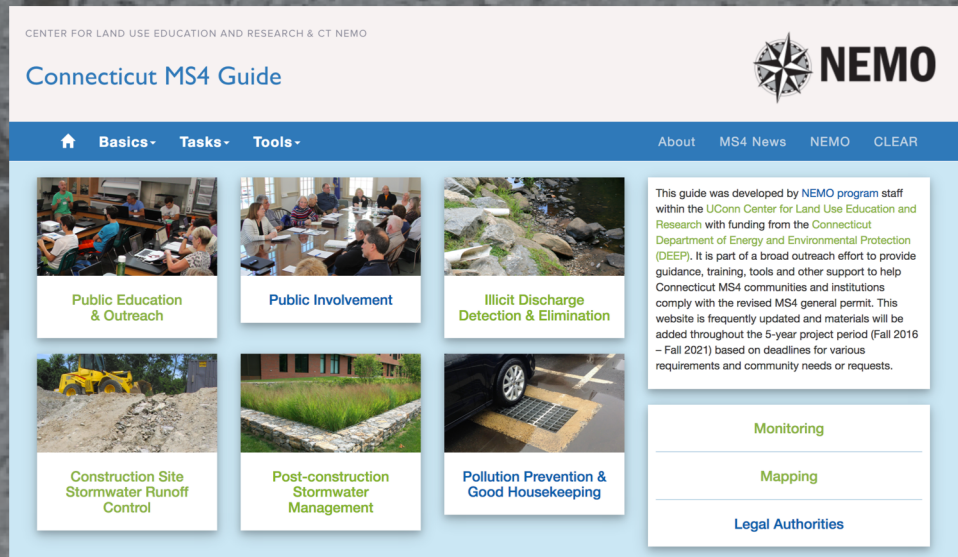


MS4 Stormwater Quality Monitoring Requirements



June 20, 2019

Amanda Ryan, UConn CLEAR

Center for Land Use Education & Research



Water (NEMO)



Land Use &
Climate Resiliency



Geospatial Tools &
Training



Conservation &
STEM Education

MISSION: to provide information and assistance to land use decision makers and other audiences in support of **better land use decisions, healthier natural resources, and more resilient communities.**

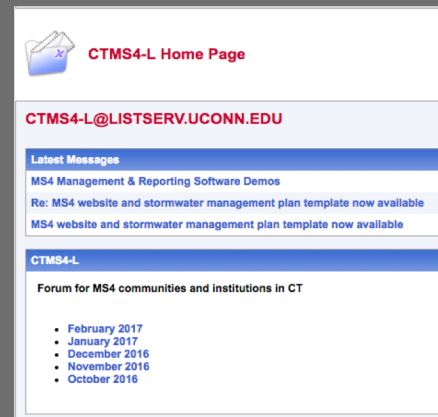
CLEAR's MS4 Support

Funded by DEEP for 5 years

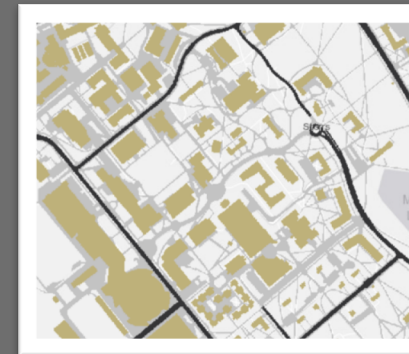
- MS4 educator
- website & listserv
- workshops & webinars
- maps & data



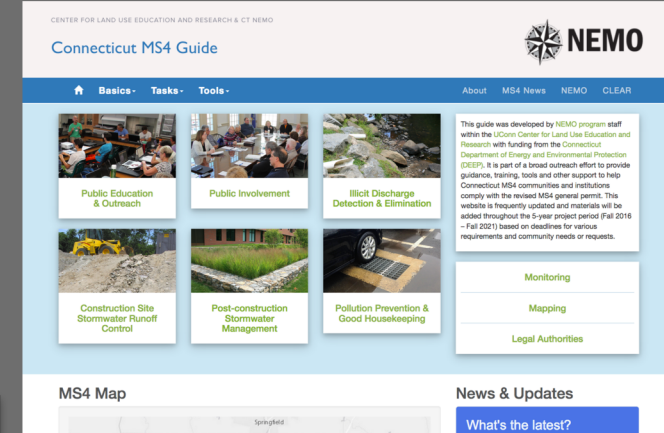
Amanda Ryan



<http://s.uconn.edu/ctms4list>



maps & data



<http://nemo.uconn.edu/ms4>



workshops & webinars

Water Quality Monitoring

CENTER FOR LAND USE EDUCATION AND RESEARCH & CT NEMO

Connecticut MS4 Guide

[Home](#)
[Basics](#)
[Tasks](#)
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[MS4 News](#)
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Public Education & Outreach

Public Involvement

Illicit Discharge Detection & Elimination

Construction Site Stormwater Runoff Control

Post-construction Stormwater Management

Pollution Prevention & Good Housekeeping

This guide was developed by [NEMO program](#) staff within the [UConn Center for Land Use Education and Research](#) with funding from the [Connecticut Department of Energy and Environmental Protection \(DEEP\)](#). It is part of a broad outreach effort to provide guidance, training, tools and other support to help Connecticut MS4 communities and institutions comply with the revised MS4 general permit. This website is frequently updated and materials will be added throughout the 5-year project period (Fall 2016 – Fall 2021) based on deadlines for various requirements and community needs or requests.

Monitoring

Mapping

Legal Authorities

MS4 Map

News & Updates

What's the latest?

Monitoring workshop coming up on Thursday, June 20th!

NEMO is offering an MS4 Monitoring workshop at Milford City

Water Quality Monitoring

Two monitoring requirements:

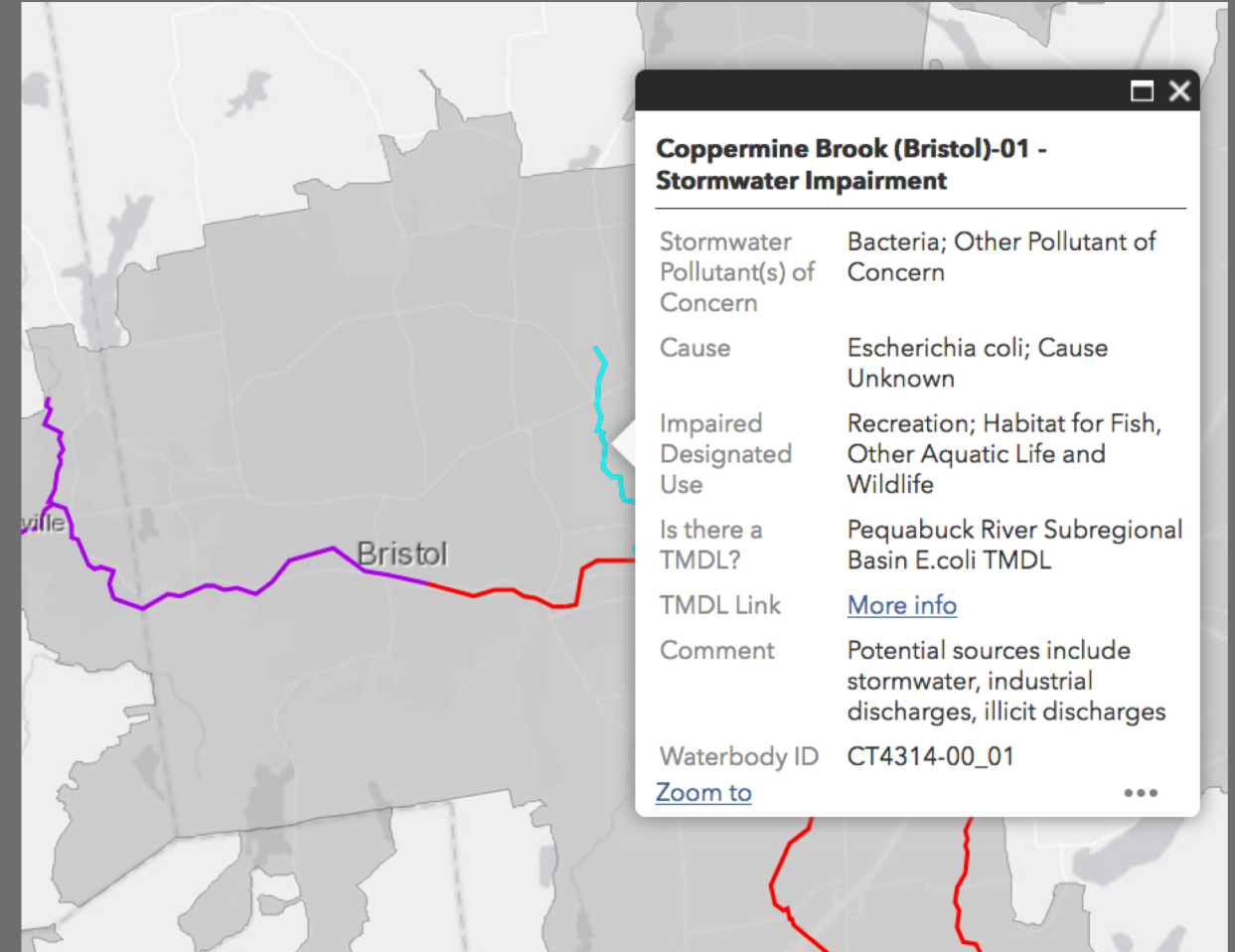
- Impaired waters
- IDDE

Monitoring Requirement Comparison

	Impaired waters monitoring	Baseline monitoring (IDDE)	Catchment Investigation Procedure (IDDE)
area covered	All outfalls to Stormwater impaired waters	Outfalls in priority areas (urbanized area, discharges to impaired waters or in basin where DCIA > 11%) that are categorized as either high or low priority catchments (see IDDE section of this website or appendix B of permit for more information)	Problem, High Priority and Low Priority catchments in the priority area. Those with at least one SVF to be investigated and screened.
type of sampling	wet weather (sample within first 6 hours of discharge from outfall)	dry weather for initial baseline screening (< 0.1 in rain in previous 24 hours)	dry weather manhole investigation wet weather screening at outfall for catchment with at least one SVF
pollutant(s) to screen for	The listed stormwater pollutant of concern (nitrogen, phosphorus, bacteria, or other pollutant of concern). For waters impaired by 'other pollutant of concern' screen for turbidity.	Listed stormwater pollutants of concern (if any), PLUS: ammonia chlorine conductivity salinity <i>E. coli.</i> (freshwater) or enterococcus (saline or brackish receiving water) surfactants temperature	Dry wx: ammonia, chlorine, and surfactants Wet wx: listed impairment pollutant(s) (if any), PLUS ammonia chlorine conductivity salinity <i>E. coli.</i> (freshwater) or enterococcus (saline or brackish receiving water) surfactants temperature
follow-up	Conduct drainage area investigation that includes: land use/development patterns business or commercial activities industrial activities DCIA natural contributors potential MS4 maintenance issues	See the Catchment Investigation procedure column.	Within year of removal of all illicit discharges in a catchment, confirmatory screening shall be done within one year

Impaired Waters Monitoring

- Know the impaired waters!
 - Red – use for determining priority area *and* for impaired waters monitoring
 - Purple – impaired waters monitoring only
- Sample all outfalls discharging to IW



What counts as wet weather?

- Any rain storm that produces a discharge from the outfall
- Single grab sample within first 6 hours of discharge
- At least 48 hours after previous rain storm
- Snow / ice melt runoff doesn't count
 - small amount OK

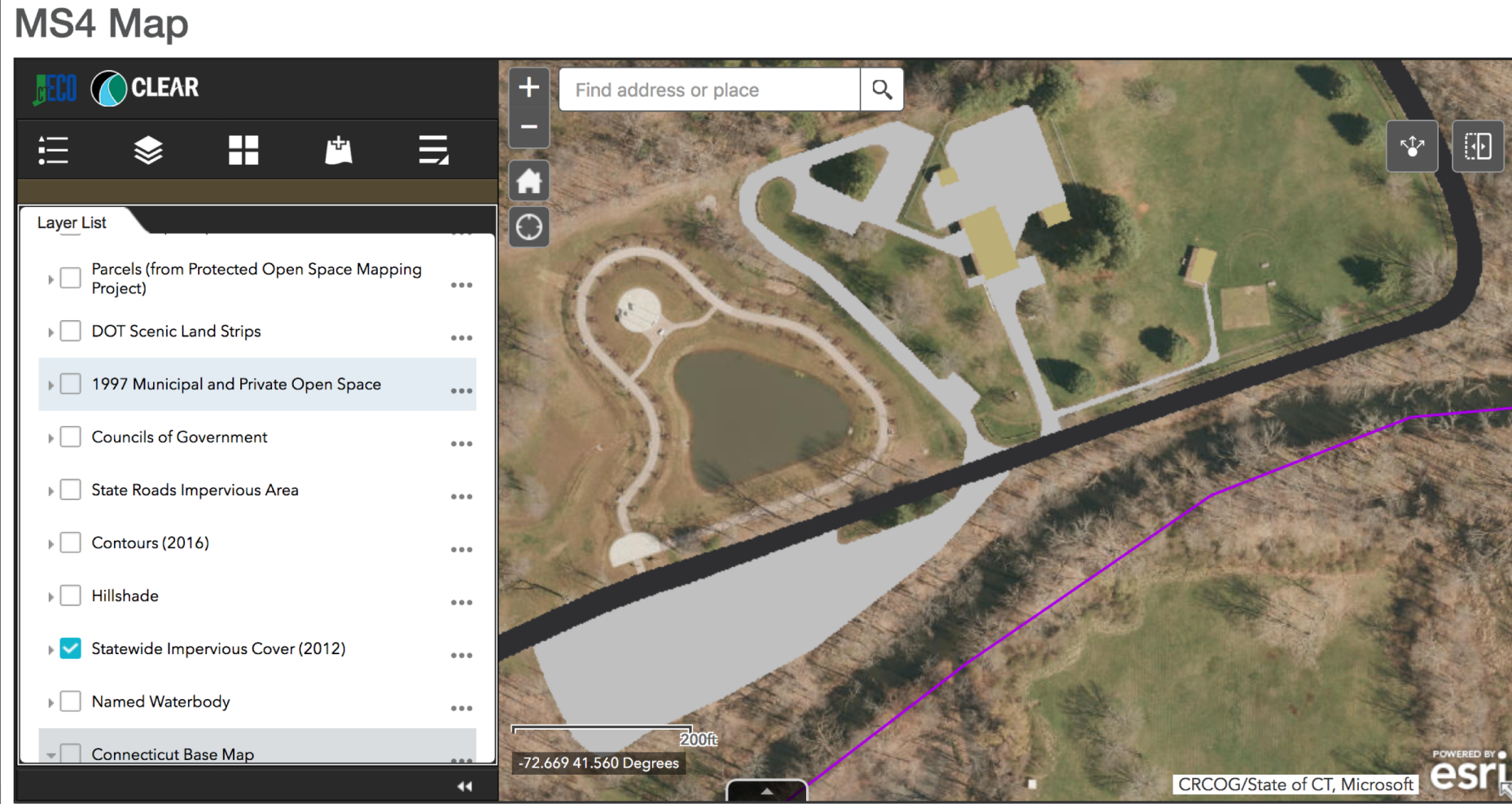


Impaired Waters Monitoring Follow-up

- High reading = drainage area investigation

Pollutant of Concern	Screening threshold
Nitrogen	Total nitrogen > 2.5 mg/l
Phosphorus	Total phosphorus > 0.3 mg/l
Bacteria	<p>For discharges to Class AA, A, and B surface waters:</p> <ul style="list-style-type: none"> - E. coli > 235 col/100ml for swimming waters and > 410 col/100ml for all others - Total coliform > 500 col/100ml <p>For discharges to Class SA and SB surface waters:</p> <ul style="list-style-type: none"> - Fecal coliform > 31 col/100ml for Class SA and > 260 col/100ml for Class SB - Enterococci > 104 col/100ml for swimming areas and > 500 col/100ml for all others
Other pollutant of concern	Turbidity 5 NTU greater than instream sample just upstream of outfall

Drainage Area Investigation



Implement control measures

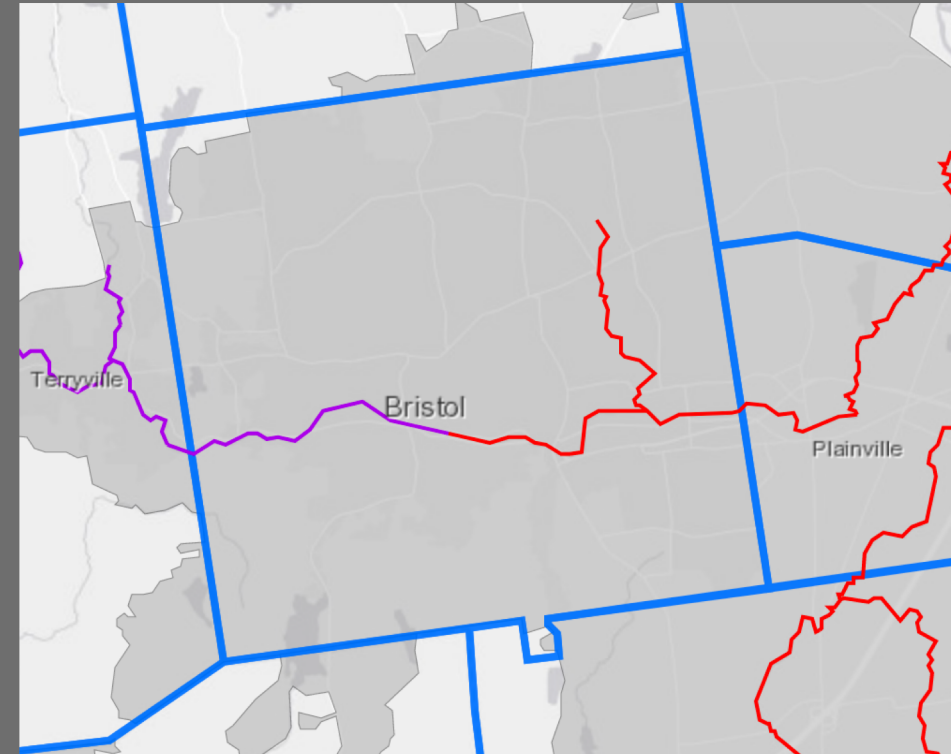
- Bacteria
 - Public outreach
 - Prioritize retrofits / source mgmt
 - Waterfowl

- Nutrients (N & P)
 - Public outreach
 - Prioritize retrofits / source mgmt
 - Turf mgmt



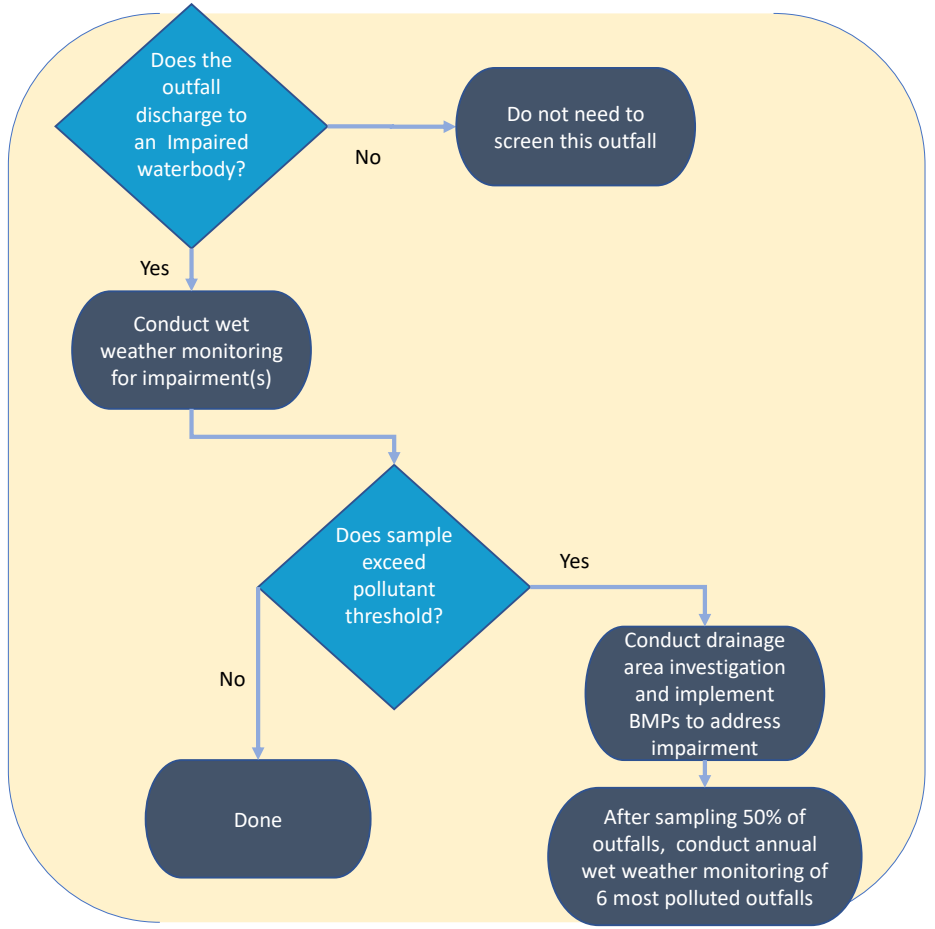
Impaired Waters Monitoring Deadlines

- Begin monitoring outfalls to impaired waters by:
 - July 2018** – Existing
 - July 2019** – New
- Sample all outfalls
 - July 2022** – All MS4s
- Monitor 6 worst offenders
 - July 2020** – Existing
 - July 2021** – New



We've got flowcharts

Impaired waters outfall monitoring



MS4 Monitoring Requirement Comparison

	Impaired waters monitoring	Baseline monitoring (IDDE)	Catchment Investigation Procedure (IDDE)
discharge	All outfalls to Stormwater impaired waters	Outfalls in priority areas (urbanized area, discharges to impaired waters or in basin where DCIA > 11%) that are categorized as either high or low priority catchments (see IDDE section of this website or appendix B of permit for more information)	Problem, High Priority and Low Priority catchments in the priority area. Those with at least one SVF to be investigated and screened.
monitoring	wet weather	dry weather for initial baseline screening	dry weather manhole investigation wet weather screening at outfall for catchment with at least one SVF
parameters to monitor	The listed stormwater pollutant of concern (nitrogen, phosphorus, bacteria, or other pollutant of concern). Note that for waters impaired by 'other pollutant of concern' screen for turbidity.	Listed stormwater pollutants of concern (if any), PLUS: ammonia chlorine conductivity salinity <i>E. coli.</i> (freshwater) or enterococcus (saline or brackish receiving water) surfactants temperature	Dry wx: ammonia, chlorine, and surfactants Wet wx: listed impairment pollutant(s) (if any), PLUS ammonia chlorine conductivity salinity <i>E. coli.</i> (freshwater) or enterococcus (saline or brackish receiving water) surfactants temperature

Water Quality Monitoring

Two monitoring requirements:

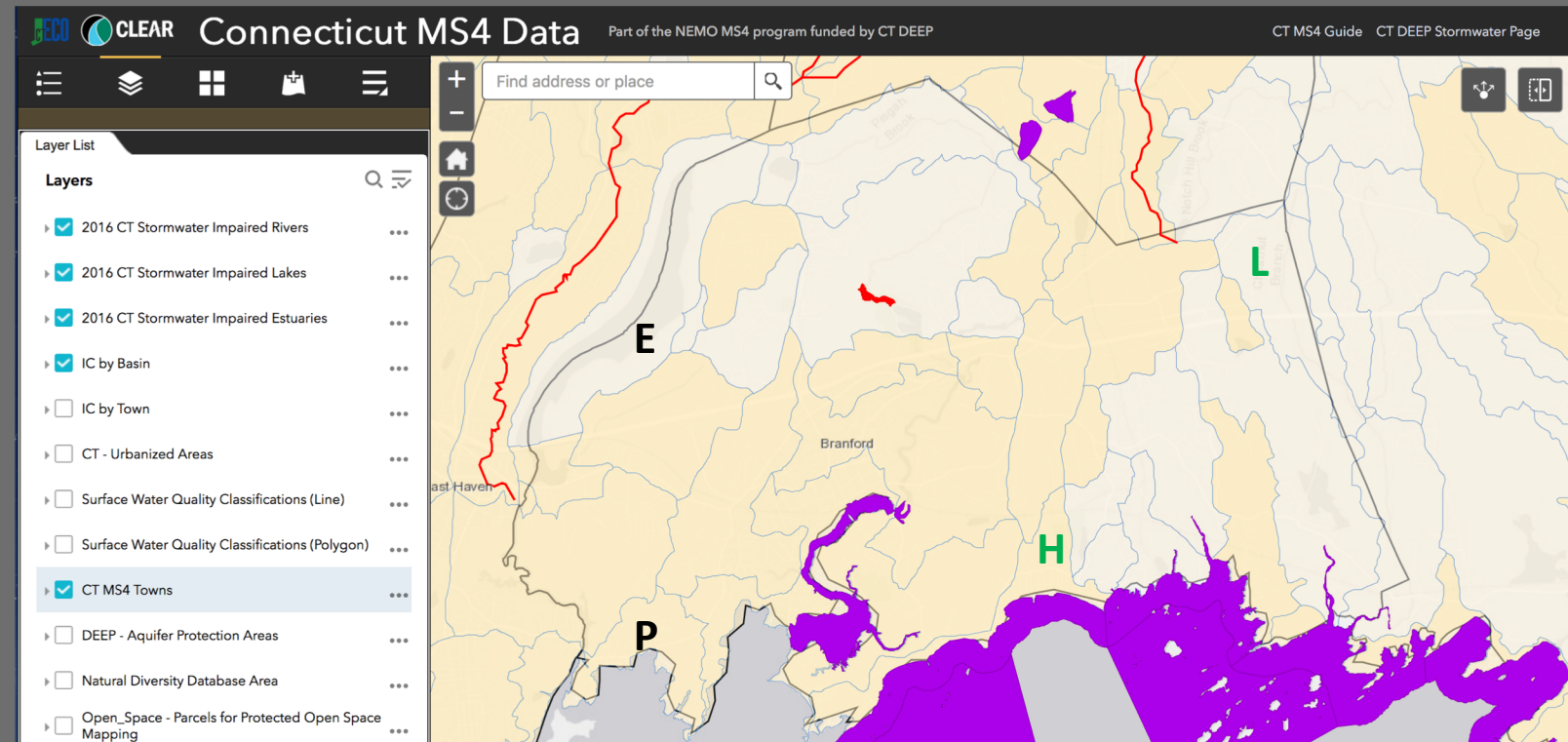
- Impaired waters
- IDDE

MS4 Monitoring Requirements Comparison

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Classifying catchments (basins)

- **Excluded**
 - no dwellings/sanitary sewers
- **High Priority**
 - Rec areas, shellfish, drinking water, screening factors
- **Problem**
 - Existing suspicion / data
- **Low Priority**
 - None of the above



Screen all outfalls in High and Low Priority basins in the priority area

What counts as dry weather?

- **<0.1 inch of rain in past
24 hours**

What to screen for?

Ammonia

Chlorine

Conductivity

Salinity

E. Coli (fresh) or
Enterococci
(saline/brackish) *

Surfactants

Temperature



<https://www.mywatersheds.org/illicit-discharges>

Baseline Monitoring Follow-up

- If sample exceeds threshold, rank catchment at top of high priority for investigation!

Pollutant Thresholds

Ammonia > 0.5 mg/L

Bacteria (same as IW threshold)

Surfactants > 0.25 mg/L

Detectable levels of Chlorine

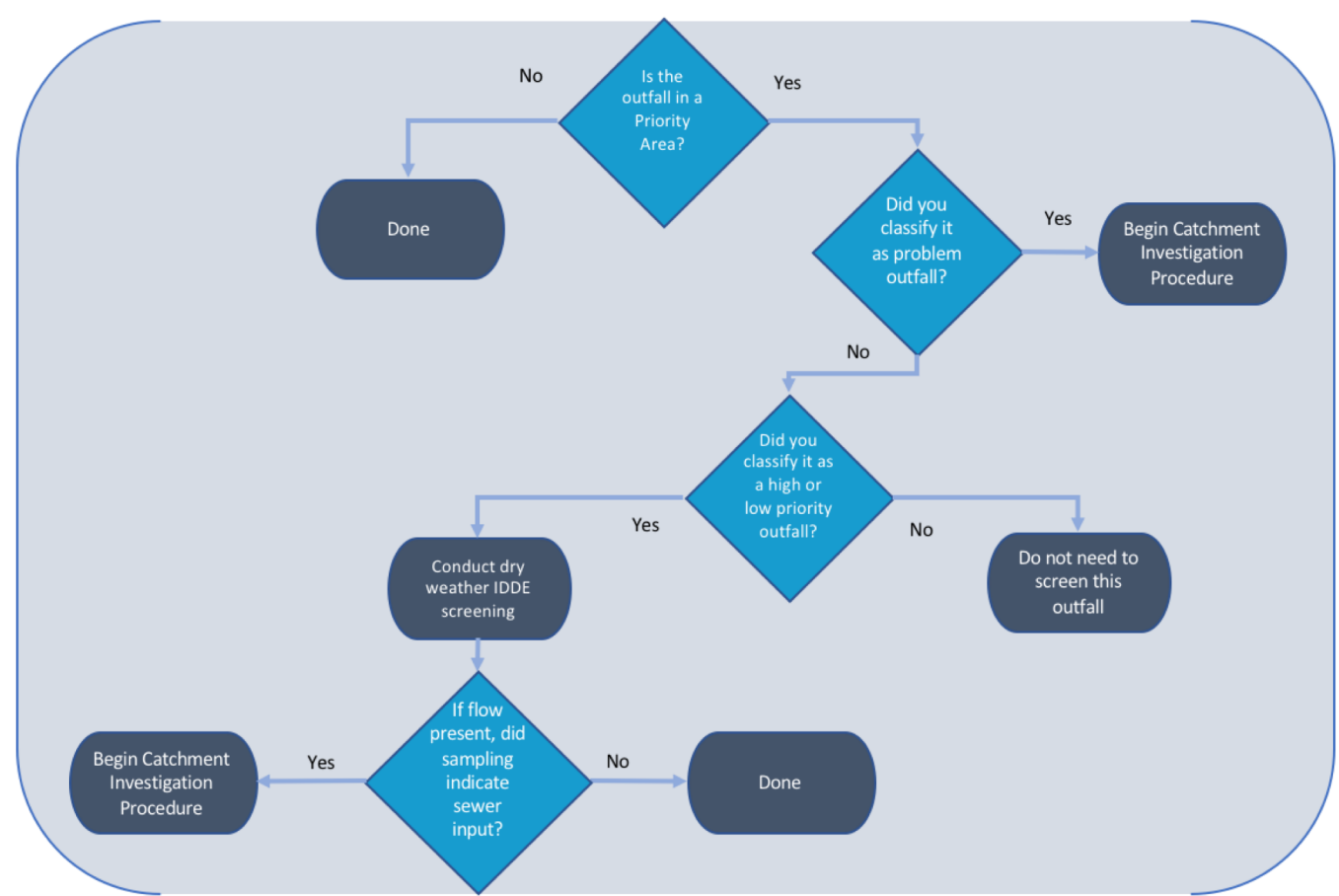
Baseline Screening Deadlines

July 2020 – Existing

July 2022 – New

There's a flowchart for that...

IDDE baseline monitoring



Monitoring Requirement Comparison

Monitoring	Baseline monitoring (IDDE)	Catchment Investigation Procedure (IDDE)
Waters	Outfalls in priority areas (urbanized area, discharges to impaired waters or in basin where DCIA > 11%) that are categorized as either high or low priority catchments (see IDDE section of this website or appendix B of permit for more information)	Problem, High Priority and Low Priority catchments in the priority area. Those with at least one SVF to be investigated and screened.
	Dry weather for initial baseline screening	Dry weather manhole investigation Wet weather screening at outfall for catchment with at least one SVF
Concern (nitrogen, phosphorus, etc.) Other pollutant of concern	Listed stormwater pollutants of concern (if any), PLUS: ammonia chlorine conductivity salinity <i>E. coli</i> . (freshwater) or enterococcus (saline or brackish receiving water) surfactants temperature	Dry wx: ammonia, chlorine, and surfactants Wet wx: listed impairment pollutant(s) (if any), PLUS ammonia chlorine conductivity salinity <i>E. coli</i> . (freshwater) or enterococcus (saline or brackish receiving water) surfactants temperature

Water Quality Monitoring

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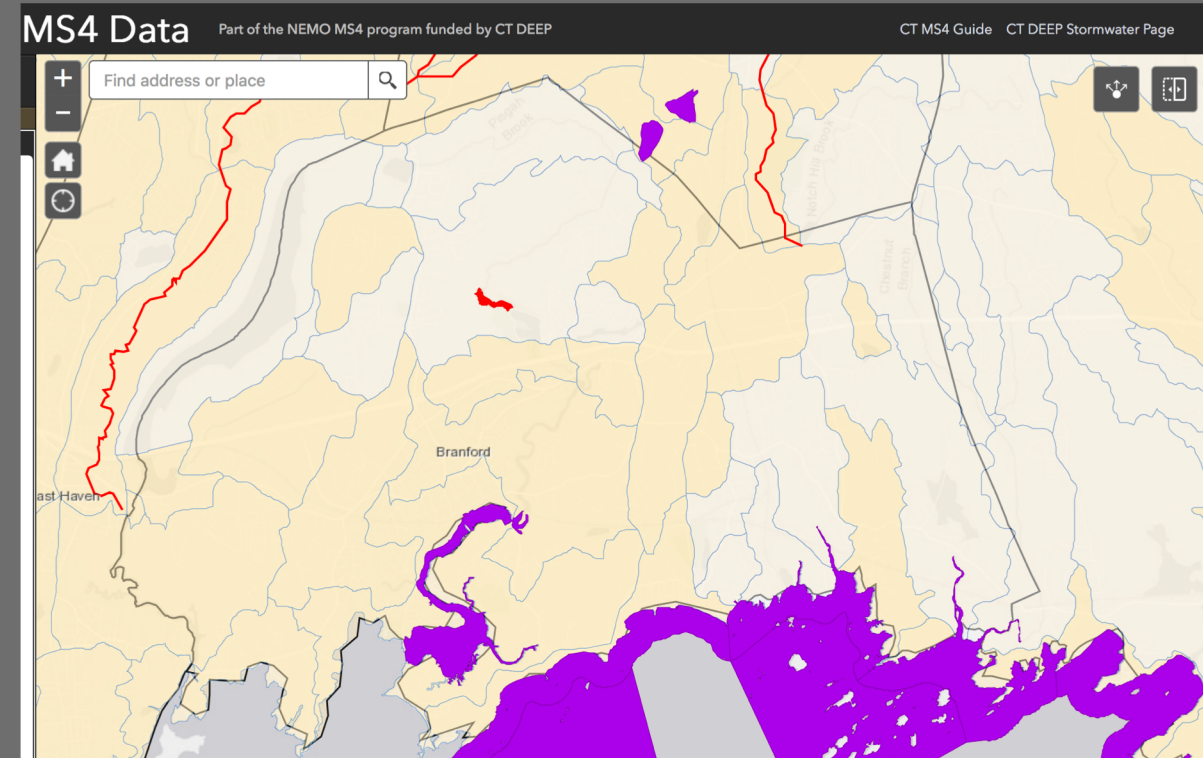
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MS4 Monitoring Requirement Comparison

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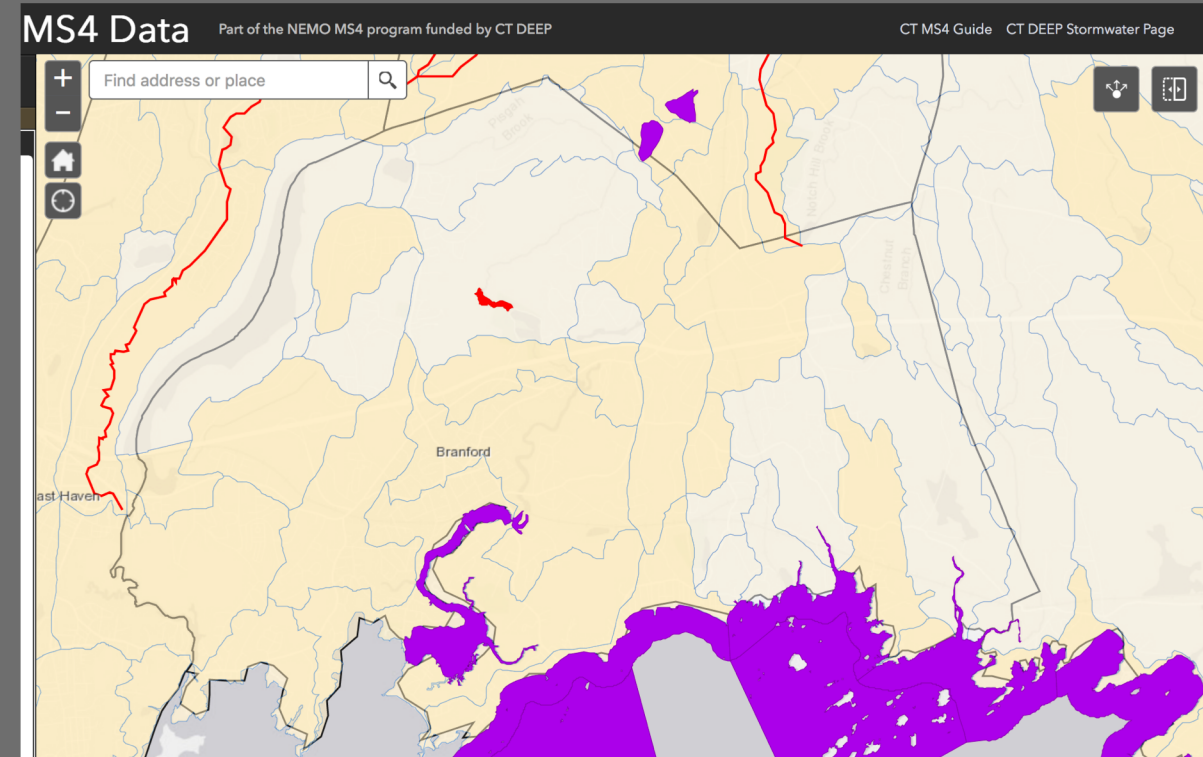
Monitoring during Catchment Investigations

- It's a little complicated
- Dry and wet weather



The dry weather part

- **Where:**
at Key Junction Manholes during system investigation
- **What:**
Sample for ammonia, chlorine & surfactants
- **Follow-up:**
Further upstream manhole investigation
Confirm source



The wet weather part

- **Where:**
At outfalls in catchments with at least 1 System Vulnerability Factor (SVF)!
- **What:**
Ammonia, chlorine, conductivity, salinity, bacteria, surfactants & temp
- **Follow-up:**
Verify the source
Dye testing, video inspections, dog?



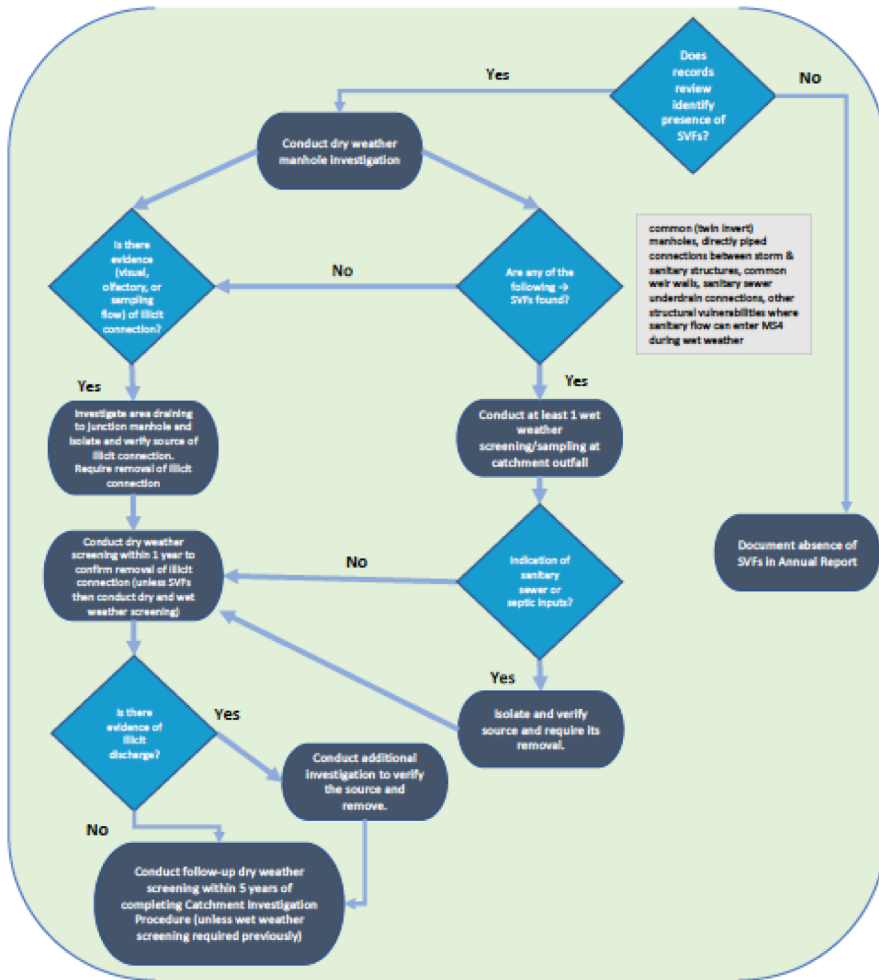
<http://www.werf.org>

What counts as wet weather this time?

- During or after a storm that produces a flow from outfall
- Only during the spring (March to June) when groundwater levels are higher
- No set minimum rainfall required prior to wet weather screening
- Avoid 'first flush'

One more flowchart

IDDE Catchment Investigation Procedure



MS4 Monitoring Requirement Comparison

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Labs in CT

CT Certified Labs for N...

✓

Certified Labs

Eastern Analytical Laboratory

Northeast Laboratories Inc.

Columbia Environmental Laboratory

Microbac Laboratories Inc.

Greenwich Health Department Laboratory

Environmental Consulting Lab

Phoenix Environmental Laboratories

Baron Consulting Company

Regional Water Authority

Hydro Technologies

Aqua Environmental Lab

Tunxis Laboratories, LLC

Complete Environmental Testing, Inc

York Analytical Inc.

EMSL Analytical Inc - CT

Environmental Monitoring Lab

Analytical Consulting Technology

Northwest Environmental Water Labs

Earthplace Laboratory

← Eastern Analytical Laboratory

Lab name

Eastern Analytical Laboratory

Address

134 Boston Post Road, Old Saybrook, CT 06475

Phone number

860-388-2378

Bacteria

Yes

Nutrients

Yes

NEMO

Reporting monitoring data

- Use the Annual Report Template
- Don't submit lab report (but retain for records)

2. Screening data for outfalls to impaired waterbodies (Section 6(i)(1) / page 41)

2.1 Screening data

Complete the table below for any outfalls screened during the reporting period. Each Annual Report will add on to the previous year's screening data showing a cumulative list of outfall screening data.

Outfall ID	Sample date	Parameter (Nitrogen, Phosphorus, Bacteria, or Other pollutant of concern)	Results	Name of Laboratory (if used)	Follow-up required?
Ex. 6-3B	7/30/17	Bacteria	- E. coli 1,000 col/100ml - T Coliform 600 col/100ml	Chemworks	Yes

Remember MEP

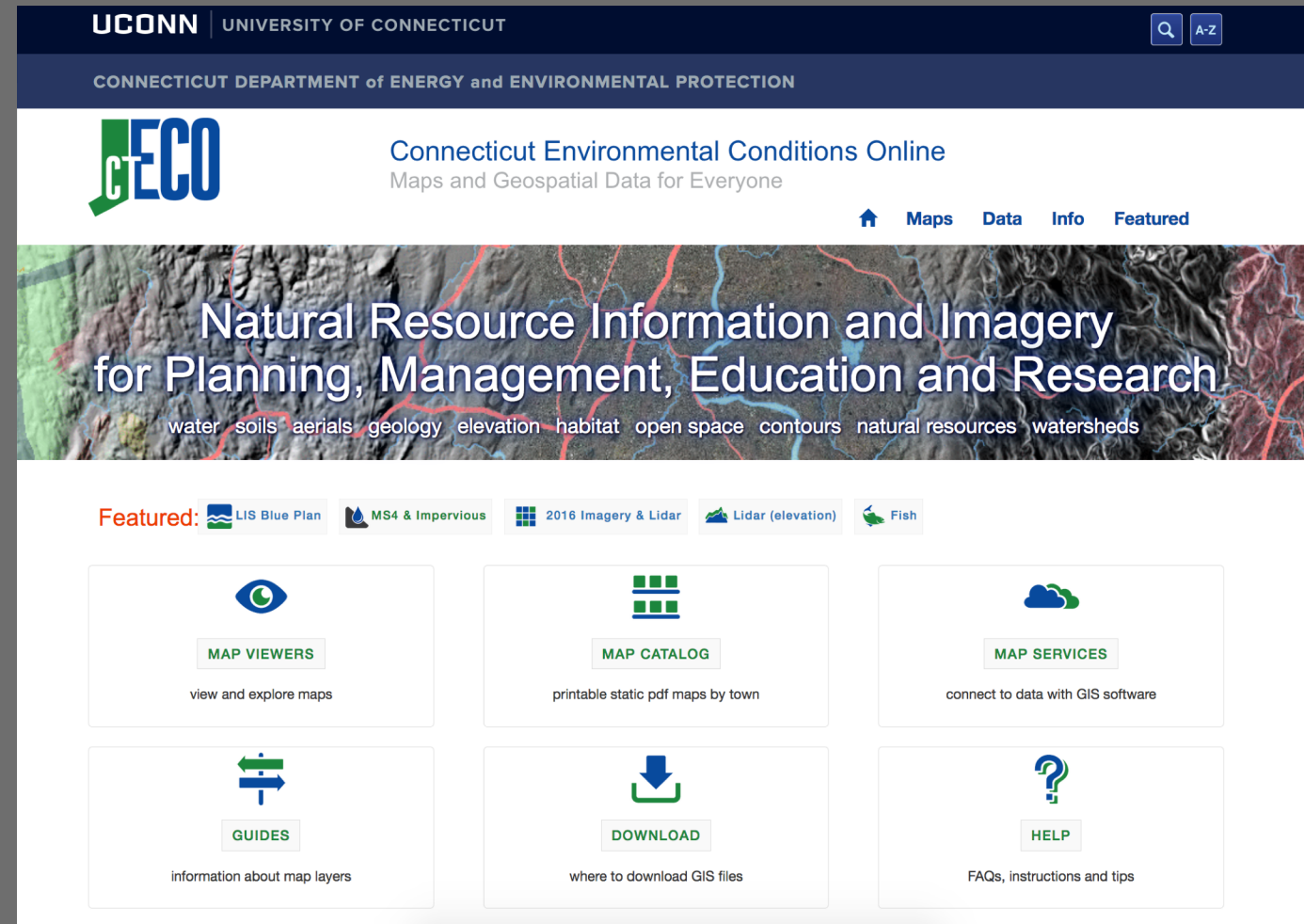


Maximum Extent Practicable (MEP)

- Make a serious attempt to comply
- Don't reject practical solutions
- Attenuating factors:
 - MS4 size
 - Ability to finance
 - Capacity to perform operations & maintenance
 - Local conditions
 - Etc.

Other news

- Year 3 Tasks webinar
Monday June 24th at 12pm
- Online Interactive CT SWQM
- Stormwater Utility webinar in October
- CT ECO



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CONNECTICUT DEPARTMENT of ENERGY and ENVIRONMENTAL PROTECTION

CT ECO Connecticut Environmental Conditions Online
Maps and Geospatial Data for Everyone

Home Maps Data Info Featured

Natural Resource Information and Imagery for Planning, Management, Education and Research
water soils aerials geology elevation habitat open space contours natural resources watersheds

Featured: LIS Blue Plan MS4 & Impervious 2016 Imagery & Lidar Lidar (elevation) Fish

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printable static pdf maps by town

MAP SERVICES
connect to data with GIS software

GUIDES
information about map layers

DOWNLOAD
where to download GIS files

HELP
FAQs, instructions and tips

If MEP chanting fails . . .

Amanda Ryan (MS4 educator)

amanda.ryan@uconn.edu

Dave Dickson (NEMO Co-Director)

david.dickson@uconn.edu

Mike Dietz (Other NEMO Co-Director)

michael.dietz@uconn.edu

<http://nemo.uconn.edu/ms4>

Monitoring with students in Madison

- Programs with 7th grade and High school students
 - locate outfalls using maps
 - Measured pH, ammonia, conductivity, water temperature and alkalinity
- Practical STEM experience / teachers enthusiastic



Contact Rob at russor@madisonct.org

CT MS4 Monitoring Workshop Survey

<http://s.uconn.edu/MS462019>