

Task 1B-1 White Paper – REVISED DRAFT 10-18-16

Current Water Resource Management Structure

This white paper includes a summary of current water resource management structure topics, and will be incorporated into the State Water Plan (draft and final reports). This white paper describes the existing management structure at the state, regional, and local levels (including roles and responsibilities of agencies and committees), and identifies significant components of the decision-making process. The paper provides an overview of current water and land management strategies and regulatory programs, including but not limited to, water supply (individual water supply plans, WUCCs, Source Water Assessment Program, Safe Drinking Water Act, watershed protection, private drinking water wells); water diversion; water quality standards; wastewater (individual municipal facilities plans, Clean Water Act, Water Pollution Control Authorities); stormwater and other non-point pollution sources; aquifer protection; inland wetlands; coastal management; drought management; stream flow; recreational waters; fisheries management; comprehensive state energy strategy, related state, regional, and local plans of conservation and development; and funding and financing.

1. Organizations and Regulatory Management Authority¹

Connecticut has traditionally managed its water through four regulatory agencies with separate, and sometimes conflicting, legislative mandates and authorities. They include the Office of Policy Management (OPM), The Department of Energy and Environmental Protection² (DEEP), The Department of Public Health (DPH), and the Public Utilities Regulatory Authority (PURA), formerly known as DPUC.

- **Department of Public Health (DPH)** is responsible for protecting and regulating the quality and quantity of the state’s drinking water by regulating adequacy and purity of all public water systems in the State, including the ownership and use of water utility-owned lands, under its Drinking Water Section. DPH has been granted primacy by EPA and has many regulatory duties under the Safe Drinking Water Act and the Connecticut Public Health Code, but also possesses key state statutory authority in the direct oversight of public water systems and planning authority relative to individual water supply plans and coordinated water system plans as well as source water protection. DPH has the statutory authority to develop regulations for private residential wells and semi-public use wells. DPH also has a role in the distribution of funds under the Drinking Water State Revolving

¹ Source: CT State Water Plan RFQ pg 25

² Public Act 11-80, “An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut’s Energy Future” combined the former Department of Public Utility Control (DPUC) and an energy group from the Office of Policy Management (OPM) with the Department of Environmental Protection (DEP) to form the Department of Energy and Environmental Protection (DEEP) to better address the challenges of the modern environmental world and energy market. The former Department of Public Utility Control is now called the Public Utility Regulatory Authority (PURA) and continues to perform the regulatory functions of the former DPUC. The Act also required DEEP establish a Bureau of Energy and Technology Policy – the first energy policy office in decades for the state.

Fund. DPH oversees certain subsurface sewage disposal systems, but DEEP oversees the largest of these as described later in this paper.

- **Department of Energy and Environmental Protection (DEEP)** is responsible for the protection of the State's natural resources, which include inland and coastal waters. DEEP manages water quality and quantity through numerous programs such as the Water Quality Standards. Like DPH, DEEP possesses regulatory, planning, enforcement, and funding authorities. Regulatory programs address water quantity and water quality, including many of the programs described in this paper. Planning programs address mainly water quality (for example, overseeing watershed management plans) rather than water quantity which has typically been managed through regulatory programs. DEEP funding program examples include the Clean Water State Revolving Fund (CWSRF), the Potable Water Program, and the Section 319 grants for impaired waters, among many others.
- **Public Utilities Regulatory Authority (PURA)** regulates the rates and services of Connecticut's investor-owned water companies and is part of the Energy Branch of DEEP. PURA directly regulates the investor-owned water and wastewater utilities in Connecticut, and formerly participated in the review and approval of new public water systems (with DPH). PURA regulates other utilities that have a bearing on water (for example, electricity generation)
- **Office of Policy and Management (OPM)** prepares periodic revisions to the Conservation and Development Policies Plan for Connecticut and oversees various planning and environmental review processes that address water. OPM plays a key role in the approval of Environmental Impact Evaluations prepared under the Connecticut Environmental Policy Act, ensuring that State actions are consistent with the Conservation and Development Policies Plan for Connecticut as well as other planning documents. OPM is also a key agency relative to oversight of various funds that affect water. According to Stream Flow³ (December 2003), OPM has general responsibility to coordinate all activities of DEP, DPH, and DPUC with respect to the state's water resources policies.

2. Connecticut's Water Management Council

The Connecticut Water Planning Council was created by the Energy and Technology Committee of the Connecticut General Assembly in 2001 with representation from the four state agencies described above (DPH, OPM, and the predecessors of DEEP and PURA [DEP and DPUC]). The charge of the WPC is to "identify issues and strategies which bridge the gap between the water supply planning process and water resources management in order that water can be appropriately allocated to balance competing needs while protecting the health, safety and welfare of the people of Connecticut and minimizing adverse economic and environmental effects."⁴ The WPC does not receive regular, dedicated funding from the State.

³ https://www.cga.ct.gov/2003/pridata/Studies/PDF/Stream_Flow_Final_Report.PDF

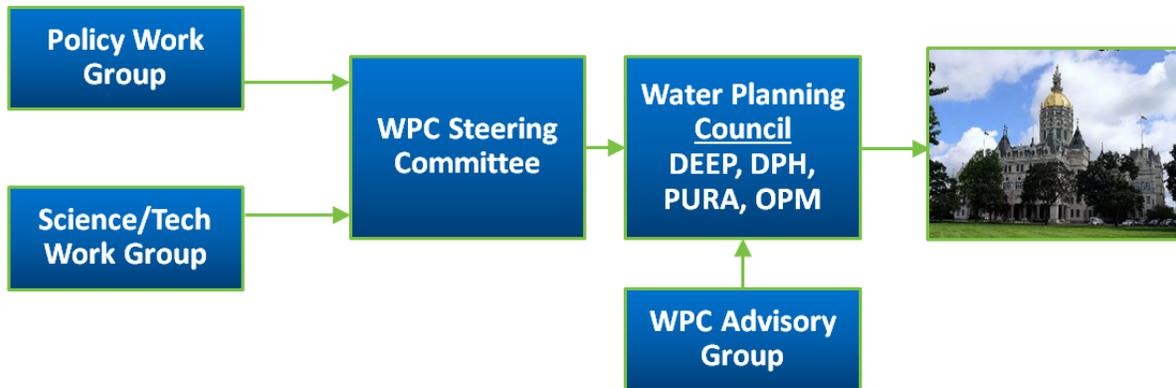
⁴ DEEP, http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325644&depNav_GID=1654

The WPC initially established three Committees to investigate specific issues identified in PA 01-177 and submitted an Issues Work Plan to the Legislature on January 28, 2002. The three committees were the Water Resource Management Committee, the Water Utility Committee, and the Technical Management Committee. Each committee supervised the work of two subcommittees that, together, evaluated 11 issues ranging from review of water rates to streamlining the diversion permit process. A full description of this process can be found in other reports. Since that time, the WPC has overseen progress in promoting policy and regulations for management of the State’s water resources.

The WPC established the Water Planning Council Advisory Group (WPCAG) pursuant to PA 07-4, Section 2(c) in 2007 to assist in researching and analyzing water resources issues. The WPCAG has formed a number of work groups over the years. The WPCAG typically oversees the work completed by its work groups and reports back to the WPC about specific issues.

In 2015, the WPC formed a Steering Committee with representatives from the WPC and the WPCAG to work with the parties providing services during the development of the State Water Plan. The WPC Steering Committee is therefore directly associated with the State Water Plan and is charged with assisting the WPC with development of the State Water Plan. While the WPCAG envisioned a small committee to provide timely feedback to the consultant in the process between WPC meetings, the Steering Committee ultimately was much more expansive, including all of those individuals on the WPC.

Several subcommittees have helped, or are currently helping, the WPC with development of the State Water Plan. The “Other States’ Plans” work group operated from 2015 through early 2016 (as a work ground of the WPCAG), and reviewed the water plans produced by other states. This work group also prepared a model table of contents for the State Water Plan. The group is now not operating, as its work has been completed. The Policy Subcommittee and Technical/Science Subcommittee are the two currently active subcommittees of the Steering Committee contributing to development of the State Water Plan.



3. Public Water System Planning⁵

3.1. Individual Water Supply Planning

In the state of Connecticut, all water companies serving greater than 1000 people are required to develop and maintain a water supply plan. Plans are developed in accordance with Section 25- 32d-1 of the Connecticut General Statutes and Section 25- 32d of the Regulations of Connecticut State Agencies, and are typically

Connecticut's public water supply planning process was prompted by the state's extended drought in the early 1980s and was an outcome of a water resources task force

updated every six to nine years. These regulations and the supporting statutes recognize that planning is a critical management activity of all water utilities. The principal goals of water system planning as defined by the Connecticut DPH (DPH) are to: (1) ensure an adequate quantity of pure drinking water, now and in the future; (2) ensure orderly growth of the system; and (3) make efficient use of available resources. PURA, OPM, and DEEP all provide review comment to DPH in the agency's review of water supply plans.

All water supply plans begin with a description of the water utility's structure and assets. This section normally includes information on company structure, employee certifications, company finances, and assets. The next sections typically provide a description of water supply sources, supply capacity, system performance, and water quality. These sections often provide source safe yield and available water, as well as distribution system specifications, and water quality records.

After describing company infrastructure and available output, the water supply plans generally focus on present and future water demands, service area land use, and source protection. These sections often observe trends within current demographics and attempt to extrapolate them into the future, to anticipate any improvements and changes that will need to be made to company infrastructure. Water supply plans help ensure that water utilities are able to adjust to changing human populations and environmental conditions within the supply area and are planning to meet projected demand over a 50-year period.

3.2. Coordinated Water System Planning⁶

As noted above, Connecticut's public water supply planning process was prompted by the state's extended drought in the early 1980s. During the 1985 Legislative Session, the Connecticut General Assembly passed Public Act 85-535, "An Act Concerning a Connecticut Plan for Public Water Supply Coordination," initiating the first statewide water supply planning program. The Connecticut DPH in consultation with the former DPUC (now PURA), DEEP, and OPM was given the charge of developing a coordinated approach to long-range water supply planning to assure adequate future supplies. The legislative finding, as reflected in Section 25-33c of the CGS, states the following: "In order to maximize efficient and effective development of the state's public water supply systems and to promote public health, safety, and welfare, the DPH shall administer a procedure to coordinate the planning of public water supply systems."

⁵ Water Supply Plans- Milone & MacBroom, INC.

⁶ Coordinated Water System Plan- Scott Bighinatti

Pursuant to Public Act 85-535 and Section 25-33e of the CGS, the boundaries of seven public water supply management areas (PWSMAs) were delineated based upon the similarity of water supply issues, population density and distribution, existing sources of public water supply, service areas or franchise areas, existing interconnections between public water systems, municipal and regional planning agency boundaries, natural drainage basins, and similar topographic and geologic characteristics.

The CGS required that the Commissioner of DPH convene a Water Utility Coordinating Committee (WUCC) for each PWSMA to implement the areawide water supply planning process. A WUCC is open to membership consisting of one representative from each public water system with a source of water supply or service area within the PWSMA, and one representative from each regional planning agency within such area who is elected by majority vote of the chief elected officials of the municipalities that are members of such regional planning agency.

Four of the seven WUCCs were convened under the previous planning process, as outlined below:

- The Housatonic Area WUCC convened in June 1986;
- The Upper Connecticut River Area WUCC convened in March 1987;
- The South Central Area WUCC convened in November 1987;
- The Southeastern Area WUCC convened in August 1998; and

The Northeast Area WUCC, Northwest Hills Area WUCC, and Southwest Area WUCC never convened.

A “Coordinated Water System Plan” is comprised of the individual water supply plans of the public water systems within the PWSMA which serve over 1,000 people or have 250 or more service connections, and an “area wide supplement” which includes a water supply assessment, delineation of exclusive service area boundaries, an integrated report, and an executive summary. Each of the four WUCCs that convened produced such documents, but only the Southeastern Area WUCC coordinated plan was formally approved by DPH.

DPH began considering consolidation of the PWSMAs and reconvening the WUCCs in 2009. Based on the needs identified by DPH and other stakeholders, the number of PWSMAs was consolidated from seven to three in October 2014. Each PWSMA boundary is consistent with the recently realigned regional planning agency boundaries completed by OPM. The WUCC representing each PWSMA convened in June 2016 with the goal of developing new coordinated water system plans over the two-year process from June 2016 through June 2018. The individual components of the area wide supplement (listed above) will be subject to State agency consultation and public review and comment, as required.

3.3. Certificate of Public Convenience and Necessity

The Certificate of Public Convenience and Necessity (CPCN) is a process for establishing new public water systems. Although the individual water supply planning and coordinated water system planning (described above) are somewhat unique to Connecticut, the CPCN is similar to other states’ staged or stepped processes for approving new water systems. PURA and DPH

manage the process in three phases. Phase IA is commonly known as the new source site approval, but it includes an overall review of the project’s location and general characteristics. Phase IB includes a review of new source quantity and quality. Phase II is the review and approval of detailed plans for the new water system.

By statute, the CPCN is designed to work with the coordinated water system planning process. A convened WUCC may review and approve of new public water systems in a PWSMA while the CPCN process is underway, providing feedback to DPH during its review steps within the CPCN. However, WUCC approval is not necessary if a nearby water system is unable to serve an area targeted for creation of a new public water system.

In the last few years, PURA has scaled back its review of CPCN applications for non-community systems, focusing on the community systems that are proposed. As of 2016, DPH fully manages the CPCN process and involves PURA as needed for all public water system applications.

4. Private Well Management

4.1. Private Well Program

Private wells that supply residential properties for domestic use and many small non-residential properties are not regulated by the EPA, and likewise are not regulated by the DPH’s Drinking Water Section. Private well owners are responsible for testing the quality

According to the DPH, approximately 322,578 private residential wells in Connecticut serve approximately 23% of the state’s population.

of their own drinking water and maintaining their own wells. Private wells are initially tested when a well is first constructed for basic parameters and may not be tested for several years thereafter. Private wells are typically tested during the home inspection of a real estate transaction or when required by a mortgage company. Testing of private wells since 2013 for metals such as arsenic and uranium that were not likely included in the basic testing of a private well prior to this timeframe has resulted in the identification of areas of the state with very high levels of these naturally occurring contaminants.

Well yield and well construction data is not available in one location, but can be found on thousands of drillers’ logs file with the Department of Consumer Protection.

The State’s 73 local health departments and districts have the authority over all private wells in the towns where they have jurisdiction, and all municipalities are served by a health department of district. Private wells must be properly sited, tested, and the water quality results approved by the local director of health before a certificate of occupancy is granted. DPH maintains a Private Well Program that provides outreach and education to the public, technical guidance, and training to local health departments and districts. DPH has the statutory authority to develop regulations for private residential wells and semi-public use wells⁷ (discussed below).

⁷ CGS 19a-37, Public Act 16-66, Section 20

4.2. Semi-Public Wells

Semi-public wells serve less than the 25-person minimum to be classified as a public water system, yet serve more than a single residence or building. These systems fall into somewhat of a regulatory loophole, as they are exempt from the reporting and regulations required by a public water supply system. Instead, they are regulated just as private wells, with oversight by the State's 73 local health departments and districts. This presents a challenge to DPH, as their oversight is limited, yet adverse water quality or well construction conditions can affect a large number of people.

5. Safe Drinking Water Act⁸

The Federal Safe Drinking Water Act (SDWA) was passed in 1974. The act authorized the federal government to set national drinking water standards, conduct special studies, and to generally oversee the implementation of the act. However, primary responsibility of implementation and enforcement essentially remained in the hands of state government.

Prior to 1974, the responsibility for regulation of public drinking water supplies rested on state government.

Subsequent to the passage of the SDWA, interim primary drinking water regulations were promulgated. These regulations and subsequent revisions set standards for organic, inorganic, and microbiological contaminants; turbidity; radionuclides; and trihalomethanes (THMs).

In June 1986, amendments to the SDWA were adopted. The amendments converted interim and revised primary drinking water standards to national primary drinking water regulations and converted recommended maximum contaminant levels (RMCLs) to maximum contaminant level (MCL) goals.

Since the adoption of the 1986 amendments, EPA has been working toward promulgating national primary drinking water regulations for various parameters. On July 8, 1987, EPA published regulations setting MCLs and MCL goals for eight volatile organic compounds and monitoring for a number of additional volatile organic compounds without MCLs. These regulations became effective January 9, 1989. In May 1989, EPA proposed national primary drinking water regulations for 38 additional inorganic and organic drinking water contaminants.

On January 30, 1991 (effective date July 30, 1992), EPA promulgated MCLs for a series of parameters referenced as the "Phase II" compounds, which include nine inorganic compounds, 10 volatile organic compounds, and 15 synthetic organic compounds. Monitoring requirements were specified for an additional 24 synthetic organic compounds without MCLs.

On June 7, 1991, the U.S. EPA promulgated maximum contaminant goals and National Primary Drinking Water Regulations for controlling lead and copper. These regulations were adopted pursuant to the Lead Contamination Act of 1988. The regulations specify a treatment technique that includes optimal corrosion control treatment, source water treatment, lead service line/connection replacement, and public education.

⁸ <https://www.epa.gov/sites/production/files/2015-04/documents/epa816f04030.pdf>

Beginning on July 1, 1992, any public water system that served greater than 3,300 and less than or equal to 50,000 persons was required to conduct initial tap water monitoring for lead and copper at targeted sampling sites. Any medium-size water system that exceeded the lead or copper action level was required to monitor applicable water quality parameters at additional taps in the distribution system and at each entry point to the distribution system. Additionally, any water system that subsequently failed to meet the lead or copper action level was required to collect one source water sample from each entry point to the distribution system within six months after the exceedance. However, lead monitoring protocols are changing rapidly and the CT DPH plans to work closely with EPA to modify methods used by public water systems in Connecticut.

On July 17, 1992 (effective date January 17, 1994), EPA promulgated the "Phase V" compounds, including five inorganic compounds and three volatile organic compounds with MCLs, and 21 volatile organic compounds and 15 synthetic organic compounds without MCLs.

The SDWA was reauthorized in 1996. The law focuses water program spending on the contaminants that pose the greatest risk to human health and that are most likely to occur in a given water system. It also requires water systems to notify the public of water safety violations within 24 hours. It maintains requirements that EPA set both a maximum contaminant level and a maximum contaminant level goal for regulated contaminants based on health risk reduction analysis that includes a cost/benefit consideration. The revised act also requires EPA to establish a database to monitor the presence of unregulated contaminants in water.

At the state level, the authority for regulation of public drinking water is established under Section 25-32 of the Connecticut General Statutes and implemented through the PHC by DPH. These requirements are consistent with federal regulations and have additional requirements such as annual watershed surveys, annual cross connection surveys, monitoring of raw and finished water, and public notification requirements.

In 1991, the state DPH adopted regulations and criteria pursuant to the EPA Surface Water Treatment Rule to evaluate all community groundwater sources by June 29, 1994 to determine if the sources were under the direct influence of surface water.

In December 1998, EPA published the Stage 1 Disinfectants/Disinfection Byproducts Rule (DBPR). This rule requires water suppliers to use treatment methods to reduce the formation of disinfection byproducts and to meet associated water quality standards. The disinfection byproducts and their corresponding standards include the total trihalomethanes (TTHM) and the total haloacetic acids (THAA). The TTHM is measured as the total concentration of chloroform, bromoform, bromodichloromethane, and dibromochloromethane. The EPA standard for TTHM concentration is 80 parts per billion (ppb). The THAA is measured as the total concentration of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. The EPA standard for THAA is 60 ppb. Both disinfection byproduct standards are based on annual averages.

The Stage 2 DBPR was published by EPA in January 2006. The purpose for the second stage was to improve public health protection by reducing health risks connected to large concentrations of disinfection byproducts throughout the entire supply system. The Stage 2 DBPR emphasizes the

monitoring and reduction of concentrations of TTHM and THAA at sampling locations throughout the distribution system. The monitoring frequency and sampling locations are dependent upon the population size that the distribution serves.

6. Source Water Protection⁹

6.1. Source Water Assessment Program

The Source Water Assessment Program (SWAP) was part of the 1996 amendments to the federal Safe Drinking Water Act, which are described above. The program called for the nationwide assessment of all public drinking water supply sources to determine their susceptibility to potential sources of contamination. The goal of Connecticut's SWAP as administered by DPH was to identify and inventory potential sources of contamination that could adversely impact the safety or quality of Connecticut's public drinking water sources, including more than 150 surface water reservoirs and more than 4,000 groundwater supply wells that provide drinking water for about 77% of the state's population.

DPH completed the assessment of more than 3,800 community and noncommunity public drinking water sources on April 29, 2003, working with DEEP in the process. The assessment method used by DPH included a determination of susceptibility for the following three categories: (1) environmental sensitivity, (2) potential risk factors, and (3) source protection needs. Based on source-specific information, each system of water supplies (a reservoir, reservoir system, or well system) was given a low, moderate, or high rating for each of the three categories. The assessment process consists of five main elements:

- Delineation of source water areas for each public drinking water source. The source water area for a well is more difficult to delineate. Large community wells in stratified drift are subject to Aquifer Protection Program regulations in sections 22a-354a through 22a-354bb of the Connecticut General Statutes. Preliminary (Level B) or Final (Level A) Aquifer Protection Area mapping where data are available for stratified drift wells is an example of source water delineation. For bedrock wells a calculated radius proportional to the pumping rate of the well, is used to delineate the source water area.
- Inventory of potential contaminant sources (SPCS) within the source water areas of each public water supply source.
- Susceptibility to inventoried potential contaminant sources for all community public drinking water source based on three key indicators: (i) Source Sensitivity: Water Quality, Source Integrity and Condition (ii) Source Vulnerability: Existence of Potential Pollution Sources, Land Use/Cover (iii) Source Protection: Land Control, Water Company Measures, and Local Protection Measures The overall susceptibility of each community drinking water source is determined using the factors associated with indicators i through iii. Initial assessments of non-community drinking water sources are based on sensitivity and vulnerability while more information is gathered about source protection needs for these types of systems.

⁹ http://www.ct.gov/dph/lib/dph/drinking_water/pdf/SWAPWEB_05_12.pdf

- Public participation in SWAP using a committee of stakeholders.
- Availability of source water assessments to the general public with recommendations for protection.

The SWAP’s intended purpose was a one-time barometer of source protection needs in Connecticut. Due to changes to 25-32d-1, similar source protection provisions have been incorporated under water supply planning. Other regulatory programs such as the water supply planning process and the Aquifer Protection Program (described below) have continued to make strides in source protection.

At the state level, DPH has been responsible for public drinking water regulation and oversight since the early 1900s, significantly preceding the SDWA.

6.2. Public Water Supply Watershed Protection

The authority for regulation of drinking water is established under Section 25-32 of the Connecticut General Statutes and implemented through the Regulations of the Connecticut State Agencies (RCSA) and the Public Health Code (PHC). These requirements are consistent with the federal regulations that oftentimes came later, but have additional requirements such as annual watershed surveys, annual

cross connection surveys, monitoring of raw and finished water, and public notification requirements.

Several very early public health laws in Connecticut recognized the link between disease outbreaks, water use, and land use. For example, CGS 25-38 through 25-43, CGS 25-32, and CGS 34-36 enacted a series of laws in 1902 and 1915, respectively, to "prevent outbreaks of water related disease..., protect and preserve for future generations, . . ." Relative to source protection, Section 19-13-B32 of the CT PHC sets forth the standards for sanitation of watersheds as follows that have persisted to the present time:

"Unless specifically limited, the following regulations apply to land and watercourses tributary to a public water supply including both surface and ground water¹⁰ sources:

- a) As used in this section, "sewage" shall have the meaning found in section 19-13-B20 (a) of the public health code: "Toxic metals" shall be arsenic, barium, cadmium, chromium, lead, mercury and silver and the salts thereof; "high water mark" shall be the upper limit of any land area which water may cover, either standing or flowing, at any time during the year and "watershed" shall mean land which drains by natural or man-made causes to a public drinking water supply intake.
- b) No sewage disposal system, cesspool, privy or other place for the deposit or storage of sewage shall be located within one hundred feet of the high water mark of any reservoir or

¹⁰ "Ground water" is two words in this reference

within fifty feet of the high water mark of any stream, brook, or watercourse, flowing into any reservoir used for drinking purposes.

- c)** No sewage disposal system, cesspool, privy or other place for the deposit or storage of sewage shall be located on any watershed, unless such facility is so constructed that no portion of the contents can escape or be washed into the stream or reservoir.
- d)** No sewage shall be discharged on the surface of the ground on any watershed.
- e)** No stable, pigpen, chicken house or other structure where the excrement of animals or fowls is allowed to accumulate shall be located within one hundred feet of the high water mark of a reservoir or within fifty feet of the high water mark of any watercourse as above mentioned, and no such structure shall be located on any watershed unless provision is made in a manner acceptable to the commissioner of health for preventing manure or other polluting materials from flowing or being washed into such waters.
- f)** No toxic metals, gasoline, oil or any pesticide shall be disposed of as a waste into any watercourse tributary to a public drinking water supply or to any ground water identified as supplying a public water supply well.
- g)** Where fertilizer is identified as a significant contributing factor to nitrate nitrogen occurring in excess of 8 mg/l in a public water supply, fertilizer application shall be made only under current guidelines established by the commissioner of health in cooperation with the state commissioner of agriculture, the college of agriculture of the University of Connecticut and the Connecticut agricultural experiment station in order to prevent exceeding the maximum allowable limit in public drinking water of 10.0 mg/l for nitrite plus nitrate nitrogen.
- h)** Where sodium occurs in excess of 15 mg/l in a public drinking water supply, no sodium chlorine shall be used for maintenance of roads, driveways, or parking areas draining to that water supply except under application rates approved by the commissioner of health, designed to prevent the sodium content of the public drinking water from exceeding 20 mg/l.
- i)** The design of storm water drainage facilities shall be such as to minimize soil erosion and maximize absorption of pollutants by the soil. Storm water drain pipes, except for crossing culverts, shall terminate at least one hundred feet from the established watercourse unless such termination is impractical, the discharge arrangement is so constructed as to dissipate the flow energy in a way that will minimize the possibility of soil erosion, and the commissioner of health finds that a discharge at a lesser distance is advantageous to stream quality. Special protections shall be taken to protect stream quality during construction."

In addition to the above requirements, stormwater discharges within 100 feet of a tributary to a public water supply reservoir must be reviewed and approved by the DPH. State statutes and regulations do not require watershed management per se, but they do require water utilities to conduct annual watershed surveys.

Regulation of water company lands is an important component of source protection in Connecticut. In Connecticut, the sale and/or change of use of water company owned lands is regulated. A change in water company land associated with either a groundwater supply or a public water supply reservoir is reviewed and approved through a permit processes.

As explained in the 1B2 paper, source protection has a key component in local land use application review processes. Developers and land use applicants in aquifer protection areas and public water supply watershed must notify water utilities and DPH of their application, and DPH may provide comments to local land use commissions and agencies.

The following table provides a list of statutes and regulations that address drinking watershed sanitation.

Regulations and Statutes Affecting Watershed Sanitation

Name and Citation	Description
Water Company Lands: P.H.C. Sections 25-37c-1 et seq. and 25-37d-1 et seq.	Regulates the sale and/or change of use of water company owned lands, along with defining watershed land classifications, and through Connecticut General Statute 25-32(b) controls the sale of watershed lands and changes in its present use through permit processes.
Source Abandonment: C.G.S. Sections 25-33k, 25-33l, & 25-33m	Regulates the sale and abandonment of public water supply sources.
Location of Cemeteries: C.G.S. Section 25-41	Prohibits the location of cemeteries within one-half mile of a public water supply reservoir.
Prohibition of Sewage Discharge: C.G.S Section 22a-417	Prohibits sewage discharge within a public water supply watershed area.
Sanitation of Watersheds: P.H.C. Section 19-13-B32 et. seq.	Mandates various separating distances from potential sources of pollution to the edge of an established watercourse within a public water supply watershed area or aquifer recharge area and requires that special protections be taken during construction to protect stream quality.
Watershed Survey: P.H.C. Section 19-13-B102(b)	Requires a water company having an active water source of supply under its control to conduct a sanitary survey of the watershed at least annually and report the results of this survey to the Department of Public Health by March 1st each year.
Sanitary Survey Of A System Using Groundwater	In conducting a sanitary survey of a system using ground water pursuant to P.H.C. Section 19-13-B102(e)(7)(E)(iii), information on sources of contamination within the delineated wellhead protection area shall be considered.
Watershed Prohibitions, Fishing, Passive Recreation & Penalties For Polluting A Reservoir: C.G.S. Sections 25-43, 25-43c and 43(a)	Prohibits (i.e., bathing, aircraft, and general pollution) and regulates specific activities (i.e., fishing from boats with electric motors, fishing from shoreline) on public water supply reservoirs and associated watershed. Allows passive recreation for both surface and ground water source areas through a permitting process. Any person who causes or allows any pollutant or harmful substance to enter any public water supply reservoir is subject to a fine of not less than one hundred dollars or imprisonment for not more than thirty days, or both.

Name and Citation	Description
Threat of Pollution: C.G.S. Section 25-34 (a)	The Department of Public Health may make orders as it deems necessary to protect public drinking water sources or ice supplies for any pollution or threatened pollution, which, in its judgment is prejudicial to public health.
Orders To Correct Pollution: C.G.S. Section 25-32g	Allows, after investigation, the issuance of orders in writing to any person to discontinue, abate, alleviate or correct conditions or activities that constitute an immediate threat to public water supplies.
Monitoring Waivers	The department may grant a public water system a waiver from the monitoring requirement for certain chemicals pursuant to P.H.C. Section 19-13-B102(e)(7)(C)(xii) – (xvi) if the watershed or zone of influence is not subject to certain types of land uses, and for certain chemicals, where previous analytical results showed no detectable limit of the contaminant to be waived.
Review of Projects In A Watershed By The Department of Public Health: C.G.S Section 25-32f	Allows the State Department of Public Health to review and comment on proposed development projects and zoning changes within public water supply source water areas.
Water Company Review of Projects In A Source Water Area: C.G.S. Sections 8-3i and 22a-42f	Requires an applicant to either the municipal planning and zoning commission, zoning board of appeals or the inland wetlands commission to notify the water company of the proposed development if this proposal is within the water company's public water supply watershed area (8-3i also includes aquifer protection areas). The water company therefore has the opportunity to provide comments to the municipality concerning the development proposal.
Individual Water Supply Plans: C.G.S. Sections 25-32d and 25-32d-1 et seq.	Requires water companies which serve over 1,000 people to produce long-term water supply plans in which the water company must plan for adequate supply to meet projected demand for the next 50 years, which includes an evaluation of source water protection measures.
Regional Water Supply Plans: C.G.S. Section 25-33d through 25-33j	Mandates water supply planning on a regional basis. Regulations detail the creation of the regional water supply plan. Individual water supply plans are a part of this regional process.
Local Governmental Consideration of Public Drinking Water Sources: C.G.S. Section 8-2 & 8-23	Requires that a municipal plan of conservation & development and zoning regulations shall be made with consideration for the protection of existing and potential public surface and ground drinking water supplies.

6.3. Drinking Water Quality Management Plan¹¹

Despite having some of the oldest source protection laws on the books, Connecticut has strived to make advances in source protection. The programs described above have accomplished significant source protection, but DPH has recognized the need for additional tools.

¹¹ Final DWQMP Report

The phrase "Drinking Water Quality Management Plan" was first developed by the DPH in 2005. The DWQMP concept is similar to traditional source protection, but it emphasizes and focuses on the public health aspects of maintaining high-quality potable water supplies through the first barrier of the multi-barrier approach. The DWQMP approach is meant to highlight and spotlight drinking water quality and public health protection. The guidelines and recommendations for the DWQMP as set by the DPH were first articulated in a presentation entitled "*Drinking Water Quality Management Planning*," given in May 2006. In general, the DWQMP is a *locally based, comprehensive planning mechanism* to define and implement quality management mechanisms for public source water.

Drinking water source protection serves as the initial barrier to contaminants entering drinking water supplies, increasing the efficiency and cost effectiveness of available treatment while maintaining the relatively low cost of water delivery to the public

A regional DWQMP was completed in southeastern Connecticut in 2009. This DWQMP was developed to become a model for other collaborative DWQMPs to be developed in Connecticut. However, to date, few have been developed, and those that have been developed are site-specific rather than communitywide.

6.4. Source Water Collaborative

Source protection has gained traction again recently with establishment of the "Connecticut Source Water Collaborative." This is a group of organizations, including water utilities, non-governmental organizations, and government regulatory bodies, who are working together towards the protection of drinking water sources. A charter formalizing the group was signed on May 4, 2016. The mission, as laid out in the charter is to "facilitate collaborative approaches and creative solutions for drinking water protection through identification and implementation of complementary objectives, education, outreach, stewardship, and leveraging of resources." DPH anticipates that the collaborative will be helpful in promoting source water protection in the coming years.

6.5. Aquifer Protection Program¹²

The Aquifer Protection Area (APA) Program is Connecticut's wellhead protection program. Enacted in 1990, the APA Program applies to public water supply wells in stratified drift that serve more than 1,000 people (the state's most productive wells). The water company owning the well(s) maps the portion of the aquifer that contributes ground water to the well in accordance with DEEP regulations. The mapping is approved by DEEP, and provided to the municipality. The municipality then adopts the mapping and imposes land use restrictions within the mapped area in a pro-active effort to protect the well(s) from contamination.

¹² http://www.ct.gov/deep/lib/deep/aquifer_protection/municipal_manual/3-apa_mapping.pdf

The mapping is conducted in two phases: Level B is preliminary and provides a rough estimate of the contributing area to the wellfield. Level B mapping was completed in the early 1990s and provided to the towns for planning purposes. . Level A mapping, or final mapping, is a refinement of Level B. The Level A mapping is based on extensive site-specific data and groundwater modeling. This mapping must be conducted in accordance with DEEP’s mapping regulations [Section 22a-354b-1 of the RCSA], and DEEP must review and approve it. The shape and size of the area encompassed by the Level A mapping can be significantly different from the Level B area. As of 2016, most of the State’s large groundwater sources have been mapped to Level A standards.

The Aquifer Protection Program has two other important components. The APA program defines 28 regulated activities that use, handle or store hazardous materials. Existing regulated activities in APAs must register and certify to best management practices. New businesses conducting these regulated activities are prohibited from locating in APAs. A permitting process allows changes to registered regulated activities in APAs. The final component of the program rests with the municipalities. Municipal commissions must adopt and implement local aquifer protection regulations and monitor the land uses in the aquifer protection areas. The APA program also requires municipalities to notify water utilities of proposed developments in aquifer protection areas.

7. Drought Management¹³

Droughts have occurred in Connecticut despite the fact that the state typically receives abundant precipitation. The most severe drought in recent history occurred during a multi-year period in the 1960s. Following a drought in the 1980s (the drought that spurred the coordinated water system planning process described above), a Drought Task Force was created as an independent standing committee to actively monitor conditions and recommend whether the State should declare a drought.

In 1999, the group was reestablished as the Interagency Drought Workgroup (IDW), which is responsible for assessing water conditions on a regional and/or state-wide basis, determining what level of concern is warranted based on the current conditions, communicating concerns to agency commissioners and the Governor, and drafting press releases. State entities represented in the group are OPM (lead), DEEP, PURA, DPH; the Department of Emergency Services and Public Protection (DESPP) including the Division of Emergency Management and Homeland Security (DEMHS), and the Department of Agriculture. The U.S. Geological Survey and the National Weather Service provide technical assistance to the Workgroup.

The IDW recognized the need to develop a set of formal operating procedures and administrative guidance to improve the function, effectiveness, and predictability of future drought response activities. Consequently, the IDW developed the original Drought Preparedness and Response Plan (“Drought Plan” or “Plan”). The Water Planning Council officially adopted the Drought Plan in 2003.

¹³ CT Drought Plan DRAFT 6-29-2016B

At the recommendation of the IDW and following a report on a table-top drought exercise in the Pomperaug River Basin conducted several years earlier, the WPC tasked the WPC Advisory Group in 2010 with an update to the Drought Plan. Significant changes in the updated draft Plan include a provision that drought declarations can apply to any geographic area; drought stage names were revised to clarify their severity and to avoid confusion with similarly-named stages in the Individual Water Supply Plans; and encouragement for the use of professional judgment concerning recommendations for drought declarations and related response activities. Enforceable actions are not identified. The draft Drought Plan identifies the following five stages of increasingly dry conditions:

- Heightened Awareness
- Below Normal Conditions
- Moderate Drought
- Severe Drought
- Extreme Drought

The draft plan has the following objectives:

1. Describe preparations that should be in place prior to a drought declaration in order for the state and municipalities to act when it becomes necessary (a section in Plan addresses long term planning for water conservation and drought preparation, not just prior to a drought declaration);
2. Define criteria and guidelines to assess drought conditions in order to determine which stage of drought is occurring in a given area;
3. Identify state, regional, local, federal, and private sector entities that are primarily responsible for managing drought-related activities;
4. Provide a guide for entities to undertake drought-related activities for which they are responsible, including coordination, public outreach, assessment, and preparedness;
5. Define communication strategies to integrate activities of the responsible parties;
6. Identify progressive water use restrictions that may be implemented at the state or local level for sufficient impact mitigation; and
7. Promote effective mobilization of public and private resources to manage drought mitigation efforts.

The draft plan recognizes a need to develop multiple model ordinances to address differing water systems and differing water needs in each community. Future revisions to this Plan will be made

as needed or as additional data become available. These revisions may be done in coordination with the State Water Plan.

8. Water Quality and Watershed Management

8.1. Water Quality Standards¹⁴

RCSA Sections 22a-426-1 through 22a-426-9, inclusive, and the Classification Maps adopted pursuant to Section 22a-426 of the Connecticut General Statutes, are known as the Connecticut Water Quality Standards. The purposes of the Connecticut Water Quality Standards are to:

1. provide clear and objective statements for existing and projected water quality and the general program to improve the State's water resources;
2. provide water quality for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water taking into consideration their use and value for public water supplies, propagation of fish, shellfish and wildlife, recreation in and on the water and agricultural, industrial and other purposes including navigation, wherever attainable;
3. recognize that surface and ground water¹⁵ are interrelated and address the issue of competing use of ground waters for drinking and for wastewater assimilation;
4. ensure Connecticut's compliance with requirements of federal law requiring the promulgation of water quality standards and qualify the state and its municipalities for available federal grants for water pollution control;
5. establish designated uses for surface and ground waters and identify the criteria necessary to support those uses;
6. focus the department's water quality management activities, including establishment of water quality based treatment controls and strategies;
7. protect the public health and welfare and promote the economic development of the state; and
8. be consistent with health standards as established by DPH.

The Connecticut Water Quality Standards are administered by DEEP. The Water Quality Standards include Surface Water Standards and Ground Water Standards. The Surface Water Standards are adopted in accordance with the federal Clean Water Act. The Ground Water Standards, while not required under the federal program, are parallel and provide important protection for drinking water sources just like the Surface Water Standards. The highest standards (such as AA and GAA) are protective of existing public water supply sources while the A and GA standards protect surface water and groundwater from pollution. The Ground Water Standards have important implications relative to the siting of certain land uses and activities,

¹⁴ <http://www.ct.gov/deep/lib/deep/regulations/22a/22a-426-1through9.pdf>

¹⁵ "Ground water" is two words in the Water Quality Standards

and they guide the level of remediation necessary per the Remediation Standard Regulations for certain contaminated sites.

The Water Quality Standards include three elements: Standards, Criteria, and a series of Classification Maps. The Standards designate use goals and set the overall policy for management of surface water and ground water quality. The Criteria include narrative and numeric criteria that prescribe the allowable parameters and conditions for various water quality classifications required to sustain the designated uses. The Classification Maps have been adopted and are amended from time to time. The Classification Maps show the water quality class assigned to each surface water and ground water resource throughout the state. The maps are used to relate designated uses and the applicable Standards and Criteria for each class of surface and ground water resource to a specific location.

As implied above, Connecticut uses only Class A or Class AA surface waters for drinking water. Section 22a-417 of the Connecticut General Statutes prohibits discharge of sewage to water supply impoundments. Therefore, Class B surface waters, which are designated in accordance with the Connecticut Water Quality Standards to, in part, receive and assimilate treated wastewater are not utilized for public drinking water supply. This topic is discussed extensively in the 1B-4 paper, as the prohibition itself creates a set of challenges in the State, despite its numerous benefits.

8.2. Impaired Water Lists¹⁶

CWA Section 305(b) requires each State to monitor, assess and report on the quality of its waters relative to attainment of designated uses established by the State's Water Quality Standards. In Connecticut, DEEP is the agency with primary responsibilities to report on these CWA activities. Section 303(d) of the CWA requires each State identify and prioritize water quality limited waterbodies, and develop Total Maximum Daily Loads (TMDLs) or other management actions consistent with the Water Quality Standards for such impaired waters. These reports are brought together in the Integrated Water Quality Report (IWQR) which is submitted to the EPA every two years for review and approval. The State's current impaired waters list was approved by EPA on November 17, 2014.

8.3. Watershed Management Planning¹⁷

Watershed management is a term used to describe the process of developing land use and water management practices to protect and improve the quality of the water and other natural resources within a watershed. The DEEP created the Watershed Management Program to more effectively address water resource issues from an integrated watershed perspective. DEEP's program is separate than the DPH watershed management programs that address public water supply watersheds.

For purposes of watershed management, the state has been divided into major watershed basins along natural watershed boundaries. DEEP Watershed Managers work within these major watershed basins to assist communities in forming partnerships, drafting watershed based plans, and implementing environmental projects to restore and protect the State's water quality on a

¹⁶ http://www.ct.gov/deep/lib/deep/water/water_quality_management/305b/2014_iwqr_draft_305b_303d.pdf

¹⁷ http://www.ct.gov/deep/cwp/view.asp?a=2719&q=325624&deepNav_GID=1654

watershed-wide scale. To accomplish watershed goals, the Watershed Managers have several key responsibilities. These include:

- Serve as a central knowledge base about watershed areas in terms of natural features, water resource issues, and State and Federal programs and activities.
- Help focus DEEP program activities on priority watershed management issues including protection of pristine water bodies and restoration of impaired waters.
- Assist in the development of comprehensive watershed management plans to protect and restore water quality, conserve resources, and enhance pollution prevention.
- Act as a liaison between municipalities, residents, citizen organizations and other stakeholders within watersheds to offer assistance and guide local land use decision making.
- Provide education and public outreach about watershed issues.
- Help to manage nonpoint source pollution related projects financed in part with funds from the Federal Clean Water Act (Sections 319, 104, 604).

The DEEP Watershed Management Program encourages the use of the EPA’s “9 Elements of a Watershed Based Plan.” The nine elements are worth noting here, and are:

1. Impairment – An identification of the causes and sources of pollution, that will need to be controlled to achieve the load reductions estimated to fix the impairment, and to achieve any other watershed goals identified in the watershed-based plan.
2. Load Reduction – An estimate of the load reductions expected for the management measures described. Spreadsheets and land cover mapping are typically employed in these models to estimate load reductions.
3. Management Measures – A description of the NPS management measures that will need to be implemented to achieve the estimated load reductions.
4. Technical and Financial Assistance – An estimate of the amounts of technical and financial assistance needed, and/or the sources and authorities that will be relied on, to implement this plan.
5. Public Information and Education – An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the NPS management measures that will be implemented.
6. Schedule – An expedited schedule for implementing NPS management measures identified.

7. **Milestones** – A description of interim, measurable milestones for determining whether NPS management measures or other controls are being implemented.
8. **Performance** – Criteria to determine whether loading reductions are being achieved over time, and if progress is being made towards attaining water quality standards and, if not, the criteria to determine if this plan, or a related TMDL, needs to be revised.
9. **Monitoring** – A monitoring component to evaluate the effectiveness of the implementation efforts over time.

The most recent watershed management plan developed in Connecticut and approved by DEEP is for the West River (New Haven, West Haven, and upstream communities). The Pomperaug River Watershed Coalition is in the process of developing a 9 element plan which will replace its existing watershed management plan.

Many watershed management plans have been developed in Connecticut (approximately 50) although not all of them have followed the 9 element process. It is important to note that the DEEP watershed management program typically does not address public water supply watersheds. This is one reason that the State may maintain different watershed management programs (the program described here, as well as the source protection programs described earlier). The watershed management and source protection programs are both integral and complimentary to one another.

9. Water Diversion Program¹⁸

9.1. Permitted Diversions

A significant piece of legislation regarding water quantity occurred with the passage of the Water Diversion Policy Act of 1982 (Sections 22a-365 through 22a-379 of the Connecticut General Statutes). This act established a permitting process for any new, non-exempted consumptive or non-consumptive “diversion” from (or of) a water body (surface or groundwater), and is essentially the State’s version of regulated riparian water law. A permit also ensures that the applicant complies with other policies governing the impact of a diversion such as the Flood Management Act, Inland Wetlands and Watercourses Act, and Endangered Species Act. However, The Water Diversion Policy Act does not directly prioritize water usage among competing users.

Over the years, DEEP has made significant progress in bringing the regulated community into compliance. Public Act 02-103 provided an opportunity for unpermitted diversions (which were eligible for registration) to be permitted, and a series of General Permits have been developed and reauthorized over the years to make it more straightforward to permit water withdrawals.

Water diversion permits are granted for either consumptive or non-consumptive uses. In this context, “consumptive” uses include those that result in a nearby discharge, such as cooling water, rather than applying solely to withdrawals where the water

¹⁸ http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324178&deepNav_GID=1654

leaves the system. Non-consumptive uses are typically instream activities. Anyone who is not exempt from the diversion permit (described below) must apply for a permit to:

- withdraw groundwater from one or more wells joined in one system whose combined maximum withdrawal exceeds 50,000 gallons of water during any 24-hour period;
- withdraw surface water (including skimming of flood flows) in excess of 50,000 gallons during any 24-hour period;
- collect and discharge runoff, including storm water drainage, from a watershed area greater than 100 acres;
- construct or otherwise modify roadway crossings or culverts which provide detention or retention of watercourse flows either by design or default;
- relocate, retain, detain, bypass, channelize, pipe, culvert, ditch, drain, fill, excavate, dredge, dam, impound, dike, or enlarge waters of the state;
- transfer water from one water supply distribution system to another where the combined maximum withdrawal from any source supplying the system or interconnected systems exceeds 50,000 gallons during any 24-hour period; or
- Modify a registered diversion (for example, modify the intended use of water or the way that it is used).

When applying for a water diversion permit, applicants must provide an analysis of the impacts of the proposed actions on various items including instream flow, designated water uses, water quality, wetlands, wildlife, threatened and endangered species, wastewater assimilation, flood management, recreation, and power generation. The application must also include an evaluation of alternatives to the proposed action.

Holders of diversion permits for consumptive uses are required to file annual reports as stated within the permit and permit conditions. These reports typically include a daily record of water withdrawals and sometimes other information such as meter calibration reports and nearby stream stage records.

9.2. Registered Water Diversions^{19 20}

Water diversions that were in use before July 1, 1982, and properly registered before July 1, 1983 are exempt from the permitting requirements of the Water Diversion Policy Act. There are 1,842 registrations of withdrawals and diversions, which are valid in perpetuity, although some of the registrations are no longer in use because the registrant has ceased to exist and/or the land use has changed. Registrations are not water rights. Water rights are appropriated (and oftentimes they are adjudicated) and imply ownership of the water. In Connecticut, all water is “waters of

¹⁹ <http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324178>

²⁰ http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325638&deepNav_GID=1654%20

the state” with the State acting as the steward. Instead of a water right, registrations are exemptions from permitting. The “right” of the water user who holds a registration is to continue using the water without being subject to the permitting requirements of the Water Diversion Policy Act, although it is recognized that many other laws may regulate such usage.

Many water sources were registered for much greater quantities than owners have used since that time, because the registered numbers reflect capacities of pumps, intakes, pipes, etc. This has been cited by many stakeholders as a reason that it is challenging to effectively allocate water uses in drainage basins because it can be difficult to understand the nature of a registration or know how a water withdrawal has changed since its time of registrations.

Holders of registered water diversions are not subject to the same type of annual water use reporting requirements like some permittees. However, Public Act 02-102 required a one-time reporting of water withdrawal data for registered diversions for the years 1997-2002. Several years later, legislation was passed that called for annual reporting on an electronic form to be developed by DEEP. A draft of this form has been created, but it has not been made available. As such, the identified data gap has not yet been addressed.

10. Streamflow Regulations

10.1. Stream Classifications^{21 22}

The Connecticut Stream Flow Standards and Regulations were passed and became effective in 2011. The standards classify each stream in the state according to degree of alteration by human use and define minimum flow standards for each class that are intended to be protective of instream habitats. Although very complex, the regulations require releases of water from certain impoundments in accordance with the standards to support the instream habitat. It applies to registered diversions .

The release requirements of the Stream Flow Standards and Regulations depend upon the designated classes of streams. Therefore, the first step for compliance with the Connecticut Stream Flow Standards and Regulations is the DEEP’s classification of all watercourses. Classes of streams can be 1, 2, 3, or 4. Class 1 is closest to a natural flow regime, and class 4 represents a stream with significant alterations for the purposes of human consumption, public health and safety, flood control, industry, and other uses. In general, the classes require the following:

- Class 1 streams are essentially free-flowing. There shall be no manipulation of the storage of water behind a dam, and no withdrawals from the resulting impoundment, if the dam releases into a class 1 water body.
- Class 2 is described as a minimally altered stream flow conditions. A class 2 water body requires 75% of the natural inflow to be released.
- Class 3 is described as moderately altered. Certain class 3 water bodies require a variable release that is consistent with six “bioperiods.” During the R&G bioperiod, the release rate

²¹ <http://www.ct.gov/deep/lib/deep/regulations/26/26-141b-1throughb-8.pdf>

²² Milone & MacBroom

is adjusted as necessary, up to twice per month to accommodate antecedent wet or dry conditions. Other Class 3 water bodies require a release consistent with the R&G BQ80

- Class 4 is described as substantially altered streamflow. Class 4 water bodies must release water to the extent described in the narrative standards; that is, “exhibit to the maximum extent practicable the depth, volume, velocity, and variation of stream flow and water levels consistent with the narrative standard for class 3 river and stream segments.” The allowable stream flows of class 4 waters must balance environmental conditions with existing channel modification, development of watershed, overriding societal needs, margin of safety in water system utilizing stream, and other factors.

Streams located in portions of eastern and south-central Connecticut have been classified, and classifications will continue until complete in the next few years. Most of the Class 3 segments are located downstream of public water supply reservoirs or adjacent to public water supply wellfields. By regulation, stream segments downstream from public water sources or adjacent to Level A aquifer protection areas cannot be classified as Class 1 or 2.

Implementation of the Stream Flow Standards and Regulations may reduce safe yield of some public water supply sources if significant releases are required. Safe yield reductions will reduce margins of safety and will need to be considered by water utilities in meeting DPH requirements for public water suppliers.

10.2. Program Compliance²³

Any person owning or operating a dam subject to the Stream Flow Standards and Regulations shall, not later than one year after the date of publication of classification for a river or stream segment on which such owner’s dam is located, submit certain information to the DEEP. In addition, the dam owner must state that it will develop a plan for making the infrastructure changes necessary, and begin making releases, to comply with the ten-year timeframe for compliance that was established in subsection (a) of section 26-141b-6 of the Regulations of Connecticut State Agencies.

At the present time, dam owners in eastern Connecticut are already in the first years of the ten-year period of time (with initial reporting due in October 2015), whereas those in south-central Connecticut are about to begin the ten-year compliance period.

Nine years after stream classification, each dam owner required to make releases must submit for DEEP approval a description of methods and locations to be used to calculate releases and to demonstrate compliance with release flow requirements. Upon initiation of a release, each dam owner must maintain an operating log that documents the flow of water from the dam, with sufficient detail to demonstrate that release meets the applicable requirement.

Some of the water utilities that own regulated dams have begun estimating changes in safe yield that may occur as a result of making releases, and some of have begun monitoring conditions downstream of dams to compare instream flows to the calculated bioperiod flows.

²³ http://www.sots.ct.gov/sots/lib/sots/regulations/title_26/141b.pdf

There are numerous exceptions and exemptions to the Connecticut Stream Flow Standards and Regulations. Notable examples include FERC-regulated hydroelectric dams, recreational impoundments without any alteration of water levels, and impoundments that are authorized by diversion permits.

11. Comprehensive State Energy Strategy²⁴²⁵

The DEEP developed the first-ever Comprehensive Energy Strategy for the State of Connecticut shortly after the consolidation of DPUC into DEEP to form PURA. This is an assessment and strategy for all residential, commercial, and industrial energy issues. The strategy was developed as called for in Public Act 11-80, passed in June of 2011. Section 51 of this Act requires that DEEP, in consultation with the Connecticut Energy Advisory Board (CEAB), prepare a Comprehensive Energy Strategy for Connecticut every three years.

DEEP issued a draft of the Comprehensive Energy Strategy for public comment on October 5, 2012. The final Strategy was issued February 19, 2013.

The State's Comprehensive Energy Strategy gives the state a more systematic basis for addressing energy opportunities and challenges. It provides a foundation for better informed policy, regulatory, and legislative decisions; as well as better energy choices at the household and business level. This Strategy covers all fuels in all sectors with a planning horizon out to 2050. The Strategy offers recommendations in five major priority areas: energy efficiency, industrial energy needs, electricity supply including renewable power, natural gas, and transportation.

With regard to water, the Strategy contains a section in Chapter 2 called "Addressing the Special Relationship between Energy and Water." The report notes that "the interface between energy and water crosses so many sectors that it is difficult to fit a discussion of the relationships, challenges, and opportunities in these areas entirely into this Chapter. The water industry itself includes public and private water companies that maintain water sources, treatment facilities, and delivery infrastructure and the wastewater treatment plants that collect, treat and discharge the water after its use. New drinking water regulations also require the use of more energy-intensive treatment technologies. Water is heavy (weighing 8.3 pounds per gallon), and pumping, extracting, treating, conveying and discharging it through its use cycle require enormous amounts of energy. A 2009 EPA report on water utilities found that globally, water utilities' biggest cost is energy, and that those costs can represent as much as 65% of a utility's annual budget. As a result, the rewards for reducing those costs through efficiency process and motor upgrades are large in terms of a water utility's overall economics. Conserving water means pumping less of it, thereby saving energy."

Consequently, one of the recommendations of the Strategy is to conserve water. The Strategy recommends that PURA encourage rate-setting that leads to conservation, and also recommended the expansion of the Water Infrastructure Conservation Adjustment (WICA) surcharge mechanism from 5% to 10%. This was subsequently accomplished by Public Act 13-78. WICA is an existing ratemaking tool that allows for interim rate adjustments, as approved by PURA, for

²⁴ http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf

²⁵ <http://www.ct.gov/deep/cwp/view.asp?a=4120&q=500752>

eligible projects that improve system reliability, water quality and reduce water losses through main breaks and leaks for regulated water companies. These projects are otherwise eligible for recovery in rates, but the WICA mechanism provides a streamline, timely approval process between rate cases. The WICA surcharge is not available to all water utilities. It is only available to private investor-owned water utilities.

The next Comprehensive Energy Strategy for the State is under development, with scoping completed in spring 2016.

12. Coastal Area Management²⁶

Public Act 15-66, An Act Concerning a Long Island Sound Blue Plan and Resource and Use Inventory, was signed on June 19, 2015 and went into effect on July 1, 2015. This "Blue Plan" legislation establishes a process by which Connecticut will develop an inventory of Long Island Sound's natural resources and uses and, ultimately, a spatial plan to guide future use of the Sound's waters and submerged lands. Currently, Connecticut's Coastal Area Management Program protects coastal resources and guides development along the State's shoreline. The development of a Blue Plan for Long Island Sound will supplement the Coastal Area Management Program's existing authority in the deeper offshore reaches of the Sound.

With the Blue Plan under development, it is not yet clear where the State Water Plan's "jurisdiction" will end. At the present time, it appears that the State's coastal area management may be germane to the State Water Plan. Therefore, a description of the State's coastal area management is provided in this report.

The United States Coastal Zone Management Act (CZMA) of 1972 emphasizes the primacy of State decision-making regarding the coastal zone. The DEEP Office of Long Island Sound Programs (OLISP) administers Connecticut's federally-approved coastal zone management program pursuant to the CZMA, as amended. OLISP is funded by the State of Connecticut and NOAA.

OLISP coordinates with programs within the DEEP regarding activities that may have an impact on Long Island Sound and related coastal land and water. OLISP implements, oversees, and enforces the State's coastal management and coastal permit laws and regulations. Connecticut's coastal management regulations are in Chapter 444 of the Connecticut General Statutes. Under the statutory umbrella of the Connecticut Coastal Management Act (CCMA) enacted in 1980, the Coastal Management Program ensures balanced growth along the coast, restores coastal habitat, improves public access, protects water-dependent uses, protects public trust waters, and promotes harbor management. The Coastal Management Program also regulates work in tidal, coastal and navigable waters and tidal wetlands under the CCMA (Section 22a-90 through 22a-112 of the Connecticut General Statutes), the Structures Dredging and Fill statutes (Section 22a-359 through 22a-363f) and the Tidal Wetlands Act (Section 22a-28 through 22a-35). Development of the shoreline is regulated at the local level through municipal planning and the zoning boards and commissions under the policies of the CCMA, with technical assistance and oversight provided by OLISP staff.

²⁶ <http://www.ct.gov/deep/cwp/view.asp?A=2705&Q=323536>

The DEEP published the Coastal Policies and Use Guidelines manual in 1979 to guide coastal development. The Connecticut Coastal Management Manual replaced this guidance document in 2002. The Manual contains a number of project review checklists, coastal resource fact sheets, coastal use fact sheets, site plan examples, and a copy of the Connecticut Coastal Management Act as well as other regulations. Most importantly, the Manual describes Coastal Site Plans and explains when they must be referred by municipalities to DEEP.

Coastal management in Connecticut is a rapidly changing program in many ways, with significant new laws passed in 2012 and 2013.

In 2012, the Connecticut General Assembly passed Public Act 12-101, An Act Concerning the Coastal Management Act and Shoreline Flood and Erosion Control Structures. This legislation combined a number of initiatives to address sea level rise and to revise the regulatory procedures applicable to shoreline protection. For the first time, the concept of sea level rise was incorporated into the Connecticut Coastal Management Act relative to the general goals and policies of coastal planning.

From a regulatory standpoint, perhaps the most significant change brought about by PA 12-101 was the change in coastal permitting jurisdiction for statutes governing the placement of structures, dredging, and fill in tidal, coastal or navigable waters. Through its coastal permitting program, OLISP has had direct regulatory jurisdiction over activities occurring in tidal wetlands since 1970 and/or waterward of the high tide line since 1987. Between 1939 and 1987, the state regulatory jurisdiction line for coastal structures, dredging, and fill was at Mean High Water, which also marks the boundary between private and public trust property. Because the statute provided several methods of field-determining the jurisdictional high tide line, there were occasional disputes over the extent of OLISP's regulatory jurisdiction. As a result, effective October 1, 2012, the "high tide line" is changed to "coastal jurisdiction line" (CJL), which is a fixed elevation that can be derived by a surveyor in accordance with a specified methodology. The CJL was developed to roughly approximate the location of the high tide line that OLISP had been using, and will be adjusted to reflect sea level rise upon the promulgation of tidal data from the next tidal epoch.

PA 12-101 also allows DEEP to establish a pilot program to encourage "innovative and low-impact approaches to shoreline protection and adaptation to a rise in sea level. Such approaches may include living shorelines techniques utilizing a variety of structural and organic materials, including, but not limited to, tidal wetland plants, submerged aquatic vegetation, coir fiber logs, sand fill and stone to provide shoreline protection and maintain or restore coastal resources and habitat."

Special Act 13-9, An Act Concerning Climate Change and Data Collection, allowed the State to establish a "Center for Coasts" to conduct research, analysis, design, outreach and education projects to guide the development and implementation of technologies, methods and policies that increase the protection of ecosystems, coastal properties and other lands and attributes of the state that are subject to the effects of rising sea levels and natural hazards. Subsequently, the DEEP Office of Planning and Program Development and OLISP teamed with the University of Connecticut to establish the Connecticut Institute for Resilience and Climate Adaptation (CIRCA).

CIRCA has been actively engaged in outreach, education, local partnerships, and dispensing of funds in 2014, 2015, and 2016.

Public Act 13-179 clarifies several Connecticut statutes by making reference to the National Oceanic and Atmospheric Administration (NOAA) sea level rise discussions in Technical Report OAR CPO-1 (Global Sea Level Rise Scenarios for the United States National Climate Assessment, December 6, 2012). Pursuant to this Act, the definition of sea level rise was changed as follows: "Rise in sea level" means the arithmetic mean of the most recent equivalent per decade rise in the surface level of the tidal and coastal waters of the state, as documented in National Oceanic and Atmospheric Administration online or printed publications for said agency's Bridgeport and New London tide gauges. The Act states that municipalities shall consider sea level rise when developing Plans of Conservation and Development, and also states that in the preparation of any municipal evacuation plan or hazard mitigation plan, a municipality shall consider sea level change scenarios published by NOAA.

13. Flood Management²⁷

The U.S. Congress established the National Flood Insurance Program (NFIP) on August 1, 1968, with the passage of the National Flood Insurance Act. The NFIP is a Federal program administered by FEMA enabling property owners in participating communities to purchase insurance protection against losses from flooding. The State of Connecticut and all of its municipalities participate in the NFIP.

State participation in the NFIP is authorized under the Flood Management Act (CGS Section 25-68b through 25-68h). The statute outlines the flood management responsibilities of DEEP and lays out the rules and regulations to be used by all state agencies when undertaking or funding activities within or affecting floodplain areas, which are normally coincident with SFHAs in this context. CGS Section 25-68b defines the terms (e.g., Floodplain, Base Flood, etc.) used in the Flood Management Act. Section 25-68c goes beyond the regulations contained within the National Flood Insurance Program (NFIP) in many aspects and references the NFIP standards as a minimum standard. Chapter 476a of the CGS authorizes flood management activities of the DEEP. Connecticut's NFIP coordinator is located within DEEP's IWRD.

Participation in the NFIP is based on an agreement between local communities and the Federal government that states if a community adopts and enforces a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses.

During the 2004 session, the State legislature passed the Floodplain Management and Hazard Mitigation Act. This legislation covers many aspects of floodplain management. It requires municipalities to revise their current floodplain zoning regulations or ordinances to include new standards for compensatory storage and equal conveyance of floodwater. The DEEP developed

²⁷ http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324172&deepNav_GID=1654

model regulation language which incorporates these new State requirements and has issued this model floodplain ordinance to communities for their use since 2007.

Other enabling State Legislation related to flood plain management includes:

- Sections 22a-36 through 22a-45, inclusive – Inland Wetlands and Watercourses Act;
- Section 22a-401 through 22a-410, inclusive – Dam Safety;
- Section 13a-94 – Construction Over and Adjacent to Streams;
- Section 25-84 through 25-98 – Flood & Erosion Control Board Statutes;
- Section 22a-318, 22a-321 – NRCS Statutes;
- Section 25-74 through 25-76 – Authorization to perform flood and erosion projects under Federal authority;
- Section 22a-365 through 22a-378 – The Connecticut Water Diversion Policy Act (especially through its requirements for various non-consumptive diversions)

Connecticut adopted a Natural Hazards Mitigation Plan Update in January 2014 to continue meeting guidelines set forth in the Disaster Mitigation Act of 2000. This Plan describes the State’s efforts to approach mitigating the effects of natural disasters on a multi-hazard basis, and furthers shifts the State from a disaster-response driven system to one based on effective hazard mitigation planning. The update references the additional challenges that climate change poses to the state.

13.1. Dam Safety²⁸

The dam safety statutes are codified in Sections 22a-401 through 22a-411 inclusive of the Connecticut General Statutes. Sections 22a-409-1 and 22a-409-2 of the Regulations of Connecticut State Agencies have been enacted, which govern the registration, classification, and inspection of dams. The DEEP administers the statewide Dam Safety Program and designates a classification to each state-registered dam based on its potential hazard.

- Class AA dams are negligible hazard potential dams that upon failure would result in no measurable damage to roadways and structures and negligible economic loss.

The State’s dam safety program is closely aligned with its flood management program. Due to the relationship between dams and water supply (described above), streamflow regulations (described above), and fish passage (described below), a detailed description of the dam safety program is provided herein.

²⁸ Text adapted from Hazard Mitigation Plans prepared by Milone & MacBroom, Inc.

- Class A dams are low hazard potential dams that upon failure would result in damage to agricultural land and unimproved roadways, with minimal economic loss.
- Class BB dams are moderate hazard potential dams that upon failure would result in damage to normally unoccupied storage structures, damage to low volume roadways, and moderate economic loss.
- Class B dams are significant hazard potential dams that upon failure would result in possible loss of life; minor damage to habitable structures, residences, hospitals, convalescent homes, schools, and the like; damage or interruption of service of utilities; damage to primary roadways; and significant economic loss.
- Class C dams are high potential hazard dams that upon failure would result in loss of life and major damage to habitable structures, residences, hospitals, convalescent homes, schools, and main highways, with great economic loss.

Dam inspection regulations require that nearly 700 dams in Connecticut be inspected annually. The DEEP currently prioritizes inspections of those dams that pose the greatest potential threat to downstream persons and properties. Dams found to be unsafe under the inspection program must be repaired by the owner. Depending on the severity of the identified deficiency, an owner is allowed reasonable time to make the required repairs or remove the dam. If a dam owner fails to make necessary repairs to the subject structure, the DEEP may issue an administrative order requiring the owner to restore the structure to a safe condition and may refer noncompliance with such an order to the Attorney General's Office for enforcement.

Owners of Class C dams have traditionally been required to maintain Emergency Operation Plans (EOPs). Guidelines for dam EOPs were published by DEEP in 2012, creating a uniform approach for development of EOPs. Important dam safety program changes are underway in Connecticut. Public Act No. 13-197, An Act Concerning the Dam Safety Program and Mosquito Control, passed in June 2013 and describes new requirements for dams related to registration, maintenance, and EOPs, which will be called emergency action plans (EAPs) moving forward. This Act requires owners of certain unregistered dams or similar structures to register them by October 1, 2015. The Act generally shifts regularly scheduled inspection and reporting requirements from the DEEP to the owners of dams. At the present time, the owner of any high or significant hazard dam (Class B and C) must develop and implement an EAP pursuant to regulations for EAPs adopted in 2015. The EAP shall be updated every two years, and copies shall be filed with DEEP and the chief executive officer of any municipality that would potentially be affected in the event of an emergency.

14. Inland Wetlands Regulations²⁹

Wetlands in the State of Connecticut are protected by the 1972 Inland Wetlands and Watercourses Act (IWWA, sections 22a-36 through 22a-45 of the General Statutes). In

²⁹ IWWA, sections 22a-36 through 22a-45 of the General Statutes of Connecticut.

Connecticut classifies 17% of the State's land area as wetlands, whereas under the federal definition about half of this same area would be classified as wetlands.

the state of Connecticut, wetlands are defined by soil drainage class. This allows wetlands to be easily identified in periods of drought, where soil moisture may not be present, and during winter, when characteristic vegetation may be absent. This is believed more inclusive (conservative) than the federal definition of wetlands under the Federal Clean Water act, which requires soil characteristics, hydrophilic vegetation, and wetlands hydrology, in order for a wetlands classification.

Connecticut allows certain operations to be performed in wetlands and watercourses including, residential home sites, grazing, farming, nurseries, gardening and harvesting of crops and farm ponds of three acres or less essential to the farming operation, and activities conducted by, or under the authority of, the DEEP for the purposes of wetland or watercourse restoration or enhancement or mosquito control. Additionally, recreational activities, public water supply operations, and infrastructure maintenance are authorized in certain circumstances, often pursuant to the limitations of other statutes.

It is important to note that most of these activities, while allowed, often require mitigation efforts to minimize disruption to ecology. Additionally, a municipality may impose limitations on wetlands disruption that may preclude some of the aforementioned activities. According to Sec. 22a-42, each town must establish an inland wetlands agency in order to carry out the provisions of the IWWA. Thus, in the state of Connecticut, municipalities provide primary enforcement of wetland laws.

Many activities that involve management of water will also involve wetlands. An individual who proposes an activity regulated by one of the many programs described in this paper (for example, certain activities regulated under the water diversion program) will also find that a wetland permit may be needed from the local Inland Wetland Commission or Conservation Commission (acting as inland wetland commission). In some cases, the need for a State permit (such as Dam Safety) will preclude the need for a local wetland permit.

15. Wastewater Management

15.1. Clean Water Act^{30 31}

Legislative interest in water pollution began in 1887 when the Connecticut General Assembly authorized the formation of a sewer study commission to investigate the subject of “sewage disposal.” The commission report (1889) recommended the State seek to stop further pollution. Similar legislative study commissions were created in 1913 for the investigation of factory wastes and, again, in 1921 to investigate solutions to eliminate pollution. Finally, in 1925 laws were enacted to create a State Water Commission. The Commission’s lack of regulatory authority greatly limited its effectiveness. By the mid-1960s, water quality conditions

Connecticut’s early regulation of wastewater – years before federal regulation – is similar to the State’s early regulation of drinking water before the formation of EPA and the passage of the SDWA.

³⁰ <https://www.epa.gov/sites/production/files/documents/actionplan101409.pdf>

³¹ <https://www.epa.gov/enforcement/water-enforcement#cwa>

in many parts of the State were so poor that public outcry and governmental interest increased, starting the process for major change.

In 1967, the State's Clean Water Act was passed, ushering in the State's modern water pollution control program. Significant new authorities enabled the former Water Resources Commission to require new stringent wastewater treatment for municipal sewerage facilities and industrial discharges. The Oil Pollution Act was passed two years later to create an emergency spill response program to deal with pollution from spills and leaks. The State's initial Water Quality Standards were approved in 1970, with Ground Water Quality Standards initially added in 1980.

The Federal Water Pollution Control Act was passed in 1972. This was the nation's first comprehensive water pollution law. It is believed to be modeled, in part, on Connecticut's Clean Water Act. The Federal Water Pollution Control Act calls for elimination of discharges to the nation's waters and mandates planning, regulation, and enforcement.

Connecticut's Clean Water Fund (CWF) program was created in 1986. The CWF provides financial assistance in the form of grants and low interest rate loans to municipalities for their water pollution control projects. Typical projects funded through this program include water pollution control facility (WPCF) upgrades which include nutrient (nitrogen and/or phosphorus) removal, combined sewer overflow (CSO) elimination, sewer extensions to resolve pollution problems created by substandard septic systems, and sewer system rehabilitation of pipes and pumping systems. The CWF covers engineering services costs in the planning and design phase of project, and engineering and construction costs to build the project. The project financing is based upon state statute. Grants vary based upon the type of project and range from a 20% grant to a 55% grant. Project loans are at a 2% interest rate and paid back to the state over 20 years. Funding for the CWF program is from state general obligation bonds (pays for the grant), state revenue bonds (pays for the loan) and a federal capitalization grant (pays for grants and loans). Currently, the funding from the state represents 90% of the funding in the CWF program.

The state legislature continues to provide financial support for the CWF program. Since the inception of the CWF program, \$3.5 billion in grants and loans have financed water pollution control projects throughout the state. In the past five years, the average funding to new projects was \$217 million per year. In fiscal year 2016, the CWF program provided \$578 million for funding new projects. DEEP anticipated that the demand for funding will remain high as projects for CSO control and phosphorus removal at WPCFs continue to advance from planning, to design and into construction.

The DEEP web sites notes that "many rivers, streams, and lakes are cleaner now than they have been in the past 100 years. Rivers such as the Willimantic, Naugatuck, Pequabuck, Quinnipiac, Connecticut and Farmington, once seriously polluted, are now used for many recreational pursuits.... Though we have cleaned up most of our worst problems, we have major issues yet to be fully addressed, such as hypoxia (low dissolved oxygen) in Long Island Sound, combined sewer overflows and groundwater contamination." Some of the individual programs described below are making gains in these areas.

15.2. Water Pollution Control Authorities³²

Through their Water Pollution Control Authority (WPCA), the State’s municipalities are responsible for managing the wastewater generated within their boundaries. For rural towns, this responsibility may require only the development and implementation of a water pollution control plan (WPCP). However, most municipalities have more complex wastewater management needs and their responsibilities are correspondingly more complex.

15.3. Municipal Facility Planning³³

For most Connecticut municipalities, wastewater management issues are too complex to be adequately addressed solely by a WPCP. In these instances, the WPCP may be supplemented with a Municipal Wastewater Facilities Plan (MWFP). An MWFP (often referred to as either a “facilities plan”) is a document produced by or for a municipal WPCA that guides the conveyance or treatment of wastewater. A complete MWFP is often, but not always, a series of documents that provide a clear description of existing conditions including identification of problem areas, an analysis of alternatives and costs, and a WPCA’s long-term intentions for managing their wastewater disposal needs.

15.4. Discharges to Surface Water

Under the CWA's National Pollutant Discharge Elimination System (NPDES) program, EPA and DEEP regulate discharges of pollutants from municipal and industrial wastewater treatment plants, sewer collection systems, and storm water discharges from industrial facilities and municipalities. EPA established the NPDES program after the enactment of the CWA in 1972 to control discharges by establishing permits with discharge limits protective of water quality standards (such as those described above) and enforcing against those permits. With only a few exceptions, EPA has authorized states to implement and enforce these programs across the country. EPA retains independent enforcement authority in authorized states and has responsibility to ensure that state programs are nationally consistent in writing quality permits and enforcing them. The Clean Water Action Plan targets enforcement to the most important water pollution problems.

EPA’s oversight of state NPDES programs has focused primarily on how well states are addressing the largest direct discharge facilities that have continuing problems. EPA has fairly complete information about these biggest facilities, as the facilities are required to submit monthly reports of their compliance with their permit limits in submissions called Discharge Monitoring Reports (DMRs).

³²http://www.ct.gov/deep/lib/deep/land_resources_and_planning/primer/themunicipalprimer_wastewaterplanning.pdf

³³http://www.ct.gov/deep/lib/deep/land_resources_and_planning/primer/themunicipalprimer_wastewaterplanning.pdf

15.5. Subsurface Sewage Disposal Programs^{34 35}

In Connecticut, the term “septic system” typically refers to subsurface sewage disposal systems. Septic systems on sites with design flows of 5,000 gallons per day and less are permitted by the local Director of Health. Additionally, plans for large septic systems serving buildings with design flows of 2,000 to 5,000 gpd must be approved by DPH. On the other hand, DEEP is charged with permitting of large septic systems on sites with design flows exceeding 5,000 gpd, alternative sewage disposal systems, and community sewage systems. These regulatory distinctions are often confusing and therefore it is critical that local health districts and departments provide direct linkage to the State programs when necessary. This is similar to the way in which local health districts and departments provide direct linkage to DPH when reviewing new well water supplies that may or may not be regulated by DPH. Decentralized wastewater management districts are an approach to managing wastewater characterized by multiple and scattered subsurface sewage treatment and disposal systems. These are found in the State’s rural towns and certain shoreline towns. There are three types of wastewater systems that can be used in a decentralized approach:

- A conventional subsurface sewage treatment and disposal system (conventional system), which consists of a house sewer connected to a septic tank connected to a leaching field, along with any necessary pumps or siphons and any groundwater control system on which the operation of the leaching field is dependent;
- A community subsurface sewage treatment and disposal system (community system), which is defined in statute as any sewerage system serving two or more residences in separate structures. Most community systems are not connected to a municipal sewerage system; however, some may be part of a municipally-managed decentralized wastewater management district; and
- An alternative subsurface sewage treatment system (AT system), which is often designed for nutrient reduction (typically nitrogen).

A decentralized wastewater management district can rely on one of these approaches or it can include a combination of conventional systems, community systems and alternative systems. Municipalities have authority to create decentralized wastewater management districts, which are areas designated by the municipality through a local ordinance. Approval of decentralized management districts typically requires a municipal commitment to upgrading individual systems to a pre-determined standard, through conventional septic systems, alternative technology, or both. A key to a successful district is the continued management by the municipality. Municipalities must assure the effective operation and maintenance of any new community sewerage system. This may contribute to the apparent limiting of their numbers in the State.

³⁴ http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387438&dphNav_GID=1828&dphPNavCtr=|#47142

³⁵ http://www.ct.gov/deep/lib/deep/land_resources_and_planning/primer/themunicipalprimer_wastewaterplanning.pdf pg 12

16. Climate Resiliency for Wastewater Treatment Facilities³⁶

In accordance with Public Act No. 08-98, An Act Concerning Connecticut Global Warming Solutions, Section 7 required the Governor’s Steering Committee on Climate Change to establish an Adaptation Subcommittee to evaluate the projected impacts of climate change on Connecticut agriculture, infrastructure, natural resources and public health and develop strategies to mitigate these impacts. In more recent years, the importance of climate resiliency for wastewater treatment plants has been discussed as it pertains to Clean Water Act based projects in the state of Connecticut. The ability for wastewater treatment facilities to adapt to climate change will be critical to future water quality within Connecticut.

In particular, Public Act 13-15 requires the Commissioner of DEEP, when establishing the SRF priority list, to consider the necessity and feasibility of implementing measures designed to mitigate the impact of a rise in sea level rise over the projected life span of the projects. Therefore, DEEP is considering establishing a Resiliency Reserve to assist communities in planning and implementing resiliency measures at treatment plants. As sea level rises, the numerous coastal facilities will be more vulnerable and therefore subject to increasing risk for flooding.

Extreme precipitation events will put additional pressure on storm sewer systems and therefore further stress the remaining combined sewer/stormwater systems that continue to exist in older, urban areas. While predictions of the impact of climate change on specific facilities depends on the accuracy of predictive tools for precipitation patterns, increased rainfall or more intense storm events is likely to impact the effectiveness of long-term control plans for combined sewer systems and result in higher and more frequent overflow volumes with greater environmental impact. Therefore, climate change effects must be considered in adaptation planning as a part of Combined Sewer Overflow (CSO) abatement long-term control plans to facilitate water treatment facility preparedness for climate change. Facilities in larger, older urban areas, especially Bridgeport, Hartford and New Haven, are most at risk and could be identified with individual adaptation plans.

17. Stormwater Management

Connecticut Manages storm water through a variety of programs. These programs aim to reduce the quantity, and improve the water quality of storm water. Major permit programs include those described below.

17.1. Connecticut Stormwater Quality Manual

The Connecticut Stormwater Quality Manual was published by DEEP in 2004 for use as a planning tool and design guidance document. The manual provides uniform guidance for developers and engineers on the selection, design, and proper application of stormwater BMPs. In the 12 years

³⁶ http://www.ct.gov/deep/lib/deep/climatechange/connecticut_climate_preparedness_plan_2011.pdf

since its publication, the Manual has been extremely useful in guiding the design of many development projects in the State.

17.2. Commercial and Industrial Stormwater Pollution Prevention³⁷

EPA has mandated a number of permit programs that are administered by DEEP to address and control stormwater pollution:

- The General Permit for the Discharge of Stormwater Associated with Industrial Activity ("Industrial General Permit") regulates industrial facilities with point source stormwater discharges that are engaged in specific activities according to their Standard Industrial Classification (SIC) code.
- The General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities ("Construction General Permit") requires developers and builders to implement a Stormwater Pollution Control Plan to prevent the movement of sediments off construction sites into nearby water bodies and to address the impacts of stormwater discharges from a project after construction is complete.
- The General Permit for the Discharge of Stormwater Associated with Commercial Activity ("Commercial General Permit") requires operators of large paved commercial sites such as malls, movie theaters, and supermarkets to undertake actions such as parking lot sweeping and catch basin cleaning to keep stormwater clean before it reaches water bodies.

17.3. MS4 Permits and Program

One of the most important EPA-mandated, DEEP-administered regulatory tools for stormwater is the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (known as the "MS4 General Permit"). The NPDES Storm Water Program, in place since 1990, regulates discharges from municipal separate storm sewer systems (MS4s). The State's program requires each municipality to take steps to keep the stormwater entering its storm sewer systems clean before entering water bodies. The MS4 program is complex and requires mapping of systems and outfalls, reporting, and use of BMPs. One key important element of this permit is the requirement that towns implement public education programs to make residents aware that stormwater pollutants emanate from many of their everyday living activities, and to inform them of steps they can take to reduce pollutants in stormwater runoff.

17.4. Low Impact Development³⁸

Low impact development is an alternative way of developing land and managing stormwater that is aimed at minimizing the impacts of urbanization on natural habitats and hydrology. The creation of hardened surfaces such as roads, parking lots and rooftops in combination with culverts and other structures that alter the natural movement of water all contribute to

In February 2016, UConn published the report "The State of Low Impact Development in Connecticut" (<http://nemo.uconn.edu/publications/2016stateofLID.pdf>). This report provides a "State of the State" for LID policy implementation in the State's municipalities.

³⁷ <http://www.ct.gov/deep/cwp/view.asp?a=2721&q=325702>

³⁸ <http://www.ct.gov/deep/cwp/view.asp?a=2719&q=459488>

degraded rivers and streams. The overall goal of LID is to design with nature in mind by working with the natural landscape, hydrology and unique features of a site to avoid unnecessary water pollution, environmental degradation, and flooding. LID accomplishes this by controlling runoff close to the point of generation and retaining more water on the site where it falls, rather than funneling it into pipes that drain into local waterways. Stormwater management techniques within LID are meant to control stormwater at its source. This occurs through the application of four key principles:

- Minimizing site disturbance
- Working with site hydrology
- Minimizing and disconnecting impervious surface
- Applying small-scale controls at the source

DEEP is in the process of evaluating the incorporation of LID principles into the State's Stormwater General Permits, which were described above, and the State's various manuals including the aforementioned Connecticut Stormwater Quality Manual as well as the Connecticut Guidelines for Soil Erosion and Sediment Control. DEEP intends to:

- Establish LID and pollution prevention, performance goals, and criteria for management practices common to Stormwater General Permit implementation.
- Identify how the performance goals and criteria can be most effectively incorporated into the Stormwater General Permit(s) to meet permit limits and conditions; and
- Identify mechanisms for incorporating LID BMPs and pollution prevention practices into the Stormwater General Permit(s) for priority attention.

DEEP also intends this process to explore several critical aspects of current and developing stormwater management practices to protect receiving waters and to provide clear regulatory guidance for the regulated community to effectively comply with permit requirements. This means providing the technical, planning and design tools necessary for effective site design, as well as a framework for broader compliance of the municipal regulatory community. These critical aspects include:

- Use of runoff volume as an indicator of environmental effect
- Relationship between volume control and pollutant control
- Appropriate permit limits for runoff volume relative to storm size
- Necessary guidance including performance criteria for LID and pollution prevention and end-of-pipe BMPs
- Role and benefit of stormwater utilities
- Building LID, stormwater utilities, and other management tools into permits and guidance

- Expanding the approach to other general permits such as the MS4 and Industrial Stormwater General Permits.

18. Recreational Management

18.1. Public Access Management³⁹

The State's system of state parks, state forests, state boat launches, and waterways provide opportunities for outdoor recreation. These range from camping and fishing to hiking, boating, and picnicking. The DEEP Bureaus of Outdoor Recreation and Natural Resources lead the agency's outdoor recreation efforts by acquiring and managing lands with an eye toward providing public use and access that is compatible with long term protection of natural resources.

Although provision of public access to marine waters is sought and managed somewhat differently than public access to inland waters, both are important components of providing access to waters statewide.

Connecticut's recreational water bodies are patrolled and protected by the State Environmental Conservation Police. Aside from enforcing State Fish and Game laws, the State Environmental Conservation Police also address wildlife management concerns, provide enforcement of regulated activities like boating, provide public outreach regarding environmental issues, and provide homeland security protection.

Many water utilities allow passive or active recreation in public water supply watersheds. For example, MDC allows use of trails in its watershed lands and The Connecticut Water Company permits use of boats in Shenipsit Reservoir. However, water utilities do not uniformly allow different types of recreation, and many do not allow any recreation in watershed lands.

18.2. Fisheries Management⁴⁰

The DEEP maintains several fisheries management programs including inland fisheries, marine fisheries, an anadromous fisheries program, and support for recreational fishing. Species managed include Bass, Carp, Channel Catfish, Salmon, Northern Pike, Trout, and Walleye. Additionally, the DEEP performs periodic electrofishing surveys of state waters in order to estimate fish species richness and diversity.

In the past, one of the central components of DEEP's fisheries management program was the requirement for impoundment owners to release a flat-rate discharge of water to stocked streams and rivers, plus a higher spring freshet release. As the Streamflow Standards and Regulations are being implemented as explained above, the flat rate release requirement will be supplanted.

³⁹ http://www.ct.gov/deep/cwp/view.asp?a=2695&q=322630&deepNav_GID=1

⁴⁰ <http://www.ct.gov/deep/cwp/view.asp?A=2696&Q=322646>

18.3. Dam Removals and Fish Passage⁴¹

Due to its prolific manufacturing past, Connecticut hosts a large number of dams along rivers and streams. Often times, dams become a barrier to migratory fish species, and can restrict downstream flow, altering ecological conditions.

Unlike nearby states like Vermont and Massachusetts, Connecticut does not have a state-funded, coordinated fish passage and dam removal program. State officials from DEEP may make a recommendation for dam removal or installation of a fish ladder, but there are often no reliable sources of funds available on the state level for these projects. In some cases, such as in Seymour and in the Housatonic Basin, mitigation funds from environmental penalties can be allocated by the state to dam removal efforts, among other projects. The Housatonic Basin projects were funded by mitigation money due to PCB pollution by General Electric in Pittsfield, MA, and the Seymour project was funded by mitigation funds associated with expansion of the sewage treatment facility in Waterbury.

Organizations like Trout Unlimited and the Nature Conservancy, which have vested interests in fish and wildlife populations, are common sources of funding for fish passage and dam removal projects.

Upon inspecting a dam in disrepair, DEEP's inspectors will typically advise the owner of the option of removing, replacing, or repairing the dam. If the owner wishes to remove the dam, funding can be acquired through a number of private entities.

19. Connecticut Environmental Policy Act (CEPA)⁴²

CEPA (CGS §§ 22a-1 through 22a-1h and Conn. Agencies Regs. § 22a-1a-1 through 22a-1a-12) is meant to ensure that state agencies consider environmental factors when deciding whether to take an action that may significantly affect the environment. It requires them to evaluate, in writing through an Environmental Impact Evaluation (EIE), the impact the proposed action would have on the environment. CEPA is often cited as the State version of the National Environmental Policy Act (NEPA).

Evaluation of impacts to water resources is a central component of almost all of the EIEs conducted pursuant to CEPA. In addition, some EIEs are developed for actions that are largely *about* water, such as water supply or flood mitigation.

The State legislature approved CEPA (PA 73-562) in 1973. PA 73-562 included a provision that the public have access to, and the ability to comment on, state agency proposals.

In 2002, the legislature adopted PA 02-121, which adds a “scoping” process that allows the public to comment on a proposed action before an agency begins the formal EIE process.

⁴¹ Correspondence with Jim MacBroom- Milone & MacBroom

⁴² Source: <https://www.cga.ct.gov/2008/rpt/2008-R-0079.htm>

At the present time, a CEPA evaluation is conducted through scoping and completion of an environmental impact evaluation, or EIE. Each EIE is overseen by a sponsoring agency such as DEEP, DPH, the Department of Economic and Community Development (DECD), UConn, or the Department of Construction Services (DCS). An EIE must examine the direct, indirect, and cumulative environmental consequences of a proposed action, and any reasonable alternatives to it (CGS § 22a-1b(c)). OPM reviews EIEs and determines if the applicable agency has taken all practicable steps to avoid or minimize environmental harm.