Village Creek Harbor & Estuary

A Study on the Feasibility of Restoring Degraded Saltmarsh with Dredged Material

Public Presentation
September 7th and 9th 2017
AGENDA

Background/Historical Perspective
Dredging History and Needs
NFWF/ CIRCA Grant Objectives
Existing & Historical Tidal Marsh Conditions
Topographic & Bathymetric Survey
Biobenchmarking (Vegetation Assessment)
Sediment Quality: Marina v. Salt Marshes
Sediment Repositioning Options
Permitting
Questions & Answers
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Village Creek Community Harbor

- Small, pleasure boat harbor in Village Creek Estuary.
- Funded by Village Creek Community
  - Open to residents and non-residents
- Complete dock renovation in 2010 – Power, water, lights, 49 slips.
Harbor and Channel maintained by conventional dredging since 1957.

Village Creek is part of the Long Island Sound Dredge Management Plan (DMMP)

We share the Sound with New York State

• In April 2016, NYS Conditionally concurred with the U.S. EPA approval of the continuation of open water disposal at WLIS and CLIS.

• With the understanding that “A goal of the regulation was to reduce or eliminate open-water disposal of dredged material into Long Island Sound”.

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New York State Opposes Open Water Disposal in Long Island Sound

On August 18th, New York State filed suit against the U.S. EPA to stop the approval of the Eastern Long Island Sound Disposal Site. (ELDS)

This lawsuit is in response to the April 2016 EPA approval of the LI Sound Dredged Materials Management Plan (DMMP)

This disposal site is similar to the Western Long Island Sound Site that serves Connecticut dredging projects at our end of the sound.

NYS and environmental groups claim that open-water disposal of dredging materials introduces contaminants, harms shellfish and reduces water quality in the Sound.
The Future of Dredging in Long Island Sound

• An agreement made in 2005 between the EPA, the Army Corps, and the states of Connecticut and New York was supposed to create a plan that would reduce and phase out open-water dumping sites.

• “The proposed amendment was intended to support the overarching goal of reducing or eliminating open water disposal by establishing standards and procedures that will encourage practicable alternatives to open water disposal.” Those standards and procedures include a permanent “dredging team” that would look for alternatives to dumping as each project comes up. Alternatives like using the silt and sand to restore beaches or marshlands.
From Recommendation to Investigation

• Permit discussions with CTDEEP offices in Sept 2015
• Recommended Saltmarsh Restoration
  – Previous effort on our part (2004)
• Encouraged to investigate “local disposal”
• Sources of Funding:
  – NFWF - Long Island Sound Futures Fund
  – CIRCA - CT Institute for Resilience and Climate Adaptation
• Norwalk Land Trust – Agreed to sponsor grant application
• Awarded NFWF and CIRCA Grant
• Fuss and O’Neil chosen as an engineering contractor
Sponsors and Supporters

Project Management

• Nominal Grant Applicant - Norwalk Land Trust
• Principal Investigators – Village Creek Harbor Corporation
• Contractor – Fuss & O’Neil, Manchester, CT
  – Josh Wilson – Project manager

Funding

• NFWF – National Fish and Wildlife Foundation – Long Island Sound Futures Fund
• CIRCA – Connecticut Institute for Resilience and Climate Adaptation
• Matching funds provided by local business and community members
Project Objectives: “Village Creek Salt Marsh Restoration Demonstration”

Preliminary Site Assessment - An analysis of existing vegetation in the surrounding marsh compared to historical photos of the site.

Topographic and Bathymetric Survey - A topographic and bathymetric survey will be performed on the subject areas to determine the plant communities, the topography and likely areas for restoration.

Sediment Characterization - The characteristics of the sediment for particle size and contaminants will be determined.

Sediment Settling and Compaction Properties - Conceptual modeling will be performed to determine area and volume calculations.

Design - The design of a saltmarsh restoration approach for the proposed target areas.

Site Monitoring Baseline - A monitoring program baseline will be established to track the changes in the affected area.
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Sediment Repositioning Options

Western Long Island Sound Disposal Site
- Opposition by NYS
- Planned “phase out”

Salt Marsh Creation
- Discouraged by DEEP in areas where salt marshes haven’t existed (new)
- Would consider if historical salt marshes are documented as lost

Thin Layer Deposition
- Economic and ecological beneficial re-use of material
- Presents unique “first-time” challenges
Existing Conditions

- First Student (280 Wilson Ave)
- B. Beinfield (280 Wilson Ave)
- SoNo Ice House
- Norwalk Land Trust (250 Wilson Ave)
- Village Creek Harbor Marina
- Woodward Ave Park
- Crystal LLC (314 Wilson Ave)
- Hoyt Island
Existing v. Historical Conditions

2016 CT State-wide Imagery & 2017 UAV Imagery

1934 CT Areal Photos

Village Creek Harbor & Estuary - Salt Marsh Restoration Feasibility Study

September 7 & 9, 2017

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Existing v. Historical Conditions

- Village Creek salt marsh exhibits typical conditions for a marsh located in a developed area:
  - *S. alterniflora* dominated
  - Mosquito ditches from 1930s
  - Limited high marsh vegetation communities (*S. patens*)
  - Development of *Phragmites* stands along disturbed edges

- Salt marsh showing signs of degradation including:
  - Extensive areas of stunted *S. alterniflora* on open marsh
  - Development of *Phragmites* stands along disturbed edges
  - Loss of peat density and erosion below the active root zone
  - Increased areas of mudflats (as exhibited by *S. alterniflora* islands)
Topographic & Bathymetric Survey

- Control established by traditional survey
- Unmanned Aerial Vehicle (UAV) [Drone]
- Sub-foot vertical accuracy
- +/- 32 acres in one day
Topographic & Bathymetric Survey
Topographic & Bathymetric Survey

White = Low Elevation
Black = High Elevation

2017 UAV Imagery – Derived DEM
Bio-benchmarking & Sediment Sampling

- Derive zones (elevation ranges) of existing vegetation communities
- Identify dominant plant communities every 3 feet along each transect
- Evaluate marsh soil for ambient chemical (pollutant) quality and physical characteristics
Bio-benchmarking
Vegetation Distribution by Elevation
Village Creek Salt Marsh, Norwalk, CT

ELEVATION (Feet, NAVD88)

- Intertidal (No Veg)
- Low Marsh
- High Marsh
- Transition Zone

MHHW 3.69'

Vegetation Distribution by Elevation

- Mudflat
- S. alt
- S. alt (stunted)
- D. spit
- S. pat
- I. fruc
- P. aust
Bio-benchmarking
Bio-benchmarking
Vegetation Distribution Relative to Sea Level Rise
(Intermediate Scenario by NOAA @ Bridgeport Harbor)
Village Creek Salt Marsh, Norwalk, CT

ELEVATION (Feet, NAVD88)

- Intertidal (No Veg)
- Low Marsh
- High Marsh
- Transition Zone

Vegetation:
- S. alt
- S. alt (stunted)
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- S. pat
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- P. aust

Sea Level Rise:
- 2020 MHHW 4.28''
- 2040 MHHW 4.94'
- 2060 MHHW 5.72'
- MHHW 3.69'
Target Elevations Based on Vegetation
Village Creek Salt Marsh, Norwalk, CT

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- High (5.39')
- Mid (4.97')
- Low (4.55')

Bio-benchmarking

MHHW 3.69'
Sediment Sampling & Analysis

Elevated concentrations of metals in salt marsh soils. Concentrations consistent with Harbor samples

Low levels of PAHs in Harbor samples. Concentrations consistent with urban runoff

Concentrations of parameters at the NLT and Village Creek Harbor shoreline consistently lower

Repositioning of material from Harbor to salt marsh consistent with beneficial reuse and anti-degradation policies. This would need approval from DEEP Remediation Division
Challenges Associated with Thin Layer Deposition

Innovation: This type of project, while understood by DEEP in concept, has never been permitted (approved) and constructed in the state. Several departments within DEEP would need to review and approve of this plan.

Regulatory Jurisdiction: Project will require permits from:
- DEEP (former) Office of Long Island Sound
- DEEP Remediation Division
- U.S. Army Corps of Engineers
- Norwalk Planning & Zoning Agency

Ownership: Actual ownership of the salt marshes need to be established and coordination with abutting landowners will be required.
Historical v. Current Salt Marsh Extents

1934 Extent

2017 Extent
Salt Marsh Restoration/Creation Areas

- Identified 12 areas (A – L) for restoration (preferred) and/or creation
- Areas A, C, F, G, H & K
  - Offer +/- 17 acres for restoration
  - Sediment chemical and physical characteristics most similar to Harbor dredge material
- Areas E, J, L & I
  - Offer +/- 5 acres for creation
  - Sediment chemical and physical characteristics similar to Harbor dredge material
- Areas B & D
  - Offer +/- 8 acres for restoration or creation
  - Sediment chemical characteristics most dissimilar from to Harbor dredge material
**Salt Marsh Restoration/Creation Areas**

- Identified 12 areas for restoration (preferred) or creation (A – L)
- Areas A, C, F, G, H & K have +/- 29,000 CY of volume to the "Mid" elevation or approximate 2040 Sea Level Rise elevation (4.97")
- Difficulty will be getting material from Harbor to salt marshes
- Conventional dredging will occur in 2017/2018 season. The next cycle of dredging would occur in 6 to 8 years (2024 to 2026). This next cycle is the project timeframe for conducting the proposed salt marsh restoration.

Dredge Area: Est. Volume = 15,000 CY per 5 years
Thin Layer Deposition Methodologies

**Spray Application**
- Larger volumes/areas
- Finer sediment
- Single process
- Common in South and Mid-Atlantic

**Mechanical Spread Application**
- Smaller volumes/areas
- Coarser sediment
- Multi-step process
- Used in Rhode Island
Thin Layer Deposition Results (Post-Construction)
Thin Layer Deposition Results (Year 1)
We would like to acknowledge contributions from Norwalk residents and business owners.
QUESTION & COMMENTS