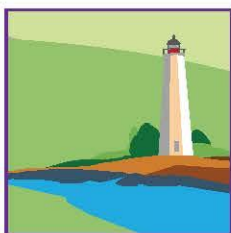


environmental infrastructure primer

water



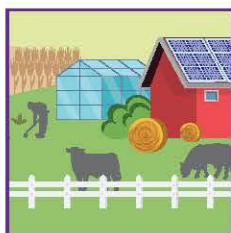
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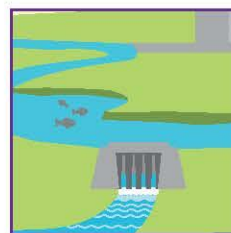
**Land
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Recreation**



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Water



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Water

Primer

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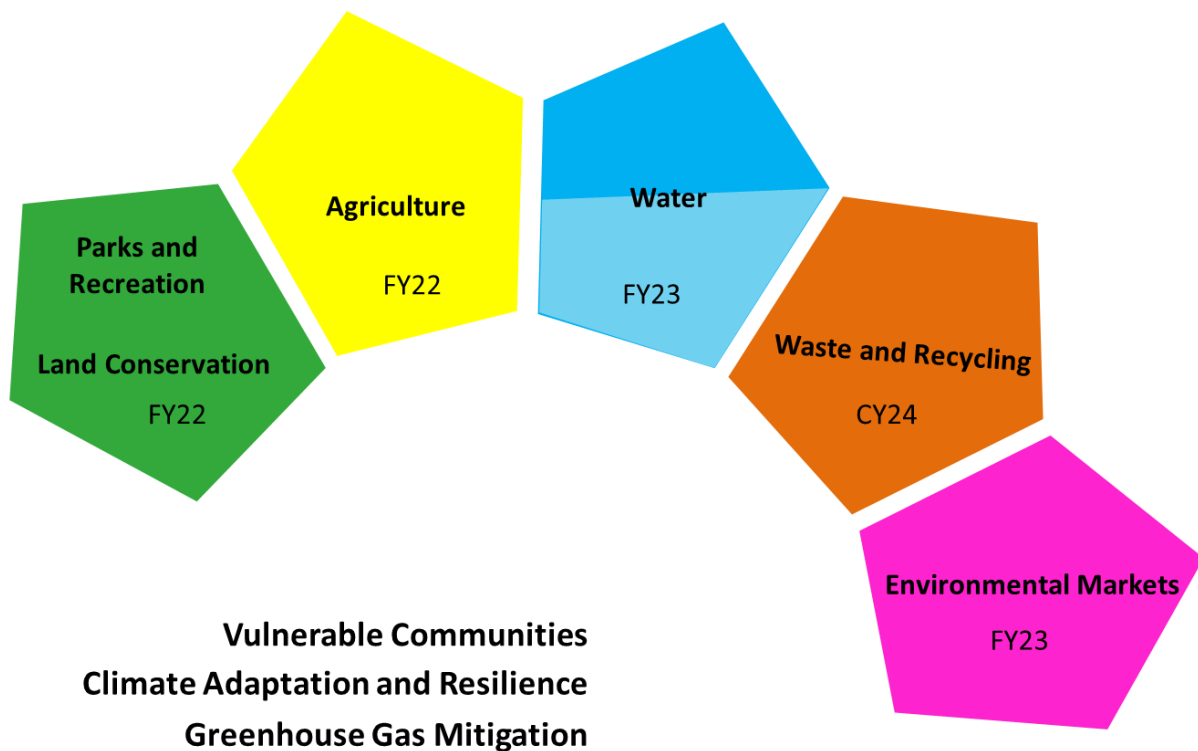
WATER

RESEARCH ON ENVIRONMENTAL INFRASTRUCTURE

1. Introduction

In October of 2021, the Connecticut Green Bank (“Green Bank”) developed a plan upon which it was going to engage stakeholders to understand the various components of “environmental infrastructure” – see Figure 1. With its mission to “confront climate change by increasing and accelerating investment into Connecticut’s green economy to create more resilient, healthier, and equitable communities,” within each component of “environmental infrastructure,” the crosscutting issues of reducing greenhouse gas emissions (“GHG”), increasing climate adaptation and resilience, and enabling investment in vulnerable communities was explored.

Figure 1. Process to Understand Components of Environmental Infrastructure



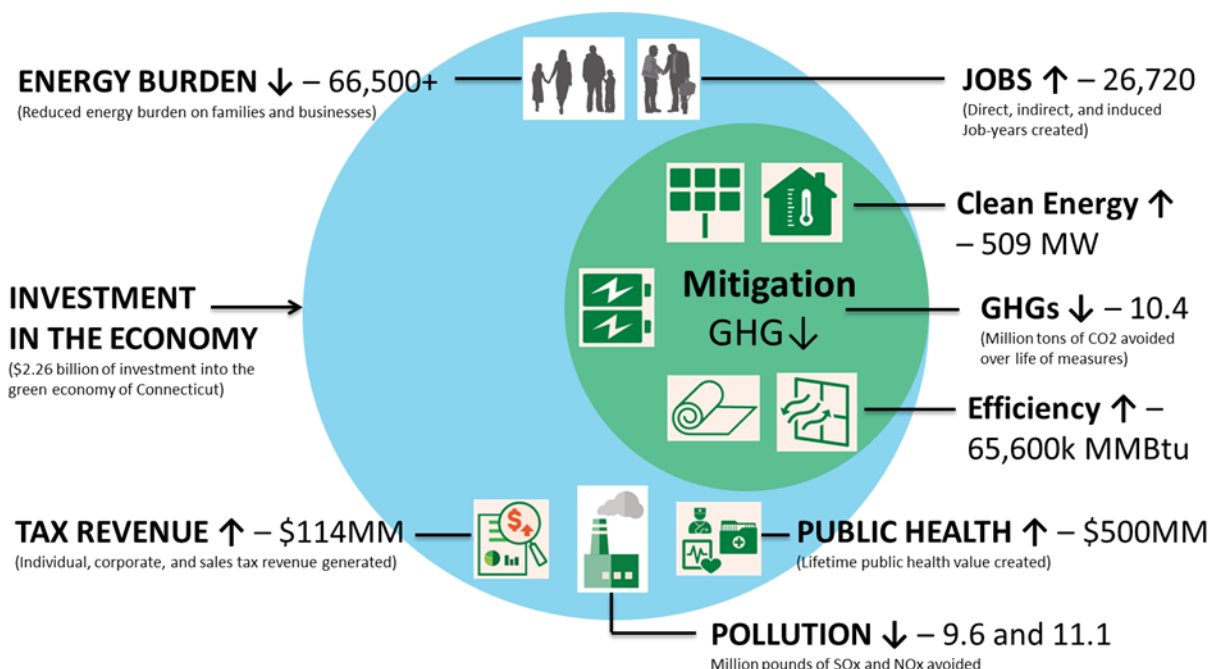
This primer reflects the observations, findings, and initial recommendations from the conversations with stakeholders and research conducted on water.

2. Overview

On July 6, 2021, Governor Ned Lamont signed Public Act 21-115 “An Act Concerning Climate Change Adaptation” (“the Act”) into law. The bipartisan-supported public policy was among the sixty-one (61) recommendations made by the Governor’s Council on Climate Change (“GC3”), including a recommendation to expand the scope of the Green Bank beyond “clean energy” to include “environmental infrastructure” (i.e., Recommendation #57).

Since its founding over a decade ago, the Green Bank has focused its efforts on using a limited amount of public resources to mobilize multiples of private investment in Connecticut to increase and accelerate the deployment of “clean energy” to deliver social and environmental impact – see Figure 2.

Figure 2. Impact of the Green Bank with focus on “Clean Energy” Deployment and Mitigation of GHG Emissions (FY12-FY22)



Given its mission, the Green Bank helps the State of Connecticut achieve its ambitious public policy objectives (e.g., GHG emission reductions targets, renewable portfolio standards). In so doing, by 2025, no less than 40 percent of investment and benefits from its programs are to be directed to vulnerable communities.¹

The Act, expands the scope of the Green Bank beyond “clean energy” to include “environmental infrastructure,” and includes the following key provisions:

¹ “Vulnerable communities” means populations that may be disproportionately impacted by the effects of climate change, including, but not limited to, low and moderate income communities, environmental justice communities pursuant to section 22a-20a, communities eligible for community reinvestment pursuant to section 36a-30 and the Community Reinvestment Act of 1977, 12 USC 2901 et seq., as amended from time to time, populations with increased risk and limited means to adapt to the effects of climate change, or as further defined by DEEP in consultation with community representatives.

- **Definition** – “environmental infrastructure” means structures, facilities, systems, services and improvement projects related to (A) water, (B) waste and recycling, (C) climate adaptation and resiliency, (D) agriculture, (E) land conservation, (F) parks and recreation, and (G) environmental markets, including, but not limited to, carbon offsets and ecosystem services;
- **Comprehensive Plan** – requirement for the Green Bank to develop a Comprehensive Plan² prior to implementing any programs or initiatives related to “environmental infrastructure”;
- **Reporting** – inclusion of the Banks Committee and the Environment Committee, alongside the Energy and Technology Committee and Commerce Committee in terms of reporting; and
- **Bonding** – the ability to issue 25-year bonds for “clean energy” and 50-year bonds for “environmental infrastructure” (i.e., no more than the useful life of the projects), supported by the Special Capital Reserve Fund (“SCRF”), for up to 25 years to improve the rating of the bonds issued.

With respect to “water,” Public Act 21-115 includes several important provisions on the state Clean Water and Drinking Water Revolving Funds (“CWSFR” and “DWSRF”), including:

- **Environmental Infrastructure Fund** – shall not receive funds that have been deposited in, or are required to be deposited in, an account of the Clean Water Fund pursuant to sections 22a-475 to 22a-483f, inclusive, or (iii) funds collected from a water company, as defined in section 25-32a.
- **Funding Sources** – specifically authorized, include, but are not limited to any federal funds, provided such funds are not required to be deposited in the accounts of the Clean Water Fund pursuant to sections 22a-475 to 22a-483f, inclusive.
- **Applying for Funds** – the Green Bank shall not apply, directly or through a subsidiary, to be eligible for grants under (i) the Clean Water Act, 33 USC 1251 et seq., as amended from time to time, without the approval of the State Treasurer and the Commissioner of Energy and Environmental Protection, or (ii) the Safe Drinking Water Act, 42 USC 300f et seq., as amended from time to time, without the approval of the State Treasurer and the Commissioner of Public Health.

This document attempts to summarize the findings from the research and outreach efforts conducted by the Green Bank³ on “water” from March 1, 2022 through June 30, 2022 and includes the following sections: (A) overview, (B) key public policies, (C) market potential, (D) target, (E) funding and financing programs, (F) other programs, (G) stakeholder outreach, (H) findings, (I) opportunities, (J) history of leadership and innovation, (K) references, and (L) definitions.

² https://www.ctgreenbank.com/wp-content/uploads/2022/08/Comprehensive-Plan_FY-2023_FINAL_080122-1.pdf

³ Led by Bryan Garcia (President and CEO) and Ashley Stewart (Manager of Community Engagement)

⁴ The term “water of the state” is generally used to refer to water that is within the State’s jurisdiction to regulate discharges, quality and extraction from, which includes, but is not limited to, rivers, streams, groundwater, lakes, and reservoirs.

This primer will look to portray the scope of water concerns in Connecticut through areas of water quality, management of water quantity, surface water protection, and public health of drinking water with a focus on green infrastructure and references to enhancing resilience and minimizing the impacts of climate change.

3. Key Public Policies

The following are key public policies that advance “water” in Connecticut, including, but not limited to:

1. **State Plan of Conservation and Development** (CGS 16a-24) – is an overarching statement of state policy in matters pertaining to land and water resource conservation and development. The Office of Policy and Management (“OPM”) prepares revisions to the State Conservation and Development Plan (“State C&D Plan”) on a recurring 5-year cycle and submits it for adoption by the Connecticut General Assembly (“CGA”). Once adopted, the State C&D Plan is then implemented by state agencies whenever they undertake certain actions.⁴ The current State C&D Plan (i.e., for 2018-2023), includes the relevant “clean energy” and “environmental infrastructure” items, including, but not limited to:
 - a. **Greenhouse Gas Mitigation** – reducing carbon dioxide emissions in the state consistent with the recommendations of the Connecticut Climate Change Preparedness Plan (i.e., 5.10);
 - b. **Climate Adaptation and Resilience** – utilizing the state’s renewable power generation potential to the extent compatible with the state goals for environmental protection, and minimize potential impacts to rural character and agricultural and scenic resources when siting new power generation facilities and/or transmission infrastructure (i.e., 4.8) and proactively address climate change adaptation strategies to manage the public health and safety risks associated with the potential increased frequency and/or severity of flooding and drought conditions, including impacts to public water supplies (i.e., 5.13);
 - c. **Water** – encouraging multi-disciplinary approaches to infrastructure planning and design (i.e., 1.4), minimizing the potential risks and impacts from natural hazards (i.e., 1.13), identifying innovative mechanisms utilizing decentralized or small-scale water and sewage systems (i.e., 2.7), encouraging and promoting access to parks and recreational opportunities (i.e., 2.8), expanding the state’s open space and greenway network (i.e., 4.3), avoiding activities that could negatively affect rare or unique ecological communities and natural areas (i.e., 4.4), seeking to achieve no net loss of wetlands (i.e., 4.6), utilizing the landscape to the extent practical and incorporate sound stormwater management design (i.e., 4.12), managing water resource conflicts by balancing the competing needs of water (i.e., 4.13), relying on the functional capacity of the land, to the extent possible, to provide drinking water and wastewater disposal needs (i.e., 4.14), protecting the ecological, scenic, and recreational value of lakes, rivers and streams (i.e., 4.16), protecting, maintaining,

⁴ Quasi-publics are not subject to this requirement

and restoring chemical, physical, and biological integrity of ground and surface waters (i.e., 4.17), utilizing a multiple barrier approach to ensure the availability of safe and adequate public water supplies (i.e., 5.1), identifying water supply sources and resources sufficient to meet existing and anticipate needs (i.e., 5.2), ensuring that water conservation is a priority consideration (i.e., 5.3), utilizing integrated watershed management approach to ensure high quality public drinking water (i.e., 5.4), seeking to prevent the loss of life and property by maintaining existing dikes, channels, dams (i.e., 5.5), minimizing the impacts of development on existing and identified drinking water sources (i.e., 5.7), supporting the creation of objective and uniform protocols for public water and sewer need assessment (i.e., 6.3), and relying upon municipal plans of conservation and development to identify the general location and extent of any existing, planned or avoided locations for sewer systems (i.e., 6.4).

2. **Clean Water Act (“CWA”)** – the Clean Water Act is the Federal regulation from The US Environmental Protection Agency (“EPA”) that manages discharges of pollutants into water bodies in the United States. This regulation sets water quality standards and shapes state level regulation. The creation of the CWA in 1948 (and expanded in 1972) made discharging into the waters of the state illegal unless permitted. The EPA’s National Pollutant Discharge Elimination System (“NPDES”) is a permit program that regulates discharges within a state department and requires enforcement and compliance.
 - A. **319 Nonpoint Source Management Program** – this program was created in 1987 as an amendment to the CWA to address the need for federal level response to state and local nonpoint source⁵ (e.g., stormwater) pollution.
 - B. **Municipal Separate Storm Sewer System (“MS4”) General Permit** - requires municipalities to manage and reduce the amount of clean stormwater that flows through sewer systems into waterbodies. This permit is one aspect of improving surface water quality across the state. This permit is one way that stormwater is regulated. Within this permit, municipalities are required to provide residents with options for reducing pollutants from stormwater and to host public education programs for residents about stormwater management.
3. **Stormwater Authorities** – CGS 22a-498 allows municipalities the ability to create stormwater authorities to develop stormwater management programs, provide public education and outreach to establish procedures for public participation, support administration of programs, establish geographic boundaries of such authority district, and recommend to the governing body with a stormwater district the ability to levy taxes, the revenues of which to carry out the powers of the authority.
4. **Safe Drinking Water Act (“SDWA”)** – Congress passed the SDWA in 1974 to protect public health and to regulate water systems that provide drinking water. The SDWA requires EPA to establish drinking water standards and a method to enforce those standards. The SDWA

⁵ A full list of the types of pollution that comes from stormwater, or non-point source pollution, can be found on the EPA’s website at <https://www.epa.gov/nps/types-nonpoint-source-pollution>

drives regulation and programs at every level of water management, federal, state and local.

- a. **Lead and Copper Rule Revisions (“LCRR”)**⁶ – the EPA revised the LCRR to better protect vulnerable communities, children from the possible risk of lead and copper exposure in drinking water. The revisions included greater information sharing with impacted communities, improved methods to find lead sources within a system, emphasizing full lead line replacement, required testing in schools and childcare facilities, and required water utilities to publish the location of lead service lines. This federal regulation was originally established in 1991 to regulate drinking water exposure to lead and copper through plumbing materials. Exposure to lead and copper can cause ranging health problems, through this rule regulation is monitored through the water users tap.

On August 4, 2022, the EPA released Guidance for Developing and Maintaining a Service Line Inventory⁷ that would support the oversight and replacement of lead and copper service lines for water systems. Water systems are required to create and maintain an inventory of service line materials by October 16, 2024.

- b. **Per- and Polyfluoroalkyl Substances (“PFAS”)** – PFAS are widely used, long lasting chemicals, components of which break down very slowly over time. Because of their widespread use and their persistence in the environment, many PFAS are found in the blood of people and animals all over the world and are present in low levels in a variety of food products, and in the environment. Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals. There are thousands of PFAS chemicals, and they are found in many consumer, commercial, and industrial products⁸.

In 2019, CT established PFAS action levels and continues to work with public water systems near areas determined to be high risk for PFAS contamination. In Connecticut, water suppliers are increasing PFAS testing and developing plans in response but legislation is currently being decided about how to address PFAS in the state⁹.

On March 14, 2023, EPA announced the proposed National Primary Drinking Water Regulation (“NPDWR”). The proposed legally enforceable levels, called Maximum Contaminant Levels (“MCLs”) for six PFAS is essentially zero. EPA anticipates finalizing the regulation by the end of 2023¹⁰.

⁶ <https://www.epa.gov/ground-water-and-drinking-water/revised-lead-and-copper-rule>

⁷ EPA has developed guidance on maintaining a service line inventory:

https://www.epa.gov/system/files/documents/2022-08/Inventory%20Guidance_August%202022_508%20compliant.pdf

⁸ <https://www.epa.gov/pfas/pfas-explained>

⁹ [CT isn't required to treat public water for PFAS. That could change \(ctmirror.org\)](https://www.ctmirror.org/news/ct-isnt-required-to-treat-public-water-for-pfas-that-could-change)

¹⁰ <https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas>

5. **Connecticut State Water Plan (CGS 22a-352)** – was created by the Water Planning Council (“WPC”) as a state-wide water plan that addresses the management of water resources across four state agencies. The Council consists of state agencies that are responsible for certain oversight and regulation of water in Connecticut. Those agencies are the Department of Energy and Environmental Protection (“DEEP”), the Department of Public Health (“DPH”), the Public Utilities Regulatory Authority (“PURA”), and the Office of Policy and Management (“OPM”). Overall, the State Water Plan aims to balance water needs, water quality, policy and planning across the state.

The Connecticut State Water Plan (“CSWP”) focuses on water health from several perspectives, including human health, environmental health, and all aspects of water management. This plan drives water programs and goals for state agencies and organizations that support or manage water in the State.

6. **Connecticut Public Act 21-115**: the public act that expanded the Green Bank’s scope to include environmental infrastructure. This act forms an Environmental Infrastructure Fund within the Green Bank that can receive funding from federal funds (e.g., Greenhouse Gas Reduction Fund within the Inflation Reduction Act) except those from electric ratepayers (i.e., Clean Energy Fund), Regional Greenhouse Gas Initiative allowance proceeds, Clean Water Funds, or funds collected from a water company. Those restrictions outline that the Green Bank is not eligible to receive federal grants under the Clean Water Act or the Safe Drinking Water Act without the approval of the State Treasurer, DEEP and DPH. These details encourage collaboration across the State in addressing water infrastructure needs.
7. **Executive Order 21-3** – On December 16, 2021, Governor Ned Lamont signed Executive Order 21-3 which calls for 23 actions supporting more than thirty recommendations from the Governor’s Council on Climate Change, including several recommendations on working lands:¹¹
 - a. **Resilient Stormwater and Drainage Systems** – mandates DEEP to update the design criteria for stormwater systems and for Department of Transportation (“DOT”) to identify the culverts that need sizing changes. Both efforts will ensure Connecticut’s management of stormwater can adapt to the changing weather conditions, aims to be resilient against the impacts of climate change, and to maximize designed stormwater management and nature-based solutions to create a more resilient State.
 - b. **Climate Resilience Using Nature-Based Solutions on State Properties** – DEEP and Department of Administrative Services (“DAS”) to develop guidance for state agencies to use nature-based solutions for flood and erosion control and stormwater management, integrate coastal marsh migration in state projects in coastal areas, and utilize low impact development and green infrastructure in new state construction and state-funded construction or redevelopment. These methods would use low impact design and green infrastructure within new construction projects and state funded redevelopment projects.

¹¹ It should be noted that Connecticut is a member of the United States Climate Alliance, and one of the original signatories to the Natural and Working Lands Challenge in 2018 – <http://www.usclimatealliance.org/nwlchallenge>

8. **Connecticut General Statutes and Regulations for the Protection of Public Drinking Water**¹²
 - DPH has a mandate to create and maintain a list and designation of all potential public water supply sources, CGS Section 25-33q. This list shapes land protection and land use within a distance from high valued water sources, as detailed in CGS Section 25-32 and the Sanitation of Watersheds found in The Regulations of Connecticut State Agencies (“RCSA”) Section 19-13-B32.
9. **Open Space Target** (CGS 23-8)¹³ – establishes that by 2023 a target of 21% (i.e., 673,210 acres) of state land area will be held by open space land, with 10% from the state (e.g., forests, parks) and not less than 11% from partners (e.g., municipalities, water companies, or non-profit land conservation organizations). The Comprehensive Open Space Acquisition Strategy (or “Green Plan”)¹⁴ is the comprehensive strategy for achieving the state goal, which includes priorities for strategic acquisitions of open space for climate change resiliency and preserving open space in perpetuity for watershed protection.

In order to identify opportunities to mobilize private investment, it is important to understand the public policy context in which “water” operates. With the focus on the Green Bank’s mission (i.e., confront climate change), public policy provides vital guidance on how to direct private investment flows in support of relevant public policy outcomes and objectives.

4. Market Potential

Water infrastructure and market opportunities in Connecticut are complex. Water is managed through several state agencies and federal departments. This section highlights some of the market potential within this sector that could support the long-term resilience of water and management of continued climate impacts.

Through stakeholder engagement several specific areas arose as potential opportunity areas for market engagement including, drinking water (or raw water) quality, lead abatement, onsite septic and well system resilience, PFAS and emerging contaminants, stormwater and flood management, watershed management through land conservation, and dam infrastructure.

Drinking Water

Drinking water can come from surface water (i.e. reservoir) or a groundwater source. There are many different water sources for drinking water. The state organizes these sources by population served, length of service, and source water. For the water consumer these sources determine the level of oversight, treatment, potential contaminants, and access to infrastructure financing. Sources include water regulated through a water supplier (public and private), large community water systems greater than 1,000 people served, smaller community water systems of less than 1,000 people, “transient” water systems that service 25 people or more per day for at least 60 days a year, and localized well water sources that are “non-transient, non-community” water systems.

¹² List of CT regulations and mandates for public drinking water can be found with DEEP at [CTStatutesRegsforProtectionofDWSpdf.pdf](#)

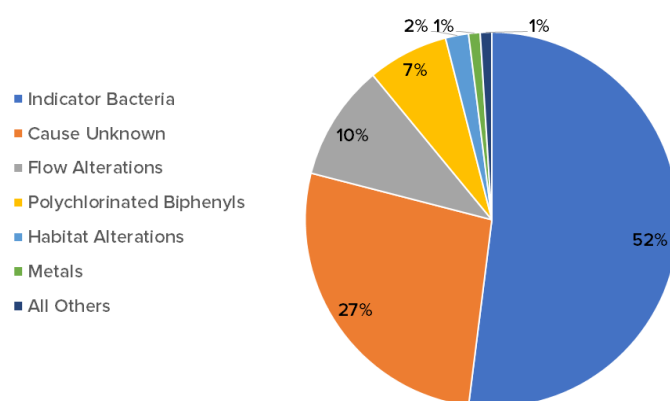
¹³ <https://law.justia.com/codes/connecticut/2012/title-23/chapter-447/section-23-8/>

¹⁴ <https://portal.ct.gov/DEEP/Open-Space/The-Green-Plan>

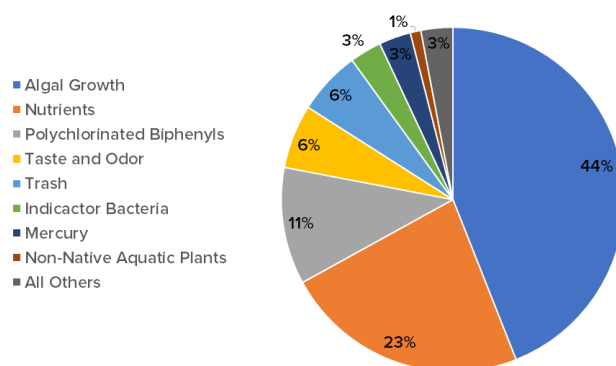
The landscape of water across the state is referred to as “waters of the state” and collectively the management of these water types shape water quality for human consumption, industry, and recreation. Managing water quality includes understanding causes of impairment and climate impacts on water quality. The cause of water quality impairment can vary across a watershed, region of the state, or type of water body. The CSWP lists the types of impairments across the state and the associated cause of the impairment – see Figure 3.

Figure 3. Causes of Impairment Summary for Connecticut's Assessed Waters (2014)

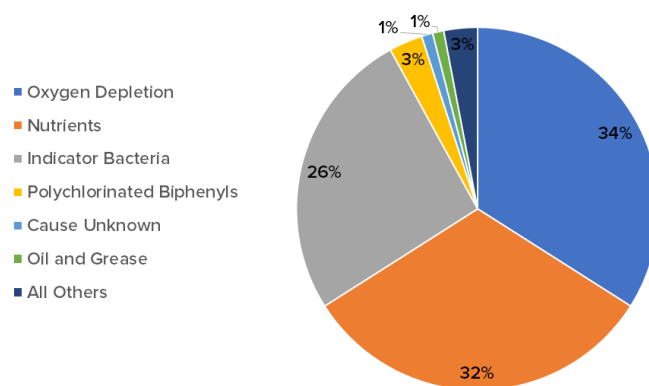
Causes of Impairment to Rivers & Streams



Causes of Impairment to Lakes & Reservoirs



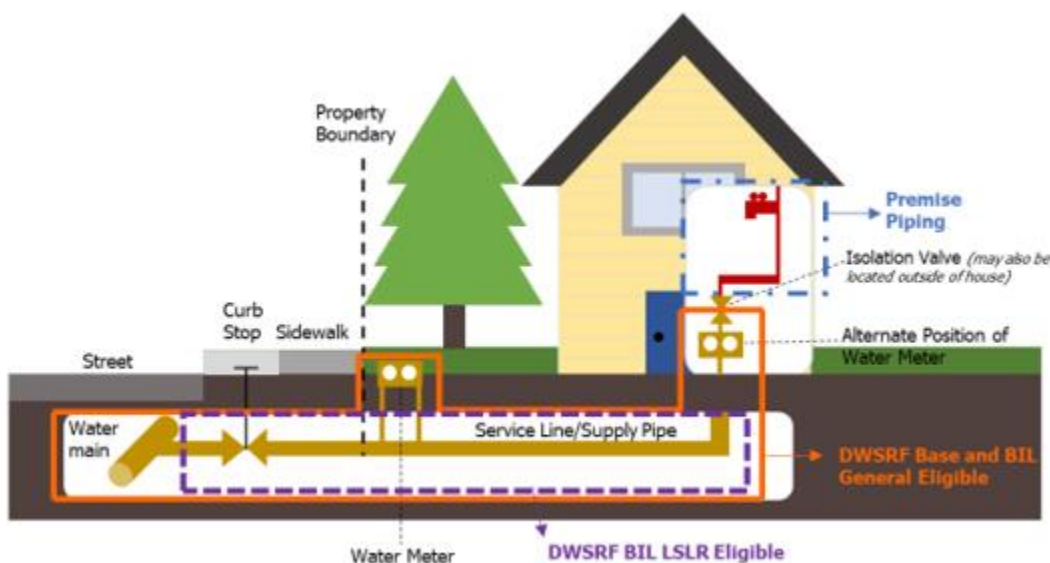
Causes of Impairment to Estuaries & Bays



Lead Abatement

The Revised Lead and Copper Rule requires the removal of lead and copper appurtenances, including service lines, from public water systems. This rule will require water utilities to develop an inventory of lead lines within their distribution systems. Many utilities are looking for opportunities to support or encourage homeowners to convert their interior home piping along with the service line changes. As an example, Figure 4 shows the delineation of water service line responsibility. Water utilities will be responsible for replacing lead service lines unless there is not a water utility, but this does not include internal home plumbing changes or homes that are not serviced by a water utility.

Figure 4. Overview of Water and Sewer Line Responsibilities for Utility vs. Homeowners



Lead and copper are one source of concern for drinking water quality, but there are other contaminants (e.g., bacteria, nutrients, and the lack of oxygen) that also represent possible market opportunities to improve the State's drinking water and surface water quality.

Onsite Septic and Well Systems

Approximately 40% of Connecticut residents are on private, small, minimally monitored well or septic systems. Residents in rural, suburban, or coastal areas may not be serviced by larger sewage treatment facilities. Issues with subsurface septic system design, poor maintenance, or siting challenges can cause a system to fail and can also threaten human health by impacting surface or ground drinking water. There is a need for more information on how climate change will impact Connecticut septic systems function.

Like septic systems, individual wells and community well systems present another market opportunity. The CSWP lists water infrastructure including the number of well systems across the state.

- Water supply wells, tanks, and pumps associated with 330 small community water systems

- Water supply wells, tanks, and pumps associated with 547 non-transient¹⁵ non-community water systems
- Water supply wells, tanks, and pumps associated with 1,455 transient non-community water systems
- Approximately 322,500 private water supply wells

Monitoring water quality of each of these well systems vary. Most private wells have no consistent monitoring or testing for water quality. Only recently did DPH require that when a test is performed on a private well, the results be reported to the DPH, the local health department, and in some cases, DEEP¹⁶. This is a potential opportunity to understand the condition of these well systems and develop an understanding of overall water quality for climate vulnerable residents. The CSWP recommends that the WPC propose legislation to support a private well testing program.

PFAS and Emerging Contaminants

Understanding the scale of PFAS impact is a current matter. Many have projected that the chemical has had far reaching impacts on humans and environmental health across the world. Locally, water utilities and food producers have started testing for PFAS. Testing, treatment and disposal of these compounds has the potential to cause a significant financial burden on public water systems and individual well owners. Testing and regulation are currently being decided at the federal and state level. The market opportunity right now is in monitoring, particularly in instances where there may be heightened exposure.

Surface Water

Environmental health in water is related to surface water and stormwater flows as well as water infrastructure. These areas each have vast market opportunities associated with protecting, enhancing, or restoring functionality. Each impacts the quality of drinking water, water recreation, water habitats, and flooding across the state. This section highlights the opportunity in three specific areas: land-use and land conservation in support of healthy watersheds, stormwater and low impact development, and dam infrastructure across the state.

Land Conservation

Land use policy is within each municipality's control; however, the impacts of land use decisions reach into every aspect of the environmental health of the state. Land conservation and water quality focused land use decisions are critical in achieving the CSWP and the state and federal water goals. Open space and conserved land can aid in providing stormwater benefits, mitigate flooding, protect water sources (i.e., surface water and ground water sources), and filter runoff before entering surface water bodies (i.e., rivers, streams and the Long Island Sound). Through an

¹⁵ Public water systems are generally categorized by the number of people they serve. The four categories are: (1) Large community water systems, which serve over 1,000 people; (2) Small community water systems, which serve under 1,000 people; (3) Transient, non-community water systems, which serve 25 or more different people per day for at least 60 days per year; and (4) Non-transient, non-community water systems, which serve 25 or more of the same people each day for at least 6 months per year.

¹⁶ https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/private_wells/EHDWCL202260Changes19a37PrivateWellSemiPublicWellTestingLaws.pdf

increased intentional focus on land conservation and coordination with municipal land use policy across the state will aid in DEEP's impairment plans¹⁷.

Stormwater

Stormwater is managed through a host of DEEP permits, including the Construction General Permit, Industrial General Permit and the Municipal Separate Storm Sewer Systems ("MS4") permit. Each of these permits aim to manage and reduce the pollutant impact of stormwater runoff. The MS4 General Permit establishes targets to disconnect impervious cover from sewer treatment systems, to also monitor pollutants (like bacteria, total suspended solids, and nutrient levels), and to link water quality standards for aquatic life and recreation to local impervious cover. All towns that have a population over 100,000 with runoff from industrial and construction activities, and a small MS4 is considered any size town with a municipally owned storm sewer system in an Urbanized Area¹⁸. There are 113 MS4 towns in Connecticut, which covers the majority of the state.

Dam Infrastructure

The CSWP provides an overview of dam regulation, and the role dams play in the state's water management. DEEP administers the state regulatory department of Dam Safety Program,¹⁹ this program regulates dam classifications, inspections, and registrations of all dams in the state. The classification system assigns a potential risk to the dam that accounts for the extent of property, infrastructure, economic loss and threat to life. The hazard classification of the dam determines the inspection frequency and other mandates. The State of Connecticut is the largest dam owner in the state. Other dam owners include corporations and water utilities. Private property owners can also own dams and have to meet the same requirements of inspection, and repair/maintenance. If a dam owner fails to maintain repairs to a significant or high hazard dam enforcement action can be taken to restore a dam to a safe condition.

In 2022, 213 dams were sent notice to conduct inspections. Notices were sent to all dam owners required to conduct inspections, including municipalities, water utilities and private owners. The inspections will detail the repairs needed, reassess the dam structure with respect to storm and water flow data, and account for development and downstream changes. Some inspections will include removal considerations. There is heightened interest in the state of dams, for benefits, risks and protections they provide through recreation, water reservoirs, flood control and flood management including climate change effects, hydroelectric power, and also for how it changes fish and aquatic life. There are approximately 1300 dams in the state that are significant and high hazard, and thousands more smaller hazard dams that can aid in the water management and water quality goals of the state. Supporting dam owners in maintaining highly safe dams and improving fish passage is an opportunity.

¹⁷ DEEP's statutory reporting requirements according to Sections 305(b) and 303(d) of the federal Clean Water Act (CWA) was submitted to the USEPA on Sept. 26, 2022. This Water Quality Report can be found here: [STATE OF CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION 2022 INTEGRATED WATER QUALITY REPORT](#)

¹⁸ "Urbanized Areas are defined by the federal Census Bureau and consist of densely populated areas surrounding urban centers. The criteria for designating UAs are developed by the Census Bureau and maps of UAs are published after each decennial census. The original maps governing the 2004 general permit were based on the 2000 census. The most recent maps reflect the results of the 2010 census." Except from DEEP's MS4 Fact Sheet ([GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS \(ct.gov\)](#))

¹⁹ [Dams Safety \(ct.gov\)](#)

Overview of Market Opportunities

Using the guidance of the CWSP, we can view market potential in support of human health and environmental health through the categories of drinking water and surface water:

- Drinking water quality through supporting private wells and residential onsite wastewater treatment and the removal of lead fixtures within the home.
- Emerging contaminant monitoring, treatment, and disposal.
- Land conservation to support healthy watershed management
- Stormwater management through nature-based solutions and supporting the development of stormwater authorities, where needed.
- Dam infrastructure management for flood control, recreation, and support of evaluation for removal

5. Target

There are several targets identified in the CSWP, however surface water quality and water management stand out as topic areas that cross all of the water industry.

Surface Water Quality

DEEP's Nonpoint Source Pollution Management Program²⁰ identified some key targets to reduce pollution from a collection of sources that could impact a watershed and surface water across the state and region. This program targets three key goals of the program:

1. To restore polluted waters and preserve healthy waters
2. To inform the public and partners about the causes and impacts of NPS pollution
3. To implement strategies that will protect and restore water resources into the future

This program aims to integrate water quality targets across state, federal, and municipal programs that address water quality with particular interest in a coordinated effort maximize effectiveness for Connecticut waters – see Figure 5.

²⁰ Nonpoint Source Pollution Management Program
<https://portal.ct.gov/-/media/DEEP/water/nps/2019ctdeepnpsplanpdf.pdf>

Figure 5. Connecticut Nonpoint Source Management Program



The NPS Program highlights specific initiatives in areas of nutrient reduction, bacteria contamination, increasing municipal Low-Impact Development and Green Infrastructure projects.

Nutrient management of phosphorus and nitrogen have set targets and total maximum daily loads (“TMDL”) to address the harmful impacts of nutrient pollution in surface water, and particularly in the Long Island Sound. Connecticut and New York along with the EPA developed an implementation plan in 2001 to address the Long Island Sound’s low dissolved oxygen levels. Connecticut created the DEEP Nitrogen General Permit Program to achieve nitrogen load reductions. In the next phase of nutrient management in the state, nonpoint sources will be a key area to address nutrients. As for phosphorous pollution, there is legislation (Public Act 12-154) to limit the amount of phosphorous in lawn fertilizers that end up in water runoff.

Water Management

Among the many forms of water management targets, this primer highlights those within stormwater, dams, and flood control infrastructure.

6. Funding and Financing Programs

The following is an alphabetical breakdown of the current funding (i.e., grants) programs in support of “water” in Connecticut, including, but not limited to²¹:

- **Community Forest Program (“CFP”)** – is a competitive grant program through the US Forest Service that provides financial assistance to tribal entities, local governments, and qualified conservation non-profit organizations to acquire and establish community forests that provide community benefits. Community benefits include economic benefits through active forest management, clean water, wildlife habitat, educational opportunities, and public access for recreation.
- **Connecticut Open Space and Watershed Land Acquisition Grant Program (“OSWA”)** (CGS 7-131d) – a matching grants program to provide financial assistance to municipalities, land trusts, and water companies to acquire open space and watershed lands, including the Urban Green and Community Garden Program for vulnerable communities. Initiated in 1998, OSWA is funded by state bonding and the CIA, provides financial assistance to municipalities and nonprofit land conservation organizations to acquire land for open space, and to water companies to acquire land to be classified as Class I or Class II water supply property, and is administered by DEEP to leverage state, local, and private funds to create a cooperative open space acquisition program.

Since 1998, DEEP has awarded over \$150 MM in open space grant funds to protect over 41,000 acres (or \$3,659/acre).

- **Connecticut Wetland Mitigation and In Lieu Fee Program (“ILF”)**²² – per the CWA—landmark environmental protection legislation passed in 1972 that applies to all waters of the United States—parties seeking to construct projects (“permittees”) that will have an impact on wetlands must take all reasonable measures to avoid such impacts, to minimize unavoidable impacts, and to provide mitigation for the remaining unavoidable impacts. On the one hand, permittees could themselves be held responsible for taking on wetland and/or stream mitigation projects, but studies have shown that many mitigation sites in southern New England have a high failure rate because they fail to meet performance standards (Minkin and Ladd, 2003). For this reason, the National Audubon Society, Inc., through its state office, Audubon Connecticut, became the “sponsor” of a Connecticut “In Lieu Fee” program as of 2013. The program allows permittees to pay a fee in lieu of taking on mitigation themselves. Instead, local organizations like land trusts and other environmental nonprofits are given the opportunity to apply for and receive grant funding to protect and enhance wetlands.

²¹ National trends have emphasized multi-benefit investment that brings “nontraditional”, often siloed sectors and partners together. Exploration into existing collaborations in support of green infrastructure and opportunities to finance projects that meet community needs and address climate impacts on water management will be critical in the development of the CT Green Bank’s work in the water sector. Resources like Georgetown’s Green Infrastructure Toolkit are a resource in how to blend capital to fund green infrastructure:

<https://www.georgetownclimate.org/adaptation/toolkits/green-infrastructure-toolkit/how-to-pay-for-green-infrastructure-funding-and-financing.html>

²² <https://ct.audubon.org/conservation/in-lieu-fee-program>

- **Emergency Watershed Protection Program** – program administered by NRCS to respond to floods, fires, windstorms, and other natural disasters. The program funds removing debris, protecting eroded banks, correcting damaged drainage facilities, repairing levees, and purchasing flood plain easements. For construction activities, it provides up to 75% of the project costs.
- **Forest Legacy Program (“FLP”)** – DEEP partners with the US Forest Service (“USFS”) to implement the FLP. The FLP helps to identify and conserve environmentally important forests. The program protects working forests, those forests that protect water quality and provide habitat, forest products, opportunities for recreation and other public benefits. The program encourages and supports acquisition of conservation easements. Conservation easements are legally binding agreements transferring a negotiated set of property rights from one party to another, without transferring property ownership. Most FLP conservation easements restrict development, require sustainable forestry practices, and protect various environmental values. There are also limited instances under the program where properties are purchased outright for their conservation values. In both instances, the federal government may fund up to 75% of program costs, with at least 25% match required from private, state or local sources.
- **Land and Water Conservation Fund (“LWCF”)** – LWCF is a federal program that was established by an Act of Congress in 1965 to provide funds and matching grants to federal, state and local governments for the acquisition of land and water, and easements on land and water, for the benefit of all Americans. The main emphases of the fund are recreation and the protection of natural treasures in the forms of parks and protected forest and wildlife areas. In August 2020, the President Trump signed the Great American Outdoors Act into law, which requires that the LWCF be funded at \$900 million yearly from offshore oil and gas revenues, a significant increase from previous funding levels, however prior to the Act much of these funds were being diverted to non-conservation purposes. The permanent authorization of the LWCF ensures that the full amount of annual funding is available for conservation purposes.
- **Long Island Sound Futures Fund (LISFF)** – LISFF²³ is an annual grant program offered by the National Fish and Wildlife Foundation (NFWF) that supports efforts to test innovative approaches to conservation, deliver transformative projects, and support people and communities who value the Sound and take a direct role in its future. This shared vision for the sound includes clean and clear waters, accessible shorelines, litter free beaches, abundant and diverse fish and wildlife, and resilient coastal communities. Nearly all of CT is geographically eligible for LISFF funding. Communities and organizations anywhere in the CT portion of the Long Island Sound watershed boundary are geographically eligible for resilience, water quality and fish passage, education and outreach, and nutrient prevention and reduction projects. Communities in the Long Island Sound coastal watershed boundary are eligible for the aforementioned activities, as well as habitat restoration projects.
- **National Park Service – Rivers, Trails and Conservation Assistance Program (“NPS-RTCA”)** – NPS-RTCA’s technical assistance program supports locally-led conservation and outdoor recreation projects. Though the program does not provide funding, it assists communities

²³ [Long Island Sound Futures Fund | NFWF](#)

and land managers in evolving climate resiliency strategies, developing or restoring parks, conservation areas, rivers, and wildlife habitats, as well as creating outdoor recreation opportunities and programs that engage future generations in the outdoors.

- **Recreation and Natural Heritage Trust Program (“RNHT”)** – administered by DEEP, is the main program to purchase or conserve state lands for conservation and public use or benefit. Since 1998, the State Bond Commission has approved \$177 MM to go towards the RNHTP to protect over 49,000 acres (or \$3,612/acre).
- **USDA Natural Resource Conservation Service (NRCS)** – administers conservation programs in the United States that brings millions of dollars annually to Connecticut. USDA NRCS provides financial assistance to farmers and other private landowners through the Farm Bill. The Environmental Quality Incentive Program (EQIP) provides funding to eligible producers, non-industrial forestland landowners, and Tribes for soil health, erosion control, nutrient management, water conservation, pollinator habitat, wildlife habitat, and forest management. A percentage of funds allocated for source water protection (drinking water supply). The Agriculture Conservation Easement Program (ACEP) funds farmland protection and wetland protection. In addition to Farm Bill funding, NRCS also has Watershed Operation funding that can be used for flood control, erosion control, and other watershed water resource management programs. The Emergency Watershed Protection Program can be used for floods, fires, windstorms, and other natural disasters. The program funds removing debris, protecting eroded banks, correcting damaged drainage facilities, repairing levees, and purchasing flood plain easements.
- **Water Infrastructure Finance and Innovation Act (“WIFIA”)**²⁴ – established in 2014, WIFIA is a federal credit program that is administered by the EPA for eligible water and wastewater infrastructure projects. Eligible borrowers include local, state, tribal and federal government entities, partnerships and joint ventures, corporations, and trusts, and SRF programs. WIFIA can fund development and implementation activities for eligible projects, including projects eligible for CWSRF (not withstanding public ownership clause), projects eligible for DWSRF, enhanced energy efficiency projects at drinking water and wastewater facilities, brackish or seawater desalination, aquifer recharge, alternative water supply, and water recycling projects, drought prevention, reduction, or mitigation projects, acquisition of property in integral to the project or will mitigate the environmental impact of a project, or a combination of projects secured by a common security pledge or submitted under one application by an SRF program. Eligible development and implementation activities are development level, construction, acquisition, or capitalized interest activities.

The following is a breakdown of the current financing (i.e., loans, tax credits) programs that could support water infrastructure in Connecticut:

- **State Revolving Fund (“SRF”)** – since 1988, Connecticut has received over \$650 MM from the federal government through the Clean Water SRF, while providing cumulative assistance (i.e., including state investment) of \$2.8 billion of investment primarily in centralized wastewater treatment infrastructure (in comparison to stormwater, energy

²⁴ [Water Infrastructure Finance and Innovation Act \(WIFIA\) | US EPA](#)

conservation, and water conservation infrastructure).²⁵ With the passage of the bipartisan supported “Investing in Infrastructure and Jobs Act” (“IIJA” or Bipartisan Infrastructure Law “BIL”) in November of 2021, there were additional resources allocated to the SRF for water quality and drinking water (i.e., \$445 million).²⁶ SRF could be used to invest in green infrastructure projects (e.g., land conservation, water, nature-based solutions) for both mitigation and adaptation. Additionally, after initial repayment to the state, it may be possible for SRF funds to serve as a source of non-federal match for other federal funding programs, though this has yet to be proven.

The water landscape in Connecticut is vast, with a lot of stakeholders with deeply invested missions to solve the water challenges the state’s residents face. Accessing funding or financing resources for water in Connecticut beyond established funds will be difficult. Finding a place in these challenges to bring Green Bank tools will be new to the industry and to stakeholders. Identifying new mechanisms to access additional funding and financing resources, especially those that seek to unlock more private capital investment, could provide a catalyst to increase and accelerate investment in a healthy and equitable water future in Connecticut.

7. Other Programs

The following are other items of note with respect to “water”:

- **Water Planning Council** – comprised of four (4) state entities, including the Public Utilities Regulatory Authority, Department of Energy and Environmental Protection, Department of Public Health, and the Office of Policy and Management, the Council’s responsibility is to develop a State Water Plan.

8. Stakeholder Outreach

In an effort to understand the public policy and marketplace context for “water” in Connecticut, the Green Bank met with many organizations.²⁷

These fourteen water-related organizations primarily represent non-profit organizations but include public and for-profit organizations as well.

The objectives of these one-hour conversations included:

- **Introductions** – to get a better understanding of the mission and initiatives of the various public, nonprofit, and for-profit stakeholders operating within the “water” space, and to introduce the Green Bank;

²⁵ Including Title II and VI funds – <https://www.epa.gov/sites/default/files/2021-02/documents/ct.pdf>

²⁶ https://www.whitehouse.gov/wp-content/uploads/2021/08/CONNECTICUT_The-Infrastructure-Investment-and-Jobs-Act-State-Fact-Sheet.pdf

²⁷ Water –Department of Public Health, Department of Energy and Environmental Protection, Treasurer’s Office, Conservation Districts, Green Print Partners, Long Island Sound Study (Th Rowe Environmental), Aquarion Water Company, Clean Water Fund, Operation Fuel, Save the Sound, PURA, Council for Environmental Quality, 120 Water, Regional Water of New Haven

- **Environmental Infrastructure** – inform the various stakeholders about the “environmental infrastructure” policy,²⁸ process the Green Bank is pursuing to develop a Comprehensive Plan, and to elicit discussion on the following areas:
 - **Relevance** – how relevant “environmental infrastructure” and its components (e.g., water) are to the stakeholder’s mission and initiatives;
 - **Policies and Targets** – what local, state, and federal policies (e.g., CWA), including plans (e.g., Green Plan) are important from the stakeholder’s perspective, and what targets are they seeking to achieve;
 - **Metrics** – what are the key metrics stakeholders believe are important in terms of monitoring and evaluating success from investments in “environmental infrastructure” improvements and “water”;
 - **Vulnerable Communities** – how does the stakeholder’s organization think about the impacts that must be addressed from climate change to build the resilience of vulnerable communities;²⁹ and
 - **Stakeholder Identification** – who else should the Green Bank meet with on the topic.

From these conversations, the Green Bank was able to develop a better understanding as to the role it might play in terms of financing “water” from the perspective of its mission – to confront climate change.

9. Findings

Based on the various meetings with public, nonprofit, and private stakeholders, the following are key findings with respect to water (it should be noted that additional findings have been generalized in the footnote):³⁰

- **State Revolving Funds** – given the provisions within Public Act 21-115 in relation to the SRF, the Green Bank should avoid any and all conflicts with DEEP (e.g., investments in wastewater treatment plants) and DPH (e.g., investments in water treatment plants) in administering the Clean Water and Clean Drinking Water Revolving Loan Funds. The Green Bank’s focus could be on areas not traditionally covered by the SRF in Connecticut (e.g., green infrastructure – lake or river)³¹ – see Figure 5.

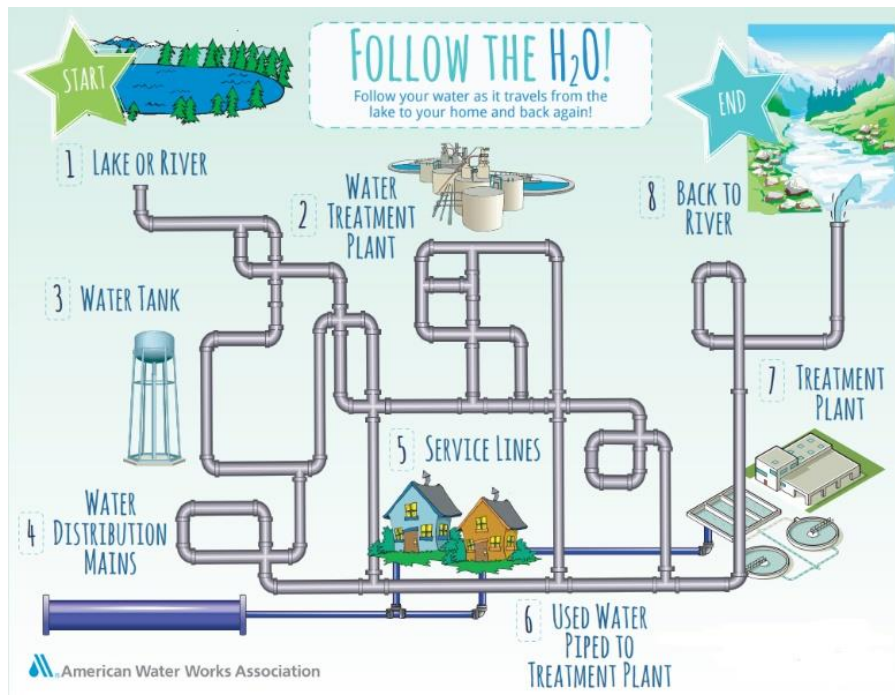
²⁸ Public Act 21-115 – An Act Concerning Climate Change Adaptation”

²⁹ As defined by Public Act 20-05

³⁰ Additional findings – Stakeholder feedback included raising concerns in several areas across the broader water sector and included nutrient retention and reduction, the concept of “One Water” to manage water without divides in source water protection and drinking water, integrating USDA programs that cover a wide range of environmental issues, “Rain Tax” – referring to the fees associated with stormwater utilities for areas with impervious surfaces that form stormwater runoff and surface water pollution, the connection between stormwater and surface water quality, biosolids and their impact on water quality and emerging contaminants, how to bring in community water systems not regulated by PURA when 30% of residents are on wells, data transparency and protection - some states have water quality dashboards.

³¹ “Financing Green Stormwater and Natural Infrastructure with Clean Water State Revolving Funds” by the Environmental Policy Innovation Center (February 14, 2022) – see Figure 4 on Page 11 ([click here](#))

Figure 6. Green Infrastructure Focus - (1) Lake or River and (8) Back to River



- **Policy and Regulation Enables Markets and Investment** – in Washington, DC, the District Department of Energy and Environment administers a regulated marketplace for the purchase of stormwater retention credits by developers provides a market-based opportunity to convert impervious surface to pervious surface, among other eligible practices. In addition, to help comply with a Consent Decree under the Clean Water Act, the municipal water utility DC Water structured and sold novel environmental impact bonds to private investors to prove the efficacy of green stormwater infrastructure in reducing combined sewer overflows. In these and other instances, policy and regulation enable local government innovation and private investment in environmental infrastructure.
- **Resource Adequacy** – many river basins have enough water to satisfy both instream (ecological, recreation) and out-of-stream (drinking, industry, agriculture, energy) needs most of the time, but they cannot all supply these needs during drought, or even typical summer conditions. Climate change is likely to have a significant effect on potential flooding in Connecticut and could also result in drier summers in the next 25 years.³²
- **Impact Metrics** – the following is a “high level” breakdown of the types of metrics appropriate for water – see Table 1.

³² Connecticut State Water Plan Summary (p. 2)

Table 1. Relevant Metrics Identified by Stakeholders on Water

Inputs	Outputs	Outcomes
<ul style="list-style-type: none"> o Flow diverted from treatment o Nitrogen, phosphorous and TMDL o Bacterial levels o Increased storm impacts (i.e. flooding and coastal changes) o Design life of built infrastructure (dams, septic, well systems) o Combined Sewer Overflow o Linear feet of lead and copper piping o Land conserved for watershed protection o Land conserved for urban stormwater management o Private well testing o Septic repair/maintenance 	<ul style="list-style-type: none"> o Wastewater treatment cost reduction o “Raw” water quality improved o Multi-use properties (stormwater and parks) o Nature-based green infrastructure that relieves designed infrastructure stress o Efficient water use o Access to resilient, clean water supply 	<ul style="list-style-type: none"> o Coastal and urban communities that are more prepared for extreme weather storms o Municipalities that are not stressed with increasing cost to treat stormwater o Recharged groundwater systems o Increased water recreation and aquatic life o Reduced/removed exposure to lead leading to improvements in learning in children o Water quality in surface water, especially the Long Island Sound o Ecosystem services (e.g., resilience, public health, water quality, soil quality) o Jobs

- **Vulnerable Communities** – even though black, indigenous, and people of color (“BIPOC”) represent nearly one-quarter of the U.S. population, water quality and water infrastructure has lacked across the nation in these communities. In August 2022, Jackson, Mississippi experienced a public health crisis after an extreme storm exasperated the failed water infrastructure that served this BIPOC community. These concerns and disparities are not decades in the past but exist today. Finding these instances in Connecticut will aid in allocating the needed resources to bring neglected environmental justice communities a resilient climate future.³³

These are the key findings from the stakeholders on water.

10. Opportunities

The following is a list of opportunities for consideration by the Green Bank given the broad categories of information and data, environmental markets and conservation finance, funding and financing sources, and other potential opportunities:

1. **Partnership** – foundational to this sector is partnership with the WPC, specifically DEEP and DPH given their roles and administration of the SRF. The development of the Green Bank’s expanded scope encourages that collaboration. The Green Bank seeks to support these agencies in attracting private capital to achieve our ambitious water goals.

³³ [EPA Report Shows Disproportionate Impacts of Climate Change on Socially Vulnerable Populations in the United States | US EPA](#)

- a. **DEEP Partnership** – in areas of water quality, green stormwater and Low Impact Development (“LID”), climate planning for flood management, and nutrient and pollutant reduction in the waters of the state.
 - b. **DPH Partnership** – in supporting drinking water quality, land protection for improved water quality, water quality testing that supports mitigation and remediation projects particularly for vulnerable and underserved communities.
 - c. **Other Partnerships** – including with PURA and water suppliers in removing lead and copper lines across the state to improve drinking water quality for all of Connecticut and with municipalities to reduce localized flooding and stormwater through implementation of nature-based solutions.
2. **Information and Data** – as a foundation, access to high quality information is important from which to base decisions. The following is a breakdown of opportunities for consideration with respect to information and data:
 - a. **Water Quality Testing** – support access to water quality testing, particularly for homes whose water source is a small community well or individual well source. The CSWP lists this as a recommendation (Section 5.1 Future Water Data Needs) and that all results of water quality testing is shared with the DPH, similar to the testing done for real estate transactions, CGS Section 19a-37. Developing a platform and access to testing and transparent data management can aid in achieving water quality across the state and supporting those most vulnerable to pollutant impacts to drinking water sources.
3. **Environmental Markets and Conservation Finance** – in terms of identifying potential carbon offset and/or ecosystem services revenue streams within compliance and voluntary markets that can support financing of water, the following is a breakdown of opportunities for consideration with respect to environmental markets and conservation finance:
 - a. **Trading Programs** – as recommended within the CSWP, determine whether there is a consistent way to monetize the value of water, how to incentivize green infrastructure, and investigate the potential to develop water quality or quantity trading programs.
4. **Funding and Financing Sources** – in terms of identifying additional funding (i.e., grants) and financing (e.g., loans) that can increase and accelerate investment, the following is a breakdown of opportunities for consideration with respect to funding and financing of water:
 - a. **Smart-E Loan** – expand the scope of the Smart-E Loan beyond “clean energy” to include “environmental infrastructure” (e.g., climate adaptation and resilience, water)³⁴ to enable private capital to finance such home improvements for water

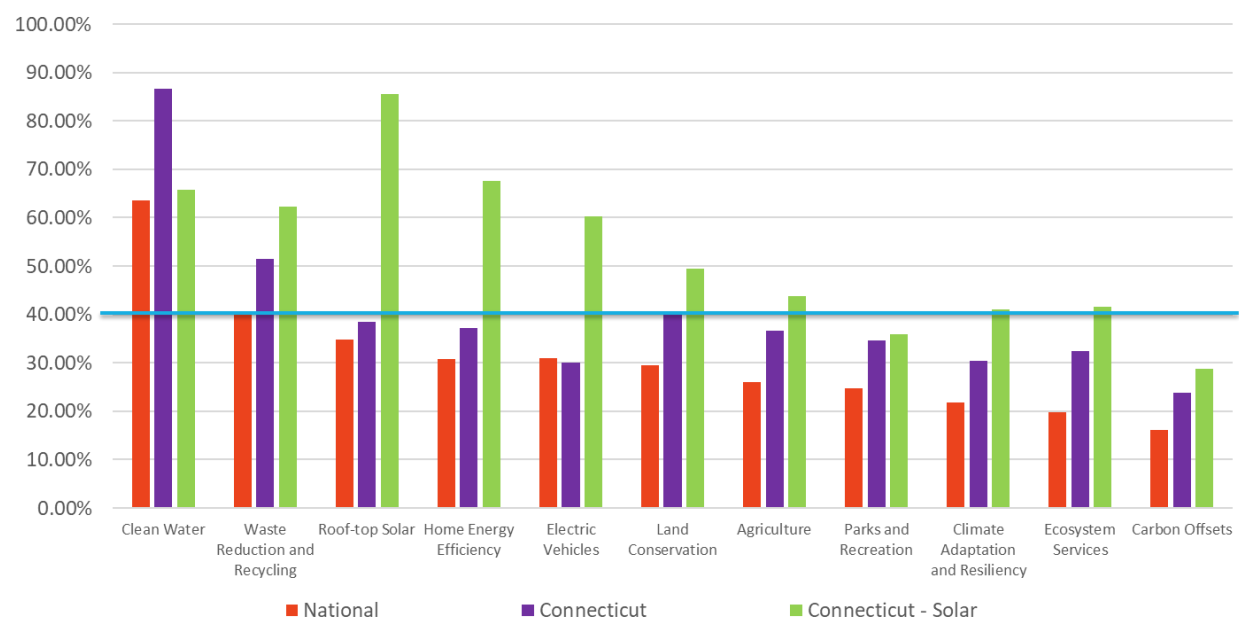
(e.g., appliances, aging pipes, well water, water quality testing, septic systems, dams, flood protection).

- b. **Commercial Property Assessed Clean Energy (“C-PACE”)** – expand the scope of C-PACE beyond “clean energy” to include “environmental infrastructure” (e.g., climate adaptation and resilience, water) to enable private capital to finance such property improvements for water (e.g., stormwater management, flood protection).
- c. **Green Liberty Bonds** – leverage the strength of the Green Bank balance sheet, with the award-winning climate bond structure of the Green Liberty Bonds modelled after the War Bonds of the 1940’s, to support investments in water:
 - i. **Pilot Revolving Loan Fund for Buy-Protect-Sell** – a pilot revolving loan fund would offer low interest rates and better terms to support land trusts buy land now for later protection and management (i.e., working land easements), and sale (or lease), including priority for lands with important water quality and/or quantity. CSWP recommends encouraging the acquisition or protection of additional watershed lands and striving for consistency with recommendations of the Green Plan.
 - ii. **Pilot Revolving Loan Fund for Stormwater Authorities** – in partnership with local stormwater authorities (e.g., Groton, New Britain), develop a revolving loan fund capitalized through the issuance of Green Liberty Bonds backed by the Special Capital Reserve Fund (“SCRF”), including revenues received through stormwater utility rates to fund bioswales, rainwater capture, and other water resiliency measures with measurable impact.
 - iii. **Pilot Revolving Loan Fund for Dams** – to support upgrades, retrofits, and/or repowering to aging infrastructure for dams that are held by private property owners, municipalities, state, and others, develop a revolving loan fund capitalized through the issuance of 50-year Green Liberty Bonds backed by the SCRF.

From research conducted by the Green Bank, it can be seen that retail investors in bonds are interested in clean water – see Figure 7.

It should be noted that in FY23, the Deployment Committee of the Green Bank approved the inclusion of climate adaptation and resiliency and water measures within the Smart-E Loan. Additional actions are needed before such measures can be offered through the financing program.

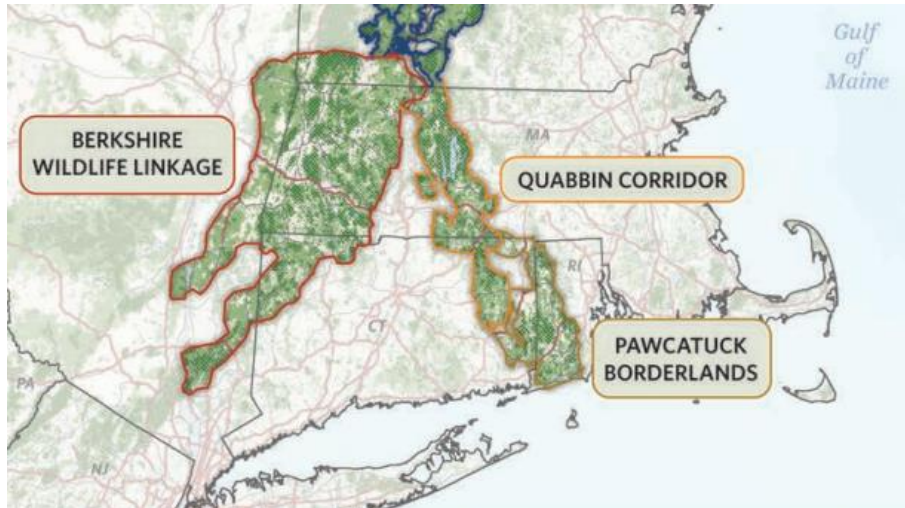
Figure 7. Retail Investor Use of Proceed Interest in Clean Energy and Environmental Infrastructure



- d. **Community Match Fund (“CMF”)** – a program of Sustainable CT, the Community Match Fund provides fast, flexible funding, and support for community engagement on a wide-range of sustainability projects. This CMF uses an innovative, online tool to connect grant contributions from the “crowd,” which are matched by various donor interests, including, but not limited to individuals, foundations, and the State of Connecticut. As of January 1, 2022, the Fund has raised \$1.3 MM from nearly 10,000 individual contributors, which was matched by \$1.1 MM from various sponsors, and supported 195 projects. The Green Bank could consider working with entities like Sustainable CT, with tools like the CMF, to enable funding for water to be matched by crowd-sourced funding, while also ensuring that equity and vulnerable communities are front and center in receiving the benefits of such investment.
- e. **State Revolving Funds** – although not a Green Bank resource, existing and additional SRF resources could be used by the state to provide low-cost and long-term capital to finance green infrastructure projects (e.g., land conservation, water) in Connecticut, or in partnership with other states across the Northeast region. As recommended with the CWP, defining green infrastructure approaches and exploring ways in which entities can use green infrastructure to address water quality is an opportunity. The Green Bank could recommend to its state colleagues that a portion of the SRF be used for green infrastructure projects in Connecticut as is being done by other states. For example, the Rhode Island Infrastructure Bank requires municipal borrowers to identify green infrastructure projects for 10% of the value of their clean water loans; the Commonwealth of Virginia invested \$20 MM of its SRF in a \$130 MM transaction to protect 253,000 acres across three-states to acquire land in Central Appalachia. Regional collaboration on the SRF and land conservation could target focal landscapes in the Berkshire Wildlife Linkage (i.e.,

1,579,566 acres in the landscape with 31% protected including lands in MA, NY, and VT), Quabbin Corridor (i.e., 475,864 acres in the landscape with 37% protected including lands in MA and NH), and/or Pawcatuck Borderlands (i.e., 473,397 acres in the landscape with 23% protected including lands in MA and RI) – see Figure 8.³⁵

Figure 8. Regional Opportunity for the State Revolving Fund and Nature-Based Solutions to Climate Change



5. **Other Potential Opportunities** – there are a number of other potential opportunities that can support financing of water, including:
 - a. **Public Policy** – working with DEEP, DPH and the WPC, consider public policies to advance working lands protection in Connecticut with the goal of “no net loss of farmlands and forestlands to development,” including, but not limited to:
 - i. **Conservation Finance Act** – consider public policies that provide incentives for performance-based outcomes modelled after Maryland’s Conservation Finance Act,³⁶ which would enable more private investment in nature-based solutions that result in measurable improvements to ecosystems, including carbon offsets and ecosystem services.
 - b. **Sustainable CT** – commits municipalities to take on a variety of tasks to promote sustainability and earn points for community designation, including:
 - i. **3.1 Provide Watershed Education** – providing residents and business owners education to protect and restore the local watershed.
 - ii. **3.3 Engage in Watershed Protection and Restoration** – complete a project or adopt/revise regulations that protect your watershed, source water, and/or riparian corridors.

³⁵ “A Safe Harbor for Nature – New England’s Resilient and Connected Network of Land” by The Nature Conservancy

³⁶ <https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/sb0348?ys=2022RS>

- iii. **3.6 Manage for Drought and Municipal Water Use** – develop municipal policy that reduces water use and drought communication plan to inform residents
- iv. **3.8 Implement Low Impact Development** – inspire LID projects across the community through education, trainings and adapting regulations and policy to encourage projects.
- v. **3.14 Implement Sustainable Snow Management** – promote sustainable management of snow and ice through reducing salt and chemical use to improve road runoff.
- vi. **5.4 Assess Climate Vulnerability** – assess local vulnerability to climate change, including flooding, extreme temperatures, and develop a mitigation plan.

Promote the existing areas noted above while exploring the possibility of additional points to advance green water infrastructure in Connecticut.

These are a few of the opportunities identified by the Green Bank to support its mission and advance water in Connecticut. Developing a method for prioritizing what opportunities under consideration are ultimately pursued, given the limited human and financial resources and organizational structure of the Green Bank, is an activity for a later date.

11. References

In addition to the conversations with stakeholders, the Green Bank reviewed the following documents to support its findings and opportunities:

- **Policy Link** – A research and policy organization that provides data and resources in water infrastructure equity. The organization publishes several resources for water policy and planning organizations, including their report titled *Water, Health, and Equity: The Infrastructure Crisis Facing Low-Income Communities and Communities of Color – and How to solve it*
https://www.policylink.org/sites/default/files/CWC_Report_Full_report_lowres.pdf
- **Environmental Policy Innovation Center** – Developed a report that highlights opportunities for philanthropic investment in water equity. [*Impact Investing Opportunities to Advance Water Health & Equity* \(July 2022\)](#)

And a report that highlights opportunities for State Revolving Funds to invest in green infrastructure. [*Financing Green Stormwater and Natural Infrastructure with Clean Water State Revolving Funds* \(February 2022\)](#)

- **Connecticut State Water Plan** – A comprehensive water plan across state and local agencies on the state and future planning of water resource management (July 2018)

- **The State of Public Sector Green Infrastructure (2022)** – A report developed by the Green Infrastructure Leadership Exchange, a peer learning network of public sector practitioners on the condition, barriers, and scaling of green stormwater infrastructure. [GSI REPORT \(stateofgsi.org\)](https://stateofgsi.org)

12. Definitions

The following are important definitions when it comes to “water” in Connecticut:

- **Clean Water Fund** – is a nonprofit organization based in Washington, DC and established in 1974 to help people campaign for clean water, air and protection from toxic pollution. Although the name resembles the Clean Water Act and the Safe Drinking Water Act, they are outside of the Federal government but support the protection of these laws.
- **Clean Water State Revolving Fund (CWSRF)** – created in the 1987 amendments to the Clean Water Act (CWA) as a financial assistance program between the states and the federal government in support of water infrastructure projects. Using a combination of federal and state funds, the CWSRF provides loans to recipients for eligible water infrastructure projects. The USEPA grants all 50 states (and Puerto Rico) funds, and the states contribute an additional 20% match to the federal grant.
- **Combined Sewer Overflow (CSO) or Combined Sewer System (CSS)**³⁷ – is a type of wastewater collection system that combines rainwater, domestic sewage, and industrial wastewater into one pipe. On sunny dry days the system flows directly to a sewage treatment plant and after treatment is discharged into a waterbody. During heavy rainfall events or other high water flow times, the capacity of what is sent to the treatment plant is exceeded and untreated stormwater and wastewater are directly discharged into the waterbody. CSO’s are subject to EPA’s National Pollutant Discharge Elimination System (NPDES) permit program.
- **Emerging Contaminants** – broadly defined as any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment but has the potential to enter the environment and cause known or suspected adverse ecological and/or human health effects. In some cases, release of emerging chemical or microbial contaminants to the environment has likely occurred for a long time but may not have been recognized until new detection methods were developed. One example of an emerging contaminant is PFAS³⁸.
- **Environmental Infrastructure** – means structures, facilities, systems, services and improvement projects related to (A) water, (B) waste and recycling, (C) climate adaptation and resiliency, (D) agriculture, (E) land conservation, (F) parks and recreation, and (G) environmental markets, including, but not limited to, carbon offsets and ecosystem services.

³⁷ <https://www.epa.gov/npdes/combined-sewer-overflows-csos>

³⁸ Information on emergent contaminants definition from EPA and CTDEEP: <https://www.epa.gov/fedfac/emerging-contaminants-and-federal-facility-contaminants-concern>
[Contaminants of Emerging Concern \(ct.gov\)](https://www.ct.gov/deep/cwpp/contaminants-of-emerging-concern)

- **Impaired Water** – Impaired waters are waters that do not meet Water Quality Standards (WQSs) even after point sources of pollution (e.g., municipal and industrial discharges) have installed required levels of pollution controls. Each state, including Connecticut, is required under Section 303(d) of the Clean Water Act (CWA) by EPA to develop a list of impaired waters (rivers, lakes, waterbodies) every two years.
- **Non-Point Source Pollution** – is the pollution resulting from many dispersed sources across a watershed, as opposed to a single source (direct) pollution. One example of non-point source pollution is stormwater created from rain and precipitation flowing over impervious (land cover (i.e. concrete that doesn't allow fluid to flow through)).
- **Open Space Land** (CGS 12-107(b)(3))³⁹ – open space land means any area of land, including forest land, land designated as wetland under section 22a-30 and not excluding farm land, the preservation or restriction of the use of which would (A) maintain and enhance the conservation of natural or scenic resources, (B) protect natural streams or water supply, (C) promote conservation of soils, wetlands, beaches or tidal marshes, (D) enhance the value to the public of abutting or neighboring parks, forests, wildlife preserves, nature reservations or sanctuaries or other open spaces, (E) enhance public recreation opportunities, (F) preserve historic sites, or (G) promote orderly urban or suburban development.
- **Resilience** – means the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from deliberate attacks, accidents or naturally occurring threats or incidents, including, but not limited to, threats or incidents associated with the impacts of climate change.
- **Stormwater** – water resulting from rain or snowmelt that runs off surfaces such as rooftops, paved streets, highways and parking lots. Along the way, the water may pick up and transport contaminants including motor oils, gasoline, antifreeze, and brake dust (commonly found on pavements), fertilizers and pesticides (found on landscaped areas), and soil sediments (from farms and construction sites). The water eventually flows into a local stream, river or lake, or into a storm drain and continues through storm pipes until it is released untreated into a local waterbody. Stormwater is considered a nonpoint source pollutant because there is no one discharge location but instead a collection of water within a watershed.
- **Vulnerable Communities** – means populations that may be disproportionately impacted by the effects of climate change, including, but not limited to, (1) low and moderate income communities, (2) environmental justice communities pursuant to section 22a-20a, (3) communities eligible for community reinvestment pursuant to section 36a-30 and the Community Reinvestment Act of 1977, 12 USC 2901 et seq., as amended from time to time, (4) populations with increased risk and limited means to adapt to the effects of climate change, or (5) as further defined by the Department of Energy and Environmental Protection in consultation with community representatives.

³⁹ https://www.cga.ct.gov/current/pub/chap_203.htm#sec_12-107b

- **Wastewater** – any water that has been used in a home or facility (including industrial water use) by humans or animals is wastewater. That includes the water that flows from sinks and toilets in a home, and also the water used in manufacturing facilities.