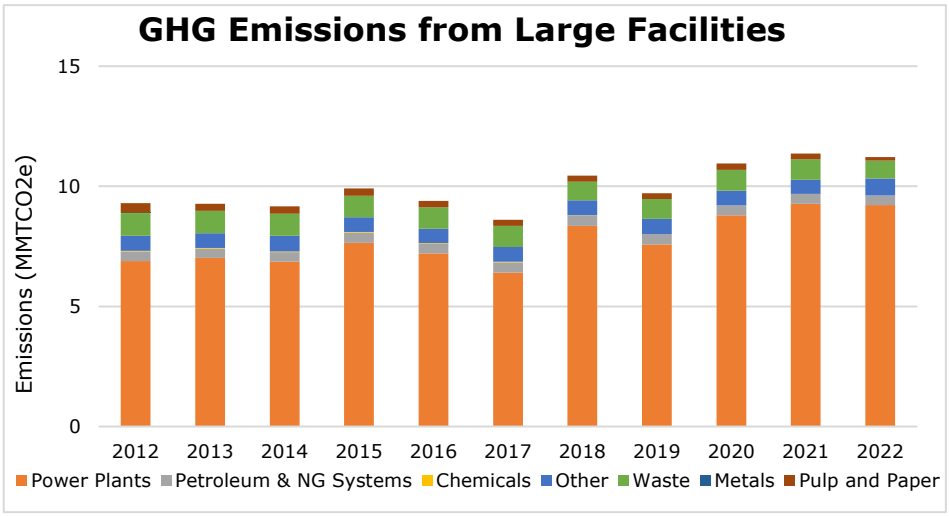
1990-2021 Rate (needle) **vs. Rate Needed to Reach 2030 Goal**

Goal: Prior to 2022, state law (Public Acts 08-98 and 18-82) set three goals for greenhouse gas emissions: reduce statewide emissions to 10 percent below 1990 levels by 2020, 45 percent below 2001 levels by 2030, and 80 percent below 2001 levels by 2050. Public Act 22-5 established a new goal for the state to reduce GHG emissions to a level of zero percent from electricity supplied to electric customers in the state by 2040.

GHG emissions from certain stationary sources decreased slightly in 2022.

QUICK SUMMARY:

✓ COMPARED TO LAST REPORT
X COMPARED TO 10 YR. AVERAGE
— ON TRACK TO MEET GOAL



In general, facilities that directly emit 25,000 metric tons of carbon dioxide equivalent (CO_2e) or more per year are required to submit annual reports to EPA ("large facilities"). Facility-specific data from the EPA indicates that in 2022, GHG emissions from 42 large reporting facilities in the state decreased by 1.2 percent from the previous year but was approximately 14 percent higher than the previous ten-year average. GHG emissions from 15 reporting facilities in the "power plant" sector decreased by approximately 0.5 percent from 2021 levels; however, emissions from these facilities were 21 percent higher than the previous ten-year average.[4]** This is consistent with the Council's analysis of the electricity generation data that indicates a greater percentage of fossil fuel electricity generation.

Technical Note: *Connecticut's GHG emissions are now calculated by the Department of Energy and Environmental Protection (DEEP) using the consumption of electricity, not the generation of electricity in the state. Emissions are reported in terms of carbon dioxide equivalents (CO2e, i.e., CO2 and other gasses with equivalent climate warming impact. While carbon dioxide is the primary GHG, emissions of other GHGs are expressed on the basis of their potential to contribute to global warming, relative to carbon dioxide's potential. **The "power plant" sector made up approximately 82 percent of GHG emissions from large "reporting" facilities in Connecticut in 2022.

Air Days

QUICK SUMMARY:
- COMPARED TO LAST REPORT
- COMPARED TO 10 YR. AVERAGE
- ON TRACK TO MEET GOAL

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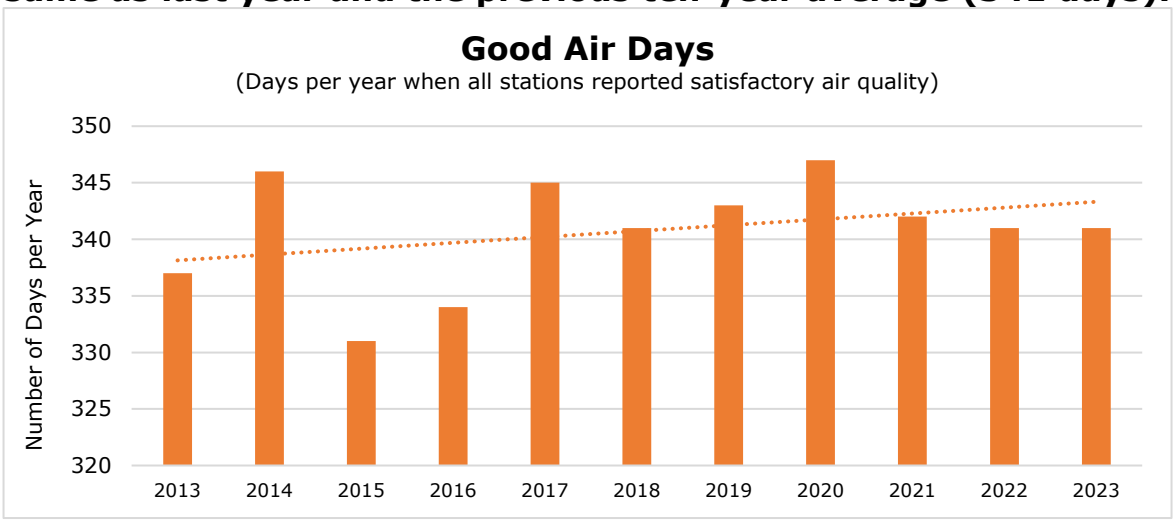
Connecticut residents breathed healthful air on 341 days in 2023; the same as last year and the previous ten-year average (341 days).



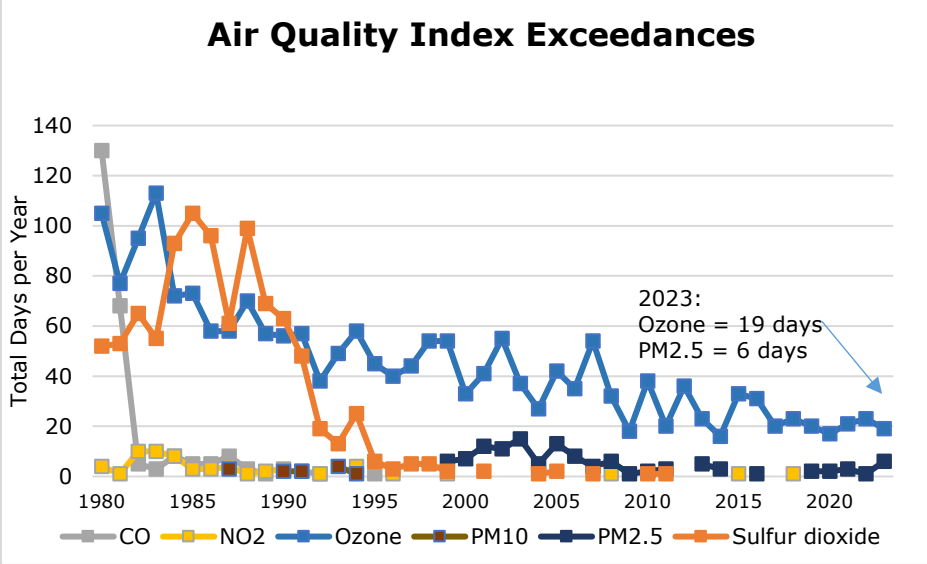
There were 341 "good air days" statewide in 2023, which was the same as 2022 and the previous 10-year average. A "good air day" is when every monitoring station in the state records "satisfactory air quality", which is defined here as air that meets the health-based National Ambient Air Quality Standard (NAAQS) for all of the following six pollutants: sulfur dioxide, carbon monoxide, particulate matter (PM2.5 and PM10), nitrogen dioxide, and ground-level ozone.

An Air Quality Index (AQI) above 100 is considered "unhealthy for sensitive groups", which includes people with heart or lung disease, older adults, and children. In 2023, there were 19 days that exceeded the AQI for ozone* and six days that exceeded the AQI for particulate matter (PM 2.5), including one day (July 1) that had an AQI above 100 for both ozone and PM2.5.[5] When air quality is "unhealthy", there is an increased likelihood for all individuals for aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly. There are also increased respiratory effects for the general population.[6]

In 2023, the Department of Energy and Environmental Protection (DEEP) provided notice of its intent to revise the State Implementation Plan (SIP) to comply with the 2015 National Ambient Air Quality Standards (NAAQS) for Ozone. The revision to the SIP addressed Connecticut's two nonattainment areas: 1) Southwest Connecticut, which is part of the New York- Northern New Jersey- Long Island (NY-NJ-CT) Nonattainment Area and includes Fairfield, New Haven, and Middlesex counties, and 2) the Greater Connecticut Nonattainment Area, comprised of Connecticut's remaining five counties. The SIP revision also included motor vehicle emissions budgets for both Greater Connecticut and Southwest Connecticut.[7]

There has been a long term trend of improved air quality, in part, due to the air pollution controls that were put in place after the enactment of the 1971 Clean Air Act. The chart below, "Air Pollutants", shows that in the 1980's, exceedances for sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) were more common, but not so recently.[8] Statewide exceedances of pollutants, except for ozone, are rarely seen, due to federal restrictions on emitters, mostly to Connecticut's west and southwest.**

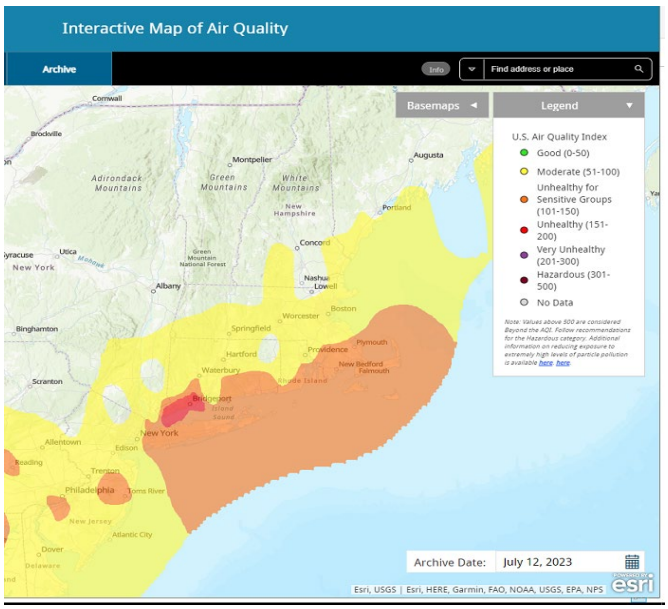
Air Pollutants



Connecticut experienced six days during the summer of 2023 when particulate matter (PM2.5) levels were elevated, primarily as a result of forest fires in Canada, making the air unhealthy. Exposure to particle pollution is linked to a variety of significant health problems, ranging from aggravated asthma to premature death in people with heart and lung disease. Fine particles are a health concern because fine particles can easily reach the deepest parts of the lungs.[9]

The image (below) illustrates a bad-air day in 2023 for ozone that was more intense than average but followed the typical pattern of Connecticut having the worst ozone pollution in New England.[10] The yellow areas indicate moderate air quality that meets the standard for ground-level ozone*, while the orange and red areas did not. Connecticut had 19 days in 2023 that exceeded the 8-hour ozone standard of 0.070 parts per million (ppm); Massachusetts had the next highest with ten days.[11]

Some residents in the yellow areas, who are unusually sensitive to air pollution, might have been adversely affected. Much of Connecticut's ground-level ozone originates in states to the west and southwest. Unless emissions in those states are reduced substantially, Connecticut residents are likely to continue to breathe unhealthful air. Past ozone control strategies for nitrogen oxides (NOx) have centered around point source electrical generating units, which have been effective in reducing long-range air pollutant transport into Connecticut. Increasingly, area sources and on-road / non-road mobile sources have become the dominant source of nitrogen oxides (NOx) production.[12]



Goal: While not formally stated, the goal is for Connecticut residents to have a "good air day", every day.

Technical Note: *The federal air quality standard for ozone was revised prior to the 2016 ozone season. The new standard (0.070 PPM over eight hours) is slightly more protective of human health than the older standard (0.075 ppm). **Lead (Pb) is not shown. Connecticut's lead levels have been below the national standard (NAAQS) since 1994.

Preserved Land

QUICK SUMMARY:

X COMPARED TO LAST REPORT
X COMPARED TO 10 YR. AVERAGE
X ON TRACK TO MEET GOAL

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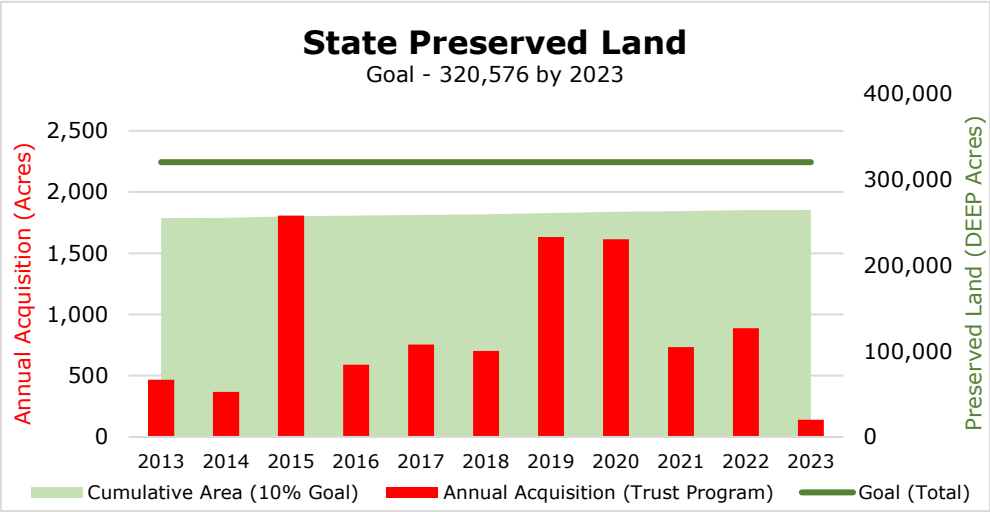
In 2023, the state acquired significantly less land than in 2022.

Goal #1: State Owned Land – ten percent



In 2023, the Department of Energy and Environmental Protection (DEEP) acquired 141 acres of land* under the Recreation and Natural Heritage Trust Program (Trust Program), the primary vehicle for adding land to the state's system of parks, forests, wildlife areas, water access areas, and other open spaces. The state invested more than $850,000 and leveraged $351,000 to acquire the 141 acres of land.[13]

The total area of land estimated to be preserved by DEEP as preserved open space is approximately 264,670 acres. Over the previous ten years, the state preserved an average of 956 acres per year. While DEEP has made progress to increase the amount of land preserved, DEEP's preservation efforts were 55,906 acres short of reaching the preservation goal of 320,576 acres by 2023. At the average acquisition rate of 956 acres per year (based on the previous ten years), it would take DEEP approximately 58 years to achieve the ten percent goal. In addition to the Trust Program, DEEP can issue a draft recommendation to the Secretary of the Office of Policy and Management (OPM) as to whether all or a portion of land or land interest, identified for transfer or sale by another state agency, should be preserved by transferring the land or land interest or granting a conservation easement to DEEP. No land or land interest was transferred to DEEP in 2023.

Open space provides Connecticut's residents with options for outdoor activities, preservation of scenic beauty, habitat protection, increased biodiversity, protection of unique bedrock and surficial geologic features, and water protection and flood control. In addition, forests, farmland and other natural habitats absorb more greenhouse gas (GHG) emissions than they emit.** Land conservation offers a double benefit for the climate: it helps absorb GHG emissions and it prevents significant GHG emissions that would result from development.

Goal #1: The State shall acquire ten percent of Connecticut's land for preserved open space. This goal was set in statute in 1997 (Connecticut General Statutes, (CGS) Section 23-8(b)).

Technical Note: *State land is primarily owned in fee by the State. A notable exception is a 111-acre easement acquired in 2020, which is included in the State acquisition total. State "preserved land" does not mean land that is not managed or harvested. The lands acquired by the state as open space might not be restricted from logging or other types of management or from recreational activities. **Nationally, in 2021, the Land Use, Land-Use Change, and Forestry (LULUCF) sector resulted in a net increase in carbon stocks, which represents an offset of approximately 13.1 percent of total (i.e., gross) greenhouse gas emissions.[14]

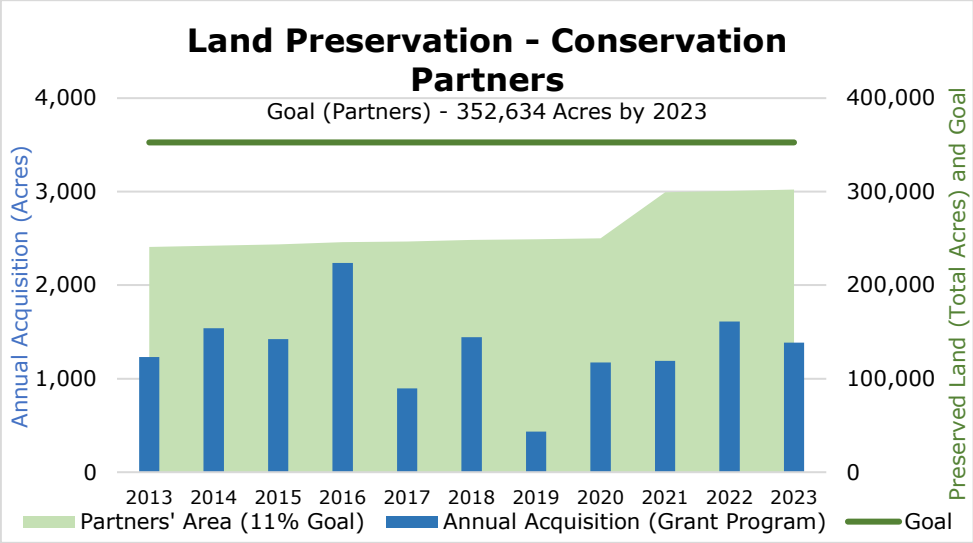
QUICK SUMMARY:

✗ COMPARED TO LAST REPORT

✓ COMPARED TO 10 YR. AVERAGE

✗ ON TRACK TO MEET GOAL

Goal #2: Other Conservation Lands – eleven percent



In 2023, state grants helped municipalities and land trusts acquire or protect 1,387 acres through the Open Space and Watershed Land Acquisition Grant Program (Grant Program), whereby DEEP provides financial assistance to municipalities and nonprofit land conservation organizations (conservation partners) to acquire land for open space.[15] The amount of land preserved as the result of grants from the Grant Program in 2023 was less than last year but greater than the ten-year average of 1,318 acres.

Unfortunately, the exact amount of land held by DEEP's conservation partners is very difficult, if not impossible, to determine because land trusts are continuously acquiring properties for conservation and outdoor recreation, the inventory of municipal land is incomplete, it is very difficult to track easements, and there is no centralized accounting of privately preserved lands. In 2023, the Council estimated that more than 302,240 acres were held as open space land in fee by DEEP's conservation partners. This would be approximately 86 percent of the goal of 352,634 acres. The spike in 2021, depicted in the chart above as "Partner's Area", is due to the addition of the Council's assessment of land trust land and water company land.

As noted above, it is estimated that DEEP has preserved approximately 264,670 acres (Goal 1) and its conservation partners "hold" approximately 302,240 acres (Goal 2) as open space for a total of approximately 566,910 acres or approximately 84 percent of the total statewide goal of 673,210 acres.

Public Act 23-196 contained provisions for an exception to the general program rule that state grants cannot be made for land that is already committed for public use. The result is that funds from the Grant Program might be able to be used to buy certain land to be preserved as open space, provided certain conditions are met. Further, Public Act 23-205 authorized $3 million in additional bonding for the Trust Program and $10 million in additional bonding for the Grant Program for both fiscal year (FY) 2024 and FY 2025.

Goal #2: Pursuant to CGS Section 23-8(b), "not less than eleven per cent of the state's land area is held by municipalities, water companies or nonprofit land conservation organizations as open space".

Forests

QUICK SUMMARY:

✓ COMPARED TO LAST REPORT

X COMPARED TO 10 YR. AVERAGE

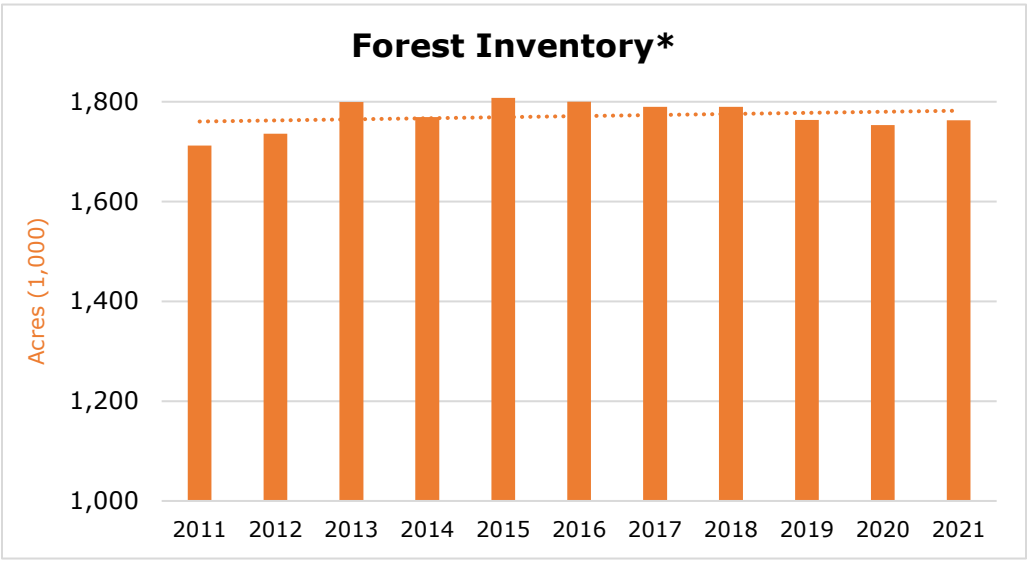
— ON TRACK TO MEET GOAL

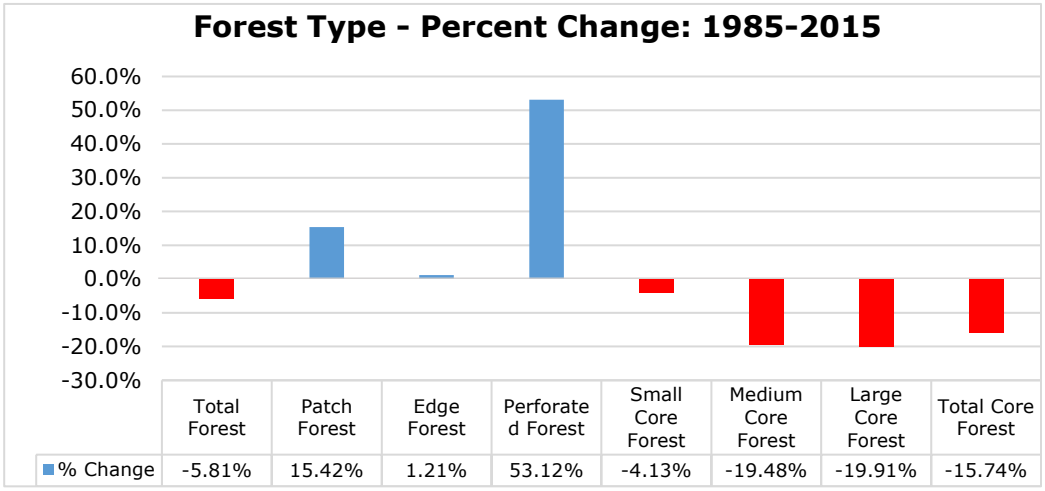
Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

Forest acreage has generally declined over the last five years. The reduction of core forests is especially concerning.

Forests and other natural habitats reduce water quality impacts associated with development, impervious surfaces, and certain agricultural practices; sequester and store carbon; and provide valuable habitat. Research is showing that visiting a forest has real, quantifiable health benefits, both mental and physical.[16]

Forest Inventory: It is estimated that forests cover between 57 – 60 percent of the land area in the state. The amount of forest land in Connecticut in 2021 (most recent data available) is estimated to have increased since the 2020 inventory but was less than the previous ten-year average.[17] Forest loss has stabilized somewhat from significant declines in forestland between the 1980s and early 2000s. In 1972, the first full year of the Council's existence, the amount of forest land in Connecticut was estimated to be 1,860,800 acres or roughly 59 percent of the area of the state.[18]





	Total Forest	Patch Forest	Edge Forest	Perforated Forest	Small Core Forest	Medium Core Forest	Large Core Forest	Total Core Forest
% Change	-5.81%	15.42%	1.21%	53.12%	-4.13%	-19.48%	-19.91%	-15.74%

Core Forest Acres**: Core forests are defined as unfragmented forest land that is 300 feet or greater from the boundary between forest land and nonforest land. Core forests provide habitat for many species of wildlife (edge-intolerant species), provide connectivity and corridors for species migration, and increased opportunity to maintain overall biodiversity. These larger blocks of forest are generally more important for wildlife habitat, drinking water supply protection, and ecological resilience. The loss of core forests diminishes the remaining forests' water purification and habitat values, and could result in heavier runoff, which might lead to poorer

water quality.[19] Forests that are fragmented, or divided by roads and development, provide some forest functions but do not contribute the full range of ecosystem services that core forest do. Fragmented forests*** are not able to provide the needed habitat for some species of wildlife, and, in many cases, less opportunity for a variety of recreational activities. Invasive species of plants and animals often colonize areas in the wake of activities that result in fragmented forests.

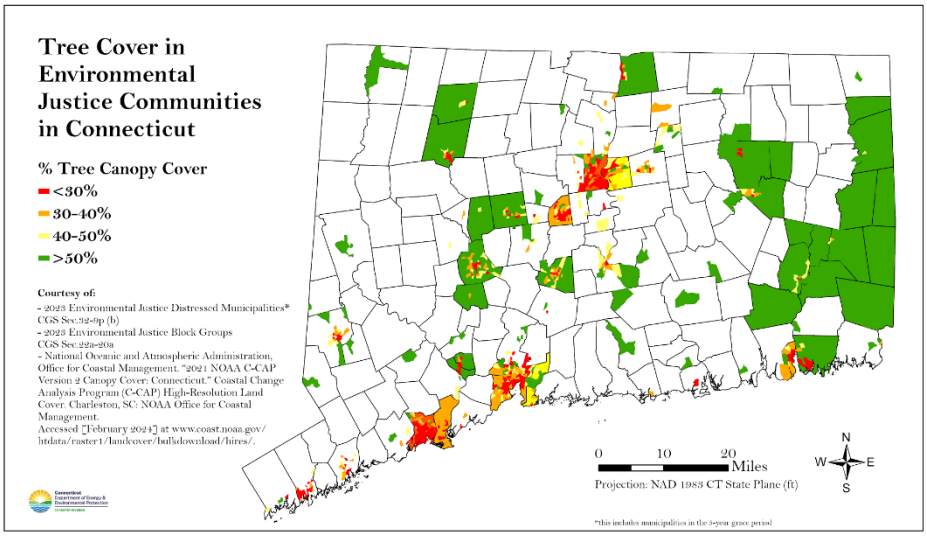
As depicted in the chart above, medium (250-500 acres) and large (>500 acres) core forests have seen the greatest percentage decline since 1985. Perforated forests have seen the greatest percentage increase over that same time period; however, perforated forests only make up about five percent of forest type in Connecticut. Overall, total core forest area has declined by more than 15 percent over the last 35 years.[20]

Connecticut's forests offer an ability to sequester and store carbon above and below ground in their roots, trunks and branches and as long-lived wood products (e.g., carbon stored in lumber and furniture). Carbon sequestration rates and storage vary by stand age, tree species, growing conditions (including soil type, regional climate, topography), and disturbance regimes (natural or silvicultural).[21] Carbon sequestration is also impacted by the type of trees that comprise the forest. Forests comprised of Oak/Hickory and Maple/Beech/Birch groups store a significant amount of carbon per hectare. These forest types combined comprise about 74 percent of Connecticut's forests, by area.[22]

In the northeastern United States, carbon sequestration rates typically peak when forests are around 30–70 years old, but trees continue to sequester carbon through their entire life span. Approximately 85 percent of Connecticut's forests, by area, are over 61 years of age.

Urban Forests[23]

Urban forests are composed of all trees within urban areas. Urban forests differ from rural forests in that urban forests typically have a lower density and percent of tree cover, and the trees are often associated with human activity and built structures. In 2020, (most recent data available) approximately 35 percent of Connecticut's land area was designated as "urban".[24] Connecticut also had one of the highest urban tree cover in the nation at 61.6 percent (2014).[25] Urban trees and forests help keep cities cooler and absorb storm water, help filter the air and water, maintain biodiversity, and increase resilience to climate change impacts.[26]



Goal: "Keeping forest as forest" is the overarching goal of Connecticut's 2020 Forest Action Plan. Public Act 23-206, Section 2 established a goal for environmental justice communities with current tree canopy cover less than 40 percent to increase the tree canopy area by five percent by 2040.

Technical Note: *The vertical axis in the "Forest Inventory" chart above has been shortened, beginning at 1,000 (1,000 acres) or one million acres rather than the customary zero. **Estimates of core forest acres were derived from data of the University of Connecticut's (UConn) Center for Land Use Education and Research (CLEAR), which uses satellite imagery to identify forests that are at least 300 feet from non-forest development, such as roads, buildings and farms. ***Fragmented forests consist of patch forest, which is forest along the edge of an interior gap in a forest that are degraded by "edge effects"; edge forest, which is forest along the exterior perimeter of a forest that are degraded by "edge effects"; and perforated forest, which consists of small, isolated fragments of forest that are surrounded by non-forest features and completely degraded by "edge effects".[27]

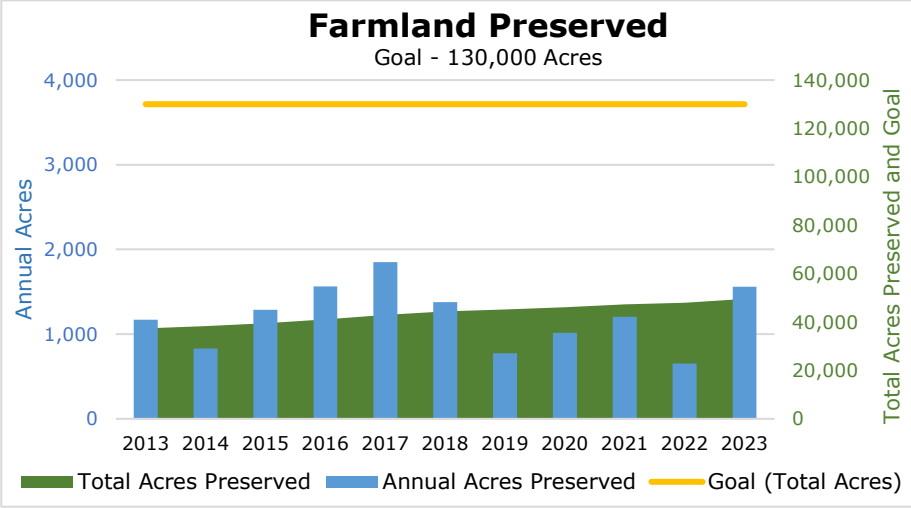
Farmland

QUICK SUMMARY:

- ✓ COMPARED TO LAST REPORT
- ✓ COMPARED TO 10 YR. AVERAGE
- ✗ ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

More agricultural land was preserved in 2023 than last year and the previous ten-year average.



In 2023, Connecticut preserved 1,559 acres of agricultural land, which was approximately 33 percent greater than the previous ten-year average of 1,172 acres. The number of farmland properties preserved in 2023 was 23, the average acreage per farmland property was 68, and the average cost per acre was $5,698, which was 13 percent greater than the average cost per acre for the previous three-year period (2020-2022).[28]

The cumulative acreage preserved by the Connecticut Department of Agriculture (DoAg), which began preserving agricultural land by purchasing development rights in 1978, has increased slowly and now totals approximately 49,600 acres. Council projections prepared in 2023 indicate that it would take approximately 66 years to achieve the state's farmland preservation goal of 130,000 acres, based on the average annual acquisition rate for the last ten years (1,211), including 2023. During that time, additional farmland can be expected to be lost to development.

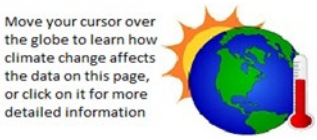
In addition to the production of food and agricultural products, Connecticut's farms have a role in mitigation of, adaptation to, and resiliency from the negative impacts of climate change. Well managed farms store carbon from the atmosphere in soils and plants, capture and store water from extreme precipitation events, and provide for bio-mass derived renewable energy. Soil is one of the sinks for atmospheric carbon, and one that can be managed to mitigate the effects of climate change.[29]

The total land area in farms in Connecticut for 2022 was estimated at 380,000 acres (most recent data available), which was unchanged from 2021 data. In 1982, the total land in farms in Connecticut was reported to be approximately 444,200 acres, a loss of approximately 64,000 acres or 14.5 percent.[30] The rate of farmland loss may change as demand for locally produced food and agricultural products increases or as development pressure increases, such as for electricity generation. As detailed in the solar photovoltaics indicator, there are provisions for the DoAg to review certain solar proposals* on agricultural land and determine if such development would "materially affect" the status of such land as prime farmland.

Goal: The Connecticut Farmland Preservation Program aims to protect 130,000 acres of Connecticut's most productive farmland.

Technical Note: *Some of the proposals on agricultural land included some type of agricultural co-use activities at the sites, such as sheep grazing. The potential agricultural viability of the co-use activities is unknown.

Inland Wetlands



Inland Wetlands:
In Connecticut, inland wetlands are defined as land, including submerged land (not including tidal wetlands) "which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soil Survey, as may be amended from time to time, of the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture (USDA)".[31] According to data from the USDA's NRCS, there are or were approximately 95,000 acres underlain by alluvial and floodplain soils and 366,000 acres underlain by poorly drained and very poorly drained soils in Connecticut. Collectively, the area underlain by these soils is estimated to account for approximately 14 percent of the total area in Connecticut.

Implementation of the inland wetlands law has been problematic.
In 1972, the state legislature enacted the Inland Wetlands and Watercourses Act (IWWA), which provides a regulatory process to protect wetlands. Activities that are likely to affect inland wetlands and watercourses are regulated by each town's municipal inland wetlands agency; however, there is no standard requirement for regulation of the upland area adjacent to identified wetlands. Regulated activities include, but are not limited to, filling, dredging, clearing, grubbing, grading, piping, culverting, channelizing, diverting, damming, dewatering or otherwise temporarily or permanently altering inland wetlands and watercourses. A report by the Council in 2008, *Swamped*, identified a number of problems with how the law was being implemented. Though some improvements have been made, such as the provision of online training* and an electronic complaint reporting form to file a coastal or inland water resource complaint, there remain structural impediments to efficient implementation:

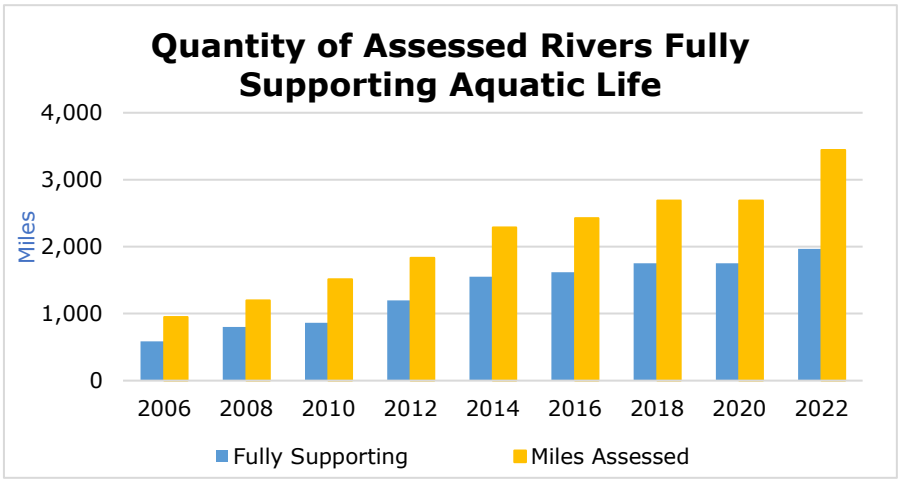
- The requirement that at least one member of a municipal inland wetlands agency be trained is not enforced. This is due, in part, to the limited staff resources at the Department of Energy and Environmental Protection (DEEP) assigned to assist municipal wetland agency officials.
- Extending the Memorandum of Understanding with the University of Connecticut and securing funding for the online training program for municipal inland wetland officials has not been determined, by DEEP, beyond the summer of 2024.
- Data that are required to be submitted by municipalities on the actions of their inland wetlands agencies are not automatically entered into a database. This requires the limited staff resources at DEEP to transfer the data that DEEP receives on written or emailed forms into a database manually.

Wetlands serve many functions; one of them being their unique ability to store and sequester carbon. Forested wetlands, which comprise most of the inland wetlands in the state serve as important carbon sinks and continue to sequester carbon as organic matter within the forested system (both above and below ground). Tidal wetlands remove more carbon dioxide (CO_2) from the atmosphere per hectare than forests. Although tidal wetlands are generally better carbon sinks than freshwater wetlands, the substantial extent of forested wetlands across the state should be recognized as important to greenhouse gas (GHG) mitigation strategies and incorporated into inland wetland protection efforts in Connecticut. [32]

Technical Note: *Connecticut General Statutes (CGS) Section 22a-42(d) requires that at least one member of the inland wetlands agency or staff of the agency be a person who has completed the comprehensive training program. The online training program fulfills the requirement pursuant to Connecticut General Statutes (CGS) Section 22a-42(d) that at least one member of the inland wetlands agency or staff of the agency be a person who has completed the comprehensive training program. This course also fulfills the training requirement for duly authorized agents pursuant to CGS Section 22a-42a(c)(2).

Rivers, Lakes, and Estuaries

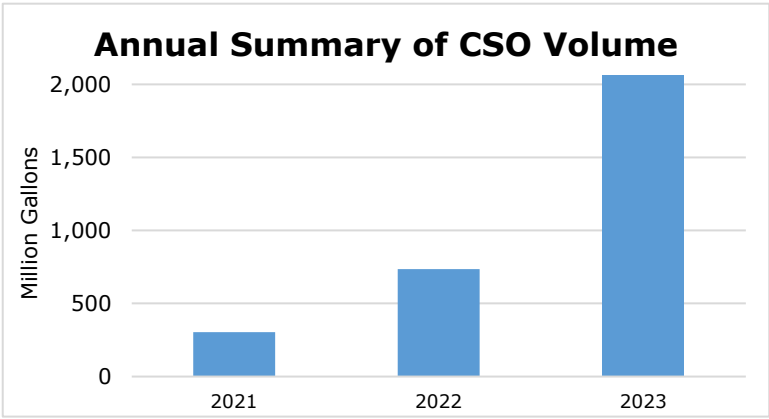
Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information



The Department of Energy and Environmental Protection (DEEP) assesses* water quality for each designated use (aquatic life, recreation, and fish consumption) for some waterbodies in the state, which characterizes whether or not the water is suitable for that designated use.

Water quality in the state has improved over the last few decades as a result of protective laws, remediation efforts, and investment in wastewater treatment infrastructure. While there has been an increase in the number of river miles assessed, there has been a slight decrease in the percentage of assessed river miles that fully support aquatic life. In addition, there has been little change in percentage of assessed lakes and estuaries that "fully support" aquatic life in recent years.[33]

Goal: Section 101(a)(2) of the CWA (1972) established a national goal for "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable".



Combined sewer overflows (CSOs) occur when wastewater and stormwater are conveyed together to larger bodies of water, with little or no treatment provided prior to discharge. As depicted in the chart, more than two billion gallons were released to waterbodies in 2023.**

The discharge of untreated or partially treated sewage can have significant impacts on water quality. All of the volume from the CSOs come from five treatment facilities: Bridgeport East, Bridgeport West, City of Norwich, Metropolitan District Commission (MDC) and Greater New Haven Water Pollution Control Authority (GNHWPCA). Extreme weather events/precipitation in 2023 is the primary reason for the significant increase in CSO volume in 2023. The type of precipitation event that triggers a CSO is very specific and dependent on the duration and intensity of an event, the level of saturation of ground conditions during the event, and the capacity and structural condition of a municipality's combined sewer system.[34]

Technical Note: *Section 305(b) of the Federal Clean Water Act (CWA) requires each state to monitor, assess and report on the quality of its waters relative to designated uses. **In 2012, Public Act 12-11 required DEEP to post the locations and relevant information of combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) in the state. In 2021, Public Act 21-42 added language to better clarify what types of sewage spills must be reported. This included permitted sewage bypasses and the removal of the 5,000-gallon reporting threshold, which was replaced with the requirement to report any sewage spill or permitted bypass reaching water or that may come into contact with the general public.

The Water of Long Island Sound

QUICK SUMMARY:

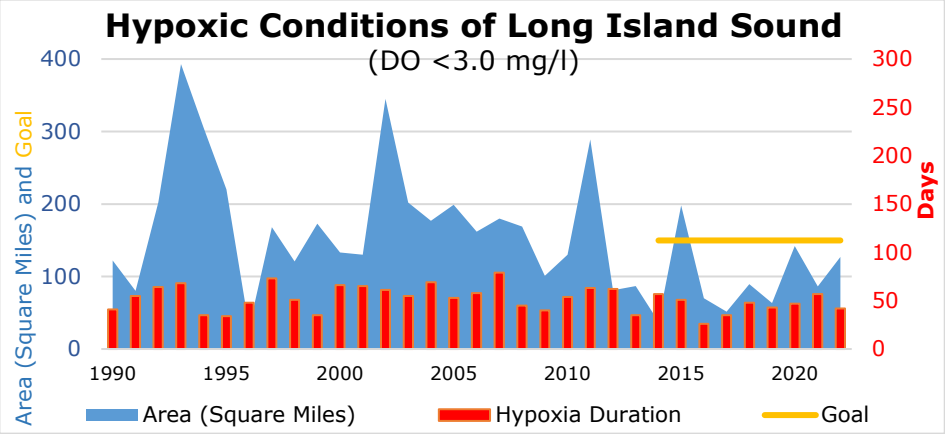
COMPARED TO LAST REPORT

COMPARED TO 10 YR. AVERAGE

ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

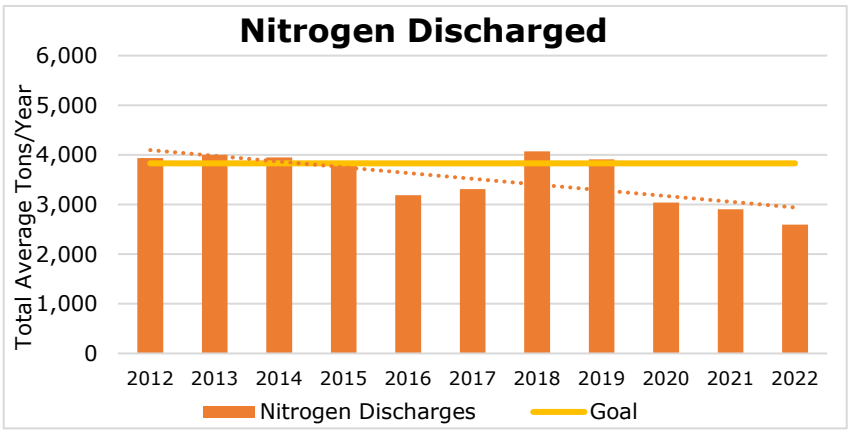
The area of Long Island Sound with hypoxic conditions increased in 2023.



The maximum area of Long Island Sound with hypoxia, which is water with a dissolved oxygen (DO) concentration less than 3.0 milligrams per liter (mg/l), increased from 87 square miles in 2022 to approximately 127 square miles in 2023. The area of hypoxia for 2023 was also approximately 28 percent greater than the previous ten-year average. However, the duration of the hypoxic conditions decreased from 57 days in 2022 to 42 days in 2023.[35] Most, if not all, of the hypoxic conditions are found in the western basin of the Sound, which is also affected by contributions from New York State. The primary cause of hypoxia is nutrient pollution, primarily nitrogen and phosphorus, from runoff and wastewater treatment effluent that fuels the growth of phytoplankton in the Sound. Several factors, such as the state's Nitrogen Control Program, improvements to wastewater treatment facilities, and better controls for stormwater runoff have reduced the area of hypoxic conditions in the Sound since pre-2000 levels.

Goal: The goal line on the top chart is an approximation of the maximum area (~150 miles^2) of the hypoxia target to "measurably reduce the area of hypoxia in Long Island Sound … by 2035, as measured by the five-year running average…" (2015).[36]

Nitrogen discharged in 2022 was lower than the previous ten-year average.



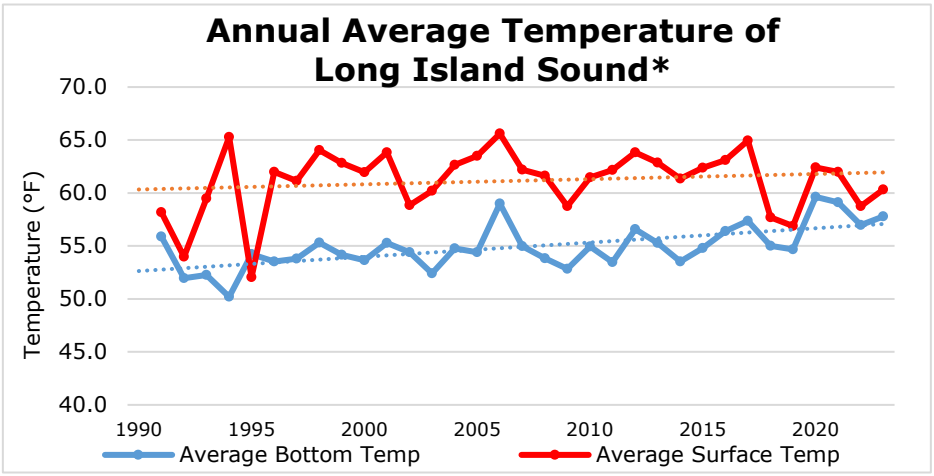
Connecticut has reduced nitrogen discharges over the last decade by investing in nitrogen-removal technology at sewage treatment plants and implementing a Nitrogen Control Program; however, reducing nitrogen discharges from non-point sources remains a challenge. The decline in nitrogen discharged in 2022 (most recent data available) is attributed to warmer weather, which is more conducive to nitrogen removal, and because 64 municipalities out of 78 participating in nitrogen credit exchange program upgraded wastewater treatment facilities that enhance nitrogen removal.[37]

Goal: Substantial reduction of nitrogen discharges is a goal that is shared by Connecticut and New York (2001). Connecticut established a goal of a maximum of 3,830 tons per year of nitrogen by 2014.[38] Nitrogen discharges "upstream" of Connecticut also contribute to the nitrogen loading.

The Warming and Rising Waters of Long Island Sound

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

Annual average bottom and surface water temperature increased from the previous year.

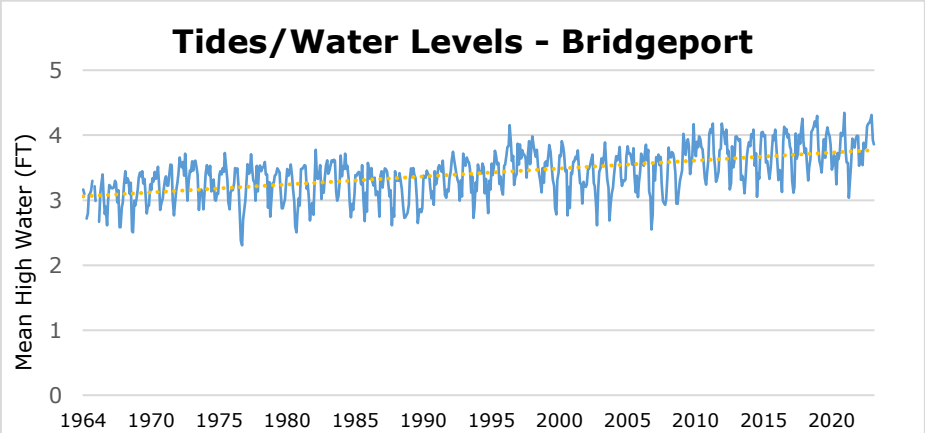


In 2023, the annual average surface water temperature for the Sound (60.3°F) was less than the average for the previous 30 years (61.53°F), while the annual average bottom water temperature for the Sound (57.8°F) was greater than the average for the previous 30 years (54.9°F).[39]

Annual variations in water temperature and water levels in the Sound are less important than longer term trends. The trends for average annual bottom and surface temperature of the water in Long Island Sound have been rising, with the average bottom temperature rising at a faster rate than the surface water. While the long-term impact of warmer water in the Sound is unknown, species diversity and biomass remain high, although there has been a shift to more warm water tolerant species.

Water levels in the Sound are also increasing.**

The average monthly value for mean high water (MHW) for 2023 at Bridgeport was 3.86, which was higher than the average monthly MHW for the previous 50 years (3.41).[40] As depicted in the chart, the trend for water levels at Bridgeport over the last almost 60 years is increasing. The natural "migration" of wetlands landward in response to sea level rise is prevented in many places by fill and development. As a result, shore birds that nest in coastal areas, such as the piping plover, might be displaced.



Goal: While there is no established goal for water temperature or sea level rise in Long Island Sound, it is assumed that a significant increase in temperature and water level is not a desired outcome.

Technical Note: *The vertical axis in the average temperature of Long Island Sound chart above has been shortened, beginning at 40.0°F rather than the customary zero. **The relative sea level trend is 3.33 millimeters/year (mm/yr) with a 95 percent confidence interval of +/- 0.38 mm/yr based on monthly mean sea level data from 1964 to 2023 which is equivalent to a change of 1.09 feet in 100 years.[41]

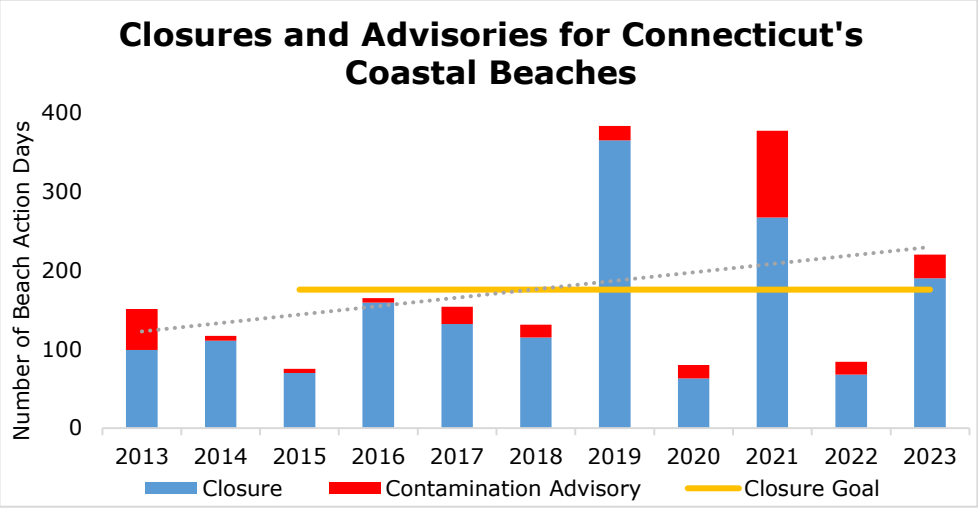
Swimming

QUICK SUMMARY:

X COMPARED TO LAST REPORT
X COMPARED TO 10 YR. AVERAGE
— ON TRACK TO MEET GOAL

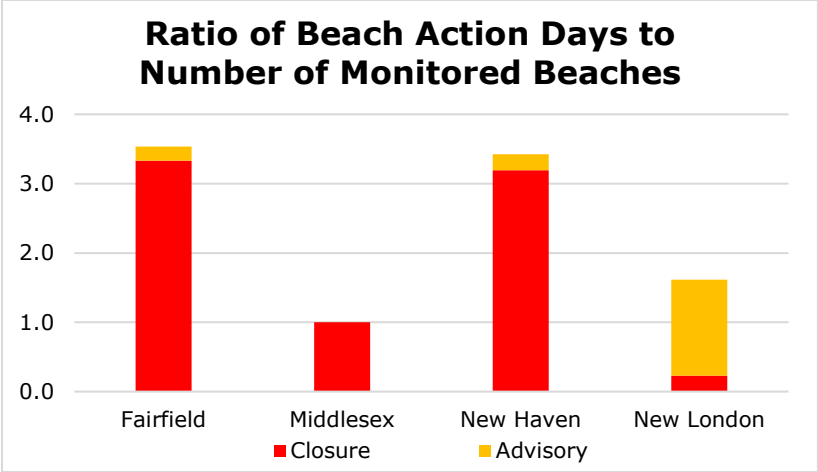
Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

Coastal swimmers saw more beach actions* in 2023.



There were 220 beach action days for all 73 reporting coastal beaches in Connecticut in 2023. Of the 220 beach action days, which was approximately 21 percent greater than the previous ten-year average (181), 190 (86 percent) were closures and 30 (14 percent) were contamination advisories. Of the 220 beach action days, 54 percent were "preemptory actions" due to rainfall, while 46 percent were due to elevated levels of bacteria.[42] Precipitation in the summer of 2023, which was approximately 50 percent greater than the previous 30-year average, and the resulting increase in combined sewer overflows, were likely the reasons for the increase in beach action days in 2023. The chart above displays both closings and advisories at Connecticut's public coastal beaches since 2013, which from a water quality perspective are functional equivalents. The beach-specific advisories or closings are issued by the reporting state or local government entity.

Because the number of beaches varies by county, the Council utilizes a ratio of beach action days (closures and advisories) to the number of reporting beaches in each county to illustrate the relative impact that pollution has on coastal recreation waters. Typically, the western half of the coastline, which has more impervious surfaces, sees the most beach actions.



Goal: The goal for keeping beaches open is to reduce the number of beach closings in half by 2035 from 2014, with the number for 2014 calculated using a five-year rolling average (2015).[43]

Technical Note: *A beach action can include beach-specific advisories or closings issued by the reporting state or local governments. A beach action is recorded for a beach even if only a portion of the beach is affected. During a beach closure, water conditions are deemed unsafe for swimmers and other users. "Preemptory actions" (advisory/closure) that some jurisdictions issue to inform the public of possible fecal contamination, based on past experience, prior to receiving from the laboratory a confirming water quality.

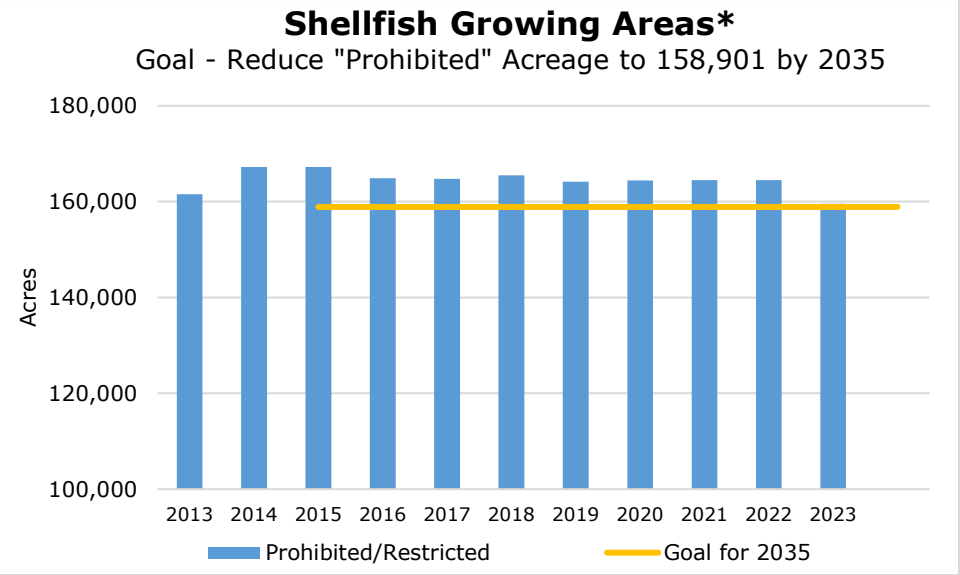
sample

Clamming and Oystering

QUICK SUMMARY:
- ✓ COMPARED TO LAST REPORT
- ✓ COMPARED TO 10 YR. AVERAGE
- ✓ ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

The area of the Sound designated as prohibited or restricted for harvesting shellfish decreased in 2023.



The acreage of shellfish growing areas that are designated as "restricted", which includes "prohibited", "restricted relay", and "conditionally restricted relay" decreased by 4,942 acres in 2023 from the previous year. However, the area of "prohibited" shellfish growing areas, which is determined by bacteria contamination and is an indicator of poor water quality, actually increased by 632 acres from the previous year. Changes in the classification of shellfish growing areas are usually related to improvement or decline in water quality, based upon the results of water quality monitoring and/or updated sanitary survey findings. However, in 2023, changes in the classification mapping for shellfish beds that extended offshore of Madison was largely responsible for the reduction of 5,062 acres in the "restricted relay" category.[44] The Connecticut Department of Agriculture's (DoAg) Bureau of Aquaculture (BoA) monitors water quality and classifies shellfish growing areas according to their potential for yielding healthful, uncontaminated shellfish. There is a total of approximately 390,000 acres of shellfish beds managed by the DoAg, BoA.

Water quality assessment criteria for shellfishing as a designated use only applies to inner-shore, and mid-shore estuarine waters where shellfish growth is viable, which is approximately 50 percent of Connecticut's estuarine waters. Only about 20 percent of the estuarine waters identified as assessed in the 2022 Integrated Water Quality Report can fully support shellfish harvesting from Class SA waters.** Meanwhile, the percent of estuarine waters that can fully support shellfish harvesting from Class SB waters remains unchanged from the 2020 report at approximately 62 percent.[45]

Goal: The goal for marine shellfishing is to "upgrade 5 percent of the acreage restricted or closed for shellfishing in 2014 by 2035" (2015).[46] The "restricted or closed" acreage in 2014 totaled 167,264 acres, which included areas designated by DoAg as "prohibited", "restricted relay", and "conditionally restricted relay". Therefore, the goal is a reduction of restricted or closed acreage to 158,901 acres by 2035, shown on the chart as a gold horizontal line.

Technical Note: *The vertical axis in the chart above has been shortened, beginning at 100,000 acres rather than the customary zero. **SA waters allow shellfish harvesting for direct human consumption where authorized, whereas SB waters allow shellfish harvesting with depuration or relay where authorized. Depuration is the action or process of freeing something of impurities. In the case of shellfish, this usually means moving the shellfish to areas with better water quality.

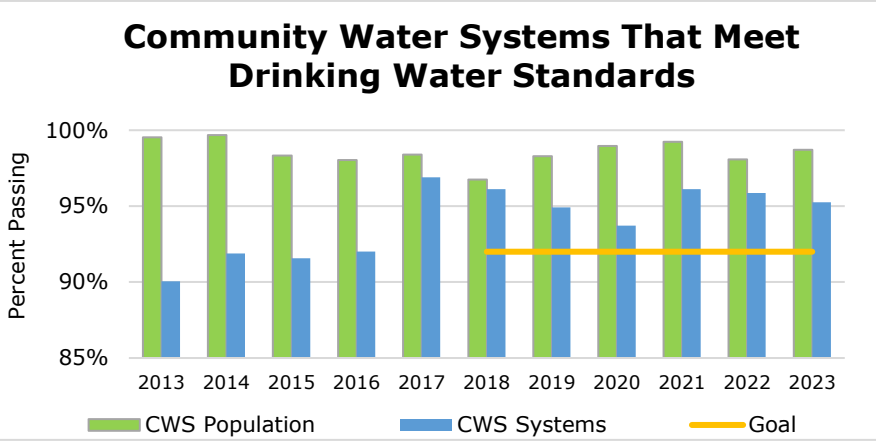
Drinking Water

QUICK SUMMARY:

- COMPARED TO LAST REPORT
- COMPARED TO 10 YR. AVERAGE
- ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

Drinking water quality in 2023 was very good, but chloride was again the most common contaminant detected in public water systems.



This indicator shows that 98.7 percent of the population served by community water systems (CWS) and 95.3 percent of all CWS demonstrated full compliance with applicable drinking water standards, based on an annual average. Data for 2023 also indicates that the percentage of the population served by CWS and the CWS were greater than the previous ten-year annual average of 98.5 percent and 93.9 percent, respectively.[47] By far, the most common problem during 2023 in water systems was excessive levels of chloride, which is typical of most years. [48] Source water protection is important for ensuring the safety and quantity of drinking water supplies.

In June 2022, the Connecticut Department of Public Health (DPH) updated the "Drinking Water Action Level for Per And Polyfluoroalkyl Substances (PFAS) and renewed its recommendation to all public water systems to test the water delivered to their customers for PFAS.[49] Public Act 23-74 established an account to provide municipalities with grants or reimbursements to test for PFAS contamination in drinking water supplies and remediate any such contamination.

Over 80 percent of people in Connecticut are supplied by the public water systems, while the remainder of the population primarily relies on private wells, which are not monitored by any government agency and are not counted in this indicator. An unknown number of private wells are contaminated by pollution or naturally occurring toxins, such as arsenic and uranium. A 2020 United State Geological Survey study of groundwater samples collected from more than 2,000 private wells in bedrock aquifers in Connecticut found that 3.9 percent of collected samples contained arsenic concentrations greater than the U.S. Environmental Protection Agency's (EPA) maximum contaminant level (MCL) of 10 micrograms per liter (µg/L), and 4.7 percent of collected samples contained uranium concentrations greater than the EPA MCL of 30 µg/L.[50] The DPH provides guidelines for testing of private wells.

Public Act 22-58 made several changes affecting water quality testing for private and semipublic wells, including a requirement that property owners test the water quality of their newly constructed private or semipublic wells, and provide prospective homebuyers and renters with educational materials on well testing.

Goal: By 2018, 92 percent of community water systems will provide drinking water that meets all applicable health-based drinking water.[51]

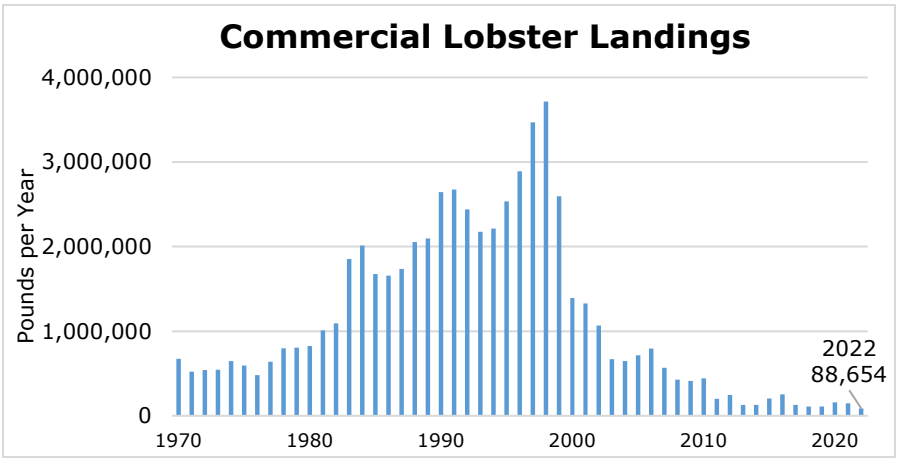
Technical Note: *The vertical axis in the chart above has been shortened, beginning at 85 percent rather than the customary zero.

Lobster and Fishes of Long Island Sound

QUICK SUMMARY:
- ✗ COMPARED TO LAST REPORT
- ✗ COMPARED TO 10 YR. AVERAGE
- — ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

Long Island Sound's species are trending towards animals that prefer warm water, and lobster landings decline to an all-time low.

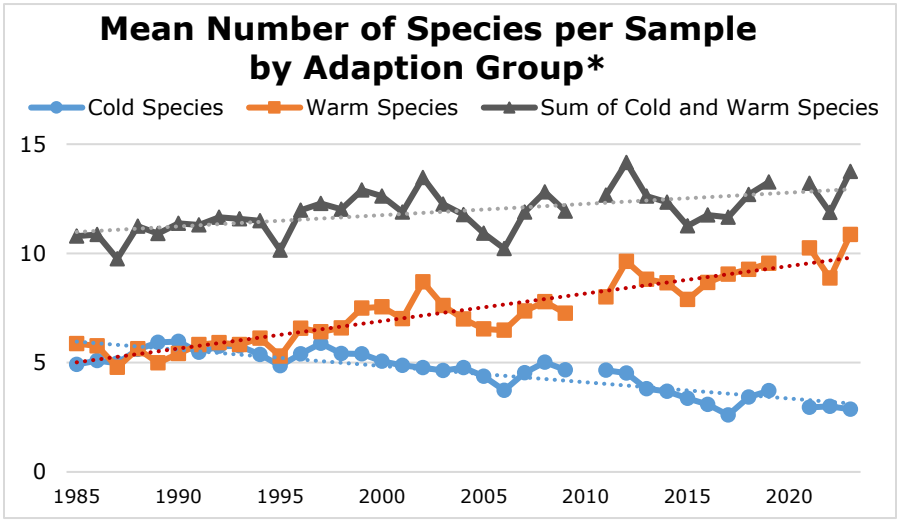


Lobster, which thrive in cold water, have become less common in Connecticut waters. Lobster landings in the state have declined dramatically from a high of over 3.7 million pounds in 1998 to a low of 88,654 pounds in 2022 (most recent data available). Lobster landings in 2022 decreased by 40 percent from 2021 levels and decreased by 45 percent from the previous ten-year average.[52]

Researchers have investigated several possible causes for the dramatic downturn in lobster populations since 1998 including disease, changes in water quality, changes in climatic conditions and other human impacts to Long Island Sound, such as the presence of pesticides. The increase in water temperature may not negatively affect the availability of thermally suitable habitat; however, warmer temperature has been linked to the increased prevalence of epizootic shell disease, caused by bacteria.[53]

QUICK SUMMARY:
- ✓ COMPARED TO LAST REPORT
- ✓ COMPARED TO 10 YR. AVERAGE
- — ON TRACK TO MEET GOAL

The decline in lobsters was also confirmed by the Department of Energy and Environmental Protection's (DEEP) spring and fall trawl surveys, which recorded a geometric mean of approximately 0.01 lobsters per tow (fall) in 2023.



The chart above shows the mean number of fish species caught during the spring and fall surveys combined. The trends show that the average number of warm-adapted species increased while the average number of cold-adapted species decreased over time. The difference is particularly evident in the fall when water temperatures are highest. Although overall finfish diversity in the Sound remains high, the composition of the finfish community is changing in favor of species tolerant of warmer temperatures.[54]

Technical Note: *Data from 2010 and 2020 are missing for the marine species chart because no fall and/or spring surveys were conducted those years. Finfish species captured in the Connecticut DEEP Long Island Sound Trawl Survey were divided into adaptation groups based on their temperature tolerance and seasonal spawning habits.

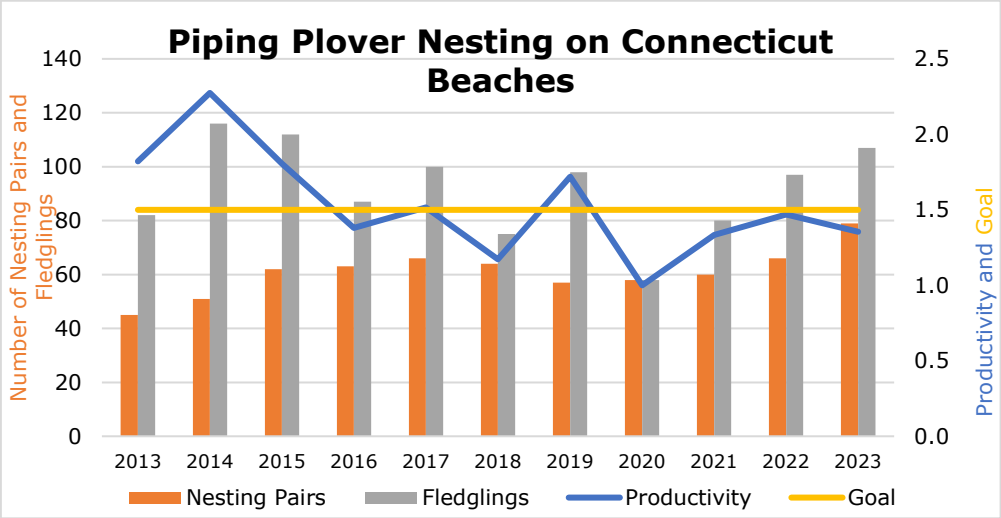
Piping Plovers

QUICK SUMMARY:

XX COMPARED TO LAST REPORT
XX COMPARED TO 10 YR. AVERAGE
— ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

The number of plover chicks to reach flight age or "fledge" in 2023 was greater than in 2022, but productivity declined.



Piping plovers are small shorebirds that nest only on sandy beaches with sparse vegetation. In 2023, piping plovers in Connecticut raised an average of 1.35 chicks per nest. While productivity was good in 2023, it was less than last year (1.47), the goal (1.5), and the previous ten-year average (1.55). In 2023, 79 nesting pairs successfully raised 107 young plovers (fledglings) on Connecticut beaches. The number of nesting pairs and fledglings both increased from the previous year by twenty percent and ten percent, respectively. Some of the causes for the lower than average productivity in 2023 was attributed to predation and human/pet interaction.[55] Scientists estimate that each pair must successfully raise an average of 1.20 young per year to maintain a stable population and an average of 1.50 young per year to successfully increase the population of piping plovers to sustainable levels. Since protection and monitoring efforts began in 1984, nesting success has generally improved, resulting in more returning adults in subsequent years.

Public Act 23-155 allows the Commissioner of the Department of Energy and Environmental Protection (DEEP) to establish a seabird and shorebird protection program, including the designation of protected areas on state-owned public property within the state's coastal area and penalties for disturbing such designated areas. No seabird and shorebird protection areas were designated in 2023 because that provision of the law became effective in October 2023, which was after the nesting/breeding period.

The piping plover population is, according to the United States Fish and Wildlife Service (USFWS), "an indicator of the health of the fragile beach ecosystem."[56] Their habitat is a narrow strip squeezed between a rising Sound and higher ground. If their habitat is able to migrate upslope and inland in response to sea level rise, breeding areas could increase. However, habitat loss is anticipated on 45 percent of sandy ocean beaches that are already developed. Coastal flooding during breeding season might also affect piping plover breeding success by flooding nests and thereby increasing chick mortality.[57]

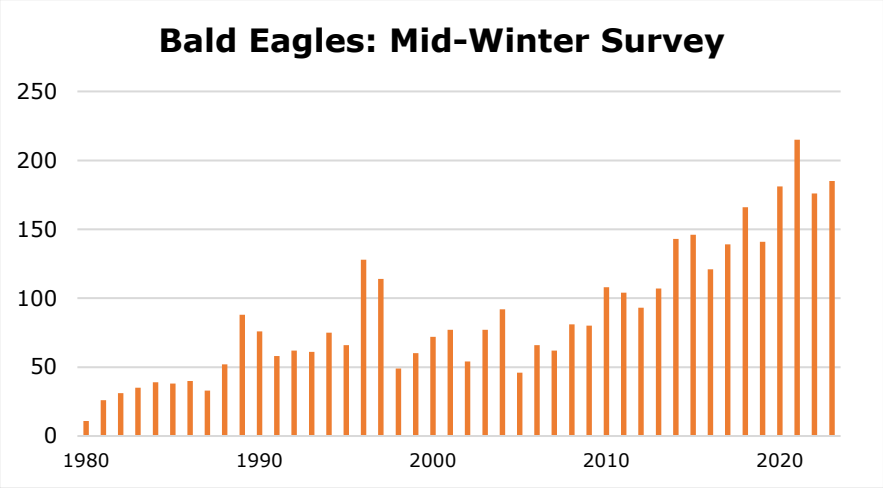
Goal: The goal for piping plover was derived from the Piping Plover Atlantic Coast Population Revised Recovery Plan (1996). That Plan's goal calls for 2,000 pairs along the east coast with 625 pairs throughout New England, and a five-year average productivity of 1.5 fledged chicks per pair. According to the U.S. Fish and Wildlife Service's 2019 Atlantic Coast Piping Plover Abundance and Productivity Estimates, there were 2,008 breeding pairs along the Atlantic coast, with over 980 breeding pairs in New England![58]

Raptors

QUICK SUMMARY:
- ✓ COMPARED TO LAST REPORT
- ✓ COMPARED TO 10 YR. AVERAGE
- — ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

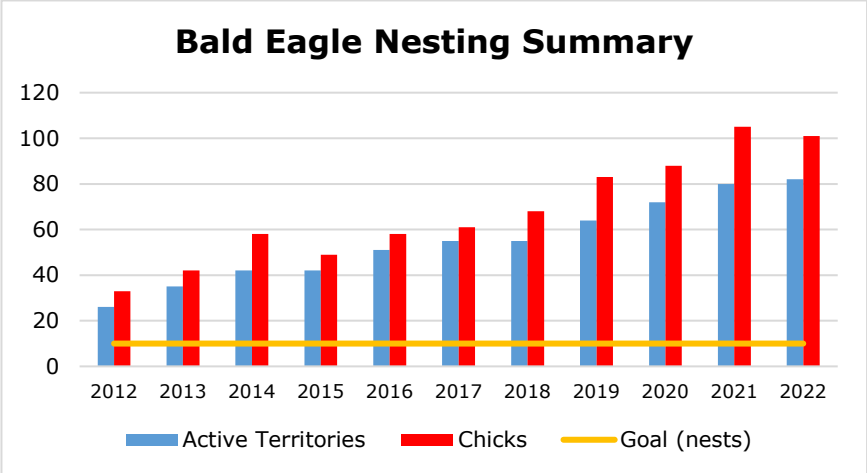
Bald eagles and ospreys continue their dramatic comeback!



The 2023 mid-winter survey in Connecticut recorded 185 eagles throughout the state. Since 1980, observations of eagles during the Midwinter Eagle Survey have increased significantly.[59] The number of eagles recorded in 2023 was five percent greater in 2022 and approximately 20 percent greater than the previous ten-year average.

Bald eagles are a representative species that require 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.

In 2022 (most recent data*), there was a record number of bald eagles active territories in the state, with at least 82 active territories across 67 towns. Over the past three decades, at least 933 chicks have been produced by Connecticut nests.[60]



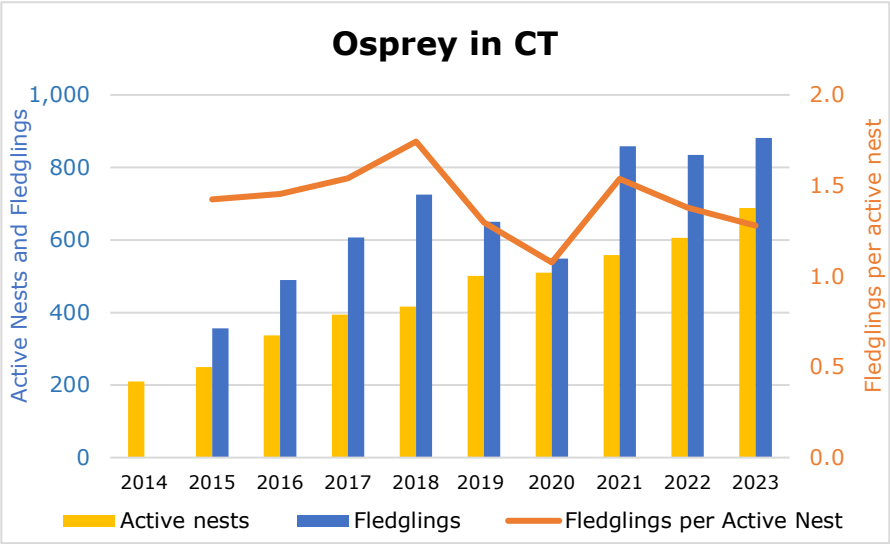
By the 1950's, the bald eagle was no longer a nesting species (extirpated) in Connecticut. The bald eagle was first declared an endangered species with the passage of the federal Endangered Species Act in 1973. Populations eventually began to recover due to the ban on the pesticide DDT over five decades ago; the successful reintroduction programs of fostered chicks and fledglings; and habitat and nest protection measures. In 1995, the United States Fish and Wildlife Service (USFWS) reclassified the bald eagle from endangered to threatened in the lower 48 states. Populations continued to recover enough that, in 2007, the bald eagle was officially removed from the federal Endangered Species List; however, bald eagles are still protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. When Connecticut's first official Endangered, Threatened, and Special Concern Species List was passed in 1992, the bald eagle was classified as "endangered". Because of the increase in nesting pairs in recent years, the bald eagle's status in the state was reclassified as "threatened" in 2010.[61]

Goal: The goal for bald eagles is derived from the 1983 Northern States Bald Eagle Recovery Plan, prepared by the USFWS. The Plan established a goal of 20 breeding birds (10 nests) for Connecticut. According to experts in the Bald Eagle Study Group, Connecticut could eventually host up to 200 nesting eagles (100 nests).

Osprey:

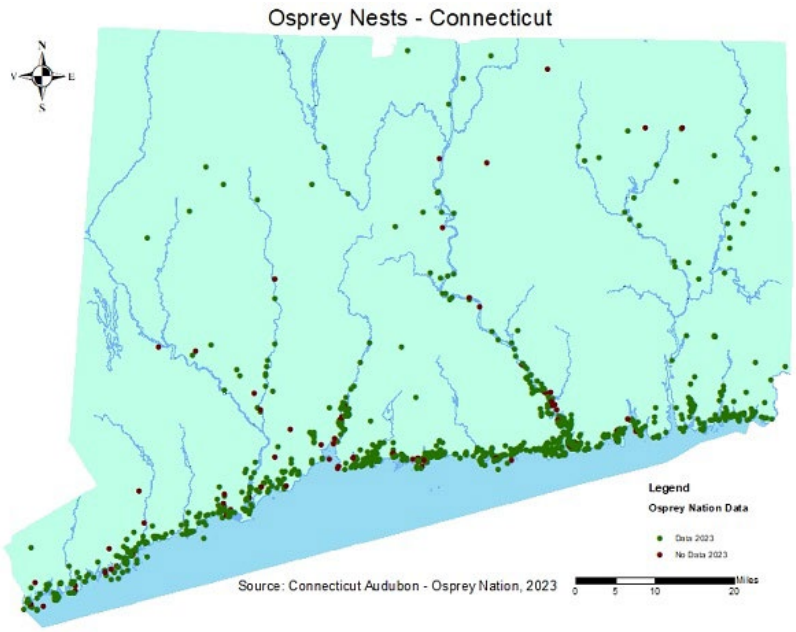
QUICK SUMMARY:

✓ COMPARED TO LAST REPORT
✓ COMPARED TO 10 YR. AVERAGE
— ON TRACK TO MEET GOAL



Another large fish-eating bird, the osprey**, has rebounded in similar fashion to the eagle. From a low of nine nesting pairs in 1974, ospreys, counted by the Connecticut Audubon Society's volunteers, were seen at more than 688 active nests in 2023, meaning they were occupied by an osprey pair. The active nests produced 881 observed fledglings, which resulted in a productivity rate of 1.28 fledglings per active nest.[62]

Osprey, also known as the "fish hawk" feed primarily on fish; consequently, osprey nests are typically located along the Connecticut shore or proximate to water.



Goal: There is no established goal for ospreys in Connecticut, but ospreys, like eagles, are a "sentinel species," meaning their health indicates the health of the environment around them.

Technical Note: *Due to reduced staffing levels in the Wildlife Division and the prolific expansion of eagle nesting territories in the state, breeding data from 2023 has not been finalized at the time of this report. Territories are resource areas used by eagles that have only one active nest. **Data on fledglings for osprey for 2014 was not available. Osprey counts in 2020 might have been affected by the COVID 19 pandemic and might not be complete.

Forest Birds

QUICK SUMMARY:

✓ COMPARED TO LAST REPORT

X COMPARED TO 10 YR. AVERAGE

— ON TRACK TO MEET GOAL

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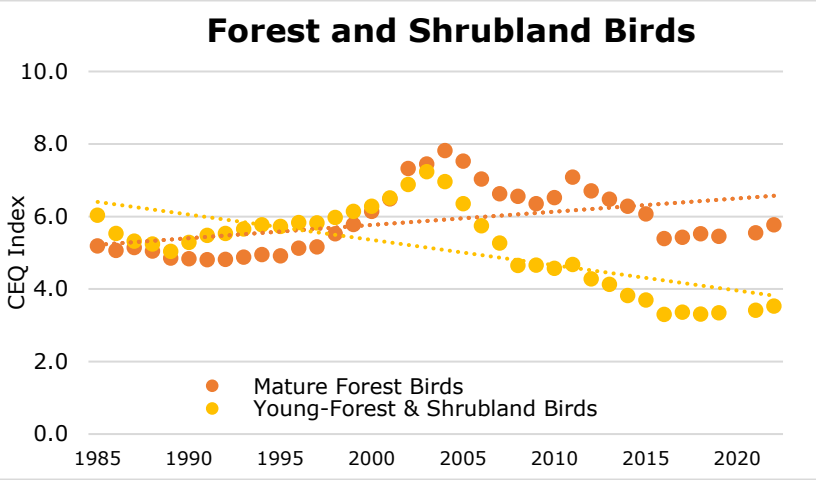
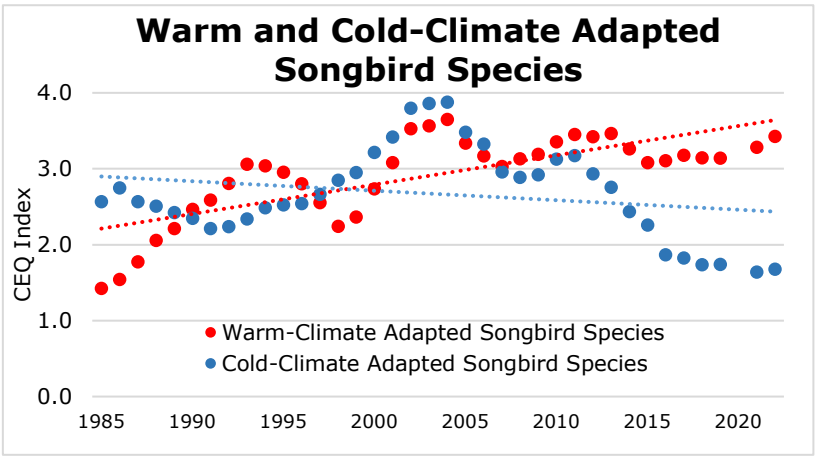
Young forest and shrubland birds are on the decline.



The population trend of songbird species that typically inhabit mature forests has increased over the last 35 years while the population trend of songbird species that typically inhabit forests that are young or dominated by shrubby vegetation, sometimes known as "shrublands", has declined over the last 35 years. As the amount of young forest and shrubland habitat has declined in Connecticut, so have the wildlife species that depend on it. However, the trend for both songbird species groups has generally declined since 2004. Most of the mature-forest bird species are affected greatly by forest fragmentation. Predators, invasive species, overpopulating deer, human activities and other intrusions into the forests cause nesting success to falter. The true forest birds, those that are not adapted to disturbed roadside or suburban habitat, will succeed in the long term only in forests that are not fragmented (i.e., core forests). Nationally, it is estimated that there has been a net loss of 2.9 billion breeding birds since 1970. It is also estimated that approximately 63.5 percent of Eastern forest avifauna, which is comprised of 63 species, are in decline.[63]



Historic data indicate that the composition of Connecticut's songbird population is changing. Over the last 35 years, the trend for songbirds that prefer warmer climates has been increasing, while the trend for cold-adapted songbird species has been declining, based on the CEQ index. The CEQ index is used to assess the presence and abundance of a total of eighteen warm-climate adapted and cold-climate adapted songbird species.[64]

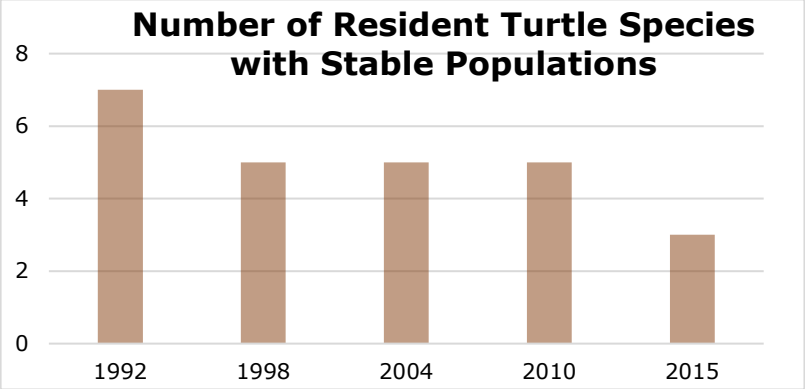
Goal: The goal for a variety of landbird species identified in the Partners in Flight Landbird Conservation Plan 2016 is to prevent further decline, stabilize populations in the short-term, and then reclaim a portion of their populations within 30 years.

Technical Note: *The Council calculates index values (using advice from statistics experts) to show the combined population trends of several species (for mature forest birds: Hairy Woodpecker, Wood Thrush, Eastern Wood-Pewee, Red-eyed Vireo, Scarlet Tanager, Black-and-white Warbler, Veery, Ovenbird; for bird species that typically inhabit forests that are young or dominated by shrubby vegetation: American Redstart, Blue-winged Warbler, Chestnut-sided Warbler, Eastern Towhee, and Yellow Warbler). Survey data were not available for 2020.

State-Listed Species Resident Turtles

QUICK SUMMARY:

— COMPARED TO LAST REPORT
X COMPARED TO 10 YR. AVERAGE
X ON TRACK TO MEET GOAL



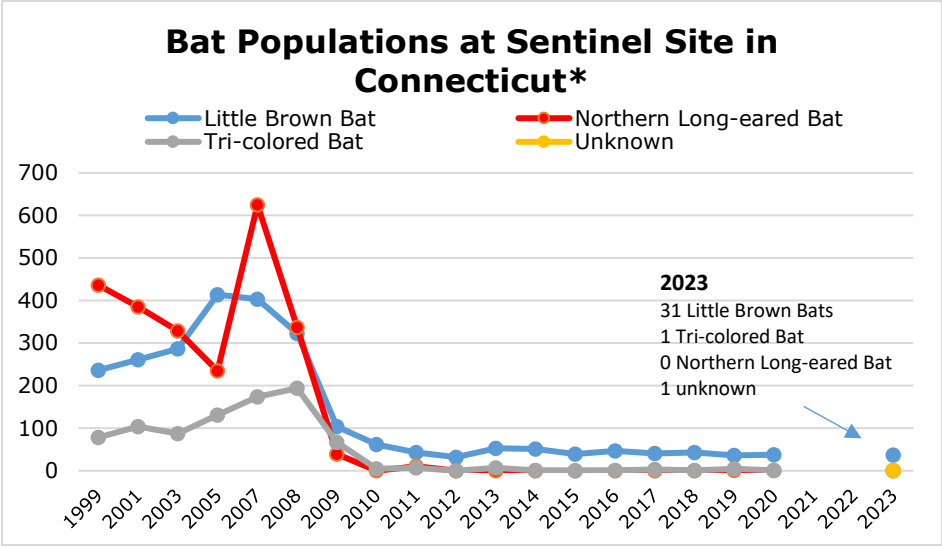
Five of the eight turtle species that live in Connecticut year-round are listed as endangered, threatened, or of special concern. Turtles are excellent indicators of ecological health. Resident turtles include the eight species of turtle that live in Connecticut (but not the four marine species that visit Long Island Sound in summer, all of which are threatened or endangered). In 2015, five of the eight resident turtle species were listed as endangered or of special concern: bog turtle (endangered), eastern box turtle, wood turtle, northern diamondback terrapin, and spotted turtle (species of special concern).[65] Turtle species in Connecticut have declined, in part, because of poaching, and the degradation and segmentation of their habitat. The ability for turtles to sustain a stable population will be difficult because turtles take a long time to reach sexual maturity and have low survivorship when newly hatched. While Connecticut General Statutes (CGS), Section 26-307 requires the Department of Energy and Environmental Protection (DEEP) to review, **at least every five years**, the designation of species as endangered, threatened or of special concern, the state-listed species list hasn't been updated since 2015.

Goal: Pursuant to CGS, Section 26-303, it is a policy of the state to conserve, protect, restore and enhance any endangered or threatened species and essential habitat.

Bats

QUICK SUMMARY:

— COMPARED TO LAST REPORT
X COMPARED TO 10 YR. AVERAGE
X ON TRACK TO MEET GOAL



Eight of the nine bat species are on the latest list of species that are endangered, threatened, or of special concern. Bat populations in Connecticut have experienced a catastrophic decline that led to the classification in 2015 of three more bat species as endangered in Connecticut and has raised concerns about the future of bats in the state. The sharp decline in bat population, between 2007 and 2010, is primarily due to an epidemic fungal disease called white-nose syndrome (WNS). Other factors that might impact bat populations include climate change and habitat loss. The chart depicts data for the winter population of three cave-dwelling bat species at a sentinel hibernation site monitored by DEEP.[66] On November 29, 2022, the U.S. Fish and Wildlife Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered under the Endangered Species Act.[67] The revised designation for NLEB became effective March 31, 2023.

Goal: The goal for bats is for recovery of all nine species to a stable, sustainable population.

Technical Note: *The horizontal axis for bats displays every other year between 1999 and 2007. Due to the COVID 19 pandemic, there were no hibernacula entries in 2021 and 2022.

Invasive Disruptors

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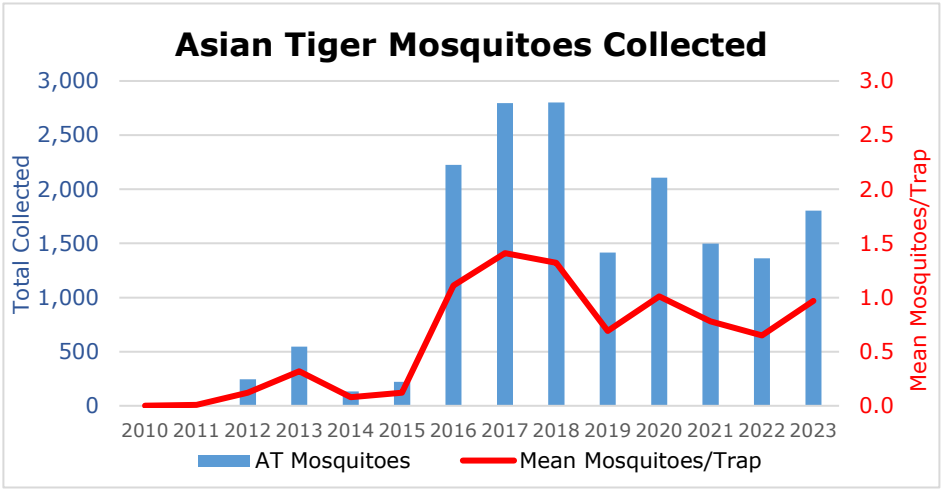
Invasive species are species that are not native to Connecticut that exhibit an aggressive growth habit and can out-compete and displace native species. It is expected that more invasive species, both plant and animal, will arrive, become established, and flourish as a consequence of the warming climate that is making Connecticut more hospitable to species that do not tolerate cold weather. Further, climate induced stress, rising temperatures, and extreme weather in an ecosystem can facilitate invasive pathways. The adverse impacts of invasives affect all the state's ecosystems, including its waterways, natural lands, working lands and developed landscapes. In addition, the economic and human health costs of unchecked invasive species can be high. In 2022, the Council completed an update *("INVASIVES": PREVIOUSLY DESCRIBED and NEWLY ARRIVED*) to the Council's 2002 report, *Great Infestations,* that included recommendations for the control of invasive species in Connecticut. Preventing invasive species from taking over and disrupting Connecticut's landscapes and waterways, requires advanced planning, vigilance, maintenance, coordination and prioritization of the expenditure of human energy and of public funds.

Asian Tiger Mosquitoes[68]

QUICK SUMMARY:

XX COMPARED TO LAST REPORT
XX COMPARED TO 10 YR. AVERAGE
— ON TRACK TO MEET GOAL



In 2023, there was an increase of Asian tiger mosquitoes collected* in the state, which might have been the result of warm temperatures during the winter and above average precipitation during the summer. The range of the Asian tiger mosquito is expanding in the United States, including Connecticut and other northeastern states. Infection rates of West Nile Virus and other mosquito-borne diseases are likely to rise, over the long term, as a warming climate creates more favorable habitats for mosquitoes. Connecticut is expected to get warmer and wetter over the coming century, enhancing mosquito populations by creating more suitable habitat. Additional information about mosquito management in Connecticut can be found on Department of Energy and Environmental Protection's (DEEP) website or the Connecticut Agricultural Experiment Station (CAES) - portal.ct.gov/CAES.

Emerald Ash Borer

It is assumed that the emerald ash borer (EAB), which attacks ash trees almost exclusively, is now present in every town in the state. In Connecticut, ash trees made up just slightly less than three percent of the trees in the forest, most of which are white ash. However, the loss of ash trees in a forest stand also reduces vital habitat and allows undesirable invasive plants to fill the gaps that are created. Movement of ash, in particular as firewood, nursery stock, logs and wood packaging materials, has been cited as the most

likely means by which EAB has spread so rapidly.[69] Because EAB is already considered as established in North America, eradication is no longer a goal. Instead, focus is on slowing or preventing the spread of the insect into new areas while managing and reducing its numbers in places where it is already found. Biological controls, such as parasitoid wasps, were released in the Northeast United States, including Connecticut (2013), as a biological control for EAB. Intensive research has shown that these parasitoids have established in the locations they were released and have successfully spread from those locations. It seems probable that the parasitoids will be able to suppress EAB populations to levels that will allow ash to regenerate in our forests; however, the longer term success of such control measures is unknown.[70] Additional information about the EAB in Connecticut can be found on DEEP's website or CAES - portal.ct.gov/CAES.

Hydrilla

The highly invasive aquatic plant, *Hydrilla verticillata*, known commonly as 'hydrilla' or 'water thyme' was first detected in the Connecticut River in 2016 around Glastonbury, Connecticut and has since spread into the river's many coves, tributaries, and boat basins. Hydrilla is an aquatic plant that has earned the title "world's worst invasive aquatic plant". The United States Army Corps of Engineers (USACE), New England District and the Engineer Research and Development Center (ERDC) will lead a demonstration project to determine the effectiveness of registered herbicides to safely reduce and control the spread of the Connecticut River hydrilla. Research on hydrilla's growth patterns, water exchange dynamics in the Connecticut River, and herbicide efficacy in laboratory conditions began in 2023 to guide operational scale field demonstrations of herbicide efficacy in 2024. The USACE is working in partnership with the Lower Connecticut River Valley Council of Governments and the CAES. To control and eradicate hydrilla, the USACE and ERDC plan to treat several sites on the Connecticut River during the summer of 2024.[71] Additional information about the hydrilla in Connecticut can be found on the CAES website - portal.ct.gov/caes/oais/connecticut-river-project.

Jumping Worms

Jumping worms, also called crazy worms and crazy snake worms, are noticeably fast-moving, highly active worms with a strong, rigid, muscular body that can thrash violently when disturbed. Jumping worms are an invasive species that alter the composition of the topsoil which leads to an increase in nutrient leaching, erosion, drought vulnerability, turf detachment, root desiccation, and low germination. Jumping worms are established in Midwestern states and are currently spreading throughout New England. Jumping worms are primarily spread in soil, mulch (a principal means of distribution), compost, and yard waste.[72] Additional information about the jumping worms in Connecticut can be found on the CAES website - portal.ct.gov/CAES.

Technical Note: *Collection data for mosquitoes for 2016-2018 has been modified from previous reports because of the introduction of new data from a trapping site in Bridgeport. Information on other invasive species can be found in the Council's 2022 special report *("INVASIVES": PREVIOUSLY DESCRIBED and NEWLY ARRIVED*.

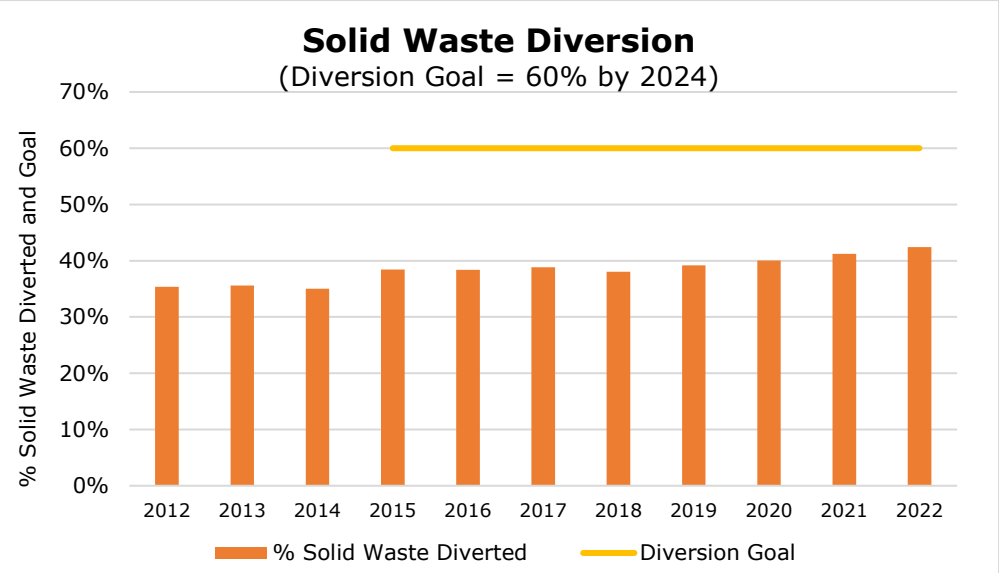
Waste Diversion

QUICK SUMMARY:

- ✓ COMPARED TO LAST REPORT
- ✓ COMPARED TO 10 YR. AVERAGE
- ✗ ON TRACK TO MEET GOAL

Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

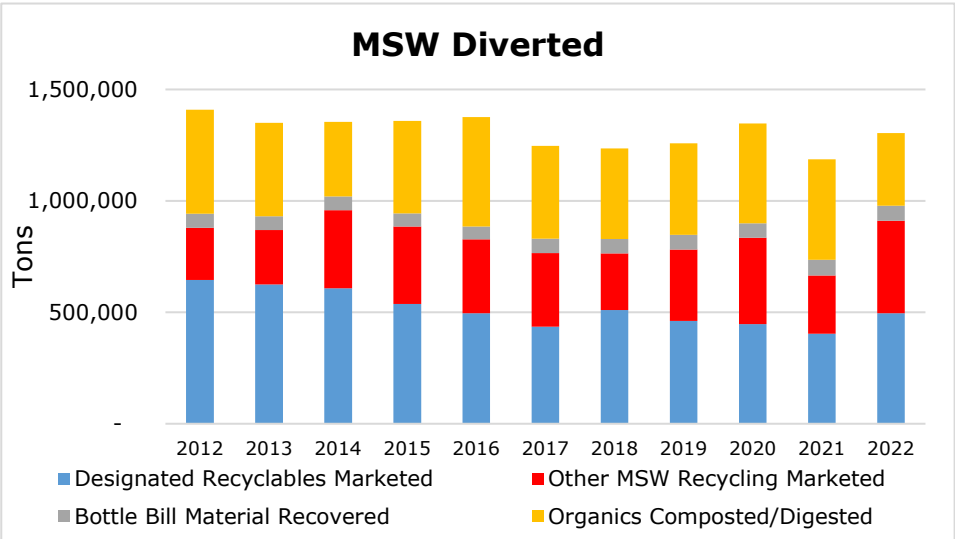
Solid waste management is a significant challenge in the state.



In 2022, (most recent data available) approximately 42 percent of the state's solid waste was diverted* from disposal. The percent of solid waste diverted in 2022 was higher than the previous ten-year average of 38 percent. The diversion percentage, which is based on a theoretical baseline of 3.8 million tons per year, includes recycling, composting, anaerobic digestion, and other waste management measures, such as source reduction. Over 1.5 million tons of the state's solid waste were disposed of at one of the resource recovery facilities (RRF) in the state, while more than 640,000 tons were transported out of state for disposal.[73] With the closure of the Material Innovation and Recycling Authority's RRF in Hartford in July 2022, and limited capacity for additional material at the other in-state RRFs, it is expected that the in-state capacity deficit to manage the state's solid waste will continue in the near term.

Goal: The diversion goal of 60 percent by 2024 was established with the adoption of Public Act 14-94 and is identified in *Connecticut's 2016 Comprehensive Materials Management Strategy*, *The Connecticut Solid Waste Management Plan*.

In 2022, approximately 495,000 tons of designated recyclables, 415,000 tons of "Other MSW Recycling", 326,000 tons of organics, and an estimated 68,000 tons recovered through the beverage container redemption program were sent to end markets and reuse facilities or composted/digested.[74] In addition to diverting an estimated 148 tons of tires from disposal in



2022, other items that are depicted in the chart include, but are not limited to, wood/yard waste, food residuals, textiles, electronics, oil and filters, mattresses, batteries, and paint.[75]

Public Act 23-62 included provisions for the establishment of a statewide tire stewardship program and a requirement for Commissioner of the Department of Transportation to undertake a "laboratory testing and pilot program utilization of tire-derived asphalt". Public Act 23-170 also expanded provisions for certain producers of organic materials, such as commercial food wholesalers or distributors, to separate such source-separated organic materials from other solid waste and ensure that such source-separated organic materials are recycled at any authorized composting facility that has available capacity.

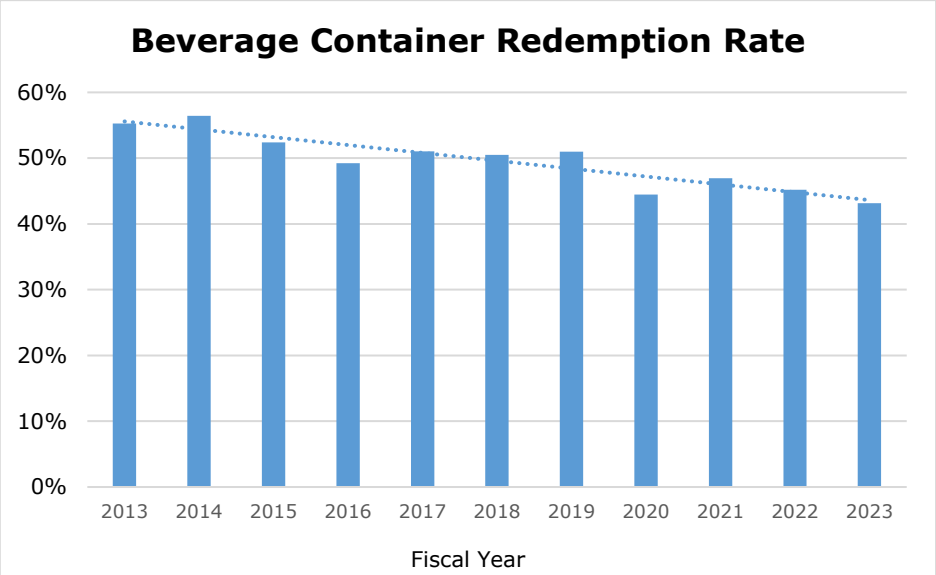
Beverage Container Redemption

QUICK SUMMARY:

X COMPARED TO LAST REPORT

X COMPARED TO 10 YR. AVERAGE

— ON TRACK TO MEET GOAL



The redemption rate in Connecticut in fiscal year (FY) 2023 was 43.2 percent, which was lower than in FY 2022 (45.2 percent), continuing the trend of decline for more than a decade.[76] The redemption rate for FY 2023 was also less than the ten-year average of 49.6 percent. In the Council's 2020 special report, *Low Deposit, Low Return*, the Council recommended ways to increase the redemption rate and divert more beverage containers from disposal. Public Act 21-58 revised the beverage container redemption program with several provisions, including 1) an increase in the handling fee paid to retailers and operators of redemption centers; 2) an expansion of the types of beverages covered to include several new item categories, such as sports drinks, energy drinks, and juices (beginning on January 1, 2023); and 3) an increase in the deposit amount from $0.05 to $0.10 (beginning on January 1, 2024). Public Act 23-170 increased the requirement for post-consumer recycled content for plastic beverage containers sold, offered for sale, or distributed in the state on or after January 1, 2027.

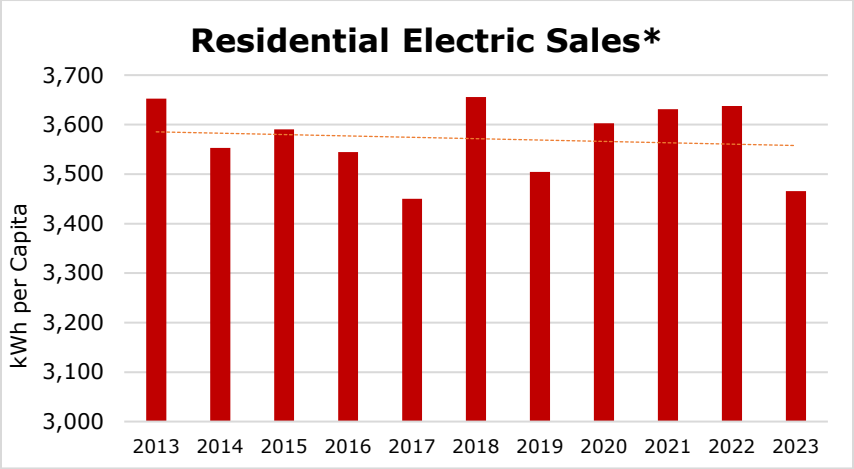
Technical Note: Personal impact indicators illustrate trends in behavior or practices that can be expected to influence the condition of tomorrow's air, water, land and wildlife. *Diversion includes the reduction of materials before it makes it into the waste stream for disposal (i.e., reuse, recycling, composting). Estimated "Diversion" is based on the 2005 baseline of 3.8 million tons, which is a planning value taken from the Solid Waste Management Plan; it is not actual solid waste generation.

Electricity at Home and Work

QUICK SUMMARY:
- COMPARED TO LAST REPORT
- COMPARED TO 10 YR. AVERAGE
- ON TRACK TO MEET GOAL

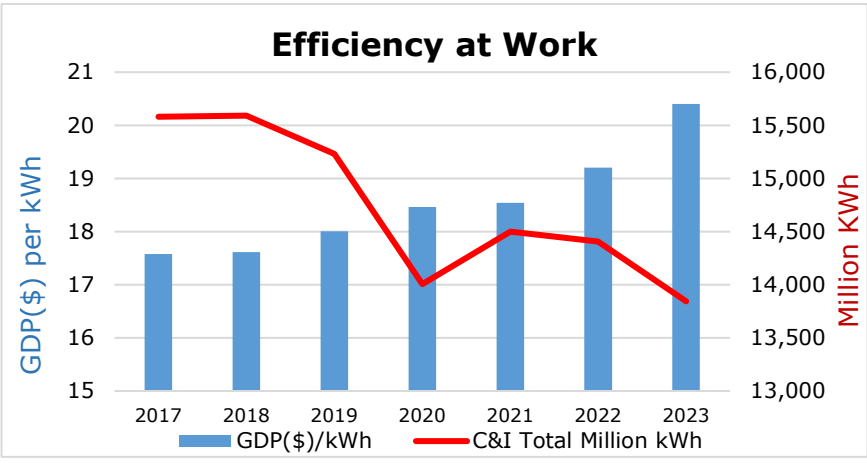
Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

Connecticut residents' electricity purchases decreased in 2023 to an average of 3,465 kilowatt-hours (KWh) per person.



In 2023, the retail sales of electricity by the residential sector decreased to 12,535 million KWh from 13,172 million KWh, a decrease of five percent from 2022 and 2.6 percent from the previous ten-year average (12,868 million KWh).[77] The decline in the retail sales of electricity in the residential sector could be attributed to the number of solar photovoltaic installations in the state and the long term impact of electric conservation measures. The use of fossil fuels for electric generation increases air pollution, especially from less efficient/more polluting units used to meet peak demand. Increasing the efficiency of electricity generating units, using Class I and zero carbon resources, and reducing electricity use and peak demand are all viable strategies to reduce air pollution from electricity generation. While cooling degree days (CDD) (931) was 13.7 percent greater than the annual average since 1961 (819), the number of days greater than 90°F (12) was 21 percent less than the annual average since 1960 (15.1). Typically, the hotter the summer, the more electricity is used by residents to cool their homes, which means more electricity that needs to be generated, and the more greenhouse gas emissions that are potentially released to the environment.

Connecticut's commercial and industrial sectors are using electricity more efficiently.



QUICK SUMMARY:
- COMPARED TO LAST REPORT
- COMPARED TO 10 YR. AVERAGE
- ON TRACK TO MEET GOAL

In 2023, Connecticut's commercial and industrial sectors purchased approximately 13,844 million KWh.[78] The purchase of electricity in the commercial sector decreased from 2022 levels by 3.2 percent and 6.8 percent for the industrial sector. Connecticut's 2023 annual average Gross Domestic Product (GDP) was calculated at approximately $282,478 million (chained 2017 dollars) and had an increase of approximately two percent from 2022.[79] Overall, there was an increase in efficiency (GDP($)/KWh) of 16 percent from 2017 to 2023.

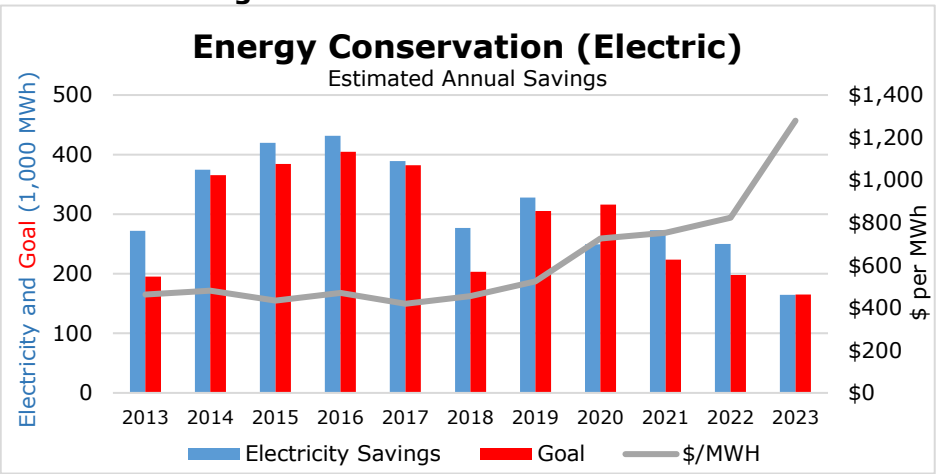
Estimated annual savings from electricity conservation measures have generally been declining since 2016.

QUICK SUMMARY:

X COMPARED TO LAST REPORT

X COMPARED TO 10 YR. AVERAGE

— ON TRACK TO MEET GOAL



As mentioned above, reducing electricity demand, especially peak demand, is an effective strategy for reducing air emissions from fossil fueled electric generation. Estimated annual savings from electric efficiency measures in 2023 (164,485 megawatt hours (MWh)) was approximately 34 percent less than in 2022 (250,189 MWh), and almost half of the ten-year average of 326,589 MWh.[80] While Connecticut's energy-efficiency programs have helped small and large businesses, homeowners and renters, and state and local governments better manage their energy use, the expenditure of funds (annual spending) for each MWh of electricity conserved (annual savings) has increased by 177 percent over the last ten years. Programs and services for energy efficiency, both electricity and natural gas, are administered and delivered by Connecticut's electric and gas utilities but funded from a "Public Benefits Charge" on electric bills and through a conservation charge included in natural gas rates.

The Independent System Operator for New England (ISO-NE) estimated that the incremental annual energy savings, net of embedded expiring measures, is expected to decrease over the next ten years.[81] Energy efficiency measures are important because residential and commercial buildings use approximately 74 percent of all electricity and 39 percent of all energy use in the United States. In Connecticut, the approximately 1.4 million households and 140,000 businesses together account for more than 70 percent of Connecticut's 750 trillion British thermal unit (Btu) of annual energy consumption.[82] With widespread adoption of existing energy-efficiency building technologies, greater use of more energy efficient multi-family housing, and the introduction and use of new energy efficiency technologies, energy use in homes and commercial buildings could be reduced by 50 percent.[83]

Goal: Public Act 18-50 introduced a new policy of the state to reduce energy consumption by 1.6 million MMBtus (one million British Thermal Units), or "the equivalent megawatts of electricity," annually each year for calendar years commencing on and after January 1, 2020, through calendar year 2025. Specific goals for energy conservation (electric savings) vary for each year based on a number of factors, including the proposed budget for conservation measures in a given year.

Technical Note: 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. *The vertical axis in the charts above "Residential Electric Sales" and "Efficiency at Work" have been shortened, beginning at 3,000 KWh/capita, 15.0 GDP($)/KWh, and 13,000 million KWh, respectively, rather than the customary zero. Chained 2017 dollars is a dollar measure that is adjusted for price changes occurring since 2017.

Zero Carbon Energy

QUICK SUMMARY:
XX COMPARED TO LAST REPORT
XX COMPARED TO 10 YR. AVERAGE
— ON TRACK TO MEET GOAL

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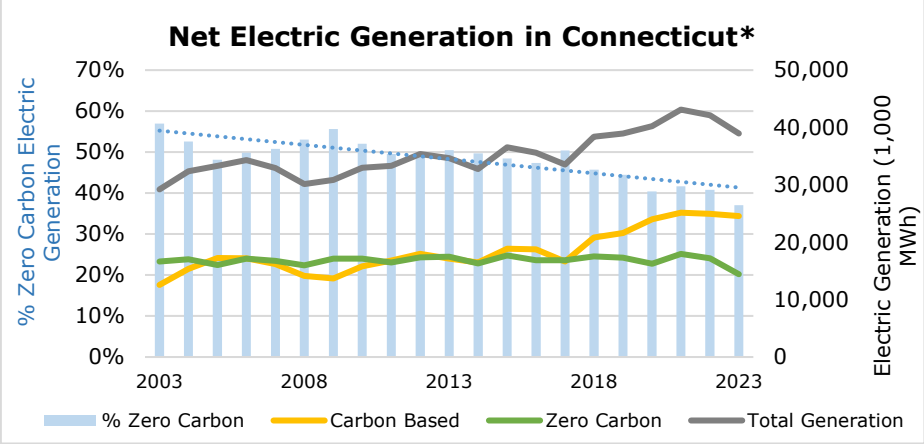
The ratio of zero carbon electricity to total electricity generation in Connecticut has been generally declining.



In 2023, electricity generated from both utility scale zero carbon* and carbon-based resources (38,968 thousand megawatt-hours (MWh)) located in the state decreased 7.5 percent from 2022. The amount of zero carbon electricity (14,430 thousand MWh), as a percentage of the total amount of electricity generated in the state, also decreased in 2023 from 2022 levels by approximately 3.8 percent. Approximately 88 percent of the decline in zero carbon generation in 2023 was attributed to nuclear power.[84] Including out-of-state generation resources, it is estimated that in 2022 (most recent data available), approximately 60 percent of the electricity supplied to electric customers in the state was from zero carbon resources.[85]

Zero Carbon Goal - Consumption

Public Act 22-5 requires the reduction of greenhouse gas (GHG) emissions to a level of zero percent from electricity supplied to electric customers in the state by 2040. Since 2011, Connecticut has selected 63 projects totaling over 2,100 MW of Class I resources and 10.9 million MWh of existing nuclear resources.** Of those Class I resources, 484 MW are currently operational with another 479 MW under development. However, since 2011, 20 contracts totaling approximately 1,122 MW of capacity have been terminated.[86] On October 27, 2023, DEEP released Requests for Proposals (RFPs) for Offshore Wind Facilities and for Zero Carbon Energy to secure cost-effective zero carbon resources that can improve the reliability of the region's electric grid and to reduce GHG emissions.[87] If the new and previous procurements are developed, it would eventually increase the amount of class I and zero carbon energy available for the state's residents and businesses; however, it might still leave the state short of its zero percent GHG emission target by 2040. The shortfall is more likely if one or more of the Millstone units are retired and/or the projected increases in electric consumption for transportation (~2,500 gigawatt-hours by 2032)[88] and thermal (1,085 GWH by 2032)[89] are accurate. The use of intermittent renewable technologies will also require a significant amount of energy storage and/or upgrades to the electric transmission system.

Goal: Connecticut General Statutes Section 16-245a requires that a minimum percentage of electricity, which is sold to Connecticut customers, must be generated from renewable energy sources. That minimum amount is 24 percent for 2022 and will escalate to 40 percent in 2030.

Technical Note: 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. *Includes utility scale renewables that generate no carbon and nuclear generation, and it is not the same as Class I or Class 2 renewable sources. Zero carbon generation does not include biomass (wood, municipal solid waste), fuel cells operating on natural gas, biogas, and landfill gas. **Includes the environmental attributes associated with the Millstone facilities through 2029.

Solar Photovoltaics

QUICK SUMMARY:
- ✓ COMPARED TO LAST REPORT
- ✓ COMPARED TO 10 YR. AVERAGE
- — ON TRACK TO MEET GOAL

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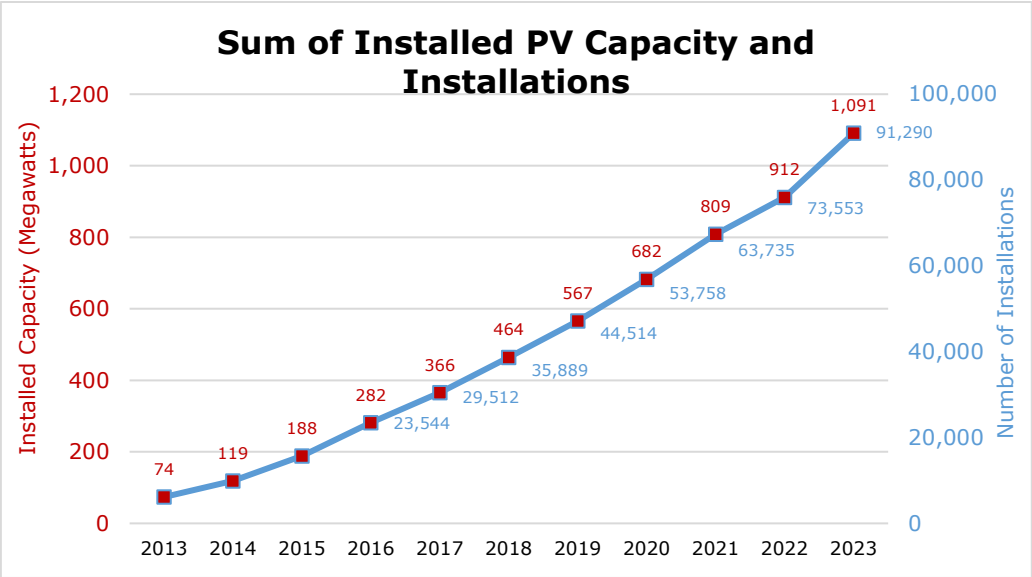
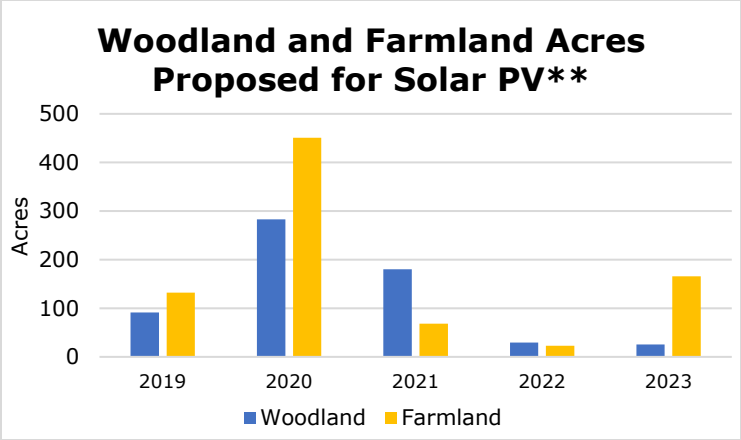
The number of solar installations throughout Connecticut increased in 2023.



Thousands of Connecticut homes and businesses now use the sun to generate much of their own electricity. Through December 2023, total installed solar photovoltaic (PV) capacity for systems generally under five megawatts (MW) of capacity exceeded 1,091 MWs at over 91,290 installations in the state.[90] On January 1, 2022, the new Residential Renewable Energy Solutions (RRES) program replaced the previous net metering and Residential Solar Investment Program, administered by the Green Bank, for residential renewable energy projects. In 2023, 22,911 solar PV installations with a total capacity of 181.6 MW were deployed throughout Connecticut as part of the RRES Program.[91] The RRES program offers residential solar installations the opportunity to sell the energy produced and the renewable energy certificates (RECs) at a fixed 20-year price by selecting one of two incentive rate structures (tariffs).

The primary advantage of solar PV technology is that it produces electricity with zero emissions – no air pollution, wastewater, or noise at the point of electric generation. The 1,090+ MW of installed PV capacity in the state in 2023 is calculated to produce more than 1.4 million megawatt-hours (MWh) of electricity, which could potentially displace over 358,445 metric tons of carbon dioxide equivalent (CO_2e) emissions.[92] The Independent System Operator for New England (ISO-NE) projects that a total of approximately 2,728 MW of solar PV capacity could be installed in Connecticut through 2033.*[93]

Public Act 22-14 expanded the Non-Residential Energy Solutions program (NRES) and the Shared Clean Energy Facility (SCEF) program. The law also increases the maximum size of individual projects under the programs; expands the programs' total capacity; allows commercial and industrial customers in the NRES program to use their entire rooftops to site projects; and increases the proportion of SCEF projects that must benefit low-income customers.

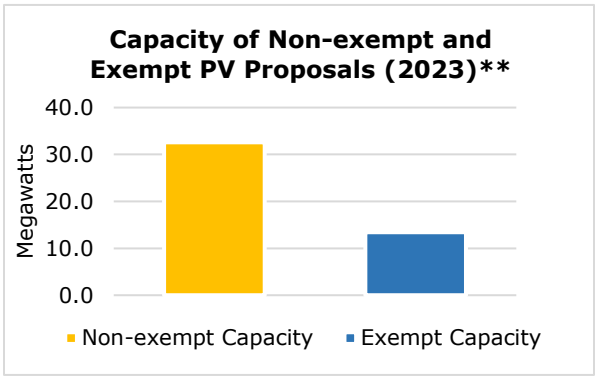


An issue with land-based solar PV installations, primarily utility scale installations, is the impact such development has on farmland, forests, shrublands, and the species that inhabit these ecosystems. In 2023, solar proposals, submitted to the Connecticut Siting Council (CSC) for regulatory approval, that involved development on farmland totaled approximately 166 acres, while proposed development on woodlands totaled approximately 25 acres. This is significant since the preservation of forests, open space, and farmland are state policy priorities and important as a mitigation strategy to address climate change.

Regulation of Certain Solar PV Systems

As a result of citizens' concerns regarding the proliferation of land-based solar PV systems in Connecticut, the Council issued a special report in 2017, *Energy Sprawl in Connecticut*, that identified deficiencies in state policy regarding the selection and siting of land-based PV installations and recommendations to ensure prime farmland and core forest habitats were protected. In response to citizen concerns, Public Act 17-218 requires certain solar projects to acquire written confirmation, from the Departments of Agriculture and Energy and Environmental Protection, that the subject proposal would not "materially affect" the status of such land as prime farmland or core forest. It is calculated that on average, one MW of solar capacity can impact approximately 4.8 acres.

Certain provisions of Public Act 17-218 only apply to certain commercial solar PV proposals, such as projects with a proposed capacity greater than two MW that seek approval from the CSC by Petition for Declaratory Ruling. In 2023, there were 17 proposals for solar projects submitted to the CSC; eight of those projects were exempt from the provisions of Public Act 17-218. All but one of the exempt projects had a capacity less than two MWs.[94]



Energy Storage

To more efficiently manage electricity generated by intermittent renewable generation and to improve energy management and reliability, Public Act 21-53 requires the state to develop and implement one or more programs, and associated funding mechanisms, for electric energy storage resources connected to the electric distribution system. In 2022, Connecticut's Public Utilities Regulatory Authority (PURA) launched a statewide electricity storage program (Energy Storage Solutions) for all Eversource Energy and United Illuminating (UI) residential, commercial, and industrial customers. The nine-year program, administered by the Connecticut Green Bank along with Eversource and UI, will continue through at least December 31, 2030. In 2023, approximately 129.8 MWh of energy storage capacity was approved throughout Connecticut, with approximately 97 percent of the capacity serving the commercial and industrial sectors.[95]

Goal: Public Act 21-53 established three goals for the deployment of energy storage systems in Connecticut: 1) 300 MW by December 31, 2024; 2) 650 MW by December 31, 2027; and 3) 1,000 MW by December 31, 2030.

Technical Note: 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. *Forecast values include Forward Capacity Market (FCM) Resources, non-FCM Energy Only Generators, and behind-the-meter PV resources. **Proposals for solar development that seek regulatory approval from local land use agencies are not included in the charts above.

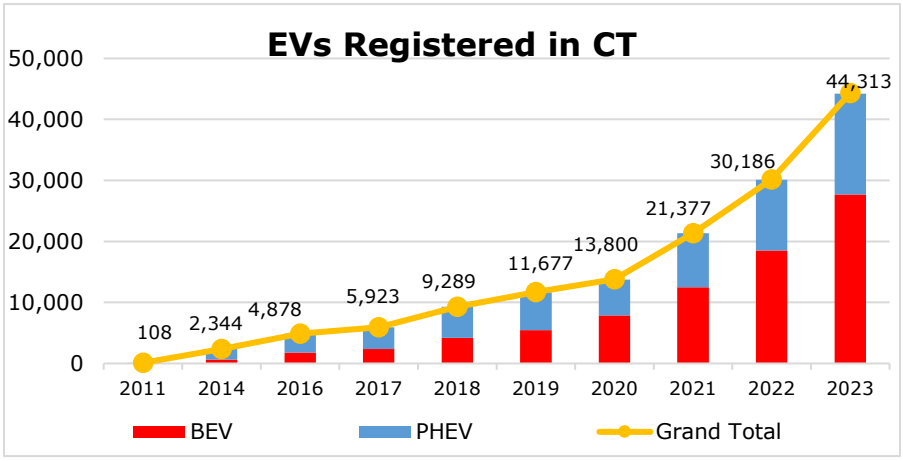
Transportation

QUICK SUMMARY:

✓ COMPARED TO LAST REPORT
✓ COMPARED TO 10 YR. AVERAGE
✗ ON TRACK TO MEET GOAL

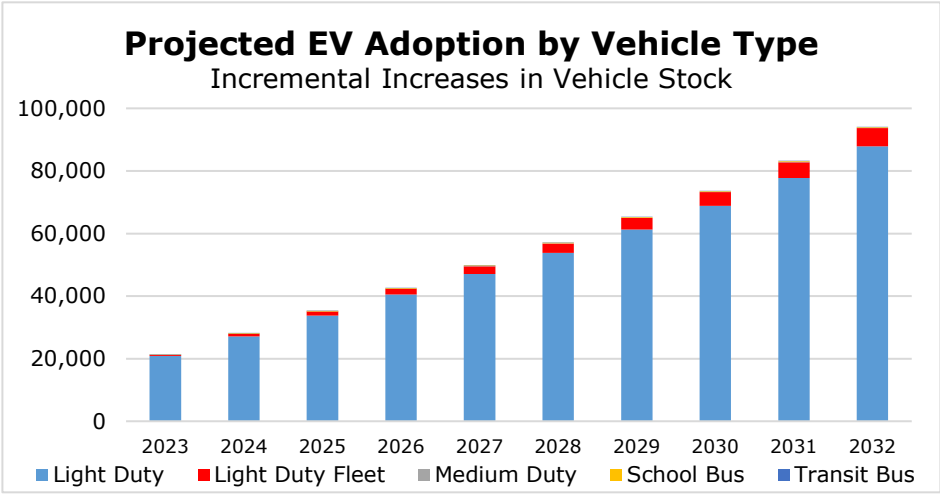
Move your cursor over the globe to learn how climate change affects the data on this page, or click on it for more detailed information

Electric-drive vehicle sales continue to increase; however, such vehicles still represent a small percentage of the total vehicle registrations.



The number of electric drive vehicles (EVs)* registered in the state increased by 14,127 or approximately 47 percent from 2022 to 2023; however, the number of registered EVs represents less than two percent of all registered vehicles in the state.[96] Significant reductions of GHG emissions in the transportation sector are necessary and achievable by reducing the combustion of fossil fuels through increased fuel efficiency, use of mass transit, and use of EVs that operate on "clean" electricity or "green" hydrogen.

It is projected that the EV stock in Connecticut could increase by approximately 550,000 vehicles over the next ten years. To support the adoption and use of EVs, electricity consumption is projected to increase by more than 2,500 gigawatt-hours, and winter peak demand is projected to increase by approximately 630 megawatts by 2032.[97]



In 2023, the Connecticut Department of Transportation (CTDOT) had four EVs and 11 electric buses and the Connecticut Department of Administrative Services (DAS) had 43 EVs (including 19 EVs leased to the CTDOT), which represents approximately 1.2 percent of the DAS vehicle fleet.[98]

Goal: There is a 2020 goal for 125,000 EVs in Connecticut by 2025.[99] Public Act 22-25 requires that an increasing percentage of all cars and light duty trucks purchased or leased by the state be battery electric vehicles, increasing to at least 50 percent by 2026, at least 75 percent by 2028, and 100 percent by 2030.

Technical Note: 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. * Electric drive vehicles (EVs) include plug-in hybrid electric (PHEV), battery electric (BEV), electric motorcycles, and fuel cell electric (FCEV) vehicles. Electric motorcycles and fuel cell electric vehicles are included in the "Grand Total" of EVs registered in the state. "Green" hydrogen refers to the production of hydrogen from sources other than fossil fuel.

Sales of transportation fuels increased in 2022.

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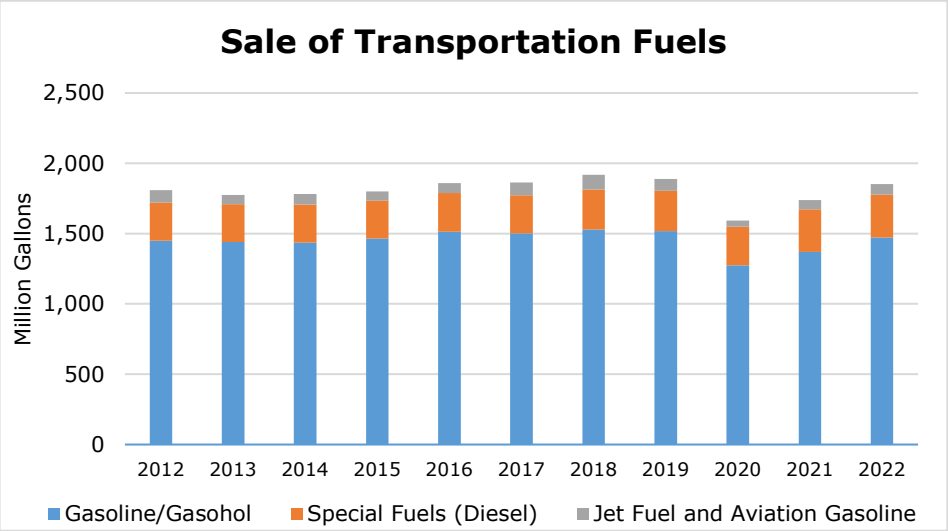
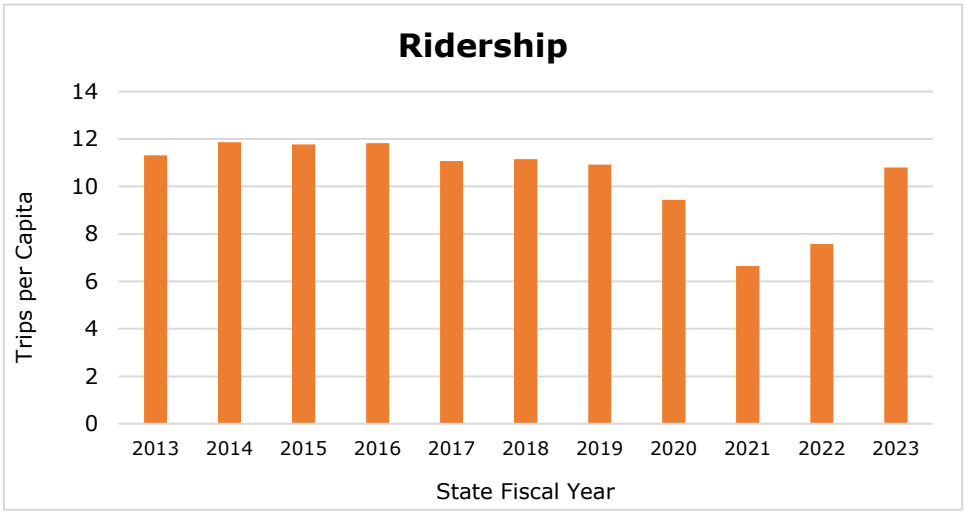
— ON TRACK TO MEET GOAL



In 2022, (the most recent available data) the sale of gasoline/gasohol in the transportation sector was 1.6 percent higher than the previous ten-year average; the sale of special fuels, which is primarily comprised of diesel, was 9.4 percent higher than the previous ten-year average;[100] and the sale of aviation fuels was approximately 0.6 percent lower than the previous ten-year average.[101] The effect of the pandemic on fuel sales and the resultant emissions from the transportation sector is also evident based on the amount of transportation fuel sold in the state in 2020 and 2021.

Ridership: People got on the bus more often in 2023 than in 2022.



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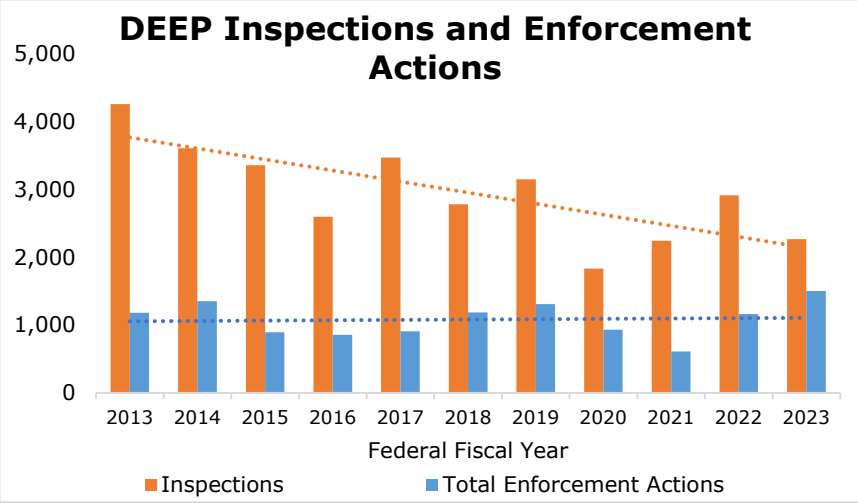
— ON TRACK TO MEET GOAL

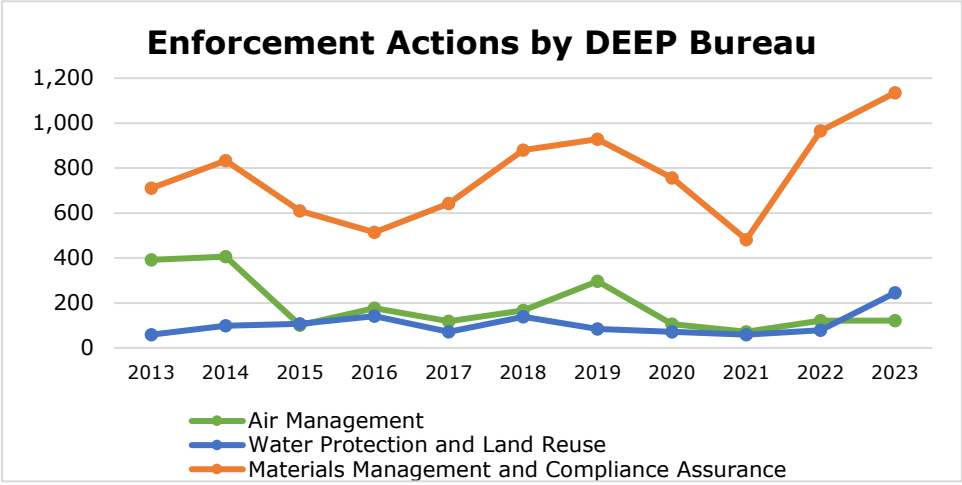
In fiscal year (FY) 2023, total ridership (39 million passenger trips) on fixed route, commuter, and Americans with Disabilities Act (ADA) transit services increased from FY 2022 (27.5 million passenger trips). In FY 2023, the average was 10.8 passenger trips per capita, which is approximately 43 percent higher than FY 2022 (7.57), and 4.3 percent greater than the ten-year average (10.4).[102] Some reasons for the general decline in ridership in FY 2020 through FY2022, compared to previous years include the impact of COVID 19, alternate work arrangements (teleworking), and the success in ride sharing efforts. It should be noted that buses were fare free from April 1, 2022 through June 30, 2022, and that was extended through March 31, 2023. Federal restrictions prevent the state from extending this suspension of fares for any longer than 12 months.[103]

Compliance

In 2023, the number of inspections by DEEP decreased but the number of enforcement actions increased from 2022.



In the 2023 Federal Fiscal Year (FFY 23: October 1, 2022 – September 30, 2023), there were 2,267 inspections* performed by the Department of Energy and Environmental Protection (DEEP), a decrease of approximately 22 percent compared to the previous year and 25 percent less than the previous ten-year average. In FFY 23, there were also 1,502 enforcement actions, which included 1,371 "Informal Enforcement Actions", consisting of Notices of Violation (NOV), Notice of Non-Compliance (NON), and warning letters; 120 "Formal Enforcement Actions"; and eleven "Referrals" to the Attorney General/Environmental Protection Agency. The Informal Enforcement Actions are enforcement tools, generally issued whenever DEEP detects one or more violations with a permit at a facility or a permitted use. Informal Enforcement Actions can be issued for minor or major violations; in cases of the latter type, the recipient might also receive an order, which might carry a financial penalty.

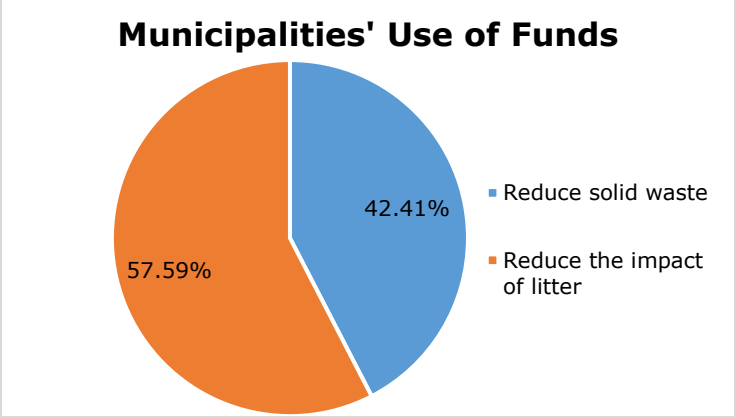


As depicted in the Enforcement Actions chart, the Bureau of Materials Management was responsible for 1,135 or approximately 76 percent of the enforcement actions in FFY23. Of this total, the Underground Storage Tank section was responsible for 847 enforcement actions, including 502 "warning letters". The Bureau of Air Management was responsible for 122 enforcement actions that consisted primarily of 85 NOVs and 33 consent orders. The Bureau of Water Protection and Land Reuse was responsible for 245 enforcement actions that consisted primarily of 139 NONs and 94 NOVs.[104] The decline in inspections over the last ten years and variations in enforcement actions by Bureaus is likely due to a variety of factors, including but not limited to, enforcement priorities, use of general permits, reduction in staffing, and federal jurisdiction.

Technical Note: *FFY 2022 was the first year DEEP reported Emergency Response Unit (ERU) data. To ensure consistency with previous years' data, the number of inspections attributed to the ERU were subtracted from the total number of inspections reported in FFY 2022 and FFY 2023.

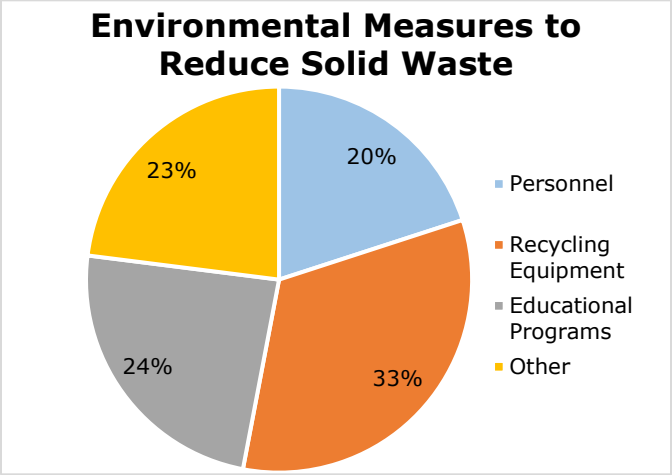
Miniature Beverage Containers

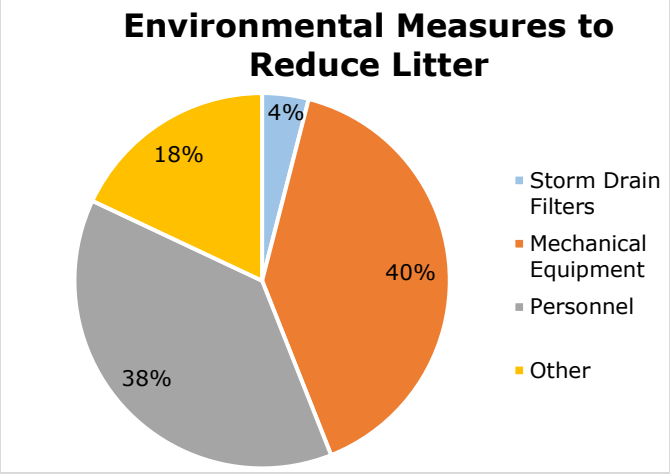
Through June 30, 2023, municipalities used most of the funds received to reduce the impact of litter.



Between October 1, 2021, and March 31, 2023, 162 out of the 169 municipalities in Connecticut received in aggregate approximately $6.6 million, through the surcharge on miniature alcohol beverage containers (Nip bottles), which equates to approximately 132.4 million Nip bottles. For the reporting municipalities (132 out of 162), through June 30, 2023, approximately 42 percent of the funds received from the surcharge on the Nips was expended to reduce the generation of solid waste, and approximately 58 percent was expended to reduce the impact of litter caused by such solid waste.

It should be noted that only ten of the municipalities reported using all of the funds they received through June 30, 2023. 56 municipalities or approximately 42 percent indicated that no funds had been expended through June 30, 2023, and overall, only 29 percent of the total funds received by the reporting municipalities had been expended on one or more environmental measures through June 30, 2023.





To view a more detailed explanation of the use of funds and the environmental measures to reduce solid waste and/or the impacts of litter, visit "Preliminary-findings-of-the-review-of-the-miniature-beverage-container-surcharge-program-1-17-2024.pdf".[105]

Technical Note: Connecticut General Statutes Section 22a-244b(d) states that funds shall be "expended by such municipality on environmental measures intended to reduce the generation of solid waste in such municipality or reduce the impact of litter caused by such solid waste, including, but not limited to, the hiring of a recycling coordinator, the installation of storm drain filters designed to block solid waste and beverage container debris or the purchase of a mechanical street sweeper, vacuum or broom that removes litter, including, but not limited to, such beverage containers and other debris from streets, sidewalks and abutting lawn and turf areas".

This page explains how climate change affects the environmental indicators in this report.

Bald Eagles and Osprey: Climate change affects the survival of bald eagles on multiple levels, according to scientists. As climate change progresses, the National Audubon Society's climate model projects that bald eagles will have just 26 percent of their current summer range by 2080. It is possible that the birds will adapt and reclaim summer terrain as new areas become hospitable, but it isn't known whether the birds will be able to find the food and habitat they need to survive.

Climate Changers: Greenhouse gases (GHG), including carbon dioxide (CO_2), from human activities are the most significant drivers of observed climate change. Carbon dioxide is generated as a result of the combustion of fossil fuels and to a lesser extent, the clearing of land for agriculture, industry, and other human activities. As described in a recent study released by the Governor's Council on Climate Change, average temperatures in Connecticut could increase by 5°F (2.7°C) by 2050 compared to the 1970-1999 baseline in Connecticut.

Degree Days: Degree days are defined as the number of degrees by which the average daily temperature is higher than 65°F (cooling degree days) or lower than 65°F (heating degree days). Growing degree days (GDD) are a temperature derived index used to correlate with the amount of heat available for the growth of plants, insects, and disease organisms.

Drinking Water: Extreme rainfall events lead to more runoff when the soil simply is not able to absorb the precipitation at the rate it is falling. In urban, suburban, and agricultural areas, this runoff can pick up pollutants from the landscape and carry them to nearby rivers and other waterways, potentially affecting the quality of drinking water. In addition to more intense storms and flooding, more frequent or longer dry spells are also projected in many climate change scenarios, which makes the possibility of water scarcity a concern.

Electricity at Home and Work: Increases in temperature will likely increase energy demand, as well as change our ability to produce electricity and deliver it reliably. In a warmer climate, more electricity will be used for air conditioning and less natural gas, oil, and wood for heating. To the extent that the increased demand is met by sources that are carbon-based, climate warming could be exacerbated.

Farmland: Climate change may benefit some plants by lengthening growing seasons. However, other effects of a warmer climate, such as less carbon sequestration in the soil, more pests, droughts, flooding, less predictable weather patterns, and changes in ground-level ozone concentrations will not be beneficial for agriculture.

Forest Birds: Climate change affects birds both directly and indirectly. As temperatures warm, some bird species will benefit from milder winters and extended breeding seasons. Others, such as northern birds associated with forest habitats, will likely decline in Connecticut, due in part to increased competition and increased frequency of droughts and extreme storm events that might inflict higher mortality during the breeding seasons.

Good Air Days: The number of days with good air is related to a number of factors, including ambient air temperature, concentrations of air emissions, weather patterns, etc. For each pollutant an AQI value of 100 generally corresponds to an ambient air concentration that equals the level of the short-term national ambient air quality standard for protection of public health. AQI values at or below 100 are generally thought of as satisfactory, while AQI values above 100 indicate air quality that is unhealthful.

Invasives: Climate change threatens to increase the extent, frequency, and severity of invasive species. The milder winters and extended spring that comes with climate change are helping

invasive species extend their ranges, pushing aside native species and transforming habitats. The removal of temperature or moisture constraints will allow species to move into and successfully invade new areas.

Lobsters: Climate change is increasing the water temperature of Long Island Sound. Water temperature is believed to have had a significant impact on lobster's health and ecology (e.g., recruitment, behavior and distribution).

Nature-based solutions: Nature based solutions include sustainable planning, design, environmental management and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience. These solutions use natural features and processes to combat climate change, reduce flood risk, improve water quality, restore and protect wetlands, and reduce urban heat.

Piping Plovers: Coastal-nesting birds, such as the piping plover, are among the species most threatened by climate change. Rising sea levels might reduce nesting areas available for piping plovers and many coastal and nesting birds.

Preserved Land and Forests: The climate influences the structure and function of forest ecosystems and plays an essential role in forest health. Forests are sensitive to changes in temperature and precipitation and are greatly affected by fragmentation and land-use change, invasion by nonnative species, forest diseases and insect pests, and extreme weather events. Land conservation can help to reduce the impacts of climate change by absorbing carbon dioxide.

Renewable Energy: Renewable energy is one of the most effective tools against climate change. Zero carbon energy sources provide a tremendous resource for generating clean and sustainable electricity without toxic pollution or global warming emissions. Solar panels, wind turbines, hydroelectric facilities and other technologies do not release any emissions as they generate electricity.

Rivers and Streams: Rivers and streams are affected greatly by fluctuations in precipitation and evaporation patterns around the world. Warming temperatures are altering the water cycle and shifting precipitation patterns. Changes in the timing and location of precipitation combined with rising levels of water pollution will strain ecosystems and threaten the survival of many fish and wildlife species. An increase in severe storms due to climate change will degrade water quality and increase the risk of catastrophic floods; while frequent droughts, enhanced evaporation, and decreases in overall annual rainfall would result in reduced water levels in streams, rivers, and lakes.

Source Water Protection: Protecting watershed land and the sources of drinking water involves the proactive planning, management and protection of water resources. This includes safeguarding the quality and availability of surface water (such as rivers, lakes, and reservoirs) and groundwater (such as wells and aquifers) to ensure the long-term health and safety of public and private water supplies.

Swimming, Clamming and Oystering: As the atmosphere warms, changes to the amount, timing, distribution, and intensity of precipitation will continue. As more intense precipitation leads to increased runoff, more pollution is washed into waterways, including sediments, nitrogen from fertilizers, pathogens and pesticides, which affects water quality.

Transportation - Driving and Riding: Combustion of fossil fuels, such as gasoline and diesel, releases GHG emissions into the atmosphere. Both nationally and in Connecticut, the transportation sector is the greatest contributor of GHG emissions.

Warming and Rising Waters: Global mean sea level has risen about 8–9 inches (21–24 centimeters) since 1880, with about a third of that occurring in just the last two and a half decades. The rising water level is mostly due to a combination of meltwater from glaciers and ice sheets and thermal expansion of seawater as it warms. The Connecticut Institute for Resilience and Climate Adaptation (CIRCA) recommended that Connecticut plan for and expect 50 centimeters (20 inches) of sea level rise by 2050 with further increases following that date.

Waste Diversion: Recycling and waste reduction have many direct benefits; however, the indirect benefits are also significant. Recycling and waste diversion reduce GHG emissions that would be created by the production, transport, and disposal of municipal solid waste. Increasing recycling and source reduction has been identified as a key strategies for reducing GHG emissions in Connecticut's Climate Change Action Plan.

Water of Long Island Sound: Climate change has a variety of direct and indirect effects on ocean ecosystems. Increasing temperatures have the capability to make coastal and marine ecosystems more vulnerable to hypoxic conditions, as well as the geographic expansion of hypoxic environments. In general, warmer water holds less dissolved oxygen, which is required for a waterbody to support aquatic life, than colder water.

Wetlands: Wetlands play a role in our ability to manage risks from climate change. Wetlands are an important sink for GHG, where carbon is stored and prevented from entering the atmosphere. Wetlands provide important functions including cleaning up polluted water. slowing and storing floodwaters and snow melt, recharging groundwater, and supporting habitat for many different native plant and animal species.

Remedying the Deficiencies of Existing Programs and Activities

The Council acknowledges the efforts of the Governor and Legislature in enacting legislation in recent years to address the critically important issue of climate change. Consistent with its charge to recommend actions to improve state environmental programs, the Council recommends the following:

- Expand efforts to more aggressively reduce greenhouse gas (GHG) emissions:
  - reduce the consumption of energy in all sectors;
  - expand the use of mass transit and electric-drive vehicles; and
  - reduce solid waste and increase the diversion of solid waste.

- Promote nature-based solutions that support climate change mitigation and adaptation:
  - increase carbon sequestration;
  - protect forests and wetlands as carbon sinks;
  - restore coastal habitats;
  - protect potable water sources;
  - meet farmland preservation goals; and
  - increase climate-smart agriculture and soil conservation.

- Protect watershed land and water resources to protect drinking water sources, reduce hypoxia conditions in Long Island Sound, increase the area of productive shellfish beds, and eliminate the number of beach action days:
  - promote protective land use controls;
  - establish and protect riparian buffers;
  - eliminate combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs); and
  - reduce impervious surface area.

- Protect agricultural land and core forests:
  - expand the forest and farmland protections of Public Act 17-218 to include any solar and/or energy storage projects within the jurisdiction of the Connecticut Siting Council.

- Increase resources for the Department of Energy and Environmental Protection (DEEP) and other agencies to:
  - provide program administration and assistance to municipal wetland officials and commissions;
  - enhance land preservation efforts for open space, forests, and farmland;
  - protect and enhance habitats for all of Connecticut's flora and fauna;
  - incorporate consideration of the rising sea level in project planning and funding in shoreline communities; and
  - control the introduction and expansion of invasive species.

Research and Reports

The Council published the 2022 *Environmental Quality in Connecticut* annual report in May 2023. In this year's annual report, the Council included new data and charts on greenhouse gas (GHG) emissions associated with the transportation sector, which accounted for approximately 41 percent of all GHG emissions in the state in 2022; waste diversion; projected electric vehicle stock; and the results of the Council's review of the municipalities' use of funds derived from the surcharge on miniature alcohol beverage containers.

In 2023, Public Act 23-76 established a requirement for the Council to conduct a review of "programs and measures of local governments implemented pursuant to subsection (d) of Section 22a-244b," as part of the Council's review of the programs and activities of the state and local governments and private organizations, as required by Connecticut General Statutes (CGS) Section 22a-12. Subsection (a) of CGS Section 22a-244b established a five-cent surcharge on any beverage container containing a spirit or liquor of fifty milliliters or less, often referred to as Nips. The Council found that 56 reporting municipalities or approximately 42 percent of respondents indicated that no funds had been expended through June 30, 2023, and overall, only 29 percent of the total funds received by the reporting municipalities had been expended through June 30, 2023. Further, the Council calculated that, through June 30, 2023, approximately 42 percent of the funds received from the surcharge on the Nips was expended to reduce the generation of solid waste, and approximately 58 percent was expended to reduce the impact of litter caused by such solid waste. Some municipalities reported using some or all of the funds on one or more environmental measures to reduce solid waste and to reduce the impact of litter, and only ten of the municipalities reported using all of the funds they received through June 30, 2023.

The Council also notes that there was no new data for certain indicators, including wetlands, forests, and turtles. The inclusion of biological indicators requires considerable care in the selection of appropriate species, and the Council is grateful for the advice it received from experts.

Advice to Other Agencies

Council staff reviewed proposals submitted to the Connecticut Siting Council; Environmental Impact Evaluations, and notices prepared by other agencies, consistent with the requirements of the Connecticut Environmental Policy Act; forest management plans; draft request for proposals / bid preferences; draft general permits, studies and reports; and proposed projects funded through the Federal Local Bridge Program and submitted comments when deemed appropriate. The Council provided training to several state agencies and updated the notice templates to assist state agencies to develop notices for publication in the *Environmental Monitor*.

The Council commented on several state activities and plans, including the following:

- DEEP's draft request for proposals (RFP) for zero carbon generation resources, and DEEP's Bid Preference for Shared Clean Energy Facility Program;
- DEEP's Bozrah Sanitary Sewer Extension Environmental Impact Evaluation, and the Department of Transportation's (DOT) Route 7 / Route 15 Interchange Environmental Impact Evaluation;
- DEEP's Draft Batterson Park Study;
- DEEP's Pachaug State Forest Management Plans;
- proposed replacement of the Fairhaven Road Bridge in East Lyme; the Groton Long Point Road Bridge in Groton; the Bosworth Road Bridge in Pomfret; the Juniper Lane, Atwoodville Road, and Gurleyville Road Bridges in Mansfield; the Colony Road Bridge in East Lyme; and the Ashford Road Bridge in Eastford;
- Office of Policy and Management's (OPM) Draft Conservation and Development Plan; and

- four applications for a Certificate of Environmental Compatibility and Public Need and 25 Petitions for Declaratory Ruling to the Connecticut Siting Council.

The Council also commented on proposed legislation, during the 2023 legislative session, that could have impacted Connecticut's environment.

Public Act 20-9, An Act Revising Provisions of the Transfer Act and Authorizing the Development and Implementation of a Release-Based Remediation Program, stipulated that the Council would be a member of a working group to develop regulations to implement a Release-Based Remediation Program. The Council has participated in the working group through the subcommittees and group meetings.

Public Act 23-204, Section 69 established a working group, which included a representative from the Council, to study the State Historic Preservation Officer's role in administering historic preservation review processes.

Citizen Concerns and Complaints

State law directs the Council to investigate citizen complaints alleging violation of any statute or regulation in respect to environmental quality. In 2023, staff investigated numerous complaints, including noise; inland and tidal wetland impacts; potential impacts associated with the possible development of a school and expansion of the Tweed New Haven Airport; the application of herbicides; indoor air quality and odors; invasive species; property remediation; development and decommissioning of solar facilities; and water quality. The Council also addressed questions regarding the applicability of the Connecticut Environmental Policy Act (CEPA) to certain proposed state actions. Routine matters are usually addressed by providing the person who inquired/complained with the correct person or agency to handle the matter. The Council is appreciative of the assistance provided by the Departments of Energy and Environmental Protection (DEEP), Public Health, and Transportation; the Office of Policy and Management; and others to answer citizen inquiries and resolve complaints.

Every month the Council discusses the inquiries and complaints of environmental consequence that were presented to the Council by individuals and groups. In 2023, the Council held 12 regular meetings. Many times, citizen complaints and inquiries lead to special reports, such as the Council's 2020 special report *Low Deposit, Low Return*, on the problem with the State's beverage container redemption program.

The main responsibilities of the Council on Environmental Quality are described in Sections 22a-11 through 22a-13 of the Connecticut General Statutes (CGS).

The Council is a nine-member board that works independently of the Department of Energy and Environmental Protection (except for administrative functions). Five members are appointed by the Governor, two members by the President Pro Tempore of the Senate, and two members by the Speaker of the House. The Council's 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. In 2023, Public Act 23-76 was enacted that requires the Council to assess programs and measures of local governments implemented pursuant to CGS subsection (d) of Section 22a-244b.

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 notices required under CEPA including, but not limited to, scoping notices and notice of the availability of environmental impact evaluations. The *Environmental Monitor* also is the official publication for notice of intent by state agencies to sell or transfer state lands.

6. Participation in studies and working groups on environmental issues, as directed by the legislature, such as the Release-Based Clean Up Program Regulation Development. In 2023, Public Act 23-204, Section 69 and Special Act 23-15 established a working group to study the State Historic Preservation Officer's role in administering historic preservation review processes. The Working Group membership included a representative from the Council.

Keith Ainsworth
Keith Ainsworth has been an environmental and land use litigator of the New Haven Bar for nearly three decades. Keith has a broad conservation-based practice representing land trusts, non-profits, landowners and businesses in transactions and litigation throughout Connecticut before administrative agencies and state and federal courts. As a former chair of the Connecticut Bar Association Environmental Law section and a municipal first selectman (Haddam), Keith has a perspective from several sides of the table. A graduate of Tufts with a bachelor's degree in biology, environmental studies and English literature, Keith brings a scientific and analytical background to the law. Keith is a life member of the Madison Land Conservation Trust and served on the national leadership council of Trout Unlimited. Keith also serves as General Counsel to Vista Live Innovations, Inc., a private educational institute for adults with intellectual disabilities. Keith is also an avid outdoorsman and author of several volumes of poetry.

Christopher Donnelly
Resident of Durham. Retired from the Department of Energy and Environmental Protection (DEEP) in 2020, where he worked in the Division of Forestry as the Urban Forestry Coordinator for twenty years. Prior work experience includes working as arborist and as the field representative of a major lumber trade association. Graduated with a master's degree in Forest Science from the Yale School of Forestry and Environmental Studies, now known as The School of the Environment, and is licensed as an arborist in Connecticut and certified as a forester. In retirement, he remains active with the Connecticut Tree Protective Association, where he administers the course for those seeking their arborist license, and with the Connecticut Urban Forest Council, currently serving as Vice-Chair.

David Kalafa
Resident of Middletown. Over thirty years working for the State of Connecticut developing and implementing policy for energy and conservation at the Office of Policy and Management and Department of Energy and Environmental Protection. Retired as Undersecretary for Comprehensive Planning and Intergovernmental Policy at the Office of Policy Management. Served on the State Water Planning Council and Governor's Climate Change Commission. Holds a Master of Public Administration from the State University of New York and a bachelor's degree in Economics from Skidmore College.

Denise Rodosevich
Resident of Hebron. Denise was an attorney with the State of Connecticut for over twenty years providing legal advice, analysis, and representation to several state agencies, including what was formerly known as the Department of Environmental Protection (DEP). Environmental law, policy, and advocacy were important aspects of her state service. Prior to that, she was a litigator in private practice and worked in various environmental analyst job titles at DEP. Denise was also an Adjunct Professor of Law at the University of Connecticut School of Law, teaching, among other courses, Toxic Torts. She has authored one and co-authored another article addressing aspects of the Comprehensive Environmental Response, Compensation, and Liability Act. In addition to her law degree from the University of Connecticut School of Law, she holds a bachelor's degree in Environmental Conservation and a master's degree in Environmental Studies from the University of Colorado and the University of Montana, respectively.

Charles Vidich
Resident of Ashford. Environmental and land use consultant concerned with energy efficient and sustainable patterns of development. Served as manager of the United States Postal Service Corporate Sustainability Initiatives program with responsibility for sustainability, energy efficiency and environmental management systems for the nation's 32,000 domestic and overseas Post Offices. Previously served as the principal planner for the Central Naugatuck Valley Council of Governments where he developed solar conscious land use ordinances and the nation's first

comprehensive regional plan of development. Appointed to the Connecticut Land Use Education Council with the mission to improve the skills and resources available to local planning and zoning commissions. Received the Lifetime Achievement Award from the Environmental Protection Agency's National Sustainable Materials Management program. Appointed as a visiting scientist to the Harvard School of Public Health as well as the Harvard Humanitarian Initiative where he lectured on scientific approaches on the use of quarantine and the environmental control of communicable disease. He served as the pivotal expert witness in a celebrated Connecticut Supreme Court case that successfully overturned restrictive zoning regulations and in a federal district court case that successfully overturned discriminatory land use practices.

William Warzecha
Resident of Norwich. Retired from the Department of Energy and Environmental Protection with 36+ years of service. Early in his career, he served as the geologist/hydrogeologist to the Eastern Connecticut and King's Mark Environmental Review Teams applying his technical background and expertise mainly in the areas of water supply development, waste disposal, and geologic development concerns with respect to major land-use projects, watershed studies and natural resource inventories statewide and assisted staff of the Connecticut Geological & Natural History Survey on geologic studies and investigations. Retired as the supervising environmental analyst for the Department's Remediation Division primarily responsible for enforcing the state's ground water pollution and potable water laws, protecting the state's water resources, and overseeing the clean-up of soil and ground water at polluted industrial and commercial sites. He was a long-time Board member representing the City of Norwich to the Uncas Health District and is presently serving as a Trustee at the Norwich Free Academy and a member of the Board of Commissioners for the City of Norwich's Public Utilities and Sewer Authority. Holds a master's degree in Environmental Management and Policy and a bachelor's degree in Environmental Earth Science.

Council Members whose terms expired in 2023 and 2024

Alicea Charamut
Resident of Newington. Executive Director of Rivers Alliance of Connecticut. Board of Directors, Farmington Valley Chapter of Trout Unlimited. Secretary, Fisheries Advisory Council. Co-Chair, Water Planning Council Advisory Group. Advisory Board, Connecticut Institute of Water Resources.

Kip Kolesinskas
Resident of Manchester. Consulting Conservation Scientist. Current projects include assisting agencies, NGO's, and private individuals with farmland protection, land access and affordability for new and beginning farmers, farmland restoration, and climate change adaptation strategies. Member of the Working Lands Alliance Steering Committee, and has contributed to numerous publications and initiatives including Conservation Options for Connecticut Farmland, Planning for Agriculture-A Guide for Connecticut Municipalities, and the award-winning training videos for CT DEEP's Municipal Inland Wetland's Agency Training Program. Formerly USDA Natural Resources Conservation Service State Soil Scientist for Connecticut and Rhode Island, where he worked extensively with farmers, educators, government and nonprofits to help them protect farmland and wetlands, and use soils information to make better informed land use decisions. He is a recognized regional and national speaker on soils and land use planning, farmland protection, climate change adaptation, farmland access, and wetlands.

Matthew Reiser
Resident of Avon. Environmental, health and safety consultant with over 20 years of experience performing regulatory compliance auditing, planning, training and reporting; air, water and waste discharge permitting; and air, water and waste sampling for industrial, commercial, municipal and institutional facilities. Member, Connecticut Chapter of the Academy of Certified Hazardous Materials Managers and Connecticut Marine Trades Association Environment Committee.

The Council acknowledges the contributions of environmentalists that have worked tirelessly to improve the quality of life for all species on Earth. The Council recognizes all the former members of the Council and staff, including Kip Kolesinskas and Alicea Charamut whose terms ended in December 2023, and Matt Reiser whose term expired in March 2024, after eight years of service.

The Council appreciates the assistance of the many people in the Departments of Agriculture, Energy and Environmental Protection, Transportation, and Public Health; the Connecticut Agricultural Experiment Station; the Connecticut Siting Council; the United States Environmental Protection Agency and the Department of Energy; and others who, annually, provide or make data available for this report.

It is appropriate to also acknowledge the many individuals and organizations that have contributed greatly to the stewardship of Connecticut's environment. This includes the many state employees who administered the environmental programs put in place by the Legislature over the last five decades who are now about to retire, or have retired, from a career of public service. The Council especially thanks the many citizens, businesses, and organizations who offered information and viewpoints about public policies, many of which have led to the Council's special reports over the years. The Council also appreciates the work of its Executive Director, Paul Aresta in assisting with drafting this report for review by the Council and preparing the final version for publication.

Image Credits: The "warming earth" symbol used to denote indicators affected by climate change was created by the Council. The image of the Asian tiger mosquito is attributed to Susan Ellis. The image of the map of Connecticut with the status of Ospreys' nests was obtained from Connecticut Audubon, Osprey Nation Map. The image of the emerald ash borer was obtained from forestimages.org; the hydrilla image was obtained from the United States Army Corps of Engineers; and the jumping worm image was obtained from the United states Department of Agriculture, Forest Service. The image of tree canopy in environmental justice communities was provided by Danica Doroski and Isabelle Zaffetti. The image on the cover of the Shepaug River was provided by Paul Aresta. The Council greatly appreciates their generosity in allowing the use of these excellent images in this report.

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