

# Remediation Roundtable

June 19, 2018





# Remediation Roundtable Webcast

- Basic directions provided on listserv email
- Detailed directions on website
  - ▶ [www.ct.gov/deep/remediationroundtable](http://www.ct.gov/deep/remediationroundtable)





# Remediation Roundtable Agenda

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- ▶ Announcements
  
- ▶ Updates and Roundtable Tips
  
- ▶ Presentations
  - ▶ Concurrence with ITRC DNAPL Guidance
  - ▶ Inland Wetlands Restoration
  - ▶ DEEP Responsibilities at CRRRA Landfills



# Announcements

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- ▶ RSR presentation from March 2018 EPOC course is online
- ▶ EPOC Lab DQA seminar on June 22<sup>nd</sup>  
<https://www.epoc.org/event-2919424>



# Questions or Comments?

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Please Speak into Microphone  
and State Your Name

[www.ct.gov/deep/remediationroundtable](http://www.ct.gov/deep/remediationroundtable)



# Update Wave 2 Remediation Standard Regulations

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Betsey Wingfield  
Bureau Chief

Bureau of Water Protection and Land Reuse



# Remediation Roundtable Tips





## Tip #18. Calculating Plume Discharge for Alternative SWPC

- Use of the Alternative SWPC calculation is acceptable when a groundwater plume is discharging to a watercourse that is not a wetland/intermittent stream or tidally influenced
- If discharging to wetland need to comply with the lower of the human health or aquatic life numbers in the Water Quality Standards [22a-133k-3(b)(2)]
- If discharging to a tidally influenced watercourse need to request Commissioner approval for an alternative SWPC [22a-133k-3(b)(3)(B)]





# Tip #18. Calculating Plume Discharge for Alternative SWPC

## Alternative SWPC

(LEP-Implementing Calculation)

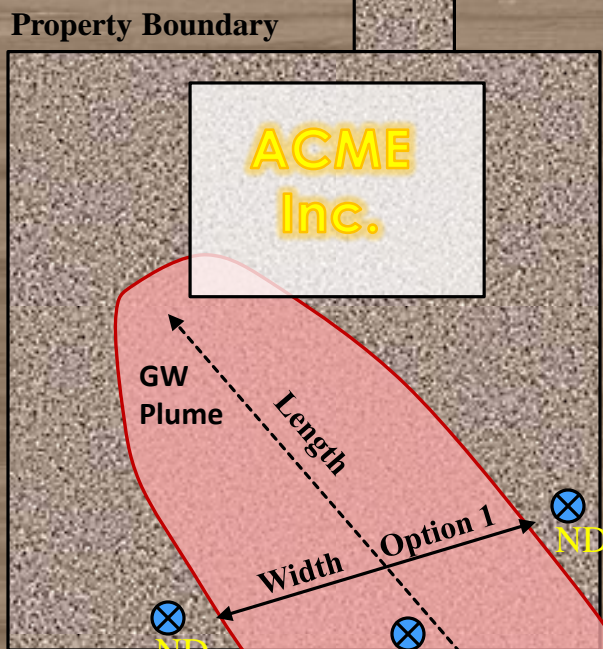
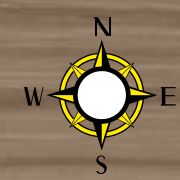


$((0.25 \times 7Q_{10}) / Q_{\text{plume}})$  (Table 3 criteria\* in Water Quality Standards)

- ◆ \* the lower of human health or aquatic life criteria
- ◆ "7Q10" means the lowest 7 consecutive day mean stream discharge rate with a recurrence interval of 10 years

22a-133k-3(b)(3)(A)

# Alternative SWPC



Option 1:  
 $((0.25 \times 0.5 \text{ft}^3/\text{s}) / 0.0032 \text{ft}^3/\text{s})(\text{Cd})$   
 $= 53 \mu\text{g/L}$

Option 2:  
 $((0.25 \times 0.5 \text{ft}^3/\text{s}) / 0.0016 \text{ft}^3/\text{s})(\text{Cd})$   
 $= 105 \mu\text{g/L}$

GW flow direction

Info needed for **Q** plume

- Conductivity of Aquifer Material ( $10^{-3} \text{cm/s}$ )
- Hydraulic gradient = 0.05
- Plume Area – X section at stream discharge point
  - Option 1 = 2000  $\text{ft}^2$
  - Option 2 = 1000  $\text{ft}^2$

Not to Scale

$((0.25 \times 7\text{Q}10) / \text{Q}_{\text{plume}})(\text{Water Quality Standards})$



# Questions or Comments?

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# Tip #19. Residential Heating Oil Releases

ENERGY

ENVIRONMENTAL QUALITY

NATURAL RESOURCES

OUTDOOR RECREATION

PURA

Remediation / Site Clean-Up

FAQs

**Information for General Public/Home Owners**

Information for Business & Industry, Towns and Environmental Professionals

Guidance

Forms

Permits

Site Characterization

Remediation / Site Clean-Up Main Page

Main Menu

Report an ENVIRONMENTAL Concern/Problem

January - Calendar of Events

## Information for General Public / Home Owners

### Understanding Chemicals & Pollution

- [Frequently Asked Questions About Contaminants Found at Hazardous Waste Sites](#) (link to Agency for Toxic Substances and Disease Registry (ATSDR)) provides answers to the most frequently asked questions (FAQs) about exposure to hazardous substances found around hazardous waste sites and the effects of exposure on human health.
- DEEP's [Potable Water Program](#) assists individuals whose drinking water supply well may be at risk of becoming polluted or have become polluted as a result of human activities. This page contains information about DEEP's potable water program, as well as fact sheets on lead, manganese, MTBE, and uranium in drinking water.
- [Clean-up Requirements](#) - Connecticut's Remediation Standard Regulations
- [Understanding Groundwater](#)
- [Significant Environmental Hazard Notification](#) - Section 22a-6u of the Connecticut General Statutes requires the owner of property which is the source of pollution causing an environmental hazard to notify DEEP of such conditions.
- [Chemical Exposure Fact Sheet](#) (link to DPH)
- [Pesticides](#) (link to EPA)
- [Glossary of Clean-Up Terms](#) (link to EPA)

### Home Heating Fuel Tanks

- [Residential Home Heating Oil Tanks](#)
- [Report a Spill - Emergency Response](#)



# Tip #19. Residential Heating Oil Releases

## Residential Home Heating Oil Tanks

### Homeowners | Contractors

#### Information for Homeowners:

- In 2015, 44% of Connecticut households used fuel oil or other petroleum products as the primary energy source for home heating.
- Residential home heating oil tanks can be found:
  - in a home's basement,
  - outside, above ground near the house or
  - buried in close proximity to the house.
- Homeowners should be proactive, educate themselves on home heating oil tank safety, and work with their licensed service provider to prevent oil leaks and spills.

#### Home Heating Oil Tank Maintenance

DEEP recommends that homeowners play an active role in ensuring that their oil system is maintained properly on a yearly basis and gives homeowners helpful tips to help evaluate the health of their oil system.

#### Video: Prevent Home Heating Oil Leaks and Spills



Video to educate homeowners, landlords and local officials on the hazards of having an unprotected oil line installed underground or within concrete basement floors.

#### Guidance for Residential Underground Home Heating Oil Tank Leaks

Information on what to do if you have an oil spill or oil contamination from a heating equipment failure, an oil





# Tip #19. Residential Heating Oil Releases

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1. Report release to DEEP Emergency Response
2. Must use Dept. of Consumer Protection registered contractor for residential UST removal
3. For UST or outside AST Leaks:
  - Remove leaking tank/piping and petroleum-stained soil
  - Collect soil samples from discrete locations
4. **Keep all documentation for future home sale!!!**



# Tip #19. Residential Heating Oil Releases

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- ▶ Goal is to protect human health by:
  - ▶ Remove additional soil if ETPH over 500 ppm, if possible
  - ▶ Remove potential sources of drinking water contamination
  - ▶ Passive SVE can be used to dissipate odors and reduce contaminant levels in soil supporting foundations



# Tip #19. Residential Heating Oil Releases

## Guidance for Residential Home Heating Oil Tank Leaks

### [Reporting](#)

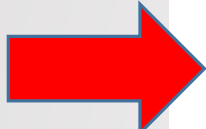
[Underground or Outside Aboveground Storage Tanks Leaks](#)

[Aboveground Storage Tank Leaks Inside a Building](#)

[Drinking Water Wells/Groundwater Sampling](#)

[Heating Oil Odors/Soil Venting](#)

[Documentation](#)

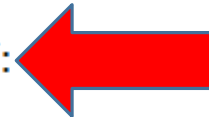


### **Drinking Water Wells/Groundwater Sampling**

In areas without drinking water wells, if you removed all floating oil, you do not need to sample groundwater.

If a drinking water well(s) is within 500 feet of the leak, call the [Remediation Division District Supervisor](#) for advice on appropriate well water sampling and cleanup. Your [local health district](#) may also be able to offer assistance.

A [Significant Environmental Hazard](#) report is required by law if:



- a drinking water well is within 500 feet of the leak and groundwater contains any petroleum component over the Groundwater Protection Criteria (for ETPH 250 parts per billion [ppb or  $\mu\text{g/l}$ ]), or
- there is any petroleum component detected in a drinking water well at any level.





# Questions or Comments?

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# Tip #20. Sampling Rationale: Characterization and Compliance

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Connecting Fate & Transport with Sampling Location  
and Depth





# Tip #20. Sampling Rationale: Characterization and Compliance

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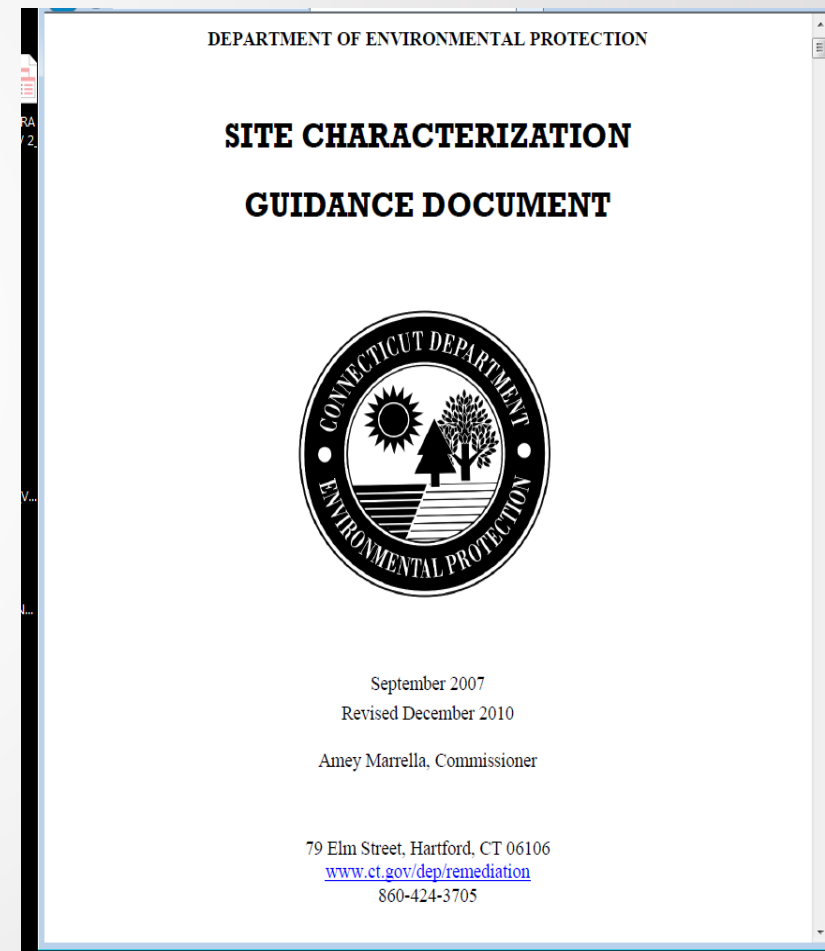
Connecting Fate & Transport with Sampling Location  
and Depth



# Tip #20. Sampling Rationale: Characterization and Compliance

When designing a sampling and analysis plan, the environmental professional is also expected to understand and consider the COCs, contaminant migration pathways and potential preferential pathways, potential chemical and physical changes to the COCs, and how COCs from a potential release could be affected by or interact with the environment. Knowledge of contaminant fate and transport characteristics of each COC is necessary to identify the most likely contaminated areas for sampling and analysis.

Therefore, temporal considerations of potential releases should be considered in the CSM.





# Tip #20. Sampling Rationale: Characterization and Compliance

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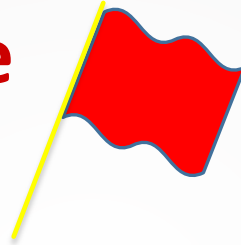
- ➔ **Nature of release** – timing, amounts, durations, and locations
- ➔ **Nature of contaminants** – solubility, volatility, degradability, breakdown products
- ➔ **Transport mechanisms** – advection, dispersion, diffusion, adsorption, desorption, etc.
- ➔ **Migration pathways**



# Tip #20. Sampling Rationale: Characterization and Compliance

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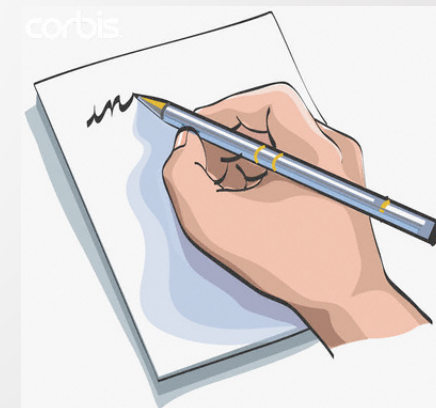
**Sampling Rationale**



**AOC / RA**

**Sample Location/Depth**

**Documentation**



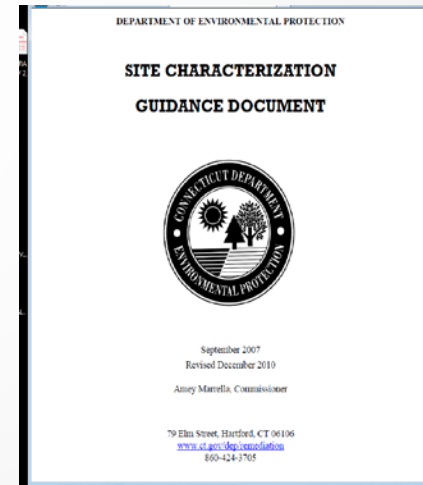


# Tip #16. Phase I ESA Expectations



Designation: E1527 – 13

Standard Practice for  
Environmental Site Assessments: Phase I Environmental  
Site Assessment Process



Site Characterization  
Guidance Document

(SCGD)



# RSRs





# Tip #20. Sampling Rationale: Characterization and Compliance

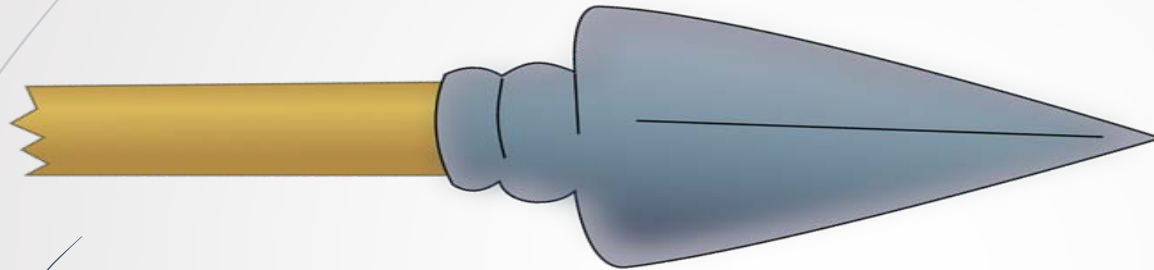
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# Tip #20. Sampling Rationale: Characterization and Compliance

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- ➔ Present knowledge and understanding of release and F & T
- ➔ Document sampling rationale in relation to F & T



# Questions or Comments?

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[www.ct.gov/deep/remediationroundtable](http://www.ct.gov/deep/remediationroundtable)



# Tip #21. SEH Notification Trigger for Groundwater

## 7 Statutory Triggers:

- ▶ Based on short-term risk potential discovered in site characterization
- ▶ Defined by statute
  - ▶ Supply well >GWPC/NAPL [6u(b)]
  - ▶ Supply well polluted (any detection) [6u(c)]
  - ▶ Groundwater polluted >GWPC (500/200ft) [6u(g)]
  - ▶ Surface soil in top 2ft > 15X / 30x DEC [6u(d)]
  - ▶ Volatilization > 10x GWVC [6u(e)]
  - ▶ Surface Water threat = GW >10x Acute Tox [6u(f)]
  - ▶ Explosion risk [6u(h)]



# Tip #21. SEH Notification Trigger for Groundwater

## Owner Notification and Initial Response Is Required by Statute

CGS § 22a-6u(g) Groundwater in Monitoring Well	
<b>Trigger</b>	> GWPC 500 feet upgradient of supply well supply well within 200 feet in any direction
<b>Notify</b>	30 days
<b>Initial Response Actions</b>	<ul style="list-style-type: none"><li>• Well Survey 500 feet radius</li><li>• Test abutters</li></ul>
<b>Report</b>	30 days Includes notification, response actions, and recommended actions



# Tip #21. SEH Notification Trigger for Groundwater

## Technical Considerations:

- ▶ Well surveys are required even where there is water service
- ▶ GB areas may have private drinking water wells
- ▶ What is downgradient?
  - ▶ Without GW flow direction, cannot truly know downgradient
  - ▶ Without study of bedrock hydrogeology, all directions could potentially be downgradient
  - ▶ Recommend notification within 500 feet if inhabitable structures present, unless receptor survey has already determined no supply wells

[Well Receptor Guidance](#)



# Tip #21. SEH Notification Trigger for Groundwater

## Recommended Follow-up Actions in 30 day Report:

- ▶ Testing of additional supply wells
  - ▶ To identify and eliminate exposure within 500 feet
  - ▶ Consider wells further away may be at risk due to hydrogeologic conditions
- ▶ Site groundwater investigation to determine extent of plume/monitor source
- ▶ Installation of treatment systems or other mitigation
- ▶ On-going monitoring of supply wells, monitoring wells, and/or treatment system to periodically evaluate water quality
  - ▶ Includes sampling locations, parameters to be tested, sampling frequency, and REPORTING SCHEDULE



# Tip #21. SEH Notification Trigger for Groundwater

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## ONLINE SEH Program Resources:

[www.ct.gov/deep/remediation/SEH](http://www.ct.gov/deep/remediation/SEH)

Statutes

Guidance

FAQs

Fact Sheet

SEH Threshold Tables

Quick Summary Table

List of SEHs





# Questions or Comments?

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# Concurrence with ITRC DNAPL Guidance

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Kenneth Feathers  
Supervising Sanitary Engineer  
Remediation Division



INTERSTATE TECHNOLOGY & REGULATORY COUNCIL  
*Advancing Environmental Solutions*

Interstate Technical and Regulatory Council is a public-private coalition. ITRC produces documents and training that expand technical knowledge.

Several ITRC guidance documents relate to Dense Non-Aqueous Phase Liquids (DNAPLs):

- ▶ Integrated DNAPL Site Strategy (IDSS-1) November 2011

<https://www.itrcweb.org/Guidance/ListDocuments?TopicID=5&SubTopicID=10>

- ▶ Integrated DNAPL Site Characterization and Tools Selection (ISC-1) April 2015

<https://www.itrcweb.org/Guidance/ListDocuments?TopicID=5&SubTopicID=49>



# Synopsis of ITRC Guidance

## Current State of Knowledge

- Dense Non-Aqueous Liquid (DNAPL) properties
- Site hydrogeologic characteristics affecting fate and transport
- Integrated DNAPL Site Strategy (IDSS)
  - Collaborative process for developing integrated remediation strategy
  - Tiered SMART remediation objectives
- Integrated DNAPL Site Characterization (ISC)  
Approaches for improved characterization and remedial design:
  - data using multiple techniques
  - appropriate spatial resolution
  - site-specific remedial objectives
  - DNAPL conceptual site model (CSM) development

# 14 Compartment Model (from ITRC IDSS-1)



Early Stage				
Zone	Source		Plume	
	Lower-K	Transmissive	Transmissive	Lower-K
Vapor	Low	Moderate	Low	Low
DNAPL	Low	High		
Aqueous	Low	Moderate	Moderate	Low
Sorbed	Low	Moderate	Low	Low
Middle Stage				
Zone	Source		Plume	
	Lower-K	Transmissive	Transmissive	Lower-K
Vapor	Moderate	Moderate	Moderate	Moderate
DNAPL	Moderate	Moderate		
Aqueous	Moderate	Moderate	Moderate	Moderate
Sorbed	Moderate	Moderate	Moderate	Moderate
Late Stage				
Zone	Source		Plume	
	Lower-K	Transmissive	Transmissive	Lower-K
Vapor	Low	Low	Low	Low
DNAPL	Low	Low		
Aqueous	Moderate	Low	Low	Moderate
Sorbed	Moderate	Low	Low	Moderate



# DEEP Concurrence

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DEEP issues concurrence letters to:

- Specifically endorse content in selected ITRC documents
- Provide guidance on applicability in CT regulatory framework

DEEP concurrence letter for 2 key documents finalized  
March 12, 2018

Presentation focuses on concurrence letter not ITRC  
documents



# Considerations for Use in CT

- ▶ Characterization of DNAPL
  - ▶ Use in conjunction with [Site Characterization Guidance Document \(SCGD\)](#)
  - ▶ Improved data supports characterization and remediation
  - ▶ Transition from Phase III characterization to remedial design investigation
  - ▶ Understanding heterogeneities and fate and transport effects is key
  
- ▶ Use in context of resolving remedial issues
  - ▶ Risk identification and reduction
  - ▶ Compliance with the RSRs
  - ▶ Incorporate plume stage concept in implementing RSR remediation



# Conceptual Site Model

- ▶ Techniques and tools to develop robust CSM
  - ▶ Use multiple lines of evidence
  - ▶ Validate CSM
  - ▶ Determine characterization objectives met
  - ▶ Identify thought process for CSM development
- ▶ Iterative CSM
  - ▶ Shifting objective from characterization to remedial design
  - ▶ Defining uncertainties and associated data gaps
  - ▶ Identifying critical data gaps for residual sources delineation
- ▶ Show rationale for how innovative methods support conventional data, the CSM, and subsequent remedial decisions





# Characterization

- ▶ Delineate full plume
  - ▶ Potential discharge zones at a distance from the site
  - ▶ Complete exposure pathways, especially for vapor intrusion
  - ▶ Daughter/breakdown products and associated substances (1,4-Dioxane)
- ▶ Innovative approaches
  - ▶ Dynamic field approaches may not meet analytical [Connecticut Reasonable Confidence Protocols](#)
  - ▶ Correlate innovative and conventional methods (Collaborative Data Sets)
  - ▶ Multiple lines of evidence in delineating a release
  - ▶ Basis for a reduction in the number of analytical samples



# Characterization Topics

- ▶ Evolving Data Objectives
  - ▶ Define degree and extent of pollution
  - ▶ Identify fate and transport to evaluate remedial options
  - ▶ Design the appropriate remedy
- ▶ Presence of DNAPL
  - ▶ Soil for RSR compliance: partitioning formula section 22a-133k-2(c)
  - ▶ CSM soil or groundwater hypotheses: use multiple lines of evidence
    - ▶ Physical observation
    - ▶ Rules of thumb
    - ▶ Remedial system performance response
  - ▶ CSM governs action under RSR section 22a-133k-2(g)
- ▶ Soil Vapor Samples
  - ▶ Depth discrete profiling may focus additional sampling efforts
  - ▶ Compliance demonstration must be under building footprint



# Monitoring

- ▶ DEEP accepts flexible and targeted approaches with supporting rationale
- ▶ Requirements under state law
  - ▶ Discharge permit
  - ▶ RSR compliance monitoring
  - ▶ Long-term monitoring for EC or TI
- ▶ Anomalous trends monitoring or remedial performance data – revisit CSM
  - ▶ Undocumented interstitial NAPL
  - ▶ Sorbed NAPL constituents on low-permeability strata
- ▶ Show rationale for data
  - ▶ Known & documented quality or otherwise representative
  - ▶ Passive (no flow) sampling methods
  - ▶ Short interval sampling horizons used for remedial design – not representative



# Tiered Remediation Objectives

- ▶ Absolute remedial objective: Eliminate potential sources of pollution to the waters of the state
- ▶ Functional objectives
  - Interim goal may not be RSR conforming
  - Can be endpoints for some RSR risk management provisions
    - ▶ Remove DNAPL from soil and groundwater – maximum extent prudent
    - ▶ Eliminate continued groundwater pollution above RSR criteria
    - ▶ Remediation of contamination even below water table as residual source
- ▶ Consider life cycle costs of defined goal – long-term obligations



# RSR Technical Impracticability Variance

- ▶ Achievable endpoints
  - ▶ DNAPL source mitigation achieved “maximum extent prudent”
  - ▶ TI zone size as affected by partial source zone treatment
- ▶ Life cycle stage helps frame technical discussion
  - ▶ Steady state plume
  - ▶ Risks to current and future receptors addressed



# RSR Compliance Verification

- ▶ Multiple characterization approaches
  - ▶ Use all lines of evidence – resolve conflicts
  - ▶ Present supporting rationale
  - ▶ Justification for reduced conventional data density
- ▶ Modeling
  - ▶ Compliance is not based on trend analysis
  - ▶ Can be supporting line of evidence for alternative remediation criteria
- ▶ Mass flux and mass discharge
  - ▶ Concepts not incorporated in RSRs
  - ▶ Line of evidence for removal to the maximum extent prudent
  - ▶ Useful in justifying the extent of a TI zone



# Limitations

- ▶ No assurance a selected remedial approach will:
  - ▶ Achieve remediation goals
  - ▶ Result in compliance
  - ▶ Prevent or abate pollution
  
- ▶ No assurance data generated using innovative methods will:
  - ▶ Successfully validate a CSM
  - ▶ Serve to document RSR compliance
  
- ▶ No specific endorsement of any commercial products, modeling software, or other documents referenced in the ITRC document



# Questions or Comments?

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Please Speak into Microphone  
and State Your Name

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[www.itrcweb.org](http://www.itrcweb.org)

[www.ct.gov/deep/remediationroundtable](http://www.ct.gov/deep/remediationroundtable)



# An Overview of Inland Wetlands Regulation in CT Remediation Focus

June 19, 2018

Presented by Brian Golembiewski, Supervising EA, LWRD  
Remediation Roundtable/ McCarthy Auditorium



Connecticut Department of Energy and Environmental Protection

# Inland Wetlands & Remediation

There are three levels of Inland Wetland Regulation in CT:

- U.S. Army Corps of Engineers – Section 404 of the CWA
- CT DEEP-Section 401 of the CWA and CGS Sect. 22a-39(h)
- Town IWWC's - CGS Sect. 22a-42 & Town IWW Regulations
- The ACOE and CTDEEP/Town IWWC can be concurrent



# Inland Wetlands & Remediation

The ACOE has authority over the discharge of dredged or fill material into "**waters of the United States**" (which includes wetlands) under Section 404 of the Clean Water Act.

\*Regulatory Division (CT, MA, NH, RI)

U.S. Army Corps of Engineers

New England District

696 Virginia Road

Concord, MA 01742-2751

978-318-8338



Connecticut Department of Energy and Environmental Protection

Brian Golembiewski

# Inland Wetlands & Remediation

For the ACOE, wetlands are "those areas that are **inundated or saturated** by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of **vegetation typically adapted for life in saturated soil conditions.**"



# Inland Wetlands & Remediation

For ACOE 404 permit, the wetlands boundary must be determined according to the mandatory technical criteria for **vegetation**, **hydrology** and **soils** as described in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands\* (Three Parameter Method)



Connecticut Department of Energy and Environmental Protection



Brian Golembiewski

# Inland Wetlands & Remediation

Most activities in CT that impact wetlands are covered by the ACOE's 21 General Permits for Connecticut\*. CTDEEP has already issued a 401 Water Quality Certificate for it.

**Applicant: General Public, State of Connecticut**

**Effective Date: August 19, 2016**

**Expiration Date: August 19, 2021**

**DEPARTMENT OF THE ARMY  
GENERAL PERMITS FOR THE  
STATE OF CONNECTICUT  
&  
LANDS LOCATED WITHIN THE  
BOUNDARIES OF AN INDIAN RESERVATION<sup>1</sup>**

The New England District of the U.S. Army Corps of Engineers (Corps) hereby issues twenty-one (21) General Permits (GPs), listed below, for activities subject to Corps jurisdiction in waters of the United States (U.S.), including navigable waters, within boundaries of the State of Connecticut and lands located within the boundaries of an Indian reservation. These GPs are issued in accordance with Corps regulations at 33 CFR 320 - 332 [see 33 CFR 325.5(c)(1)], and authorizes activity-specific categories of work that are similar in nature and cause no more than minimal individual and cumulative adverse environmental impacts. These GPs will provide protection to the aquatic environment and the public interest while effectively authorizing activities that have no more than minimal individual and cumulative adverse environmental effects.



# Inland Wetlands & Remediation

The ACOE has a CT GP Activity #13. Cleanup of hazardous and toxic waste (Site Remediation):

**GP 13. CLEANUP OF HAZARDOUS & TOXIC WASTE (Sections 10 and 404; tidal and non-tidal waters of the U.S.)** Specific activities to effect the containment, stabilization or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements which are performed, ordered or sponsored by a government agency with established legal or regulatory authority\*. Special Aquatic Sites must be restored in place to pre-impact elevations.

**Not authorized under GP 13 are:** (a) the establishment of new disposal sites; or (b) the expansion of existing sites used for the disposal of hazardous or toxic waste.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
Permanent and temporary impacts are $\leq 5,000$ SF in non-tidal waters and wetlands.  Booms placed in navigable waters for oil and hazardous substance containment, absorption and prevention, provided they are removed upon completion of the cleanup.  <b>Notes:</b> For activities in non-tidal waters of the U.S., permittees have up to two weeks following commencement of these activities to submit the Self-verification form (Appendix E).	Work not eligible for SV.  Permanent and temporary impacts are $> 5,000$ SF in non-tidal waters and wetlands.  Work in navigable waters of the U.S. other than booms placed for hazardous and toxic waste containment, absorption and prevention.

**DEEP waived the 401 WQC for this GP!!**

**So, you only have to deal with the ACOE!!**



# Inland Wetlands & Remediation

## General Eligibility for CT GP Activity #13. Cleanup of hazardous and toxic waste:

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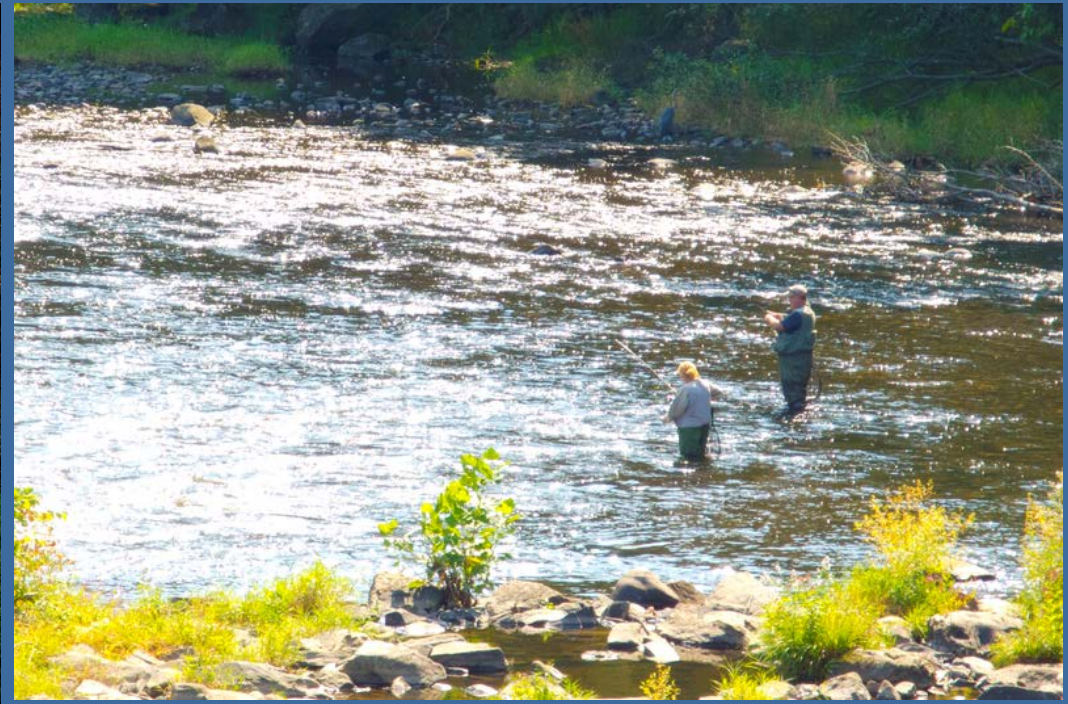
**Not authorized under GP 13 are:** (a) the establishment of new disposal sites; or (b) the expansion of existing sites used for the disposal of hazardous or toxic waste.





# Inland Wetlands & Remediation

Special Aquatic Sites\* must be restored in place to pre-Impact elevations. These would include Wetlands and Riffle/Pool Complexes (stream habitat).



# Inland Wetlands & Remediation

## DEEP's GP – Kick Outs Not Covered by 401WQC



- **NO** Detention or retention of stormwater in non-tidal waters, wetlands or watercourses, including crossings that by design or default function to provide stormwater detention
- **NO** Piping, boxing, enclosing or covering of a non-tidal watercourse for a purpose other than a driveway or roadway crossing.



# Inland Wetlands & Remediation

## DEEP's - GP Kick Outs cont...

- **NO** Activities with direct, indirect or secondary impact(s) to: Special Wetlands, Threatened, Endangered, or Special Concern Species, Significant Natural Communities/Critical Habitats identified by the Connecticut Natural Diversity Database.
- **NO** Activities within a FEMA established floodplain that would adversely affect the hydraulic characteristics of the floodplain.



# Inland Wetlands & Remediation

CT GP Activity #13.  
Cleanup of  
hazardous and toxic  
waste:  
SV – (Category 1) –  
You would submit a  
self verification form  
to ACOE

## Self-Verification (SV) Eligible

Permanent and temporary impacts are  $\leq 5,000$  SF  
in non-tidal waters and wetlands.

Booms placed in navigable waters for oil and  
hazardous substance containment, absorption and  
prevention, provided they are removed upon  
completion of the cleanup.

**Notes:** For activities in non-tidal waters of the  
U.S., permittees have up to two weeks following  
commencement of these activities to submit the  
Self-verification form (Appendix E).



# Inland Wetlands & Remediation

CT GP Activity #13. Cleanup of hazardous and toxic waste: PCN – (Category 2) – You would submit:

- Corps application form (ENG Form 4345)\*
- 8.5" x 11" or 11" x 17" drawings and one large-scale drawing,
- wetlands functions and values assessment,
- Federal wetland delineation documentation (data sheets)

## Pre-Construction Notification (PCN) Required

Work not eligible for SV.

Permanent and temporary impacts are >5,000 SF in non-tidal waters and wetlands.

Work in navigable waters of the U.S. other than booms placed for hazardous and toxic waste containment, absorption and prevention.



# Inland Wetlands & Remediation

Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act.



EPA needs to meet the applicable, or relevant and appropriate requirements (ARARs) of the Resource Conservation and Recovery Act (RCRA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Clean Air Act (CAA), and other Federal and State environmental laws, as required by CERCLA §§121.



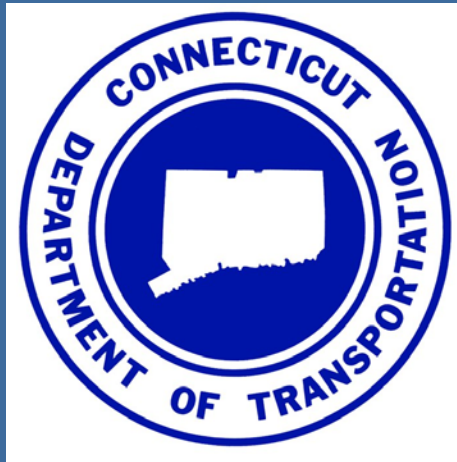
# Inland Wetlands & Remediation

If the activity is **not eligible** for the CT GP, then the ACOE and CTDEEP would require that Individual Section 404 and 401 Water Quality Certification permits applications\* to be submitted.



# Inland Wetlands & Remediation

**CTDEEP** – \*CGS Sec. 22a-39(h) The commissioner shall: Grant, deny, limit or modify an application for a license or permit for any proposed regulated activity conducted by any department, agency or instrumentality of the state (Also includes regulated activities carried out on State Property by others).



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# Inland Wetlands & Remediation

CTDEEP has exclusive jurisdiction over activities authorized under a dam repair or removal order under CGS Section 22a-402 or a permit issued under CGS Section 22a-403.



# Inland Wetlands & Remediation

Sec. 22a-42. Municipal regulation of wetlands and watercourses. Action by commissioner...it is hereby declared to be the public policy of the state to require municipal regulation of activities affecting the wetlands and watercourses within the territorial limits of the various municipalities or districts.

## INLAND WETLANDS & WATERCOURSES REGULATIONS

### TOWN OF MANSFIELD, CONNECTICUT

Adopted by the Mansfield  
Inland Wetlands Agency

Effective Date: November 15, 2017

(First Effective Date July 1, 1974)



# Inland Wetlands & Remediation

CTDEEP and Town IWWC:

“Wetlands” means **land**, including submerged land, not regulated pursuant to sections 22a-28 to 22a-35, inclusive, which consists of any of the **soil types designated as poorly drained, very poorly drained, alluvial, and floodplain** by the National Cooperative Soils Survey, as may be amended from time to time, of the Natural Resources Conservation Service of the United States Department of Agriculture;



# Inland Wetlands & Remediation

## CTDEEP and Town IWWC

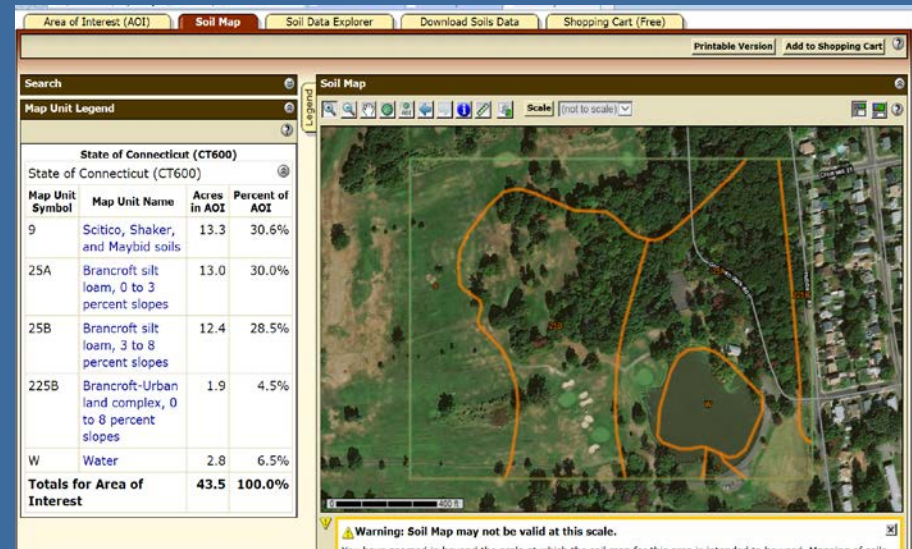
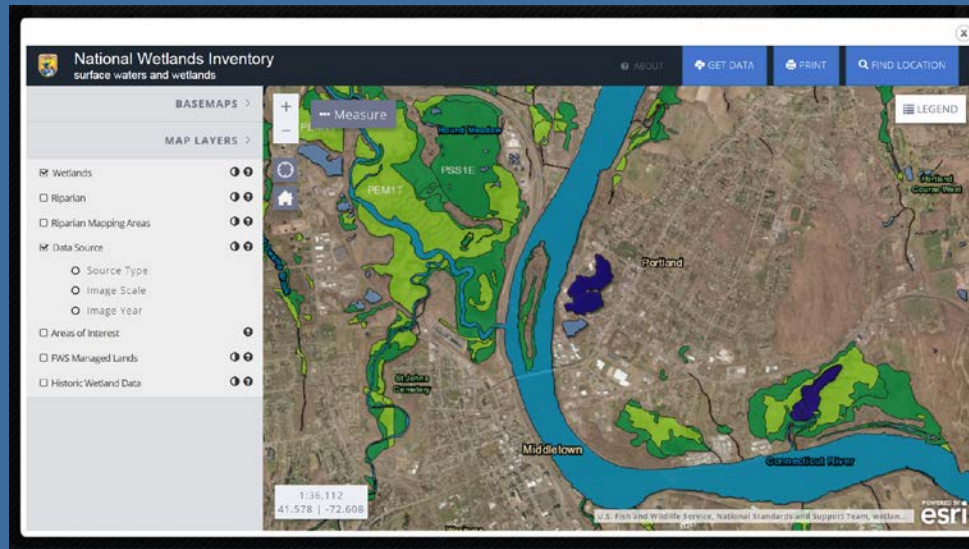
(16) “Watercourses” means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, **vernal or intermittent**, public or private, which are contained within, flow through or border upon this state or any portion thereof, not regulated pursuant to sections 22a-28 to 22a-35, inclusive.



# Inland Wetlands & Remediation

How do you know if you have inland wetlands?:

- Desktop Analysis is first step
  - Town or CT ECO GIS Viewers\*
  - USFWS National Wetlands Inventory\*
  - USDA Websoil Survey\*



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# Inland Wetlands & Remediation

On-site Wetland Delineation is next:

**For ACOE:** An environmental professional experienced in conducting delineations using the Federal three-parameter method.

**For CTDEEP and Town IWWC:** Need to meet CGS 22a-38(5) “Soil scientist” means an individual duly qualified in accordance with standards set by the federal Office of Personnel Management (USDA).



# Inland Wetlands & Remediation

Wetland Characterization is next:

**ACOE Data Sheets** (hydric soils, hydrology, hydrophytic vegetation)

**Soils Report** – (poorly drained, very poorly drained or floodplain/alluvial soil types)

**Wetland Habitat Description** (floral and faunal surveys, species diversity, habitat classification)

**Stream/Fish Habitat** (channel, substrate, fish species)



# Inland Wetlands & Remediation

Identify any Special Wetlands:

Include **vernal pools\***, bogs, fens, cedar swamps, spruce swamps, calcareous seepage swamps, and wetlands that provide habitat for threatened or endangered species or species of special concern as designated by the State of Connecticut Natural Diversity Database.




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# Inland Wetlands & Remediation

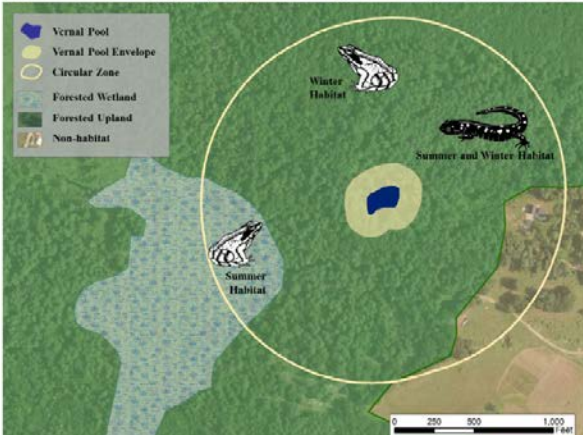
Vernal Pool wetlands can be tricky. ACOE and CTDEEP has specific Best Management Practices that impact upland areas outside of the wetland.

  
**US Army Corps of Engineers**  
New England District

**Vernal Pool Best Management Practices (BMPs)**

Vernal pool-breeding amphibians<sup>1</sup> depend upon both the vernal pool (VP) depression and surrounding envelope and critical terrestrial habitat<sup>1</sup> (CTH) for survival. The envelope and CTH support the non-larval life-cycle stages of VP-breeding amphibian species and protect the water quality of the VP. Adult amphibians spend as little as two or less weeks in breeding pools before they move back into the forests where they spend the vast majority of their lifecycle (feeding and hibernating). Adult pool-breeding amphibians typically travel as much as 750 feet (and often  $\geq 1$  mile) to reach non-breeding habitats. Juvenile dispersing amphibians may move many miles to reach new breeding pools.

During their life cycle, some species require two or more distinct habitats. For example, in southern and central Maine, the wood frog uses VPs to breed, forested wetlands and moist stream bottoms to hibernate (Figure 1). Spotted salamanders typically breed in VPs and rely on small mammal burrows (often shrews) in upland forests for both summer habitat and for hibernating.



- Vernal Pool
- Vernal Pool Envelope
- Circular Zone
- Forested Wetland
- Forested Upland
- Non-habitat

**Check It Out!**  
*Watch frogs develop from tadpoles in your backyard.*



Eggs



Adult Wood Frog (female)



Larvae



Metamorphs



# Inland Wetlands & Remediation

A Functions and Values Assessment\* is the next step in characterizing the wetlands at the site.

Wetland I.D.	Total Acres		Impacted Acres	

**Symbols Key**

- Groundwater Recharge/Discharge
- Floodflow Alteration (Storage & Desynchronization)
- Fish and Shellfish Habitat
- Sediment/Toxicant Retention
- Nutrient Removal/Retention/Transformation
- Production Export (Nutrient)
- Sediment/Shoreline Stabilization
- Wildlife Habitat
- Recreation(Consumptive & Non-Consumptive)
- Educational/Scientific Value
- Uniqueness/Heritage
- Visual Quality/Aesthetics
- ES Endangered Species

Indicates Principal Function or Value

The Highway Methodology Workbook Supplement

US Army Corps of Engineers  
New England District

Wetland Functions and Values  
*A Descriptive Approach*



# Inland Wetlands & Remediation

Wetland Decision-making (CTDEEP & Town IWWC):  
Finding of no feasible and prudent alternative to the proposed remedial action

1. Avoidance of the impact (**leave contamination?**);
2. Minimization of the impact to the greatest extent possible; and
3. Mitigation of the impact.



# Inland Wetlands & Remediation

Mitigation measures which may be considered as a condition of issuing a permit:

(A) prevent or minimize pollution or other environmental damage,

(B) maintain or enhance existing environmental quality, or

(C) in the following order of priority: **Restore, enhance and create productive wetland or watercourse resources;**



# Inland Wetlands & Remediation

ACOE Mitigation Guidance in the CTGP:

Activities must be designed and constructed to **avoid** and **minimize** adverse effects, both temporary and permanent, to waters of the United States (U.S.) to the maximum extent practicable at the project site (i.e., on site).

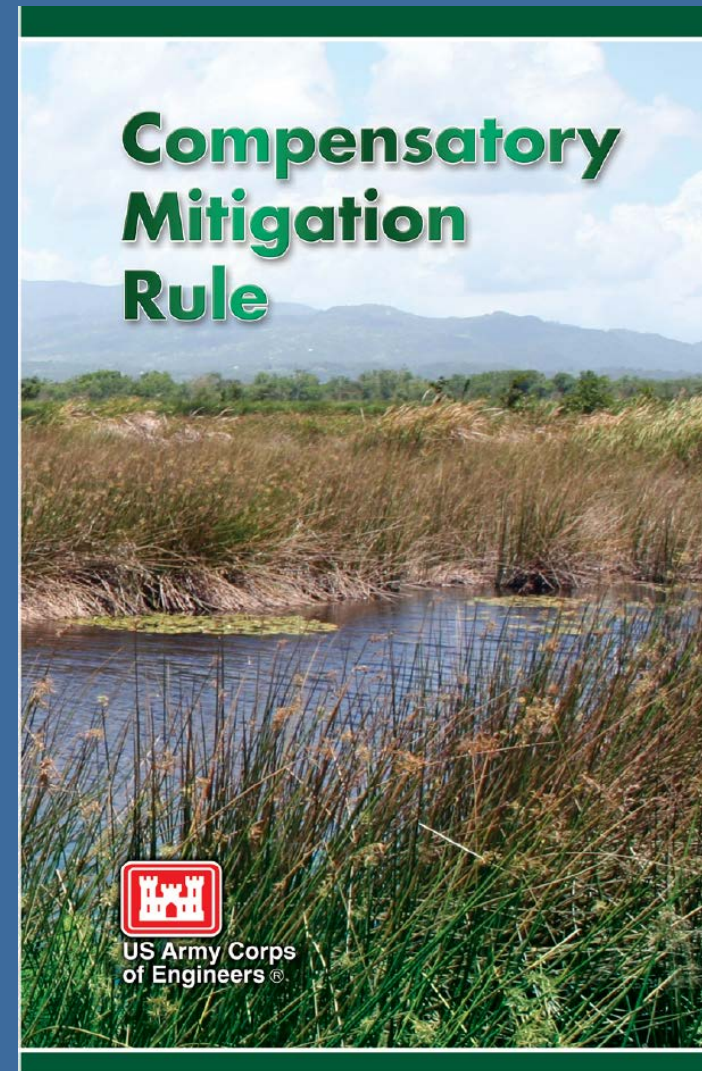
Consideration of **mitigation** (avoiding, minimizing, rectifying, reducing, or compensating) is required to the extent necessary to ensure that the adverse effects to the aquatic environment are no more than minimal.



# Inland Wetlands & Remediation

The ACOE's follow a Mitigation Rule with New England Regional guidance\*.

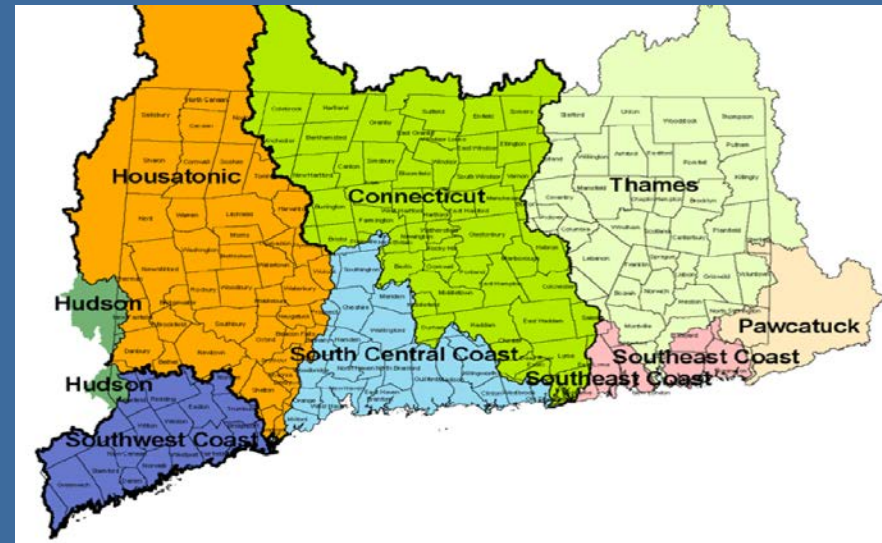
In CT, the ACOE prefers that permittee's submit fees in accordance with the Connecticut In-Lieu Fee Program\* as wetland compensation and discourages permittee-responsible mitigation.



# Inland Wetlands & Remediation

The Connecticut In-Lieu Fee program divides the State into six separate service areas based on watersheds, and is assessed per square foot of wetland impact.

Service Area	Notes	Credit Cost Per Square Foot <sup>1</sup>
Housatonic River		\$ 7.56
Southwest Coastal		\$ 9.12
South-central Coastal		\$ 7.45
Connecticut River		\$10.11
Thames River	South of I-95	\$10.80
	North of I-95	\$ 7.97
Southeast Coastal		\$ 7.97



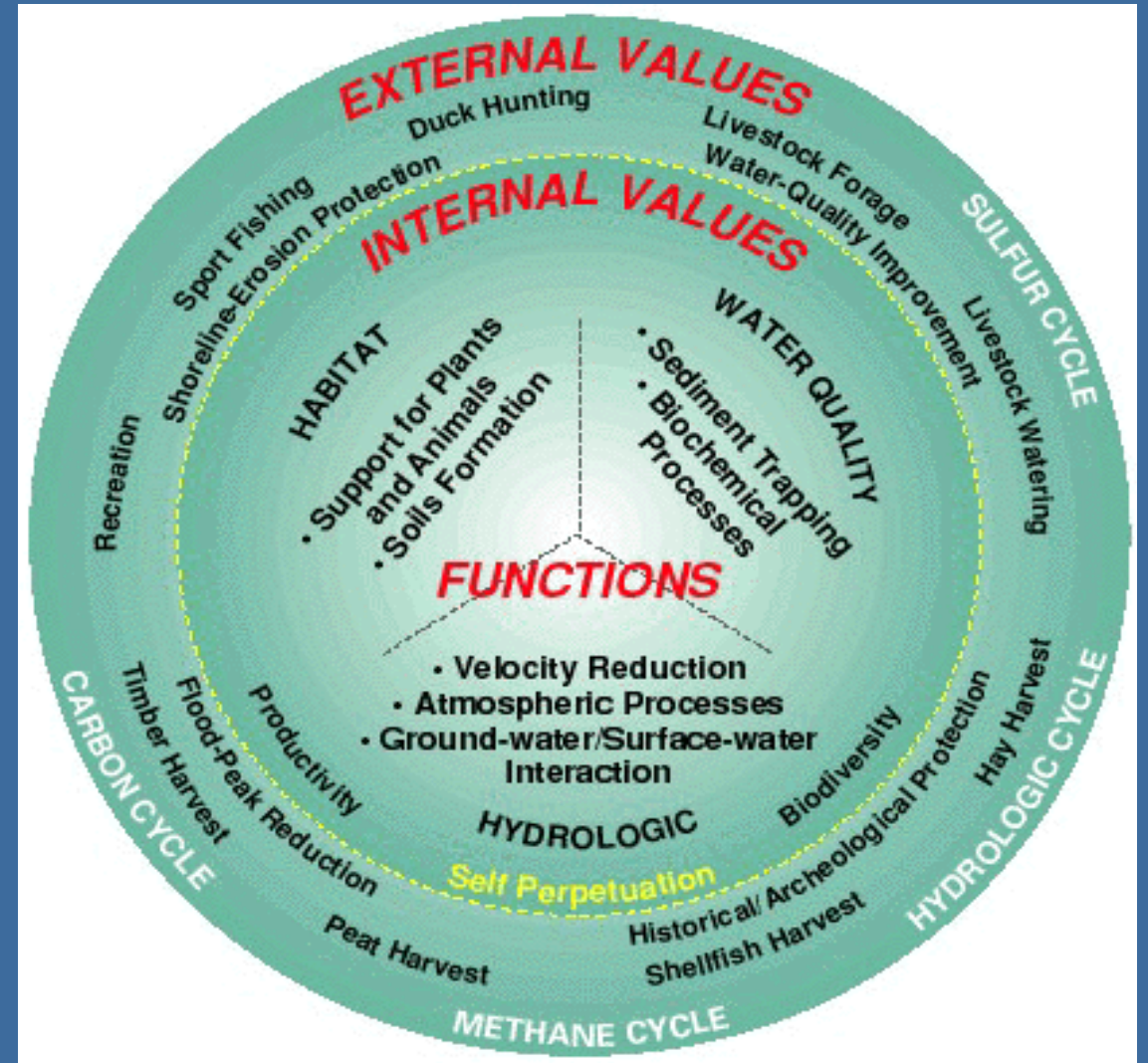
**The paradox is that CTDEEP and Town IWWC's cannot accept the ILF to satisfy any 401 WQC or IWW mitigation needs.**



# Inland Wetlands & Remediation

## Wetland Considerations:

- Saturated and/or flooded hydrology and soils
- Position in the Landscape
- Increased organic matter in soil layers
- Reduced (anaerobic) water chemistry
- Food web/nutrient cycles







Questions?? Brian Golembiewski

860-424-3867 [Brian.Golembiewski@ct.gov](mailto:Brian.Golembiewski@ct.gov)



Connecticut Department of Energy and Environmental Protection

# Inland Wetlands & Remediation Related Links

ACOE New England District -

<http://www.nae.usace.army.mil/Missions/Regulatory.aspx>

ACOE Delineation Manual & Forms -

<http://www.nae.usace.army.mil/Missions/Regulatory/Jurisdiction-and-Wetlands/Wetland-Delineation-Manual/>

ACOE CT General Permits -

<http://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/Connecticut-General-Permit/>



# Inland Wetlands & Remediation Related Links

Special Aquatic Sites Definition -

[https://www.epa.gov/sites/production/files/2015-03/documents/cwa\\_section404b1\\_guidelines\\_40cfr230\\_july2010.pdf](https://www.epa.gov/sites/production/files/2015-03/documents/cwa_section404b1_guidelines_40cfr230_july2010.pdf)

Corps application form (ENG Form 4345) -

<https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit/>

DEEP Non-tidal Section 401 Water Quality Certificate Application -

[http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324222&deepNav\\_GID=1643#InlandWaterResources](http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324222&deepNav_GID=1643#InlandWaterResources)



# Inland Wetlands & Remediation Related Links

CT Inland Wetlands & Watercourses Statutes -

[https://www.cga.ct.gov/current/pub/chap\\_440.htm#sec\\_22a-37](https://www.cga.ct.gov/current/pub/chap_440.htm#sec_22a-37)

CT ECO GIS Viewers –

<http://cteco.uconn.edu/viewers/index.htm>

USFWS National Wetlands Inventory Mapper -

<https://www.fws.gov/wetlands/Data/Mapper.html>

USDA Websoil Survey Mapper -

<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>



# Inland Wetlands & Remediation Related Links

Wetlands Functions and Values Assessment -

<http://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/HighwaySupplement6Apr2015.pdf>

ACOE's Mitigation Rule and New England Guidance -

<http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx>

ACOE CT In-Lieu Fee Program -

<http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation/In-Lieu-Fee-Programs/CT/>



# Post-Closure Care of the CRRA Landfills

Ray Frigon, Water Planning and Management Division  
Supervising Environmental Analyst



Connecticut Department of Energy and Environmental Protection

# Prompting Legislation

- Public Act 13-184, Sec 99: Stipulates that CRRA shall transfer \$35M to State General Fund
- Public Act 13-247, Sec 236: Stipulates that DEEP and CRRA shall enter a memorandum of understanding (MOU) to transfer post-closure care obligations of five landfills (Hartford, Ellington, Shelton, Waterbury, Wallingford) from CRRA to DEEP



# DEEP Assumes Post-Closure Obligations

- April 2014: DEEP and CRRA enter a MOU and associated Transition Plan to guide the transfer of post-closure obligations, contracts and accounts to DEEP.
- Land ownership remains with City of Hartford, Town of Wallingford, and CRRA (now MIRA).





# CRRA Landfills

## CRRA Ellington LF:

- 28 acre landfill owned by MIRA, additional 84 acres owned by MIRA for plume control
- MSW; 2' soil cap; 3:1 slopes
- LF gas collection & control system; Thermal oxidizer
- Adjacent private drinking water wells impacted

## CRRA Hartford LF:

- 124 acres owned by City of Hartford
- MSW & ash; Geomembrane/soil cap with 3:1 slopes; Solar Turf on eastern half
- LF gas collection & control system; Thermal oxidizer; Emergency generator
- Groundwater Flow Control System (discharge to MDC)
- Leachate collection from ash cell, on-site treatment prior to discharge



# CRRA Landfills

## CRRA Shelton LF:

- 110 acre landfill owned by MIRA
- MSW (2' soil cap), two ash landfills & HW metal hydroxide cell (geomembrane/soil cap);
- Very steep side slopes 3:1+
- LF gas collection & control system; Thermal oxidizer; Emergency generator
- Leachate collection from ash cells/on-site treatment prior to discharge

## CRRA Wallingford LF:

- 84 acre landfill owned by Wallingford; Adjacent 45 acres owned by MIRA for plume control
- Moderate slopes 2:1
- MSW, bulky, one ash landfill (2' soil cap), HW metal hydroxide cell (geomembrane/soil cap);
- Passive LF gas collection/venting



# Landfill Properties

## CRRA Waterbury LF:

- 34 acres owned by MIRA; bulky waste; 2' soil cap

## Yaworski Landfill, Canterbury

## PIRNO Parcel (Century Brass Landfill), Waterbury



# Project Staff

**Ray Frigon**

**Scott Wing**

**Lisandro Suarez**

**Teddy Brightwell**



# Project Goals

- Provide a safe working environment for staff/contractors
- Be a model of excellent permit compliance
- Reduce post-closure care expenses
- Improve/establish communications with host towns and stakeholders
- Perform actions within budget



# DEEP Activities at CRRA Landfills

- Repair, protect and enhance operating systems
- Establish SOPs for operating systems
- Prioritize site improvements that enhance permit compliance and reduce recurring expenses
- Quarterly summary reports to host towns
- Enhance habitat for desirable wildlife species
- Pre-construction involvement with solar projects



# Hartford Landfill



# Hartford Landfill



Connecticut Department of Energy and

Ray Frigon



# Ellington Landfill



Connecticut Department of Energy and Environmental Protection

Ray Frigon

# Ellington Landfill



Connecticut Department of Energy and Environmental Protection

Ray Frigon

# Shelton Landfill



# Shelton Landfill



Environmental Protection

Ray Frigon

# Shelton Landfill



Connecticut Department of Energy and Environmental Protection

Ray Frigon

# Wallingford Landfill



Connecticut Department of Energy and Environmental Protection

Ray Frigon

# Waterbury Landfill





# Questions or Comments?

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Please Speak into Microphone  
and State Your Name

Ray Frigon

860.424.3797

[Raymond.frigon@ct.gov](mailto:Raymond.frigon@ct.gov)

[www.ct.gov/deep/remediationroundtable](http://www.ct.gov/deep/remediationroundtable)





# Remediation Roundtable



E-mail: [DEEP.remediationroundtable@ct.gov](mailto:DEEP.remediationroundtable@ct.gov)

Web: [www.ct.gov/deep/remediationroundtable](http://www.ct.gov/deep/remediationroundtable)



# Remediation Roundtable

Next meeting: October 16, 2018