

**Fourth Annual Monitoring Report**  
**Tidal Wetland Restoration**  
**159 Long Neck Point Road, Darien, CT**  
**NAE-2007-1130**  
**December 31, 2015**

**1) Project Overview**

This is the fourth year of a five year monitoring program designed to monitor the restoration of an approximate  $\frac{1}{4}\pm$  acre tidal wetland within a protected cove at 159 Long Neck Point Road in Darien, CT.

A monoculture of common reed (*Phragmites australis*) had taken over the tidal wetland along the southwestern shoreline of Ziegler's Cove in Darien, CT. The *Phragmites* population was approximately  $\frac{1}{4}$  acre in size and situated along the northern side of a stone wall associated with an access way to Hay Island and west of a residential wooden dock.

The objective of the tidal restoration plan was to employ all practical efforts to control the *Phragmites* population within the tidal restoration area and to allow a stable population of native shoreline vegetation to establish naturally. This included the application of herbicide and the removal of accumulated sediment to lower the substrate elevation up to 18 inches to restore tidal flushing. This restoration activity was conducted as compensation for the construction of an adjacent residential dock to the east and to restore the wetland's functions and aesthetics. Annual photographs from before the restoration to the present are located in Appendix C.

This restoration plan was approved by the USACE in permit NAE-2007-1130 on December 15, 2010 and by the then named Connecticut Department of Environmental Protection under permit 201101116-KR dated June 17, 2011. Mitigation success shall be achieved after: the 5 year mitigation monitoring, the implementation of any corrective measures, the submittal of any needed mitigation monitoring reports, and a final wetland assessment.

This year's monitoring found success with natural colonization of *Spartina*, establishment of the planted plugs of *Spartina* in the western portion of the marsh, and the natural colonization of shoreline and tidal wetland vegetation along the stone wall. The monitoring also found large clumps of last year's *Spartina* growth shading out recent growth. Small populations of *Spartina* stunted from the herbicide control remain. No major issues were observed.

**2) Requirements**

The restoration plan consists of four components: A) herbicide application and physical removal of *Phragmites australis*; B) lowering of the substrate by 12-18" to provide tidal flushing allowing brackish water to flow into the tidal wetland and over the former *Phragmites* population; C) planting of native shrub species within the narrow area along

the stone wall to accelerate colonization of native species and, D) monitoring of the restoration area for 5 years.

Components A and B were completed in 2011, shrub planting (Component C) was conducted in August 2012. The monitoring phase began in the fall of 2012 and will continue until the fall of 2016.

As stated in the 2012 report, item C (native shrub planting) was re-evaluated. The planted native shrubs did not do well as much of the area was too wet now that the elevation of the substrate was lowered. We decided that it would be better to wait until 2015 to see if native vegetation establishes naturally and then make a decision on whether replanting is necessary. The results are described below.

The 2015 data continue to show a successful restoration of the wetland. This year we saw the natural colonization of *Iva frutescens* (high tide bush), *Limonium carolinianum* (sea lavender), and *Solidago sempervirens* (seaside golden rod) along the waterward side of the wall. This natural colonization is what we were hoping for and means that as long as the native species survive and do well during the 2016 growing season that a replanting effort is not needed. With regards to the *Spartina* population, this species has grown more dense and has spread slightly using existing seed sources. Stem counts from the test and control plots are presented in the Summary Data section. Photos showing the recolonization are presented in Appendix C.

During the spring visit, the invasive *Phragmites* population was comprised of dead stands and some new growth within a few small isolated areas along the stone wall. The fall inspection found the population limited to a reduced area of stunted growth with no seed heads, which shows continued progress of its control.

### 3) Summary Data

Site visits to inspect the progress of the restoration effort were conducted on June 4 and September 24, 2015.

The June 4<sup>th</sup> site visit found that the *Spartina alterniflora* population coverage increased to approximately 80% of the restoration area. The majority of this increase is due to the installation of over 1,900 plugs of *Spartina alterniflora* which were planted in the small sparsely vegetated depression in the western portion of the restoration area on May 26<sup>th</sup>. The plugs were installed at a spacing of 9” on center.

The *Phragmites* population during the June site visit was primarily dead or a stressed remnant of last year’s growth. The population was limited to a small area along the western end of the stonewall.

The September 24, 2015 site visit found scattered and stunted (3’ tall) *Phragmites* populations with no seed heads. In comparison, stands of 6’ plus tall *Phragmites* with seed heads were observed on nearby properties confirming the effectiveness of the herbicide treatments on the subject property. One final application of herbicide in the spring should remove the population from the wetland. The site visit found an abundant colonization of native tidal and shoreline vegetation along the waterward side of the wall. Species identified were *Iva frutescens* (high tide bush), *Limonium carolinianum* (sea lavender), and *Solidago sempervirens* (seaside golden rod).

Spartina density within the 2 one square meter test plots was re-inspected. As reported last year, the stake from the control plot was missing but since it was in a mature and established population, we don't expect to see much variability year to year. Under those conditions and the fact that the stem density has been recorded, a new control plot has not been established.

Test plot 1. Test plot #1 continued to support a monoculture of *Spartina alterniflora*. The Spartina population has fully filled in within the test plot. This year the one square meter plot contained approximately 195± Spartina stems. Last year the coverage was approximately 75% and was approximately 50% in 2013.

Test plot 2. This year Test Plot #2 contained 43± Spartina stems. This reduction was a result of the southern two thirds of the plot being covered by a dense mat of last year's dead Spartina growth. This mat restricted the growth of the Spartina during the growing season. Only the northern 1/3 of the plot contained Spartina stems.

Control plot. The control plot contained an established population of Spartina. The plants were slightly taller than the test plots and contained 140± stems in 2013 with a visual coverage of approximately 70% coverage.

Table 1. Spartina Density Comparison

Plot	2013	2014	2015
Test Plot 1 stems per m <sup>2</sup>	98±	168±	195
Test Plot 2 stems per m <sup>2</sup>	84±	108±	43*
Control Plot stems per m <sup>2</sup>	140±		

\*the data was obtained from the northern third of the plot. The southern two thirds of the plot was impacted by a dense mat of dead last year's Spartina growth which restricted the growth of Spartina during the growing season.

These plots will be re-inspected next year as part of the final year's inspection.

No remedial actions were implemented this year.

Next year we will be: 1) focusing on inspecting the success of the Spartina plug plantings, 2) applying herbicide to the small remaining populations of Phragmites, and 3) monitoring the establishment of the naturally colonizing shoreline and tidal wetland vegetation.

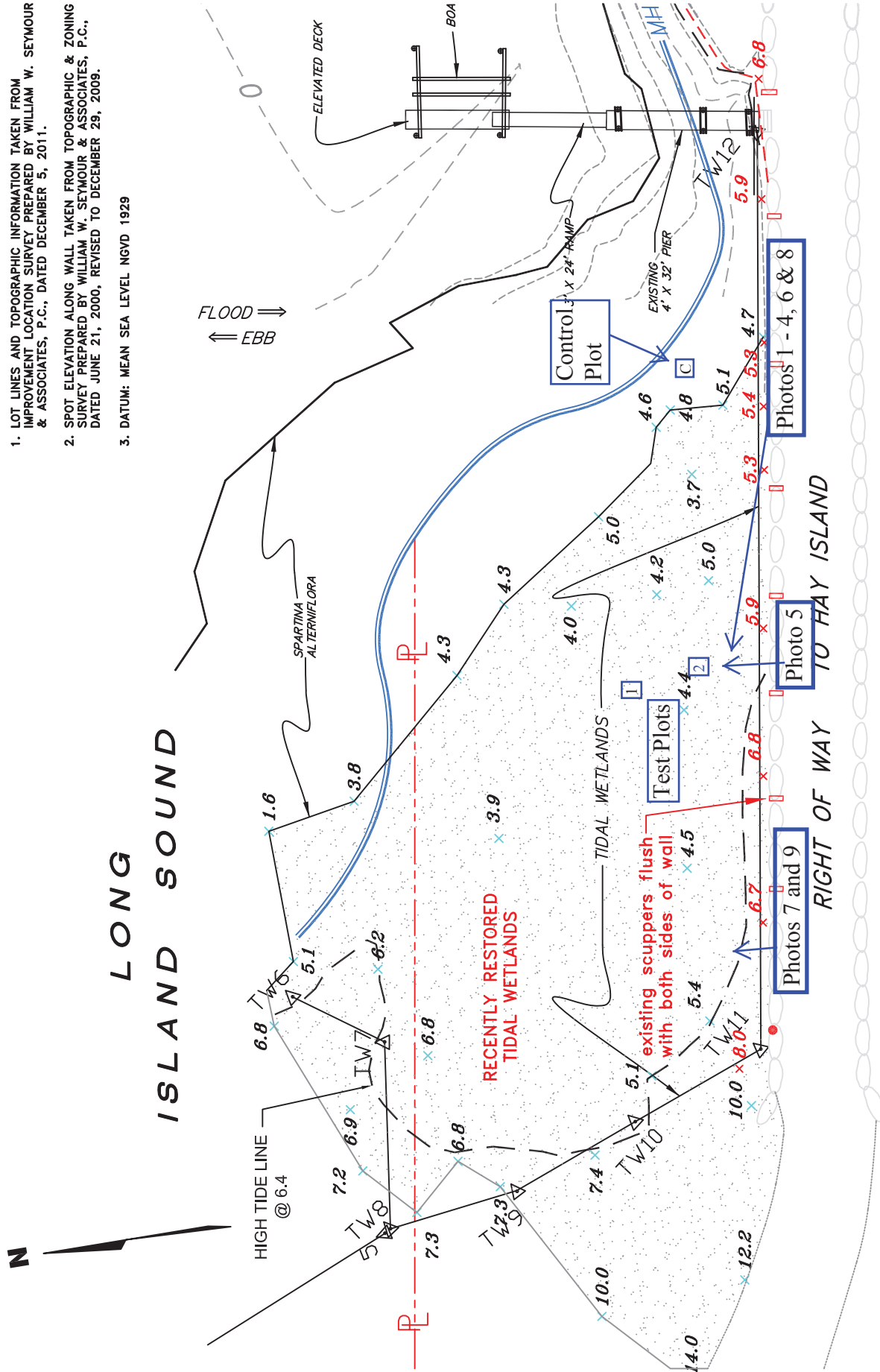
#### **4) Maps/Plans**

Approved Tidal Wetland Restoration Plan Revised to Show Photograph  
Views and Plot Locations Referenced in Report.



**NOTE:**

1. LOT LINES AND TOPOGRAPHIC INFORMATION TAKEN FROM IMPROVEMENT LOCATION SURVEY PREPARED BY WILLIAM W. SEYMOUR & ASSOCIATES, P.C., DATED DECEMBER 5, 2011.
2. SPOT ELEVATION ALONG WALL TAKEN FROM TOPOGRAPHIC & ZONING SURVEY PREPARED BY WILLIAM W. SEYMOUR & ASSOCIATES, P.C., DATED JUNE 21, 2000, REVISED TO DECEMBER 29, 2009.
3. DATUM: MEAN SEA LEVEL NGVD 1929



DATUM CONVERSION CHART	
1929	1988
-2.8	MLW -3.9
4.3	MHW 3.2
6.6	CJL 5.5

# LANDTECH

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Civil & Structural Engineers  
Environmental Scientists  
Permit Coordination  
Construction Management  
Construction Finance

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PREPARED FOR: ROBERT MINICUCCI

PROJECT LOCATION: 159 LONG NECK POINT DARIEN, CT.

TITLE: TIDAL RESTORATION MONITORING PLAN

DATE: 9/13/13

SCALE: 1"=30'

OWN. BY: JMS

DOC. NO.: 05-430-01

CAD. BY: TSR

SHEET 1 OF 1

## **5) Conclusion**

The fourth year's data show that the restoration area continues to be successful. The data collected since 2012 shows an effective control of the invasive Phragmites population. A few small localized populations remain but are severely stressed as indicated by stunted growth and a lack of seed heads in late summer and early fall. One last application of herbicide will be applied to the remaining Phragmites populations next year.

The *Spartina* population continues to recolonize itself within the restoration area. There was a natural setback this year where a large mat of last year's dead *Spartina* growth covered a portion of the restored *Spartina* population inhibiting its growth. The size of this mat was a direct result of the severe 2014/2015 winter. The 2015/2016 winter is looking significantly milder indicating that less matting may be produced this winter. Although the matting is natural and the *Spartina* population can handle the temporary stress, we plan to clear away any large matts that are within the restoration area before the start of the growing season in order to assist the population with its recovery.

The test plots over the last three years showed a recolonization increase of 98 to 168 to 195 stems per square meter in Plot 1 and 84 to 108 to 43 stems per square meter in Plot 2. As stated above, the reduction in Plot 2 is due to the large mat of dead *Spartina* growth covering most of the plot. With the exception of the matting, the data and visual appearance continue to show that the *Spartina* population within the restoration area is establishing well.

To further the establishment of *Spartina* within the restoration area, the relatively large sparsely colonized area located in the western portion of the restoration area was planted with *Spartina* plugs in June to accelerate the establishment of cord grass. The success of the plantings will be monitored in the spring and fall of 2016.

Native shoreline vegetation have started to naturally establish along the waterward side of the stone wall. This wanted new growth will be monitored during the 2016 season to determine its success.

## **6) Appendices**

Appendix C – Site Photos

Appendix E – Mitigation Report Transmittal and Self-Certification

Appendix F – Mitigation Report Project Overview Form

## Appendix C

### Site Photos.



Photo 1 – Tidal restoration area facing west. Photo Taken January 6, 2011 Prior to Restoration Work. Photo shows Phragmites Population and Ground Elevation.



Photo 2 – Phragmites Population in Tidal Restoration Area on July 26, 2011 after Initial Herbicide Application but Prior to Regrading.





Photo 3 - Post Restoration, Facing West on November 28, 2012.



Photo 4 – Spartina Starting to Recolonize the Wetland on September 13, 2013. Phragmites Population Present along Waterward Side of Wall.





Photo 5 – Facing North on September 13, 2013. Phragmites Along Wall in Foreground, Recolonizing Spartina population in Middle and Undisturbed Spartina Population in Background. Stake for Test Plot #2 is Observable Just Beyond the Phragmites Population.



Photo 6 – Facing West on October 2, 2014. Dead Phragmites Located Along Wall in Upper Left of Photo.





Photo 7 - Western Portion of Wetland Facing North on October 2, 2014. Dead Phragmites in Foreground. Spartina Slowly Colonizing the Lower Elevation areas in middle of Photo.



Photo 8 - Facing West on September 24, 2015. High Tide Bush and Seaside Goldenrod Shown Present Along Back Portion of Wall In Vicinity of Where Phragmites Population was in Photo 6.





Photo 9 – Facing North on September 24, 2015 Darker Green Shoots in Back Area of Marsh are the recently planted *Spartina alterniflora*.



**APPENDIX E**

**MITIGATION REPORT  
TRANSMITTAL AND SELF-CERTIFICATION**

DEPARTMENT OF THE ARMY PERMIT NUMBER: NAE-2007-1130  
PROJECT TITLE: Tidal Wetland Restoration - 159 Long Neck Point Road, Darien, CT

PERMITTEE: Robert Minicucci  
MAILING ADDRESS: 159 Long Neck Point Road, Darien, CT 06820

TELEPHONE:

AUTHORIZED AGENT: LandTech, Inc.  
MAILING ADDRESS: 518 Riverside Avenue Westport, CT 06880

TELEPHONE: 203-454-2110

**ATTACHED MITIGATION REPORT**

TITLE: Fourth Annual Monitoring Report  
Tidal Wetland Restoration 159 Long Neck Point Road, Darien, CT  
NAE-2007-1130

PREPARERS: Thomas Ryder, LandTech, Inc.

DATE: December 31, 2015

CERTIFICATION OF COMPLIANCE: I certify that the attached report is accurate and discloses that the mitigation required by the Department of the Army Permit **(is)** **[is not]** in full compliance with the terms and conditions of that permit.

CORRECTIVE ACTION: A need for corrective action **[is]** **(is not)** identified in the attached report.

CONSULTATION: I **[do]** **(do not)** request consultation with the Corps of Engineers to discuss a corrective strategy or permit modification.

CERTIFIED: Thomas Ryder authorized agent for 12-31-15  
(Signature of permittee) Robert Minicucci Date

**APPENDIX F**

**MITIGATION REPORT  
PROJECT OVERVIEW FORM**

Corps Permit No.: NAE-2007-1130

Mitigation Site Name(s): 159 Long Neck Point Road, Darien, CT

Monitoring Report: 4 of 5

Name and Contact Information for Permittee and Agent:

Permittee: Robert Minicucci, 159 Long Neck Point Road, Darien, CT

Agent: LandTech, 518 Riverside Avenue, Westport, CT 06880

Name of Party Responsible for Conducting the Monitoring:

Thomas Ryder of LandTech.

Date(s) of Inspection(s): June 4 and September 24, 2015

Project Summary:

Restore an approximate 1/4 acre tidal wetland which has been over taken by invasive species. Restoration includes lowering the area by 12" to 18", applying herbicide to the invasive population and monitor area for 5 years.

Location of and Directions to Mitigation Site(s): From I-95, take exit 11 to Route 1 south.

Travel 1 mile and turn left on Rings End Road. At end of road, turn right onto Goodwives River Road, then veer left on to Long Neck Point Road. Go 0.7± miles to subject site on left.

Start and Completion Dates for Mitigation:

Sediment removal and initial application of herbicide was conducted in 2011. Followup application of herbicide was conducted in 2013 and 2014.

Performance Standards ~~are~~ **are not** being met:

The Spartina within the restoration area continues to increase in density and expand in area. Including the initial success of the Spartina plug planting, the total population is estimated to cover approximately 80% of the restoration area. The Phragmites population continues to be stressed and reduced in size.

Dates of Corrective or Maintenance Activities Conducted Since Last Report:

No corrective measures were required.

Recommendations for Additional Remedial Actions:

Apply herbicide to the remaining small scattered populations of Phragmites and focus on the health of the self colonizing native shoreline vegetation along the wall and the recently planted Spartina alterniflora plugs in the lower elevation area.