



DEPARTMENT OF ENVIRONMENTAL PROTECTION  
Bureau of Water Management  
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Arthur J. Rocque, Jr., Commissioner

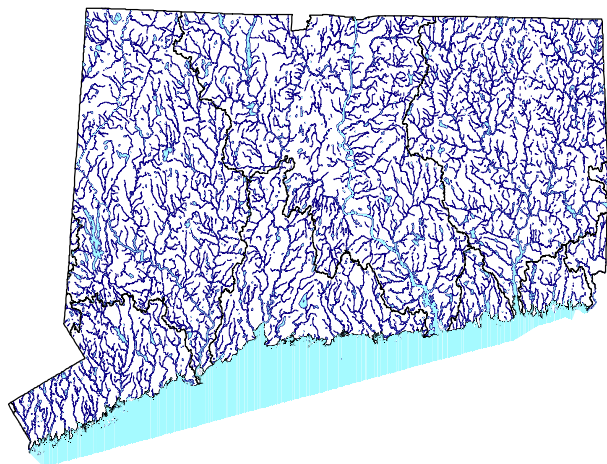
## Connecticut Water Quality 2002

Summarized from the  
2002 Water Quality Report to Congress, Prepared Pursuant to Clean Water Act Section 305(b)

### About This Fact Sheet

This fact sheet is a summary of Connecticut's 2002 Water Quality Report to Congress, also known as the 305(b) Report. Section 305(b) of the Federal Clean Water Act (CWA) requires each State to assess the quality of its surface and, to the extent practicable, ground waters every two years. Water quality is assessed in terms of designated uses, such as aquatic life and recreation, which are specified in the State's Water Quality Standards. States submit biennial 305(b) Reports to the U.S. Environmental Protection Agency (US EPA), where the information is compiled into a national water quality inventory. 305(b) water quality assessments are also used to generate the State's list of impaired waters, a requirement of Section 303(d) of the CWA. The 303(d) list identifies priorities for developing Total Maximum Daily Loads (TMDLs), which are waterbody-specific, pollutant load analyses used to design abatement strategies.

This fact sheet and documents discussed herein may be viewed and downloaded from the Connecticut Department of Environmental Protection's (CT DEP's) website (see **For More Information**).



### CONNECTICUT SURFACE WATERS Connecticut's Water Resources

<u>River miles</u> .....	~ 5,830
Perennial stream miles .....	~ 5,484
Intermittent stream miles .....	~344
Ditch/canal miles .....	~2
<u>Lakes/Ponds/Reservoirs</u> .....	~ 2,267
Significant Recreational Lakes .....	~ 116
Reservoirs .....	~ 179
<u>Wetland acres</u> .....	~ 452,500
Tidal acres .....	~ 17,500
Inland freshwater wetland acres .....	~ 435,000
<u>Miles of Coastline</u> .....	~ 380
<u>Estuaries/Harbors</u> (sq. mi.) .....	~ 613

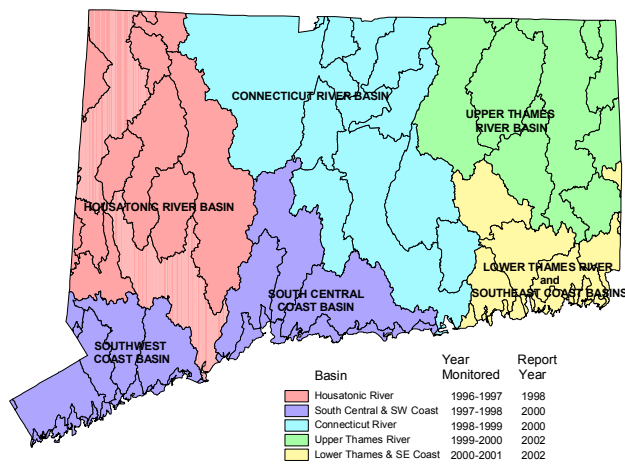
**Surface Waters:** Connecticut's surface water resources are distributed throughout seven major basins that drain to Long Island Sound: the Thames River, Pawcatuck River, Connecticut River, Housatonic River, Southeast Coast, South Central Coast and Southwest Coast. The coastal basins are complexes of rivers that drain directly to the Sound. In addition, a very small portion of the state drains to the Hudson River in New York.

**Ground Waters:** Ground water serves as the drinking water supply for roughly one third of Connecticut's residents. Most public drinking (ground) water is extracted from aquifers in glacial sand and gravel deposits called stratified drift. Most single family wells and many small community wells tap into fractured bedrock aquifers.

## Where Water Quality is Monitored

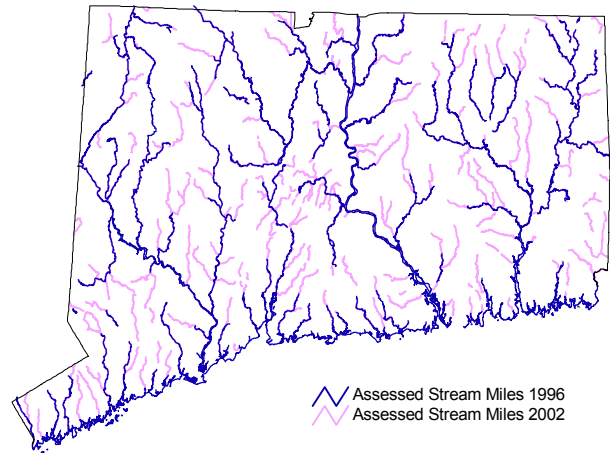
The CT DEP began a rotating basin approach to monitoring in 1996 in an effort to enhance the number of monitored stream miles. The state was divided into five hydrological assessment units, each representing one or two major drainage basins. Stream monitoring was concentrated in one unit each year for a five-year cycle. The Housatonic River basin was assessed initially, and reported on in 1998. For the 2000 305(b) Report, the Southwest Coast, South Central Coast, and Connecticut River basins were assessed. Assessments for the remaining basins (Thames River, Pawcatuck River and Southeast Coast) were included in the comprehensive 2002 305(b) Report. The 2002 Report compiled information from all Connecticut waters assessed during the full basin rotation. Although monitoring of lakes and estuaries did not follow the same rotating basin schedule, they were assessed and reported on with their respective basins.

### ROTATING BASIN SCHEDULE



**Streams / Rivers:** River monitoring in Connecticut historically focused on larger waste-receiving waters, even though small streams make up a substantial portion of stream miles. For the 1996 305(b) Report, only 15% of the 5,484 perennial stream miles in Connecticut were assessed for both aquatic life support and contact recreation. The number of assessed stream miles was augmented over the last few years through implementation of the rotating basin approach and an increased effort to include data from volunteers, academia, and municipalities. The percent of assessed stream miles for the 2002 Report increased to 27% for aquatic life support and 22 % for contact recreation. Despite this improved coverage, assessed river miles do not constitute a statistically representative sample of Connecticut streams. Monitoring was still biased toward larger streams. Therefore, river use support information cannot be extrapolated for the entire state.

### ASSESSED RIVERS: 1996 & 2002



**Lakes:** Of the approximately 2,100 lakes and ponds in the state, 116 are considered "significant" in that they have public recreational access or otherwise have outstanding aquatic habitat. These lakes have historically been included in 305(b) assessments. For the 2002 Report, an additional 28 lakes and ponds were assessed. Most of these additions were ponds that had been included in the 1998 impaired waters (303(d)) list.

**Drinking Water Reservoirs:** These impoundments are monitored by their respective water utilities. Water quality data from raw and finished water (treated water ready for distribution) are submitted to the Connecticut Department of Public Health (CT DPH). Additionally, CT DEP surveyed water utilities regarding the trophic status of and potential sources of degradation to individual reservoirs.

**Estuaries:** The 613 square miles of Connecticut estuarine waters include all coastal bays and harbors, as well as all Long Island Sound waters within the state boundary. Nearshore waters and some offshore areas are monitored for indicator bacteria by the CT Department of Agriculture/ Bureau of Aquaculture (DA/BA) to determine openings and closures of shellfish grounds. The CT DEP monitors offshore areas and some harbors for dissolved oxygen and several chemical/physical parameters. Coastal beaches are monitored for indicator bacteria as described below in *Public Beaches*. Information was also contributed by municipal, academic and volunteers.

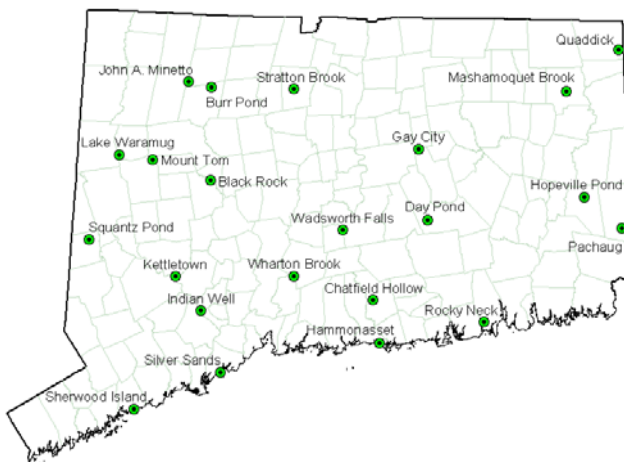
**Special Monitoring Projects:** Special monitoring is conducted to acquire more specific information than is generally obtained by periodic ambient monitoring. For example, special monitoring may be required to determine compliance with water quality standards, verify or calibrate mathematical water quality models,

or evaluate the effectiveness of pollution control measures. More than 50 such projects were conducted throughout the State during the assessment period for the 2002 Report.

**Volunteer and Academic Monitoring:** Volunteers and academics monitor waters throughout the State. For the 2002 Report, monitoring data from these sources were incorporated into the assessment of 232 miles of 45 rivers.

**Public Beaches:** The CT DEP, in a cooperative program with the CT DPH, monitors 22 State beaches weekly during the swimming season. Local health departments generally follow the same monitoring schedule for designated public swimming areas within their districts. Beach closure decisions were based on sanitary surveys and levels of enterococci bacteria as indicators of sanitary quality.

### MONITORED STATE BEACHES



**Ground water:** Although CT DEP does not have an established ambient ground water monitoring program, there are numerous programs that track ground water quality. These include, but are not limited to: CT DPH monitoring at more than 3,200 community and non-community systems for compliance with the Safe Drinking Water Act; CT DEP compliance monitoring of permitted dischargers; hydrologic investigations by the U.S. Geologic Survey (USGS); monitoring of private wells as may be required during the transfer of property; and monitoring by CT DEP, US EPA and responsible parties at known or suspected contamination sites. CT DEP samples more than 500 wells annually, of which approximately 50 - 70 are identified as contaminated.

## Information Used to Make Water Quality Assessments

Depending on data availability and the kind of waterbody, any one or combination of the following types of data were used to make water quality assessments:

- Physical/Chemical
- Benthic Invertebrate Community
- Fish Community
- Indicator Bacteria
- Aquatic Toxicity (Bioassay)
- Tissue Contaminant
- Sediment Chemistry/Toxicity

The primary source of assessment data for the 2002 305(b) Report was monitoring conducted by the CT DEP, USGS and CT DA/BA. Information from other state and federal agencies, municipalities, utilities, consultants, academia and volunteer groups was incorporated into assessments where possible.

## How Assessments are Made

Water quality is assessed in terms of support of uses, such as recreation and aquatic life, which are designated in the Connecticut Water Quality Standards. Detailed assessment methodologies are documented in the *CT Consolidated Assessment and Listing Methodology for 305(b) and 303(d) Reporting (CT CALM)*. The CT CALM emphasizes the use of sound environmental data over anecdotal (undocumented) evidence in making water quality assessments.

**Recreation:** Enterococci bacteria were used as the primary indicator of sanitary quality and support for contact recreation (swimming). Beach closure information, generally based on indicator bacteria, was incorporated into these assessments. In lakes, nuisance aquatic weed growth was also a consideration for support of swimming and other recreational uses.

**Aquatic Life Use:** The composition of the benthic invertebrate community was the primary means by which aquatic life use was assessed in wadeable streams. Fish community, water and sediment chemistry, and water and sediment toxicity (bioassay studies) also contributed to this assessment. Aquatic life use in estuarine waters was largely determined by the presence of hypoxic or low oxygen conditions.





**Left:** Collecting invertebrates in a Connecticut stream for aquatic life use assessment.

**Right:** Electro-shocking for fish. Fish community structure is also used to assess aquatic life use support.



**Fish Consumption:** Contaminants in fish tissue and resultant annual health advisories issued by the CT DPH were used to determine fish consumption use support.

**Shellfishing:** Use support for shellfishing in estuarine waters was based on restrictions to shellfishing as determined by the CT DA/BA based on indicator bacteria and sanitary surveys.

**Public water supply:** Water utilities report on the quality of water supplies directly to the CT DPH, who in turn, reports to the legislature and public. The 305(b) Report lists the trophic status of all drinking-water reservoirs. But, complete assessments were conducted for only a few of these waterbodies, which allow recreational uses.

**Other Designated Uses:** Other designated uses of Connecticut surface waters include navigation, industrial and agricultural supply. All State waters are assumed to support these uses.

## Summary of Water Quality Assessments

Following completion of the five-year monitoring cycle, 204 rivers (1,666 miles), 143 lakes (27,840 acres) and 613 square miles of estuary were assessed for at least one major designated use. A summary of use support is provided below.

**DEFINITIONS:** *Full Support* - available data indicate the waterbody meets all criteria for a designated use. *Full Support but Threatened* - the waterbody meets criteria, but conditions exist that threaten water quality. *Partial Support* - the waterbody meets criteria part of the time or to a lesser degree than desirable. *Not Supporting* - water quality conditions do not permit a designated use. *Not Attainable* - this designation applies to several miles of river that are completely enclosed in conduit, or where habitat manipulations preclude a use.

Designated Use	Assessed	Not Assessed	Full Support	Full Support but Threatened	Partial Support	Not Supporting	Not Attainable
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**RIVERS:** numbers are in miles, rounded to whole numbers

Aquatic Life	1,461	205	935	187	287	45	6
Contact Recreation	1,197	469	619	169	173	232	4
Fish Consumption*	1,666	0	1,536	2	108	20	0

**LAKES:** numbers are in acres, rounded to whole numbers

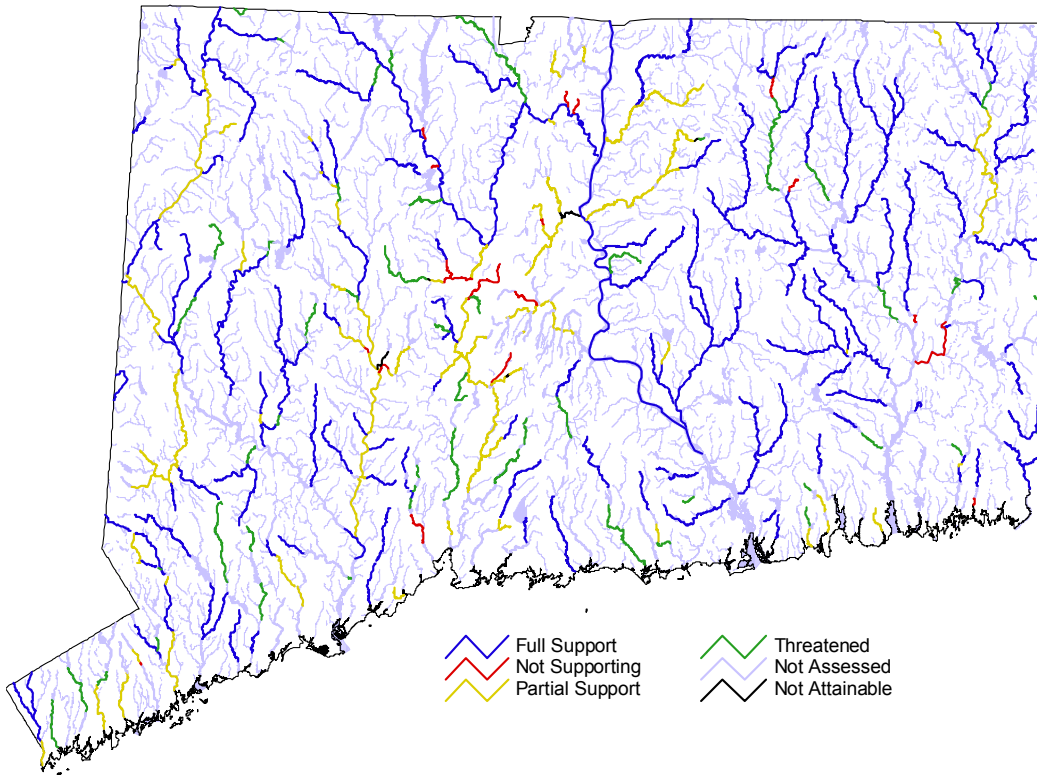
Aquatic Life	27,515	325	13,003	13,478	1,034	1	0
Contact Recreation	25,805	2,035	10,712	13,683	1,334	76	0
Fish Consumption*	27,839	1	23,706	0	4,021	112	0

**ESTUARIES:** numbers are in square miles, rounded to whole numbers

Aquatic Life	613	0	376	0	237	1	0
Contact Recreation	609	4	532	48	21	8	0
Fish Consumption*	613	0	604	0	0	9	0
Shellfishing	387	226	197	9	9	172	0

\* All freshwaters in Connecticut are considered to partially support fish consumption because of the potential for mercury contamination. Based on results of fish tissue sampling, the CT DPH issued a statewide advisory for certain people to restrict their consumption of certain species of freshwater fish. Similarly all estuarine waters partially support fish consumption because of a statewide advisory for the consumption of bluefish, striped bass and lobster tomalley due to PCBs. Water listed here carry a consumption advisory beyond these statewide advisories.

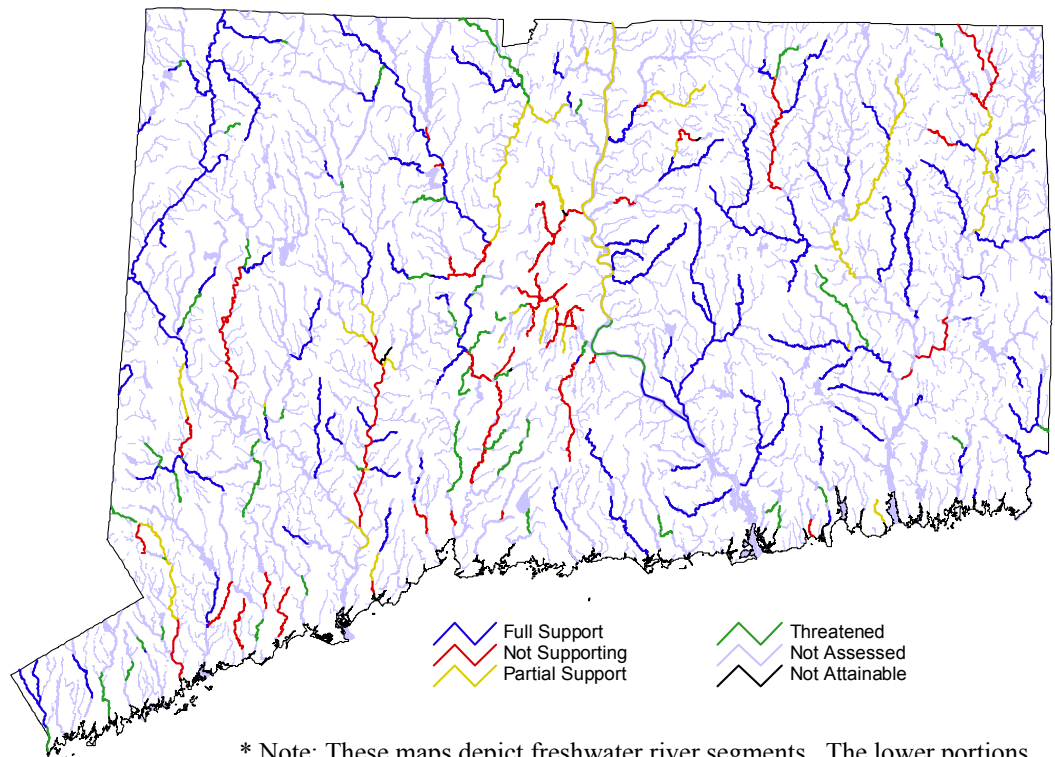
## AQUATIC LIFE USE SUPPORT IN RIVERS\*



**Aquatic Life Use:** Sixty-four percent of assessed river miles were considered to fully support aquatic life. An additional 13% were assessed as fully supporting but threatened. Forty-seven percent of lake acres were considered to fully support aquatic life with an additional 49% fully supporting but threatened. Sixty-one percent of estuary square miles were assessed as fully supporting of aquatic life. Impairment of aquatic life use in estuaries was almost entirely attributed to seasonal hypoxia (low dissolved oxygen).

## CONTACT RECREATION USE SUPPORT IN RIVERS\*

**Contact Recreation:** The sanitary quality of 52 % of assessed river miles supported contact recreation (full body immersion); an additional 14% were fully supporting but threatened. Ninety-five percent of assessed lake acres supported contact recreation (42% full support, 53 % threatened). Impairment of this use in lakes was more often attributed to extensive aquatic weed growth than indicator bacteria. The 30 square miles (5%) of estuary impaired for contact recreation were generally affected by remaining Combined Sewer Overflows (CSOs).



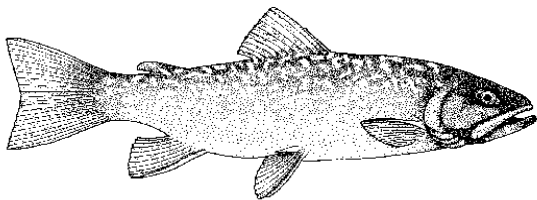
\* Note: These maps depict freshwater river segments. The lower portions of some rivers (e.g., Connecticut, Thames, Housatonic) appear as Not Assessed on these maps because they were assessed as estuaries.

## Causes and Sources of Impairment

The following tables show commonly identified causes and sources of impairment for Connecticut's assessed waters.

### RIVERS

Potential Cause	Miles affected
Indicator Bacteria	404
Cause Unknown	279
PCBs (fish consumption concern)	125
Siltation	100
Organic enrichment	90
Flow alteration	65
Nutrients	62
Other habitat alterations	40
<b>Potential Source</b>	
Source Unknown	408
Runoff / Storm Sewers	246
Municipal Point Sources	122
Dam / Channel / Flow Regulation	102
Industrial Point Sources	99
Combined Sewer Overflows	74
Collection System Failures	72
Agriculture	54



### LAKES

Potential Cause	Acres Affected
PCBs (fish consumption concern)	3,412
Algal Growth	1,283
Nutrients	940
Organic Enrichment	900
Noxious Aquatic Plants	825
Mercury (fish consumption concern)	818
Exotic Species	477
Indicator Bacteria	376
<b>Potential Source</b>	
Contaminated Sediments	3,444
Sources outside State borders	3,203
Source Unknown	1,232
Atmospheric deposition	630
Runoff / Storm Sewers	528
Internal Nutrient Cycling	346
Hydromodification	325

### ESTUARIES

Potential Cause	Square Miles Affected
Nutrients	233
Low Dissolved Oxygen	225
Indicator Bacteria	191
Priority Organics	13
<b>Potential Source</b>	
Runoff / Storm Sewers	387
Municipal Point Sources	343
Atmospheric Deposition (nitrogen)	233
Natural Sources / Waterfowl	187
Marinas/boats	187
Combined Sewer Overflows	163

Connecticut's long-term investment in abating pollution from sewage treatment and industrial facilities has achieved significant improvements in water quality statewide. While further improvements will be attained through additional point source controls, more attention is now being directed to nonpoint source (NPS) management. NPS runoff can carry fertilizers that cause algal blooms, soil particles that cloud the water or form deposits over natural substrates, and toxic substances that harm or kill aquatic organisms.

The atmosphere, as a delivery medium for contaminants, is also a serious NPS management concern. Up to 21% of all nitrogen loading to Connecticut's portion of Long Island Sound is estimated to come from atmospheric deposition. In freshwaters, atmosphere-borne mercury bio-accumulates through aquatic food chains, and in large part accounts for the statewide consumption advisory for certain fish species.

The exceedence of indicator bacteria criteria, which affects contact use support, was the most common cause of impairment to rivers. A waterbody was also considered impaired for this use if there was a known sewage collection system leak or CSO, regardless of bacteria levels. In lakes, contact recreation was more often impaired by nuisance aquatic vegetation than bacteria.

PCB contamination in fish of the Housatonic River and two of its impoundments, Lakes Zoar and Lillinonah, accounts for most of the impaired lake acres and about 50 miles of river. The contamination results from the movement of PCB-laden sediments from a site in Pittsfield, MA. A



major restoration project is on-going at the site to remedy environmental damage and health risks.

The exact causes and sources of aquatic life use impairment in rivers are often difficult to discern. Therefore, "cause unknown" and "source unknown" were usually indicated along with potential causes and sources. Determination of a specific cause requires more intensive investigation than is normally conducted during ambient water quality monitoring. Such a study may be undertaken when a waterbody is targeted for TMDL development. (See also **303(d) Listed Water and TMDLs**).

In Long Island Sound, the causes and sources of aquatic life use impairment are well understood. Nitrogen loading from sewage treatment plants and nonpoint sources causes extensive algal blooms. Harmfully low oxygen conditions (hypoxia) occur when large amounts of these floating microscopic algae die and decompose in bottom waters. (See also **Special State Concerns and Initiatives**).



### **303(d) Listed Water and TMDLs**

Section 303(d) of the Federal CWA requires each State to prepare a list of waterbodies not meeting Water Quality Standards (WQS), and establish a priority ranking for those waters. Beginning in 2002, the Connecticut 303(d) list was generated as a subset of waters assessed for the 305(b) Report, following guidance in the *CT CALM*. More detailed information is provided in the *2002 Connecticut Waterbodies Not Meeting Water Quality Standards (Impaired Waters List)*.

For waters where required point and nonpoint source pollution controls are not stringent enough to meet State WQS, Section 303(d) of the CWA requires the State to develop a Total Maximum Daily Load (TMDL). A TMDL defines the greatest amount of a pollutant that a waterbody can receive without exceeding criteria adopted in the State's WQS, and presents a plan to reduce the loading of that pollutant to a level that will restore the beneficial uses of that waterbody.

## **CT DEP Water Quality Programs**

*Connecticut Water Quality Standards (WQS)*: The WQS provide the overall policy for implementing State statutes and regulations, and describe water quality goals, criteria and classifications for individual resources. Policies set forth in the WQS maintain that the CT DEP shall:

- ◆ Protect waters of high quality from degradation.
- ◆ Segregate waters used for drinking from those that play a role in waste assimilation.
- ◆ Restore and maintain all surface waters at conditions suitable for fish, wildlife and recreation.
- ◆ Restore degraded ground water to protect existing and designated uses.
- ◆ Provide a framework for establishing priorities for pollution control.
- ◆ Adopt standards that promote the State's economy in harmony with the environment.

*Permitting of Discharges*: The CT DEP regulates wastewater discharges through the issuance, monitoring and enforcement of surface and groundwater discharge permits. Regulated discharges include those from: industrial and power generation facilities, municipal sewage treatment plants, large construction sites, agricultural waste management systems, large subsurface sewage disposal systems, landfills, and ground water remediation sites.

*Enforcement*: The CT DEP relies upon a number of enforcement tools to achieve compliance with State and Federal Clean Water Act regulations. Examples include facility monitoring and inspection, notices of violation, compliance assistance, and various types of pollution abatement orders. In severe cases, enforcement may be referred to the State Attorney General for civil violations, or the State Attorney for criminal violations.

*Nonpoint Source (NPS) Pollution Control*: Management of NPS requires the integration of numerous State, local and Federal programs. Connecticut uses a "networked" approach involving diverse programs such as stormwater and agricultural waste management, local land use planning, aquifer protection, wetland protection and air pollution control. Section 319 of the CWA, administered through the CT DEP, funds a number of education, monitoring and restoration projects aimed at mitigating effects of NPS.

## Special State Concerns and Initiatives

Long Island Sound: Over the next 15 years, nitrogen loading to the Sound will be decreased from the 1990 baseline level of 12,700 tons per year to 5,800 tons per year (a 58.5% reduction) to increase the dissolved oxygen levels in bottom waters to a minimum of 3.5 mg/l. To achieve this goal, the CT DEP issued a general discharge permit for 79 sewage treatment plants (STPs) and three industrial discharges located throughout Connecticut. This, in addition to requirements for reduction of nonpoint source nitrogen loading, is the main component of the Long Island Sound TMDL. To provide the most cost effective approach and an economic incentive to STPs, the CT DEP developed a nitrogen credit exchange program based on legislation passed by the Connecticut General Assembly.

Watershed Management: Watershed management considers the resources and problems of a whole drainage basin. Priorities and opportunities are identified within the basin to abate pollution, restore degraded aquatic habitat and protect water resources. In 1999, the CT DEP established basin coordinators for five major hydrological areas in the state (essentially the same areas identified for the rotating basin approach to monitoring). Each basin coordinator serves as the point person for comprehensive watershed management based on sound science, local stewardship and shared management responsibilities with watershed partners.

Stormwater Management: At the present time, almost 2000 facilities in Connecticut are registered under one or more general permits authorizing the discharge of storm water. Over the next several years, these efforts will be expanded, especially in the areas of municipal storm water (Phase II), and discharges from farm animal feeding operations.

Site Remediation: Recent improvements to Connecticut's site remediation programs include the adoption of remediation standard regulations, the "covenant not to sue" program, and changes to Connecticut's Property Transfer Act. Urban areas are prioritized through the State's Urban Sites Remedial Action Program and Federal Brownfield's Program. The CT DEP's Potable Water Program provides short and long-term drinking water relief to citizens affected by contaminated wells.

State Water Allocation: CT DEP is working to develop a comprehensive State water allocation system that preserves the integrity of water resources while providing for public drinking water needs. This may be accomplished by developing mechanisms to prioritize water use requests and designate allocations for the environment. The CT DEP recently submitted an inventory of water diversion registrations and a report regarding State water allocation policies to the Connecticut General Assembly. CT DEP now participates in the legislatively established Water Planning Council (WPC) along with representatives from other agencies. The WPC, its three committees and six subcommittees studied eleven issues related to water company and natural resource management. Final reports from these studies can be viewed at: <http://www.dpuc.state.ct.us/DPUCINFO.nsf/ByWaterPlanning?OpenView>.

## Help Protect Connecticut's Water Quality

- ◆ Dispose of wastes and hazardous materials properly.
- ◆ Keep pet wastes, chemicals, oils and detergents away from storm drains and water resources.
- ◆ Report spills, suspicious discharges and water quality problems to the proper authorities.
- ◆ Get involved in volunteer monitoring and/or local land use decision making.

## For More Information

Copies of the 2002 305(b) Report, CT CALM, 2002 Impaired Waters List and Water Quality Standards can be obtained from: <http://www.dep.state.ct.us/wtr/index.htm>. For information about these documents, water quality monitoring, volunteer monitoring, NPS programs, CT Water Quality Standards, Long Island Sound studies, and environmental laws and regulations:

CT DEP, Bureau of Water Management  
Planning & Standards Division  
79 Elm Street  
Hartford, CT 06106-5127  
Phone: 860/424-3020 Fax: 860/424-4055  
Website <http://dep.state.ct.us/>.

For information regarding specific basins, CT DEP Basin Coordinators:

Connecticut River, Charles Fredette, 860/424-3930  
Housatonic River, Susan Peterson, 860/424-3854  
Southwest Coast, Chris Malik, 860/424-3959  
South Central Coast, Sally Snyder, 860/424-3869  
Thames River, SE Coast, Eric Thomas, 860/424-3548

To report hazardous material spills: 860/424-3338