CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

Nonpoint Source Management Program 2009 Annual Report

August 2010

Nonpoint source pollution is diffuse in nature, both in terms of its origin and in the matter in which it enters surface and ground waters. It results from a variety of human activities that occur over a wide geographic area. Pollutants find their way into water in sudden surges and are associated with rainfall, thunderstorms, or snowmelt. Nonpoint source pollution results from land runoff, precipitation, atmospheric dry deposition, drainage, or seepage. Hydromodification is any physical disturbance to a water resource caused by human activity. Included in these activities are filling, draining, ditching, damming, or any other disturbance to wetlands and stream courses.

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I. INTRODUCTION

The Connecticut Department of Environmental Protection (CT DEP) Nonpoint Source (NPS) Program works to abate known water quality impairments and prevent significant threats to water quality from nonpoint source pollution. A significant strength of the program is its networked approach to nonpoint source management. CT DEP has formed partnerships with a wide range of public agencies, industry organizations, and private (citizens) groups to implement nonpoint source management. Connecticut's NPS Program is well-balanced, with an appropriate mix of statewide programs and geographically targeted watershed projects. The state NPS Program includes all the components required under the federal Clean Water Act (CWA) Section 319(h) (Nonpoint Source Management Programs).

Resources

The CT DEP NPS Program is supported by both federal and state funds. The CT DEP Bureau of Water Protection and Land Reuse (BWPLR) administers grants funded under the Clean Water Act (CWA) Section 319(h). From FY90, Section 319 grants totaling almost $25 million have supported 454 projects and CT DEP NPS Program staff salaries. Of these 454 projects, 160 projects were active between January 2009 and December 2009. CT DEP closed out 16 projects during this period. Since FY97, 25-30 percent of the total Section 319 allocation to Connecticut has been awarded as part of the state's Performance Partnership Grant (PPG), primarily to support NPS Program-related staff positions. The remaining allocation funded projects that are generally targeted to watersheds identified by the state as impaired (i.e., not meeting state water quality standards), and/or for which the development of total maximum daily load (TMDL) analyses are required.

CT DEP State funds support staff in other units that are involved in various aspects of NPS management. State bond and other special legislative acts provide funds for special projects and grant programs targeting specific resources. Coastal Zone Management Act (CZMA) funds, awarded by the National Oceanic and Atmospheric Administration (NOAA), support CT DEP Office of Long Island Sound Programs (OLISP) nonpoint source management efforts in the coastal area. Numerous other funding sources, from other federal and state agencies, and private foundations, are utilized when available.

The Connecticut Department of Environmental Protection awarded $1,080,101 to help fund fourteen projects designed to reduce NPS pollution in lakes and streams. Nonpoint Source Pollution (NPS) grants will be funded with 2009 federal fiscal year monies provided to Connecticut by the EPA under Section 319 of the Federal Clean Water Act.

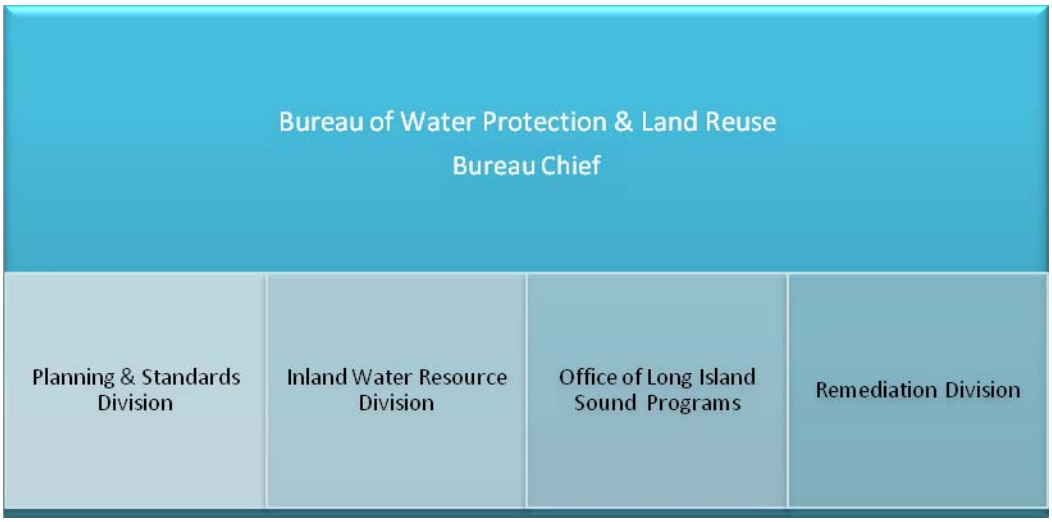
1. The proposal should address impairment in a 303(d) listed water body. An example of an impairment is "does not support Primary Contact Recreation" as indicated by high indicator bacteria. Impairment is an identification of the causes and sources that will

need to be controlled to achieve the load reductions estimated and to achieve any other watershed goals identified in the watershed-based plan.

2. In addition, the waterbody must have an EPA approved "Watershed-based Plan" which focuses on addressing that specific 303(d) impairment and addresses the following 9 elements **(impairment; load reduction; management measures; technical assistance & financial assistance; public information & education; management measures; performance and monitoring).** In cases where a final Watershed-based Plan has not been completed, applicants have the option of creating an interim Watershed-based Plan that partially addresses the water quality impairment, a portion of the watershed, or a specific management activity relevant to the water quality impairment. For example, an interim plan may use land use/cover information to identify cause and affect relationships with the intention of a more complete analysis leading to a final Watershed-base plan in the future.

FINAL WATERSHED-BASED PLANNING EFFORTS "PRESENTLY OR SOON TO BE" UNDERWAY	
Watershed	**Status**
Coginchaug	Completed
Niantic	Completed
Tankerhoosen	Completed
Broad Brook	Near Completion
Little River (North East corner)	Underway
Steel Brook	Completed
North Branch of the Park River	Near Completion

II. CT DEP NPS MANAGEMENT STRUCTURE



The NPS Program is responsible for coordinating the NPS management activities of various units throughout the CT DEP, as well as those being conducted by other state, county, and municipal organizations within the state. Numerous NPS Program activities are implemented by the BWPLR, which is organized into three divisions with the following responsibilities:

Planning and Standards Division (PSD)

Adopts water quality standards and classifications for the state's surface and groundwater resources; monitors and assesses the quality of water resources; administers the TMDL program, watershed, and lakes management programs; conducts NPS Program planning and coordination; manages the planning, design, construction and permitting of municipal sewage treatment facilities; administers the state's revolving fund, the Clean Water Fund (CWF); and provides support functions for the other bureau divisions for necessary planning, program development, and technical and administrative assistance.

Inland Water Resources Division (IWRD)

Regulates activities in the state's inland wetlands, watercourses, and flood plains, including oversight of municipal Inland Wetland Agencies; enforces the state's inland wetland and floodplain protection statutes; manages allocation of water resources through diversion permitting; and prevents or mitigates natural disasters through flood warning, emergency recovery efforts from flooding, and dam safety programs.

Office of Long Island Sound Program (OLISP)

The CT DEP Office of Long Island Sound Programs (OLISP) also has NPS management responsibilities. OLISP administers the state's Coastal Zone Management Program, and is responsible for developing and administering in conjunction with the BWPLR, the state Coastal Nonpoint Pollution Control Program (CNPCP) pursuant to Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA). OLISP also is responsible for administering statutes related to coastal NPS problems, including the state's Tidal Wetlands Act and Structures, Dredging, and Fill Act.

Remediation/Sites Clean-up

The Remediation Division oversees the investigation and remediation of environmental contamination and the redevelopment of contaminated properties. The Division's goal is to clean up contaminated sites to meet Connecticut's Remediation Standards Regulations, which ensure that human health and the environment are protected. The Remediation Division staff, with the help of Licensed Environmental Professionals (LEPs), oversees the clean-up of hundreds of contaminated sites across Connecticut.

There are also several other CT DEP units that perform NPS Program support activities. The CT DEP Office of Communication and Publications supports outreach and education on NPS issues to municipal agencies, the general public, and teachers. The Office of Information Management (OIM) houses the department's Geographic Information System (GIS) staff, whose members are responsible for collecting and digitizing all manner of data relevant to water resource management in the state. The GIS Office is responsible for coordinating GIS activities that involve CT DEP and other federal, state, and local government agencies. Over the past couple of years, the GIS Office has expanded its program to include GIS activities and issues that relate specifically to NPS management.

Program Coordination

The CT DEP NPS Program Coordinator is responsible for the overall management of the program, and for coordination of state, regional, and local NPS management activities. This involves working closely with EPA, the USDA Natural Resources Conservation Service (NRCS), the University of Connecticut Cooperative Extension System (UConn/CES), the soil and water conservation districts, and other NPS Program partners. The coordinator is also responsible for the technical review, ranking, and implementation of all Section 319 NPS grant-supported projects, including reporting on progress to EPA, coordinating NPS meetings, and organizing issue-based groups involved in NPS management.

One of the major tasks of the NPS Coordinator is working with CT DEP Watershed Managers to identify, prioritize, and oversee watershed projects being conducted by local organizations, including the Connecticut soil and water conservation districts (SWCDs) and their partners. The

NPS Program Coordinator continues to ensure that Connecticut's program meets the requirements of CWA Section 319 and associated state statutes and regulations.

In 2008, Section 319 funds in the PPG were used to support the following staff: NPS program coordinator, Water Bureau administrative assistant, two watershed managers, two subsurface staff, one full time cartographer and one position for data management (305[b]). These staff help integrate NPS Program goals and objectives into their own programmatic areas.

CT DEP is an active participant in the New England Interstate Water Pollution Control Commission's (NEIWPCC) NPS Work Group. The purpose of the work group is to promote technical transfer among NPS managers at the federal, state, regional, and local levels in the New England states, and New York.

Monitoring and Data Management

Section 319 funds support two staff positions in the Bureau of Water Protection and Land Reuse (BWPLR), water quality monitoring and data management unit: the Volunteer Monitoring Coordinator and the 305(b) Assessment Database (ADB) Manager providing technical support to prepare the biennial Integrated Report.

The Volunteer Monitoring Coordinator

The Volunteer Monitoring Coordinator facilitates training in sampling procedures and data quality methods to volunteer monitoring organizations to assure results meet DEP criteria for use in Integrated Report, and assists in evaluating and assessing Connecticut water bodies based on water quality monitoring data. This includes working closely with monitoring programs funded under Section 319, like the Connecticut River Watch Program and the Earthwatch (formerly Harborwatch/Riverwatch) program in the Norwalk River watershed. One of the coordinator's major responsibilities is to review and assist with the development of Quality Assurance Project Plans (QAPP), which assure the scientific reliability of data collected for these federally funded projects. DEP and EPA must approve these plans. This program has lead to volunteer monitoring data being integrated with DEP data to increase our knowledge of the conditions of Connecticut's waters.

The 2009 summary report for the Rapid Bioassessment in Wadeable Streams and Rivers by Volunteer Monitors (RVB) can be seen on the DEP web page under the Bureau of Water Protection and Land Reuse, volunteer monitoring heading (http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325606&depNav_GID=1654). This program enables citizen groups to collect useful data for DEP by combining the utility of invertebrate indicators with a non-technical methodology. Prior to sampling, a three-hour training session was held, in which over 300 individuals participated in this water quality-monitoring program. Participants include watershed associations, college ecology classes, town conservation commissions, and sporting clubs.

Data collected according to the RBV protocol can be used as a screening tool to identify stream sections with either very high or very low water quality. The documentation of key indicator organisms in a section of a stream provides a record of the benthic community present for a collection date and time. Since the program inception in 1999, volunteer monitoring data has been used to assess more than 323 river miles as fully supporting Aquatic Life Use in the 305(b) water quality report to Congress.

The 305(b) Assessment Database (ADB) Manager

The 305(b) Assessment Database (ADB) Manager assures water quality assessments are entered into the ADB, and mapped using Arcview 9.x to provide a geographic representation of Connecticut's water quality assessments for all water-body types in support of the biennial submission of the Integrated Report (formerly referred to as the "Water Quality Report to Congress" or 305(b) Report, as required under Section 305(b) of the federal Clean Water Act (CWA) and Connecticut Impaired Waters List, which is required by Section 303(d) of the CWA).

CT DEP evaluates water quality based on results from data collections within CT DEP, and results from data shared by the U.S. Geological Survey (USGS), volunteer, municipal, academic, and Project SEARCH monitoring. The resulting water quality assessments are stored by "segment identifiers" (segment ID), a unique identifier derived from a combination of the Connecticut basin code, and segment number in the ADB. This information is extracted into the Integrated Report biennially, and shared with EPA and the public.

Updating the Assessment Database (ADB) is an ongoing process, based upon monitoring results from all available field work. Water quality work performed during the 2009 calendar year was to support the 2010 Integrated Report, comprised of a written report of Connecticut Water's assessed by segment ID, a copy of the Assessment Database (ADB), electronic copies of Connecticut's assessed waters called "shape files', and the Impaired Waters list (303(d) list), which will be submitted on April 1st, 2010 to EPA and posted on the DEP web page, which will be available to the public.

Rapid Bioassessment in Wadeable Streams/Rivers by Volunteer Monitors

Number of monitoring locations	113
Number of samples collected	121
Number of waterbodies monitored	76
Number of fall samples > or = 4 "Most Wanted" types	32
Number of individual participants	400+
Number of groups participating in 2009	22
Number of groups participating for the first time	6
Number of groups returning for another year	16

Outreach and Education

Project SEARCH is a collaborative program of the CT DEP and The Children's Museum. The program provides equipment, training, and technical support to high school and middle school teachers who have incorporated a water quality monitoring program as part of their science curriculum. Funding for this program, which was initiated through a National Science Foundation grant, is now provided by CT DEP General Funds and Section 319.

In 2009, Project SEARCH continued to work with teachers and students from over 85 public and private high schools and middle schools across Connecticut to collect water quality data on rivers and streams within their communities. Schools collected water chemistry data, assessed habitat quality (including potential NPS pollution), and surveyed benthic macroinvertebrate communities in the fall and spring at their monitoring sites. SEARCH staff conducted 102 school site visits including 71 field sampling trips to provide technical support to teachers and collect replicate data for the project QAPP, 16 classroom training sessions with students on SEARCH methods, and 7 planning and introductory sessions with teachers establishing new SEARCH programs in their curricula.

Due to scheduling conflicts, the annual SEARCH training workshop was not conducted in the summer of 2009. Additional outreach to schools interested in getting involved was made by SEARCH staff in order to bring new teachers into the program. In the fall of 2009, a total of 4 new teachers were introduced to the program. An estimated 96 teachers and 2,000 students in grades 9-12 participated in SEARCH activities throughout the calendar year.

Water quality data was collected from 82 sites on 65 rivers and streams. SEARCH staff collected 62 replicate samples for the project's Quality Assurance/Quality Control (QA/QC)

analysis, and prepared annual reports, *Project SEARCH: Water Quality Data Summary Report 2008* and *2009*, that summarized the results of the stream surveys. SEARCH staff successfully integrated NPS issues into new data collection sheets used by the schools during their trips. Several schools have begun to collect the NPS data in addition to their own data. New teachers now receive training on the use of the sheet and discuss NPS issues and sources with their students during the summer workshop. Several schools have continued their use of the GIS land use/cover mapping component in order to facilitate understanding of NPS issues with their students. At the conclusion of the GIS lessons, the students will be able to generate watershed maps of their stream with land use types highlighted and connected to their water quality samples.

Geographic Information

The NPS Program receives GIS support services from trained Bureau of Water Protection and Land Reuse (BWPLR) staff in addition to the Office of Information Management (OIM). GIS services relevant to NPS management include maintaining the NPS Online Viewer and the DEP GIS Data Download websites, assisting NPS Program staff both with the use of desktop GIS and with materials and guidance for GIS projects, including updating data layers such as the Aquifer Protection Areas, Surface/Ground Water Quality Classifications, and creating maps representing Connecticut hydrology for presentations and for public use.

III. PROGRAM HIGHLIGHTS

In 2009, grantees completed sixteen nonpoint source projects. Below are a few of the completed projects and their accomplishments.

- NRCS designed a project to provide a fish passage on the Norwalk River. This would involve the removal of the Merwin Meadows Dam in Wilton, CT and the creation of a new, natural channel and floodplain through the present pond area. Secondary objectives include the removal of contaminated sediments and the reinforcement of railroad embankments.
    - Waterbody Name: Merwin Meadows Dam; Norwalk River
    - Location: Wilton
    - Project Grantee: Natural Resources Conservation Services (NRCS)
    - 319 Grant Amount: $274,000
    - Local Match: N/A

Merwin Meadows Dam, Wilton CT

- The Quinnipiac River Watershed Association ran a business outreach campaign in which they distributed Best Management Practice (BMP) materials and recruited businesses to pledge to become Friends of the River. Materials were distributed through decals,

newspaper advertisements, posters, and press tours. A total of 95 businesses agreed and pledged to follow BMPs on their property.

- Waterbody Name: Quinnipiac River Watershed
- Location: New Britain, Plainville, Southington, Cheshire, Meriden, Wallingford, Hamden, North Haven, New Haven
- Project Grantee: Quinnipiac River Watershed Association, Inc
- 319 Grant Amount: $8,700
- Local Match: $5,800

Recreation Park Pond in Southington-Before Restoration

- The Quinnipiac River Watershed Association ran an outreach campaign for municipalities and landowners to educate communities about the link between stormwater runoff and nonpoint source pollution. Materials were distributed through a landowner's guide, in addition to flyers and pledge forms. Volunteers successfully participated in popular projects including a storm drain marking program, a series of streambank stabilization demonstrations, and a rapid bioassessment of stream health.

  - Waterbody Name: Quinnipiac River Watershed
  - Location: New Britain, Plainville, Southington, Cheshire, Meriden, Wallingford, Hamden, North Haven, New Haven
  - Project Grantee: Quinnipiac River Watershed Association, Inc
  - 319 Grant Amount: $25,000
  - Local Match: $3,859.77

Stormwater drain near Quinnipiac River

- The Lake Lillinonah Authority continued to develop a database on trophic conditions and water quality in Lake Lillinonah (on left). The lake is on CT's list of impaired waters due to excess nutrients. As a result, water quality data is gathered and analyzed in order to assist in management decisions of the lake and document the sources of pollution.

  - Waterbody Name: Housatonic Watershed; Lake Lillinonah
  - Location: Bridgewater, Brookfield, New Milford, Newtown, Southbury, Roxbury
  - Project Grantee: Lake Lillinonah Authority
  - 319 Grant Amount: $15,000
  - Local Match: $10,000

Lake Lillinonah

- The Eastern Connecticut Resource Conservation and Development Area, Inc. worked with The Cooperative Development Institute to develop a business and marketing plan for an Anaerobic Digester Business Center for dairy farms in Woodstock. The result was the creation of a business plan that involved the installation of an anaerobic digester that could use dairy waste to produce gas, electricity, liquid fertilizer and fiber by-products to be used by the farms and sold off of those farms, offsetting costs and reducing nutrients on the farm.

    - Waterbody Name: Thames River Basin; Little River
    - Location: Woodstock
    - Project Grantee: Eastern Connecticut Resource Conservation and Development Area
    - 319 Grant Amount: $118, 867
    - Local Match: $79,000

Members of the project meet to discuss the Woodstock Dairy Farms

- The Eastern Connecticut Conservation District proposed several stormwater retrofits that could reduce nonpoint source pollution. They would be implemented in The Children's Museum in East Lyme, which are replicable in the entire watershed. The proposed retrofits included installation of a rain garden to treat roof runoff, rain barrels to capture water runoff to be used later, fescue grass seed mixtures to promote low maintenance lawns, the incorporation of a compost system into the picnic area, and the reduction of impervious surfaces to promote stormwater infiltration. In the future, the museum hopes to complete at least six of these seven retrofit items.

    - Waterbody Name: Niantic Bay
    - Location: Niantic, East Lyme
    - Project Grantee: Eastern Connecticut Conservation District
    - 319 Grant Amount: $20,000
    - Local Match: $11,403

Members collaborate on proposed stormwater retrofits

- The Northwest Conservation District conducted a visual track down survey assessment of the entire Northfield Brook watershed to identify conditions responsible for impairments in the brook, and recommended solutions that could result in the brook's removal from the EPA's Impaired Waters of the US list.

    - Waterbody Name: Northfield Brook Watershed
    - Location: Thomaston
    - Project Grantee: Northwest Conservation District
    - 319 Grant Amount: $6,500
    - Local Match: $20,000

Northfield Brook, Thomaston, CT

- The Niantic River Coordinator was provided funds to move the Niantic River Watershed-Based Plan into the implementation stage. A presentation was given to the participating towns of East Lyme, Montville, Salem and Waterford along with the DEP to seek endorsement of the plan. A condensed version of the plan describing the water quality impairments affecting the watershed and recommendations to reduce those impairments was produced and distributed to a wide audience of decision makers and local residents. This project was successful, meeting all of its objectives, and in the future the four towns plan on creating a permanent watershed board.

    - Waterbody Name: Niantic River Watershed
    - Location: East Lyme, Montville, Salem, Waterford
    - Project Grantee: Eastern Connecticut Conservation District
    - 319 Grant Amount: $19,400
    - Local Match: $11,333

Niantic Fish Market, Niantic, CT

- The DEP, NRCS, and the town of Watertown developed a watershed-based plan (WBP) for the impaired water body, Steele Brook. This project developed the WBP, as well as compiled GIS data to characterize the land use in the watershed, conducted riparian analysis, and discussed the feasible options for the removal of the Heminway Dam.

    - Waterbody Name: Steele Brook Watershed; Heminway Pond
    - Location: Watertown
    - Project Grantee: Natural Resources Conservation Service (NRCS)
    - 319 Grant Amount: $98,000
    - Local Match: $65,333

Steele Brook, Heminway Pond, Watertown, CT

- The Southwest Conservation District conducted an assessment along the 303d listed impaired waterbodies to search for potential stormwater retrofit opportunities. Once the stormwater retrofit candidates were identified, two stormwater outfall locations were chosen. Two multi-celled stormwater treatment basins were designed and installed in the town of Hamden to improve water quality in the Mill River Watershed.

    - Waterbody Name: Mill River Watershed
    - Location: Hamden, Wallingford
    - Project Grantee: Southwest Conservation

Sleeping Giant, Hamden, CT

District, Inc.
- 319 Grant Amount: $32,000
- Local Match: $21,333

- The Children's Museum of Connecticut and the DEP completed another year of Project SEARCH, a statewide water quality monitoring and educational program that partners aquatic biologists with teachers and their students to monitor local rivers and streams. Schools collected data on the physical, chemical and biological condition of 80 monitoring sites around the state. Water quality monitoring coupled with a general environmental awareness through education is an effective method for increasing understanding of NPS pollution, watershed concepts and stewardship of local waterways. An estimated 2,500 grade 7-12 students and teacher participated in the program. A three-day workshop was also held to train twelve new teachers entering the SEARCH program on monitoring methods, water chemistry, macroinvertebrate sampling and habitat assessment.

CT residents help out with water quality monitoring

  - Waterbody Name: N/A
  - Location: Statewide
  - Project Grantee: Children's Museum of Connecticut (formerly Science Center of Connecticut)
  - 319 Grant Amount: $40,000
  - Local Match: $26,667

- The Connecticut River Coastal Conservation District conducted a track down survey stream corridor assessment in the Miner Brook watershed in Middletown to search for sources of impairments and identify restoration opportunities. Eleven critical restoration management areas were identified, with recommendations covering landowner education and improved municipal good housekeeping (watershed-wide); dam inspection/repair; storm water quality retrofits; outfall and road culvert repair/maintenance; bank stabilization; drainage swale stabilization; channel protection; investigation/retrofit of a storm drainage system; and outfall maintenance. In addition, the District conducted site plan reviews and Environmental Review Team evaluations in the lower Connecticut River Watershed, providing information critical to reducing potential impacts of development through sensitive site planning and design, erosion prevention and sediment control, and stormwater management; and responded to requests for on-site technical assistance from municipalities and watershed residents, addressing concerns about water quality, stream bank erosion, and pond health.

Severe slope failure, Miner Brook, Middletown, CT

  - Waterbody Name: Mattabesset River Watershed; Miner Brook

- Location: Middletown
- Project Grantee: Connecticut River Coastal Conservation District, Inc.
- 319 Grant Amount: $50,000
- Local Match: $33,000

- The North Central Conservation District (NCCD) performed detailed investigations of municipal stormwater outfalls in Manchester to assess general conditions, pollutant contribution from discharges and resource value of the receiving waters. NCCD staff inspected over 49 outfalls within three sub-watersheds of the Hockanum River. Mini-watershed-based plans were developed for all of the major sub-basins within Manchester, characterizing the basins and assessing land use and load reductions in association with stormwater retrofits. NCCD also completed 29 reviews of development projects within the Connecticut River Watershed in northern Connecticut.

  - Waterbody Name: Hockanum River Watershed
  - Location: Manchester
  - Project Grantee: North Central Conservation District, Inc.
  - 319 Grant Amount: $50,000
  - Local Match: $33,000

Hockanum River, Manchester, CT

- The Laurel Brook Farm in North Canaan implemented a composting business for 36 tons of manure with the help of a roofed complex and machinery to facilitate the composting. A building was also installed to store the finished product and a tipping shed to store other materials delivered to the site for this project. The objective of this project is to remove over 75% of the phosphorus or 75,336 pounds of phosphorous per year from the farm so that it is not deposited into our waterways due to runoff.

  - Waterbody Name: Housatonic River Basin, Blackberry River (Laurel Brook Farm)
  - Location: North Canaan
  - Project Grantee: Eastern CT RC&D Area
  - 319 Grant Amount: $144,796
  - Local Match: $96,531

Tractors at Laurel Brook Farm in North Canaan, CT

- The Rivers Alliance of Connecticut coordinated the fifth round of the Watershed Association Small Grants Program (WASGP). Rivers Alliance is administering grants ranging from $500 to $15,000. The grants were awarded to watershed organizations for training of volunteers, water-quality monitoring equipment, outreach and education related to watershed issues, GIS mapping, river clean-ups, community workshops, and

the creation or improvement of buffer zones. The DEP assisted with project development, review and selection. Funds were awards to organizations including: the Connecticut Audubon Society, Farmington River Watershed Association, Pomperaug River Watershed Coalition, Housatonic Valley Association, Quinnipiac River Watershed Association, Save the Rivers-Save the Hills (Niantic), SoundWaters, and Connecticut's Conservation Districts. Since its inception in 2002, the WASGP has successfully helped 41 local watershed and related organizations, many of them start-ups, and awarded 61 grants, totaling over $200,000. This grant round is scheduled to conclude in 2010.

- Waterbody Name: N/A
- Location: Statewide
- Project Grantee: Rivers Alliance of Connecticut
- 319 Grant Amount: $40,000
- Local Match: $26,667

IV. WATERSHED MANAGEMENT PROGRAM

Watershed Management and Low Impact Development

The CT DEP has been in a comprehensive, multi-media "watershed approach" for over a decade now. CT DEP has developed a watershed management strategy that establishes the framework within which the CT DEP will work through a networked approach with federal, state, and municipal governments and non-government agencies and organizations to conduct watershed management and strengthen the state's ability to control nonpoint source pollution. The CT DEP has organized and focused base program staff, establishing five "major basin" coordinators, and continues to target grant funds based on watershed priorities.

Consistent with this approach, CT DEP offers competitive annual Section 319 grants to watershed initiatives for the priority watersheds, and to statewide NPS initiatives for transfer to local watershed management efforts. Basins that CT DEP has targeted in the past include the Norwalk, Quinnipiac, Hockanum, Mattabesset, Pequabuck, and Scantic, Sasco, and Fenger River watersheds. New focused watershed management initiatives are underway for the Little, Quinebaug and Shetucket rivers in the Thames River basin, the Pomperaug River and Steel Brook in the Housatonic River basin, the Niantic in the Southeast coastal basin, the Saugatuck in the Southwest coastal basin, the Coginchaug in the Connecticut basin, and other priority watersheds. The watershed approach is also being used to restore lake water quality, building upon studies and plans developed with funds provided by the state Lake Water Quality Grant Program, the federal Clean Lakes Program (pursuant to section 314 of the C.W.A), and Section 319 grants.

The NPS Coordinator works closely with Watershed Management and Coordination (WMC) staff and other NPS Program partners to select and manage watershed projects for Section 319 funding. Generally, the goals and objectives for watershed programs include the protection, restoration and improvement of water quality, habitats for fisheries and other wildlife, and recreational opportunities. As described in the state's *Enhanced State Nonpoint Source Management Program*, watershed management priorities are determined by a variety of mechanisms, including watershed and stream corridor assessments, the Consolidated Assessment and Listing Methodology (CALM) reporting and targeting NPS assessments. The primary purposes of the CALM data analyses are to determine the extent to which waters are attaining water quality standards, to identify waters that are impaired and need to be added to the 303(d) list, and to identify waters that can be removed from the list because they are attaining standards. The CT DEP WMC Section administers river and lake watershed management programs in cooperation with other CT DEP programs, other state and federal agencies, and nongovernmental organizations. The WMC Section includes coordinator positions for the five major river basins (Thames, Connecticut, Housatonic, Central Coastal, and Southwest Coastal Basins), and overseeing and coordinating watershed management activities in each basin. The watershed program addresses NPS-related water quality problems on a

comprehensive basis throughout an entire watershed. The role of the WMC basin coordinators include:

- Coordinating CT DEP base program activities in priority watersheds
- Serving as liaison between CT DEP and other state and federal agencies, municipalities, citizen groups, watershed associations, and other partners
- Assisting in the development of basin reports, watershed assessments, TMDLs, and watershed management plans
- Providing education and outreach on watershed issues, including the CT DEP web site, fact sheets, meetings, workshops, and conference
- Helping to manage NPS control projects financed in part with funds from the federal Clean Water Act Sections 319, 604(b), 104(b)(3), and state River Restoration Grants; and NPS education and outreach, and capacity building for nongovernmental organizations

CT DEP continues to encourage the growth of both new and previously existing non-governmental watershed organizations, and partnerships and initiatives in priority watersheds. The CT DEP directs funds to the Rivers Alliance of Connecticut to administer the Watershed Assistance Small Grants Program (WASGP). The WASGP was established in 2002 through the Section 319 (FY '01) program to provide small grants to start-up and growing organizations, and those who have not had ready access to some of the more traditional sources of funding. In this program, 27 watershed groups have been active in watershed management activities related to NPS pollution education and control, water monitoring, and water resource and land-use management and education. The program is well received and effective at improving watershed protection and reducing NPS pollution. During 2006 and 2007, CT DEP emphasis continued on completing progress on previously provided assistance grants, and preparing for a new round of grants in 2008. The Rivers Alliance is also assisting CT DEP in developing and promoting model municipal tools and regulatory options to reduce and control NPS pollution. CT DEP and Rivers Alliance are focusing on an in-depth study of towns' needs, useful tools, model regulatory language and non-regulatory efforts that will be suitable for towns to adopt or modify as they see necessary.

Other watershed management initiatives during 2006 and 2007 include:

- Continuing to evaluate and implement CT DEP watershed management strategies to improve watershed management and strengthen the state's ability to control NPS pollution including coordination of DEP programs that influence land use development, creating stronger municipal relationships, offering assistance to municipalities making land use decisions, and promoting low impact development tools.

- Examining a long-term approach to solving complicated water quality impairments in the main stem tributaries in Thames basin.

- Working with the NPS Program to focus on 303(d)-listed impaired waters, causes and sources of impairments, and implementation projects to fix impairment.

- Developing a watershed management plan model in the Niantic River basin, which covers all 9 elements of an EPA watershed-based plan, build out conditions, and other CT DEP NPS and watershed management assessment, planning and implementation needs.

Connecticut's soil and water conservation districts ("Conservation Districts") play an integral role in nonpoint source (NPS) pollution. They deliver technical assistance and education to municipalities and landowners. Technical and educational services provided include erosion and sedimentation control, management and control of NPS pollution, management of storm water runoff, and promotion of watershed management with recommendations for best management practices.

Districts partner with various public and private stakeholders to develop and implement watershed management plans and local initiatives focused on protecting and improving watershed health. Among others, partners include CT DEP, NRCS, municipalities, regional planning entities, and natural resource and land preservation groups. Throughout 2006 and 2007, Conservation Districts used their base section 319 funds to provide assistance to municipal leaders, commissions and staff, the development community, and residential, commercial and agricultural land users by:

- Providing technical information and assistance on natural resource problems by conducting site plan reviews and on-site inspections and providing recommendations for management of NPS pollution, erosion and sedimentation control and storm water management including stormwater retrofit opportunities; and conducting pollution source track down surveys to identify potential sources of water quality impairments and restoration opportunities.

- Planning and presenting technical assistance, natural resource training workshops and hands-on assistance to land use decision makers and landowners on, for example, channel restoration and restoration of stream banks; erosion and sediment control, nutrient management, stormwater management; forestry best management practices; and integrated pest management.

- Providing on-call detailed information and recommendations to ensure protection of wetlands, streams, rivers, groundwater, watersheds and land from storm water run-off, and to address problems resulting from the lack of erosion and sedimentation controls.

Rivers Alliance of Connecticut received Section 319 Nonpoint Source (NPS) grant funds to conduct a broad survey of towns and local environmental organizations on their practices and policies for water quality protection. The survey results rendered valuable information on current issues of concern, which will help Rivers Alliance develop future educational and resource opportunities. They also compiled and posted on their web site several ordinances and regulations from Connecticut towns which serve as examples of new and effective ways to address nonpoint source pollution
(See http://www.riversalliance.org/ModelOrdinances/modelordinances.cfm).

Low Impact Development Program

In 2009, the CT DEP Bureau of Water Protection and Land Reuse Planning and Standards Division continued to support the Watershed Management and Nonpoint Source Pollution Program in bringing the citizens of Connecticut an awareness of Low Impact Development (LID) techniques for reducing storm water and nonpoint source pollution runoff. The LID program works with partners at the municipal, state and federal levels to provide information and outreach materials and technical coordination in the application of LID techniques. The program promotes LID management practices with municipal land use agencies and public and private stakeholders in order to protect conserve and restore the water resources of Connecticut.

Low Impact Development (LID) is a land use planning and site design strategy for the management of storm water runoff that uses small scale controls integrated throughout a site to infiltrate, filter, store, detain, and evaporate storm water close to its source, replicating the pre-development hydrology of a site. LID techniques decrease surface runoff, erosion, and non-point source pollution and conserve natural site features to improve water quality and regulate water quantity.

Photo: §319 Funded Green Roof at UConn Gant Plaza.

The role of the LID Program includes:

- Supporting the work of DEP's Watershed Managers to protect and restore water quality by serving as a liaison between CT DEP and other state and federal agencies, municipalities, citizen groups, watershed associations, and others through the coordination of LID recommendations for watershed-based plans and implementation efforts.

- Providing assistance to municipalities for the incorporation of LID regulations and ordinances into local zoning, subdivision and wetlands codes.

- Providing information on best management practices through outreach materials and technical coordination to municipalities, planners, watershed associations and contractors.

- Providing education and outreach on LID and nonpoint source pollution topics and funding opportunities through the CT DEP web site, fact sheets, brochures, meetings, workshops, and conferences.

- Integrating LID alternatives into CT DEP environmental site plan reviews.

Some of the CT DEP Low Impact Development accomplishments for 2009 included:

- Supporting the work of the Watershed Managers and providing stakeholder capacity building through participation at conferences, workshops, watershed meetings and with interagency workgroups.

- Incorporating LID education and outreach materials, including three brochures on LID practices, into the CT DEP Watershed Management webpage online at: www.ct.gov/dep/watershed

- Conducting LID presentations for land use commissions, watershed organizations, DEP Inland Wetlands Training, trade groups, and watershed based planning efforts

- Coordinating with DEP's Permitting and Enforcement Division, stormwater permitting and enforcement program to support of Supplemental Environmental Projects to implement LID. This included awarding ten towns within the Farmington River Watershed DEP grant funding to review current land use regulations and ordinances to identify barriers to LID, and to revise the applicable land use regulations and ordinances to remove barriers and incorporate LID into municipal regulations, zoning, and subdivision approvals. Town workshops were coordinated to support these land use changes and were partially funded by CWA Section 319 NPS grant funding. Workshop presentations included: DEP&EPA (MLUE Program Overview), CT-NEMO (Municipal Planning), UNH-Stormwater Center (LID Implementation) and DEP Planning and Standards (Streamflow Overview) and Inland Water Resources Division (Inland/Wetlands Regulatory Overview).

- Collecting CT LID resources for distribution to municipalities, land use commissions, watershed associations and others

- Assisting in the development of a LID checklist and resource list in support of watershed based planning implementation and outreach for the Niantic River Watershed Plan

- Technical review of site specific LID practices in coordination with other DEP programs to assist municipalities, and other state agencies with development proposals.

Southwestern Coastal Basin

Southwest Coast Basin

The Southwest Coast Basin consists of a series of mostly north to south flowing streams that discharge to Long Island Sound between Stratford, CT and Port Chester, NY. The Southwest Coast Basin encompasses approximately 448 square miles, 57 of which are in New York State, and is home to approximately 650,000 people. The basin can be further subdivided into five regional basins: Southwest Shoreline, Southwest Eastern Complex, Saugatuck, Norwalk, and Southwest Western Complex. The northern half of the basin watershed is relatively rural, characterized by small towns, farmland and forest, much of which surrounds public water supply reservoirs. The southern half of the watershed tends to be more urbanized and commercial, dominated by the major transportation corridor surrounding I-95 and US 1.

Byram River

The Byram watershed is in the towns of Greenwich Connecticut and Port Chester/Bedford, New York. The major issues in this watershed are: flooding, especially in the Pemberwick area, water quality, sanitary sewer overflows (SSOs) and illicit discharges from Port Chester, NY into the estuary, sediment quality due to its industrial legacy, and contaminated sediments. A watershed-based plan is being developed and a Draft Plan will be available in late 2010. The Byram River Watershed Coalition has been organized with the following focuses: water quality, watershed-based plan development, public access and mitigation of flooding and erosion. EPA Region 2 has issued an Administrative Order against Port Chester New York for noncompliance with their MS4 stormwater Phase 2 permit. Ambient monitoring continues to indicate significant dry-weather sewage discharges coming from the Port Chester stormwater systems. There have also been enforcement activities against the Town of Greenwich for intermittent problems related to infrastructure failures.

Watershed stakeholders include, but are not limited to the Town of Greenwich, Interstate Environmental Commission, Byram Watershed Coalition, Westchester County Health Department, Port Chester, Southwest Conservation District, Westchester County Planning/Conservation District, Bedford, Save our Shores, Save the Sound/Connecticut Fund for the Environment, Citizens Campaign for the Environment, Pace University, Columbia University, and SoundKeeper.

Mianus River

The Mianus River watershed is in the towns of Greenwich and Stamford, Connecticut. The major issues in this watershed are land preservation, riparian restoration, heavy use of parks, NPS pollution, and goose management.

South West Regional Planning Agency has been funded to develop a watershed-based plan for nonpoint source pollution. The City of Stamford has worked with local park users to enhance the trail system to lessen impacts to the river at Mianus River Park. Volunteer labor has been managed very successfully to implement trail and river corridor management projects. A

hardened access point has been installed to lessen conflicts between user traffic and riparian restoration. In some areas, temporary deer fencing has been an effective tool in restoring vegetation by limiting human and animal traffic. River herring runs continue to improve dramatically in response to improved fish passage over existing dams.

Watershed stakeholders include, but are not limited to the Mianus River Watershed Council, Greenwich, Stamford, Mianus River Greenway Alliance, SWRPA, Aquarion, and Mianus River Gorge Preserve.

Mill/Rippowam River

The Mill/Rippowam watershed is located in Stamford, Connecticut. The major issues in this watershed include the Mill River Restoration Project. The City of Stamford has essentially completed a major construction project to restore a more natural riparian condition and mitigate flooding in the lower end of the Mill River, in cooperation with the US Army Corps of Engineers. Bulkheads have been removed, two dams breached, and streambank slopes restored and managed for multiple uses. The City has also been working on a watershed plan to address water quality and stormwater and numerous other issues related to reconnecting the City's residents with the riverfront. Baseline data collection and analysis has been completed with funding from a STAG grant. Watershed stakeholders include, but are not limited to Stamford, the Mill River Collaborative, and the US Army Corps of Engineers.

Noroton River/ Holly Pond/Goodwives/Stoney/Tokeneke Rivers/Gorham's Pond

The Noroton River/ Holly Pond/ Darien River watersheds are located in Stamford, Connecticut. Goodwives/ Stoney/ Tokeneke Rivers/ Gorham's Pond watersheds are located in Darien, Connecticut. Major issues in these watersheds include flooding, sedimentation of impoundments, and NPS pollution.

The City of Stamford has initiated a Holly Pond Sedimentation Study and Improvement Design Project. The Town of Darien has completed Flood Studies on both Stony Brook and the Goodwives River and is planning significant work to mitigate flooding in the town's watercourses, beginning with construction of a basin that will provide flood mitigation for Stony Brook. Implementation of most of the measures defined in a draft watershed study completed by the friends of the Goodwives River is nearly complete.

Watershed stakeholders include, but are not limited to Stamford, Darien, SoundWaters, the Darien Land Trust, and the Friends of Goodwives River.

Five Mile River

The Five Mile River watershed is located in New Canaan, Norwalk and Darien, Connecticut. Major issues in the watersheds include flooding, erosion and sedimentation, water quality

issues from point and nonpoint source pollution, treated effluent dominated in late summer, and development of a watershed-based management plan.

Concerns have been voiced regarding frequent flooding, erosion and sedimentation, and degradation of water quality and riparian habitat. The Town of New Canaan has completed a hydraulic and hydrologic study. SWRPA has initiated a project to create a watershed-based plan to address nonpoint source pollution and water quality.

Watershed stakeholders include, but are not limited to Norwalk, New Canaan, Darien, Friends of the Five Mile River, West Norwalk Association and Harbor Watch – River Watch.

Norwalk / Silvermine / Comstock Rivers

The Norwalk/Silvermine/Comstock River watersheds are located in the Connecticut towns of Norwalk, Wilton, New Canaan, Weston, Ridgefield, Redding and Lewisboro, New York. Major issues in the watersheds include flooding, erosion and sedimentation, and water quality issues including nutrients from Publically Owned Treatment Works (POTWs) and pathogens from nonpoint source pollution.

The river's flow can be strongly influenced by treated wastewater effluent in late summer. There is an industrial legacy and zinc accumulation in sediments may have some effect upon aquatic life use support. Volunteer water quality monitoring has been active and has led to correction of many pollution sources. A bacterium Total Maximum Daily Load (TMDL) has been written and is being implemented with the assistance of the municipalities and the Norwalk River Watershed Initiative. CT DEP has undertaken a stressor analysis study focusing on nutrients and dissolved oxygen, and the role of wastewater discharges and impoundments on water quality and aquatic life use support. Citizen's water quality monitoring and a part time NRWI Watershed Coordinator continue despite the loss of State funding. Management of excess non-migratory Canada Geese has been identified as a priority project and funded by CT 319 funding. The goals are twofold: egg oiling and educating people to not feed geese. Two dam removal projects are being planned on the Norwalk River. Engineering design and permitting will be completed by NRCS, under contract to CT DEP, at Merwin Meadows Dam in Wilton. A similar design project at Flock Process Dam in Norwalk has been delayed due to funding problems.

The South West Regional Planning Agency has initiated a project to update the Norwalk River Watershed Initiative's Action Plan to comply with EPA's nine element format for watershed-based plans.

Watershed stakeholders include, but are not limited to the Norwalk River Watershed Initiative, Norwalk River Watershed Association, Harbor Watch/River Watch, Trout Unlimited, Norwalk Maritime Museum, Norwalk, Wilton, New Canaan, Ridgefield, Redding, Weston, Lewisboro, Southwest Conservation District, South Norwalk Water and Electric, and SoundKeeper.

Saugatuck / Aspetuck Rivers

The Saugatuck and Aspetuck River Watersheds are located in Westport, Weston, Easton, Redding, Newtown, Wilton, Fairfield, and Danbury, Connecticut. Major issues in the watersheds include land preservation, water quality, NPS, shellfish, water diversions and low flow, citizens monitoring, goose management, and The Nature Conservancy-Aquarion Low Flow Reservoir Management Model.

The Saugatuck River Watershed Partnership has had success with municipal support for its Conservation Compact. Several watershed workshops have been held focusing on stormwater and nonpoint source pollution. Citizen's water quality monitoring has been successfully implemented in both the Saugatuck and Aspetuck River watershed. The South West Regional Planning Agency has initiated a project to create a watershed-based plan to address bacteria and nonpoint source pollution.

Watershed stakeholders include, but are not limited to the Saugatuck River Watershed Partnership, The Nature Conservancy, Harbor Watch/River Watch, Aquarion, Westport, Fairfield, Weston, Newtown, Wilton, Fairfield, Ridgefield, Danbury, Easton, Trout Unlimited, Land Trust, USGS, Highstead Arboretum, SouthWest Conservation District, and Soundkeeper.

Sherwood Mill Pond

Sherwood Mill Pond is located in the town of Westport, Connecticut. The Town of Westport and Harbor Watch River Watch have been actively seeking out bacteria sources through Citizen's Water Quality Monitoring efforts to supplement efforts by the Westport-Weston Health District.

Watershed stakeholders include, but are not limited to Westport, Harbor Watch/River Watch, and the Westport-Weston Health District.

Sasco Brook

Sasco Brook watershed is located in the town of Westport, Connecticut. Major issues in the watersheds include water quality, citizens monitoring, NPS pollution, goose management, hobby farms/animals, watershed-based management plan, and the bacteria TMDL.

Nonpoint source management continues to be a primary concern. Education of horse owners to use best management practices for manure management has been successful. The identification of outfalls that serve areas where septic systems may fail continues. The Town of Westport is working on a draft watershed-based plan to address sources of bacteria in the Brook.

Watershed stakeholders include, but are not limited to Westport, Fairfield, Sasco Brook Water Pollution Abatement Committee, HarborWatch/Riverwatch, SouthWest Conservation District,

Natural Resources Conservation District, and the CT Department of Agriculture Aquaculture Division.

Mill River

The Mill River watershed is located in the towns of Fairfield, Easton, Trumbull and Monroe, Connecticut. Major issues in the watersheds include water quality, water quantity, lead and bacteria TMDLs, and riparian restoration.

The Mill River Wetland Committee continues to work on educational programs in schools. Other organizations such as the League of Women Voters and the Fairfield garden clubs have taken an active role in public education and outreach, as well as riparian restoration and invasive species control at local parks and dedicated open spaces.

Watershed stakeholders include, but are not limited to Fairfield, RiverLab / Mill River Wetland Committee, Fairfield Garden Clubs, and the League of Women Voters.

Ash Creek / Rooster River

Ash Creek and Rooster River watersheds are located in the towns of Bridgeport and Fairfield, Connecticut. Major issues in the watersheds include water quality, CSOs, riparian restoration and preservation, and the bacteria TMDL.

Conservation efforts in the watershed coalesced around opposition to several large dock proposals and spread to other areas such as habitat restoration.

Watershed stakeholders include, but are not limited to the Ash Creek Conservation Association and the Connecticut Conservation Association.

Pequonnock River

The Pequonnock River watershed is located in the towns of Bridgeport, Trumbull and Monroe, Connecticut. Major issues in the watersheds include water quality from point and nonpoint sources, as well as combined sewer overflows, riparian and habitat restoration, flooding, and a watershed-based plan.

A collaborative effort is underway to develop a watershed-based plan with the City of Bridgeport and Southwest Conservation District / Save the Sound taking the lead. Interest in organizing a Pequonnock River Watershed Partnership has been strong. A Citizen's Water Quality Monitoring program has been designed and implemented by Harbor Watch/River Watch.

Watershed stakeholders include, but are not limited Save the Sound, Bridgeport, Harbor Watch/River Watch Trout Unlimited, USDA/NRCS, and Beardsley Zoo.

Housatonic Major Basin

Originating near Pittsfield, MA, the Housatonic River flows south for approximately 150 miles through western Massachusetts and Connecticut before entering Long Island Sound in Stratford and Milford, CT. Altogether, the Housatonic watershed encompasses almost 2000 square miles in Connecticut, Massachusetts and New York. In Connecticut, the approximately 1200 square mile "Housatonic Major Drainage Basin" can be further subdivided into the following 10 "Regional Drainage Basins": Housatonic Main Stem, Aspetuck, Blackberry, Candlewood, Hollenbeck, Naugatuck, Pomperaug, Shepaug, Still and Tenmile. The northern half of the Housatonic watershed is relatively rural, characterized by small towns, farmland and forest. The southern half of the Housatonic watershed tends to be more urbanized and industrial.

Housatonic Mainstem Regional Basin

The Housatonic River has been extensively harnessed for hydroelectric power generation. In Connecticut, FirstLight Power Resources operates five hydroelectric facilities on the Housatonic River: Falls Village, Bulls Bridge, Rocky River (associated with Candlewood Lake), Shepaug (dam forms Lake Lillinonah) and Stevenson (dam forms Lake Zoar). A new license covering all of these facilities was issued by the Federal Energy Regulatory Commission (FERC) in June 2004. The license includes a Water Quality Certificate issued by CT DEP. In addition to these five plants, McCallum Enterprises operates a hydropower facility at Derby Dam (dam forms Lake Housatonic).

To date, the major issues affecting water quality of the Housatonic River in Connecticut have revolved around eutrophication, dissolved oxygen levels and PCBs. The first two issues are primarily associated with the three lower impoundments on the river – Lake Lillinonah, Lake Zoar and Lake Housatonic. It has been found that excessive amounts of phosphorus from upstream sources are causing serious algal blooms in these lakes. Reduction in phosphorus levels at upstream wastewater treatment plants, as well as the disappearance of some point sources, has helped to lower nutrient levels and improve water quality. However, eutrophication problems persist, particularly in Lake Lillinonah.

The Housatonic PCB issue was first identified in the late 1970's and is primarily associated with releases from the General Electric Company (GE) facility in Pittsfield, MA. As a result of a Consent Decree, approved by the U.S. District Court in October 2000, involving GE, U.S. EPA and other federal entities, the State of Connecticut, Commonwealth of Massachusetts and City of Pittsfield, a collaborative clean-up of PCBs in the most heavily contaminated portions of the river (close to the GE facility) is underway. In-river remediation activities are being addressed in three distinct phases known as: the ½ mile (on the East Branch of the Housatonic, immediately adjacent to and downstream of the GE facility); the 1 ½ mile (on the East Branch of the Housatonic, commencing immediately below the ½ mile and ending at the confluence of the East and West Branches); and Rest of River (from the confluence of the East and West Branches which form the mainstem of the Housatonic, down through MA and CT to Long Island Sound). Remediation of the ½ mile and 1 ½ mile sections were completed in 2002 and 2007

respectively. Determination of whether clean-up in Rest of River will occur and to what extent is a multi-step process that is currently underway.

The Housatonic River and the lands within its watershed constitute an important recreational resource. There are hundreds of acres of public recreation land within the watershed, including the Appalachian Trail, which runs along the river for five miles between Kent and Cornwall. In Connecticut, the northern portion of the river offers catch-and-release Trout Management Areas, Smallmouth Bass Management Areas and seasonal Class I-IV whitewater boating opportunities. Meanwhile, the four lakes associated with the river - Lillinonah, Zoar, Housatonic and Candlewood - are popular areas for boating, fishing and swimming. In 2001, the Housatonic River was officially designated by the State as the "Housatonic Riverbelt Greenway". It is hoped that this planning designation will encourage towns and other groups to work together and create a contiguous greenway along the river corridor.

During 2009:

- As part of the Housatonic GE-PCB remediation project under the 2000 Consent Decree, GE submitted a "Work Plan for Evaluation of Additional Remedial Alternatives" which is an addendum to GE's Corrective Measures Study (CMS) Proposal of the Rest of River. The CMS evaluates potential clean-up alternatives for Rest of River. CT DEP submitted comments to EPA on GE's work plan addendum.

- GE submitted a report entitled "PCB Concentrations in Fishes from the Housatonic River, Connecticut, 1984-2008, and in Benthic Insects, 1978-2008", prepared by The Academy of Natural Sciences of Philadelphia, to CT DEP. Overall, the 2008 results show that PCB levels in fish and invertebrates were the same or only slightly elevated when compared to the lowest concentrations found in previous study years. However, PCB levels are considerably lower than those found in the earliest years of this study. This study was conducted voluntarily by GE as there was no longer a CT DEP-GE Cooperative Agreement in effect.

- The Connecticut Trustee SubCouncil, comprised of CT DEP, USFWS and NOAA representatives, approved the "Housatonic River Basin - Final Natural Resources Restoration Plan, Environmental Assessment, and Environmental Impact Evaluation for Connecticut". The Connecticut Trustee SubCouncil was tasked with the responsibility of creating a restoration plan to expend GE-PCB damage funds ($7.5 million) awarded to Connecticut under the 2000 Consent Decree. Altogether, 27 projects within three restoration categories (Aquatic Natural Resources; Riparian and Floodplain Natural Resources; and Recreational Uses of Natural Resources) were selected for funding.

Naugatuck Regional Basin

The Naugatuck River is the largest tributary of the Housatonic River, with a watershed of approximately 311 square miles incorporating 27 municipalities. The mainstem of the

Naugatuck River forms in Torrington and flows south for 40 miles to Derby, where it enters the Housatonic River only 11 miles from Long Island Sound. The Naugatuck River watershed has the potential for excellent cold-water fish habitat and has historically supported anadromous fish runs. The existence of these runs ceased during the industrial revolution due to the construction of numerous dams and poor water quality. Although the river has a long history and reputation as one of the most polluted in the state and country, it has been recovering as a result of restoration efforts by CT DEP and other stakeholders initiated in the late 1960s. The primary objectives of the restoration efforts are to restore water quality and anadromous fish passage. Secondary goals include providing passage for recreational boating, reducing sediment deposition in impoundments, removing safety hazards, reducing flood levels, and establishing greenways. While initial efforts focused on eliminating or reducing gross point source pollution, more recent efforts have involved advanced wastewater treatment, NPS management, and fish habitat restoration. These efforts have been led by the CT DEP, watershed municipalities, Naugatuck Valley Chapter of Trout Unlimited, Naugatuck River Watershed Association, the U.S. Army Corps of Engineers, and the Soil and Water Conservation Districts.

Based on a wasteload allocation (WLA) analysis completed by CT DEP in 1988, five of the six major municipal wastewater treatment facilities were upgraded to advanced treatment between 1992 and 2001, and the sixth was linked to the new Waterbury facility. In conjunction with the upgrade of the Waterbury wastewater treatment plant (WWTP), by far the largest of the six plants, a mitigation plan was developed that included: dam removals or construction of fish passage facilities at seven dams in the watershed, tributary habitat enhancements, river corridor revegetation~~,~~ and water quality monitoring. In 1998-99, a fish ladder was constructed at the Kinneytown Dam, the southern-most dam on the river, as a condition to issuance of a federal hydropower license. In 1999, four dams on the Naugatuck were removed or breached (Freight Street, Platts Mill, Union City, and Anaconda). In 2004, the Chase Brass Dam on the Waterbury/Watertown section of the river was removed by the City of Waterbury. Plans are currently underway to construct fish and canoe/kayak passage around Tingue Dam in Seymour. This will leave just the Plume and Atwood Dam in Thomaston as the only remaining fish passage barrier on the Naugatuck below the Thomaston Flood Control Dam. If and when the Plume and Atwood Dam is eventually removed, over 30 miles of the lower Naugatuck River up to the Thomaston Flood Control Dam will be opened for anadromous fish passage. As water quality in the river has improved over the years, CT DEP Fisheries has expanded its fish-stocking program of trout and broodstock salmon on certain sections of the river, and has designated the Naugatuck mainstem - from the confluence of the East and West Branches in Torrington to the Kinneytown Dam in Seymour - as a Trophy Trout Stream. In addition, as a result of advocacy by municipalities and regional planning organizations up and down the river, the Naugatuck River has been officially designated as a “State greenway” area.

In 2009:

- The USDA Natural Resources Conservation Service completed the 319-funded “Steele Brook Watershed Based Plan – Including Heminway Pond Dam Removal

Feasibility Analysis" for the Town of Watertown. The water quality impairments which the plan focuses on are: iron precipitate which is impacting aquatic habitat, and bacteria which is impacting recreational use. Steele Brook is a tributary of the Naugatuck River.

- The Town of Watertown received official State greenway designation for Steele Brook, and also held a ground breaking ceremony in anticipation of beginning work soon on a proposed recreational greenway.

- The Northwest Conservation District (NCD) completed a "track down survey" and "mini-watershed based plan" for Northfield Brook Lake in Litchfield and Thomaston with funding through a 319 Block Grant. The primary goal was to identify potential sources of bacteria impairing this impounded lake which is operated as a flood control project and recreational area by the U.S. Army Corps of Engineers. NCD identified upstream agricultural activities as well as stormwater runoff from a nearby subdivision as the primary potential sources of the bacterial loading. NCD contacted the USDA Natural Resources Conservation Service with regard to the agricultural issues, and is currently working with the Town of Thomaston to address the subdivision stormwater issues. Northfield Brook is a tributary of the Naugatuck River.

- CT DEP received $2.5 million in American Recovery and Reinvestment Act funds, to supplement the existing $2.25 million in CT DEP Supplemental Environmental Project funds to move forward with completing the fish passage project at Tingue Dam on the Naugatuck River in Seymour.

Shepaug Regional Basin

The Shepaug River basin drains a 155+ square mile area that encompasses portions of 12 towns. The watershed stretches approximately 29 miles from Cornwall, Goshen and Litchfield in the north to Roxbury, Bridgewater and Southbury in the south. The Shepaug River flows into the Housatonic River just 2 miles upstream of the Shepaug Dam which impounds Lake Lillinonah. The last 3 miles of the Shepaug are impounded as a result of this dam. Therefore, the lower reach of the Shepaug is considered part of the lake and is known as the "Shepaug Arm" of Lake Lillinonah. In the northern half of the Shepaug watershed there are two water supply reservoirs and several large lakes including Bantam Lake, the largest natural lake in Connecticut.

The Shepaug watershed is relatively rural, characterized by forests, small towns and a diminished but persisting agricultural community. The scenic landscape makes this region a popular location for secondary as well as primary homes. As a result, residential and associated commercial development are exerting a steady and growing pressure on the land and water resources of the watershed. There are several active land trusts and other conservation entities in the region, which, among other things, have protected considerable stretches of land along the Shepaug and Bantam Rivers and around Bantam Lake. In 2001, the area along the

Shepaug River through the towns of Washington and Roxbury received official State greenway designation. In 2004, the Bantam River Historical and Conservation Greenway, along headwaters of the Bantam River in Goshen received official State greenway designation. The Bantam River is a major tributary of the Shepaug.

Almost the entire Shepaug basin has been identified as an existing or potential public water supply area as a result of long range State public water supply planning efforts in the 1970s. While active public water supply lands do comprise a portion of the upper basin, most of the watershed is not known to have been officially proposed as a future water supply source by a water supplier in an individual or regional water supply plan. In any case, before these other areas of the Shepaug basin could be used for public water supply, water quality would need to be improved to meet State standards required for drinking water.

Meanwhile, the portion of the Shepaug basin currently being used for public water supply became the focus of an important court case initiated in 1995 between the City of Waterbury and the Shepaug River Association, the Towns of Washington and Roxbury, and others with regard to minimum stream flow in the Shepaug River. This issue stemmed from a 1921 agreement between the City of Waterbury and the Town of Washington which allowed the City to divert water out-of-basin from reservoirs in the upper watershed for public water supply. The law suit, which made it all the way to the Connecticut Supreme Court, was finally concluded in 2005 through an agreement and stipulated judgment. While the decision generally favored Waterbury's diversion rights, it did require the City to increase flows in the river during warmer, low flow months – provided the City was given adequate funding to make the necessary changes to its reservoir facilities to allow for additional water releases. Subsequently, the Governor approved $1 million in funding for the City for these improvements. The Shepaug court case has had a major influence in moving the State towards adopting statewide streamflow standards and regulations which are currently under consideration.

Bantam Lake is a valued fishery and popular water-based recreational resource which has been a long-standing focus of attention in the Shepaug basin due to problems with algal blooms and nuisance weeds. Naturally eutrophic by virtue of its physiography and evolution, Bantam Lake has experienced increased eutrophication due to human activities which often contribute excess nutrients to the lake in the watershed. During the mid-1970s through the early 1990s, CT DEP worked to eliminate point source discharges of treated sewage effluent from the upstream watercourses, which feed into the lake. Extensive dredging was also done in selected portions of the lake. These measures greatly improved lake water quality and reduced the spread of aquatic weeds. However, management of this naturally eutrophic lake is an ongoing process. For example, water chestnut, an invasive aquatic plant, was recently identified as an emerging issue that could affect habitat and recreation.

The City of Waterbury completed work on its Shepaug Reservoir dam, allowing for increased flows into the Shepaug River. Subsequently, the Steep Rock Association hosted the "Shepaug River Celebration" at its annual picnic to celebrate this accomplishment. Guests at this event

included parties from both sides of the Shepaug court case, in addition to the Governor and the Connecticut Attorney General.

Connecticut River Major Basin

Salmon Regional Basin

The Salmon River, located in the Tidelands Region of the lower Connecticut, begins at the confluence of the Jeremy and Blackledge Rivers in Colchester, and flows ten miles to the Connecticut River in East Haddam. The watershed is a 125 square mile area draining portions of Bolton, Glastonbury, Hebron, Columbia, Lebanon, Marlborough, East Hampton, Colchester, Haddam and East Haddam. With its relatively clean and quick flowing streams and an extensive freshwater tidal marsh, the watershed provides important fish spawning areas, is used by the State for Atlantic Salmon restoration, and provides habitat for migrating and wintering ducks. The watershed also supports a variety of water-based recreational uses. Due to its high quality, the Salmon is used by DEP as a reference stream.

In 2009, Project Manager Shelley Green of The Nature Conservancy/Connecticut Chapter continued coordination through an Advisory Committee, finalizing the Municipal Land Use Evaluation (MLUE) Assessment Project report. The report culminated the first phase of the project and initiated the process of developing recommendations for revising municipal codes and management practices/policies more protective of watershed health as well as cool- and cold-water stream health. The consultant Horsley-Witten Group, Inc. focused on identifying current resource protection tools and prepared watershed-wide as well as town-specific recommendations to ensure better protection in the future. Recommendations are guided by a series of resource oriented goals to address the issues of direct impacts on wetlands and watercourses as well as the broad municipal policies that dictate the general patterns of development. Recommendations were made for Conservation Subdivision Developments, Roadway Design Standards, Stormwater Management, Wetland/Watercourse Buffers and Associated Regulations, Forestry Regulations, Land Clearing Provisions, and Parking Regulations. In late 2009 a Land Use Summit was widely attended by municipal land use decision makers across the watershed. A record was made of municipal feedback from the Summit and other community members attending open house workshops. Priorities were refined and incorporated into a newly awarded LIS Futures Fund grant agreement to focus implementation of the MLUE report, focusing on intensive technical support to two chosen basin communities to facilitate implementation of specific recommendations for the MLUE Project. The Partnership will hold a series of regional workshops in 2010 for professionals who design, review or approve land use projects or manage municipal pollution prevention/good housekeeping. This recent work builds upon an earlier phase 10-town regional conservation compact signing ceremony with full town leader representation, successfully applied for LIS Futures Fund grant funding to develop a Municipal Land Use Evaluation Project to provide information to the participating towns on tools and practices to accomplish several recommendations (especially being proactive of watershed health and cool- and cold-water stream habitats) contained in the 2007 Conservation Action Plan, and targeted land acquisition

negotiations with CT DEP, TNC, local land trusts and the basin towns. A RFQ was issued, and the primary deliverable will be a report containing text, data, and maps that will provide a detailed audit of municipal plans, policies, and practices related to conserving the integrity of watershed resources (e.g., via stormwater management, impervious cover, forest cover, wetland regulation upland review areas). It also will include a set of recommendations to municipalities. The final report will be due in approximately nine months from consultant selections.

In the fall of 2008 the Salmon River Watershed Partnership, led by the Connecticut Chapter of The Nature Conservancy, initiated a rapid bioassessment of streams in the Salmon River watershed as part of the DEP RBV program. The bioassessment was planned in collaboration with other watershed stakeholders, with guidance and support from the DEP and the Connecticut River Watch Program. The RBV is intended to complement and enhance existing monitoring activities, as well as education and conservation efforts associated with the Salmon River Watershed Partnership.

Eightmile Regional Basin

The Eightmile River, located in the Tidelands Region of the lower Connecticut, flows approximately 15 miles from its headwaters in East Haddam to its confluence with the Connecticut River in Lyme. Its watershed comprises a 62 square mile area draining large portions of East Haddam, Lyme and Salem, and smaller portions of Colchester and East Lyme. Before it meets the Connecticut River, the Eightmile opens up into Hamburg Cove. This largely undeveloped watershed is home to a number of rare and endangered plants and animals. Past water quality assessments of the Eightmile River and its main tributary, the East Branch undertaken by the Department of Environmental Protection (DEP), have documented good water quality and a healthy benthic macroinvertebrate community, although the most recent 305(b) report and *Impaired Waters List* include the Eightmile River as not supporting recreation due to bacteria. In 2008 the Eightmile River was designated as a Wild and Scenic watershed after years of work by the local community and members of the Wild and Scenic Study Committee.

In 2009, the Eightmile River Wild and Scenic Coordinating Committee (ERWSCC) established a Project Review Subcommittee, formed a supportive policy, and initiated two development proposals under the direction of the Eightmile River Watershed Management Plan. ERWSCC filled the part-time Project Manager position with the hiring of Pat Young. Pat will serve as the principle point of contact for ERWSCC and the watershed communities. She will be in charge of implementing the Eightmile River Watershed Management Plan including river protection issues, land protection, public outreach and education, scientific studies and river monitoring. The Committee also provided CT DEP Watershed Management staff with some proposal ideas and supportive documents for the Eightmile River watershed to be considered under a future Healthy Watersheds Initiative pilot project in CT. More information will be available in 2010. ERWSCC's Science and Monitoring Subcommittee began framing a watershed-wide water quality monitoring proposal and report card. The Subcommittee worked with the CT District

office of U.S. Geological Survey to submit a pre-proposal for the USGS/NPS Water Quality Program. This proposal is focused on the newly established Eightmile River (Wild and Scenic Partnership River) in Connecticut, under the topic of fixed station monitoring. The USGS has two operating streamflow gaging stations in the watershed covering the major tributaries. Water-quality data is needed to establish baseline information for planning and management in the watershed. An invasive species control field trip was held to investigate a newly discovered species—Stiltgrass—with high potential for quick expansion and displacement of native herbaceous species in the Eightmile River watershed. A river segment was listed in 2008 as impaired for recreational use due to bacteria levels. Initial discussions were held with DEP staff to understand the assessment and what local efforts can be offered to effectively manage the impairment towards eventual full support of the river. The Protection and Management Subcommittee developed a white paper on the proposed "Land Conservation Partnership"- an effort to seek Congressional funding to aid ERWSCC in land acquisition. The program would follow the precedent of the Lamprey Wild and Scenic River in New Hampshire which has protected important river lands with federal funding assistance. The proposed Eightmile program seeks $500,000/year from Congress to be matched 50/50 with non-federal sources. This subcommittee also prioritized top barrier remediation projects and assessed the feasibility of launching a pilot barrier remediation project. The subcommittee began working with the basin towns to require the 2004 CT Stormwater Quality Manual as guidance of the design, implementation and maintenance of all new and existing stormwater systems. The Subcommittee also began investigation of two projects; 1) enabling East Haddam to adopt municipal stream-crossing best management practices, as promoted by both the University of Massachusetts and CT DEP's Inland Fisheries Division; and 2) started collaborative discussions with towns and stakeholder agencies to establish a Cooperative Weed Management Area, under guidance from The Nature Conservancy. The Outreach and Education Subcommittee rolled out a grassroots campaign called the RiverSmart pledge program, with mailings to all residents in the three major towns in this watershed. The Subcommittee updated their Committee website (http://www.eightmileriver.org/RiverSmart/index.html) to collect the pledges; participants received a sign to post on their property. The Subcommittee also worked on developing new signs and local/state approvals for "Entering Watershed" boundary signs along main transportation routes in the watershed. Additional accomplishments in 2009 included complementary work with towns and area land trusts to spread their watershed message through newsletters.

Ongoing biological monitoring was also conducted as part of the DEP's RBV program through a collaborative effort of the Eightmile River Wild and Scenic Coordinating Committee and Three Rivers Community College, with support from the Connecticut River Coastal Conservation District's Connecticut River Watch Program (CRWP). Bioassessment data were compiled and analyzed, and summary reports were produced by CRWP, along with an eight year report summarizing results from 2001-2008, completed in 2009.

Farmington Regional Basin

The Farmington Regional Watershed covers 607 square miles in two states, including sixteen Connecticut towns (Avon, Barkhamsted, Bloomfield, Bristol, Burlington, Canton, Colebrook, East Granby, Farmington, Granby, Hartland, New Hartford, Simsbury, West Hartford, Windsor, and Windsor Locks). Beginning in the rural Berkshire Mountains in Massachusetts, flowing through the Connecticut highland region and Farmington Valley, then out to the Connecticut River in Windsor; it provides 100% of the drinking water for over 600,000 people living in the Greater Hartford area and the Farmington Valley. The main stem of the Farmington River and the West Branch flows for 81 miles, and overall receives over 35 million gallons per day of treated wastewater from 9 publicly owned sewage treatment plants. The watershed is two-thirds forested, with equal amounts of agriculture and development, and supports abundant recreational opportunities; unique fish, wildlife, and plant habitats; hydropower generation; and is the first River in Connecticut to have a section federally designated as Wild & Scenic - one of only six in New England. The Farmington River is considered one of the premiere trout-fishing streams in the East.

Upper Farmington

The Farmington River Coordinating Committee (FRCC), the stakeholder group (consisting of the National Park Service, CTDEP, Metropolitan District Commission (MDC), Farmington River Watershed Association (FRWA), the towns of Hartland, Barkhamsted, New Hartford, Canton and Colebrook, and the Farmington River Anglers Association) oversees the implementation of the Upper Farmington River Management Plan for the Wild & Scenic section which is non-regulatory and advisory only. With funding from the National Park Service, FRCC helps support projects within the Upper Farmington river corridor and watershed, aimed at conserving and enhancing natural and cultural resources – including improving water quality in the Farmington River and its tributaries. Water resource related projects supported in 2009 included: water quality monitoring, vernal pool identification and mapping, and development of plans for the Greenwood Anglers Trail to redirect foot traffic away from eroding banks along the Farmington River, on a MDC property popular among anglers.

Lower Farmington

The Lower Farmington River and Salmon Brook Wild & Scenic Study Committee was approved by Congress in late 2006 to determine the eligibility of these waterbodies for possible federal Wild & Scenic designation by the National Park Service (this study area is a continuation from the existing federally designated 14-mile segment of the Farmington River, downstream to the Rainbow Dam and includes both branches of Salmon Brook). Wild & Scenic designation will provide the ten communities (Avon, Bloomfield, Burlington, Canton, East Granby, Farmington, Granby, Hartland, Simsbury, and Windsor) with the knowledge, tools and resources to ensure that growth is approached in a way that is compatible with preserving the region's outstanding resource values. The valuable attributes currently being considered are geology, water quality, biological diversity, cultural landscape, and recreation. Also serving on the Study Committee is CT DEP, the Farmington River Watershed Association, and Stanley Works.

As part of the Wild & Scenic designation process, a locally supported management plan must be developed to provide for the long-term protection of these valuable attributes. This will provide an invaluable opportunity for the lower Farmington River and Salmon Brook watershed towns to come together, mobilize public participation, and fulfill a locally-shaped vision for their communities to protect and preserve these highly valuable water resources. The management plan would guide the actions of a locally led coordinating committee which would oversee the plan's implementation (non-regulatory, advisory only), similar to the FRCC above. Work on the management plan, determination of the upper and lower Wild & Scenic boundaries, as well as public education and outreach is ongoing in through 2009.

Salmon Brook Subregional Basin

See above.

West Branch Salmon Brook Subregional Basin

See above.

Pequabuck River Subregional Basin

The Pequabuck River watershed lies in the Central Connecticut Valley and collects drainage from both the Poland River and Coppermine Brook Subregional Basins, eventually discharging to the Farmington River. The Pequabuck River watershed alone is 29 square miles, but combined with the Poland and Coppermine watersheds totals nearly 58 square miles. This larger area covers six towns (Bristol, Burlington, Farmington, Harwinton, Plainville and Plymouth) and has three Water Pollution Control Facilities (WPCF) discharging their effluent into the Pequabuck River. Although there has been a drastic reduction in bacteria and nutrients since the late 1980s, much work still needs to be done to improve the water quality of the river. E-coli bacteria levels still exceed the permissible limit for non-contact recreation and nitrogen is present in a significant amount. The Pequabuck River serves as a water source for various industrial and recreational purposes, as well.

The Central Connecticut Regional Planning Agency and the Pequabuck River Watershed Association rolled out to the general public the Pequabuck River Watershed Management Plan (including the Poland River and Coppermine Brook) which was written with a Section 319 NPS grant.

Poland River Subregional Basin

See above.

Coppermine Brook Subregional Basin

See above.

Park Regional Basin

The Park River's 77 square mile watershed covers the Greater Hartford Area (major towns include Bloomfield, East Hartford, Hartford, Newington, Rocky Hill, West Hartford, Wethersfield and Windsor; also portions of East Granby, Farmington, Glastonbury, Manchester, South Windsor and Windsor Locks). This highly urbanized, largely impoverished and minority community is plagued by Combined Sewer Overflows, Sanitary Sewer Overflows, as well as having its river and stream systems channelized and otherwise altered to convey stormwater, sewer overflows, and flood waters.

The Metropolitan District Commission (MDC) has developed a Long-Term Control Plan to reduce the impact of Combined Sewer Overflow discharges into the Connecticut River from the Park River and Wethersfield Cove. The fundamental purpose of the LTCP is to improve water quality by updating aged sewer infrastructure. Proposed activities include system-wide sewer cleaning assessment, capacity improvements and repairs; 80 miles of sewer separation, new drains and larger sewers; a 2 mile storage tunnel; a 2.5 mile microtunnel; treatment plant improvements to increase capacity and remove nitrogen; and relining and building new pipes to eliminate local overflows.

CT DEP's Municipal Facilities section is using Supplemental Environmental Project (SEP) funds to address public education and outreach related to combined sewer overflows. These are exacerbated by illicit connections which violate local sewer ordinances; however, in some communities the municipal officials may condone the connections in areas were separate storm sewers do not exist or are not accessible. Educational efforts are needed to find ways to communicate with the public and other officials that these connections are harmful to public health and the environment and to identify the means or enticements to eliminate the illicit connections and prevent future connections from being made. The targeted audience for education may include, but is not limited to, homeowners, building officials, and plumbers.

The Eastern Connecticut Resource Conservation and Development Program (RC&D) has partnered with the USDA Natural Resources Conservation Service, the City of Hartford, Hartford Housing Authority, and Capitol Region Council of Governments (CROG) to design and construct the Park River Greenway, a 1.8 mile multi-use trail, along the South Branch Park River. This is a component of a $500,000 grant from CT DEP.

The City of Hartford is sponsoring a bike committee to assess potential bike paths that would connect the Park River Greenway, the East Coast Greenway, and other city routes. The East Coast Greenway is the nation's first long-distance urban trail system; a city-to-city transportation corridor for cyclists, hikers, and other non-motorized users. By connecting existing and planned trails, a continuous, safe, green route 3,000 miles long is being formed linking Calais, Maine at the Canadian border with Key West, Florida. It incorporates waterfront esplanades, park paths, abandoned railroad corridors, canal towpaths, and highway corridors, and in many areas it temporarily follows streets and roads to link these completed trail sections together.

North Branch Park River Subregional Basin

The MDC recently initiated its Clean Water Project to address Combined Sewer Overflows, Sanitary Sewer Overflows, and nitrogen removal. A Supplemental Environmental Project (SEP) in the amount of $140,000 from a civil penalty of $425,000 from a Consent Order between EPA and the MDC, has been reserved for the development of a Watershed-Based Plan (WBP) for the North Branch Park River Watershed for MDC's failure to correct CSOs. The proposed project will primarily take place in the towns of Bloomfield, Hartford and West Hartford. A sum of $72,500 is being held in reserve for yet-to-be-identified project implementation upon completion of the WBP.

The WBP will follow the EPA-approved Clean Water Act Section 319 required Nine Element planning points. The Plan will complement the effort to control point sources of pollution by addressing, at a watershed scale, nonpoint source pollution, land use policies and practices, stormwater and river restoration and protection, education and outreach, and implementation to further advance water quality improvements and quality of life. It will also serve as a potential model for other urban watershed plans and to address the unique challenges and needs of urban rivers and waterways, their value as a natural resource, and their role in improving livability in an urban environment.

The WBP will assess current conditions, identify threats and opportunities for improvements, foster stewardship by the community, and serve as a model for other urbanized watersheds. The plan will characterize water and land resource conditions and nonpoint source pollution sources within the watershed. Based on this assessment, the plan will estimate the pollution load reductions and improved conditions that can be expected once the plan's management measures are implemented to achieve water quality standards. Besides the measurable water quality improvements, the plan will revitalize an urban river by maintaining and restoring natural systems within an urban environment, and improve public recreation and use. The plan will also provide for public education and outreach to inform businesses and residents about nonpoint source pollution, thereby promoting a constituency for sustainable development and demonstrating the value of collaboratively and cooperatively working on ways to better manage land and water resources.

The Farmington River Watershed Association (FRWA) has "adopted" under its stewardship the contiguous North Branch Park River Watershed and, together with the Park River Watershed Revitalization Initiative, will assist in the development of the WBP.

Hockanum Regional Basin

The Hockanum Regional Watershed encompasses 77 square miles in north central Connecticut and is a major tributary of the Connecticut River. It originates in the hills near Shenipsit Lake in Ellington and flows southwesterly into the Connecticut River Valley to its confluence with the Connecticut River in East Hartford. The Hockanum River is approximately 25 miles long,

draining large portions of Manchester, Vernon, Ellington, and Tolland, and smaller portions of East Hartford, South Windsor, Bolton, Stafford, Glastonbury, and Somers. The major water quality issues include high turbidity and floatables, organic enrichment and algal growth, and elevated bacteria in various reaches of the Hockanum River and its impoundments. It gets progressively worse as it flows through the increasingly urbanized landscapes of the major population centers of Vernon, Manchester, and East Hartford. Potential sources include municipal point sources (landfills and wastewater treatment plants), urban runoff and storm sewers, agriculture, channelization and habitat modification, and erosion and sedimentation.

Hockanum River Subregional Basin

The North Central Conservation District (NCCD) received Section 319 NPS and River Restoration grants to construct improvements of stormwater outfalls, bank stabilization, fish habitat enhancement, and river access on the Hockanum River in the Rockville section of Vernon. The project was completed.

The Friends of the Hockanum River Linear Park of Vernon, the Hockanum River Watershed Association, and other watershed groups, together with the North Central Conservation District and the Connecticut River Watch Program, are actively involved in protection and restoration efforts throughout the watershed. The CT DEP provided a Section 319 NPS Watershed Assistance Small Grant to the North Central Conservation District and the Hockanum River Watershed Association to help disseminate the State of the Watershed Report on the Hockanum River, previously funded by 604(b) grant funds.

Tankerhoosen River Subregional Basin

The Friends of the Hockanum River Linear Park of Vernon also received a Section 319 NPS Watershed Assistance Small Grant to review local planning & zoning regulations for reducing imperviousness, as well as a previously receiving a Long Island Sound Futures Fund grant with the Hockanum River Watershed Association to collect and evaluate chemical and biological water quality monitoring data in the Tankerhoosen River Watershed.

They additionally received a LISFF grant to develop a watershed management plan for the Tankerhoosen. This watershed management plan was completed in March, 2009 and can be found at: http://www.ct.gov/dep/cwp/view.asp?a=2719&q=379296&depNav_GID=1654.

During the fall of 2008 and 2009 the Friends of the Hockanum River Linear Park of Vernon coordinated and conducted a rapid bioassessment of the Tankerhoosen River with guidance from the Connecticut River Watch Program. The bioassessment was planned in collaboration with other watershed stakeholder groups and the Connecticut Department of Environmental Protection (DEP). Teams of volunteers, including members of the Hockanum River Watershed Association and the Hockanum River Linear Park Committee of Vernon, a science teacher and students from Rockville High School, students from the University of Connecticut, and members of the community assisted with the bioassessment, a survey of the benthic macroinvertebrate community following the DEP RBV protocol.

Mattabesset Regional Basin

The Mattabesset Regional Watershed has a drainage area of almost 109 square miles over more than ten towns (Berlin, Cromwell, Durham, Guilford, Middlefield, Middletown, Newington, New Britain, Rocky Hill, and Southington) and the Mattabesset River itself is a major tributary to the Connecticut River. The Mattabesset River flows for 18 miles in a southeasterly direction before entering the Connecticut River just north of Middletown. Land use in the watershed is nearly 50% forest cover and high-density urban development, with commercial development right up to the riverbank in many cases. Water quality and biological monitoring have documented significant degraded biological activity due to sedimentation, mostly as a result of urban development.

The Mattabesset River Regional Basin has a Total Maximum Daily Load (TMDL) analysis based on indicator bacteria. Achievement of the TMDL is directly linked to incorporation of the provisions of the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4) by municipalities, as well as the implementation of other BMPs to address nonpoint sources. Nonpoint sources of E. coli bacteria in the basin include failed collection systems, urban runoff and storm sewers, waterfowl, agriculture, and failed or inadequate septic systems. BMPs for the management of NPS sources include nuisance wildlife control plans, pet waste ordinances, septic system testing and maintenance, and farm animal waste management systems.

The Connecticut River Coastal Conservation District (CRCCD) has been systematically gathering and compiling water quality monitoring data, conducting education and outreach efforts, evaluating watersheds with Stream Walks and Track Down Surveys, designing and implementing stormwater retrofits, providing technical NPS assistance to municipalities, and preparing mini watershed-based plans throughout the Mattabesset Watershed. In addition to numerous Section 319 NPS grants, they received a Long Island Sound Futures Fund Grant to conduct a Comparative Subwatershed Analysis (CSA) of the Mattabesset Watershed as the first step towards developing small watershed restoration plans to address known water quality impairments. Information from the CSA was used to help prioritize subsequent stream corridor assessment and restoration planning efforts. In 2008-2009, Track Down Surveys and mini watershed-based plans were completed in Miner and Swamp Brooks in Middletown as part of these efforts, with nine completed now in total.

Willow Brook Subregional Basin (New Britain)

The Connecticut River Coastal Conservation District (CRCCD) received a Section 319 NPS grant to develop and implement site-specific recommendations to address elevated turbidity and bacteria levels in Willow Brook, including stormwater retrofits and streambank stabilization. CRCCD is working with the City of New Britain Public Works Department on a two phase project to improve stormwater management at Willow Brook Park. The first phase, consisting of improvements to treat stormwater runoff to Willow Brook and improve water quality and aquatic habitat in the brook, was completed in 2008. In 2009 planning began for the second phase, a demonstration project for one of the park's parking areas using pervious materials and other state of the art Low Impact Design enhancements to improve both the aesthetics of the area and the health of Willow Brook.

Miner and Swamp Brook Local Basins (Middletown)

CRCCD completed track-down surveys in Miner and Swamp Brooks in Middletown with Section 319 NPS grant funds. Potential sources of pollution were identified, NPS management solutions recommended, and implementation priorities identified. Results were presented in reports, which also address EPA's 9 criteria for watershed-based plans, albeit at the local basin scale. In Miner Brook, eleven high priority restoration areas were identified; recommended pollution reducing practices include more frequent street sweeping and catch basin cleanout, storm drainage and road culvert repair, and watershed-wide landowner education. In Swamp Brook, seven high priority restoration areas were identified; recommended management measures include stormwater quality retrofits, culvert replacement and maintenance, bank and channel stabilization, channel protection retrofit, stream buffer planting, livestock exclusion, and watershed-wide landowner education and street sweeping and catch basin cleanout.

Coginchaug River Subregional Basin

The Coginchaug River watershed has a drainage area of 28 square miles (predominantly in Middlefield, Durham, Middletown, and Guilford), which is about half undeveloped and the rest equally divided between agriculture and development. The Coginchaug River, a major tributary of the Mattabesset River, begins in N. Guilford and flows northerly to its confluence with the Mattabesset in Middletown, just west of the Connecticut River. Indicator bacteria is the major impairment with suspected sources being agriculture, crop-related sources, intensive animal feeding operations, natural sources, waterfowl, and other unknowns.

The USDA Natural Resources Conservation Service (NRCS) received a Section 319 NPS grant to develop a Coginchaug River watershed-based plan (WBP) to address the Mattabesset TMDL for bacteria and the Long Island Sound TMDL for nitrogen. The WBP was finalized in July 2008 and provides guidance on how to manage, at a watershed scale, nonpoint source pollution, land use policies and practices, stormwater and river protection, education and outreach, and implementation efforts to further advance water quality improvements. The NRCS has

assessed current conditions; identifying threats and opportunities for improvements while fostering stewardship by the community.

The WBP characterizes water and land resource conditions and nonpoint source pollution sources within the watershed. Landscape features and characteristics were examined using GIS-based maps to assess the spatial relationships between impairments and land use/land cover types. This analysis then determined the potential for pollutant load reductions related to the impairment, load reduction goals, and other features and benefits essential to sound watershed management and healthy biological conditions in the stream network. The plan describes both "place-based" (site specific) and regional BMPs that will be needed to achieve the load reductions, as well as provide an estimate of the technical and financial assistance funds needed to implement the plan. The plan can be found at:
http://www.ct.gov/dep/cwp/view.asp?a=2719&q=379296&depNav_GID=1654

The Connecticut River Coastal Conservation District (CRCCD) also received a Section 319 NPS grant to work with NRCS and assist with the collection and compilation of data, and community education and outreach efforts associated with development of the WBP. The plan will provide for public education and outreach to inform businesses and residents about nonpoint source pollution, thereby promoting a constituency for sustainable development and demonstrating the value of collaboratively and cooperatively working on ways to better manage land and water resources. The plan satisfies Section 319 NPS guidance while providing broader benefits to federal and state watershed management efforts in Connecticut and the NRCS Watershed Planning Process.

The Connecticut River Coastal Conservation District received a Section 319 NPS grant to develop and implement a pet waste education and clean-up campaign at Wadsworth Falls State Park in Middletown/Middlefield to address uncollected pet waste at the park, which was indentified in the Coginchaug Watershed-based Plan as a potential source of bacteria to the river. Working hand-in-hand with park staff, all-in-one pet waste collection stations were purchased and installed, signs were posted in the park's kiosks, educational materials were developed, and outreach activities were conducted both in the park and at pet related businesses.

To complement the pet waste management project and follow up on very high levels of bacteria measured in Laurel Brook at Wadsworth Falls State Park in 2008 by Connecticut River Watch Program volunteers, CRCCD conducted an intensive stream corridor assessment of Laurel Brook. The study consisted of collecting and analyzing water samples for *E. coli* bacteria, and conducting a track down survey, a stream walk focused on identifying potential sources of pollution and restoration actions. While no obvious bacteria sources were identified through the water monitoring, results suggest that the most significant and likely sources are located in the lower third of the watershed. High priority pollution reduction recommendations include three stormwater outfall improvements, a stream buffer restoration, water quality treatment for an open water pond, upgrade/maintenance of two on-site wastewater disposal systems,

and five stream culvert improvements. Future assessment and restoration activities in the Laurel Brook watershed will be guided by results of the study.

Salmon Regional Basin

In 2008, Project Manager Shelley Green of the Nature Conservancy/Connecticut Chapter convened an Advisory Committee, accomplished a 10-town regional conservation compact signing ceremony with full town leader representation, successfully applied for LISS Futures Fund grant funding to develop a Municipal Land Use Evaluation Project to provide information to the participating towns on tools and practices to accomplish several recommendations (especially being proactive of watershed health and cool- and cold-water stream habitats) contained in the 2007 Conservation Action Plan, and targeted land acquisition negotiations with CT DEP, TNC, local land trusts and the basin towns. A RFQ was issued, and the primary deliverable will be a report containing text, data, and maps that will provide a detailed audit of municipal plans, policies, and practices related to conserving the integrity of watershed resources (e.g., via stormwater management, impervious cover, forest cover, wetland regulation upland review areas). It also will include a set of recommendations to municipalities. The final report will be due in approximately nine months from consultant selection.

Blackledge River Subregional Basin

Eightmile Regional Basin

In 2008, a new USGS stream gauge station was established on the East Branch of the Eightmile River, collecting flow data and made available in a real-time format through the USGS website.

Congress granted National Wild and Scenic designation to the Eightmile River on April 29th and the bill was signed into law by President Bush in May. The designation places the Eightmile River in company with eight other Wild and Scenic rivers in the northeastern U.S., and one of only two in the entire country that includes the entire watershed. The river will now be included within the Partnership Rivers program of the National Park Service and based on the philosophy or local control and collaboration. The designation will provide funding to implement the Watershed Management Plan and hire professional National Park Service staff in the coming year. The Coordinating Committee continued to meet regularly, with 4 committees pursuing Tier 1 and 2 action steps. A Conservation Land Summit was held in the fall, targeting watershed stakeholders to contribute perspectives on current and future land conservation measures to take in the watershed; a summary document is expected in early 2009. A RiverSmart public outreach campaign based on a successful RiverNetwork tool was rolled out in late 2008, seeking homeowners across the watershed to take a voluntary pledge to be a RiverSmart household to protect streams and rivers in their backyards.

South Central Coast Major Basin

Quinnipiac Regional Basin

The Quinnipiac Regional Watershed covers an area of 165 square miles, located in 12 towns (Bristol, Cheshire, East Haven, Farmington, Hamden, Meriden, New Britain, New Haven, North Haven, Plainville, Southington, and Wallingford). The Quinnipiac River flows 38 miles southward from the Plainville—New Britain border and enters Long Island Sound from New Haven Harbor. The watershed is heavily urbanized and faces several problems including stormwater discharges, contaminated sediments, habitat degradation, low flows during summer months, and flooding. Nonpoint source pollution in the watershed caused by stormwater runoff has led to the listing of the Quinnipiac main stem and several tributaries on the DEP's *List of Connecticut Waterbodies Not Meeting Water Quality Standards.* In June 2008, a Total Maximum Daily Load Analysis was developed for the entire basin to address excessive levels of indicator bacteria.

QRWA Business Outreach Program

The Quinnipiac River Watershed Association (QRWA) has received several Section 319 NPS grants for outreach projects aimed at engaging the public and identifying NPS pollution through numerous streamwalks throughout the basin. As a result of their multi-year efforts, they have compiled a database of volunteers' observations and have provided recommendations to the towns for stream restoration. In an effort to educate river-side residents and municipalities about managing their land in ways that would help the Quinnipiac improve as a community resource, QRWA completed a §319 Grant funded outreach campaign in 2008, focused on municipalities and landowners.

In 2009, QRWA utilized §319 NPS funds to conduct a business outreach project in the Quinnipiac Basin. The campaign included the distribution of Best Management Practices (BMP) materials to businesses, recruitment of business pledges to follow BMP's, and general information about the project to QRWA volunteers and members, the media and the community. Project partners included US EPA, CT DEP, CT NRCS, The Community Foundation for Greater New Haven, and the QRWA Board of Directors, interns and members.

QRWA staff and volunteers distributed best practices materials through Friends of the River posters, decals, newspaper advertisement, press tours and Friends of the River pledge forms. An estimated 101 pledge forms were distributed to watershed businesses, and 95 businesses agreed to be Friends of the River, pledging to follow BMPs on their property. Future plans include continuing work with businesses and volunteers and the Community Foundation for Greater New Haven to expand the distribution of BMP materials and to promote vegetative buffers by home builders and contractors.

Businesses were interested and cooperative due to existing strict regulations in some communities, corporate policy embracing stormwater management, the appeal of public recognition for their prevention pledge and because they wished to protect the health of the Quinnipiac River and its tributaries. Media coverage of the project educated the community

on the concept of linking business best practices and water quality and offered QRWA the opportunity to further educate and assist communities in protecting local water resources.

Consider the Quinnipiac Travelling Photography Exhibit

Sponsored by funding from the Quinnipiac River Fund, the *Consider the Quinnipiac* exhibit features 150 photographs that showcased both the beauty and the pollution problems on the Quinnipiac River. The exhibit was intended to inspire people to appreciate the river and its beauty, while moving them to take action to help protect it—including alleviating nonpoint source pollution. In 2009-10, the exhibit travelled to New Haven, North Haven, Wallingford, Meriden, and the State Capital Building.

Quinnipiac River Subregional Basin

Wallace Dam

Wallace Dam is the first dam from Long Island Sound along the Quinnipiac River. A second breached dam in Wallingford is passable by anadromous fish and a fish ladder has been constructed at a third dam in Meriden. After these three impoundments, the river is open to fish passage up to the Town of Southington. In 1999, The Quinnipiac River Watershed Association (QRWA) received a Section 319 NPS Grant to arrange for a transfer of land to allow a fish ladder to be built at the dam and to contract an engineering service to document existing conditions and provide a final design and specifications for the fish ladder. After several years of extensive negotiations, the landowner transferred their portion of ownership of the dam to the town of Wallingford, giving the town 100% ownership of the dam. The town is supportive of the project. Complete removal of the dam is not feasible due to third party water rights. A contractor completed design and specifications for the fish ladder. With guidance from CT DEP Fisheries, construction drawings and project costs for a number of design variations were developed. CT DEP submitted the project for American Reinvestment and Recovery Act (ARRA) funding in May 2009. Save the Sound submitted an application for a General Dam Repair Permit from DEP's Inland Water Resources Division in Spring 2010. Construction will be overseen by Save the Sound and it is anticipated that the project will be put out for bid in Winter 2010 with construction planned for Spring 2011. After completion of the project, the Town of Wallingford will retain ownership of the fish ladder but daily operation and maintenance will be overseen by QRWA and DEP Inland Fisheries Division.

Wharton Brook Subregional Basin

The Wharton Brook watershed covers 7.65 square miles, the majority of which lies within the Town of Wallingford. Its confluence with the Quinnipiac River is just to the west in North Haven. The area is highly developed with a high percentage of imperviousness. As is typical for most urbanized watersheds, sources of NPS pollution are construction, erosion and sedimentation, land development, urban runoff and storm sewers, and other unknown sources.

Allen Brook, a tributary, is especially affected by golf course runoff and wildlife, specifically geese.

Chatfield Hollow Brook Subregional Basin

The Connecticut River Coastal Conservation District (CRCCD) received a Section 319 NPS grant to develop and implement a pet waste education and clean-up campaign at Chatfield Hollow State Park to reduce excessive bacteria. Five pet waste stations were installed, along with signage and distribution of various educational materials specifically designed for this purpose. The final report indicated that the project was successful in changing the behavior of some park visitors and in raising awareness of why dog waste is a nonpoint source pollutant. In particular, a critical aspect contributing to the success of this project was the personal interactions between CRCCD staff and park users. Printed educational materials were of great value but personal interactions proved most effective in educating park users about the link between uncollected dog waste and environmental health. The TMDL only requires a 5% reduction in bacterial loadings, therefore compliance by only a small number of visitors could make a large difference. The CT DEP plans to continue efforts to reduce dog waste as a nonpoint source pollutant in this park.

West River Subregional Basin

West River List Serve

Yale School of Forestry and Environmental Studies is facilitating local stakeholder interests in improving the water quality of the urbanized sections of the West River in New Haven/West Haven. Long lists of notable individuals and experienced entities have participated, leading to the creation of a West River list serve for communication among stakeholders.

Kroon Hall

In 2009, The Yale School of Forestry moved into Kroon Hall, a LEED Platinum certified building. The building includes a rainwater harvesting system that reuses stormwater for irrigation and toilet flushing, a geothermal heating system, solar panels to heat hot water, and generates 25 percent of its own electricity onsite.

West River Watershed Youth Council

The West River Watershed Youth Council (WRWYC) was formed in 2009 with a mission to educate and promote water conservation and the importance of community awareness and involvement in stewardship for protection of the West River. In 2009, WRWYC participated in Project WET certification. The group also offers paid and volunteer opportunities to assist teens in becoming informed stewards of their local community through mentoring, hands-on learning, restoration and stream monitoring.

Thames River Major Basin

The Thames Major Drainage Basin comprises nine regional drainage basins: Thames Main Stem, French, Five Mile, Moosup, Pachaug, Quinebaug, Shetucket, Natchaug, Willimantic and Yantic. The upper reaches of the Quinebaug River and the French River are located in south-central Massachusetts, and smaller percentages of the French, Fivemile, Moosup and Pachaug basins originate in neighboring Rhode Island. The northern half of the basin is relatively rural, characterized by small towns, farmland and forest. However, a variety of pressures have caused the disappearance or further segmentation of many farms and privately-owned forest lands. In 1994 Congress designated the Quinebaug and Shetucket Rivers Valley National Heritage Corridor, whose mission is to preserve the significant natural and cultural resources of the 35-town region while encouraging compatible economic development. The southern half of the basin trends to more urbanized and industrial land uses where urban re-development and suburban expansion has occurred. Recent development and multiple expansion phases of two Tribal Nations casino resorts have created a national tourism destination area and a new force as regional employers. An international pharmaceutical corporation developed its global research and development headquarters and transferred thousands of employees new to the region. The greater Thames River watershed includes one of Connecticut's leading tourism destination areas – the Mystic River with Mystic Seaport and Mystic Aquarium as anchors – attracting hundreds of thousands of people throughout the region and East Coast every year. The basin's proximity to urban areas of Hartford, Springfield, Worcester and Providence has increased residential and commercial development pressures not seen in several decades. A few regional distribution centers (food and home improvement stores) have been constructed or expanded within the basin in recent years. A large-scale re-development proposal for the former Norwich State Hospital property in Preston and Norwich, associated road/rail/ferry transportation improvement proposals in Norwich and New London, and regional water supply planning and distribution systems in southeastern Connecticut are recent additions to the myriad regional development pressures not seen in decades.
Significant accomplishments in 2009 included the following:

French River Regional Basin

The Town of Thompson Together coalition, along with the Massachusetts-based French River Connection and other watershed stakeholders, continue action strategy development for water quality and watershed issues along the French River, and across State boundaries. Existing state and federal agency water monitoring data continues to be shared. CT DEP provided some Section 319 NPS funds to the Quinebaug-Shetucket Heritage Corridor Water Subcommittee Coordinator to fund necessary water quality equipment for a citizen monitoring project in Thompson, CT, while the Coordinator also obtained funding support for the Commonwealth of Massachusetts to obtain water quality monitoring equipment for citizen monitoring work in the Dudley, Oxford and Webster, MA communities within the French River watershed. Data collected within Thompson was provided to CT DEP Water Monitoring program for integration in the upcoming Connecticut 2010 Integrated Water Quality Assessment report. A CT DEP Section 319 grant agreement with USDA-NRCS was executed to design and develop community

support and participation in a riparian buffer project on a highly visible municipal parcel along the French River, with the project completed in 2008. Trained town volunteers initiated riparian plantings in 2008. In 2009 NRCS successfully completed the French River Riparian Buffer Demonstration Project in Riverside Park along the French River. Final planting design led to town installation of a rain garden collecting runoff from a small park gazebo, 1000 feet of riparian area plantings of native perennials, shrubs and trees, interpretive signage and recreational amenities including pet waste collecting stations, picnic benches and a river fishing access site. Trained town volunteers and town maintenance staff continued raising funds to extend riparian plantings twice in 2009 and to extend the adjacent park walking trail to connect to the towns nearby Community Center. The town is considering additional stream corridor enhancement proposals identified in the final report's streamside assessment report

The Town of Thompson:

Town staff developed a pre-proposal for a stormwater retrofit project at the Town Hall parking lot that contributes runoff to the downstream Riverside Park and French River. This has potential for another municipal demonstration project to increase awareness and pragmatic steps taken in the community towards restoring favorable water quality conditions to its water bodies.

The Town received a CT DEP Recreational Trail Grant award for Phase 1 of the Air Line Trail Improvement Plan covering a 2.3 mile section of the state rail-trail project in northeastern CT. Improved trail conditions will lead to increased public access to, and managed uses of resources along the trail, including the previously underappreciated French River.

Quinebaug River Regional Basin

Town of Putnam:

The Town received a CT Recreation Trail Grant award to execute a conservation and access easement agreement that will include trail improvements for a mile-long, privately owned segment of the Airline Trail. Interpretive signage and trail drainage/regarding of the abandoned rail bed will improve local drainages to the Quinebaug River and provide a vital recreational link in the regional Air Line Trail and the East Coast Greenway, leading in and out of Putnam.

Cargill Falls Mill, Putnam

DEP programs completed a Stage I Site Review of the above referenced project. Given that the project involves redevelopment of a brownfield site in an urban area, it is expected that a properly prepared plan would not be inimical to the planning program objectives of DEP. Revised study plans for hydroelectric power generation on-site have been submitted by the applicant outlining the parameters to be assessed in studies of these issues. The Department is reviewing these study plans and will be submitting comments. Overall, it is anticipated that

any environmental resource issues associated with development of a hydropower project at this site will be resolved in the FERC license exemption process. Among the issues DEP identified requiring further study were: minimum flow release, downstream fish passage, upstream eel passage, recreational amenities and various project design elements including turbine type, tailrace design and trash rack design. Overall site redevelopment plans were encouraged to incorporate appropriate analysis of the water quality assessment, site design elements and best management practices to minimize urban stormwater quality and quantity impacts to the receiving Quinebaug River, following the *2004 Connecticut Stormwater Quality Manual.* In order to reduce the impact of development and address stormwater quality issues, the Department strongly encouraged the appropriate uses of Low Impact Development (LID) measures on this site. The water supply issue must be resolved and the plan must also insure that remediation will be accomplished in accordance with regulations as well as provide appropriate recreational amenities and proper mitigation for potential stormwater impacts. . DEP's Inland Water Resources Division is working with the Putnam Water Pollution Control Authority to revise a Consent Order that will resolve the unauthorized diversion from the nearby Little River and could lead to supporting additional water service to this redevelopment project. Confirmation of the acceptability of the plan can be accomplished during CEPA review, if a document is prepared for this project, or during the Stage II Plan Review. The Department also encouraged the expansion of the Putnam River Mills Heritage Trail to be included in Phase I. The Department's former River Management Program had provided technical support for development of another trail, the 1.3 mile Putnam River Trail, back in the mid 1990s. A new pedestrian linkage from the Cargill Falls Mill complex would complement the existing Heritage Trail and River Trail system. DEP further recommended site redevelopment planning should also provide for linkage to the nearby Little River State Greenway, designated by the Governor's Greenway Council in 2006. The Council's designation announcement highlighted the potential to link to other trails such as the River Trail in Putnam. The Quinebaug River floodplain resource area should be conserved for effective long term flood management objectives, while appropriate public access from land should be considered to introduce mill complex visitors and others to the Little River Greenway, at a minimum through an information kiosk, and possibly an extension of the proposed trail. Future plans by the Town of Putnam and partnering organizations may be able to develop appropriate public linkages to the upper components of the Little River Greenway.

Eastern Connecticut Conservation District (ECCD)

The Eastern CT Conservation District continued to cooperate with DEP's Wildlife Division to monitor management efforts with the Phragmites control areas in Roseland Lake, Woodstock, tied to a completed water quality management plan for the broader Muddy Brook watershed. The project has promoted significant landowner and general public re-connections to the lake. The Roseland Lake Association met with Army Corps of Engineers staff to discuss permitting needs and guidance for improving the denuded shoreline section that once was a popular bathing beach area. The Association sponsored a regional "Source To Sea Expedition" public event at their park, in part to highlight aesthetic improvements and access along the Lake. Roseland Lake Park will likely be the future site of innovative stormwater treatment practice

demonstrations. The District completed the *Muddy Brook et al Water Quality Improvement Project* in Woodstock (Phase 2 of the Upper Quinebaug watershed evaluation plan, previously completed by the Conservation District). The *Muddy Brook et al* final report was the culmination of several tasks performed by the Conservation District. These tasks included meeting with town officials, staff, and local stakeholders to identify concerns and needs, development of a nuisance goose management assessment, an educational outreach summary, evaluation of a former Connecticut 208 agriculture report issued by the Connecticut Council on Soil and Water Conservation for the Muddy Brook basin, research of available water quality monitoring data, mapping of known stormwater discharges, and creation of a GIS mapped data set. The final report does highlight the need to study Roseland Lake to determine internal loading of nutrients from the bottom sediments, in preparation for a comprehensive watershed based plan.

In 2010, DEP staff will develop a funding agreement with one or more partners to augment the *Muddy Brook et al* report to fully align the requirements of an approved watershed based plan for the Little River, Muddy Brook, and Roseland Lake watershed. There are five assessed water body segments with current impairment listings. The recommendation section includes 3 sub-sections – overall watershed recommendations, primary and secondary recommendations addressing the impairment and other management options of importance to that segment, and specific and management recommendations to other water body segments in the broader watershed. A significant increase in water sampling and testing will be essential to identify the causes and sources of non point source pollution so that effective management measures can be pursued.

Quinebaug/Shetucket/Thames/Niantic River Watershed Integrated Pest Management (IPM) and Nutrient Loading Demonstration Project

Partially supported with a Section 319 NPS grant, University of Connecticut Department of Plant Sciences and Cooperative Extension Service continued to recruit IPM project cooperators in several agricultural commodity areas. The primary goal of this project was to reduce the use of pesticides and nutrients within the Quinebaug and Shetucket River watersheds that may pose a critical threat to aquifers and surface waters. This was accomplished by in-depth educational training programs for agricultural producers and green industry professionals. Training was implemented in the Quinebaug and Shetucket River watersheds in the following commodity areas: vegetable crops, fruit crops, nursery crops, greenhouse crops, field corn and turf grass. Depending on the commodity or clientele group, IPM education consisted of on-site demonstration projects, individual and group training sessions, twilight meetings, season-long consultations and meeting presentations. The programs provided recommendations for best management practices, particularly to reduce high-environmental-risk pesticides (e.g. those with high leaching potential) and excess nitrogen applications. The Nutrient Management component included the use of the Presidedress Soil Nitrate Test (PSNT). The soil testing was conducted by staff of the Eastern Connecticut Conservation District. Nitrate analysis and nutrient recommendations were provided by Dr. Tom Morris (University of Connecticut Extension Soil Specialist), and the University of Connecticut Soil Testing Laboratory. Post-

season surveys of program participants were used to determine changes in pesticide and nutrient practices as a result of the program.

A second goal of the project was to conduct educational programs for home gardeners, particularly for turf grass management. Collaboration was established with the UConn Cooperative Extension Residential Water Quality Project to achieve this goal. Additional education was provided via online internet courses, through the University of Connecticut Home and Garden newsletter, as well as training of Cooperative Extension Master Gardeners. IPM presentations were also made at public events. Geographic and watershed-based impairment focus in this reporting cycle was transitioning to the lower Thames River basin during this reporting period. In 2009, UCONN staff continued to recruit commodity owners/managers to be involved in IPM and Nutrient Management program for this growing season. Within the lower Thames River basin, farmers managing 114.5 acres were involved and 87.5 acres within the Niantic River Basin (Southeast Coastal/Western Complex). A total of 9 people from 8 different businesses (farms, green industry) with nearly 400 acres participated in Integrated Pest Management or Nutrient Management programs in 2009. The farms and businesses were located in the lower Thames Basin (114.0 acres), Niantic River watershed (75.5 acres) and Coginchaug River watershed (191.2 acres). Some growers were involved in more than one IPM program. e.g. IPM in fruits and vegetables. The IPM programs included 221.7 acres on 2 vegetable farms, 4 fruit farms (orchards and/or small fruits), 2 nurseries, and 1 greenhouse operation. One dairy farm with 159 acres of field corn was involved in the Nutrient Management Program. On-site demonstration plots were established for the 2009 season. IPM staff conducted surveys to determine pre- and post- program inputs in the 2009 growing season and to quantify reductions in pesticide and nutrient loading.

- Weather stations (Plant Disease Station by Spectrum Instruments) were installed at three farms. Weather data were downloaded each time these farms were visited. These data were input into fruit disease models (e.g. apple scab, fire blight, sooty blotch) which indicate when disease infections have occurred.

- Maple Lane Farm in Preston, CT, with 75+ acres of black currants, is the largest grower of black currants in the U.S. In 2005, researchers identified the currant borer as the major pest of this crop in Connecticut. In 2006, a mating disruption experiment for currant borer was initiated on 25 acres on this farm. Pheromone dispensers (200 per acre) were used to inundate the field with pheromones. As a result, males have difficulty locating the females to mate. These trials continued in 2007, 2008 and 2009 to determine the long-term effectiveness of mating disruption for this pest. Preliminary results indicate a reduction in infestation levels as high as 50% after two years of use.

- Mating disruption with pheromones (as described above) was used as a management tool for peachtree borers and lesser peachtree borers at three orchards. The same orchards will participate in 2010 to deermine the effectiveness of disruption achieved in 2009. If mating disrption is effective, it will replace the use of chlorpyrifos, a high leacher, which is the primary chemical control of these borers.

- Deep zone-tillage is a form of reduced tillage which combines strip tillage and sub-soiling under the crop row. Over time, it should help replenish organic matter levels, soil structure and fertility while providing immediate solutions to problems with soil and wind erosion, soil drainage, associated root rots, and should increase yields and improve fruit quality. One farmer purchased a 4-row Unverferth Zone Builder which was used to prepare fields for planting both fruit (strawberry and apples) and vegetable crops (all crops) in 2008 and 2009. Where other pioneers in this technology use zone tillage to plant only large-seeded vegetables such as sweet corn, pumpkins, beans and winter squash, the farmer worked out a way to install black plastic-mulched beds after preparing the ground with his zone builder, so that he can transplant all his vegetables using zone till (including tomatoes, peppers, summer squash, beets, Swiss Chard, onions, cabbage, broccoli, kale, etc.). The farmer also designed and built a fifth-wheeler-style hitch that allows him to pull his planter and complete all field preparations in many crops with a single-pass, thus further reducing soil compaction and fuel consumption. The farm documented their efforts with zone tillage throughout the summer using digital photography so they could share his experiences with growers at the New England Vegetable & Fruit Conference in December 2009.

- Another farmer experienced an on-site demonstration comparing a low tech method of scouting for early blight to a high tech computer forecasting model called TomCast. Data on temperature and leaf wetness were gathered via a weather station, used for modeling orchard diseases, which was downloaded on a weekly basis and run through the TomCast computer model to produce disease severity units (DSU). The DSU's accumulated and were used to predict when initial and additional fungicide applications were necessary. The low tech scouting method relied on weekly trips through the tomato planting looking for chlorotic lower leaves that contained the first early blight lesions of the season. Additional fungicide applications are applied on a 7-14 day schedule depending upon the frequency and duration of rainfall events. Both TomCast and scouting called for the initial spray of the season on the same day in 2008 at the Holmberg Farm, but the scouting system detected early blight over two weeks earlier in 2009. The low tech scouting method has the additional advantage of being able to pick up other pests, such as, the necrotic pith disease found in the Holmberg's tomato planting and late blight. The farmer found that the TomCast model helped supply motivation to make repeat applications in a timelier manner, because it quantified how many disease severity units beyond the action threshold the tomatoes were if he was late making an application. A total of 82 in-field IPM training sessions were conducted with these cooperators during the 2009 growing season. A number of educational materials were developed in 2009, and reported in summary form to DEP.

Woodstock Nutrient Management Feasibility Study

The CT DEP and Eastern Connecticut Resource Conservation and Development Area, Inc. (ECRCD) coordinated and used Section 319 NPS funding for a feasibility study to evaluate

composting or the anaerobic digestion of dairy manure at a regional facility in the Woodstock area, tributary to the Quinebaug River. This area was identified as having surplus dairy manure in excess of what is needed for crop production on the farms that generate the manure. Conceptual designs and associated costs were developed for four alternatives. The revenue generating ability of the proposed facilities was evaluated through market analysis of composting products and energy costs. A food waste survey was conducted to identify local food waste producers who could benefit from alternative disposal options. A project website, www.ctnm.org was developed to disseminate information about the project and the statewide nutrient management study of 2005, and a fact sheet was developed for the project. The project will continue with development of a business plan and marketing study to determine the direction future efforts will take in the Woodstock area. Funding from the CT DEP Section 319 NPS program and other State funding will be used in 2008 to start construction of a manure composting facility in North Canaan Connecticut. In 2008, a food waste survey was conducted to identify local food waste producers who could benefit from alternative disposal options. The survey obtained information on the availability of food waste and other organic wastes, quantities of waste, costs to dispose of waste, willingness of facilities to participate, and potential restrictions or obstacles. Several findings and conclusions were reported in the survey report, including the fact that large producers such as hotels, conference centers, and casinos should be considered a potential source of food waste, and that establishing food waste as a revenue source for a regional digester or composting facility would require a dedicated marketing effort to educate and establish relationships with local producers. This project phase also included the development of a marketing study and business plan for the Woodstock area.

In 2009, Phase 2 was completed with submission of the Woodstock Anaerobic Digester Business Center Plan (ADBC). Low BTU bio-gas produced by anaerobic decomposition of dairy wastes will be cleaned to make high BTU bio-methane, and then converted to electricity and connect to the electric power grid to off-set farm electricity costs. A plug flow digester will decompose dairy manure from lactating cows into products useful to the farm and which can be sold off the farm to off-set costs and to reduce nutrients on the farm (and watershed). The ADBC will provide targeted benefits that include: reduction in manure volume, stabilized nutrients that will maximize fertilizer benefits and minimize leaching losses, a loss of viable pathogens surviving the temperatures of the digester, and the reduction of chemical oxygen demand in dairy manure which decreases the potential for depletion of dissolved oxygen in receiving waters. The original scenario of a complete mix digester and a composting facility was deemed too complex and incompatible with the farm's resources and core business. The solution was a better fit for the farm business and operations, and has a better opportunity to be implemented and sustained by the farm. Eastern RC&D has submitted a proposal for a Section 319 NPS grant to convert dairy manure fiber into plant growing media as a nutrient removal strategy. The project if funded will build on the findings of the aforementioned Plan. Building on existing research, trials using digestive fiber based potting mixes to grow annuals, perennials and woody plants will be conducted at commercial greenhouse and nursery sites under supervision of the University of Connecticut. There continues to be an identified need for funding sources to help offset the capital costs of engineering, building, training and start-up of the digester operation.

Fivemile River Regional Basin

Town of Killingly

The town Conservation Commission recently developed an active Water Access Subcommittee as part of a town-wide visioning and growth management workshop. This subcommittee sponsored a successful river cleanup last fall, along with a series of commission-sponsored family river paddles and a competition river race provided community reconnections for dozens of people back down to their local rivers. The Town has recognized the renewed public interests and will continue public outreach and related projects (including a public car top boat launch re-dedication on the Quinebaug River) in 2010 and beyond. The Town developed background applications and gathered neighboring town support for Connecticut State Greenway designation for the Fivemile River in early 2010.

The town planning department conducted local catch basin stenciling in the urban Main and Water Streets section of Danielson following a streetscaping and drainage improvement project. Initial plans to install a street-side stormwater treatment train were temporarily shelved in favor for needed sanitary sewer system improvements in this urbanized village center, which will provide more substantial water quality improvements to the Fivemile and downstream Quinebaug River. Town staff continues to look for opportunities to incorporate stormwater tree filter installations and other enhanced stormwater management activities in support of improved water quality for the Fivemile River and downstream Quinebaug River.

Moosup River Regional Basin

The Borderlands Project, initiated by The Nature Conservancy (TNC) in 2001, focuses on the Pawcatuck Borderlands forests and has since expanded by the Rhode Island Economic Policy Council and basin communities to include 20 towns on the Rhode Island and Connecticut border, and includes the Moosup River basin in Connecticut and Rhode Island. A research project to identify priorities for ecologically-based land conservation was completed in 2005 with support from a new landscape target initiative of TNC. High priority parcel mapping in this watershed revealed that aquatic habitat ranks strongly in several alternative conservation strategies. The greatest threats to overall health of the area include future development, interruption of free-flowing streams, sewer discharges, roads and associated road runoff. Several headwaters and aquatic buffer areas which are most valuable to protect given these threats, were identified and acquisition methods and agencies were provided. Formation of a bi-state watershed council is encouraged to address these watershed-scale conservation planning priorities. TNC continued their planning focus in 2007 with a Conservation Area Planning (CAP) exercise for the Thames River basin, highlighting conservation strategies for priority aquatic targets that include the Moosup River. One CAP outcome was the proposal by TNC staff to access settlement funds from the US Fish and Wildlife Service (USFWS) to initiate the removal of the first fish passage barrier on the Moosup at Water Street. In 2009, USFWS approved settlement funding for this project, and have entered into an agreement with the

Town of Plainfield to remove the pipe, likely in late summer 2010. DEP has provided technical guidance to the Town in early permitting and approval reviews and site plan design work.

A series of fish passage barriers have been identified along the mid Moosup River in Plainfield that effectively limit some anadromous fish species migration, as well as resident fish movement to varied river corridor habitats. The river corridor is identified by CT DEP as one of the highest quality cold water fisheries of the Quinebaug River watershed. A preliminary assessment began in 2001-03 as part of a Supplemental Environmental Project proposal by Kaman Aerospace in Moosup. That proposal was revisited in 2006 and 2007 by CT DEP Watershed Management and Inland Fisheries Division staffs in preparation for a competitive application to the Millennium Power/Quinebaug River Mitigation Management Team Phase 2 program. Seven barriers, including an abandoned water/steam distribution main pipe and several dams of varying construction styles used for water impoundment and/or hydropower generation needs, have been visited, photographed and reviewed for initial design and construction cost estimates to breach or remove the barriers. Tours of this river corridor segment were provided to several other agencies and potential stakeholders. DEP plans to submit a formal project proposal for funding assistance (approximately $1.5 million for an 8-10 year project timeline) to the Millennium Project Management in the winter of 2010.

Natchaug River Regional Basin

The Naubesatuck Watershed Council completed a Section 319-funded project to develop a river Plan of Conservation (phase 1 data collection). Preliminary data was collected and augmented with late summer streamwalk assessments. A part-time coordinator reviewed action plan options including town-by-town resource plans to address more watershed-based planning and management opportunities. Several multi-town conversations were held to determine priority directions to take and likely partners to include. That process led to a proposal coordinated by the Nature Conservancy–CT Chapter staff, Naubesatuck Watershed Council, Windham Region Council of Governments and CT DEP to initiate a Natchaug Conservation Area Planning (CAP) in late 2008. This process was based on a successful application within the Salmon River watershed and other locations in Connecticut. This process developed a set of focal conservation targets that represent the Natchaug Basin biodiversity, key ecological attributes and measureable indicators, and determination of current and desired status. The process first acquired the support from each of the watershed town's governing bodies. Nonpoint source pollution topical areas included a review of CT DOT and local highway department road operations and management of infrastructure with real and potential degrading impacts to generally high quality water resources in this watershed. The Green Valley Institute started development of a watershed-wide Natural Resources Inventory, linked to a co-occurring resource analysis tool to identify key parcels in this watershed from the perspective of water quality protection and connectivity on the landscape. In 2008 the CAP process was used to coordinate the initial stakeholder workshops – a kickoff meeting for municipal CEOs, town representatives, local conservation organizations, state and local agencies and the University of Connecticut in June. The workshop yielded an enthusiastic response to illustrate continued need for strong partnerships to help balance growth and conservation in the watershed while

minimizing challenges to quality and quantity of the basin's waters; a first workshop in to identity conservation targets, key ecological attributes and indicators of ecological viability (9 identified/7 retained). In 2009, the second and third CAP workshops were conducted. 22 separate threats were identified across the 7 priority targets, or key ecological attributes (KEAs). The five highest ranked threats impacting the greatest number of targets were: residential and commercial development, road construction and maintenance, groundwater withdrawal, and dams. Key strategies and actions for conservation of Natchaug Basin ecological targets were determined, with the highest strategies including the identification and convening of a steering committee to build leadership and local capacity (to elicit endorsement of and support for the Natchaug CAP Plan); implementing a watershed-wide mechanism for balancing conservation and economic growth in ecologically appropriate basin segments; and development of a so-called "dashboard manual" for town public works staff and ConnDOT outlining environmentally friendly road maintenance practices, and inventory of storm water infrastructure and needs in each basin town. In addition, a municipal land use evaluation of each watershed town was conducted. A summary for major threats to water quality, general recommendations for regulatory changes where basin town regulations were deemed deficient, and specific regulatory suggestions unique to each town were made.

Quinebaug Highlands - Natchaug River Watershed Project

The Nature Conservancy-CT chapter led a successful watershed resources protection North American Wetland Conservation Act (NAWCA) grant application to near completion in 2009. When completed in early 2010, project partners will permanently protect 1,103 acres of significant habitat over 11 different tracts through fee and conservation restriction acquisitions. The project area is part of The Last Green Valley, the federally designated Quinebaug-Shetucket Rivers Valley National Heritage Corridor recognized for its important ecological condition and intact natural habitats. Completion of this project will protect key wetland ecosystems for waterfowl and other migratory birds, fish and wildlife. These habitat areas provide critical inland stop-over habitats for migration, diversity of food, cover and nesting habitat. The permanently protected land will provide recreation, educational and ecosystem service benefits to the public including bird watching, nature study, hiking, and winter pedestrian recreation, hunting, fishing and water resource conservation. This proposal will contribute to the achievement of the Atlantic Coast Joint Venture waterfowl goals in the Thames River Basin and the Long Island Sound. Much of the focus is on highly functional wetland systems that support base flow and excellent water quality in the targeted watersheds. Public benefits of the permanently protected lands will provide for water resource conservation, as well as for recreational and ecosystem services. Existing and pending CT DEP land acquisition matches are an integral part of a protection oriented strategic approach in this regional watershed, and meets the protection-oriented watershed strategies for the Natchaug River basin as well as some headwaters of the Quinebaug River basin.

Based on Natchaug River Basin CAP recommendations, watershed stakeholders suggested several fundable projects that could be eligible for a Connecticut Healthy Watersheds Initiative Pilot. Watershed partners have a successful history (see above NAWCA project) are well poised

to effectively act on funds available for targeted land and water resource protection. Design and implementation of a watershed-wide education program for municipal land use decision makers would focus on consideration of regional impacts to water quality and quantity in this river basin. Another suggestion is an assessment of storm water infrastructure, road crossing and culverts in a pilot town. The watershed partner Green Valley Institute is currently conducting GIS analysis in the river basin of highest priority forested parcels for the protection of water resources with a US Forest Service grant, expected to be completed in mid 2010. These data could be used to inform model regulations and land protection by municipalities.

Leadmine Brook Fish Passage and Habitat Restoration Project

In 2009, DEP's Inland Fisheries Division received a $50,000 funding award from the National Fish Habitat Action Partnership for critical work in the town of Ashford. Town public works staff repaired road and stream culvert damage caused by the October, 2005 flooding event that severely impacted much of northeastern Connecticut. The repair work created perched culvert conditions and a skewed culvert alignment, which redirected flows into the southern streambank, initiating streamside erosion. Native brook trout and other in-stream aquatic species were effectively blocked from in-stream migration, and more than 125 feet of downstream channel was straightened and channelized by the initial repair work. The project is targeted for work in 2010, will restore upstream fish passage and in-stream habitats for the wild trout population at this road crossing and provide access to nearly 3 miles of upstream brook trout habitat. Effective partnership will include the Town of Ashford, the Yale School of Forestry (which owns the surrounding 7,800 acres Yale-Myers Forest), and technical guidance from CT DEP Fisheries staff. The local Trout Unlimited chapter will assist with the construction and installation of in-stream fish habitat treatments, and strengthen their watershed stewardship presence in this basin.

Shetucket River Regional Basin

The CT DEP Diadromous Fish Restoration program continued monitoring of newly installed or revamped fish passage facilities at hydroelectric power generating facilities in the Taftville section of Norwich, and for Norwich Department of Public Utilities hydropower generation facility at the upstream Occum Dam. Diadromous fish species were reported as passing both facilities in their upriver migration each year from 2006-2009. Migratory river herring can now travel up the Thames River watershed to the base of the Scotland Dam in Scotland, which will incorporate fish passage plans as part of anticipated Federal Energy Regulatory Commission (FERC) hydropower license reissuance by 2012.

In 2008 and 2009 CT DEP continued to stock approximately 300 Atlantic salmon surplus brood stock (typically 4 years old, and between 3 and 15 pounds each) in the Shetucket River to expand a popular recreational fishery between the Occum and Scotland Dams along the main stem. This is a catch and release only fishery, open through the end of November. Fish passage became operational at the Tunnel Dam on the lowermost Quinebaug River in 2008, and some fish moving up the Shetucket were observed at the base of the new Tunnel Dam fish

lift facility. Downstream migration of some salmon broodstock has also been recorded at the Tunnel dam fish lift.

Scotland Dam Hydroelectric Project

The current FERC license (FERC # 2662) was subject by its owners to the beginning of a long relicensing process in 2006. By mid-2007 a rather unique scenario unwound in the integrated relicensing process, as two applicants submitted notices of intent and preliminary resource assessment documents for the same facility – FirstLight Power and the Norwich Department of Public Utilities. Both applicants are announcing run-of-river flow conditions through this facility, which can have significant benefit potential for water quality and aquatic life habitat needs in the river. CT DEP submitted review comments in 2007 with respect to water quality and flow regimes in this segment of the Shetucket River, reminding applicants to review their plans in light of the current impaired waters listing for Recreation, due to bacterial exceedance. In 2008, DEP met with both applicants to review Study Plans for the Project and requested FERC identify environmental issues and concerns to be addressed in the environmental assessment for the Project. Studies included water quality monitoring, Vegetation, Fish Passage, Freshwater Mussel Survey, Wetlands/Riparian/Littoral Habitat Inventory, Recreation, and Archaeological/Historic. Studies were essentially completed by the end of 2009 for agency reviews. Water quality study elements produced baseline conditions and provided sufficient information to enable DEP and FERC staff to understand the current water quality conditions at the Project. Temperature and dissolved oxygen were taken at profiles in several areas of the Project, and should include stressor times of warm, low flow summer conditions and before power generation events, as well as some nighttime profiles. FirstLight is the current licensee for this project. They expect to file its Preliminary Licensing Proposal (PLP) to relicense the existing 2000W project in spring of 2010. Norwich DPU is expected to file a similar PLP around the same time. DEP will continue as an active regulatory stakeholder in this relicensing process in 2010 and beyond.

Town of Sprague

The town in recent years has placed significant priority to reconnecting residents to their main river through their River Park project (which abuts the Shetucket River in the village of Baltic). Many of the trees that have been planted there are donations from the grower that supplied the town with trees for our 2nd and 3rd Urban Forestry grants. Additionally, the Last Green Valley, Inc. grant assistance purchased trees which were leveraged by a local grower who donated many flowering perennials. This project has been furthered by CT DEP Urban Forestry grants that the town applied for over and received over the past 3 years. In 2009 the town received funds to plant 150 white pines (and 1,500 seedlings) at the Baltic Reservoir to control leaf litter blowing into the reservoir. In 2008 the Town utilized Urban Tree grant funds to conduct an adjacent streetscaping project, which continued in 2009. The Town is also partnering with regional entities in development of a spring 2010 DEP Open Space and Watershed Lands Acquisition Grant program application for substantial acreage of a key

Shetucket River parcel near the now-protected Mukluk property, which the Town and region have prioritized for long term resource protection.

Willimantic River Regional Basin

Eagleville Brook TMDL Implementation Project

Eagleville Brook is an impaired stream for aquatic life use and for recreation use. The watercourse flows through a highly urbanized area of the University of Connecticut (UConn) Campus and down into the rural Town of Mansfield where it meets the Willimantic River. The brook is piped under the most developed section of campus and daylights off-campus further downstream. In 2007 DEP issued an impervious cover (IC) Total Maximum Daily Load (TMDL) for the Eagleville Brook watershed. This innovative TMDL is not based on a specific pollutant but rather on an indicator of the impacts of urban development. DEP set a target watershed impervious cover of 11% for streams, with a 50 square mile drainage area or smaller. The 2.4 square mile Brook watershed, which is 18.9% impervious, exceeds the target by 97 acres, primarily in the highly urbanized section of the UConn campus. The objective of this project is to meet the TMDL requirements by reducing the amount of effective IC in the watershed by either removing IC or by disconnecting it through LID practices to treat runoff.

DEP had developed the TMDL with key stakeholders, including UConn's Center for Land Use Education and Research (CLEAR). The TMDL implementation will be managed by local stakeholders and partners. UConn's CLEAR and the Town of Mansfield initiated the Eagleville Brook impervious cover TMDL project in 2009 through a Clean Water Act Section 319 nonpoint source grant. The project team consists of UConn/CLEAR, Center for Watershed Protection, and the Horsley Witten Group, Inc. Other watershed stakeholders taking an active interest in implementing this TMDL include the local Willimantic River Alliance, The Last Green Valley, Inc, and the Thames River Basin Partnership. Implementing this IC TMDL involves a four-step adaptive management strategy: reducing IC where practical, disconnecting IC from Eagleville Brook, minimizing additional disturbances, and installing engineered best management practices to reduce the quantity and improve the quality of stormwater runoff. For Phase 1 of this project, CLEAR staff initiated education and technical assistance for the Town of Mansfield by meeting with the Town Planner and the Public Works Director. A detailed land use board outreach program will commence in the fall of 2010. The project team also shared a project overview presentation at the NEWIPCC meeting of 319 NPS and TMDL coordinators in New England. In addition, all data collected and mapping was placed on the project interactive map site at http://clear2.uconn.edu/TMDL/ The TMDL website metadata includes: streets, land cover (wetlands, land cover, impervious surfaces), watersheds (original and project revised), hydrography, CAD files, stormwater drainage, parcels and zoning, NRCS soils, topography, imagery, and coordinate system information. Technical meetings on TMDL and watershed-based plan implementation options were held mid-year. Results from the mid-summer field work led the Project Team to settle on a "Top 50" list of campus stormwater disconnections opportunities, which were verified with UConn's Office of Environmental Policy for logistical and timing considerations. A briefing was then held with DEP technical staff. Retrofit projects

identified included: bioretention, rainwater harvesting, permeable pavement, green roofs, rooftop disconnection to cisterns or turf, wetland creation/restoration, and soil amendments in compacted lawn areas. A refined "Top 10" list, each linked with field notes and follow up 20 percent design drawings, will be generated in early 2010. The project is on schedule, with Phase 1 completion expected in mid to late spring, 2010. The Project Team was in communication several times during the year to establish current elements of a draft document. Some interim efforts were underway through UConn operations that included a porous surface maintenance manual, a retrofit project with design done/installation forthcoming, and a parallel campus-wide plan that can support the TMDL implementation work) as well as projected next steps. During this phase, project team members discussed the need for baseline stream flow data associated with this watershed. The project scope was amended to fund acquisition and installation of new monitoring equipment at an inactive sampling station on Eagleville Brook, just south of main campus. Stream gage calibration was completed and volumetric measurements began in late 2009. UConn will report to DEP on the calibration of the rating curve, and then daily stream flow values in electronic formats. The final TMDL Implementation project report, expected in 2010, will include a summary of stream flow monitoring program and any findings/recommendations related to continuation of the one year monitoring window.

University of Connecticut Grant Plaza Green Roof Demonstration Project (UConn Green Roof)

The DEP issuance of the Eagleville Brook TMDL (2007) identified aquatic life use impacts associated with excess stormwater as the likely cause of the stream impairments. UConn initiated this green roof demonstration project in 2009 through a Clean Water Act Section 319 grant to install and monitor a green roof on a portion of UConn's Gant Plaza. A second project phase will evaluate the uppermost Eagleville Brook watershed to determine suitable locations for disconnections of impervious areas and installation of bioretention or green roofs. The site design was performed by the Landscape Architecture department at UConn. The design includes 356 Green Grid TM units (measuring 2 feet by 4 feet each). The resulting watershed best management practice covered a treatment area of 2,672 square feet. The units were installed with assistance from a number of UConn classes and clubs at a public ceremony in September (see photo). Flow monitoring equipment was installed in drainage pipes from two section of the Plaza, along with a v-notch weir insert and a precipitation gauge. A paired watershed design study involved flow data collection in both a control and a treatment (the green roof modules) watershed to more accurately quantify any flow reduction from the green roof. Precipitation and runoff monitoring (including a suite of nutrient and metals constituents) began before the module installations to calibrate the two studied watersheds, and will continue for one full year of treatment period through mid 2010. Green roof maintenance is being overseen by the Landscape Architecture program and will include a training program for UConn maintenance personnel. Initial statistical analysis of the runoff data will be shared at the March 2010 Connecticut Conference on Natural Resources, and later reported to DEP. UConn is already designing a larger footprint green roof on at least one new academic building to begin construction in 2010.

Willimantic River Alliance (WRA)

In 2009, the Alliance extended its 10 year advocacy role in the watershed by receiving an Environmental Leadership Award from the University of Connecticut (UConn), recognizing the Alliance's contribution to a more sustainable campus. This award recognizes efforts to monitor and recommend environmentally responsible actions by the University. Further, the Alliance was represented on environmental committees at UConn: the Willimantic River Study's Technical Advisory Group and the Compost Facility Site Committee. The Alliance submitted testimony to town land use commissions reviewing development applications with potential impacts to the Willimantic River Greenway segments in Coventry. The Alliance expanded its website offerings (previously supported by a Section 319 NPS grant through Rivers Alliance of CT) to promote recreation and education, mostly significantly through a web blog (www.willimanticriver.org) to post timely notices about events along the Willimantic River and programs promoting watershed stewardship. The Alliance sponsored several events including river paddles, a UConn Green Roof Demonstration Project tour, and exhibits at several community fairs.

University of Connecticut / Willimantic River Well field Study

Based on the findings and recommendations of the University's Water and Wastewater Master Plan (2007), University administration initiated an instream flow study to assess aquifer pumping on the Willimantic River along the mid Mansfield/Coventry town boundary. Modeled sustained yields at this wellfield are 1,400 gpm (2.016 mgd), whereas the total authorized diversion amount is 1,600 gpm (2.3007 mgd). The firm of Milone and Macbroom were able to accomplish the bulk of required field work during 2008, but they were unable to get low flows. They still collected most of the data needed for the PHABSIM modeling, and were able to get in one short aquifer test to use for re-calibrating the groundwater model. Although they still want to collect data at low flow, which is unlikely to occur until next summer. The key preliminary finding was that wellfield withdrawals did exert an influence on the streamflow in the vicinity of the University's wellfield. Some interim recommendations on wellfield management were made in late 20008 that assume all the water pumped from the well field is coming from the river. The interim recommendations would be in place in the event that next summer is a low-flow year. They plan to complete the field work in 2009 and subsequently make final recommendations. The report will assist the University in its current strategy planning for the University water system. NPS pollutants do include altered stream flow, and thus this project is being followed by the NPS and Watershed Management program. The U.S. Geological Survey will, maintain an existing full water quality/flow stream gauge at the wellfield site, as well as install a full stream gage station at a preferred upstream location at the Merrow Bridge, running the 2 gauges concurrently through the completion of the project. In 2009, with low flow data finally collected, a draft final report was circulated to the Technical Advisory Group, where comments were returned that recommended additional modeling analyses that could modify drought management plan stream flow thresholds that could cause water supply/drought advisories and warnings. The report included supply management as well as demand-based conservation. Some water infrastructure and campus improvement projects

are already incorporating draft report recommendations. A final report is slated for distribution to the University in the spring of 2010. University administrators will now develop a coordinated well field management plan that integrates the study findings and recommendations of both the Willimantic and the Fenton Rivers well fields. The University continues to develop an on-campus water reuse project capable of producing up to 500,000 gallons per day. DEP is encouraging UConn to ensure that a portion of demand freed up by this reclaimed project, once operational, be set aside for in-stream flow, with the remainder tagged for future potable water demands, and at an allocation ratio of 1 to 1. DEP also encourages UConn to explore the draft recommendation of augmentation by managed upstream water releases during drought conditions, as well as to explore further discussions with Windham Water Works as a possible source of supply. Meanwhile, the University continues to work with the Town of Mansfield and private land owners/developers with requests for connections to the UConn water system.

Thames River Main Stem/Basinwide

The Last Green Valley Inc (TLGV)

Water Quality Subcommittee

The Last Green Valley (TLGV) Volunteer Water Quality Monitoring Program completed its 4th season. Five separate teams collected water quality information on a monthly basis using an In-situ Troll 9500 multi parameter sonde and hand held microprocessor in the French, Quinebaug and Five Mile River watersheds at more than 60 unique locations. For 2010, a second Troll system is available and the program will expand further into Connecticut waters.

Source to Sea Expedition Project

TLGV Board of Directors and staff enthusiastically committed several months of planning, design and execution of a large scale Thames River Watershed outreach and education campaign in 2009. With a history of working as a regional catalyst with partnerships, TGLV created the Source to Sea Expedition. This was a nine week project focused on three goals: connecting people to their place in the watershed; connecting individual behavior and water quality; and highlighting recreational opportunities and attracting new river stewards. The paddling events provided structure to the overall project, with over 500 paddlers traversing collectively along 160+ river miles. Approximately 95 partners and sponsors supported 90 events, with over 30 events containing an "on water" component. This project produced first known Thames River Basin watershed map depicting town boundaries, major water bodies and roads within CT, MA and RI; see at http://www.tlgv.org/uploads/NRA/Source%20to%20Sea/StoS%20map4smallfinal.pdf. Project highlights included the dedication of three new Quinebaug River Water Trail segments (with paddling guides and information kiosks in the 30 mile route), production and distribution of several public educational materials to 8,000-10,000 people (see children's brochure at http://www.tlgv.org/uploads/NRA/Source%20to%20Sea/ConnectDrops3-

final%20kids%20activity%20guide.pdf), construction of interactive traveling exhibits (including Flo the water drop), and a social marketing component that resulted in over 700 individual "Making Sound Choices for Clean Water" pledge cards being returned. Over 50 event participants indicated interest in water quality monitoring volunteer work, excellent media cover and participation was recorded throughout, and the project recorded over 558,000 hits on TGLV website during a 6 month period.

Green Valley Institute (GVI)

GVI was created to help document, plan for and protect natural and related cultural resources as the 35-town Last Green Valley region grows. The stated goals are to improve the knowledge base from which land use and natural resource decisions are made; and to build local capacity to protect and manage natural resources as the region grows. GVI is a formal outreach partnership among The Last Green Valley (TLGV) a National Heritage Corridor, the University of Connecticut's College of Agriculture and Natural Resources, the University of Massachusetts Extension, and The Nature Conservancy Connecticut Chapter. Its programs are made possible through active partnerships with many other organizations, and the active involvement of the TLGV's Natural Resources and Agriculture (NRA) Committee. GVI programming is based on the premise that land use and natural resource planning and management are primarily *local* activities. As a result, their programs specifically target three local audiences: private landowners, municipal leaders and land use commissioners, and contractors, realtors and others who convert open space to other uses. GVI works to ensure that these groups have the knowledge and resources they need to make good decisions as they plan for the future. Since GVI geographically covers a substantial portion of the upper Thames River basin AND targets its services to land use decision makers, a number of 2009 accomplishments within Connecticut and related to nonpoint source pollution prevention and abatement, are listed below:

In 2009, GVI received formal recognition on several fronts, including selection as finalists for the University of Connecticut Provost's Awards of Excellence in Public Engagement, and also was invited to present *Lessons Learned: GVI & Borderlands Projects* at the National Association of Community Development Extension Professionals conference in San Diego, CA.

Forty-eight Green Valley Institute (GVI) short courses, workshops and training sessions were taught to 1,073 LGV community leaders, landowners and others. The great majority of these were held in TLGV town halls and other community buildings, bringing the information directly to the target audience in their own communities.

GVI staff held numerous individual meetings with private landowners and interested citizens in 2009 as well as two Family Land Protection workshops with over 120 participants in attendance; these efforts contributed to at least 343 acres of additional land that is now in the process of, or has been permanently protected. These additional acres bring the total since 2001 of at least 8,685 acres of undeveloped land permanently protected from development, as a direct result of landowners attending programs and workshops or working directly with GVI staff to identify protection options.

GVI has worked with TLGV to develop an agricultural sustainability plan for the Corridor, an important networking tool to advance agricultural business cooperation that can address local and regional non point source impacts from their operations.

With funding from the Borderlands Project, GVI continued to work with the two project towns, Killingly CT and Exeter RI, to identify innovative approaches and regulations that will encourage new community growth and development in village centers and protect valuable farms and forestland. Phase I, Heart and Soul Visioning, included University of Connecticut Landscape Architect students and innovative public engagement techniques. Phase II will focus on researching innovative regulatory tools to implement the vision developed in Phase I and further refining this vision. Lessons learned from this project will benefit other LGV communities. GVI was invited to present *Lessons Learned: GVI & Borderlands Projects* at the National Association of Community Development Extension Professionals conference in San Diego.

GVI has assisted Eastford, one of only two towns in Connecticut without zoning regulations; with a workshop to help them better understand the inter-related issues. Such support will assist others working within Eastford to address current and future non point source pollution management through enhanced local land use decision making.

TLGV towns are continuing to respond to GVI workshops on conservation subdivisions and alternative development techniques. Twelve TLGV towns (in the Quinebaug, Shetucket and uppermost Thames River watersheds) now include Conservation or Open Space Subdivisions in their regulations, and two more are in the process.

GVI's GIS Center has worked with local land trusts including Joshua's Tract and Wolf Den Land Trust to map existing protected open space and identify potential land protection projects. Updated data and maps allow land trust volunteers to coordinate resource protection with municipalities and other organizations as well as provide valuable assistance for conservation monitoring.

GVI continued to work with TLGV towns in developing or updating their Natural and Cultural Resource Inventories. Two more towns received their first map set bring the total TLGV towns with a GVI map set to 21. GVI also has developed methodology to map co-occurring resources, another tool to help towns prioritize their resources and incorporate those goals into their Plans of Conservation and Development or Open Space Plans. GVI worked with 2 additional towns to develop their own co-occurring maps in 2009; to date 12 towns have this important tool.

GVI continued its successful seminar series in 2009 in partnership with Eastern Connecticut RC&D Council on tools and techniques to protect what the region values as TLGV continues to develop. Topics included Transfer of Development Rights: Making it Happen, as well as Brownfield’s Redevelopment.

To help the Town of Brooklyn prepare an update to their Plan of Conservation and Development, GVI staff conducted a second build-out analysis. A build-out analysis projects the maximum development possible based on current zoning regulations. The first analysis, in 2002, showed that a significant population growth was possible in Brooklyn; subsequently the town revised the zoning regulations. This 2009 study clearly shows that the zoning revisions decreased the potential build-out.

GVI staff is finishing a comprehensive workbook designed to assist municipalities, land trusts and recreational organizations in planning for greenways and green infrastructure across town and state boundaries. It will be developed, printed and distributed throughout the QSHC. The "how-to" workbook will include information on greenways, green infrastructure, important natural and cultural resources and protected lands maps, as well as visioning tools for planning.

Thames River Basin Partnership (TRBP)

The mission describes this Partnership as a voluntary, cooperative effort to share organizational resources and to develop a regional approach to natural resource protection. Priority areas of concern in the basin are to:

- Protect the region's agricultural and natural resources being threatened by land use changes
- Protect the ground and surface water quantity and quality being threatened and degraded by contamination
- Protect the region's biodiversity
- Improve the coastal zone resource conditions

A Steering Committee continued to develop and implement an Annual Plan, following three consecutive years of a part-time Coordinator funded with Section 319 NPS funds to the Eastern Connecticut Conservation District. That grant-funded Year 3 Coordinator position was completed by the June Floating Workshop event. The District continued Coordinator support by providing almost 2 hour per week of staff time to the Partnership in the latter half of 2009, with the focus on Partnership meeting coordination, quarterly Partners in Action reports, and maintaining the Partnership website. The following are highlighted NPS management accomplishments:

TRBP Coordinator – Year 3

The TRBP coordination role involving 40 organizations continued with a well-attended series of quarterly meeting presentations (Green Valley Institute – Co-occurring Resources Analysis, NRCS State Conservationist on role of NRCS in CT, CT DEP Water Planning presentation on

proposed CT Stream flow Regulations, and GVI presentation on the regional Borderlands Project.)

The Partners in Action reports highlighted the various TRBP Plan of Work related initiatives of partnering organizations. The newsletter is imbedded with web links to partner's agency websites where additional information can be obtained. The Report e-distribution continued to grow in 2009. The newsletter assists partner organizations with their outreach efforts, and helps to build collaborative efforts to achieve natural resource protection goals. Lastly, the newsletter was used by many partnering agency representatives, including DEP, for reporting at interdepartmental meetings.

Rain Barrel Promotion

The second annual rain barrel promotion was a success, partnering with New England Rain Barrel Company, the towns of Mansfield and Waterford. A total of 115 rain barrels were purchased by residents of eastern Connecticut to reduce local stormwater runoff. The program raised $1035 to support future TRBP educational programs.

Willimantic Storm Water Stenciling Outreach Project

Willimantic storm drain marking project is nearly complete. The TRBP, through the Eastern Connecticut Conservation District (ECCD), was awarded a small grant by the Rivers Alliance of Connecticut to support this effort. The Environmental Committee of a student run group, People Helping People from the Eastern Connecticut State University, assisted the core volunteer team. Custom designed bilingual door hangers were distributed in the neighborhoods where the storm drain markers have been placed. At the October ECCD Annual Meeting, ECCD awarded high school students Celia Guillard and Hannah McMerriman with a Volunteer Project of the Year Award for their committed effort to complete this project.
Eagleville Brook TMDL actions summary
An Inventory of Existing, Scheduled and/or Planned Implementation Projects in Support of the Eagleville Brook TMDL was delivered to the CT DEP in the fall of 2009. This report was the final task for the Thames River Basin Partnership Coordinator as funded by the EPA Section 319 grant. The CT DEP may use this report to develop a continual tracking database that could be replicated in other TMDL implementation efforts.

Website update- Rain Garden Demonstration

http://www.thamesriverbasinpartnership.org/coventry.raingarden.htm

Water Wise Workshops

Photographs taken during the Coventry rain garden installation were developed into a Back yard Water Wise workshop. This workshop was conducted in the towns of Canterbury, Ledyard, Mansfield, and Woodstock and attended by over 120 people.

TRBP Floating Workshop

The ninth annual workshop was held in June, titled "Municipal Actions to Reduce Harmful Hypoxia in Long Island Sound". The workshop (and annual Plan of Work) was developed following a survey of 40 Thames watershed municipalities. Presentations included a Source To Sea Expedition presentation by The Last Green Valley, followed by an introduction to Long Island Sound hypoxia by the US Geological Survey. Forty five participants then boarded TRPB partner Project Oceanology's Envirolab for a Thames River tour that included stops with short informative presentations.

- Stop 1 – Getting to the point – understanding Point Source discharges (CT Nitrogen Trading Program, and Thames Science Plan overview)
- Stop 2 – Paving the Way to Reduced Impervious Cover (What is Low Impact Development, Town of Coventry Impervious Cover Regulations, and Stormwater Retrofitting)
- Stop 3 – Partnering to Protect Poquetanuck Cove (Towns of Preston and Ledyard, Avalonia Land Conservancy, the Nature Conservancy, CT DEP)
- Stop 4 – Norwich Harbor (Clean Water, Clean Harbor, Sound Norwich, and harbor bottom sampling demonstration with Project Oceanology staff)

Each participant was given a custom flash drive containing expanded information on the workshop topics covered, and asked to pledge to facilitate a follow up event in their community.

Southeast Coastal Major Basin

Rapid Watershed Assessment (RWA)

The USDA-Natural Resources Conservation Service (NRCS) Connecticut State Office piloted a national NRCS assessment framework within five watersheds in southeastern Connecticut. The communities of Preston, Ledyard, North Stonington, Stonington and Groton are a combination of densely populated urban areas, low density residential development, forested land, farms, and coastal communities. Both industry and agriculture are vital parts of the culture, economics, and history of the region. According to estimates between 2005 and 2007, the total population of the five towns was 85,878. Together the RWA area comprises 85,182 acres and includes portions of five (5) municipalities. Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals. The information contained in this RWA summarizes readily available data and provides a snapshot of natural resources, concerns, and conservation opportunities. The

first objective of this RWA is to produce a comprehensive inventory and evaluation of the natural resources and environmental condition of the study watersheds. The second objective was the engagement of the public and partners in an interactive process of information gathering and data assessment. The ultimate result of the first and second objectives is the presentation of a set of recommendations for the implementation of specific conservation measures. The RWA Advisory Committee was asked to identify the issues and interests facing the region, which included the following:

Water Quality

- Non-point source pollution
- Potential/future areas for water use (surface and groundwater)
- Impact of thermal pollution
- Stormwater runoff
- Land Development in Class A drinking water areas

Communication and Cooperation

- Need to distill existing information – make more easily understandable
- Inclusion of sovereign tribes
- Inland Wetland Commissions – inclusion/education for – include discussion of watercourses
- Clarification/understanding of responsibilities for dealing with surface water runoff
- Involvement of agricultural community (including aquaculture)
- How to balance agricultural needs with environmental quality
- State DOT roadway maintenance (local permitting process and requirements)
- Conservation Commissions

Given the level of landscape, social, and political complexity of the RWA area, addressing the resource concerns is a challenging process. A wide range of Best Management Practices (BMPs) can be implemented by stakeholders in the region to reduce or eliminate the impact of potential pollutant loading and resource degradation. The BMPs, or conservation practices,

identified in the Assessment Matrix are somewhat generic in nature. Site specific conditions need to be assessed to determine which particular BMPs would be most suitable and effective for a given location. Stakeholders identified water quality, open space, wildlife, habitat, invasive species, and communication and cooperation as the primary issues facing the municipalities in the RWA area. The general nature of the RWA highlights the overlap and connection between and among the different land uses and interests in the community. It is a starting point for discussions about how to balance these interests and concerns. The RWA is a first step toward achieving implementation of conservation measures to address the specific resource concerns identified in the report. Based on the findings in this report, local stakeholders, in consultation and collaboration with State and Federal agencies and other entities, can begin to identify and prioritize specific goals to improve and strengthen the condition of natural resources in the region. The matrix of recommendations provides a list of NRCS conservation practices which could be considered to address some resource concerns. Additionally, based upon prior watershed work, the report presents potential BMPs that could be implemented in urban/suburban landscapes. Using this study along with other studies that have been conducted, community members can evaluate their resources in greater depth, target geographic areas or specific resources concerns, establish goals and the actions needed to meet those goals. Management of the natural resources in the RWA area is a dynamic process. Goals, objectives, and actions will change over time as the environment and climate of the region changes. By remaining flexible to an ever changing world, people are able to step back to see what they have accomplished, the work that still remains, and the ability to find new and innovative ways to come together and realize their common vision for a healthier landscape.

Southeast Coastal Watershed - Western Complex

Niantic River Watershed Protection Plan (NRWPP)

In 2005 CT DEP awarded a NOAA-OCRM coastal NPS management grant to develop a watershed protection plan for NPS-impaired Niantic River and its watershed (within towns of East Lyme, Montville, Salem and Waterford). A twelve-month planning process was completed in September 2006 with the publication of the *Niantic River Watershed Protection Plan: Watershed-wide Strategies to Prevent Nonpoint Source Pollution*. The Plan includes an integration of nine key watershed plan elements required by DEP and U.S. EPA for support of implementation recommendations that are eligible for Section 319 NPS funds. Key findings in the areas of data assembly and results, zoning, environmental and monitoring include:

- 15+ stormwater outfalls discharge directly into the Niantic River.
- 5 local basin drainages are currently covered by over 10% impervious surfaces, and current local regulations can allow for 10 local basins to be covered by 10% or more impervious over, with one basin projected to be over 30% impervious cover.

- Stormwater modeling showed increased loading to the Niantic River from existing development. Any areas considered developable pose a risk for direct discharge to the lower river by increasing pollutant loading through its tributaries.

- Undeveloped areas upstream of the lower, more developed portion of the bigger watershed pose a great risk to increasing loads to town water supply reservoirs.

- Tracked development in the watershed since 1985 recorded over a thousand acres of forest conversion to either developed, barren or grassed lands.

- For zoning, a more effective approach to protect community water resources may be to match wetland protection requirements for a consistent watershed wide approach to protecting water quality.

- Eelgrass populations plummeted in 1999 but rebounded in 2003-04. The future of eelgrass in the coastal river is unclear and requires regular protection and monitoring.

- Measurement of water quality throughout the watershed is not currently a standard practice. To evaluate improvements through use of BMPs and planning changes, practical measurement techniques will be needed.

- Monitoring and inspection programs are already underway in towns of East Lyme and Waterford, but the potential for future development is the greatest in the upper reaches of the watershed.

The DEP Watershed Management program posted the document on its website at http://www.ct.gov/dep/cwp/view.asp?a=2719&q=379296&depNav_GID=1654 . DEP programs continued to meet with local stakeholders in 2007 towards formation of a standing committee to gain local adoption of the Plan. A delay ensued with the local election results bringing in new town chief officials. DEP contracted with Eastern CT Conservation District, utilizing Section 319 funds, to fund a part-time position with existing District staff to provide a local coordinating role. The early results are promising, with new energy displayed by town staff and land use/shellfish commissions, local conservation and watershed organizations. There is a preliminary plan for a town CEO forum in early 2008 to garner political support to move the Plan document towards a useable community plan and basis for development of action strategies. Additional Plan priority recommendations that include water quality monitoring and community education/outreach were being pursued by DEP and local watershed stakeholders in future DEP contract agreements. An additional Plan recommendation is being addressed through the Connecticut Clean Marina Certification program, where DEP is working with at least one Niantic basin marina toward possible certification in 2008.

In 2008, the Niantic River Basin Coordinator position was partially funded with a CT DEP 319 grant to the Eastern Connecticut Conservation District for a part-time staff dedicated to assist in the implementation the 2006 Niantic River Watershed Protection Plan. The Coordinator worked 8-10 hours per week and accomplished many tasks in this first Coordinator year. Plan presentations were given to watershed town boards and commissions. Based on town land use committee and government leader feedback, a Plan Refinement Group was formed and met monthly through 2008 toward a draft Guided Summary Plan document, with updated Land Cover Maps, modified Impervious Surface Coverage maps, and a more user-friendly interface of the Plan. The Guided Summary will be distributed in early 2009. A summary report of outreach activities by this Coordinator and other relevant efforts in the watershed was developed and distributed to the watershed towns, for inclusion in three town's Stormwater MS4 General Permit reporting requirements. In addition, a summary of the Plan's recommendations, relative to each of the four basin towns, was collected for a document to share with basin towns and a future Advisory Committee or Watershed Board. Two grant funding applications were submitted in 2008 to further implement the Plan's recommendations; one to Rivers Alliance of Connecticut for assistance in establishing a Watershed Board, and the second to DEP for a Year 2 Section 319 grant to continue the Coordinator role for the watershed towns and other watershed partners. A project website was created at www.nianticriverwatershed.org .

In 2009, the Niantic River Watershed Advisory Committee (NRWAC) began the transition from the Plan Refinement Group to a legally established watershed board or commission. A mission statement and three working subcommittees were established – Board Development, Monitoring, and Education and Outreach. Board Development explored options for a non-profit commission framework and a supportive role within the communities. Members also researched mechanisms for sustainable funding, and maintained communications with watershed stakeholders. The Monitoring working group was charged with assembling all available water monitoring source and data relevant to the Niantic River watershed, and then synthesizing in agreed-upon format(s) to facilitate interpretation and ongoing input. They were also tasked to identify long-term monitoring needs. The working group will be developing a Request for Proposals in 2010 for a qualified consultant to consolidate, analyze and report on existing data (a priority NRWPP recommendation), submitting for quotes and applying for funding assistance. The Committee was populated with interested community and agency representatives with full support from the four watershed town CEOs. The Niantic Coordinator staff position from the Conservation District continued to provide coordination services for this Committee's affairs, organizing meetings and presentations and involving all watershed towns and other watershed stakeholders in the process. The Coordinator continued participation in outreach events such as the STR-STH annual kayak regatta, training of Children's Museum teachers on LID opportunities, and development of a LID/Stormwater checklist and follow up workshop (augmented with field training by town staff on erosion and sediment control and stormwater practices.) A key Coordinator product was the March, 2009 Guided Summary document, now available on the project website. The Summary was produced after many meeting with local officials and other watershed stakeholders, for the purpose of providing a shortened account of the highlights of the full NRWPP. It has been organized in a format that

describes the watershed management concerns, and then outlines the goals, objectives and recommendations. References to sections in the full plan are found throughout the document, so readers can conduct further research into an area of interest. The purpose was to offer a concise description of the water quality impairments affecting the watershed and to provide a focused directory of recommendations aimed at reducing those impairments. With this condensed tool, it is anticipated that stakeholders will have a better understanding of the relevant issues, be able to determine their role in the decision-making process and take appropriate actions.

Save The River Save The Hills, Inc (STR-STH)

STR-STH continued to track the zoning appeals of the Landmark development proposal on Oswegatchie Hills. The group joined forces with East Lyme High School Ecology Club students and a local scout troop to clean up the Latimer Brook headwaters, collecting over 17 bags of garbage. Watershed education programs were continued by this watershed group, as well as support for incoming programs, such as CT Sea Grant Riparian Buffer workshops. Water quality testing in the Niantic River continued, incorporating closer sample dates following major rain events, with findings posted by the groups' social network site. Data will be shared in the EPA WQX database system. STR-STH, with strong support of Waterford's First Selectman, began a partnership with the regional Ledge Light Health District to extend its testing for swimming water quality to the upper Niantic River. The Pump Out Boat Program ran its successful 8th season, in support of the federally designated No Discharge Zone along Long Island Sound and including the Niantic River and Bay. Representatives were active participants on the NRWAC, and will apply for a 2010 Long Island Sound Futures Fund grant to assist the NRWAC transition into a legally established commission with town appointments, as outlined in the Niantic River Watershed Protection Plan. Funding will also be requested in support of the boat pumpout program.

Southeast Coastal Watershed- Eastern Complex

Clean Up Stonington Harbor, Inc (CUSH)

In 2008, a citizen organization Clean Up Stonington Harbors (CUSH) enhanced its active membership campaign, lecture series and start up citizen science water monitoring program. Information that includes a water monitoring program is posted at www.cushinc.org . The organization's geographic focus includes all coastal harbors adjacent to the Town of Stonington, from Mystic River to Pawcatuck River, including waters off Barn Island. CUSH has two primary objectives: 1) Identify sources of nonpoint pollution to restore a healthy aquatic environment through water testing; and 2) reduce pollution by changing resident's habits through an educational process. In addition to these objectives, the group provided rapid citizen feedback and worked with local officials to improve harbor regulation and water quality management. CUSH members have set two goals – to reopen shellfish beds in Rhode Island, and to assist CT DEP and RI DEM to establish bacteria TMDLs as required by the federal Clean Water Act. Twelve volunteers focused on 6 monitoring sites in 2008. Harbor Friendly Yards planning began

in 2008. A four-page Yard Care Guide for the Coastal Homeowner was printed and distributed in 24,000 newspapers going to all residents of Mystic, Stonington and Pawcatuck, with grant funding from the Town of Stonington (now online at http://www.cushinc.org/id141.htmhttp://www.cushinc.org/id141.htm). A new Eco-Boating brochure has been distributed as well (now on line at http://www.cushinc.org/CUSH_boatersbro_2010.pdf). In 2009, CUSH joined forces with area volunteer organizations Save The Bay, Inc. and also Southeast Connecticut River Estuary Stewardship (SE*CRES) in an effective collaboration. Water quality study results for the Stonington Harbor area indicated chlorophyll had good seasonal averages at most sites and fair at 3 sites, fecal coliform bacteria exceedance of the shellfish limit consistency in the two long cover and occasionally at all other sites, and *Enterococci* exceedance of the swimming limit in both long coves. Nutrients (DIN, TN, TP) and some metals (Cu, Zn) were monitored as well. Plans for the 2010 water quality monitoring season will include continued monitoring with focus on the long coves, expand salinity data collection, and explore tidal cycles in the river and the coves to help distinguish overland flow from ocean contributions. Half of the CUSH (Clean Up Stonington Harbors) mission is educating residents about ways to improve local waters. During the summer of 2009, Gary Poe and his Tide Pool Cruiser joined forces with CUSH at four events aimed at local families. School adventures start during an assembly where urban runoff and stormwater pollution are explained. Hands-on demonstrations illustrate sources of pollution and how it can be stopped. Students then go outdoors to the TidePool Cruiser itself for a "worms' eye view" of a storm drain full of trash, pesticides, oil, fertilizer, and additional pollutants on their way to be deposited, untreated, into streams, rivers, coastal harbors, and the ocean. Windows-On-Our-Waters (www.windowsonourwaters.org) is a 501(c) (3) non-profit educational organization.

Nitrogen Fertilizer Reduction in Coastal Lawns Project

The University of Connecticut Turf Management Program initiated this project through a training and education approach in 2008. The main objective is to establish demonstration stations showing alternative, lower input turf species and best management nitrogen fertilizer practices. Five sites were initially chosen, though none in the Thames River or the Southeast Coastal basins. However, the Hole-in-Wall Beach in Niantic was the site of an innovative stormwater management project for a 93-parking space lot with high public visibility. UConn donated fescue seed to be planted in the area surrounding the various stormwater practices. UConn also established a 350 square foot demonstration site that utilized seven different lower input turf species. UConn staff conducted targeted training for municipal/turf industry professionals during the 2008 UConn Turf Field Day. Pre- and post-workshop surveys were conducted to ascertain the knowledge level and opportunities to modify turf management practices that reduce nutrient runoff potential to receiving waterbodies and Long Island Sound. Training was provided in web-based and in print media formats, aimed at changing fall fertilizer practices, broadening awareness of alternative inputs and use of slow-release fertilizers. The project has expanded through a Year 2 Section 319 funding assistance grant to UConn. In 2009, the first phase was completed and report submitted to DEP. Eight demonstration sites were established with fine and tall fescues. Approximately 20 landscape professionals and municipal

workers were trained through a series of workshops over the two year period. Pre- and post surveys reveal the majority of the 20 individuals will change their nitrogen fertilization practices based on the workshop information. This should result in less nitrogen and phosphorus applications, decreasing threats to water quality. There are very good prospects for adoption of revised recommendations. In addition to web-based and print media formats, a video/DVD, instructional pamphlets and handouts were produced and distributed. Continuing education efforts are planned through UConn's Cooperative Extension System, Master Gardener Program and Residential Water Quality Group. A second Biennial Turfgrass Field Day will be held at UConn Storrs campus in July 2010. The focus of the event will be guided tours of current research studies in the

Pawcatuck River Major Basin

Migratory Fish Restoration Plan

The U.S. Fish and Wildlife Service-Northeast Region Wood/Pawcatuck Watershed Partnership SNEP (Southern New England office) provided technical expertise and funding in the effort to open migratory fish routes for alewife and blueback herring, American shad, sea run brook and brown trout and American eel in the Pawcatuck River. The first action completed by the partnership was repairing deficiencies at the Bradford Fishway (RI) in the fall of 2008 to prevent structural failure and improve efficiency, and to ensure sustained anadromous fish passage to the rest of the restorations planned for the upper Pawcatuck River system in Rhode Island.

Borderlands Project

The project progressed in this reporting cycle with several workshops in support of existing village centers within this region – including topics of transfer of development rights, alternative wastewater treatment technologies, economic development and affordable housing. The project is chronicled and communication amongst participants is enhanced with a project website posted at: http://www.borderlandsproject.org/. A Village Innovation Pilot program began in 2007 through a competitive application process. This is a strategic planning initiative to work with two Borderland towns to conserve critical lands by focusing appropriate growth into existing or planned village centers. The chosen towns are Exeter, Rhode Island within the Pawcatuck Major Basin, and the community of Killingly, CT, within the Thames Major Basin (Quinebaug/Fivemile). The pilot will also give organizers a stronger sense of the level of technical assistance needed by the communities' future programs. This intensive community visioning and planning initiative should develop strong potential for transferability to other Borderland towns in the Pawcatuck (and Thames) Basins, and develop local capacity to address nonpoint source pollution restoration and protection strategies and actions. The town of Killingly has already expressed interest to tie their new-found community village center visions to include integration of a stormwater retrofit project (within a streetscape improvement project) coordinated by the Thames River Basin Partnership Coordinator, under a Section 319 NPS grant. In 2008, the initiative really took off. It began with hiring a consultant team to lead our two towns - Killingly, CT and Exeter, RI - through Phase I. This phase involved an in depth

Heart and Soul Visioning process. Both communities were very involved throughout and are now working diligently on developing priorities to be addressed in Phases II & III - Research and Recommendations and Implementation. Reflections on this innovative process included: 1) the innovation intent of this project was focused on how Borderlands communities can balance conservation and development, determining how to effectively act at the local and regional scales. So, while the Pilot has been significantly influenced by the Foundation's Heart & Soul Community Planning, it did not start with the same robust Heart & Soul approach as more recent projects. 2) The Pilot involves two states and two towns with related but unique growth and conservation challenges, adding to the level of complexity and coordination required. 3) The Borderlands Project lost an anchor partner in April 2008, which created challenges in the overarching regional partnership, project management and fundraising effort. 4) The towns arrived at visions that support village style development while preserving important natural, cultural and recreational resources. 5) The visioning process seemed to largely validate information that had been identified through past processes although new voices were added to the mix. 6) It was difficult to engage a cross section of the community in a proactive process using conventional planning events and outreach techniques, even when the content of those events included innovative tools. Involvement of youth had some limited success but there remains untapped potential for this in the project. 7) Communicating the Pilot at the local level proved to be quite challenging given its regional foundation and bi-state nature. 8) Partners are interested and focused on how this process will influence town plans and decision making. Towns are looking forward to the more specific technical assistance that will occur in the next phases. 9) The opportunities for regional action are still emerging but there is a movement towards transfer of development rights (TDR) in a smaller sub-region of the Borderlands that includes Exeter. In addition, Killingly residents and staff discovered a great interest in improving access to its water resources, which is an issue with local and regional implications. Partners indicated that some of the tools and methods used in Phase 1 could be models for other towns in the region. An important outcome of the Phase 1 process was consensus by project leaders of the following "best practices":

- Go slow to go fast
- Set your local committee up for success
- Present a process "road map"
- Develop a media and communications strategy
- Know your community networks
- Tap into the urgency and interest in a proactive process
- Create multiple paths for engagement
- Identify actionable issues

For more Borderlands Project information, the website remains active at www.borderlandsproject.org. The notable NPS outcomes of Phase 2 involvement by the Town of Killingly will be reported in the Quinebaug and/or Fivemile River basin section(s) of this report in future years.

Connecticut River Major Basin

Salmon Regional Basin

In 2009, Project Manager Shelley Green of the Nature Conservancy/Connecticut Chapter continued coordination through an Advisory Committee, finalizing the Municipal Land Use Evaluation (MLUE) Assessment Project report. The report culminated the first phase of the project and initiated the process of developing recommendations for revising municipal codes and management practices/policies more protective of watershed health as well as cool- and cold-water stream health. The consultant Horsley-Witten Group, Inc. focused on identifying current resources protection tools and prepared watershed-wide as well as town-specific recommendations to ensure better protection in the future. Recommendations are guided by a series of resource oriented goals to address the issues of direct impact to wetlands and watercourses as well as the broad municipal policies that dictate the general patterns of development. Recommendations were made for Conservation Subdivision Developments, Roadway Design Standards, Stormwater Management, Wetland/Watercourse Buffers and Associated Regulations, Forestry Regulations, Land Clearing Provisions, and Parking Regulations. In late 2009 a Land Use Summit was widely attended by municipal land use decision maker across the watershed. A record was made of municipal feedback from the Summit and other community members attending open house workshops. Priorities were refined and incorporated into a newly awarded LISS Futures Fund grant agreement to focus implementation of the MLUE report, focusing on intensive technical support to two chosen basin communities. The Partnership will hold a series of regional workshops in 2010 for professionals who design, review or approve land use projects or manage municipal pollution prevention/good housekeeping. This recent work builds upon an earlier phase 10-town regional conservation compact signing ceremony with full town leader representation, successfully applied for LISS Futures Fund grant funding to develop the MLUE project to provide information to the participating towns on tools and practices to accomplish several recommendations (especially being proactive watershed health and cool- and cold-water stream habitats) contained in the 2007 Conservation Action Plan, and targeted land acquisition negotiations with DEP, the Nature Conservancy, local land trusts, and the basin towns. A RFQ was issues, and the primary deliverables were a report that provides a detailed audit of municipal plans, policies, and practices related to conserving the integrity of watershed resources (e.g. vi stormwater management, impervious cover, forest cover, wetland regulation upland review areas.) It also will include a set of recommendations to municipalities. The final report will be due in approximately nine months from consultant selections.

Eightmile River Regional Basin

Eightmile River Watershed Management Plan

In 2009, the Eightmile River Wild and Scenic Coordinating Committee (ERWSCC) established a Project Review Subcommittee, formed a supportive policy, and initiated two development

proposals under the direction of the Eightmile River Watershed Management Plan. ERWSCC filled the part-time Project Manager position with the hiring of Pat Young. Pat will serve as the principle point of contact for ERWSCC and the watershed communities. She will be in charge of implementing the Eightmile River Watershed Management Plan including river protection issues, land protection, public outreach and education, scientific studies and river monitoring. The Committee also provided CT DEP Watershed Management staff with some proposal ideas and supportive documents for the Eightmile River watershed to be considered under a future Healthy Watersheds Initiative pilot project in CT. More information will be available in 2010. ERWSCC's Science and Monitoring Subcommittee began framing a watershed-wide water quality monitoring proposal and report card format. The Subcommittee worked with the CT District office of U.S. Geological Survey to submit a pre-proposal for the USGS/NPS Water Quality Program. This proposal is focused on the newly established Eightmile River (Wild and Scenic Partnership River) in Connecticut, under the topic of fixed station monitoring. The USGS has two operating stream flow gauging stations in the watershed covering the major tributaries. Water-quality data is needed to establish baseline information for planning and management in the watershed. An invasive species control field trip was held to investigate a newly discovered species – Japanese stiltgrass - with high potential for quick expansion and displacement of native herbaceous species in the Eightmile River watershed. A river segment was listed in 2008 as impaired for Recreation use due to bacteria exceedance. Initial discussions were held with DEP staff to understand the assessment and what local efforts can be offered to effectively manage the impairment towards eventual full support of the river. The Protection and Management Subcommittee developed a white paper on the proposed "Land Conservation Partnership" - an initiative to seek Congressional funding to aid ERWSCC in land acquisition. The program would follow the precedent of the Lamprey Wild and Scenic River in New Hampshire which has protected important river lands with federal funding assistance. The proposed Eightmile program seeks $500,000/year from Congress to be matched 50/50 with non-federal sources. This subcommittee also prioritized top barrier remediation projects and assessed the feasibility of launching a pilot barrier remediation project. The subcommittee began working with the basin towns to require the 2004 CT Stormwater Quality Manual as guidance of the design, implementation and maintenance of all new and existing stormwater systems. The Subcommittee also began investigation of two projects; 1) enabling East Haddam to adopt municipal stream-crossing best management practices, as promoted by both the University of Massachusetts and CT DEP's Inland Fisheries Division; and 2) started collaborative discussions with towns and stakeholder agencies to establish a Cooperative Weed Management Area, under guidance from the Nature Conservancy. The **Outreach and Education Subcommittee** rolled out a grassroots campaign called the RiverSmart pledge program, with mailings to all residents in the three major towns in this watershed. The Subcommittee updated their Committee website (http://www.eightmileriver.org/RiverSmart/index.html) to collect the pledges; participants receive a sign to post on their property. The Subcommittee also worked on developing new signs and local/state approvals for "Entering Watershed" boundary signs along main transportation routes in the watershed. Additional accomplishments in 2009 included complementary work with towns and area land trusts to spread their watershed message through newsletters.

V. STATEWIDE MANAGEMENT PROGRAMS

Inland Wetlands and Watercourses

Inland Wetlands Management

The Wetlands Management Section provides day-to-day support to all 170 municipal Inland Wetlands Agencies in the state. As the majority of land use decisions are made at the local level, one of the most important functions of the Wetlands Management Section is conducting the Municipal Inland Wetland Commissioners Training Program. The training program helps commission members and staff to understand their roles and responsibilities under the Inland Wetlands and Watercourses Act (IWWA). It also provides skills in the identification of wetlands, wetland functions, site plan review, permitting, and enforcement as related to the IWWA. The CT DEP wetlands program staff utilized numerous training materials in presenting the training program, including documents funded under Section 319.

In 2009 there were:

- 534 total participants, representing
- 116 municipal Inland Wetlands Agencies, of which
- 277 individuals attended at least one of the three program segments, with
- 79 of these individuals attending all three segments and therefore received a 2008 certificate of program completion.

Erosion and Sediment Control

Since the publication of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (Guidelines), CT DEP has provided detailed training, identified and corrected errors and then published a corrected electronic version on DEP's webpage under Publications, Guidance Materials [http://www.ct.gov/dep/cwp/view.asp?a=2720&q=325660&depNav_GID=1654]. Future potential work on the Guidelines includes producing a fully bookmarked / linked version for availability on the web and on compact disk. In the past several years the DEP has been working with the Connecticut Council on Soil and Water Conservation to develop visual training aids with the assistance of the Connecticut Conservation Districts with the goal of developing new training programs on soil erosion and sediment control.

Water Allocation

The Water Planning Council (WPC) was established by Public Act 01-177 to study eleven issues which fall into two distinct areas of investigation: water company management and natural resource management. The WPC consists of Commissioners, or their designees, from 4 state agencies, the Department of Environmental Protection, Department of Public Health, Department of Public Utility, and the Office of Policy and Management. The Water Planning Council established three Committees to investigate issues identified in PA 01-177. The Council meets the first Monday of every month at the Department of Public Utility Control. Contact: Bruce Wittchen, CT OPM – Intergovernmental Policy Division, (860) 418-6323.

All Annual Reports, minutes of WPC meetings, the Water Allocation Policy Planning Model, and several other important committee reports related to WPC activities are available on the Department of Public Utility Control website: http://www.dpuc.state.ct.us/DPUCINFO.nsf/ByWaterPlanning?OpenView&Start=1&ExpandView

Flood and Erosion Control Projects

The CT DEP Flood and Erosion Control program as defined by CGS 25-69 thru 25-98 allows the DEP to implement studies and capital repair projects to reduce or eliminate damage caused by flooding and erosion. The statute was changed in 1982 to allow DEP to fund a portion of a dam repair as long as the dam was owned by a municipality.

The CT DEP Flood and Erosion Control program implements studies and capital repair projects to reduce or eliminate damage caused by flooding and erosion. CT DEP is allocated funding from the Connecticut General Assembly, and then awards grants on a cost-sharing basis with municipalities and special taxing districts. The CT DEP also provides technical assistance in cooperation with private consultants or government agencies like the NRCS and Army Corps of Engineers (ACOE).

CT DEP has started no new "Flood & Erosion Control" projects involving dams during the 2009 construction season. There have been many requests recently from municipalities asking DEP through this program to fund repairs to municipally owned dams. One project in particular has been bid and the municipality is waiting for funding to be approved by the bond commission before they award the bid.

Late in 2006 the ACOE inspected all of the riverine and coastal levees that they constructed. Several levees were found to be in immediate need of study and repair. Of note was the levee in East Hartford along the Connecticut River. This levee had previously been rated good, but due to a fresh look at the design plans, an area previously not maintained as a part of the system was discovered. The lack of maintenance of this "impervious blanket" led to large trees being allowed to grow in this area, affecting the effectiveness of the blanket. This was repaired in 2008 with cost sharing in the amount of $4,000,000 from the State of CT DEP through the Flood and Erosion Control Board statutes. This repair was critical and therefore the repair was performed quickly. Due to ACOE questions raised during their initial inspection and file review

and due to the fact that FEMA was re-mapping Hartford County, including East Hartford, additional studies were performed, leading to additional construction work being required in 2010. The DEP will aid the Town of East Hartford with additional funding for the future repairs, as well as provide technical expertise during the study and design portions of the levee review.

Other levees have required work. These levees are located in Hartford, Torrington and Waterbury/Watertown. The DEP is responsible for maintenance for the Waterbury/Watertown levee, and we have completed our initial work to meet the minimum standards of the ACOE. However, some additional work needs to be performed at the levee, which the DEP is working towards.

The Torrington Levee, owned and operated by the City of Torrington is the only levee which did not meet the ACOE standards by the deadline. Therefore, the City's levee has been deemed in-active by the ACOE, meaning that if the levee is damaged due to a storm event, the ACOE will not be allowed to fund repairs. Most of the problems with this levee have to do with many years of neglect, followed by environmental riverine enhancements which conflicted with the goals and design parameters of the original design. Torrington received $200,000 from DEP to help clear debris and vegetation from the river channel to allow additional studies to take place. The City continues to move forward towards bringing this project into compliance with ACOE standards. The DEP IWRD continues to participate in helping the city meet all of its engineering goals while allowing as much riverine enhancements to remain intact.

The DEP entered into a three way agreement with The City of West Haven and the Lake Phipps Taxing District describing all of the monetary and long term obligations of each party. The dam reconstruction was started in the summer of 2008 and completed in the fall of 2009. DEP is working with the Legislature to have the dam transferred from DEP to the Lake Phipps Taxing District. It was always the intent of the DEP that after the dam was fixed with a combination of state and local funds, that the dam would be turned back to the local taxing district.

The Flood events of 2007 have led to 2 Emergency Watershed Projects (EWP) being worked on in 2008 and 2009. The Natural Resource Conservation Service (NRCS) funds 75% of the project costs and DEP funds the non-federal share of 25%. All of these projects protect infrastructure, but most of these projects protect the infrastructure by controlling the erosion that has created the threat.

Lakes

Lakes Management Program

The goal of the Lakes Management Program is to protect and restore the ecological and recreational integrity of Connecticut's lakes and ponds through pollution prevention, pollution source abatement, and implementation of lake restoration technologies. The primary water quality concerns for Connecticut lakes are infestations of non-native aquatic plants and eutrophication. Eutrophication is a form of water pollution caused by excessive enrichment with plant nutrients, organic matter, and

sediments. Symptoms of eutrophication include dense algal blooms, nuisance weed beds, and depletion of oxygen in bottom waters. These conditions limit recreational opportunities and diminish ecological values.

The technical components of a lake water quality improvement project are developed through baseline monitoring, diagnostic/feasibility studies, and engineering studies. Implementation includes watershed management to address land use issues and control active sources of pollution. In-lake management is used to remediate undesirable lake conditions that cannot be addressed by watershed management alone. The development of a successful lake management program is dependent on active community participation. CT DEP is very active in meeting and communicating with property owners, lake associations, and town officials to promote and assist in lake and pond management projects.

Lake and pond projects are funded through a variety of federal, state, and local funding sources. Federal and state funding sources generally place priority on lakes with public access for recreation. At the federal level, CWA Section 314 provided funding for statewide baseline water quality assessments, and matching grants for diagnostic/feasibility studies and lake restoration projects. Since the phasing out of Section 314 funding, Section 319 funds have supported nonpoint source pollution control projects in lake watersheds.

Lakes Grant Program

Connecticut DEP Lakes Grant Program funds lake restoration activities such as diagnostic water quality studies, land use planning, engineering feasibility studies, construction bid specifications development, storm water infrastructure improvements, dredging projects, and development of public education documents. The last year funding was available for the Lakes Grant Program was in 2001. In 2009, a new phase of the ongoing stormwater improvement project at Highland Lake began. This project will continue into 2010 and represents the fifth phase of a long-term project that has been funded with state and CWA Section 319 funds over many years.

Lake restoration projects are also conducted using bond funds authorized by the CT General Assembly and allocated by the State Bond Commission. In 2009, a project using state bond funds was completed for Lake Pocotopaug in East Hampton. The resulting report is a watershed based plan that will be used to prioritize locations for stormwater Best Management Practices (BMPs). The report will also be used as the bases for the Total Maximum Daily Loads (TMDL) for this CWA Section 303d listed water body. In 2009, the third basin cleanout phase for the multiyear Silver Lake project was completed. Plans are underway to implement the fourth dredging phase in 2010. At Quaddick Lake in Thompson an extensive macrophyte control program was implemented using herbicides. In 2009, dredging and stormwater improvements were constructed at Mill Pond in New Canaan.

CWA Section 319 Lake Projects

In 2006 and 2007, CWA Section 319 funds were used to develop the small grants program through the Connecticut Federation of Lakes. This program helps small and new lake groups become established

and funds initial watershed assessments for lakes. In 2008, the Small Grants Program received more Section 319 funding to continue the program. In 2009, an educational project was completed in Portland for Great Hill Pond and Jobs Pond. Projects were also completed for Hitchcock Lake Mossup Pond. CWA Section 319 continued to fund a lakes probabilistic monitoring program. CWA Section 319 funds were also used to award a grant to the Lake Lillinonah Authority who hired a consulting limnologist to implement a comprehensive water quality-monitoring program. This monitoring effort is helping the DEP to develop a nutrient management strategy for Lake Lillinonah. In 2009, Connecticut College continued analyses of data for sixty lakes collected under contract with CT DEP.

Technical Assistance

The Lakes Management Program also provides technical assistance, as needed to municipalities, lakes groups, and DEP programs. In 2008, numerous FERC license articles for hydroelectric facilities were reviewed.

Invasive Aquatic Plants

The Bureau of Water Protection and Land Reuse, in cooperation with the Division of Inland Fisheries, Wildlife Division, and the Pesticides Group of the Materials Management and Compliance Assure Bureau continued a to address infestations of non-native aquatic plants species that are new to Connecticut. In 2007, the CT General Assembly also appropriated $500,000 for aquatic and terrestrial invasive plant control. These funds were to be used to award grants to municipalities for invasive plant control projects. Unfortunately, grants were swept back into Connecticut's general funds as a result of the poor economic climate. Funds were used to hire an invasive plant coordinator who is housed at the University of Connecticut.

Groundwater

Corinne Fitting / Kim Czapla

The CT DEP develops and implements ground water protection strategies for all ground water resources, including public water supply wells. This includes ground water quality standards and classifications, ground water resource mapping, water supply planning, discharge permitting, water diversion permitting, site remediation, land use regulation in certain aquifer areas, technical assistance, pollution prevention, and a host of NPS control programs. One of the key components of this program is the Aquifer Protection Area (APA) Program, which provides comprehensive protection for major drinking water well fields in stratified drift aquifers. The APA Program requires mapping of the "areas of contribution" and "recharge areas" to major well fields and regulating land use in those areas to minimize the potential for contamination of the water supply.

Preliminary APA mapping has been completed for all the state's major well fields (122) and provides a rough estimate of the contributing areas. Inventories of potentially regulated facilities and agricultural activities have been conducted. Final mapping is a further refinement

and will define the APA, the area subject to land use regulation. To date, plans for data collection and analysis have been submitted for 112 well fields, of which 109 have been approved. Final Level A mapping has been submitted for 99 well fields and 88 have been approved. GIS mapping of the APAs has been partially supported with FY93 and FY95-98 Section 319 funds.

The APA Land Use Regulations were adopted in February, 2004, and a Model Municipal Ordinance, along with guidance documents and forms necessary for implementation of the APA program were published in June, 2005. CT DEP continues to develop guidance on materials management plans, stormwater management plans, site plan review, planning and zoning coordination, water utility assistance, and other local guidance.

Municipalities are beginning program implementation, and the first step is to appoint a municipal aquifer protection agency (through adoption of a local ordinance). Thus far, 74 of the 78 towns have passed the required ordinance, and CT DEP continues to work with the remaining municipalities to implement this first step. Additionally, 50 towns have approved land use regulations in place, and have adopted APAs.

In 2009, CT DEP:

- Continued to work with the municipalities to implement the program, providing extensive outreach and meeting with individual municipalities to assist with delineation of APAs and establishing local regulations;
- Held the annual municipal training program, a one-day workshop for Municipal Aquifer Protection Agencies, in October, 2009. The workshop which provided instruction on the adoption of local aquifer protection regulations, the delineation of aquifer protection boundaries, and a broad range of administrative and legal issues, was well attended and well received. Additional training for the municipalities is planned for June, 2010, and training is being developed for the industries affected by the program.
- Began development of a training manual for the municipalities in the program, in part, using Section 319 funding for development and production of the manual.
- Continued to keep the APA web site updated with new mapping as it becomes available, new guidance, examples and tracking tables; the Aquifer Protection Area Program web site is at www.ct.gov/dep/aquiferprotection
- Provided technical assistance to numerous towns in response to inquiries and requests for assistance with aquifer protection issues;
- Completed work with the water utilities to develop a Municipal Assistance Program;
- Continued to collect and review data, including point and nonpoint pollution sources, land use/land cover, and water quality data;
- Continued to update the Water Quality Classifications and Leachate & Wastewater Discharge coverage for the Thames River major basin, as well as

evaluated and approved (if appropriate) requests for reclassification of groundwater; and

- Completed work on a mapping project with the Connecticut Geological Survey to derive an "Aquifer Potential Map" for the state that is available in GIS format (the project utilizes federal Section 319 funding) and is available on the DEP website.

Long Island Sound

Long Island Sound (LIS) is one of Connecticut's most important natural and economic resources, serving as habitat to numerous fish and wildlife populations, a commercial and recreational resource to the citizens of CT and NY, and contributing an estimated $8 billion annually to the regional economy. Improving water quality in LIS is a major goal to ensure healthy habitats and safe productive use by people living around LIS. Studies in the late 1980s identified hypoxia (low dissolved oxygen) occurring in the bottom waters of the western Sound as a result of excess nitrogen enrichment in LIS waters. CT and NY have implemented management actions including upgrading of sewage treatment plants (STPs) to remove more nitrogen from STP discharges entering LIS, thus alleviating the spread and intensity of hypoxia. Another challenge facing LIS are pressures for increased recreation and public access of the Sound, and commercial interests for energy and commerce. Habitat restoration projects are being carried out through a number of programs with the goal of preserving 923 acres of coastal and near shore habitat and 175 river miles of migratory fish passage in CT and NY by 2011. In addition, citizens, their elected officials, and agencies are working to implement the Long Island Sound Stewardship Initiative preserving 33 areas of ecological and recreational value and identifying additional areas to preserve and protect for future generations.

CT DEP's Long Island Sound management efforts revolve around two major programs: the Long Island Sound Study (LISS) estuary program, coordinated through the Bureau of Water Protection and Land Reuse Planning and Standards Division (BWPLR PSD) in cooperation with DEPs Coastal Management Program, which is administered by the Office of Long Island Sound Programs (OLISP).

Long Island Sound Study

The Comprehensive Conservation and Management Plan (CCMP) for Long Island Sound, completed and approved by EPA and the states in 1994, identified low dissolved oxygen (hypoxia) as the primary water quality problem for the Sound and excess nitrogen loads as the primary cause of the problem. The CCMP also cites additional problems, including toxic contamination, pathogens, floatable debris, loss of fish and wildlife habitat, and land use and development pressures. Management efforts over the past several years have focused on reducing nitrogen loads to improve dissolved oxygen conditions and restoring degraded coastal habitats.

Nitrogen management efforts include installing advanced wastewater treatment equipment in new and existing municipal sewage treatment plants, eliminating raw sewage discharges

through combined sewer overflows (CSOs), and controlling NPS pollution. In 2001, EPA approved the CT DEP and the New York State Department of Environmental Conservation (NYS DEC) TMDL for nitrogen loads to Long Island Sound. The TMDL calls for an approximately 64 percent reduction in nitrogen loads from point sources and a 10 percent reduction in nitrogen loads from nonpoint sources from urban and agricultural land. In 2008, CT DEP in collaboration with EPA LISS and NYS DEC initiated revision of the 2001 TMDL. This was untaken to address the change in the hypoxia model from LIS 3.0 to SWEM (System Wide Eutrophication Model), as well as work completed by the Connecticut River Workgroup (CTRW). The work completed by the CTRW provided a better estimate of nitrogen loading from both point and nonpoint sources from states upstream of Connecticut but included in the LIS watershed. This work also included a cost evaluation of best management practices and proposed target nitrogen reductions.

In 2002, the nitrogen credit trading program and a statewide general permit with nitrogen limits for 79 sewage treatment plants were initiated. Through 2008, seven annual credit exchange cycles have now been completed with oversight by CT DEP and a nitrogen credit advisory board. It is anticipated that the trading program and general permit will continue to enable the state to meet the nitrogen load reduction required by the TMDL more cost-effectively.

The LISS contracted with Manhattan College and HydroQual Inc. in developing a nonpoint source nutrient watershed modeling tool. A nitrogen-tracking program is being developed and the LISS Nonpoint Source Workgroup has begun fine-tuning and implementation of the approach. The program will allow managers to determine progress towards the 10% load allocation reduction in CT and NY specified in the TMDL. Work was completed on a Long Island Sound Riparian Buffer Toolbox that is posted on the LISS web site providing resources for local officials in drafting and implementing regulations to protect riparian areas. Riparian buffers can be a very effective means of reducing nonpoint source pollution to receiving waters in developed watersheds, similar to that of the Long Island Sound.

Identifying the causes of nonpoint source pollution and the relationship to human activities to the health of Long Island Sound is a priority area of concern for CT DEP and the Long Island Sound Study estuary partnership. LISS and CT DEP have contracted with the University of Connecticut's NEMO program and it's Center for Land Use Education and Research (CLEAR) on projects to map land use and land cover in the coastal areas of Connecticut and New York. (see http://clear.uconn.edu/) The Long Island Sound Regional Impervious Surface Study, the Coastal Riparian Buffer Analysis, and the Coastal Area Land Cover Analysis Project are important tools available to municipal and environmental managers in guiding future development needs while protecting watershed health. (http://clear.uconn.edu/research/index.htm) These projects utilized GIS technology to identify land cover and land cover change within LIS watersheds and riparian corridors of coastal Connecticut. Riparian, or streamside, corridors are known to be environmentally important areas critical to stream stability, pollutant removal, and both aquatic and terrestrial wildlife habitat. Many of the threats posed to Long Island Sound are directly or indirectly the result of the urbanization of the watershed, particularly with the increase of impervious surfaces. Impacts related to the

increase in impervious surfaces include: deterioration of water quality resulting in polluted surface waters, reduced ground water recharge resulting in a decrease in available sub-surface ground water, and an increase in runoff volume resulting in flood control problems.

The LISS and CTDEP have also been investing time and funding in habitat restoration activities that are relevant to NPS pollution abatement. In 2006, the LISS adopted 33 Inaugural Coastal Stewardship Areas and in September 2006 Congress passed the Long Island Sound Stewardship Act of 2006, which was signed into law by President Bush (Public Law 109-359) in October. The bill authorizes up to $25 million per year for stewardship projects, including acquisitions of environmentally-sensitive lands for LIS that will help protect sensitive habitats but also ensure protection of land conditions that are amenable to pollutant removal. LISS is also involved in CT DEP eelgrass protection evaluations, with a goal of establishing appropriate nitrogen loading criteria to protect eelgrass beds in eastern CT that have been in decline in recent years.

Connecticut and New York have made commitments to have 50% of their respective sub-watershed areas in the LIS watershed developing or implementing watershed management initiatives in collaboration with locally based public and private entities by 2014.

With funding from the Long Island Sound Study (LISS), CT DEP has also conducted extensive monitoring of Long Island Sound. The program is used to track changes in low dissolved oxygen levels as well as water temperature, nutrient levels and other parameters relevant to an extensive hypoxia impairment that affects the western half of Long Island Sound's bottom waters. In combination with upland monitoring described above, CT DEP and the LISS use these data to chart management progress, particularly for control of nitrogen, the primary pollutant leading to hypoxia.
(http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325570&depNav_GID=1654)

Coastal Zone Management

During this reporting period, OLISP and DEP staff provided assistance to the coordinator of the Niantic River Watershed Protection Plan as progress toward municipal implementation of the watershed protection plan continued. DEP staff met with the watershed plan coordinator and the Chief Elected Officials, land use planners, and public works staff of three of the four watershed towns to discuss the next steps for implementing the recommendations of the Niantic River Watershed Protection Plan and establishing a Niantic River Watershed Advisory Committee to facilitate inter-municipal actions as towns adoption of the Niantic River Watershed Protection Plan. Volunteers willing to serve on the advisory committee will be sought by each of the watershed towns. Individuals with an interest or experience in the areas of stormwater management, land-use development, water quality monitoring, river recreation or educational outreach will be encouraged to contact their respective town leaders for further information. OLISP and other DEP staff will continue to work with the watershed coordinator as warranted during upcoming reporting periods to assist in plan implementation. Plan implementation progress can be monitored at http://www.nianticriverwatershed.org/ .

The coastal nonpoint source pollution control program coordinator is a member of the Long Island Sound Study Nonpoint Source Work Group. During this reporting period, the work group focused on updating the work plan and reviewing the LIS Futures Fund RFP. The updated work plan will allow the work group to focus on promoting low impact development and sustainable development practices in municipalities, implementing Connecticut's impervious cover TMDL in Eagleville Brook, and encourage research on nitrogen issues associated with onsite wastewater management systems.

Clean Marina Program

OLISP continues to implement the Clean Marina Program. By the end of 2009, 27 marinas had been certified as "Clean Marinas." The pledged facility list was not managed during this timeframe. All facilities that had previously pledged were maintained on the list. Approximately 26 facilities remain on the pledged list.

The Clean Marina Program is a voluntary, incentive-based education and outreach campaign to encourage environmental compliance and the use of BMPs at the state's 275 coastal and inland boating facilities. The program also includes an outreach campaign to educate the state's boaters about environmentally sensitive boating practices. OLISP, in cooperation with the CT DEP Boating Division, developed the program to address the potential threats to water quality from both inland and coastal marinas, particularly in the form of NPS pollution.

In 2009:

- Clean Marina staff revised the certification process to require the submission of additional information which demonstrates compliance with all applicable environmental requirements and conduct of 90% of applicable BMPs by the facilities requesting certification

- Clean Marina staff conducted outreach at the following events:
  - The Hartford Boat Show
  - The CT Marine Trades Association's Annual Marine Exposition
  - The CT Harbor Management Association's Annual Environmental Meeting

- Clean Marina staff conducted informal informational site visits to several CT marinas

- Clean Marina staff conducted 13 verification visits resulting in 13 new certified facilities

Information on the Department's Clean Marina Program can be found at: www.ct.gov/dep/cleanmarina.

Vessel Sewage Management

Sewage from recreational and commercial boating on Long Island Sound continues to be a potential source of pathogen contamination to shellfish beds and swimming areas. In poorly flushed areas with high boat concentrations this potential waste discharge may also contribute to nutrient enrichment. The CT DEP Office of Long Island Sound Programs (OLISP) has primary responsibility for regulating marinas and related boating activities, including vessel sewage management.

Funding from the U.S. Fish and Wildlife Service through the Clean Vessel Act (CVA) grant program has allowed DEP OLISP to fund the construction, operation, and maintenance of a total of over 103 total pumpout facilities, including sixteen (16) pumpout boats, and 22 dump stations available to boaters at boating facilities along Connecticut's coastal waters.

EPA approved the application for designation of all Connecticut coastal waters in Long Island Sound and its navigable tributaries from the New York state boundary in the Byram River to Guilford as a No Discharge Area (NDA) on June 2007. All Connecticut coastal waters are now a designated NDA. The current website is: http://www.ct.gov/dep/cwp/view.asp?a=2705&q=323816&depNav_GID=1635.

A directory of pumpout stations and boats can be found on the CT DEP website at: http://dep.state.ct.us/olisp/cva/cva.htm, along with a variety of information about Connecticut's Clean Vessel Act program.

Habitat Restoration

Like many northeastern coastal states, Connecticut has lost much of its historic, natural tidal wetlands and other habitats to development and hydromodification (e.g., ditching, diking, draining, and filling). In reversing this trend, Connecticut has become nationally recognized for its leadership role in tidal wetland restoration, and has been an active participant on the LISS Habitat Restoration Team. In 1997, CT DEP established the Wetlands Habitat and Mosquito Management (WHAMM) Program, one of the first dedicated wetland habitat restoration programs in the country, with dedicated staff and specialized low ground pressure equipment. Connecticut also was the first state in the country to use funding from the federal Intermodal Surface Transportation Efficiency Act (ISTEA) for tidal wetland restoration where undersized culverts or tide gates associated with transportation routes have impacted the coastline. Since the early 1970s, CT DEP has used these programs and resources to restore over 1,800 acres of tidal wetlands. In addition to restoring degraded habitat, OLISP also is involved in preventing degradation through improved management of exotic and nuisance species. In 1998, the LISS adopted a "Habitat Restoration Strategy" that sets a goal of restoring 2,000 additional acres of coastal habitats such as tidal wetlands and coastal grasslands by 2008. In September 2006, the LISS set a new goal to restore or protect an additional 300 acres of coastal habitat and open up an additional 50 miles of riverine migratory corridor to diadromous fish from January 1, 2006 to December 31, 2011, and ultimately restore 2,000 acres by 2020.

In 2009:

- Restoration occurred at the Camp Harkness tidal marsh, Waterford (4.2 acres), and in the Mill River, Stamford (0.8 acres), for a grand total of 5 acres restored.

- In addition, WHAMM program performed Phragmites control at 8 new sites in Connecticut for a total of approximately 61.5 acres. These acres do not count toward DEP's restoration goal of 2,000 acres.

- Another aerial survey of eelgrass in eastern LIS was completed during summer 2009, and it was done using the same techniques as the 2002 and 2006 surveys. Preliminary results of the 2009 survey are not ready yet.

Atmospheric Deposition

CT DEP continues to participate in a Critical Loads Ad Hoc Committee sponsored by the National Atmospheric Deposition Program. The critical loads cover both land and water effects. The short-term goals of the Committee will be to gather scientific data and information to fill gaps in critical load development in the US. Eventually, the findings will help define management goals that could benefit both terrestrial and aquatic environments.

A regional Total Maximum Daily Load (TMDL) for mercury was coordinated through the New England Interstate Water Pollution Control Commission (NEIWPCC) and included the New England states and New York. The TMDL gained approval from EPA in 2007. A large portion of the mercury comes from out of state sources via atmospheric transport and deposition, becoming part of the stormwater and nonpoint source load. The states and NEIWPCC have decided to submit a Section 319(g) petition to EPA to request convening a management conference to address those out of state sources. The petition was submitted in October 2008, and EPA has begun planning for the first conference meeting tentatively targeted for late June, 2010.

Connecticut and New York continue to work on the Long Island Sound TMDL for nitrogen. The contributions of atmospheric nitrogen are being reviewed, but are a substantial portion of the load. It is likely that the TMDL will look to Clean Air Act provisions and other agreements to provide atmospheric nitrogen source reductions under the TMDL. A draft is planned for the fall of 2010.

Fish Habitat Restoration

The CT DEP Inland Fisheries Division has an active fish habitat restoration program, involving removal of barriers to fish passage, construction of fish passage facilities, and physical restoration of in-stream and riparian habitat features. CT DEP coordinates its restoration activities with many other federal, state, and town agencies and non-government

organizations, including the U.S. Fish and Wildlife Service, NOAA, NRCS, EPA, State Water Conservation Districts, American Rivers, The Nature Conservancy, Trout Unlimited, the Connecticut River Watershed Council, and various other watershed groups and land trusts. Although Section 319 funds have only been used on a limited basis in the past, several fishway projects currently in the planning stage have received 319 funding and these types of projects will receive high priority in the future. Providing fish passage at the Wallace Dam (first barrier on the Quinnipiac River) in Wallingford has been a top priority for many years. Progress was achieved in 2007 when final designs for a Denil fishway at the Town-owned dam were completed. The project has submitted applications for permits to construct this fishway and it is hoped that construction could begin in 2010 using 319 funding.

Restoring habitat for native *diadromous* fish is a high priority in Connecticut. Diadromous species include *anadromous* and *catadromous* species. *Anadromous* species, which spend most of their lives in salt water and migrate up rivers to spawn in fresh water, include Atlantic salmon, blueback herring, alewife, and American shad. *Catadromous* species, which spend most of their lives in fresh water and migrate down rivers to spawn in salt water, include only the American eel.

Stormwater Management

Stormwater permitting and compliance is conducted by the CT DEP Water Permitting and Enforcement Division (WPED) under the authority of the CWA National Pollutant Discharge Elimination System (NPDES) storm water provisions and supporting state statutes and regulations.

CT DEP regulates stormwater discharges from the following sources:

- Construction sites (sites 1-5 acres in size are not required to register with DEP if municipal approval have been obtained; sites 5 acres or more must register with CT DEP),
- Industrial activities (activities defined as “light” industries with no stormwater exposure submit a No Exposure Certification in lieu of a permit registration),
- Commercial sites with more than 5 acres of impervious area, and
- Municipal separate storm sewer system discharges.

Approximately 2100 facilities, towns or activities were registered under the various stormwater discharge general permits as of March, 2010, many of which have annual monitoring requirements. There were 1393 industrial operations, 382 construction sites, 214 commercial sites, and 114 MS4 activities. Additionally, 167 No Exposure Certifications were submitted as of

March, 2010. DEP stormwater staff conducted 70 inspections and issued 46 Notices of Violations for stormwater related violations.

Accomplishments in 2009 include:

- CT DEP conducted compliance initiatives of sites with poor stormwater quality, including auto salvage yards and marinas.

- CT DEP reissued its construction, industrial, MS4, and commercial general permits in "as-is" form to maintain permit coverage while the Department works to reissue the permits in modified form.

- CT DEP issued 3 consent orders, with penalties, to municipalities regulated by the MS4 permit for permit violations related to failure to submit annual reports and sampling data.

- In June 2007, the state legislature enacted Public Act 07-154. This created a pilot program for as many as 4 municipalities to develop a stormwater utility authority and provided $1,000,000 to fund this. The Cities of Norwalk, New Haven and New London were authorized to go ahead and develop their programs. In 2009, these towns submitted a summary report to the legislature with recommendations on what actions were necessary to pursue implementation of a stormwater utility. The City of New Haven intends to proceed with implementing the first Stormwater Utility Authority in the State of Connecticut while the other two municipalities still are considering further action.

Agricultural Nonpoint Source Management

Confined animal feeding operations (CAFOs), an important source of agricultural pollution, are now defined by EPA as point sources. CT DEP, which is authorized by EPA to administer its NPDES permitting program, will implement the CAFO permitting program with a statewide general permit. CT DEP has determined that there are approximately 10 CAFOs and at least 35 animal feeding operations (AFOs) statewide. The DEP Commissioner has the discretion to decide that certain AFOs be regulated as CAFOs.

Under the general permit, each farm will be required to develop a Comprehensive Nutrient Management Plan (CNMP). Connecticut is using phosphorous-based manure application criteria for CNMPs. Recommendations for nutrient application rates are based on the agronomic critical ranges required for crop production as established by the UConn Soil Nutrient Analysis Laboratory, or UConn-recognized industry practice. Recommended rates are based on soil nutrient analyses and crop tissue tests, documented yield information, environmental risk and management capabilities.

In addition, NRCS and UConn/CES evaluate the adequacy of a farm's land base with potential for fertilizer application for its capacity to utilize manure nutrients. NRCS will use the technical guidance for developing CNMP's along with Field Office Technical Guide Practice Standards to develop CNMP's. CT DEP is working on the General Permit criteria.

Agricultural NPS program accomplishments in 2009 include:

- NRCS and UConn/CES assessed about 26 farms from 2008 through 2009 and wrote or revised about agricultural waste management system plans (AWMPs) that CT DEP has approved.

- Nutrient management plans are being implemented on 24 farms and about 12,482 acres although the acreage changes each crop year as farmers add and or lose fields.

NRCS and UConn/CES continued to work with agricultural producers to develop a user-friendly computerized record-keeping system to help them track nutrient use on their fields. The record-keeping program is being tested and developed for uploading to the UConn Soil Nutrient Analysis Laboratory's web site for ease of access by farmers. A new recommendation system for nitrogen management that relies on the field-by-field records of nutrient applications is being developed. UConn/CES has continued a 319-funded IPM/ICM program targeting coastal watersheds in Fairfield and New Haven counties, with a focus on outreach and education.

Technical Assistance Program/Demonstration Projects

NEMO

The NEMO (Nonpoint Education for Municipal Officials) program began in 1991, with the foundation that education – not regulation – is the most efficient and cost-effective, means of influencing land use decisions. Initial programming emphasized "linking town halls to land use and water quality" using build-out projections, remote sensing, impervious surface cover, and water quality ratings to show towns various scenarios for the future. CT DEP and UConn/NEMO have had a long and productive partnership on projects that support the state's Nonpoint Source Program. Early partnership efforts focused on applied landscape research and statewide educational efforts. For much of the last several years, the emphasis has been on the "Municipal Initiative"; which works intensively with towns and has resulted in many changes to local plans, regulations and development designs.

NEMO provided education on stormwater to numerous municipalities, groups, agencies and at conferences both in the state and regionally. During the project period, NEMO educators conducted 40 workshops or talks about LID and stormwater management to hundreds of local commissioners, professionals and the public. Education has been a key factor in preparing the state for the acceptance of LID and other practices. The partnership between UConn NEMO and the DEP has made this education possible and has served as a model around the country. By

2009, over 30 states have adopted the NEMO education model and have been promoting the use of LID and other alternative stormwater approaches.

In 2009, NEMO took the lead in an innovative project to respond to the first impervious cover-based TMDL in the country, which CT DEP promulgated for the Eagleville Brook watershed in Mansfield, CT. The project is a partnership between CT DEP, the University of Connecticut, and the Town of Mansfield. The NEMO team and its partners assembled a geospatial database of the watershed, and updated the impervious coverage and storm drainage data layers using the latest high resolution imagery. A week of field work in July resulted in a list of 51 stormwater retrofit opportunities, and a "Top Ten" list of high priority retrofit sites for which detailed designs were developed. Although still in progress, the project has already resulted in several implemented and planned practices. A pervious asphalt parking lot (the first in the state) and a pervious concrete parking lot have been installed. The renovation plan for an off-campus residence complex now includes pervious parking stalls and rain gardens. And the plans for the first new building built since the TMDL include a green roof, bioswale, and pervious pavers.

NPS Program Contact List

CT DEP Nonpoint Source Coordinator	(860) 424-3730
US EPA Nonpoint Source Coordinator	(617) 918-1687

Related Programs:

Aquifer Protection	(860) 424-3020
Council on Soil & Water Conservation	(860) 767-9594
Inland Water Resource Wetland Comm. Training	(860) 424-3706
Water Quality Monitoring	(860) 424-3020
Lakes Management	(860) 424-3020
Watershed Management & Coordination	(860) 424-3020
Stormwater Management	(860) 424-3018
Stormwater Data	(860) 424-3020
Permitting and Enforcement	(860) 424-3018
NRCS Water Quality Coordination	(860) 977-1543
Inland Fisheries Division	(860) 424-3474
Marine Fisheries Division	(860) 434-6043
Office of Long Island Sound Programs	(860) 424-3034

This report was compiled and edited by Ryan Hersh, CT DEP Student Intern, Clark University.