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

December 13, 2013

1) Project Overview

This is the second year of a five year monitoring program designed to monitor the restoration of an approximate ¼± 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 ¼ 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. Photographs prior to and after the physical restoration activity 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 the Spartina population naturally recolonizing the restoration area and the Phragmites population was controlled with the exception of a narrow area along the stone wall. 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. Follow up spraying was conducted this summer.

As stated in last year's report, item C (native shrub planting) was re-evaluated. Native shrubs were planted right after tidal flushing was restored and before a full understanding of the restored tidal penetration could be understood. Much of the area planted was too wet. It was determined last year that it would be better to wait and see if vegetation establishes naturally and then decide in year four if additional plantings are needed.

Data from the second year of the monitoring program showed that the removal of sediment and the regrading of the tidal wetland was successful. The 2013 data showed a substantial increase in Spartina density from last year. The majority of the tidal wetland is being colonized by Spartina from existing seed sources dormant in soil or from the adjacent population. Stem counts from the test and control plots are presented in the Summary Data section. Photos showing the recolonization are presented in Appendix C.

The invasive Phragmites population has been reduced to a small area, approximately 12 feet wide along the waterside of the stonewall. This population was spot treated with Polaris® in September 9, 2013, and will continue to be spot treated as necessary next year.

3) Summary Data

Site visits to inspect the progress of the restoration effort were conducted on June 28 and September 13, 2013.

The June 28th site visit found *Spartina alterniflora* recolonizing approximately 20% of the restoration area. A small depression located along the eastern edge of the restoration area, contained little to no Spartina growth. The Phragmites population was successfully controlled within the basin however Phragmites had regrown within a narrow 12 foot wide area along the waterward side of the wall. A few of the northern bayberry (*Myrica pensylvanica*) planted in September 2012 in the western end of the restoration area were doing well with little evidence of stress but as reported in last year's report, most of the other native shrubs planted in 2012 have died.

September 9, 2013 – The invasive Phragmites population along the waterward side of the wall was sprayed with herbicide by a licensed applicator.

A follow up site visit was conducted on September 13, 2013. During this visit 2 one square meter test plots were established in the wetland restoration area and 1 control plot was established just beyond the restoration area in an undisturbed area of Spartina. A wooden stake was placed in the southeast corner of each of the plots in order to revisit them in future years.

During the September 9th inspection, the Spartina population covered approximately 40 to 50% of the restoration area. The western portion and the lower areas were just starting to colonize. Abundant Atlantic marsh fiddler crabs (*Uca pugnax*) and burrows were visible. The approximate locations of the test and control plots are shown in the Tidal Restoration plan shown in Section 4.

The number of Spartina stems and fiddler crab burrows were counted in each of the test and control plots. The results are presented below.

Test plot 1. Test plot #1 contained a monoculture of *Spartina alterniflora*. The visible coverage was approximately 50%. The one square meter square plot contained approximately 98± Spartina stems and 65± fiddler crab burrows.

Test plot 2. This plot contained 84± Spartina stems (an approximate 40% coverage) and 28 common glasswort (*Salicornia depressa*) stems.

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

These plots will be re-inspected in the next three years to document the status of re-colonization by tidal vegetation.

Remedial actions were limited to the September 9, 2013 application of herbicide (Polaris®) by a licensed applicator to control the narrow band of *Phragmites australis* that has reestablished along the waterward side of the wall. The Phragmites were sprayed only four days prior to the September site inspection so no visible signs of stress were observed at that time.

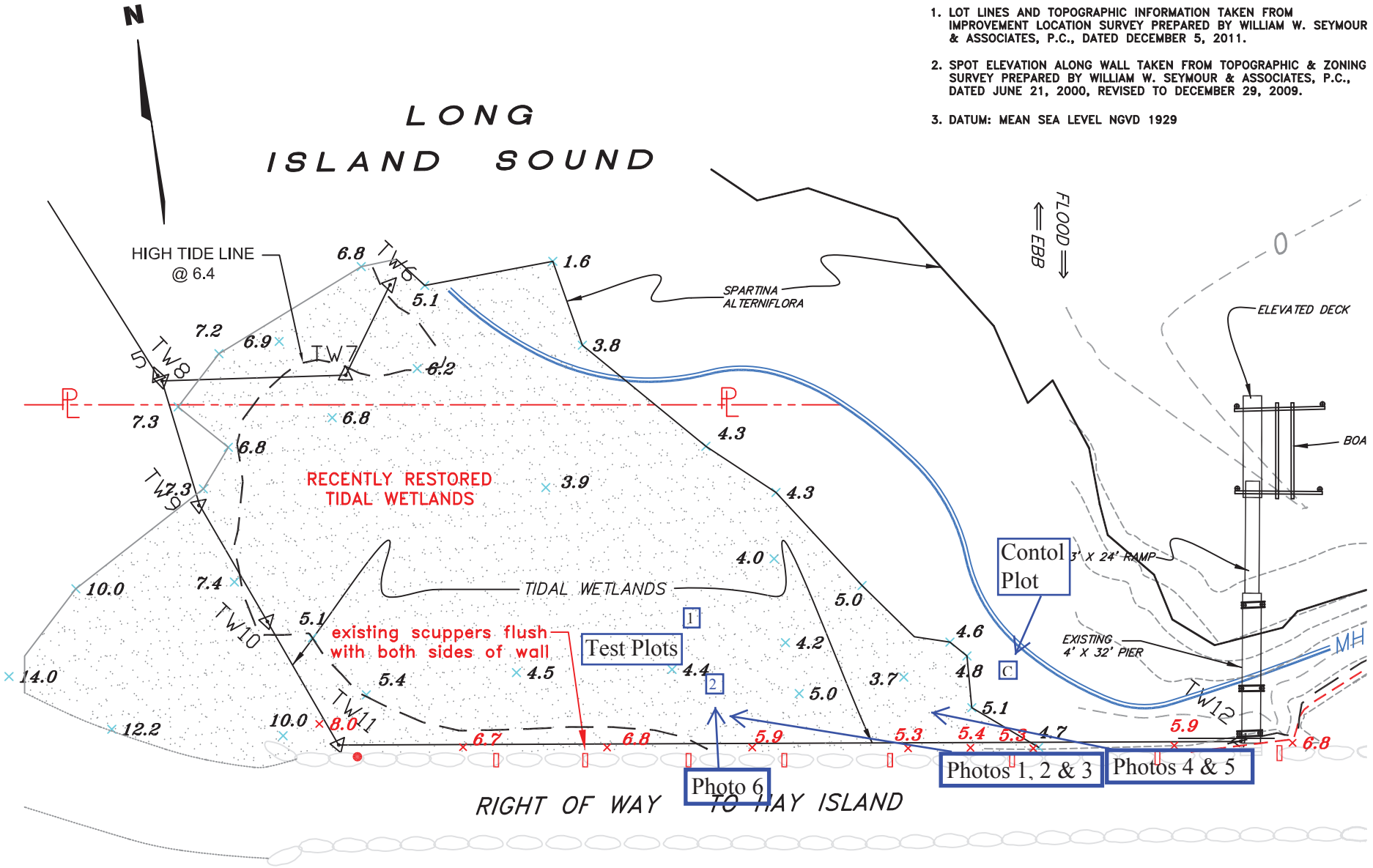
4) Maps/Plans

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

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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 | DWN. BY: JMS | DOC. NO.: 05-4430-01

SCALE: 1"=30' | CKD. BY: TSR | SHEET 1 OF 1

5) Conclusion

Overall, the restoration area continues to be successful. The data collected from the 2012 and 2013 growing seasons show that the vast majority of the Phragmites population is under control with the exception of a narrow band along the waterward side of the wall. This population will continue to be watched and spot treated with herbicide as needed over the next few years in order to control this remaining population.

The Spartina population is recolonizing well within the restoration area. The test plots showed a recolonization of 98 and 84 stems per square meter in this second growing season in comparison to the 140 stems per square meter in the undisturbed Spartina population of the control plot. These data will be compared to data from years 3 and 4 to determine the percentage of Spartina regrowth in each plot. During year four, the data will be evaluated to determine if the Spartina colonization needs to be accelerated through the installation of plugs.

The planted shrubs that died along the stone wall were not be replanted in 2013. The narrow area of soil adjacent to and waterward of the stone wall will be watched to determine if native vegetation colonizes the area or if planting of different species will be needed.

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 June 28, 2013. Phragmites Population Present along Waterward Side of Wall.

Photo 5 – Facing West on September 13, 2013. Phragmites Population at Far Left, Spartina Recolonization in Center and Undisturbed Spartina Population to Right.

Photo 6 – Facing North on September 13, 2013. Phragmites Along Wall in Foreground, Recolonizing Population in Middle and Undisturbed Spartina Population in Background. Stake for Test Plot #2 is Observable Just Beyond the Phragmites

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: 31 Franklin Street
Westport, CT 06880

TELEPHONE: 203-454-2110

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

PREPARERS: Thomas Ryder, LandTech, Inc.

DATE: December 13, 2013

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 J Ryder authorized agent for Robert Minicucci — Dec 13, 2013
(Signature of permittee) 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: 2 of 5
Name and Contact Information for Permittee and Agent:
Permittee: Robert Minicucci, 159 Long Neck Point Road, Darien, CT
Agent: LandTech, 31 Franklin Street, Westport, CT 06880
Name of Party Responsible for Conducting the Monitoring:
Thomas Ryder of LandTech.

Date(s) of Inspection(s): June 28 and September 13, 2013

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:

September 9, 2013 followup application of Herbicide

Performance Standards (**are**) / **are not** being met:

This year inspections found that *Spartina alterniflora* and other native tidal wetland vegetation has recolonized the wetland covering an approximately 75% of the area.

Dates of Corrective or Maintenance Activities Conducted Since Last Report:
No corrective measures required. Followup application of herbicide to control narrow band of Phragmites along wall applied on September 9, 2013
Recommendations for Additional Remedial Actions:

None at this time.