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Transmittal

To: Jay Clement (USACE), Bill Bullard (MDEP),

Cc: Arthur Sewall (Jetport), Ken Grondin (Grondin), Dwight Anderson (DeLuca-Hoffman), Richard Jordan (Boyle Associates)

From: David Brenneman (Boyle Associates) on behalf of Grondin Aggregates/Larrabee Farms Wetland Mitigation Site

Date: 1/10/2012

Re: **Portland International Jetport Wetland Mitigation Project at Larrabee Farms Wetland Mitigation Monitoring Report – Year 2 of 10**

Corps Permit No.: NAE-2008-00053

Maine DEP NRPA Project Number: L-13760-AN-A/TG-AO-N

You will find the 2011 (year 2) monitoring report for the wetland mitigation project completed for the Portland International Jetport (PWM) – Terminal Area, Cargo Area Taxiway, Runway 11-29 Safety and Runway 18-36 Improvements attached.

If you have any questions or would like to conduct a site visit, please contact Ken Grondin (207-854-1147) or Rich Jordan (207-671-2760).

Thank you,

David Brenneman

MITIGATION REPORT
TRANSMITTAL AND SELF-CERTIFICATION

DEPARTMENT OF THE ARMY PERMIT NUMBER: NAE-2008-00053

PROJECT TITLE: Portland International Jetport (PWM) – Terminal Area, Cargo Area Taxiway, Runway 11-29 Safety and Runway 18-36 Improvements (Herein referred to as “Jetport Project”)

PERMITTEE: Portland International Jetport (PWM)

MAILING ADDRESS: 1001 Westbrook Street Portland, Maine 04102

AUTHORIZED AGENT: Grondin Aggregates, LLC

MAILING ADDRESS:

Ken Grondin

11 Bartlett Road

Gorham, Maine 04038

TELEPHONE: 207.854.1147

ATTACHED MITIGATION REPORT TITLE: Portland International Jetport: Year 2 Wetland Mitigation Monitoring Report

PREPARERS: Boyle Associates (207.591.5220)

DATE: January 10, 2012

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: _____ Signature on file

(Signature of permittee)

_____ Date

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<p><u>Appendix B</u> -- A vegetative species list of volunteers in each plant community type. The volunteer species list should, at a minimum, include those that cover at least 5% of their vegetative layer.</p>	
<p><u>Appendix C</u> -- Representative photos of each mitigation site taken from the same locations for each monitoring event. Photos should be dated and clearly labeled with the direction from which the photo was taken. The photo sites must also be identified on the appropriate maps.</p>	
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Project Overview Form

Corps Permit No.: NAE-2008-00053 **Maine DEP NRPA Project Number:** L-13760-AN-A/TG-AO-N

Mitigation Site Name(s): Larrabee Farms Wetland Mitigation Site: Portland International Jetport (Jetport)

Monitoring Report: Year 2 of 10 years

Name and Contact Information for Permittee (left) and Agent (right):

Portland International Jetport c/o Arthur Sewall 1001 Westbrook Street Portland, Maine 04102	Grondin Aggregates, LLC Ken Grondin #207.854.1147 11 Bartlett Road Gorham, ME 04038
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Name of Party Conducting the Monitoring: Boyle Associates (David Breneman #207.591.5220)

Date(s) of Inspection(s) (Specific to Monitoring): April 13 & 27, October 18 & 21

Project Summary:

Second year monitoring procedures were conducted at the herbaceous and scrub-shrub wetland creation areas at the Larrabee Farms Wetland Mitigation Site on October 18th and 21st. These wetland areas were created as compensation for wetland functions and values impacted by improvements and expansions constructed at the Portland International Jetport. Construction of the project impacted approximately 11.58 acres of freshwater wetland (0.64 acres of emergent wetland, 3.85 acres of mixed forested/shrub/emergent wetlands, and 2.2 acres of emergent wetland; this included 1.61 acres of NRPA-defined wetlands of special significance). Wetland compensation took place at Maine Wetlands Bank and Grondin Aggregate’s Larrabee Farms Wetland Mitigation Site, a multi-user mitigation project site. Wetland compensation at Larrabee Farms includes permanent protection of 100 acres consisting of 3.5 acres of wetland creation (1 acre PEM and 2.5 acres PSS), preservation of 58.5 acres of existing upland and preservation of 38 acres of existing wetland (including approximately 7,000 linear feet of the Nonesuch River).

Location of and Directions to Mitigation Site:

The Larrabee Farms Wetland Mitigation Site is located in the town of Scarborough, approximately 1 mile southeast of the corner of Route 114 and Beech Ridge Road.

Start and Completion Dates for Mitigation:

Conservation easement recorded - Cumberland County Registry of Deeds	March 2010
Final wetland grading began	March 2009
Final wetland grading completed	May 2009
Hydroseeding with wetland herbaceous seed mix completed	July 2009
Installation of woody vegetation completed	

Performance Standards are/are not being met:

The success standards for hydrology, invasive species, and slope and soils stabilization are being met. The success standard for aerial cover by hydrophytes and shrub density and diversity are not yet being met.

Dates of Corrective or Maintenance Activities Conducted Since Last Report:

- Re-grading of berm along southwestern corner of creation area (01/2011).
- Chemical control of purple loosestrife (*Lythrum salicaria*) (08/2011 & 09/2011).

Recommendations for Additional Remedial Actions:

- Continue on-going inventory and control of purple loosestrife and other invasive species.
- Conduct broadleaf cattail (*Typha latifolia*) reduction in winter 2012 as described in previous correspondence with ACOE.
- Move seven shrubs found in southern PEM creation to adjacent PSS creation area.

Requirements (1 page)

Performance Standards

The wetland creation areas will be assessed once annually during the growing season (May-October) for at least 10 years. Monitoring will take place twice per season during the first through fifth years following planting. One visit will take place in the spring, and will include a general site walk and assessment of general site health, an assessment of any winter damage and in order to determine any corrective needs. A second site visit will take place between June and October to assess plant mortality/vitality and to gather data for the annual monitoring reports. The data gathering and reporting procedure will then take place once during the first through fifth years, and during the 7th and 10th years, if necessary, following construction.

Success Standards:

1. Hydrology <ul style="list-style-type: none"> • Adequate to support the designed wetland type: • Proposed hydrology being met: • Percentage of site meeting proposed hydrology: • Too wet/dry areas identified and corrective measures proposed: 	Yes Yes 100% N.A.
2. Proposed vegetation diversity and/or density goals for woody plants from the plan met:	No
3. Aerial cover <ul style="list-style-type: none"> a. Each mitigation site has at least 80% aerial cover, by noninvasive species: b. Emergent areas have at least 80% cover by noninvasive hydrophytes: c. Scrub-shrub and forested cover types have at least 60% cover by noninvasive hydrophytes, of which at least 15% are woody species: 	Yes Yes No
4. Common reed (<i>Phragmites australis</i>), Purple loosestrife (<i>Lythrum salicaria</i>), Russian and Autumn olive (<i>Elaeagnus</i> spp.), Buckthorn (<i>Rhamnus</i> spp.), Japanese knotweed (<i>Polygonum cuspidatum</i>), and/or Multiflora rose (<i>Rosa multiflora</i>) plants at the mitigation site(s) are being controlled:	Yes
5. All slopes, soils, substrates, and constructed features within and adjacent to the mitigation site(s) are stable:	Yes

In general, the mitigation area is doing well in its second growing season. There is a dominance of hydrophytic vegetation, presence of hydric soils and evidence of prolonged saturation in the upper part of the soil profile throughout the 3.5-acre creation site. Vegetation across the site is robust, and is dominated by wetland plants. The created wetland is successfully providing functions and values similar to those provided by wetlands impacted by the construction improvements at the Jetport. Wetland functions and values provided include wildlife habitat, groundwater recharge/discharge, floodflow alteration, educational and scientific value, production export, and recreational value.

Despite the site’s other successes, unfortunately the woody plant density and diversity goals are not being met within the PSS creation area. Possible causes and remediation are discussed in Section 2.

Invasive purple loosestrife sprouts are still being detected within the creation site, despite 2 years of mechanical control (hand pulling and digging). A chemical control plan was devised and implemented in late summer 2011 (further discussed in the Summary Data section under ‘Remediation’). Additionally, broadleaf cattail (*Typha latifolia*) is still dominating a portion of the northern PEM creation area. Strategies for control was described in the 2010 (Year 1) monitoring report, but the spring thaw set in before the plan could be implemented (the Corps project manager was notified about the change). The means of control chosen will seek to remove the cattails and root systems then restore the area with a slightly higher/drier topography. This will be achieved by removing approximately 3 inches of the existing topsoil with the cattail colony then removing and destroying (burying) the cattails. The grade will then be restored, albeit a slight bit higher elevation (approximately 3-6”, in general). Clean topsoil will be applied back to the site and the area will be hand seeded with a wetland seed mix and mulched with straw. This remediation work will take place during the winter of 2011-2012, as conditions allow (the area needs to be frozen to allow for equipment on the site). This means of control was discussed with the USACE’s Jay Clement in January 2010 and with Ruth Ladd and Paul Minkin during a site visit in September 2011, and is further described under “Remediation” in the next section.

Summary Data (maximum of 4 pages)

Describe the monitoring inspections, and provide their dates, that occurred since the last report.

Wetland Creation Monitoring

Site walks were conducted throughout winter, spring and summer of 2011 to assess general site health and to determine if any winter damage occurred that would warrant correction measures. In-depth plant monitoring (*i.e.* density and diversity data gathering) occurred in October 2011.

During the first year monitoring effort, 8 round monitoring plots with radii of 30 feet were used to provide a sample size of 0.5 an acre of the scrub-shrub creation area (representing 20% of the overall PSS). Because the shrub species were planted in a clustered fashion rather than even spacing, this sampling methodology may not have been truly reflective of the woody plant densities. For the 2nd year monitoring effort (2011), monitors surveyed the entire PSS creation area in order to locate every countable and viable woody plant. Volunteer (non-planted) trees and shrubs were only counted if they were over 18” tall (see Table 7). Herbaceous vegetation within the scrub-shrub creation area was sampled using the eight round monitoring plots used during the first year monitoring.

For the PEM creation areas, the entire 1 acre of PEM (a combination of two areas) was investigated.

Success Standards

1) Hydrology

Is the proposed hydrology met at the site?

Yes.

Most of the wetland creation site is meeting the projected hydrology levels as indicated by the presence of reducing conditions within the soil profile, ponded water within the designed pits and troughs throughout the site, and signs of drainage through the rip rap overflow spillways. As anticipated, the primary source of hydrology in the wetland creation areas comes from groundwater discharge from the slope cuts and surface runoff from the adjacent quarry area. General hydrology across the wetland mitigation area varies from seasonally saturated to semi-permanently flooded.

What percentage of the site is meeting projected hydrology levels?

95-100%

The northern PEM area is retaining water for a longer duration than anticipated or planned which has resulted in colonization of cattails in this area. This will be addressed in 2012; a brief narrative detailing the plan can be found in the remediation section of this report.

2) The proposed vegetation diversity and density goals for woody plants from the plan are met.

No – neither the density nor diversity goals are currently being met.

The diversity of planted woody species does not meet the permitted goal of four different species with at least 50 plants per acre. Currently, there are three species - speckled alder (*Alnus incana*), red-osier dogwood (*Cornus sericea*) and pussy willow (*Salix discolor*) - that have a density greater than 50 plants/acre. The next most-dense species is winterberry holly (*Ilex verticillata*) with a density of approximately 25 plants/acre.

The planted densities for the scrub-shrub creation areas were 600 woody plants/acre. The planted density goal, as described in the Corps checklist, is 500/acre. In 2011, the average density of woody plants is 365/acre (an increase from 2010 during which we found only 291/acre). For additional details on the shrub and tree plantings, please see Table 7 in Appendix B.

As described above, monitors investigated the entire PSS creation area to obtain an accurate count of the woody plants present. Obtaining an accurate count of the smallest shrubs was difficult due to the thick herbaceous cover (in particular, beggar’s ticks (*Bidens* spp.) and soft rush (*Juncus effusus*) are especially robust throughout the creation site). It should be assumed that a few woody plants remain uncounted due to their being dwarfed by the herbs. However, the 2011 (2nd year) monitoring data does appear to conclusively show fewer woody plants within the PSS creation area than would meet the Corps standards.

3) a. Each mitigation site has at least 80% aerial cover, excluding planned open water areas or planned bare soil areas (such as for turtle nesting), by noninvasive species.

Yes.

Based on plot data, average aerial cover by non-invasive species was approximately 113% throughout the wetland creation site. The transect areas did not include some planned non-vegetated areas such as sand mounds (turtle nesting islands), course woody debris, and shallow pool areas excavated during the initial construction (see Table 8 in App. D).

3) b. Planned emergent areas on each mitigation site have at least 80% cover by noninvasive hydrophytes.

Yes.

The average aerial percent cover of noninvasive hydrophytes within the two PEM creation areas is 102%. This is an increase of from the first year monitoring of 43%. This increase is mainly due to the drastic reduction of cattails in the southern PEM. Many new herbaceous species are beginning to colonize this area and are out-competing the broadleaf cattail.

3) c. Planned scrub-shrub cover types have at least 60% cover by noninvasive hydrophytes, of which at least 15% are woody species.

No.

Monitors observed 115% aerial cover by non-invasive hydrophytes in the scrub-shrub creation area (herbaceous vegetation *and* woody vegetation) with 14 percent of the cover provided by woody species. This is an increase of eight percent over 2010. The increase can be largely attributed to the vast increase in coverage of speckled alder. The cover by woody species is just shy of the 15% standard; judging from the growth noted in 2011, the 15% standard should easily be met during next years growing season.

4) Common reed (*Phragmites australis*), Purple loosestrife (*Lythrum salicaria*), Russian and Autumn olive (*Elaeagnus* spp.), Buckthorn (*Rhamnus* spp.), Japanese knotweed (*Polygonum cuspidatum*), and/or Multiflora rose (*Rosa multiflora*) plants at the mitigation site(s) are being controlled.

Yes.

The only invasive and noxious species observed within the creation area were purple loosestrife, broad-leaf cattail, reed-canary grass (*Phalaris arundinacea*), and crown vetch (*Securigera varia*). Reed-canary grass was observed in very low numbers. Observations at other mitigation sites has shown that it takes three to four growing seasons for certain species of native vegetation to take hold and eventually begin to out-compete this species (no remediation is planned for reed-canary grass). Purple loosestrife was found within the site shortly after construction and a remediation plan was immediately enacted. The control plan is discussed under "Remediation".

Cattails are colonizing the wetter pits in the northern PEM area – the control plan for this is described under "Remediation".

In 2011, a few healthy clumps of crown vetch were observed within the PSS creation area. The vetch seems to be relegated to these clumped areas, but it will be closely monitored in 2012. If the vetch appears to be spreading or limiting the growth of native species, the vetch will be removed and/or destroyed in place.

5) All slopes, soils, substrates, and constructed features within and adjacent to the mitigation site(s) are stable.

Yes.

All slopes, soils, substrates and constructed features within and adjacent to the mitigation site are stable.

Soils data:

Four soil profiles were investigated within the wetland creation site (two in PEM areas and two in PSS areas). Soils observed consisted of thick or very thick, dark and very dark A horizons underlain by gray to grayish-

brown horizons with redoximorphic features. Two of the four profiles keyed as hydric following the Field Indicators of Hydric Soils in the United States, Version 7 (HSUS7). The third profile keyed as hydric following the Field Indicators for Identifying Hydric Soils in New England, Version 3 (HSNE3). The fourth profile did not meet a hydric soil indicator, but is showing signs of reducing conditions (low chroma matrix color with mottling) in the upper portion of the profile.

Please see Tables 1 through 4 in Appendix D for representative soil profile descriptions for each creation type. The HSUS7 and HSNE3 hydric soil indicator reference is indicated in parentheses after the wetland creation type.

Remediation:

Cattail control program: An invasive control program for cattail species was originally scheduled for the late winter of 2011, but the spring thaw set in before this work could be completed. The work is now scheduled for the late winter of 2012. A description of the work was sent to representatives from the ACOE as follows:

The hydrology alteration will be achieved by scraping away approximately one to three inches of the existing topsoil in order to collect the roots and rhizomes of the existing cattails (this material will be set aside for a deep hole burial in uplands elsewhere on the site). An additional 10-12 inches of the augmented wetland topsoil in the area will be moved aside and stockpiled. Grondin will then add approximately six inches of clean, fine-grained subsoil across the scraped site. Finally, the 10-12 inches of topsoil will be restored to the area, and the site will be seeded with a wetland seed mix and mulched with straw. Care will be taken to avoid the planted shrubs growing within the adjacent scrub-shrub area. A wetland scientist will be onsite to inspect the grading and planting work. The overall slope of the creation site will remain the same, with a slight downgrade from north to south across the site. To shed additional overflow and prevent ponding in the immediate vicinity of the created PEM area, a level-lip spreader will be installed just east of the work area and will connect to an existing rip-rap drainageway (matching prevailing grade with the elevation of the PEM).

This work was approved provided that the removed “scrapings” are not reused at Larrabee Farms and that the area is monitored to ensure it is still meeting the planned covertype for this area.

Purple loosestrife control program: An inventory of loosestrife was conducted post construction during the 2009 growing season and an aggressive mechanical control strategy was implemented. Loosestrife plants were hand-removed twice in 2009 and three times in 2010. As can be seen in the aerial cover amounts (Table 8) control of loosestrife has been effective. The hand removal was effective at controlling seedlings from reaching maturity, but some of the larger plants that were not completely removed were found re-sprouting this season. Due to that fact, a chemical control plan was chosen as the most effective control method to assure that the plants were destroyed prior to going to seed.

A licensed Maine Master Pesticide Applicator transected the entire creation area cataloguing purple loosestrife. A 1.5% solution of Accord Concentrate (active ingredient glyphosate) was applied to all loosestrife plants found within and around the creation area. To ensure that adjacent native plants were protected a low volume foliar spray application method was used. Plants around the target species were pulled away from target plants to further aid in limiting any overspray. A follow-up visit was conducted in September to look for and re-spray any individuals missed during or that survived the original visit.

Due to the prolific nature of purple loosestrife and ability of the seed to remain viable for many years additional monitoring and mechanical and chemical control will continue to be conducted on a yearly basis.

Berm repair: The slope on the berm around the southwestern corner of the creation site was reduced in May of 2010. In January 2011, Grondin performed additional remediation work on the southwestern berm which included adding soil materials in order to reduce the slope steepness around the creation area and to facilitate a walking path along the top of the berm.

Addition of Course Woody Debris: Based on suggestions from the Corps, in January 2011 additional course woody debris was placed within the mitigation site. Several large hemlocks (*Tsuga canadensis*) and beech trees

(*Fagus grandifolia*) were installed in and around the creation area; these were placed standing (snags) and on the ground.

Woody Plant Relocation: Seven woody shrubs were noted within the southern PEM creation area. These shrubs will be dug up and replanted in the PSS creation area during spring 2012.

Erosion Control Measures:

No erosion problems were observed onsite. Temporary measures, such as silt fence, were removed upon completion of the project in 2009. Erosion control mulch remains in place around the perimeter of the wetland creation site and will be left to degrade in place. The permanent rip rap spillways are functioning as planned. Silt fence along the access road between the Jetport creation area and the MDOT Gorham Bypass creation area is still in place near the small stream crossing. During site visits with the Corps in 2011, the regulators requested this be removed so it will be pulled out during late winter or spring.

Visual Estimate of Percent Cover of Non-invasive and Invasive Species:

The average percent vegetative cover by non-invasive plants at the mitigation site is approximately 113%. The average percent cover of invasive species is approximately 25% (*Typha latifolia*). This is a reduction from last year, mainly due to competition from non-invasive herbaceous vegetation in the southern PEM area.

Fish and Wildlife Use at the Site:

Please see table 6 for a list of species found to be using the site. Several bird and mammal species (as well as a healthy and creepy population of yellow garden spiders) are using the created wetland.

During spring 2011, site visits and amphibian breeding surveys were conducted within the ephemeral pool in the southerly end of the site. This feature was inadvertently created during grading, but has been left in place because monitors noted that it provides amphibian breeding habitat. During the 2010 survey, the pool appeared to be functioning successfully. In 2011, wood frog and spotted salamander egg masses were observed, but a complete draw-down of the pool was noted in late April. Several egg masses were found desiccating in the pool basin and along the edges. It is unclear why the early drawdown occurred; no spillover or drainage through the adjacent berm was noted. The two best theories we have are that the remediation work on the adjacent berm opened an underground fissure to where water is flowing out of the pool (unlikely since the pool did not dry until months after the work) or that the rapid increase in herbaceous vegetation around the pool has increased evapotranspiration to the point where it is drying the pool quicker than before. Monitors will revisit the pool again throughout 2012 and provide an updated on the hydrology in the Year 3 monitoring report.

Two site visits were conducted during the breeding season on April 13th, and April 27th. On April 13th five wood frog egg masses (*Rana sylvatica*) and 14 spotted salamander (*Ambystoma maculatum*) egg masses were found within the southern ephemeral pool. On April 27th the pool was revisited and severe draw-down was noted. All egg masses found either completely or partially out of water.

General health and vigor of the surviving plants, prognosis for their future survival, and a diagnosis of the cause(s) of morbidity or mortality:

Overall, planted shrub species (*Alnus incana*, *Aronia melanocarpa*, *Cornus sericea*, *Ilex verticillata*, *Salix discolor*, and *Vaccinium corymbosum*) appear to be healthy and growing. Hydrology appears adequate for these plants and there is limited evidence of death from herbivory, flooding or desiccation. Many of the planted alders have tripled in size since last year and several of the willow and dogwood individuals have doubled in size. The winterberry and the blueberry plants appear healthy, but are slow growing and getting competition from the robust herbaceous population.

Maps

Maps must be provided to show the location of the compensatory mitigation site relative to other landscape features, habitat types, locations of photographic reference points, transects, sampling data points, and/or other features pertinent to the mitigation plan. In addition, the submitted maps must clearly delineate the mitigation site boundaries to assist in proper locations for subsequent site visits. Each map or diagram must fit on a standard 8 ½ x 11” piece of paper and include a legend and the location of any photos submitted for review.

PLEASE SEE FIGURE 1 ON NEXT PAGE (10) FOR A CLOSEUP OF MITIGATION PLOT LOCATIONS AND AS BUILT CONDITIONS (additional maps can be available by request)

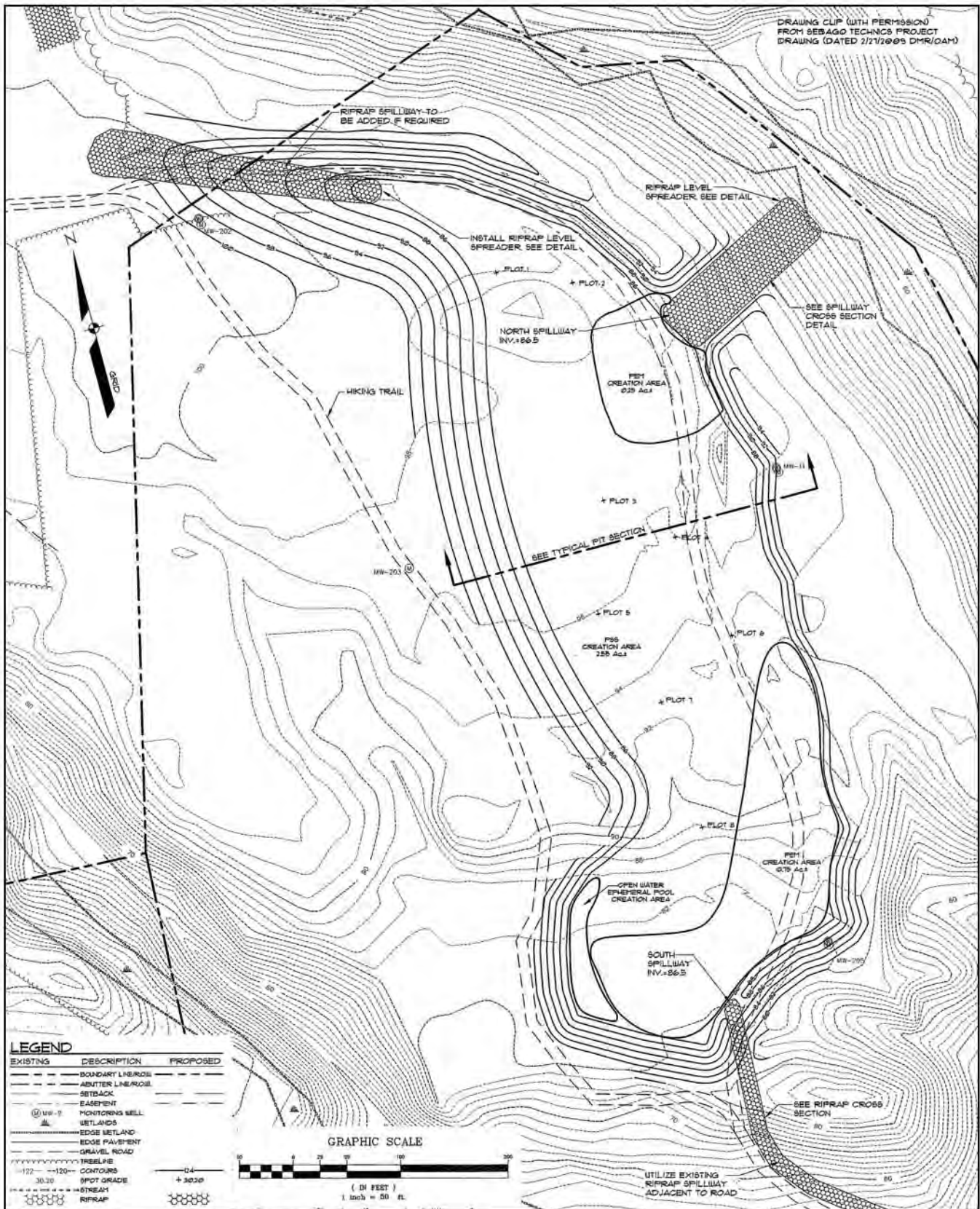


Figure 1. As-built conditions of site showing plot location centers

Conclusions (1 page)

In general, and as can be noted from the photographs and data, the Jetport Expansion Project wetland creation area is responding well after two years. In the wetland creation area, hydrology appears to be adequate to achieve wetland conditions. Pockets of standing water were observed within the creation area and there is evidence of reducing conditions in the soil profiles. Planted woody vegetation is growing well, and herbaceous cover is very robust contributing to increased competition of the invasive species found around the site. Wildlife usage within the wetland creation site and surrounding habitat preservation areas is abundant year-round and the site and surroundings are being used by hikers, birders, hunters, Nordic skiers, and bicyclists.

Even though the site does appear to have a good start toward providing replacement functionality for wetlands impacted by the Jetport expansion, it does have a few minor problems that will continue to be monitored and addressed:

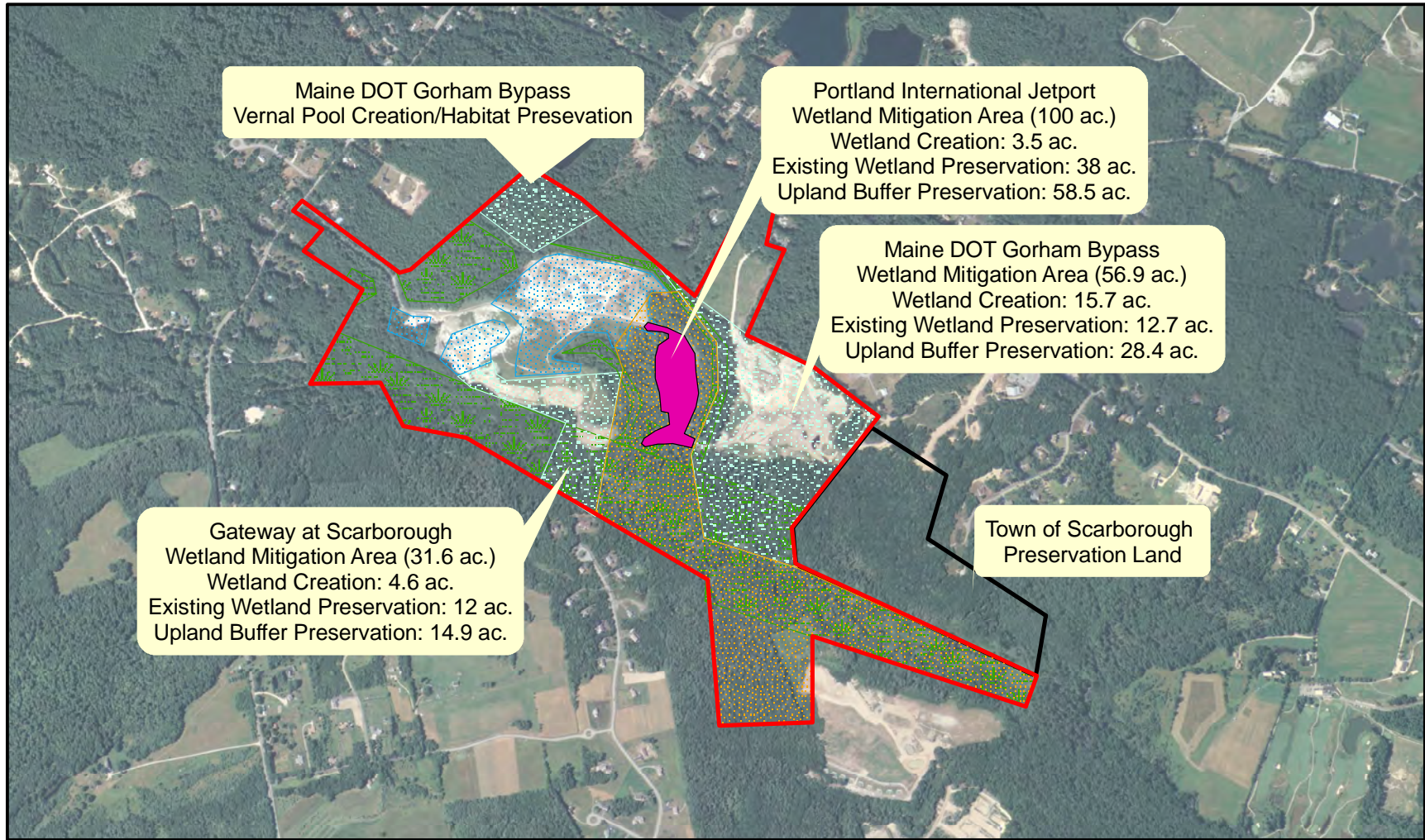
First, the woody plant density and diversity are not meeting the site goals. There is a disparity between the amount of planted individuals and the current densities found within the site (600 plants/acre versus 365 plants/acre). Because only a few dead individuals were located this year (during a full site assessment,) monitors believe that most of the die-off happened during the first growing season. Now that plants have acclimated to the site and the herbaceous stratum has matured, the surviving woody vegetation is vibrant. Many of the planted alders have tripled their aerial coverage since last year and several of the willow and dogwood individuals have doubled in size. The located winterberry and the blueberry plants appear healthy, but are not as fast growing and may be further stunted by competition from the robust herbaceous strata. Density is also not meeting the goals set for the project site. If density and diversity data do not increase in 2012 (with the addition of volunteers and with moving a few of the shrubs out of the PEM area) then Grondin will work with the Corps and MDEP to define remediation steps to achieve the site goals (possibly including additional planting work).

Second, noxious and invasive species (most notably cattails and purple loosestrife) are still a threat to the site. Cattails are dominant in the northern PEM creation cell and remediation steps designed to remove the cattails and increase the elevation of the area will take place this winter (2012). Purple loosestrife is being controlled mechanically and chemically. Loosestrife will be monitored again in 2012 and controls will be implemented as required. Now that the site has full coverage by non-invasive herbaceous plants, monitors believe the loosestrife problem may have reached a controllable level (with no additional spread as the ultimate, long-term goal).





Appendix A -- An as-built plan showing topography to 1-foot contours, any inlet/outlet structures and the location and extent of the designed plant community types (e.g., shrub swamp). Within each community, type the plan shall show the species planted—but it is not necessary to illustrate the precise location of each individual plant. There should also be a soil profile description and the actual measured organic content of the topsoil. This should be included in the first monitoring report unless there are grading or soil modifications or additional plantings of different species in subsequent years.

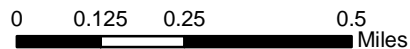
- Please see Figure 1 on page 10 of this report for a close-up site map.
- Soil Profile Descriptions are included in Tables 1 through 4 in Appendix D.
- A site map showing the Jetport location in comparison to the overall Larrabee Farms site is attached in this appendix.

Larrabee Farms Wetland Mitigation Project Site



LEGEND

-  Portland Jetport Preservation Area
-  Areas for future Projects
-  Existing Wetland Areas
-  Portland Jetport Creation Project



Project: 299 PWM Expansion Project
 Client: Portland International Jetport
 Prepared by: DRB
 Date: 24 February 2009
 Projection Data: 2007 1m Aerial Image
 Scarborough, Maine
 UTM NAD 1983
 Source(s): NAIP



BOYLE ASSOCIATES

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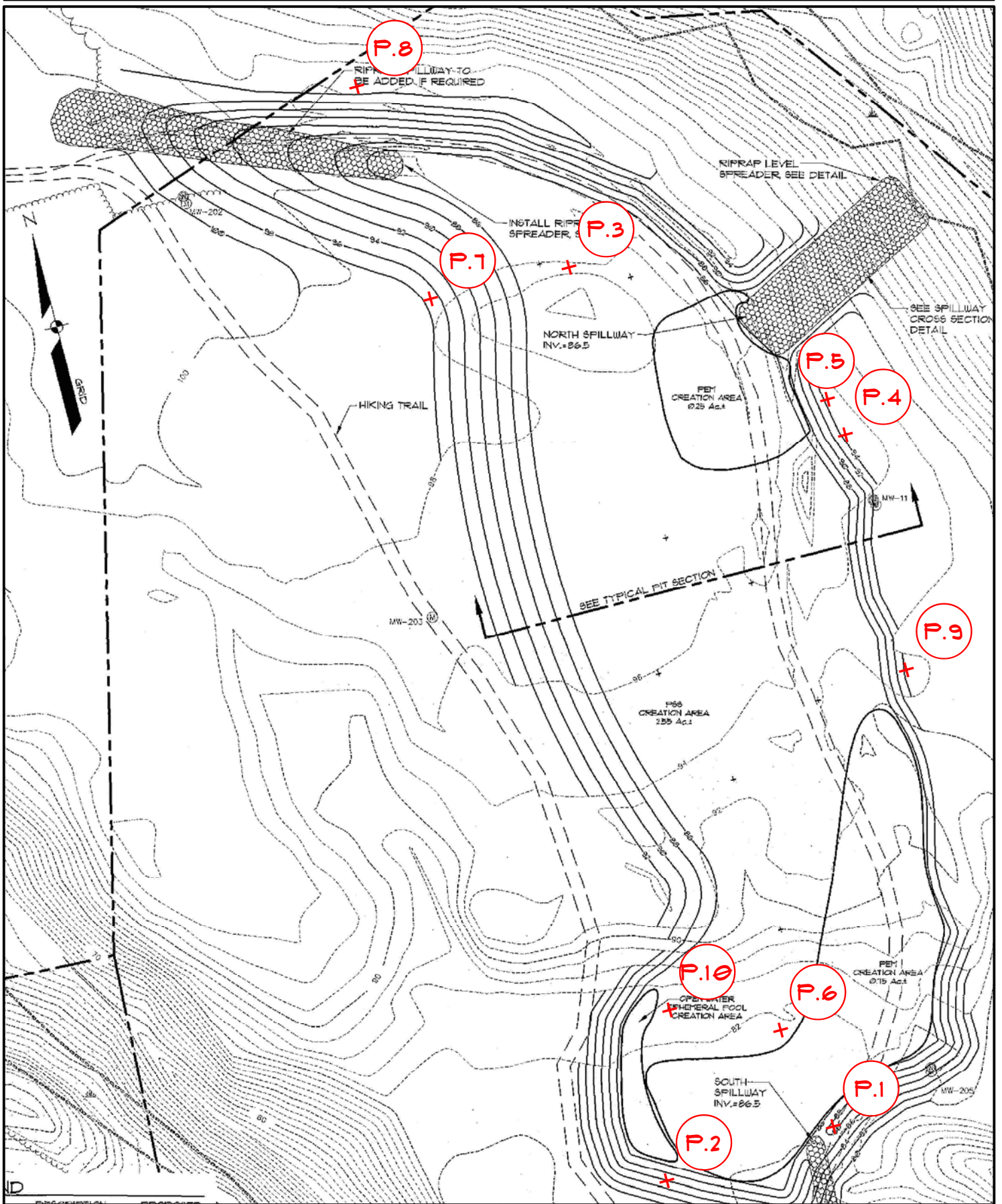
Appendix B – A vegetative species list of volunteers in each plant community type. The volunteer species list should, at a minimum, include those that cover at least 5% of their vegetative layer*.

Volunteer Species

<u>Scientific Name</u>	<u>Common Name</u>	<u>Indicator Status</u>	<u>Percent Aerial Cover (On average across creation area)</u>
<i>Agrostis alba</i>	Redtop	FACW	52
<i>Elymus virginicus</i>	Virginia wild-rye	FACW	1
<i>Euthamia graminifolia</i>	Grass-leaved goldenrod	FAC	6
<i>Lythrum salicaria</i>	Purple loosestrife	FACW	1
<i>Phalaris arundinacea</i>	Reed canary grass	FACW	1
<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed	FACW	2
<i>Securigera varia</i>	Crown vetch	UPL	2
<i>Solidago rugosa</i>	Wrinkleleaf goldenrod	FAC	2

*Being that this is the first year of monitoring, percent aerial cover by volunteer species is low. Therefore, all volunteer species with 1% aerial cover or greater (within the area of the mitigation site surveyed) are included in the volunteer species table. For additional species observed, please see Table 8 in Appendix D.

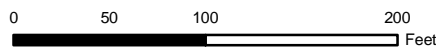
Appendix C -- Representative photos of each mitigation site taken from the same locations for each monitoring event. Photos should be dated and clearly labeled with the direction from which the photo was taken. The photo sites must also be identified on the appropriate maps.



Project: # 299
 Prepared by: DRB
 Drawing Date: 2 Dec 2010

Notes:
 Drawing Clip (with permission)
 Sebago Technics Project
 (Dated 2/29/2010)

Larrabee Farms: Portland International Jetport Creation Area - PHOTO LOCATIONS



Mailing Address:
 25 Dundee Road
 Gorham, Maine 04038
 Phone 207.591.5220
 www.boyleassociates.net



Photolocation 1 (Year 1). Facing north towards emergent and scrub-shrub wetland creation areas, 09-September-2010.



Photolocation 1 (Year 2). Facing north towards emergent and scrub-shrub wetland creation areas, 21-October-2011.



Photolocation 2 (Year 1). Facing northeast across newly created emergent area, 9-September-2010.



Photolocation 2 (Year 2). Facing northeast across created emergent area, 21-October-2011.



Photolocation 3 (Year 1). Facing south across scrub-shrub creation area, 9-September-2010.



Photolocation 3 (Year 2). Facing south across scrub-shrub creation area, 21-October-2011.



Photolocation 4 (Year 1). Facing southwest across scrub-shrub creation area, 9-September-2010.



Photolocation 4 (Year 2). Facing southwest across scrub-shrub creation area, 21-October-2011.



Photolocation 5 (Year 1). Facing northwest across scrub-shrub creation area, 9-September, 2010.



Photolocation 5 (Year 2). Facing northwest across scrub-shrub creation area, 21-October, 2011.



Photolocation 6 (Year 1). Facing northeast across emergent and scrub-shrub creation areas, 9-September-2010.



Photolocation 6 (Year 2). Facing northeast across emergent and scrub-shrub creation areas, 21-October-2011.



Photolocation 7 (Year 1). Facing southeast across scrub-shrub creation area from berm, 9-September-2010.



Photolocation 7 (Year 2). Facing southeast across scrub-shrub creation area from berm, 21-October-2011.



Photolocation 8 (Year 1) Facing south at scrub-shrub creation area, 9-September-2010.



Photolocation 8 (Year 2) Facing south at scrub-shrub creation area, 21-October-2011.



Photolocation 9 (Year 1). Facing west across scrub-shrub creation area, 9-September-2010.



Photolocation 9 (Year 2). Facing west across scrub-shrub creation area, 21-October-2011.



Photolocation 10 (Year 1). Facing south at ephemeral pool, 13-April-2010.



Photolocation 10 (Year 2). Facing southwest at ephemeral pool. Pool is already dry at this early date. Egg masses were found desiccating near the depression center. 19-April-2011.

Appendix D. Tables

Table 1. Soil profile 1 in southern PEM creation area (HSNE3 Indicator VII).

Depth	Horizon	Matrix	Redox	Texture
0-15	A	10YR3/1	5BG 3/6 – 2% 10YR 4/6 – 2%	fSL
15-20+	B	2.5Y5/2	10YR 3/6 – 5% 2.5Y 6/2 – 15%	fSL

Table 2. Soil profile 2 in southern part of PSS creation area (HSUS7 Indicator A11).

Depth	Horizon	Matrix	Redox	Texture
0-5	A	10YR 3/1	7.5Y 3/3 – 10%	fSL
5-12	B ₁	10YR 5/1	10YR 4/6 – 20%	fS
12-20+	B ₂	2.5Y 6/1	2.5Y 5/4 – 20% 10YR 3/4 – 5%	fSC

Table 3. Soil profile 3 in northeastern PEM creation area (HSUS7 Indicator A11).

Depth	Horizon	Matrix	Redox	Texture
0-6	A	10YR3/1	5BG 3/2 – 2% 10YR 4/6 – 2%	fSL
6-15+	B	2.5Y5/2	10YR 4/6 – 5%	SiL

Table 4. Soil profile 4 in northern part of PSS creation area (No indicator).

Depth	Horizon	Matrix	Redox	Texture
0-17	A	10YR 3/1	10YR 4/6 – 5% 5Y 5/2 – 7%	fSL
17+	REFUSAL			

Table 5: Fauna Species List April through October 2011 (wetland creation area)

Common Name	Scientific Name	Field ID Methodology	Use
Birds:			
Black-capped chickadee	<i>Parus atricapillus</i>	visual	feeding, nesting
American goldfinch	<i>Carduelis tristis</i>	visual	feeding, nesting
Red-tailed hawk	<i>Buteo jamaicensis</i>	visual	feeding
Cooper's hawk	<i>Accipiter cooperii</i>	visual	feeding
American crow	<i>Corvus brachyrhynchos</i>	visual	feeding, roosting
Mallard	<i>Anas platyrhynchos</i>	visual	feeding, nesting
Wild turkey	<i>Meleagris gallopavo</i>	visual	feeding
Blue jay	<i>Cyanocitta cristata</i>	visual	feeding
Pileated woodpecker	<i>Dryocopus pileatus</i>	visual	feeding
Northern flicker	<i>Colaptes auratus</i>	song	feeding
White-breasted nuthatch	<i>Sitta carolinensis</i>	visual	feeding
Red-breasted nuthatch	<i>Sitta canadensis</i>	visual	feeding
American woodcock	<i>Scolopax minor</i>	visual	feeding
Eastern bluebird	<i>Sialia sialis</i>	visual	feeding
Barn swallows	<i>Hirundo rustica</i>	visual	feeding
Tree swallows	<i>Tachycineta bicolor</i>	visual	feeding
Eastern phoebe	<i>Sayornis phoebe</i>	visual	feeding
Chipping sparrow	<i>Spizella passerine</i>	visual	feeding, roosting
Song sparrow	<i>Melospiza melodia</i>	visual	roosting
American robin	<i>Turdus migratorius</i>	visual	feeding, roosting
Mammals:			
Fox	<i>Vulpes vulpes</i>	visual	feeding
Raccoon	<i>Procyon lotor</i>	tracks	feeding
Coyote	<i>Canis latrans</i>	tracks	feeding
White-tailed deer	<i>Odocoileus virginianus</i>	tracks	foraging, feeding
North American porcupine	<i>Erethizon dorsatum</i>	visual	feeding
Amphibians:			
American toad	<i>Bufo americanus</i>	heard	feeding, breeding
Green frog	<i>Rana clamitans</i>	visual	feeding, breeding
Wood frog	<i>Rana sylvatica</i>	visual	feeding, breeding
Spotted salamander	<i>Ambystoma maculatum</i>	visual	breeding
Gray tree frog	<i>Hyla versicolor</i>	visual	feeding
Spring Peeper	<i>Hyla crucifer</i>	heard	feeding, breeding
Turtle species	Order Testudines	tracks	feeding, roosting
Insects:			
Praying mantis	<i>Mantis religiosa</i>	visual	resting
Predacious diving beetle	<i>Dytiscus species</i>	visual	feeding

Table 6. Jetport Wetland Mitigation Year Two Monitoring Results - 2011

Scrub/Shrub Wetland Areas		Planted	Volunteer [†]	Total	
Red Maple	Acer rubrum	0	3	3	Plants/acre* 365
Speckled Alder	Alnus incana	448	0	448	
Black Chokeberry	Aronia melanocarpa	31	0	31	
Gray birch	Betula populifolia	0	2	2	
Red Osier Dogwood	Cornus sericea	125	0	125	
Winterberry	Ilex verticillata	58	0	58	
White Pine	Pinus strobus	0	1	1	
Pussy Willow	Salix discolor	155	0	155	
Black Willow	Salix nigra	0	5	5	
American Elm	Ulmus americana	0	1	1	
Highbush Blueberry	Vaccinium corymbosum	29	0	29	
Total		846	12	858	

*2.45 acres surveyed excludes "planned non-planted areas" or approximately 4% (e.g. ephemeral pools, nesting areas, coarse woody debris). [†]Volunteers are individuals that are 18" tall or taller.

Table 7: Jetport Wetland Creation Area Year Two Herbaceous Vegetation (Plot Data) - 2011

Scientific Name	Common Name	Indicator Status	1	2	3	4	5	6	7	8	N PE M	S PE M	Average Total %
<i>Agrostis alba</i>	Redtop	FACW	20	20	50	90	90	50	60	90		50	52
<i>Alisma plantago-aquatica*</i>	European mud plaintain	OBL	5					2	2		5		1
<i>Aster vimineus</i>	Small white aster	FAC							2	1			0
<i>Bidens frondosa</i>	Devil's beggar-	FACW	2										0
<i>Carex crinita*</i>	Fringed sedge	OBL									5	2	1
<i>Carex lurida*</i>	Shallow sedge	OBL	5	2	2	5	2	2				3	2
<i>Carex scoparia*</i>	Broom sedge	FACW	2	2	2	5		5					2
<i>Elymus virginicus</i>	Virginia wild-rye	FACW		2	3							1	1
<i>Epilobium strictum</i>	Downy willowherb	OBL								2			0
<i>Euthamia graminifolia</i>	Grass-leaved	FAC		2	15	2	5	10	15	5		10	6
<i>Eupatorium perfoliatum*</i>	Common boneset	FACW								2		20	2
<i>Juncus effusus*</i>	Soft rush	FACW	40	50	20	20	5	20	10	15	50	20	25
<i>Lythrum salicaria</i>	Purple loosestrife	FACW	1		2	1	1	1		1	2	2	1
<i>Mimulus ringens*</i>	Allegheny	OBL				2		5	2	3	5	5	2
<i>Phalaris arundinacea</i>	Reed canary	FACW			2		2	1	2			2	1
<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed	FACW								2		15	2
<i>Scirpus cyperinus*</i>	Woolgrass	FACW	3	2	2		2	2			5		2
<i>Securigera varia</i>	Crown vetch	UPL					2		15				2
<i>Solidago rugosa</i>	Wrinkleleaf	FAC							5	2		15	2
<i>Symphiotrichum novi- angliae</i>	New England aster	FACW				1				2			0
<i>Symphiotrichum novi- belgii*</i>	New York aster	FACW			2								0
<i>Typha latifolia</i>	Broad-Leaf cattail	OBL	30	40	10	3		30	10	1	70	15	21
<i>Verbena hastata*</i>	Blue vervain	FACW			2		3		3	2			1
Average % cover by herbaceous plants			108	120	112	129	112	128	126	128	142	160	
Average % cover by woody plants			50	30	10	0	5	3	10	5	0	0	
Average % cover by invasive plants			31	40	14	4	5	32	27	2	72	19	
Average % cover by non-invasive herbaceous plant			77	80	98	125	107	96	99	126	70	141	
Average % cover by all hydrophytes			127	110	108	125	112	99	109	131	70	141	
Av. % cover of non-invasive veg over 20% of site surveyed													113
Av. % cover of non-invasive hydrophytes													102
Av. % cover of invasives													25
Av. % cover of planned emergent areas													106

Red plants are considered invasive or noxious.

Green plants are hydrophytes.

*in seed mix

Appendix E: Permit –

Copies of permits were submitted with the year one monitoring reports and can also be made available upon request.