

October 18, 2016

To: Lori Sommer  
NH DES Wetlands Bureau  
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CC: Steven Rickerich, Ransom Consulting, Inc.  
Michael Mates, Pease Development Authority  
David Keddell, US Army Corps of Engineers

From: Adele Fiorillo, NHCWS, PWS

Re: NH DES File #2012-001052 & 2012-1060  
Third Year Monitoring Report

## **Introduction**

This report outlines the third year monitoring results following completion of the mitigation design at the Pease Golf Course, located in the Towns of Newington and Greenland and the City of Portsmouth, New Hampshire. Monitoring was completed in August 2016. This report is in accordance with the conditions of the New Hampshire Department of Environmental Services (DES) permit dated December 6, 2012 and was prepared on behalf of the Pease Development Authority (PDA). Mitigation activities were completed on September 26, 2013, and included stream channel and bank restoration, pond expansion, and wetland creation. First year monitoring initiated on August 27, 2014 and was completed on September 16, 2014 following completion of the remedial actions to repair a portion of the stream bank as outlined in a letter from Normandeau Associates dated August 12, 2014. The second year monitoring visit was conducted on September 8, 2015.

## **Third Year Monitoring Results**

### **Monitoring Results**

During a visit on August 29, 2016 the overall health of planted shrubs appeared to be high. Several native shrubs (hereafter volunteer shrubs) have established themselves in the wetland, including speckled alder (*Alnus incana*), red maple (*Acer rubrum*), black elderberry (*Sambucus canadensis*), and winged and staghorn sumacs (*Rhus copallinum*

and *Rhus typhina*). As long as these species do not interfere with golf course operations, they will provide additional cover and stream bank stability.

Planting counts were again conducted in 2016 (Table 1). Although below the second-year 75% survivorship threshold, the surviving plantings appear to be well established. The loss of plants may be due to unseasonable spring and dry summer weather that caused significant dieback to many plants in the seacoast region. An additional 176 volunteer shrubs were counted in the restoration areas. At this time the banks and upland buffer are stabilized by the existing vegetation, and no erosion was noted. Given the high success of volunteer plant species within the stream buffer, additional intervention is not required to maintain bank stability.

**Table 1: Plant Survivorship- (Planted September 2013)**

Common Name	Scientific Name	Number Planted 2014	Number Dead 2016	Survivorship
Sweetfern	<i>Comptonia peregrina</i>	266	186	30%
Sand cherry	<i>Prunus depressa</i>	166	88	47%
Meadowsweet	<i>Spiraea latifolia</i>	166	22	87%
Sweet pepperbush	<i>Clethra alnifolia</i>	65	35	46%
Silky dogwood	<i>Cornus amomum</i>	65	77	83%
Red chokeberry	<i>Aronia arbutifolia</i>	65	38	42%
Steeplebush	<i>Spiraea tomentosa</i>	100	97	3%
Sweetgale	<i>Myrica gale</i>	100	0	100%
American hazelnut	<i>Corylus americana</i>	7	0	100%
<b>Total Shrubs</b>		993	543	46%

Erosion control measures along the stream channel and pond edges seem to have been effective, and no significant erosion was noted around the ponds.

### Invasive Species

Small amounts of Purple Loosestrife continue to occur in the wetland mitigation area (WM-13A). This infestation is sparse and continued control by hand pulling is likely to be effective. Several invasive species have established within the upland stream buffer (multiflora rose, autumn olive, bella honeysuckle), but they are unlikely to encroach on the wetland. Autumn olive became more widespread since fall 2015, but is still

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restricted to the upland stream buffer, and normal maintenance activities at the golf course will limit the spread beyond the stream bank. These shrubs are providing additional bank stability and no action is recommended at this time. No invasive species were noted growing in the pond areas and, other than continued monitoring for invasive species, no additional actions are needed.

#### Remedial Actions


No additional remedial actions are recommended at this time. The surviving planted shrubs have established themselves, additional desirable volunteer species have become established in monitored areas, and invasive species control measures have been effective. However, hand-removal of encroaching purple loosestrife plants within the wetland mitigation area and adjacent upland should continue.



In compliance with Permit #2012-01052/1060, this completes the third and final year of monitoring at the Pease Golf Course. A final deliverable that includes as-built wetland creation site plans will be provided in 2018 in accordance with permit conditions.

## Monitoring Photo log

		Date: 8-29-16
		Photographer: Benjamin Griffith
		Comments: Stream bank restoration with dense shrub and herbaceous growth along the bank




		Date: 8-29-16
		Photographer: Benjamin Griffith
		Comments: Dense shrub and herbaceous growth along stream buffer

	Date: 8-29-15
	Photographer: Benjamin Griffith
	Comments: Wetland mitigation area with dense herbaceous vegetation
	Date: 9-8-15
	Photographer: Benjamin Griffith
	Comments: Healthy chokeberry planted in the stream buffer, with fruit clusters



	Date: 9-8-15
	Photographer: Benjamin Griffith
	Comments: Healthy Sweetfern (foreground) and Silky Dogwood along streambank

	Date: 9-8-15
	Photographer: Benjamin Griffith
	Comments: Pond 1
	Date: 9-8-15
	Photographer: Benjamin Griffith
	Comments: Pond 2



	Date 9-8-15
	Photographer: Benjamin Griffith
	Comments: Pond 3