Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

Integrated Water Resource Management:

Taking Action to Restore and Protect Water Quality

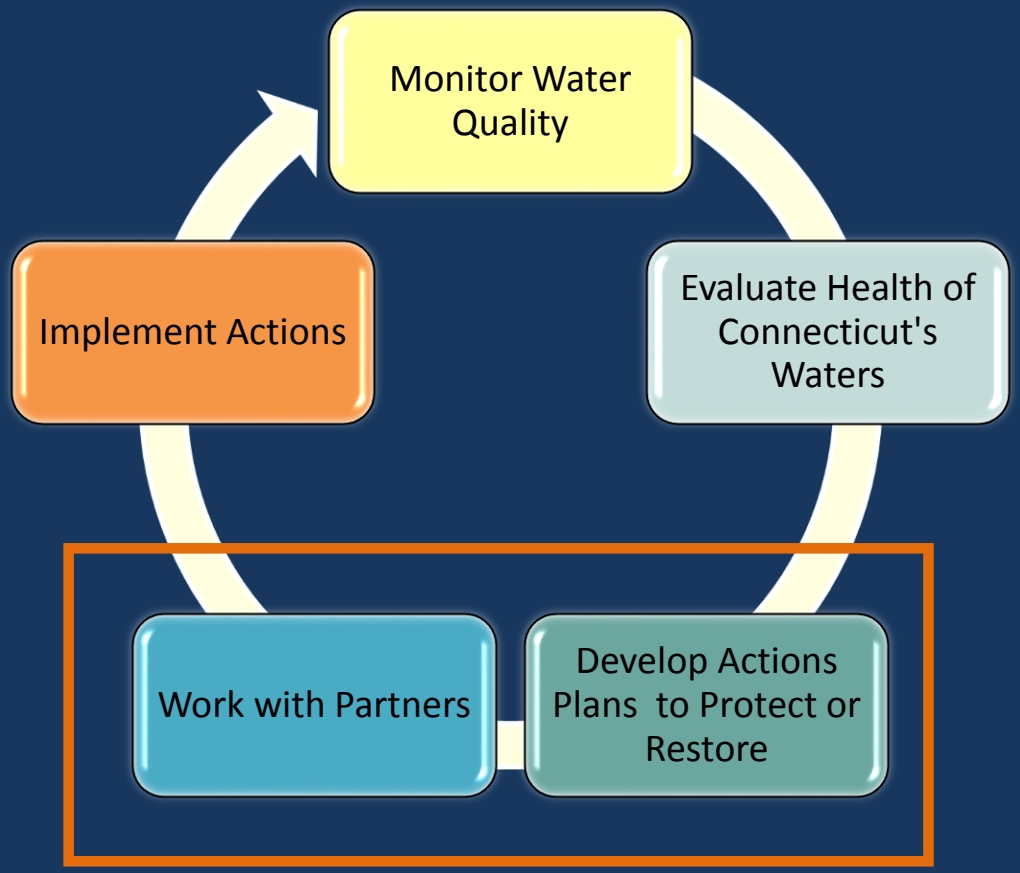
September 24, 2019

Traci Iott
Goodwin College, East Hartford

Presentation Objectives

- Review Integrated Water Resource Management
- Provide update on projects and activities
- Announce public comment opportunity

Environmental Protection Process



Integrated Water Resource Management

- Develop plans that lead to water quality restoration and protection
- Build on & expand internal & external partnerships

303d Integrated Water Resource Management

- A renewed approach to focusing existing programs to achieve Water Quality goals
- Works within existing regulatory frameworks – No new regulatory requirements
- Collaboration Between EPA & States Starting 2011

Integrated Water Resource Management

Environmental Data & Goals → Action Plan: Bridging the Gap → Implementation Program

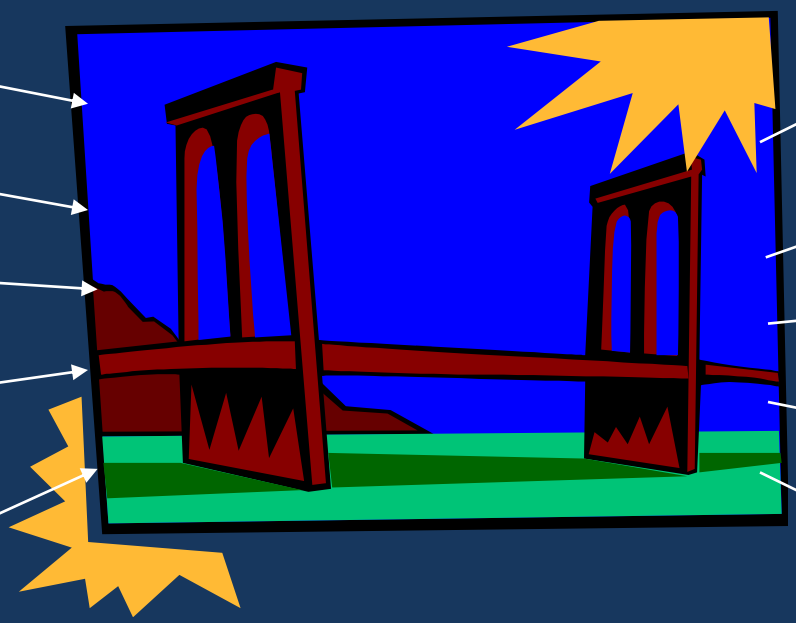
Data

Criteria

Monitoring

Standards

Natural Resource Information



Groundwater Remediation

Non-point Source

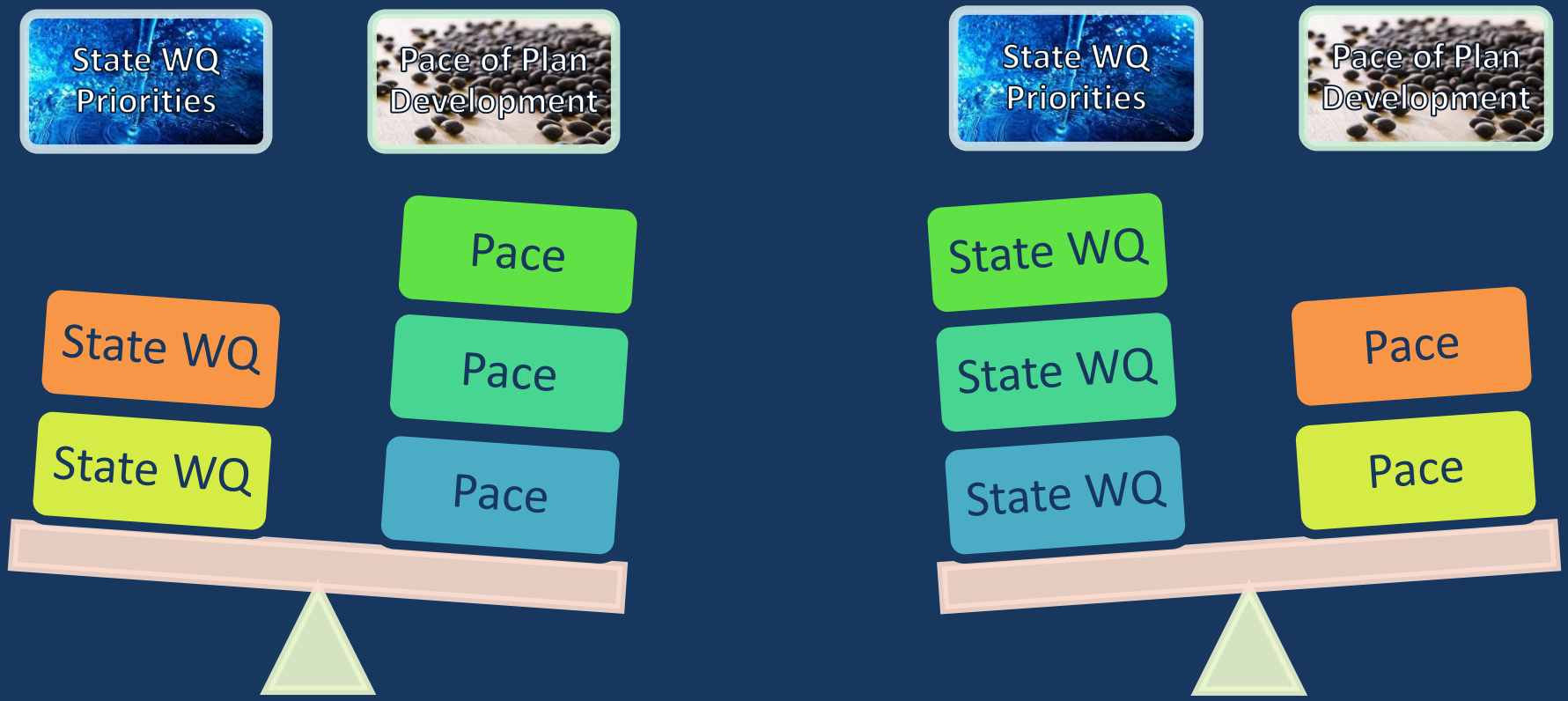
Wastewater Permitting

Natural Resource Management

Watershed Plans

Establishing Action Plans to Restore and Protect Water Quality

Why take a new approach?

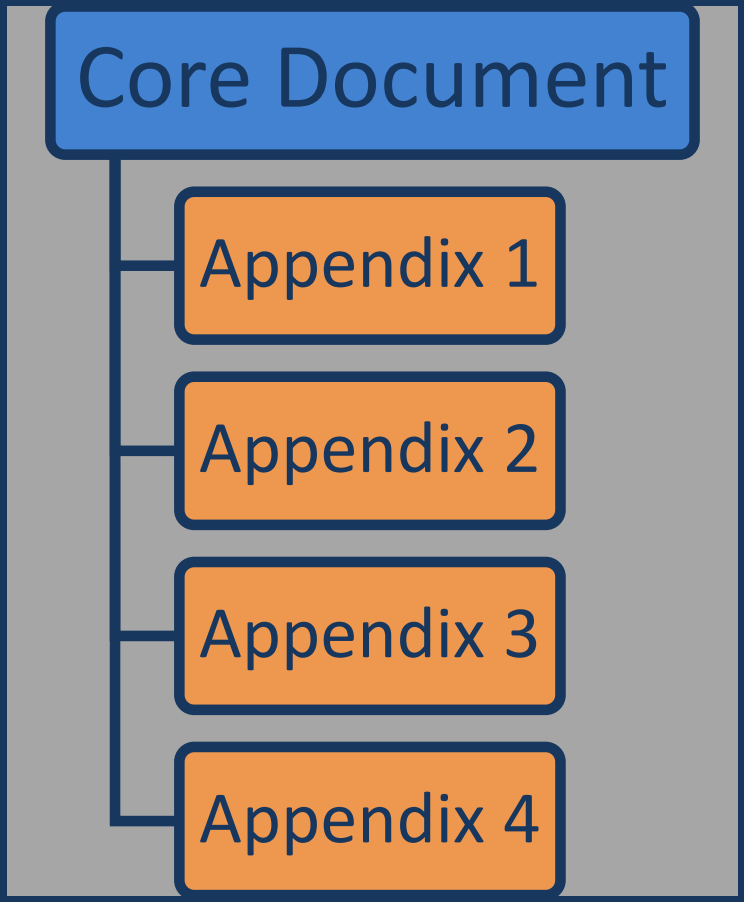


Integrated Water Resource Management:

2012 - 2016

Connecticut Department of Energy and Environmental Protection

Developed Statewide TMDL Approach



Core Document

- Contains required TMDL elements
- Includes reference & resource materials to assist implementation
- Generally written once with revisions as needed

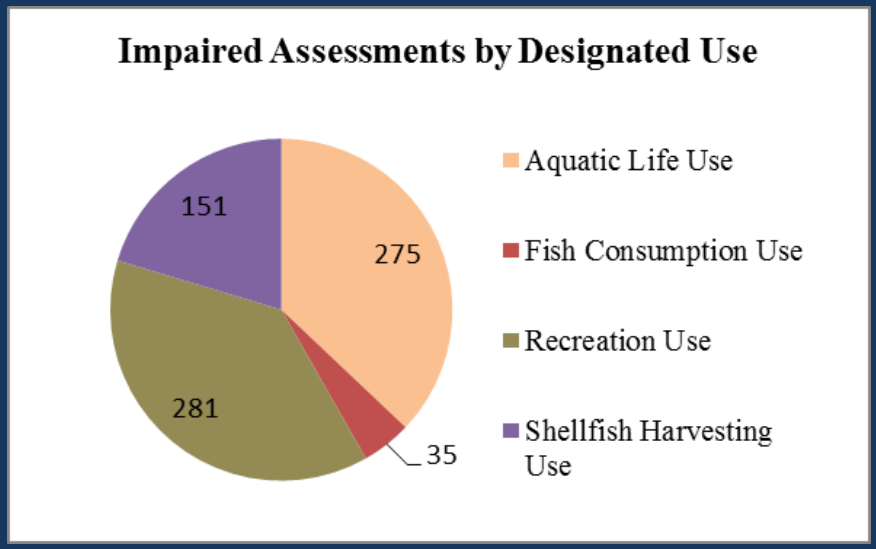
Appendices

- Supporting Documentation
- Watershed Specific Appendices
- New Appendices added as new waters are included

IWRM Focus Areas: 2012-2016

Bacteria

- >50% Waters Impaired due to bacteria (2010)
- Implemented Statewide Bacteria TMDL
  - Between 2012-2016 developed TMDLs for 61% of waters impaired for bacteria based on 2010 list
  - 150 TMDLs for Recreation and 113 for Shellfishing



2010 Integrated Water Quality Report
Impaired Segments

Integrated Water Quality Report Web Site

IWRM Focus Areas: 2012-2016

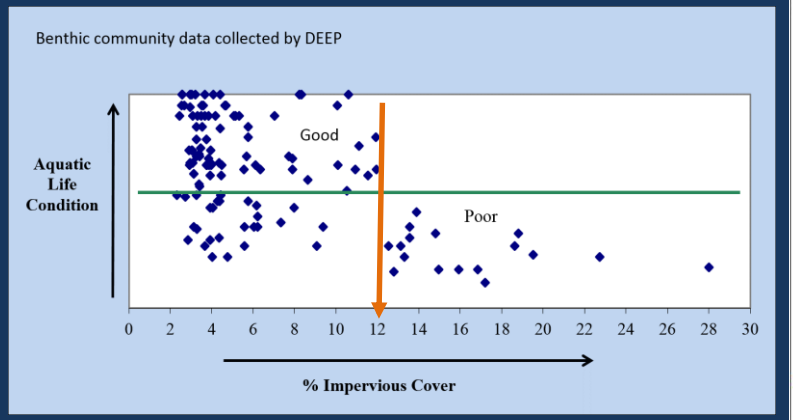
NEMO Bioretention Cell Laurel Hall UCONN

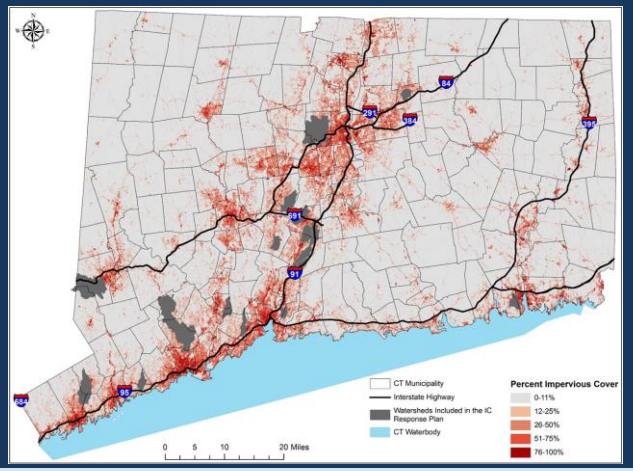
NEMO Green Roof UCONN

[Watershed Response Plan for Impervious Cover (2015)]

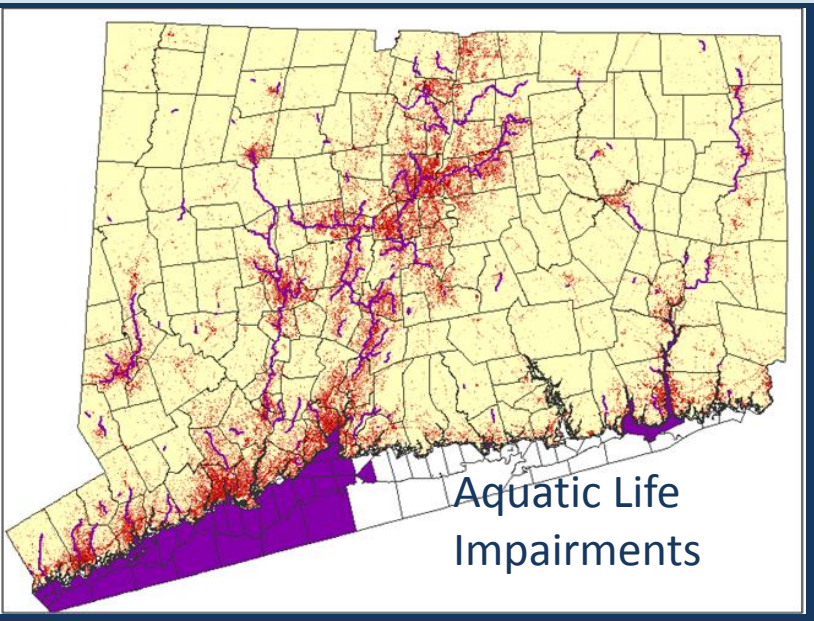
Watershed Response Plan for Impervious Cover (2015)

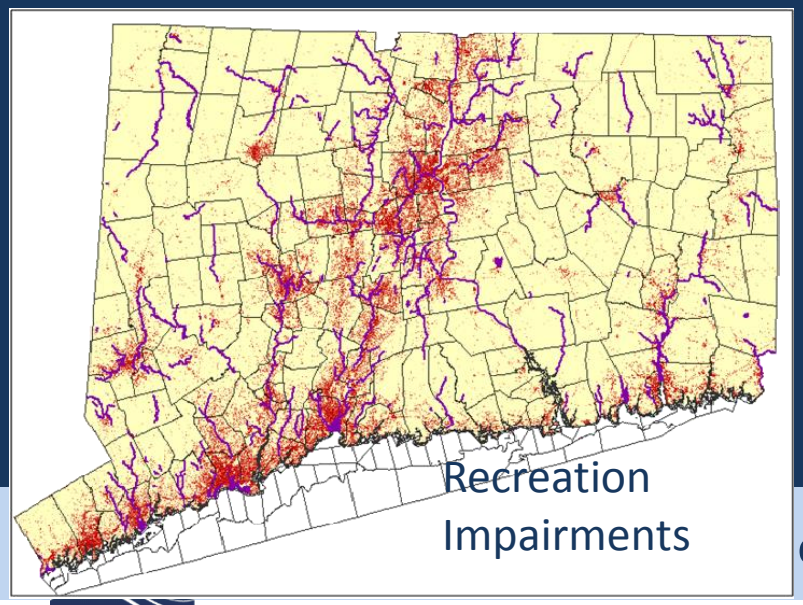
- **Addresses Storm Water Impacts on Water Quality**
- Resource Guide
  - What to do
  - Where to target efforts
  - Success stories
- Procedure to Calculate Directly Connected Impervious Cover
- Covers 20 Segments in 15 Watersheds

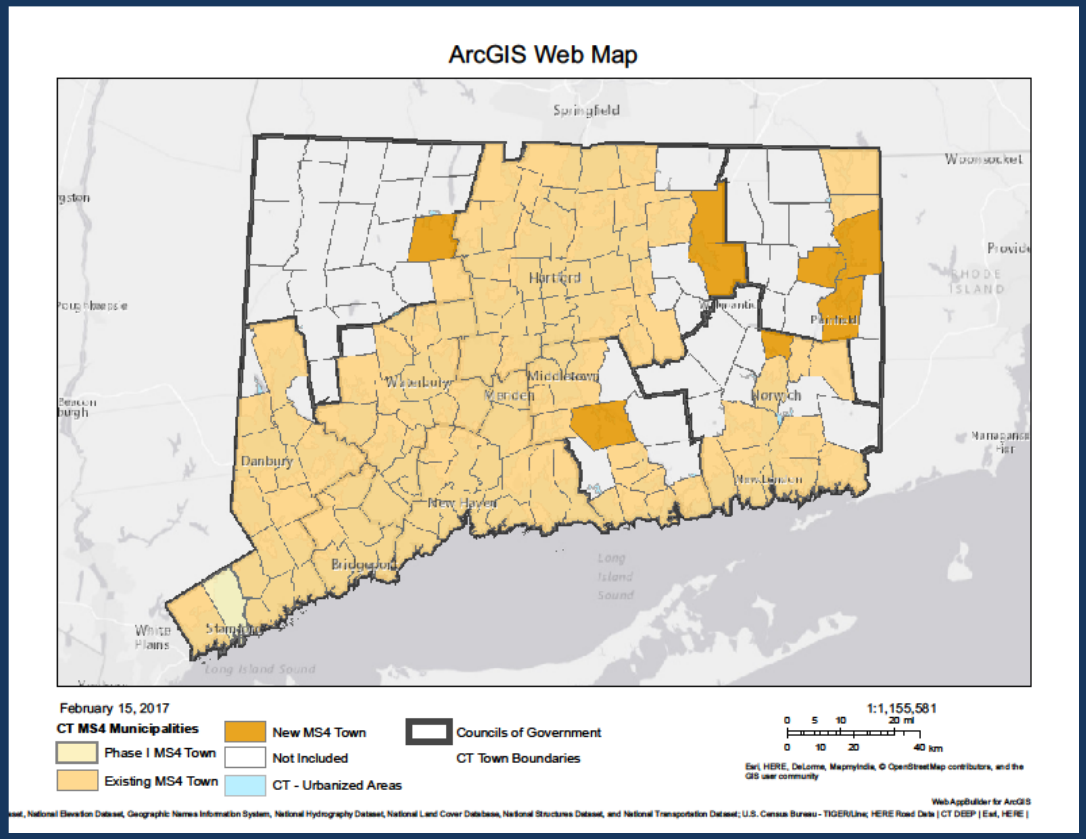




MS4 Permit Coverage, IC, Impairments





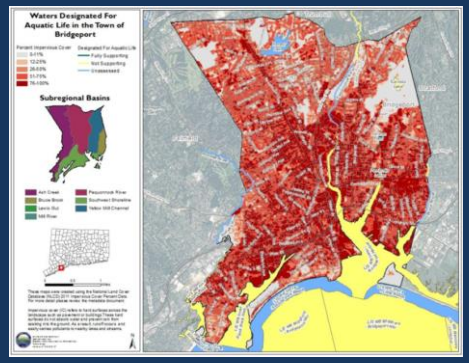


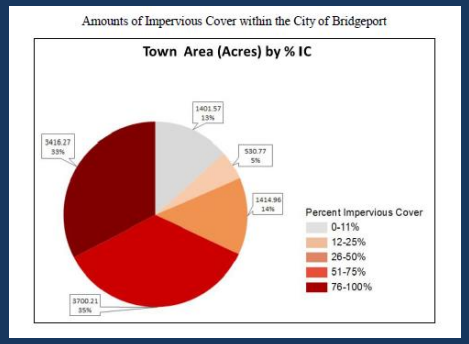
of Energy and Environmental Protection

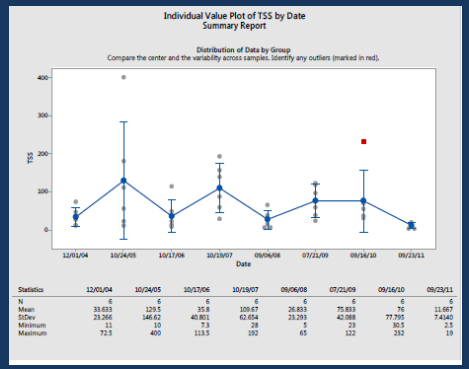
IWRM Focus Areas: 2012-2016

Storm Water

- WQ Based Permitting Assistance
  - 112 Municipal Fact Sheets focused on Storm Water Impacts on Water Quality
- Permits
  - Developed to address water quality
  - Incorporate concepts from Watershed Response Plan
  - 2015 Municipal MS4 Permit
  - 2017 DOT MS4
- TMDL Alternative approach (Direct Implementation)



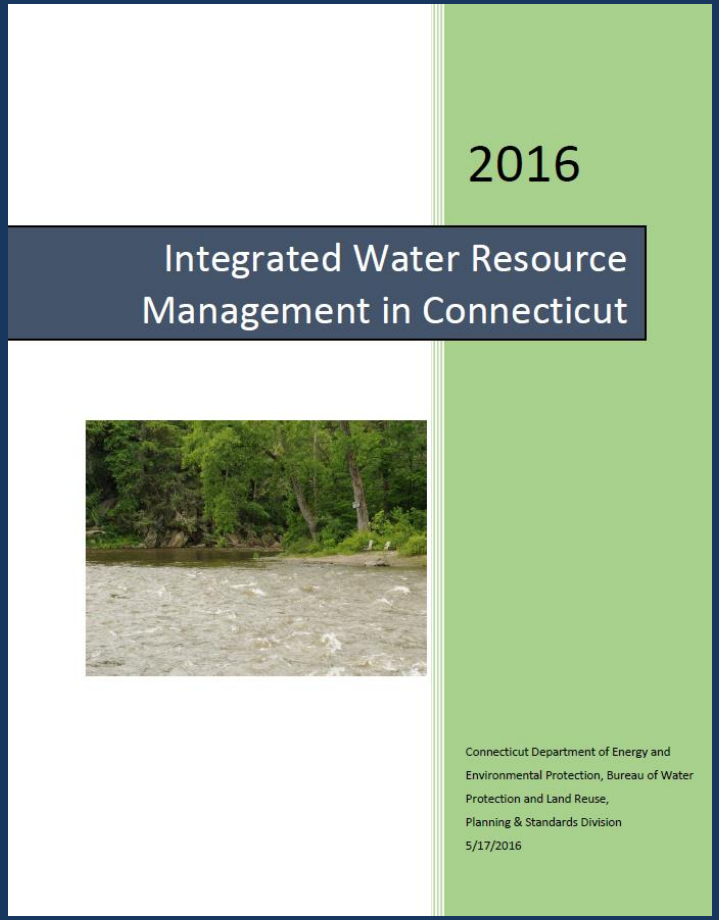




IWRM Focus Areas: 2012-2016

- Conduct Public Process / Outreach to:
  - Identify Water Quality Focus Areas
  - Initial Watersheds for Plan Development

[CTDEEP Integrated Water Resource Management Web Page]



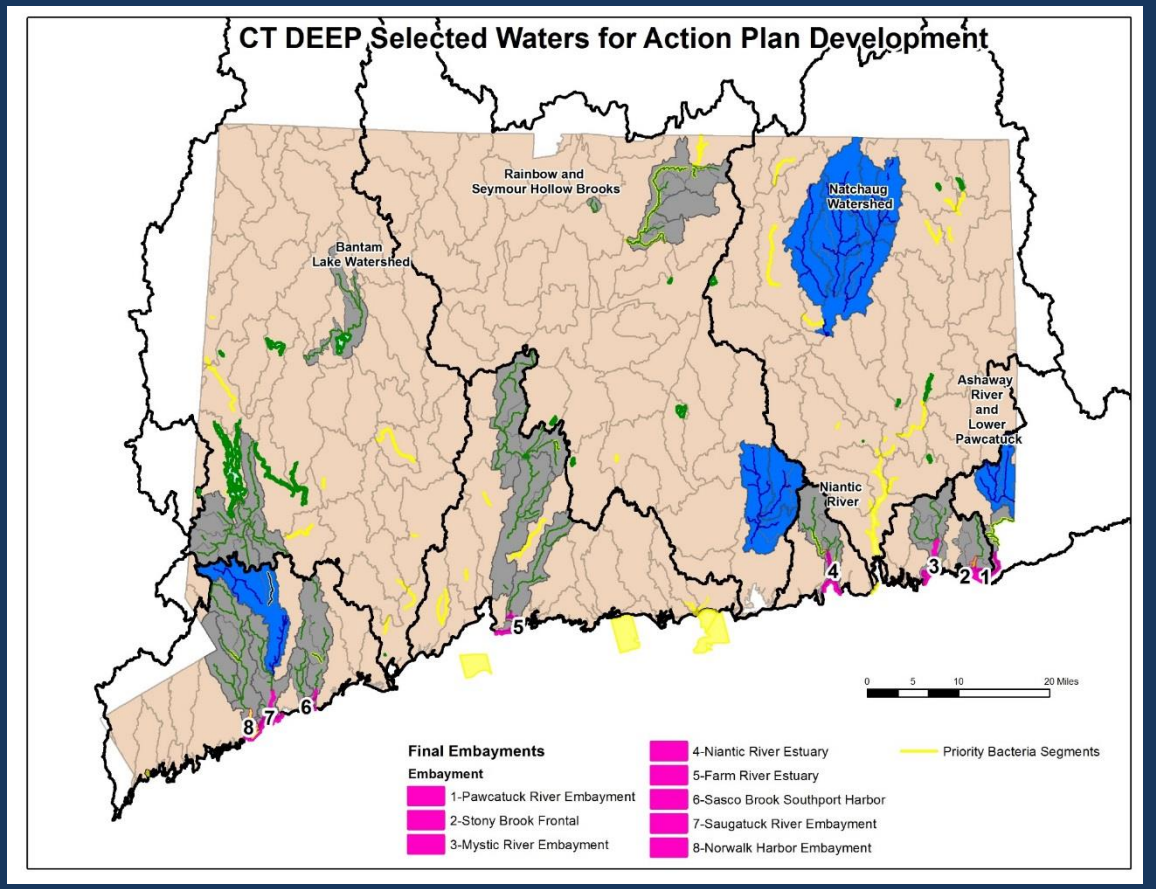
IWRM Updates 2016 Based on Public Comment

- Water Quality Priorities
  - Continue work on bacteria impairments and storm water
  - Expand focus to include :
    - nutrients, coastal areas & aquatic life/wildlife support
    - Water Quality Restoration & Protection

IWRM Updates 2016 Based on Public Comment

Locations for Initial Water Quality Restoration and Protection Plans

- Developed using EPA Recovery Potential Screening Tool modified with CT-specific information
- Active projects and partnerships
- Public Feedback



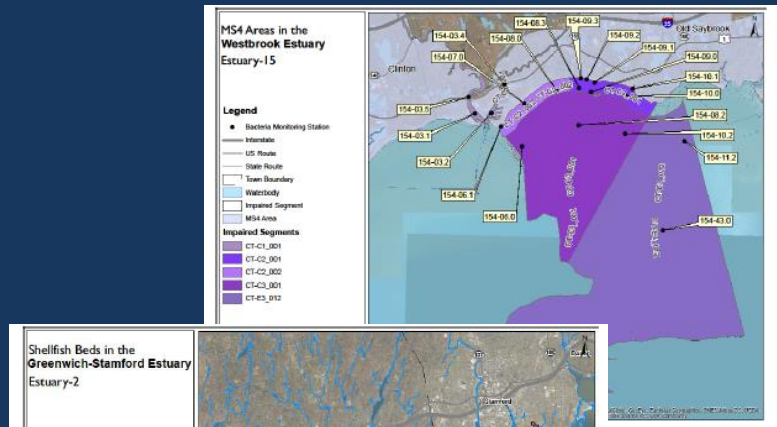
Integrated Water Resource Management Project Updates

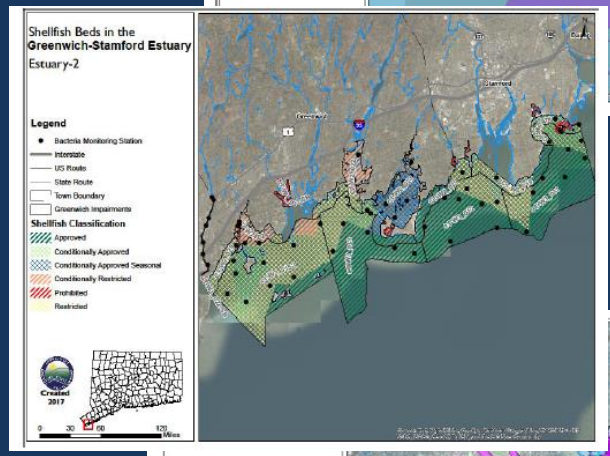
Connecticut Department of Energy and Environmental Protection

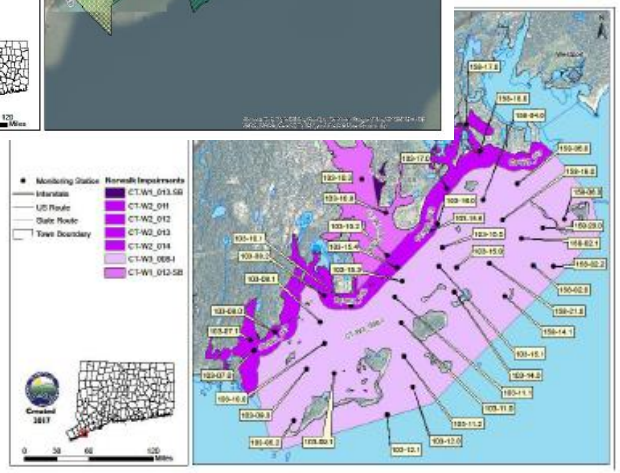
Status: New or Updated TMDLs for Bacteria

- TMDLs for Bacteria
  - Continued TMDL Development

Waterbody Type	Commitment	In Progress	Done
Freshwater Rivers & Lakes	53	7	
Coastal Areas	16	5	7

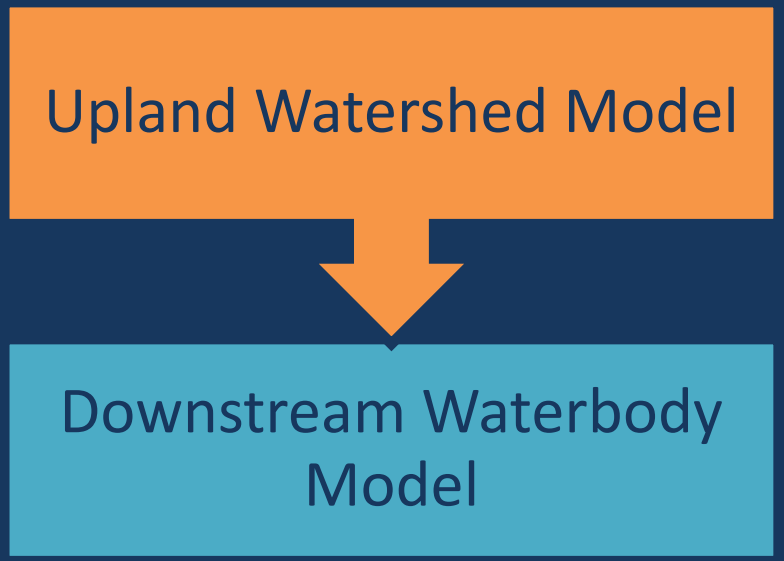






Overview: Watershed Based Approach to Nutrients

- Objective:
  - Develop a watershed scale approach
  - Evaluating nutrient related environmental conditions and sources
  - Nitrogen & Phosphorus
  - Point and Nonpoint Sources
  - Nutrient effects in
    - freshwater watersheds & associated embayments
    - Lakes
  - Restoration and Protection



Using Models in TMDL and Other Programs

- Models simulate water quality and hydrology
- Include ambient and source conditions
- Extend data sets
- Develop WLA and LA
- Allows for scenario analyses
- Supports Implementation Plan Development

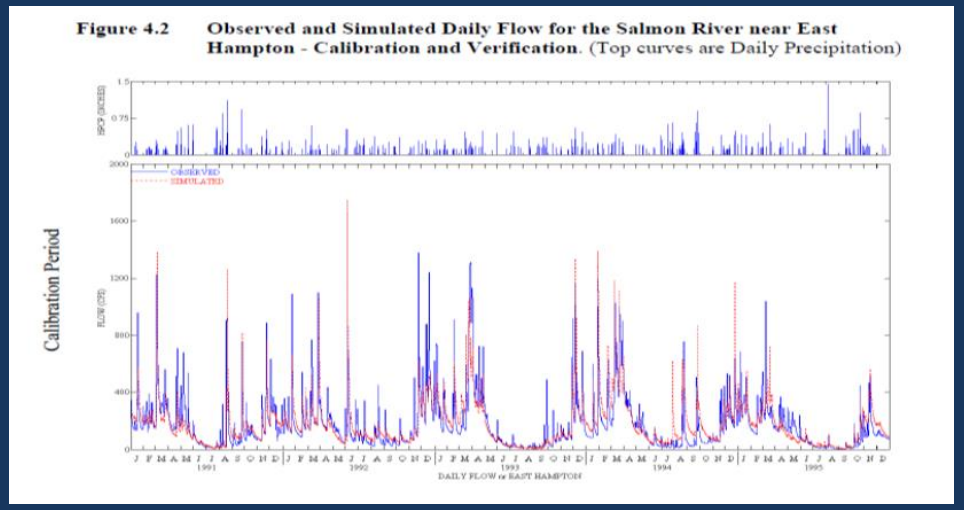


Figure 4.2 **Observed and Simulated Daily Flow for the Salmon River near East Hampton - Calibration and Verification.** (Top curves are Daily Precipitation)

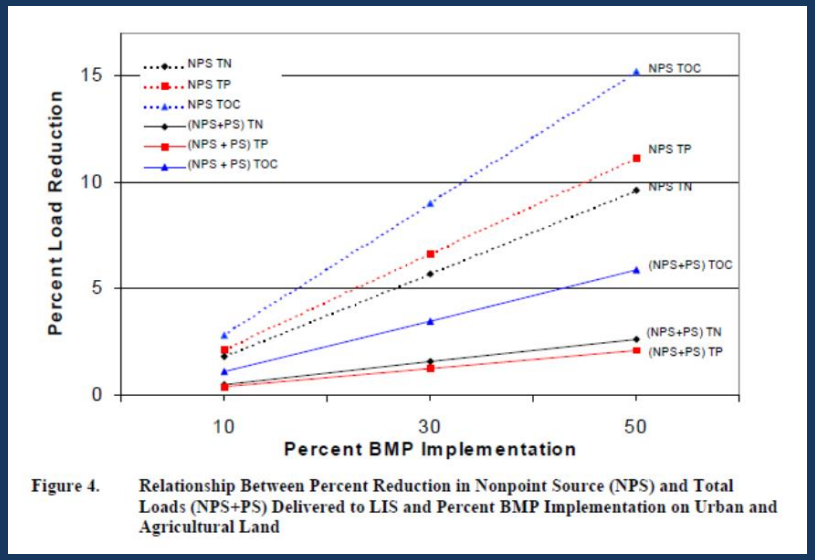


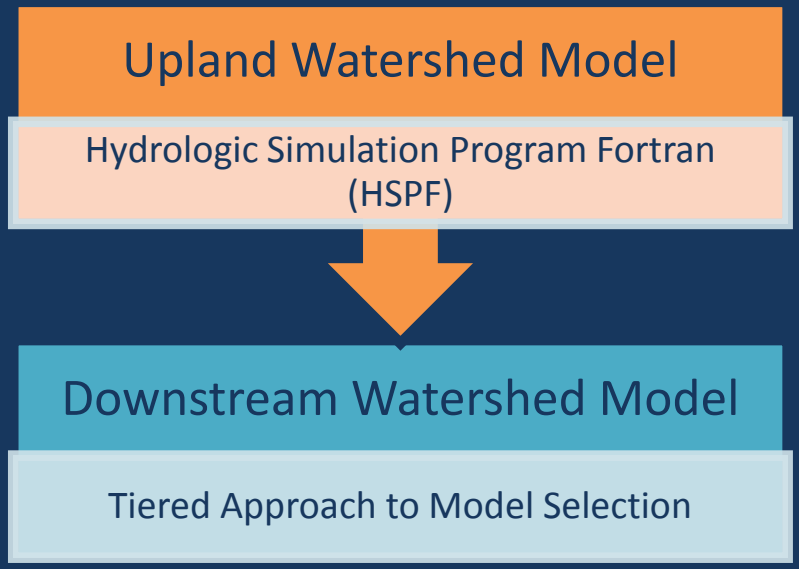
Figure 4. **Relationship Between Percent Reduction in Nonpoint Source (NPS) and Total Loads (NPS+PS) Delivered to LIS and Percent BMP Implementation on Urban and Agricultural Land**

Nutrients in Coastal Embayments and Contributing Watershed

Connecticut Department of Energy and Environmental Protection

Overview: Watershed Based Approach to Nutrients

- Estuaries and Associated Freshwater Watersheds
- Build on existing WQ restoration activities
  - Bacteria TMDLs
  - WQ Based Permits
  - EPA Nitrogen Reduction Strategy
  - CT Second Generation Nitrogen Strategy
  - Habitat improvements



Pawcatuck River Watershed & Estuary

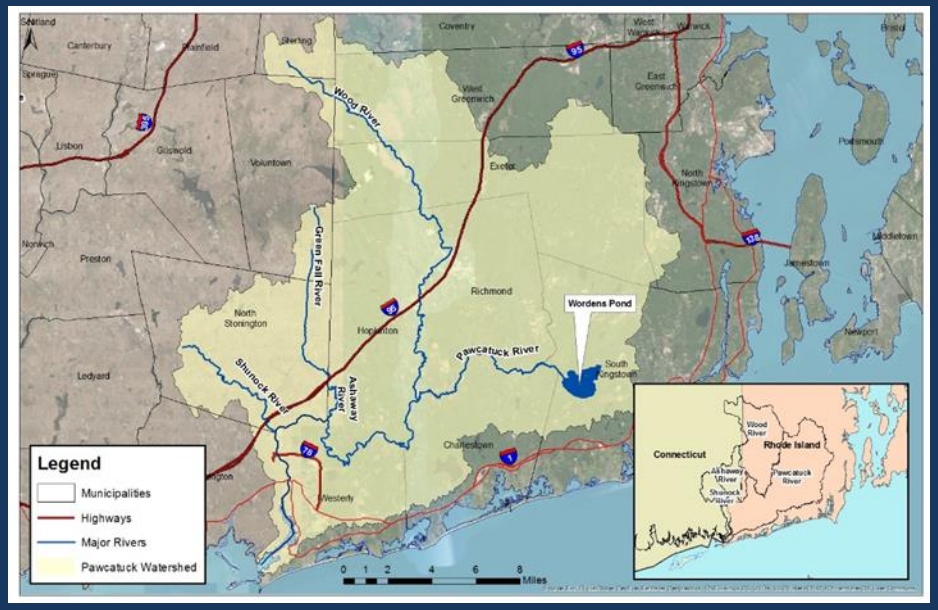
Pawcatuck River Estuary

- WQ Impairments from bacteria & insufficient oxygen
- USGS study nutrients decreased 1975-2015
- Other studies
  - Disappearance of eelgrass
  - Extensive growth *Cladophora spp.*
  - Mucky, oxygen poor sediments
- Highest total load of nitrogen per embayment area in Long Island Sound (Vaudrey et al, 2016)

Partnering for the Pawcatuck

Project Partners:

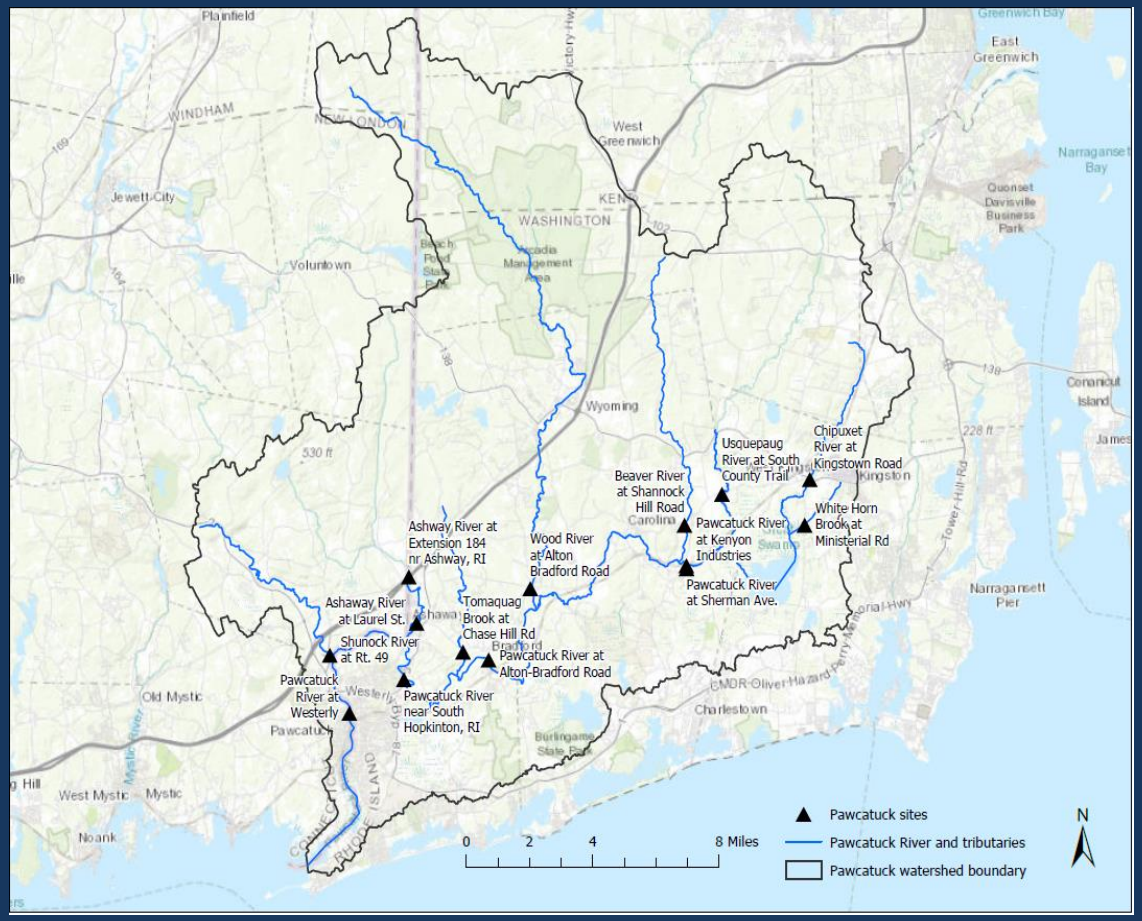
- CTDEEP,
- Rhode Island Dept of Environmental Management
- Save the Bay



Project Supported by a Southeast New England Program (SNEP) Watershed Grant, which is funded by EPA through collaboration with Restore America's Estuaries https://estuaries.org/

SNEP
Southeast New England Program

SNEP Project Components



Water Quality Monitoring

- Monitoring by USGS
- Nitrogen, phosphorus, flow, solids, dissolved oxygen, chlorophyll a, general chemistry
- Samples collected monthly November – March and bi-weekly April – October

Objective: Generate WQ data in upland watershed that characterizes a range of flow conditions, weather and seasons

SNEP Project Components

- HSPF Watershed Model
  - Hydrologic Simulation Program - Fortran
  - Comprehensive
  - Hydrology & WQ
  - Addresses soil, groundwater, surface water processes
  - Storm Events
  - Point & Non-point Sources
  - Used previously in CT, RI & other states
  - Developed for Fresh water portion of watershed
  - Supported by EPA and USGS

Objective: Create a tool to evaluate and predict and evaluate watershed responses based on current and future conditions

Pawcatuck Project Communication & Outreach

- Project web page
  - Updates
  - Reports
  - Data
- Interactive Story Map
- Meetings with Partners and Stakeholders to be planned

[Pawcatuck Project Website]

Click on the picture above to go to the Pawcatuck Project Story Map

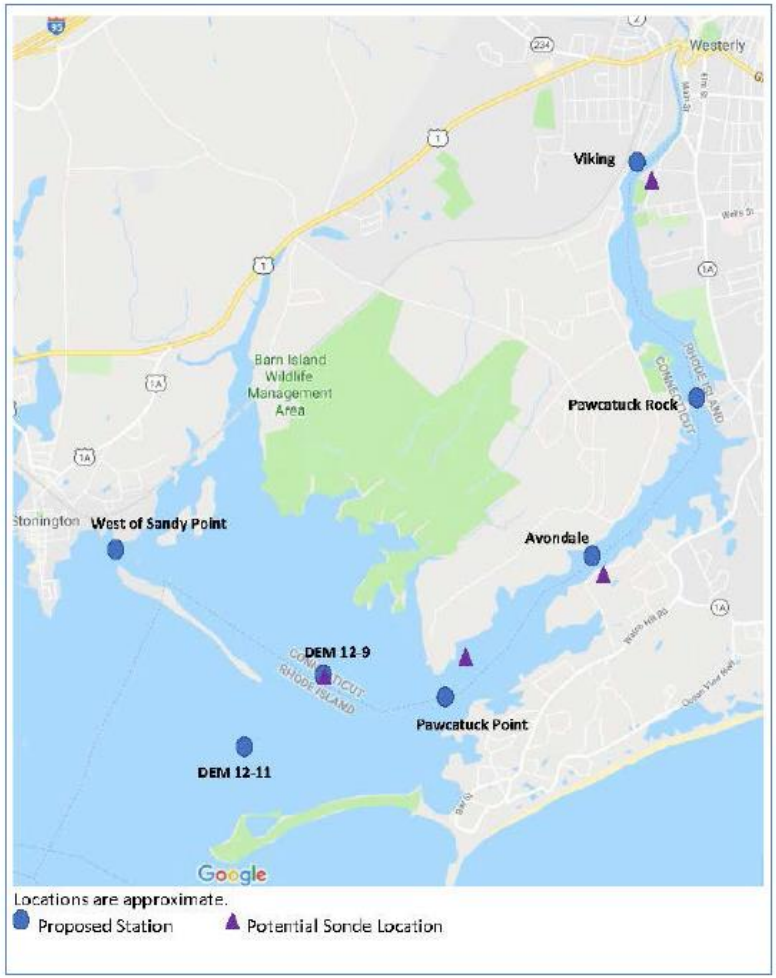
Pawcatuck Watershed: Estuary Work

Sampling

- 2018
  - Sampling in Pawcatuck River Estuary by RIDEM & USGS (CT)
- 2019
  - Sampling in Pawcatuck River Estuary and Little Narragansett Bay by RIDEM and USEPA
  - Macroalgal sampling by Dr. Vaudrey using Unified Water Study Procedures
  - Reach out to other sampling efforts

Modeling

- Consulting with EPA Narragansett Lab



Extending to Other CT Embayments

Support from LISS to develop HSPF Model for rest of CT

- Pawcatuck Project is demonstration project for this concept
- Working with USGS to develop associated monitoring program
- Expect to contract for statewide HSPF model update
- Considering a tiered approach to embayment modeling
- Focus on initial embayments identified in IWRM
- Coordination with other LIS efforts

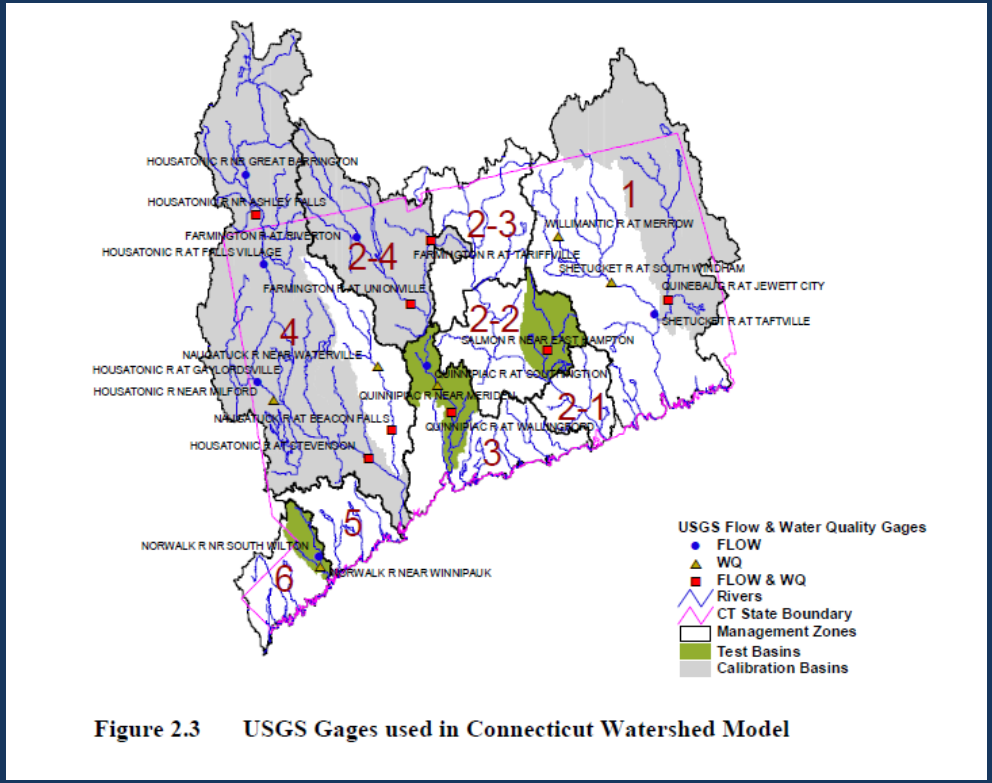


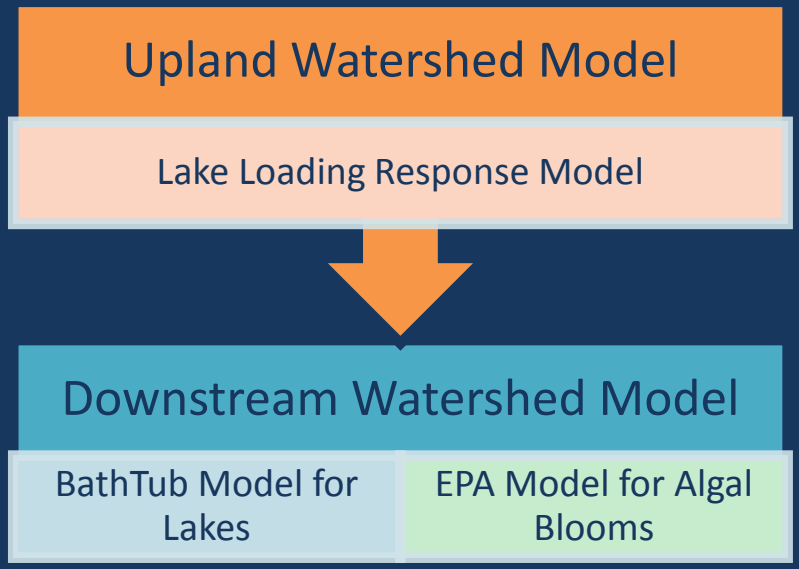
Figure 2.3 USGS Gages used in Connecticut Watershed Model

Nutrients Affecting CT Lakes

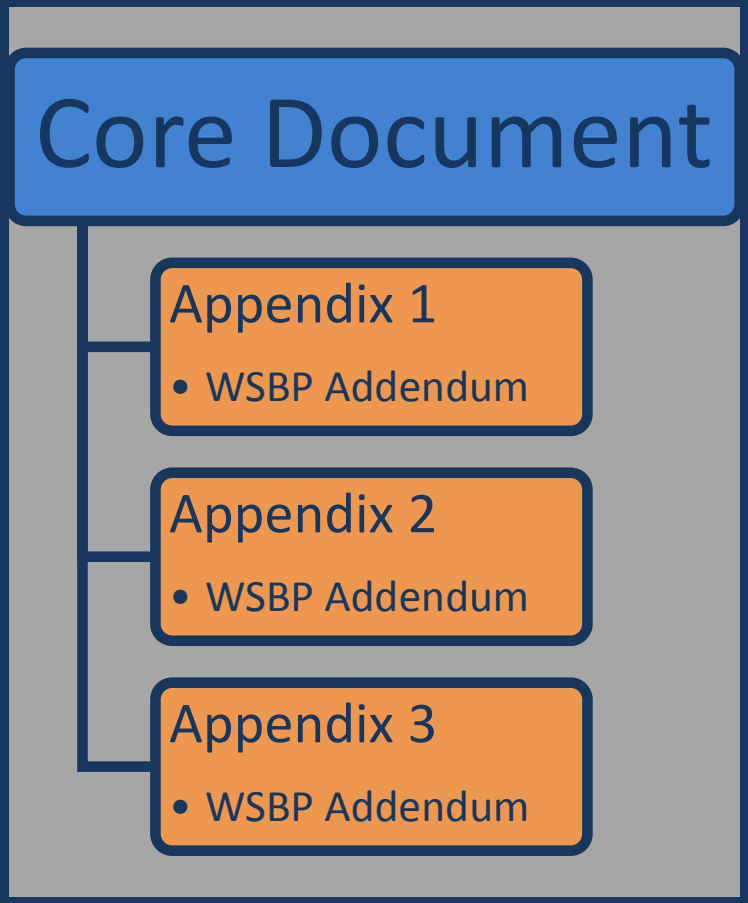
Connecticut Department of Energy and Environmental Protection

Overview: Watershed Based Approach to Nutrients

- **Lakes and Associated Watersheds**
  - Build on existing WQ restoration activities and partnerships
  - Develop modeling capacity at CTDEEP for project models
  - Coordinate with EPA HQ on application of EPA model (under development) in CT regarding nutrients and Harmful Algal Blooms



Developing Statewide Approach for Lakes



Core Document

- Contains general information on required elements for TMDLs and Watershed Based Plans
- Includes reference & resource materials to assist implementation

Appendices

- Watershed Specific Appendices consistent with TMDL requirements

Addendums

- Developing Watershed-Based Plan Addendum Template
- Include components of 9-element plans not fully covered in Core document or watershed specific appendix
- Focus on Implementation Activities

Bantam Lake

- CT's largest natural lake
- Important public resource for swimming, water skiing, fishing, boating, other recreation
- Affected by nuisance aquatic vegetation
- Summer algal blooms beginning in July or August
- Bottom phosphorus concentration increase as dissolved oxygen decreases

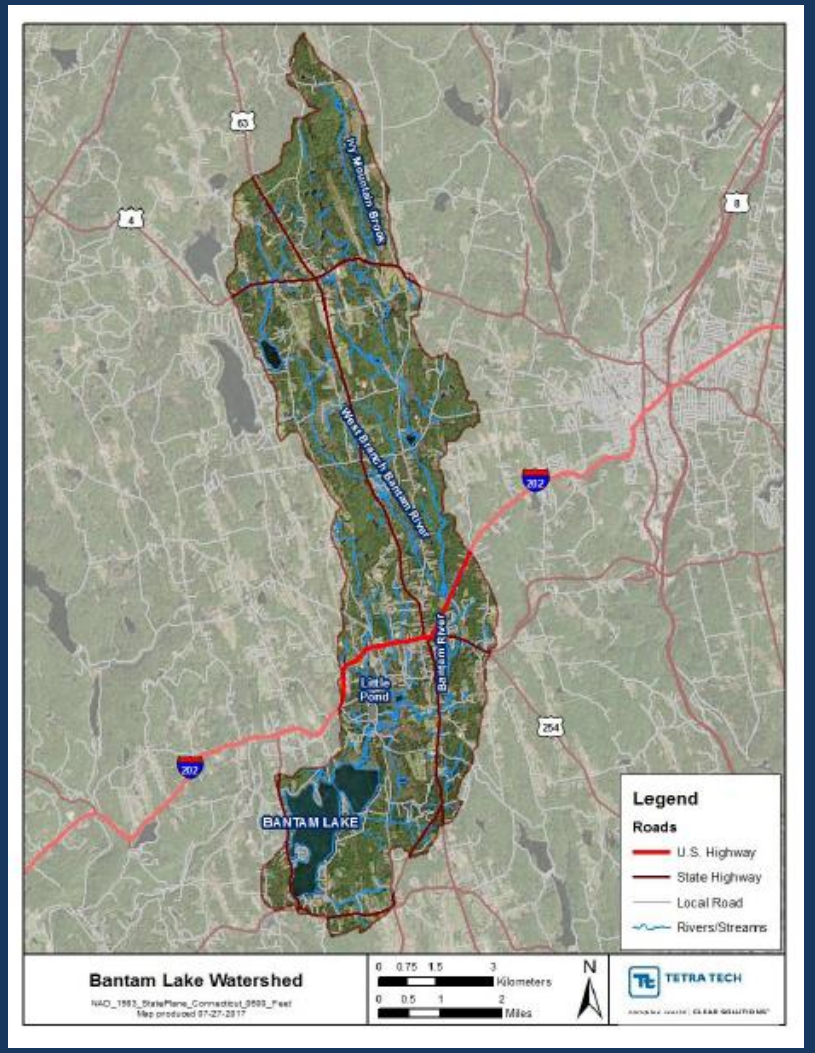
Photo from Bantam Lake Protective Association
http://bantamlakect.com/aboutus.html

Partnering for the Bantam Lake

Project Partners:

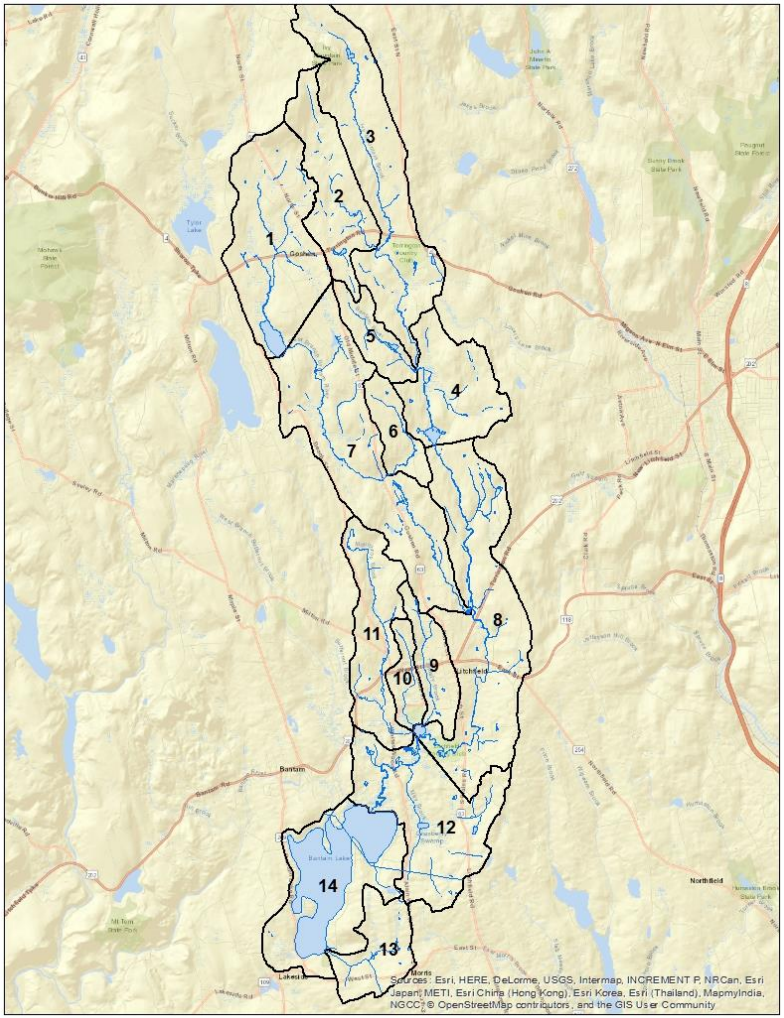
- CTDEEP
- Bantam Lake Protective Association
- White Memorial Conservation Center

Project Supported by a grants from USEPA through the 303d and 319 Programs



Project Activities

- Gathered data from Bantam Lake and Contributing Watershed
- Currently working with Contractor for Lake Loading Response Model and BathTub Model Development
- Starting Contracting Process for WSBP Addendum



CT Lake Data Request

- EPA is developing a model that relates Chlorophyll A levels to concentration of algal toxin (microcystin) in lakes
- CTDEEP is requesting data from CT Lakes where both Chlorophyll A and microcystin have been analyzed in the same sample
- This data will be provided to EPA to help develop a CT-specific version of the draft national model
- Please contact Traci Iott at CTDEEP if you have data to share

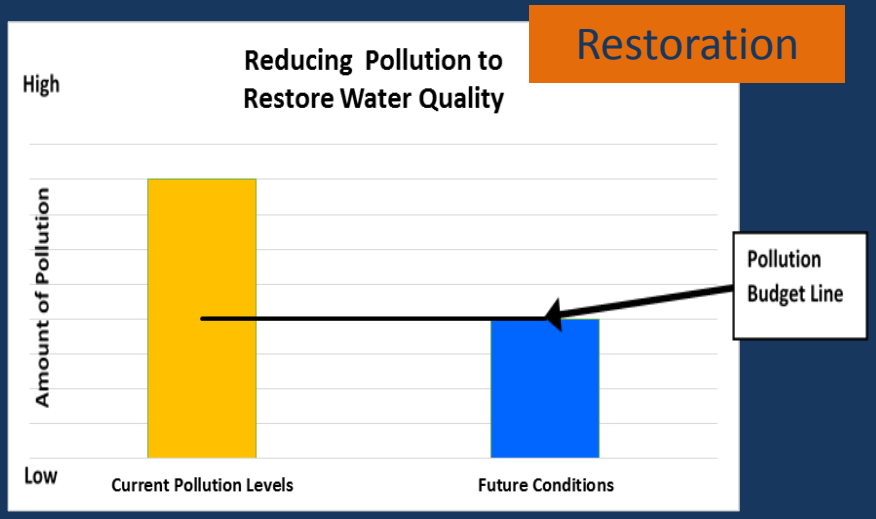
Developing Water Quality Protection Plan

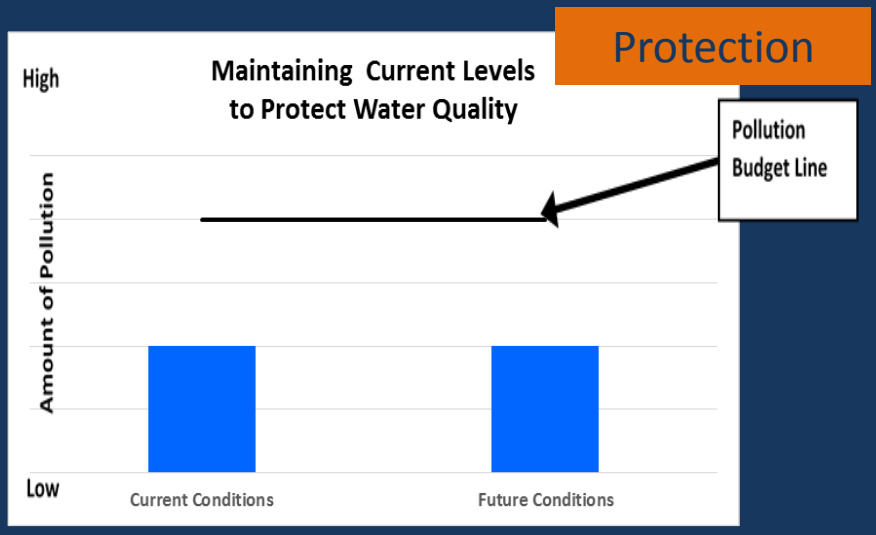
Connecticut Department of Energy and Environmental Protection

Protecting Water Quality

There are significant benefits to communities and the environment when areas with good water quality can be protected

- Multiple Efforts to Protect Water Quality
  - Antidegradation Policy in Water Quality Standards
  - Protection Plans in TMDL Program
  - Healthy Watershed Plans in Nonpoint Source Program

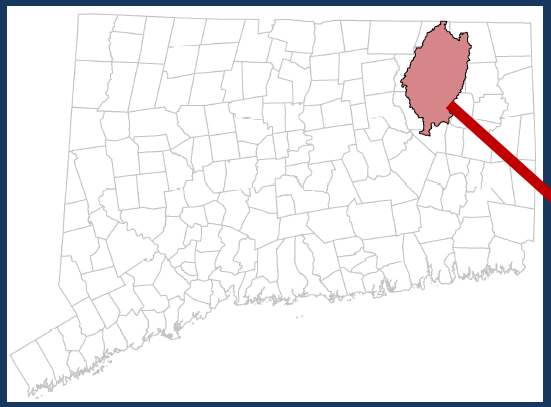




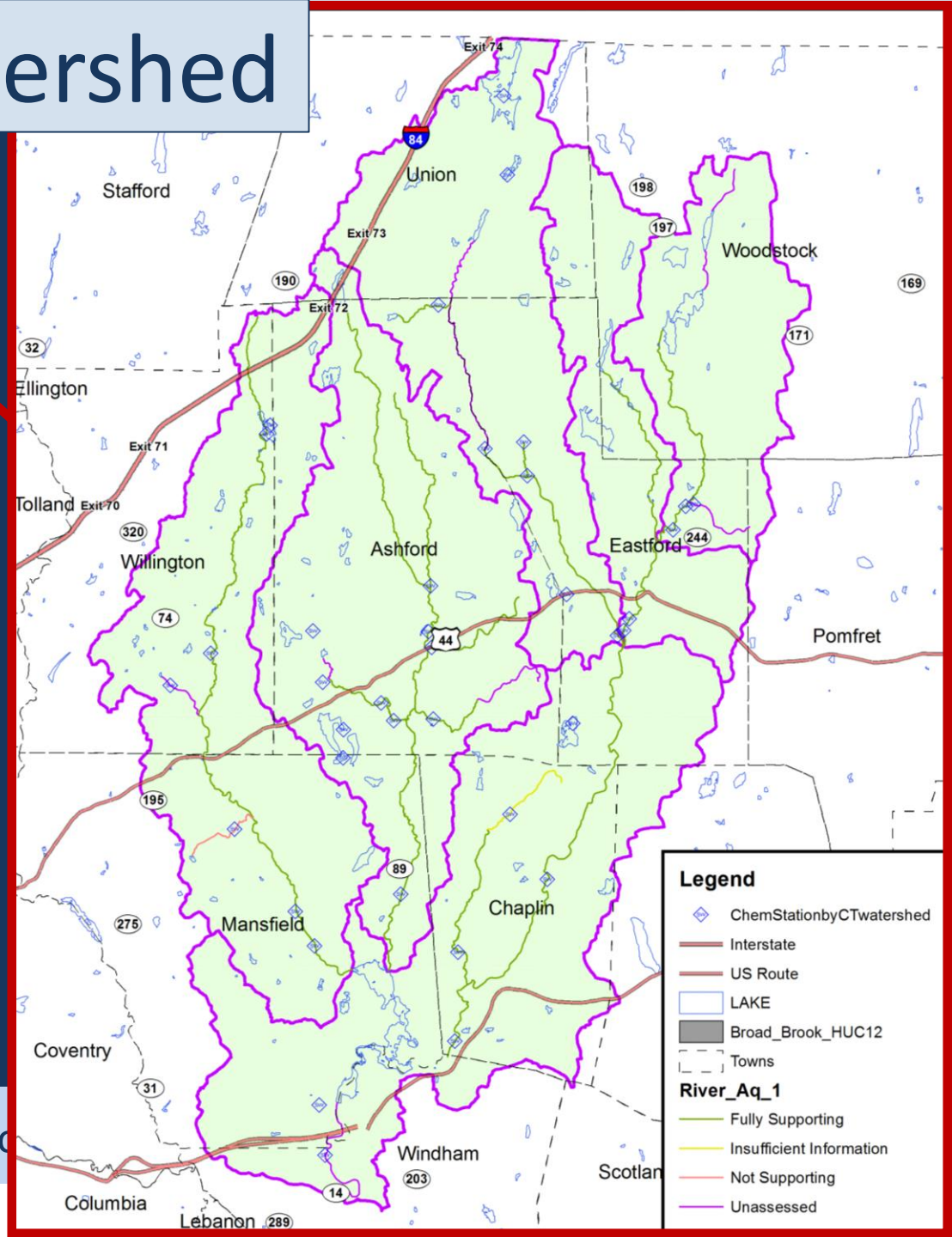
Developing Protection Plan Approach

- Develop an approach to planning for Healthy Watersheds that can be applied throughout CT
- Expected Plan Elements
  - Information on Water Quality conditions
  - Information on potential sources that could affect water quality
  - Identification of actions to protect existing good water quality
  - Implementation plan for protecting water quality

Natchaug R. Watershed



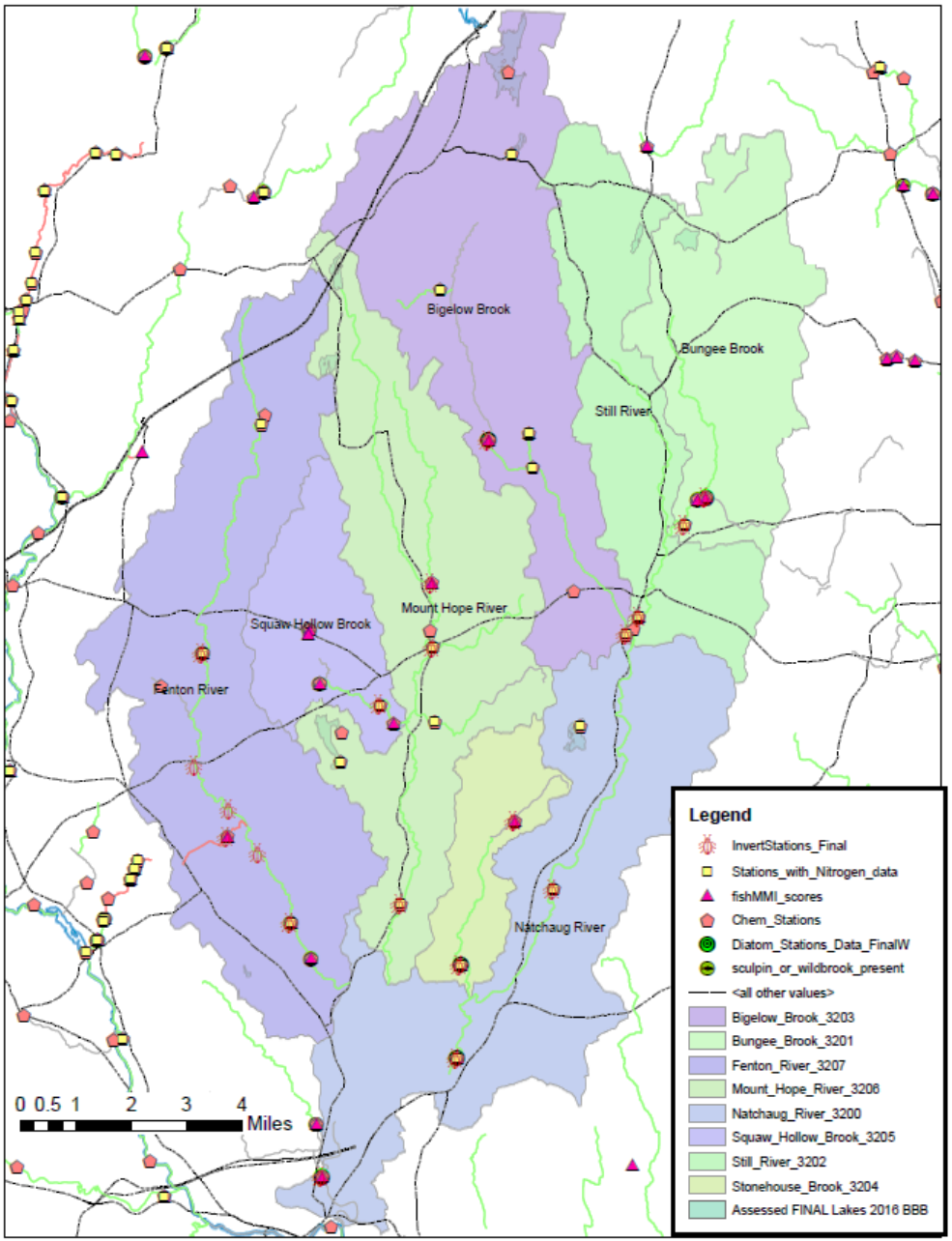
Natchaug Regional Watershed was selected as demonstration project for developing Protection Plans for Healthy Watersheds



Connecticut Department

Protection Plan for Natchaug

- Healthy Watershed Plan = Protection Plan
  - Local partnership
  - NPS pollutant focus- land use
  - Present WQ data and watershed conditions
  - Consistency w/ WQS
  - Focus on implementation to protect water quality
  - Craft a practical document



Healthy Watershed Funding

- DEEP will develop an action plan for the watershed describing water quality conditions, stressors, documenting current conditions, application of antidegradation policy, etc.

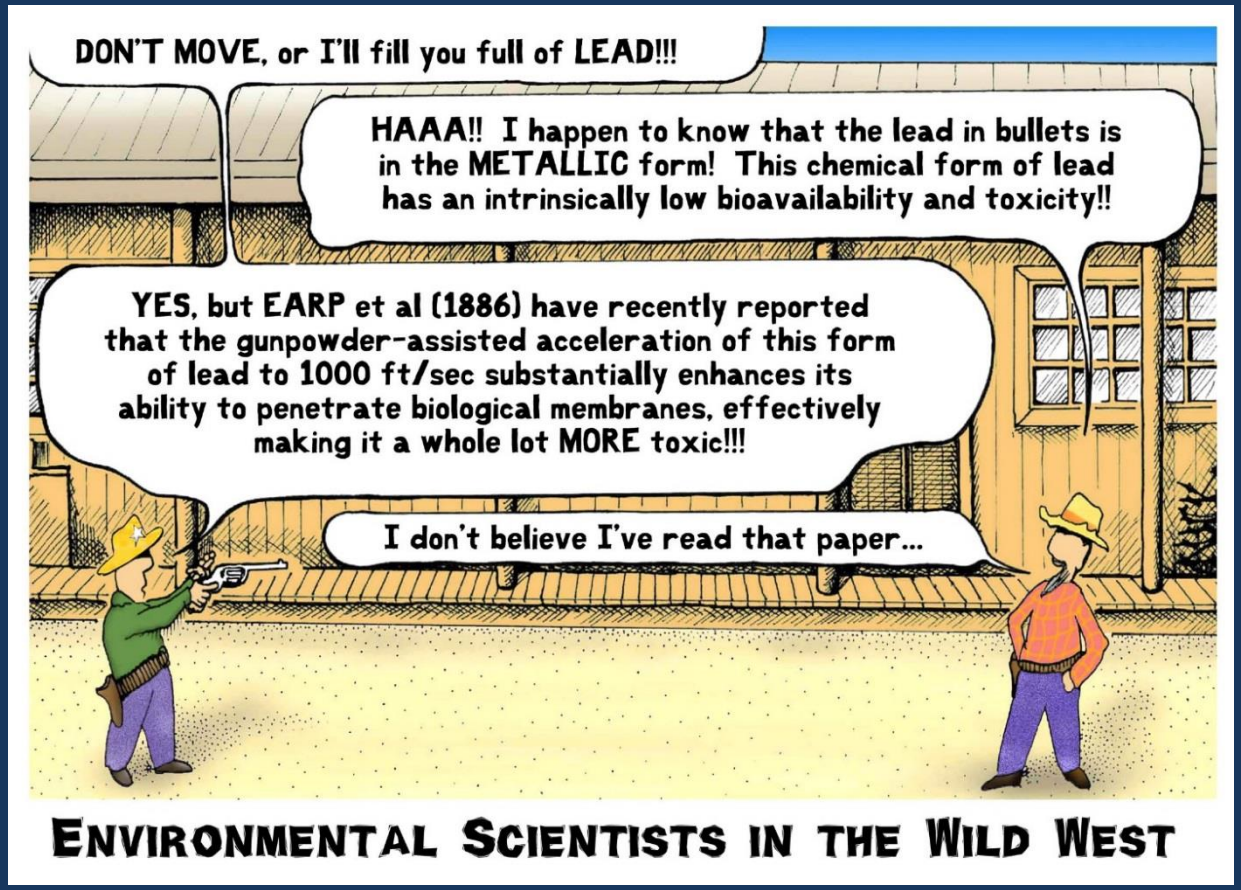
- Eastern CT Conservation District will develop a community outreach campaign to identify benefits of health waters, draft an implementation plan with adaptive management approach

Project Supported by a grant from USEPA through the Section 319 NPS Program

TMDL Alternative Projects
for Toxics

Connecticut Department of Energy and Environmental Protection

Remediation: Water Quality Protection



http://www.lab-initio.com/250dpi/nz015.jpg

- Remediation Program protects surface water and ground water resources
- Conceptual Site Models
- Risk-based Remedial Goals

Site Remediation can be used as an alternative to TMDLs

Remediation: Contaminated Sediment

WARNING

PERTAINING TO THIS SECTION OF MILL RIVER

Sediments & Blue Crabs May Contain Lead

Do Not Use Shoreline:

- No Crabbing
- No Wading
- No Swimming
- Avoid Contact with Sediments
- No Powerboats

These Activities Are Safe

- Canoeing or Kayaking
- Fishing From Boats (finfish are not affected)
- Crabbing in Southport Harbor (this area is unaffected by lead)

For More Information Call:
The Fairfield Health Department: 256-3020

CTDEEP web page for Mill River Remediation Project

Setting Environmental Goals for the Mill River

Human Health Risk Assessment

- Sediment & Surface Water
- Fish & Shellfish Tissue
- Children & Adults Fishing and Direct Contact

Ecological Risk Assessment

- Sediment & Surface Water
- Plants, Aquatic Organisms, Birds & Mammals
- Biological Assessments for Survival, Growth & Reproduction

Remediation Activities are designed to be consistent with CT Water Quality Standards

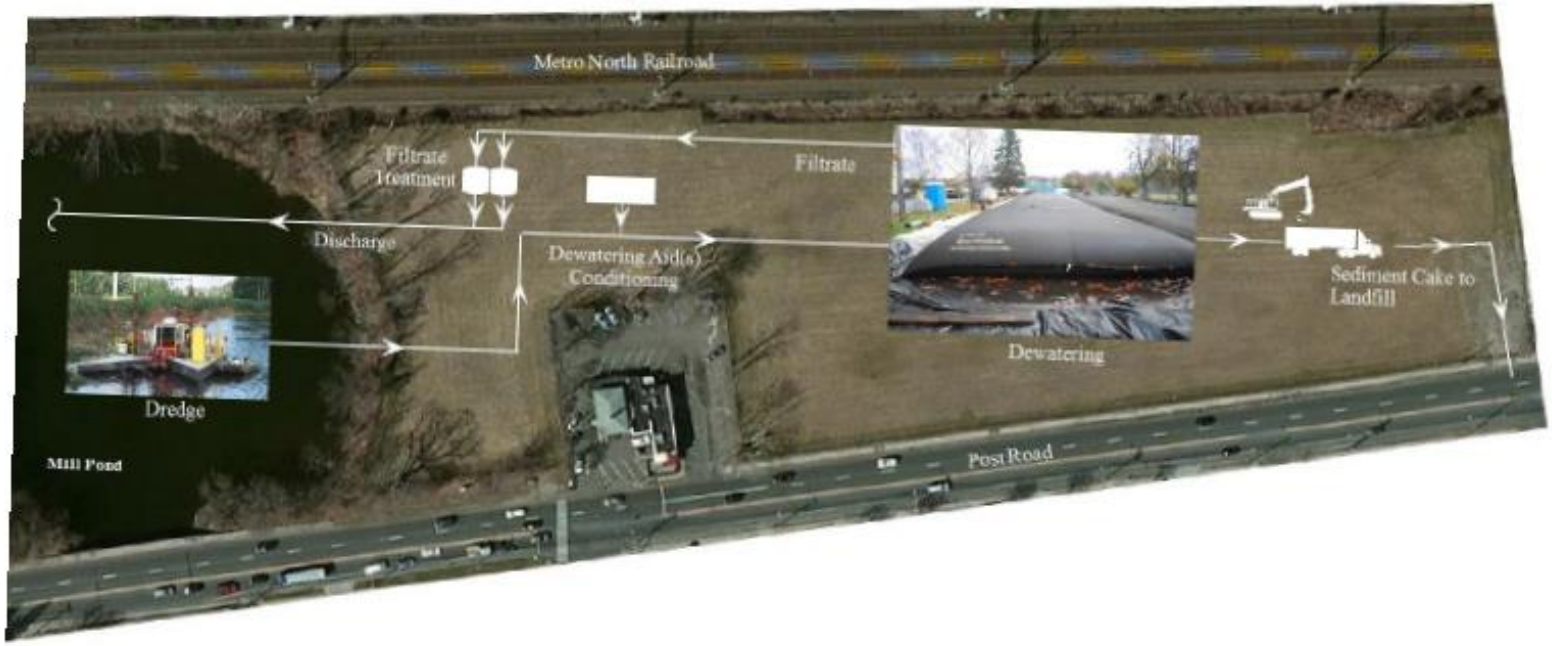
Risk-based Remedial Goals for Lead

Pre-Excavation	Area 4	Area 3	Area 2	Area 1	Area 5
Minimum	2	1	2.5	3	1
Maximum	1,300	3,200	170,000	3,600	6,200
Average	93	355	3,760	590	148

Ecologically Based Remediation Goals:

- Human Health Protection
  - 400 mg/kg
- Ecological Protection
  - Birds: 437 mg/kg
  - Aquatic Organisms: 220 mg/kg

Mill River Sediment Remediation



Connecticut Department of Energy and Environmental Protection

Public Input Opportunities

Public Input Opportunities

- Integrated Water Resource Management (IWRM) and Integrated Water Quality Report (IWQR)
  - Both include identifying waters for development of TMDLs or Alternatives
  - IWRM : Allow for longer term planning
  - IWQR: Focus on shorter term planning
    - Next report, 2020 IWQR, expected to be ready for public comment in March 2020
- Public Engagement on Each Project

IWRM: Opportunity to Provide Comment

Public Coment: September 24 – October 31

- Written or email comments accepted
- Provide feedback on any aspect of IWRM from Water Quality Focus areas to associated projects
- Send comments to Traci Iott (Traci.Iott@ct.gov)

Task Force Committees - Stakeholder Involvement

Human Health

Minimize human health risk and work to prevent human exposure

Meeting Dates:

August 16

September 10

Pollution Prevention

Minimize future releases of PFAS to the environment

Meeting Dates:

August 15

September 11

Remediation

Identify, assess, and clean up historic releases of PFAS to the environment

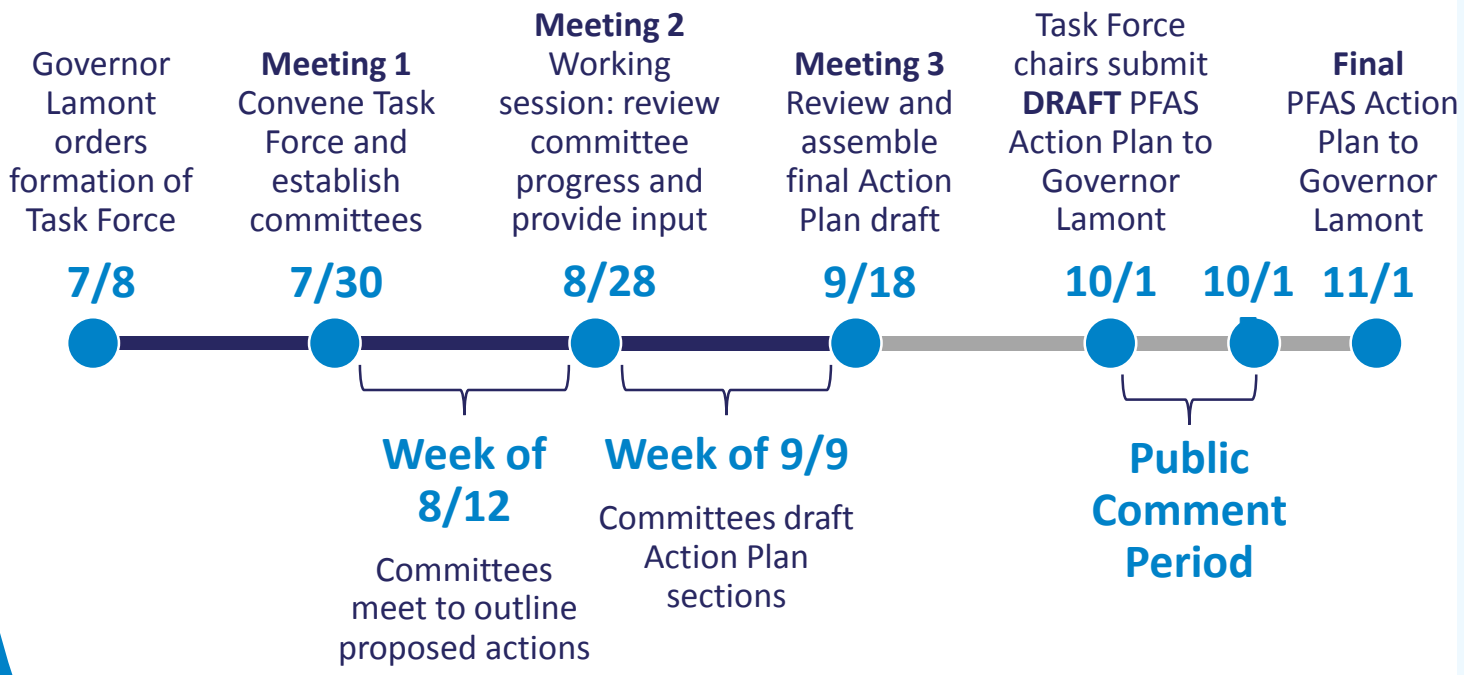
Meeting Dates:

August 16

September 12

PFAS

Task Force Timeline



Governor's Interagency PFAS Task Force

- Visit the Task Force Web Site:

  https://www.ct.gov/CTPFASTaskForce

- NEW - Preliminary Draft Action Plan posted for review
- Stay informed—sign up for the ListServ
- Email questions, comments on the October 1 Draft Action Plan to CTPFAS@ct.gov

Questions?

Traci Iott

Supervising Environmental Analyst
Planning & Standards Division
Bureau of Water Protection & Land Reuse

860 424 3082
Traci.iott@ct.gov

Networking Break: 10:45-11:15

- CT River Conservancy
- Sustainable CT
- Earthrise
- Save the River-Save the Hills
- CT Federation of Lakes
- Housatonic Valley Association
- Farmington River Watershed Association
- Eightmile River Wild & Scenic Watershed Association
- Scantic River Watershed Association
- Park Watershed Association
- Food & Water Watch
- Thames Valley Trout Unlimited
- River Advocates of South Central CT
- Rivers Alliance of CT
- Eastern CT Conservation District
- Niantic River Watershed Committee

Thank you for your participation!