



Remediation Roundtable Webcast

- Basic directions provided on listserv email
- Detailed directions on website
 - <u>www.ct.gov/deep/remediationroundtable</u>







Remediation Roundtable Agenda

- Announcements
 - Roundtable in Review
 - Remarks from Management
- Updates and Presentations
 - ■Wave 2 RSRs
 - Tidal Wetland Habitat Restoration
 - Roundtable Tips
 - Concurrence with ITRC DNAPL Guidance
- 30th Roundtable Celebration Reception



Website Updates

- New General Permit for Discharge of Remediation
 Wastewater <u>Donald.Gonyea@ct.gov</u>
- Voluntary Remediation Program 133x Fact Sheet
- Voluntary Remediation Program 133y Fact Sheet
- DEEP: LEP Verification Audit Program Fact Sheet
- Emerging Contaminants
- Current Projects added Durham Meadows
- Concurrence memo with ITRC DNAPL Guidance



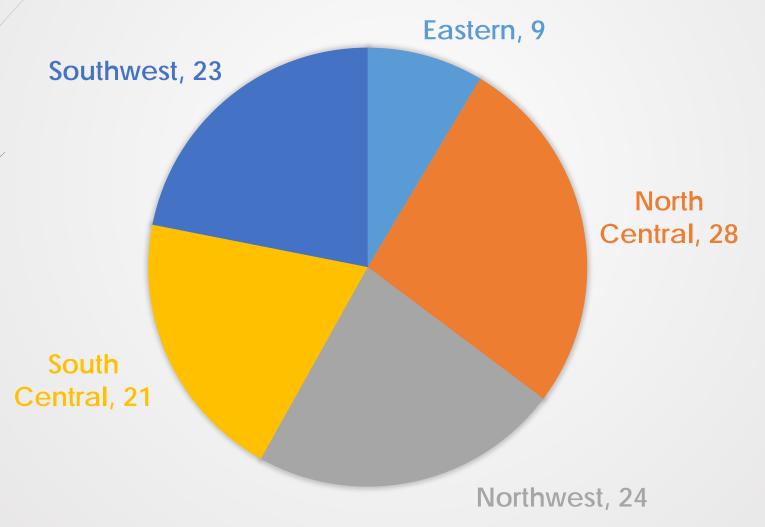
LEP Verification Program Year in Review





LEP Verification Program Year in Review







LEP Verification Program Year in Review

Verification Form Notice of Insufficiency

- 2015 June 2016
 - 45% incomplete or inaccurate

- August 2016 January 2018
 - 30% incomplete or inaccurate



Roundtable in Review

- Topics survey vs topics covered
- Additional topics covered

April 2011 Survey Results

MOST IMPORTANT

Additional Polluting Substances/ Alternative Criteria

IMPORTANT

Cost Concerns

Widespread Contamination

Sampling Concepts

Ecological Risk Assessment

Engineered Controls - case study of previously approved ECs

Verifications

ELURs - review process and available options

Engineered Controls - amount of and method for establishing financial surety

Property Transfer - changes to Property Transfer statutes; compliance goals

• February 8, 2011, June 14, 2011, April 12, 2011, February 14, 2012, May 14, 2013, August 13, 2013, May 13, 2014, February 24, 2015, June 9, 2015, September 9, 2015, March 16, 2016

11

- •August, 12, 2012, May 14, 2013, November 18, 2014, October 25, 2016, October 17, 2017
- •September 13, 2011, November 8, 2011, May 8, 2012, May 14, 2013, November 18, 2014, June 9, 2015, September 9, 2015, March 16, 2016

8

•November 18, 2014, March 15, 2016, June 20, 2017

3

•November 12, 2013

1

• February 8, 2011, May 8, 2012, February 5, 2013, November 18, 2014, March 16, 2016

5

•May 8, 2012, August 14, 2012, February 11, 2014, November 18, 2014, June 20, 2017, October 17, 2017

5

•August 13, 2013, February 11, 2014, November 18, 2014, June 21, 2016, March 28, 2017

2

- •February 8, 2011, November 18, 2014
- •August 13, 2013, February 11, 2014, November 18, 2014, March 28, 2017, October 17, 2017

5

April 2011 Survey Results

SOMEWHAT IMPORTANT

Property Transfer - decision process for ECAF delegation and purpose of information requested on the form

•Quasi December 10, 2010

Remediation Website

• Every Roundtable the Website is discussed

2015, June 9, 2015, September 8, 2015

•May 14, 2013, August 13, 2013, November 21, 2013, May 13, 2014, November 18, 2014, February 24,

Analytical Methods

•February 8, 2011, April 12, 2011, May 8, 2012, August 14, 2012, May 13, 2014, August 26, 2014, June 9, 2015, September 8, 2015, October 25, 2016, March 28, 2017, October 17, 2017

ELURs - discussion of subordination purpose and procedure

•March 28, 2017



Additional Topics of Note

IR OF	Outreach from other DEEP Programs and Agencies • Brownfields, PCBs, DECD, DPH SAFER Program, etc.	8
	Emerging Contaminant and Improved Contaminant Health Concerns	6
	• TCE, 1,4-Dioxane, PFAS, etc. In-Situ Remediation Technology and Permitting	3
	 Technical Tips 95% UCL, groundwater compliance monitoring, soil reuse, asphalt millings, ITRC concurrence, etc. 	6
	 Administrative Updates Verification forms, Verification audit updates, Significant Environmental Hazard Forms, APS forms, etc. 	6

Connecticut Department of Energy and Environmental Protection: Remediation Division

Camille Fontanella



Roundtable in Review

Please let us know if there are topics you would like to hear about

DEEP.remediationroundtable@ct.gov

Index of Topics



Questions or Comments?

Please Speak into Microphone and State Your Name

www.ct.gov/deep/remediationroundtable



Announcements

Betsey Wingfield
Bureau Chief

Bureau of Water Protection and Land Reuse



Announcements

Robert Bell
Assistant Director
Remediation Division
Bureau of Water Protection and Land Reuse



Announcements

Patrick Bowe
Director
Remediation Division
Bureau of Water Protection and Land Reuse



Update Wave 2 Remediation Standard Regulations

Betsey Wingfield
Bureau Chief

Bureau of Water Protection and Land Reuse

Tidal Wetland Habitat Restoration in Connecticut





Harry Yamalis
Environmental Analyst 2
Connecticut Dept. of Energy & Environmental Protection
Land & Water Resources Division

What Are Tidal Wetlands?

Tidal wetlands are defined as... Well, it depends.

- Google search: 312,000 hits
- Yahoo search: 737,000 hits
- Some define tidal wetlands by vegetation or soil type
- EPA's definition is about a paragraph long (for now)
 - --see https://www.epa.gov/wetlands/what-wetland
- Section 22a-28 thru Section 22a-35, inclusive, is the Connecticut Tidal Wetlands Act in its entirety. The definition alone, however, still would not fit on this slide unless I used this font size

- Relatively flat, intertidal coastal habitat, capable of supporting salttolerant, emergent vegetation (salt marsh); also may exist in tidal brackish or fresh waters.
- If you are ever uncertain, call DEEP-LWRD

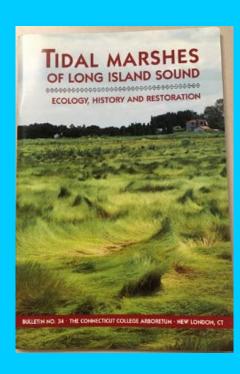
What Are Tidal Wetlands?

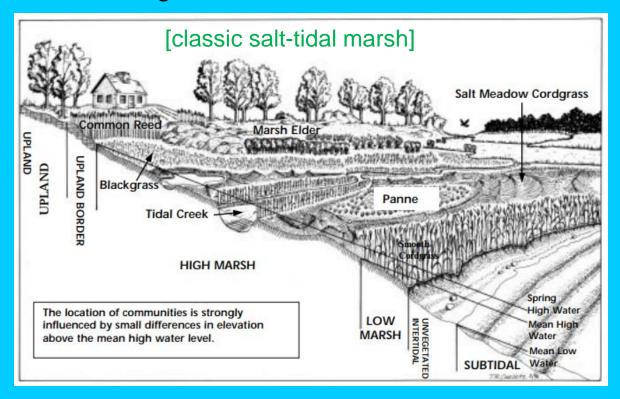
Tidal wetlands are defined as... Well, it depends.

- Google search: 312,000 hits
- Yahoo search: 737,000 hits
- (2) "Wetland" means those areas which border on or lie beneath tidal waters, such as, but not limited to banks, bogs, salt marsh, swamps, meadows, flats, or other low lands subject to tidal action, including those areas now or formerly connected to tidal waters, and whose surface is at or below an elevation of one foot above local extreme high water; and upon which may grow or be capable of growing some, but not necessarily all, of the following: Salt meadow grass
- (Spartina patens), spike grass (Distichlis spicata), black grass (Juncus gerardi), saltmarsh grass (Spartina alterniflora), saltworts (Salicornia Europaea, and Salicornia bigelovii), sea lavender (Limonium carolinianum), saltmarsh bulrushes (Scirpus robustus and Scirpus paludosus var. atlanticus), sand spurrey (Spergularia marina), switch grass (Panicum virgatum), tall cordgrass (Spartina pectinata), high-tide bush (Iva frutescens var. oraria), cattails (Typha angustifolia, and Typha latifolia), spike rush (Eleocharis rostellata), chairmaker's rush (Scirpus americana), bent grass (Agrostis palustris), and sweet grass (Hierochloe odorata), royal fern (Osmunda regalis), interrupted fern (Osmunda claytoniana), cinnamon fern (Osmunda cinnamomea), sensitive fern (Onoclea sensibilis),
- marsh fern (Dryopteris thelypteris), bur-reed family (Sparganium eurycarpum, Sparganium androcladum, Sparganium americanum, Sparganium chlorocarpum, Sparganium angustifolium, Sparganium fluctuans, Sparganium minimum), horned pondweed (Zannichellia palustris), water-plantain (Alisma triviale), arrowhead (Sagittaria subulata, Sagittaria graminea, Sagittaria eatoni, Sagittaria engelmanniania), wild rice (Zizania aquatica), tuckahoe (Peltandra virginica), water-arum (Calla palustris), skunk cabbage (Symplocarpus foetidus), sweet flag (Acorus calamus), pickerelweed (Pontederia cordata), water stargrass (Heteranthera dubia), soft rush (Juncus effusus), false hellebore (Veratrum viride), slender blue flag (Iris prismatica pursh), blue flag (Iris versicolor), yellow iris (Iris pseudacorus), lizard's tail (Saururus cernuus), speckled alder (Alnus rugosa), common alder (Alnus serrulata), arrow-leaved tearthumb (Polygonum sagittatum), halberd-leaved tearthumb (Polygonum arifolium), spatter-dock (Nuphar variegatum nuphar advena), marsh marigold (Caltha palustris), swamp rose (Rosa palustris), poison ivy (Rhus radicans), poison sumac (Rhus vernix), red maple (Acer rubrum), jewelweed (Impatiens capensis), marshmallow (Hibiscus palustris), loosestrife (Lythrum alatum, lythrum salicaria), red osier (Cornus stolonifera), red willow (Cornus amomum), silky dogwood (Cornus obliqua), sweet pepper-bush (Clethra alnifolia), swamp honeysuckle (Rhododendron viscosum), high-bush blueberry (Vaccinium corymbosum), cranberry (Vaccinium macrocarpon), sea lavender (Limonium nashii), climbing hemp-weed (Mikania scandens), joe pye weed (Eupatorium purpureum), joe pye weed (Eupatorium maculatum), thoroughwort (Eupatorium perfoliatum);
- Relatively flat, intertidal coastal habitat, capable of supporting salttolerant, emergent vegetation (salt marsh); also may exist in tidal brackish or fresh waters.
- If you are ever uncertain, call DEEP-LWRD

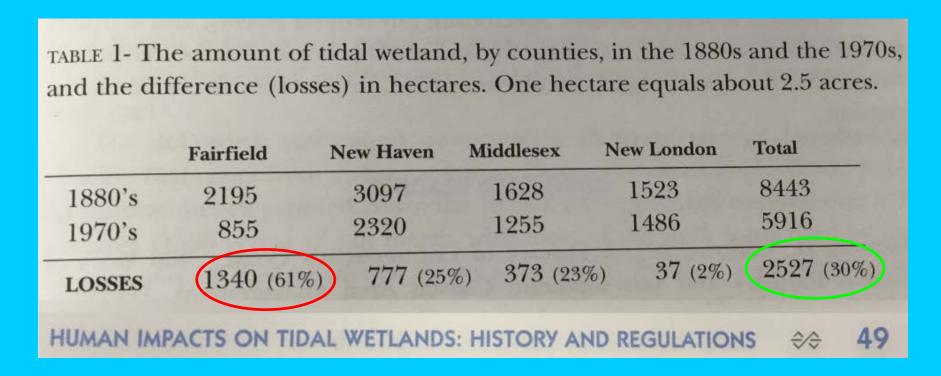
What Are Tidal Wetlands?

- Among the world's most productive habitats*
- They exist intertidally, with the most salt-tolerant grasses occupying areas beginning a few inches below Mean High Water; tidal wetlands also exist in fresh and brackish water
- Soils are commonly known as "peat" → very high organic content; much higher than what is found in intertidal mudflats or sandflats.
- Accordingly, the mineral sediment (sand, mud, etc.) component of peat is much lower than in unvegetated sand / mud flats



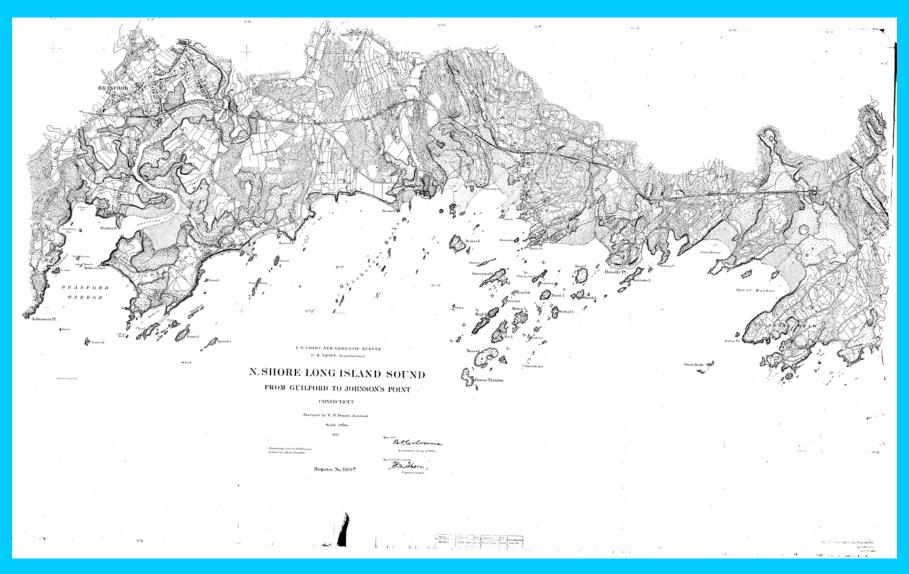


- Read Connecticut College Arboretum Bulletin #34 https://digitalcommons.conncoll.edu/arbbulletins/
- How much tidal wetland was lost?



Anecdotally, I have heard that overall losses of CT tidal marshes hover around 50% compared to pre-colonial acreage

US Coast and Geodetic Survey Maps



"T-sheets"

Why did the colonists launch a major assault against tidal marshes?

- -Tidal marsh ecology and the important functions and values of these habitats were not well understood.
- -While farmers immediately recognized the value of marsh grasses as feed and bedding material for livestock, most just thought of them as muddy swamps or wastelands to be filled, dredged, or otherwise avoided.



-Salt hay was also used as insulation (for ice, etc.) prior to refrigeration

-Salt hay farming continues to this day – weed free mulch

What are the primary causes of tidal marsh degradation?



Photo from UConn CLEAR website, Connecticut's Coast: Then and Now. https://clear3.uconn.edu/viewers/Coast1934/

Dredging

Filling

Mosquito Ditching

-So what's the harm?



-So what's the harm?

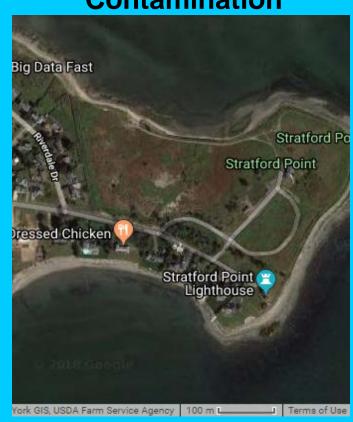
What are the primary causes of tidal marshes degradation?



What are the primary cause liking EMEDIATION ALERT!!

Contamination







Francis Studios

Very different from the rest:

- Quite possibly among the most expensive of marsh restoration projects
- Evidence of contamination is not always visible in aerial photos or in person.

What is the Need for Tidal Marsh Habitat Restoration?

- Degraded tidal wetlands can promote mosquito breeding & water pollution
- Do not provide the level of quality habitat needed as nesting, feeding, or nursery areas for wildlife, including many commercially important species
- May become so bad that they become dangerous for people and lose all recreational value; Phragmites infestations can become fire hazards
- Healthy marshes buffer the adjacent uplands from storm energy and may decrease the risk of coastal flooding
- Healthy & functional tidal wetlands and waterways provide critical habitat for fish and wildlife, and offer many recreational opportunities for people



Tidal Marsh Habitat Restoration - a quick how-to

How do we get started? And how de There are as per REMEDIATION ALERT!!

Each Project is an acres by case by case by

Each Project i e evaluated on a case-by-case basis

Applicant must demonstrate that the selected restoration site is indeed degraded

A tidal marsh can be classified as degraded when one or more of its functions and values have been undermined or lost due to disturbances caused by anthropogenic influence. In short, the definition of a degraded tidal marsh is one that no longer looks and performs as nature intended. In some cases, all of the degraded marsh's functions and values have been lost.

Remediation –restoration site may be predetermined, but this may not always the case. It is common for the regulated community to be told to select a site (step 1).



Photo from UConn CLEAR website, Connecticut's Coast: Then and Now. https://clear3.uconn.edu/viewers/Coast1934/

Tidal Marsh Habitat Restoration – A Quick How-to

Now set some restoration goals and targets

Habitat Restoration is defined as the intentional alteration of a site in an attempt to reestablish the approximate biological, geological, and physical conditions that existed in the pre-disturbance ecosystem.

Restoration goals are site-specific and depend on the types of impacts and disturbances present. Goals and targets may include:

- Restoring appropriate marsh surface elevation to support tidal wetland plants. This may be accomplished by either adding or removing fill material;
- Restoring tidal hydrology, which involves both high tide flooding, and low tide drainage;
- Removing or abating contamination issues;
- Species-specific targets, such as increasing vegetation % cover, or improving the marsh's overall suitability for wildlife;
- Phragmites control can be accomplished through the reintroduction of salt water, and natural mosquito control through the reintroduction of small predatory fish.

Tidal Marsh Habitat Restoration – A Quick How-to

- **✓** Restoration site selected
- ✓ Clear goals & targets set Now it's time to start planning
- Team up with a consultant experienced in tidal wetland ecology and restoration
- Draft a set of conceptual plans. Details are always good, but don't go too crazy. Changes will be made.
- Write up some construction methodology. OK to be general and brief at this early stage
- Contact the permitting section of DEEP's Land & Water Resources Division
- A pre-application consultation will be very helpful to both the applicant and the permit analysts who will review the application.
- Share a summary of the project, including maps, photos, and conceptual with the permit analyst. He REMEDIATION ALERT?? or she may recommend a face to face pre-ann meeting on how complicated the project is.
 - Ask which application eed to be filled out.
 - Ask about federal permitting as well, and contact ACOE Regulatory staff.
- If the site is contaminated, applicant will need to contact DEEP's Remediation Division for additional guidance.

Tidal Marsh Habitat Restoration – A Quick How-to

- **✓** Restoration site selected
- ✓ Clear goals & targets set

More Planning!

- **✓** Now it's time to start planning
- The search for funding usually plays an important role in the early planning stages for habitat restoration projects (in general), but may not be a factor in remediation.
- Develop a monitoring plan, for pre- and post-construction. Required parameters will vary among projects, including:
 - water and/or soil salinity
- marsh surface elevation
- sediment characteristics
- wildlife surveys
- percent cover, species abundance, & species distribution of marsh plants
- **You may propose your own parameters to monitor, but you may be asked to do more.
- Some of the more expensive studies that may be required prior to construction include:
 - hydrology studies & modeling
 contaminant testing
 - groundwater analyses
- sediment transport analysis
- marsh surface compression and sediment compaction (settling) studies
- Draft final design plans, submit your survey / monitoring reports, and apply for permits.

Restored vs. Restoring

When the construction phase is completed, it is common to hear people state that their site is 'restored.'

Technically, the site is still 'restoring' and most likely will be for a very long time.

The project's monitoring plan will include a minimum of 3, sometimes 5 years of post-construction monitoring. The data collected will indicate if the marsh is restoring at a pace typical to the sorts of restoration techniques applied.

After a few years of monitoring, your site is still not 'restored.' The ultimate goal is to set the marsh on a long-term trajectory to becoming a self-maintaining ecosystems with minimal (if any) further maintenance or management required – as a natural ecosystem should be.

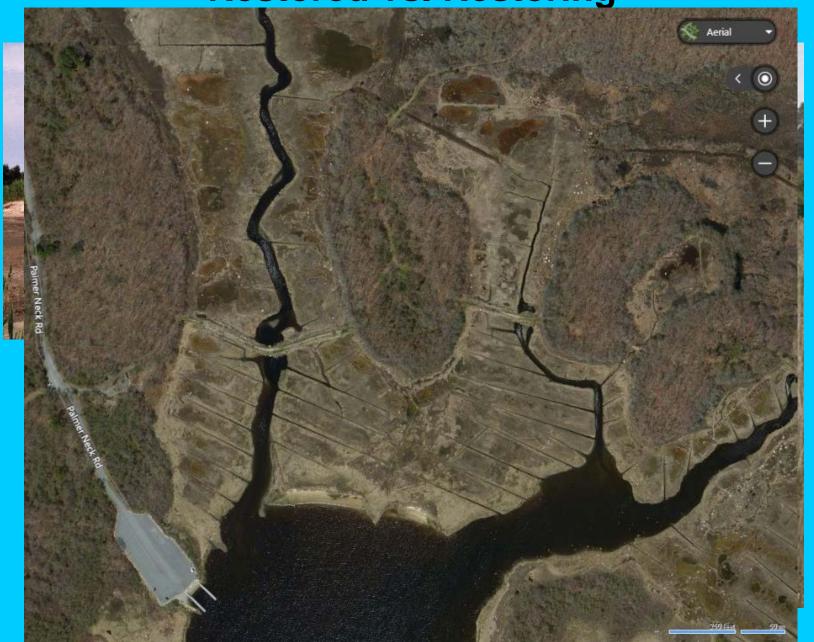
Restored vs. Restoring







Restored vs. Restoring





When is a contaminated site "remediated?" Or "restored?"

- Depends on the interests of the involved parties:
 - DEEP's Remediation and Planning & Standards Divisions determine when site is remediated
 - Land & Water Resources Division determines when the completed restoration activities are sufficient
 - Wildlife Division / resource staff make recommendations to all three when remediation and restoration efforts are suitable for wildlife
- One of the key elements of all of this after a tidal marsh site is decontaminated through the remediation process, there's still the degraded tidal marsh issue to resolve. It's very likely that the activities necessary for decontamination resulted in tidal wetland impacts, which also must be corrected.

Building a Tidal Marsh from Scratch

But how do we rebuild a tidal marsh after excavating and properly disposing of more than 3 feet of contaminated peat soils?

All of the tidal marsh restoration guidelines from earlier still apply – set the marsh elevation correctly, with the appropriate level of tidal flushing, and if no other site-specific problems left to resolve, then the marsh should begin restoring itself fairly quickly and continue on that path.

New steps necessary, but not mentioned earlier:

- need to locate a source of suitable material
 - dredge from aquatic sources, or
 - excavate from terrestrial sources
 - transport material to marsh restoration site
 - place the material, stopping at a predetermined target elevation
- BUT, project likely to fail if the sediments cannot be contained

Building a Tidal Marsh from Scratch

Beneficial use of dredged material

- Thin* Layer Placement (TLP), TLD, marsh filling**
 - emerging technique in marsh restoration
 - solves 2 problems at once
 - containing the material is vital to success

Methods that have worked

- biodegradable fiber logs / blankets (low energy areas)
- low (up to about MHW) stone sill (moderate energy)
- rigid containment cells concrete, large boulders + filter fabric lining (high* energy)

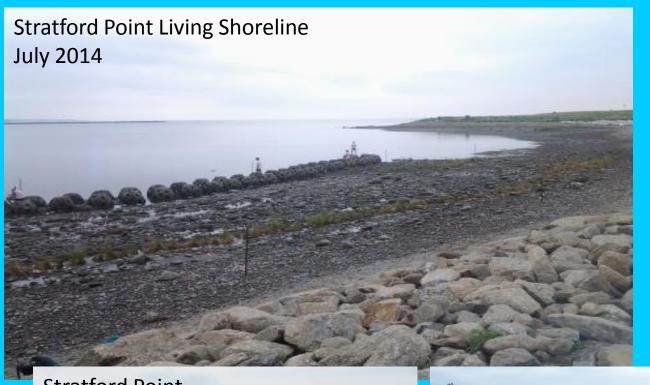
Search the web

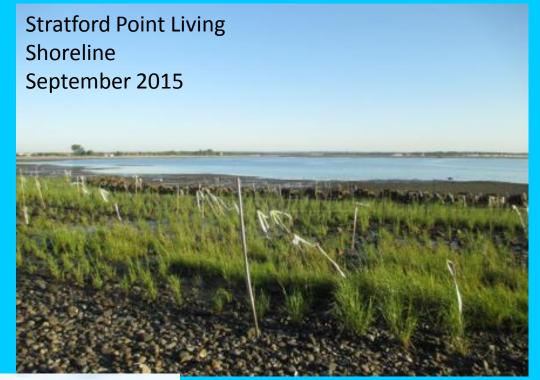
- thin layer placement / thin layer deposition
- marsh subsidence
- living shorelines

^{*}Thin is relative

^{**}Only fill to the level necessary to support tidal marsh vegetation...or else!







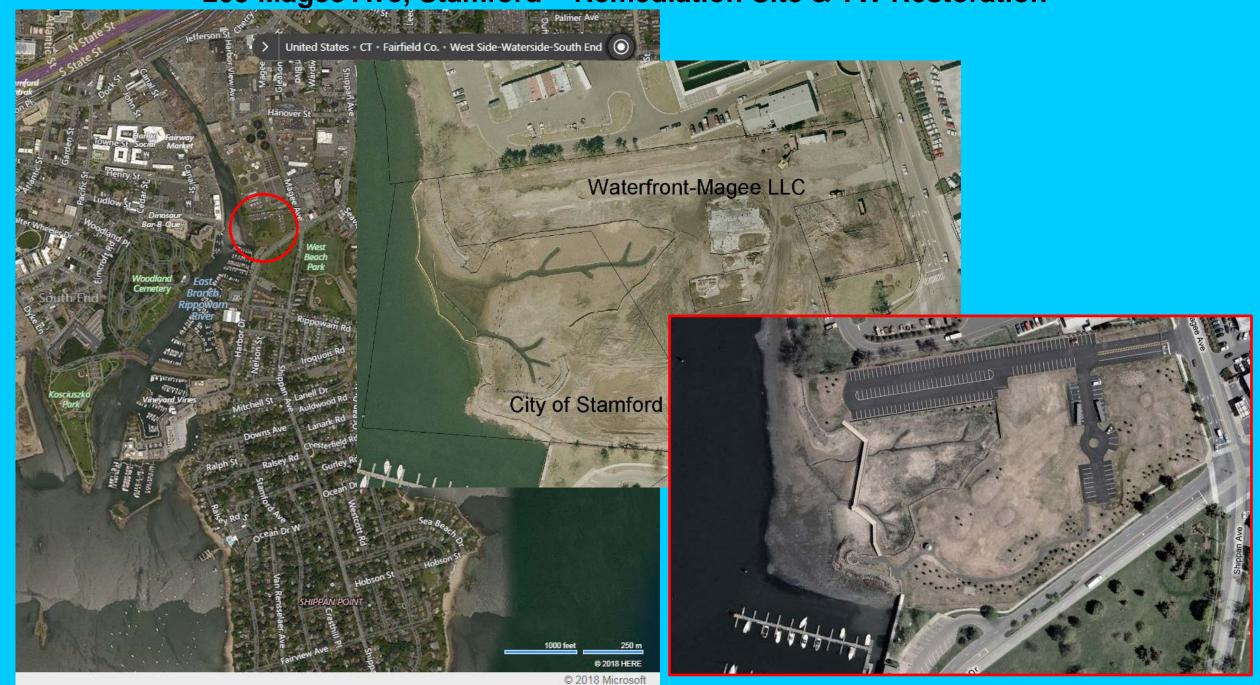


Stratford
Point Living
Shoreline
July 2017



Photo credit: Sacred Heart University

205 Magee Ave, Stamford – Remediation Site & TW Restoration

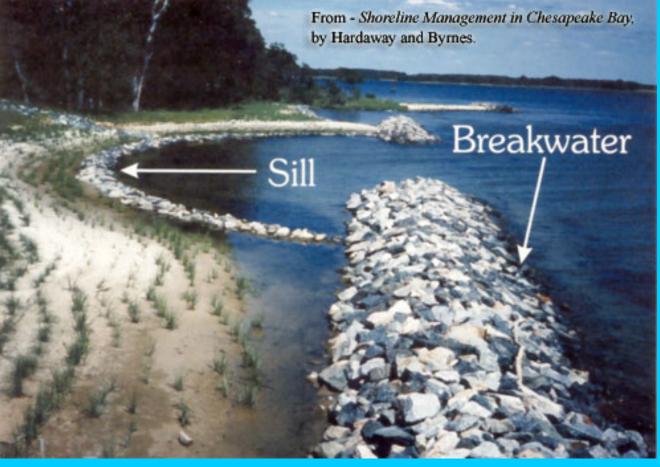


205 Magee Ave, Stamford – Remediation Site & TW Restoration



http://www.woodardcurran.com/project/brownfield-property-redevelopment









Tidal Wetland Habitat Restoration in Connecticut



Harry Yamalis
Environmental Analyst 2
Connecticut Dept. of Energy & Environmental Protection
Land & Water Resources Division



Remediation Roundtable Tips







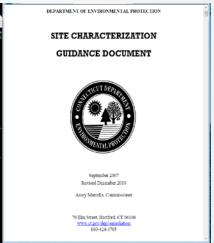
Designation: E1527 – 13

Standard Practice for

Environmental Site Assessments: Phase I Environmental

Site Assessment Process





Site Characterization Guidance Document

(SCGD)

RSRs



Although the ASTM E1527-13 standard will satisfy the requirements for all appropriate inquiries under CERCLA, and may provide liability protections to the land owner ...

- The ASTM Standard Practice for Phase I ESA's is not all inclusive of the expectations for completing a Phase I in accordance with the SCGD.
- In fact: Section 1.1.4 of E1527-13 states that, "Users are cautioned that federal, state, and local laws may impose environmental assessment obligations that are beyond the scope of this practice."



E1527-13, Section 4.1:

"This [ASTM Standard Practice for Phase I ESA's] practice is intended primarily as an approach to conducting an inquiry designed to identify recognized environmental conditions in connection with a property."

Recognized Environmental Conditions means, "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. 'De minimis' conditions are not recognized environmental conditions." [Section 3.2.78]



➤ 'De minimus' means a condition that generally does not present a
threat to human health or the environment and that generally would
not be the subject of an enforcement action if brought to the
attention of appropriate governmental agencies [3.2.22]

- Conditions determined to be 'de minimus' are not RECs, so therefore would not be evaluated
- De minimus conditions are expected to be evaluated in accordance with the SCGD



ASTM		SCGD
REC		AOC
	Dumpsters	✓ y
	Loading docks	✓ y
	Septic systems	✓ y
	Transformers	✓ y

Connecticut Department of Energy and Environmental Protection: Remediation Division



- Any Phase I ESA presented to DEEP as basis for support for a remedial program milestone is expected to be completed in FULL accordance with Connecticut's SCGD
 - Regardless of Type of Property Transfer Filing or type of Verification

Verifications that rely solely or mostly on findings of ASTM Phase I will be selected for Audit

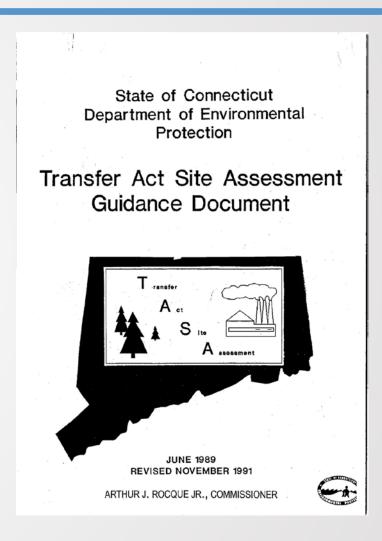


Tip #16 p.s. SCGD --- TASA

TASA

Preamble of SCGD states, "The TASA guidance document is superseded by this SCGD, except for limited use of TASA pursuant to CGS Section 22a-133w (voluntary site remediation in GB or GC areas). At such sites, TASA may be used in conjunction with this SCGD".

Key context = "in conjunction with" the SCGD





Questions or Comments?

Please Speak into Microphone and State Your Name

www.ct.gov/deep/remediationroundtable









- Where??? Located in the lower level (basement) at 79 Elm/Street
- When can you view files??? Tuesdays, Wednesdays, and Thursdays from 9:00-11:30 a.m. and 1:00-2:30 p.m. Viewing files may occur until 4:00 p.m. Appointments can also be made to view the files by calling 860-424-4180. Please leave a detailed message.



What can you find in the file room???

Air Bureau • Air permits, Pre-Inspection questionnaires, Stack testing records, Site inspections, Open burn permits, Enforcement actions...

Material
Management and
Compliance
Assurance

 Oil & Chemical Spill incidents, RCRA facilities inspections, Enforcement documentation, Complaints and correspondence, Engineering drawings, Discharge permits, Underground Storage Tank reports, Industrial Discharges, Landfill monitoring Subsurface disposal sites, Stage II gas station inspections...

Water Protection and Land Reuse • Superfund site records, Property Transfer forms, Urban site remediation records, Well completion reports, Gas station inspections, Groundwater monitoring reports, and Significant Environment Hazard Notifications...



- Complete a "File Review Form" provided by the Records Center staff.
 - Best to do a broad search by Town, with all possible site names, and all possible addresses.
- Viewing of scanned files:
 - Oil & Chemical Spill Incidents and disposal manifests
 - SEH notifications and DEEP correspondence
- For Copying- A prepaid card can be purchased by visiting the Bureau of Administration's Central Processing Unit located in the front entrance
 - Certified copies can be provided by the Records Center staff. The first page is a \$1.00 and additional pages are \$0.50/page



Basic File Room Rules:

No files are allowed to be removed from the viewing area.

Keep the files neat, in the order in which you found them, and do not write on them.

If information is misplaced, notify the Records Center staff.



When files are not in the file room:

- Files may be at a Project Manager's desk and the Records Center staff may help retrieve these files at your request
- Pre-1990 files are filed off-site and require arrangements by requesting the Bureau assigned Records Center staff to get access to these files
- Aerial photos are no longer at the DEEP and can be reviewed at the Connecticut State Library



The presence or absence of information in the Department files is not a guarantee of the presence or absence of an environmental problem or violation at a site or facility



Questions or Comments?

Please Speak into Microphone and State Your Name

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Remediation Roundtable





E-mail: <u>DEEP.remediationroundtable@ct.gov</u>

Web: www.ct.gov/deep/remediationroundtable

Connecticut Department of Energy and Environmental Protection: Remediation Division

