Mitigation Monitoring Annual Report Template

1. Mitigation Monitoring Report Cover Sheet

1: *Project Name* W&M Butler Farm Mitigation Bank Identifiers:

DSL Permit # 46986 Corps Permit # 46986- RF Permittee: Wes and Marybell Butler Farm LLC
County- Washington Report Date: 12/2017 Monitoring Year : 1 2 3 4 **5**
Date Removal-Fill Activity Completed: 9/2012, 7/3013, 9/2014, 10/2015.
Date mitigation was completed: Grading 9/2012, 7/3013, 9/2014, 10/2015
Planting 12/2012, 3/2013, 3/2014, ongoing
Date(s) of data collection: 6/9/2017-7/5/2017
Report prepared by: Nicole Ruggiero, Ash Creek Forest Management

2: Monitoring Report Purpose:

This monitoring report is for a project that includes: (check all that apply):

- ❑ Compensatory **freshwater, non-tidal** wetland mitigation for permanent wetland impacts.
- ❑ Compensatory **estuarine** wetland mitigation for permanent wetland impacts.
- ❑ **Only non-wetland** compensatory mitigation.
- ❑ **Only** mitigation for **temporary** impacts that had a monitoring requirement.
- ❑ **Voluntary** wetland enhancement, creation or restoration (General authorization or individual permit) not funded with money from DSL's wetland mitigation fund.
- ❑ Voluntary wetland enhancement, creation or restoration (General authorization or individual permit) funded with money from DSL's **wetland mitigation fund**.
- **X** **Mitigation Bank** Report
- ❑ Other _____

3: Results: *(add more rows if needed)*

	Performance standards (verbatim from permit)		Fully Met? (Y/N)	Comments/Reason for shortfall (mark NA if doesn't apply this year)
1.	**Herbaceous wetlands**- native species cover is > 60%	Phase 1	Y	Average was 106% (+/- 2; 80% CI)
		Phase 2	Y	Average was 81% (+/- 4; 80% CI).
2.	**Herbaceous wetlands**- invasive species cover is no more than 10%	Phase 1	Y	No non-native weeds encountered were considered invasive according to definitions in the MBI.
		Phase 2	Y	None considered invasive
3.	**Herbaceous wetlands**- Bare substrate is no more than 20%	Phase 1	Y	Average was 11% (+/- 3; 80% CI)
		Phase 2	Y	Average was 18% (+/- 3; 80% CI).
4.	**Herbaceous wetlands**- After year 3,at least 10 different native species (defined as 5% cover or occur in 10% of plots and have a prevalence index ≤ 3)	Phase 1	Y	12 species met the diversity criteria measured by occurring in 10% of plots and prevalence index of < 3
		Phase 2	NA	Not yet 3 years since planting, however at this time 22 FAC or wetter species occurred in at least 10% of the plots.

5.	**Herbaceous wetlands**- Non-grass species must comprise at least 30% of total vegetative cover.	Phase 1	Y	Non-grass cover was 77% (+/-5; 80% CI).
		Phase 2	Y	Non-grass cover was 63% (+/-3; 80% CI).
6.	**Shrub/Forested wetlands**- native species cover is > 60% *		Y	Average was 83% (+/- 7.5; 80% CI)
7.	**Shrub/Forested wetlands**- cover of invasive herbaceous species <10%		Y	Average was .09% due to a very small amount of pennyroyal in one plot.
8.	**Shrub/forested wetlands**- cover of invasive trees and shrub species is no more than 10%		Y	No invasive trees or shrubs were noted
9.	**Shrub/forested wetlands**- Cover of bare substrate is no more than 20%		Y	Bare ground cover was 11% (+/- 3; 80% CI) in Phase 1.
10.	**Shrub/Forested wetlands**- By year 3, at least 6 different native woody species (defined as 5% cover or occur in 10% of plots and have a prevalence index < 3)		Y	11 woody species met this criteria
11.	**Shrub/Forested wetlands**- native shrub and tree stem density is ≥ 1600/acre		Y	Density was 2218 (+/- 252; 80% CI) plants/acre.
12.	**Upland buffers**- cover of native species is at least 60%		Y	Average cover was 86% (+/- 7; 80% CI)
13.	**Upland buffers**- cover of invasive species is no more than 10%		Y	This was low at 2.2% due to blackberry in two plots
14.	**Upland buffers**- stocking of woody plants ≥ 1,800 stems/acre		Y	Density was 2722 (+/- 362; 80% CI) plants/acre.
15.	**Upland Prairie**- native species cover is > 60%		Y	Average cover was 86% (+/- 4; 80% CI).
16.	**Upland Prairie**- invasive species cover is no more than 10%		Y	No species encountered were considered invasive
17.	**Upland Prairie**- Bare substrate is no more than 20%		Y	Average bare ground was 11% (+/- 3; 80% CI).
18.	**Upland Prairie**- After year 3, at least 4 different native species, 2 of which are non-grass have significant cover (defined as 5% cover or occur in 10% of plots)		NA	Not yet 3 years since planting, however at this time 13 species occurred in at least 10% of the plots; 9 of which were not grass species.

*** Phase 1 and 2 PFO combined (Phase 2 acres in this habitat now considered Phase 1 due to timing of planting).**

4: Further Actions:

Remedial work recommended	Yes ☐	No ☒
Deed Restriction or other protection instrument attached	Yes ☐	No ☒
Final Monitoring Report?	Yes ☐	No ☒
Requesting release or partial release of financial security?	Yes ☐	No ☒

Remedial actions recommended include ongoing weed maintenance and infill planting of bare root shrubs and trees in buffer and forested shrub wetlands as necessary to ensure density targets.

W&M Butler Mitigation Bank Mitigation

Permittee: Jay Hoffman
Monitoring and Report Completed by: Ash Creek Forest Management
Contact: Nicole Ruggiero (nicole@ashcreekforestry.com)
or George Kral (gkral@ashcreekforestry.com)

Year 5 of 5 for Phase 1, Year 2 of 5 for Phase 2

2. Plan Purpose and Overview

A. Location.

The mitigation site is located at: Township 2S Range 2W, Tax Lot 2S2110000200, Latitude 45 degrees, 24' 38.55" N (45.410708) and Longitude 122 degrees, 54' 18.04" W (-122.905011). The bank is located at 22242 SW Scholls Ferry Road, near the city of Beaverton, Oregon.

B. Mitigation goals and objectives.

The primary goals of the W&M Butler Mitigation Bank are to create, enhance, and restore emergent, scrub, and forested wetlands and to protect surrounding buffer areas. The project involves weed control, broadening of the riparian fringe with dense plantings of riparian forest and scrub species. The project has converted existing agricultural fields to a complex of emergent wetland, wet prairie, wetland and upland scrub, and wetland and riparian forest. Wetland restoration, enhancement, and creation will generate wetland credits that will be used for compensatory mitigation for unavoidable impacts to waters of the Unites states or waters of the states that result from activities authorized under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, Oregon's Removal-Fill Law (ORS) 196.800-196.990 and OAR 141-085 or to resolve enforcement cases resulting from activities subject to these regulations. This mitigation project is intended to create the functions and values shown in Table 1. The project is broken into two phases. Table 1 shows the total expected results of both phases. Phase 1 is substantially complete, including all earthwork and structures, seeding and planting. Phase 2 work completed to date includes earthwork, grading, weed control, and initial seeding.

Table 1.

Plant Community	TOTALS	Restoration	Enhancement	Creation	Buffers
PEM (emergent wetland and wet prairie) Acres	47.01	13.80	12.80	21.40	
PFO Acres	6.54	3.50	0.69	2.40	
PSS Acres	2.70	1.68	0.19	0.81	
Forested buffers	14.20			33.70	33.70
TOTAL ACRES	**90.97**	**18.98**	**13.68**	**24.61**	**33.70**
Credit Ratio		1:1	2:1	1.5:1	10:1
Credits Expected	**TOTAL**	**Restoration**	**Enhancement**	**Creation**	**Buffers**
	45.60	18.98	6.84	16.41	3.37

** Until the post-project delineation has been completed, fill in 'pending'.*

C. **Maintenance and management actions.**
In the past year, the following activities were conducted:

3/2017- 8,000 woody plants in-filled along existing riparian forest edges in Phase 1
4/2017- Spot spray and hand-pulled throughout for clover, curly dock, thistle, reed canary grass, and blackberry.
6/2017- Grazed 20 acres of Phase 1 to remove thatch, and manage prairie (see more detail below).
7/2017- Buffer grass mow
9/2017- Grazed 8 acres of emergent wetland.
10/2017- seeded native herbaceous species in the grazed area of Phase 1 (25 pounds); spot-spray and hand-pull of clover and wild carrot.
11/2017-11,200, bulbs and plugs planted in herbaceous area of both Phase 1 and Phase 2

Grazing:
We used controlled, prescription cattle grazing to decrease thatch and biomass and create space for the introduction of broadleaf forbs to increase diversity. We created a fenced pasture and grazed 12 yearling cattle over approximately 20 acres of the established native prairie at Butler from May 31-July 3, 2017. This pasture included areas seeded and established as herbaceous wetland and riparian forest. In September we also grazed an approximately 8 acre area of emergent wetland to better understand how these areas respond to cattle grazing in the late season.

We continuously monitored vegetation throughout the grazing period to assess and record species preferences and aversions, soil condition, and stubble height in order to adjust timing and move cattle as necessary. In addition, both grazed areas and a control area outside of the grazing area was monitored with 1 X 1 square meter vegetation plots. Using visual estimation from an aerial view of the plot, we assessed percent cover and percent grazed for each species, percent bare ground, and plant height (measured at the inner and outer corners). We repeated plots every other day during grazing and again after animals were removed. We intend to continue to monitor this area to understand the effects of the grazing and seeding success in the coming years.

D. **Monitoring methods**
Vegetation monitoring followed the same protocol as in previous reports following the routine methods specified in the DSL Removal-Fill Monitoring Guidelines with the following exceptions:

1. The PFO and RF acres (total of 7.38) in the eastern half of the project that were originally included in Phase 2 have been combined with PFO/RF acres in Phase 1, as this area was planted closer to the Phase 1 timeline.

2. The existing riparian forest buffer was not sampled this year as it has met standards already.

3. The Upland Prairie area in Phase 2 is small and would not be adequately sampled using the plot layout that is applied to the rest of the project. We ran a transect (90 degrees) across the area to add 8 more plots. See discussions of Sample Size, below.

E. **Monitoring data locations**
Monitoring plot locations were repeat sampled using GIS and existing permanent markers. In the original set up as explained in the Mitigation Bank Instrument, a systematic sampling methodology was utilized in order to produce representative data and avoid bias. A permanent baseline has been established between two fixed points on the site. The first point is the center of a large marked oak tree, located 10 feet NE of transect 6 plot 1 (see map 3.0). The

second point is the southwest corner of the water control structure, which is located approximately 60' NE of transect 6 plot 2 (see map 3.0). Transects are positioned perpendicular to this baseline, 265 feet apart. A random starting point between 0 and 25 is selected to determine the number of feet along the baseline west of the oak tree where the first transect should begin. Each subsequent transect is located 265 feet NE along the baseline from the last. Monitoring plots in the herbaceous wetland units are located 300 feet apart from each other, with the first point's number of feet from the baseline being determined by using a number randomly selected between 0 and 50. Each subsequent point is 300 feet along that transect until reaching forested buffers or until reaching the mitigation bank boundary. When forested buffers are encountered, the distance between monitoring plots was reduced to 150 feet. Herbaceous data was collected from two, one meter quadrants placed on the NW and SE corners of each plot. Tree and shrub data was collected in 11.8 foot diameter circles around center of the plot.

Table 2. Plots and Acres

Habitat	Number of herbaceous plots	Number of woody plots
PEM	64	0
PFO	22	11
Upland Planted Buffers	18	9
Existing Riparian Buffer**	--	--
Upland Prairie	12	0
TOTAL	**116**	**20**

** Existing riparian buffer no longer monitored per communication with DSL and as it has met criteria.

E. Sample Size Calculations

As discussed, the minimum sample sizes for each habitat type originally were determined using general DSL guidelines, but have not yet been calculated based on actual field data. We applied a sample size formula found in Elzinga et al (1998) Appendix 7, Equation 1: "Determining the necessary sample size for estimating a single population mean or single population total with a specified level of precision." We assumed an 80% confidence level and maximum confidence level interval of 10 (B=5) along with standard deviations as calculated from the 2017 data. We used % native cover data for herbaceous plots and plants/plot for woody plots to determine minimum sample sizes. We found that percent native cover is still variable and requires more herbaceous plots than previously collected to achieve the desired level of precision. However, we have more than enough woody plots to achieve the desired level of precision.

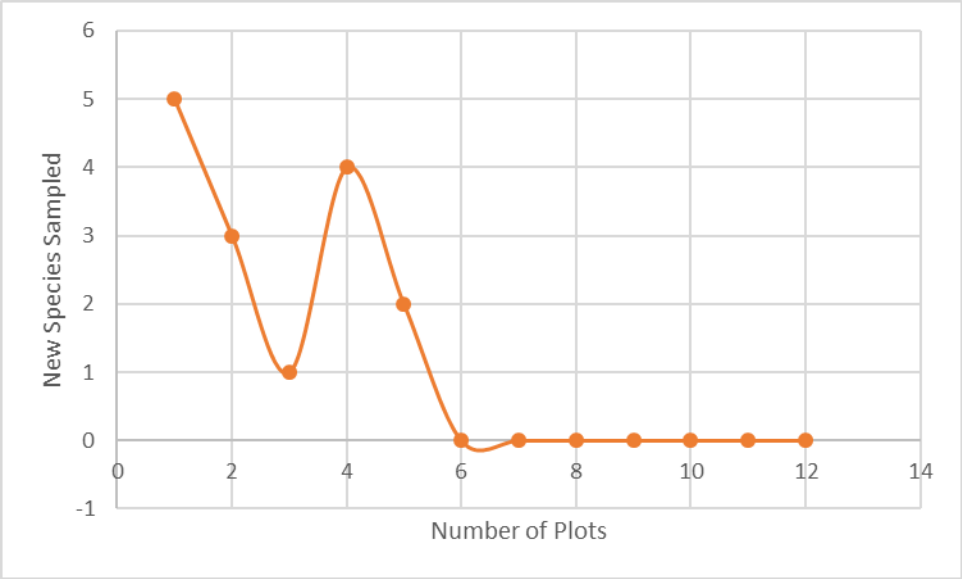
Table 3. Sample Size Calculations

Statistic	Herbaceous Plots (% native cover)					Woody (plants/plot)	
	PEM Phase 1	PEM Phase 2	Upland Prairie	Buffers	PFO/FW	Buffers	PFO/FW
mean	106	81	86	86	67	27	22
SD (s)	23.6	29.44	16.7	15.8	24.07	8.07	7.9
n, calculated*	36.50	56.80	18.28	16.36	37.97	4.27	4.09
n, actual 2017	**34**	**30**	**12**	18	**22**	9	11

*From Elzinga et al. 1998: $n = ((Z\alpha)^2 * (s)^2)/ B^2$

In order to decide if we added enough plots in the Upland Prairie acres while still in the field, we conducted a Species-Area Curve to understand how many new species we were adding as we continued to add plots. This method suggests we needed far fewer plots than the results reported in Table 3. No new species were sampled after 6 plots. We look forward to recommendations from the IRT as to whether or not to add or remove plots in certain habitat types in future monitoring.

Table 4. Species-Area Curve for Upland Prairie Plots



4. Results

We sampled a total of 116, one meter square plots for herbaceous vegetation in the mitigation bank. Within these plots we detected a total of 79 species. Fifty-five were native, 20 were non-native, and none were considered invasive. This is an increase in number of native herbaceous species detected from 2016, and a decrease in non-native species detected in previous years. The vast majority of the vegetative cover in the plots was made up of native species.

Herbaceous Wetlands

Performance Standard 1. The cover of native species is at least 60%

This standard was fully met in both Phase 1 and Phase 2. The average cover of native herbaceous species was 106% (+/- 2; 80% CI) in Phase 1 and 81% (+/- 4; 80% CI) in Phase 2.

Performance Standard 2. The cover of invasive species is no more than 10%;

This standard was fully met with no invasive species recorded in Phase 1 or Phase 2.

Performance Standard 3. Bare substrate represents no more than 20% cover;

This standard was fully met. The average cover of bare substrate was 11% (+/- 3; 80% CI) in Phase 1 and 18% (+/- 3; 80% CI) in Phase 2 after the first growing season post-seeding.

Performance Standard 4. By Year 3 and thereafter, there are at least 10 different native species. To qualify, a species must have at least 5% average cover in the habitat class, **or** occur in at least 10% of the plots sampled with a Prevalence Index < 3.

Using the definition of occurring in 10% of the plots sampled, both Phase 1 and Phase 2 meet this standard, although this is the first year of monitoring after seeding Phase 2. Phase 1 had 12 species and Phase 2 had 22 that met the criteria for diversity.

Performance Standard 5. Non-grass species must comprise at least 30% of total vegetative cover.

This standard was fully met with 77% cover by non-grass species in Phase 1 and 63% in Phase 2.

Shrub Dominated and Forested Wetlands

Performance Standard 6. The cover of native herbaceous species is at least 60%.

This standard was fully met. The cover of native herbaceous species was 83% (+/- 7.5; 80% CI)

Performance Standard 7. The cover of invasive herbaceous species is no more than 10%. After the site has matured to the stage when desirable canopy species reach 50% cover, the cover of invasive understory species may increase but may not exceed 30%

This standard was fully met with the average cover of invasive species at .09% due to a very small amount of pennyroyal in one plot.

Performance Standard 8. The cover of invasive shrub or tree species is no more than 10%

This standard was fully met. The cover of invasive shrub and tree species was 0%.

Performance Standard 9. Bare substrate represents no more than 20% cover

This standard was fully met. Average cover of bare substrate was 11% (+/- 3; 80% CI) in Phase 1.

Performance Standard 10. By Year 3 and thereafter, there are at least 6 different native woody species providing cover. To qualify, a species must have at least 5% average cover in the habitat class, **or** occur in at least 10% of the plots sampled and have a Prevalence Index of <3.

This standard was fully met. 11 different native species met this criteria based on occurring in at least 10% of the plots.

Performance Standard 11. The density of woody vegetation is at least 1,600 native plants (shrubs) and/or stems (trees) per acre (native species volunteering on the site may be included, dead plants/stems do not count).

This standard was fully met with an average density of 2,218 (+/- 252; 80% CI) plants/acre. To confirm, individual plants are the unit counted and not the stems. Where new stems are emerging as a definitive separate plant or as a volunteer, these are also included in the count.

Upland Buffers

Performance Standard 12. The cover of native species is at least 60%

This standard is fully met for herbaceous species with average cover of 86% (+/- 7; 80% CI).

Performance Standard 13. The cover of invasive species is no more than 10%. After the site has matured to the stage when desirable canopy species reach 50% cover, the cover of invasive understory species may increase but may not exceed 30%.

This standard was fully met. The average cover of invasive species was low at 2.2% due to blackberry in two plots.

Performance Standard 14. In years 3 to 5 in all woody buffer types, stocking meets or exceeds 1,800 stems per acre stocking of all woody species.

This standard was fully met. The average density of plants per acre was 2,722 (+/- 362; 80% CI) plants/acre.

Existing Riparian Buffers

Performance Standard. In existing riparian stands, Himalayan blackberry will be reduced by a minimum of 80% to less than 5% of the total area, and treated areas replanted to initial stocking densities prior to the first credit release.

The standards for existing riparian buffers refer to the threshold of blackberry in the understory and have been met in years past. Therefore, we were asked to not include these plots in the upland buffer stratum. We did not sample these plots in 2017.

Upland Prairie

Performance Standard 15. The cover of native species is at least 60%

This standard was fully met. Average cover was 86% (+/- 4; 80% CI).

Performance Standard 16. The cover of invasive species is no more than 10%.

This standard was fully met.

Performance Standard 17. Bare substrate is no more than 20%

This standard was fully met. Average bare ground was 11% (+/- 3; 80% CI).

Performance Standard 18. After year 3, at least 4 different native species, 2 of which are non-grass have significant cover (defined as 5% cover or occur in 10% of plots).

This standard is not yet applicable as it has only been 1 year since planting. However, in 2017, 13 species met the standard for diversity.

4. Conclusions and Recommendations

A. Project status

Phase 1:

As the trend has been over the past years, the mitigation project is in compliance with the performance standards. This was the final year of monitoring Phase 1 plots. Many similarities in cover, species, and density continue from the years past, with some improvements in species diversity and lower numbers of non-native species.

The inclusion of previously defined Phase 2 PFO acres into Phase 1 has allowed for greater sample size and overall continuity in monitoring performance of these woody species as they were planted on a similar timeline.

The native herbaceous species cover in the wetland habitat types is exceedingly met, and overall has a large percentage of non-grass species (such as *Alisma plantago aquatica*, and *Eleocharis palustris*).

In woody habitats, overall stocking is high, and survival and growth achieve or exceed expected rates.

Overall, an absence of invasive species and low percentage of cover of non-native species, growth in diversity, decrease in bare ground, high coverage of native species and overall wetland health are notable advancements at Butler.

Phase 2:

This was the first year of monitoring herbaceous wetland and upland prairie acres after seeding Phase 2. The 2016 seeding and weed control was extremely successful and diverse suite of native herbaceous species have established. We expect more cover of grasses and sedges as these species mature in the coming years. With the establishment of the herbaceous community, we plant to install woody species in buffers in early 2018.

B. Recommendations

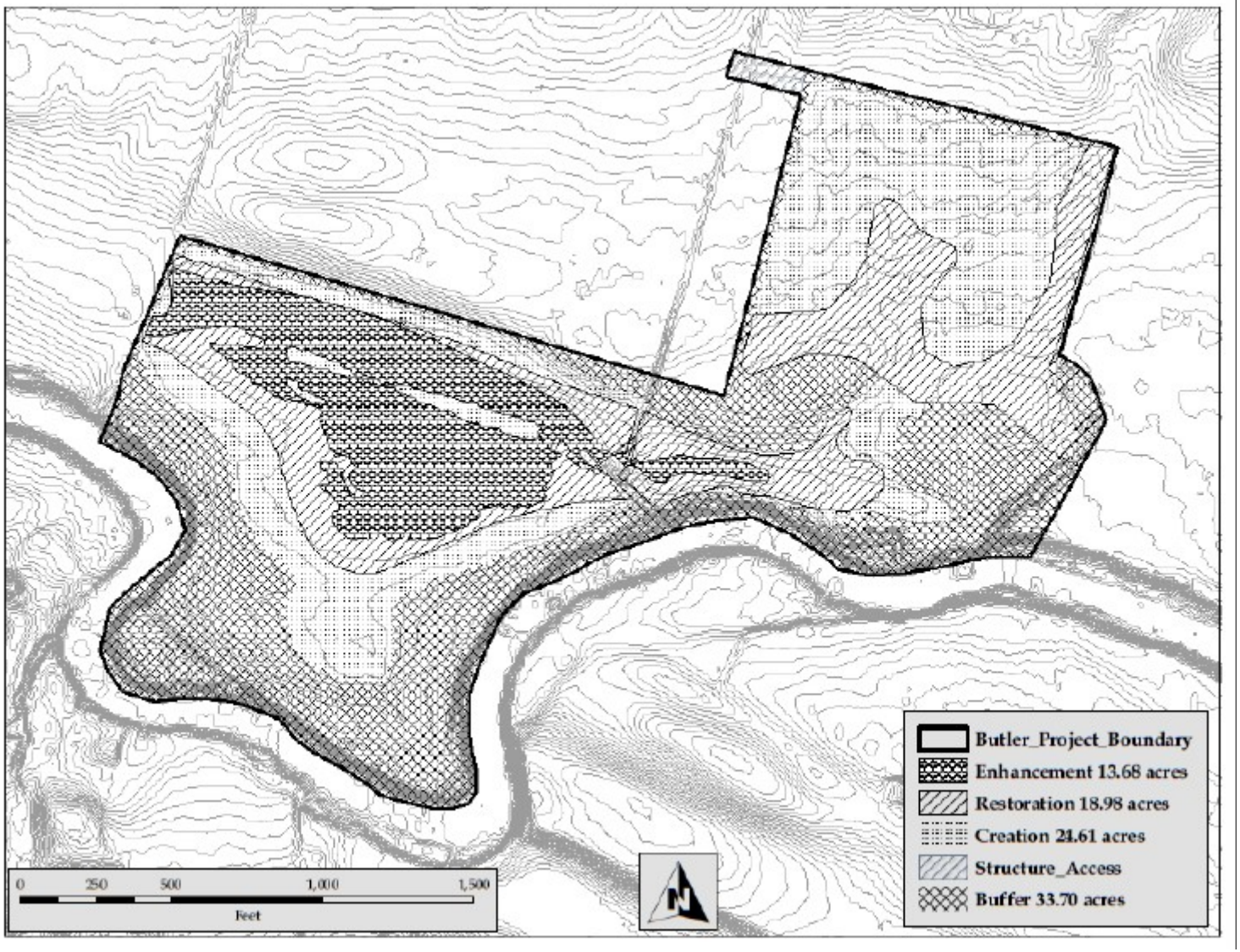
While non-native cover is low, continuing to aggressively control non-native species throughout the project area will be an important follow-up action over the coming year. One species of concern is *Leontadon taraxacoides*, particularly in areas of Phase 1, and we intend to continue to address this weed.

C. Financial Security status

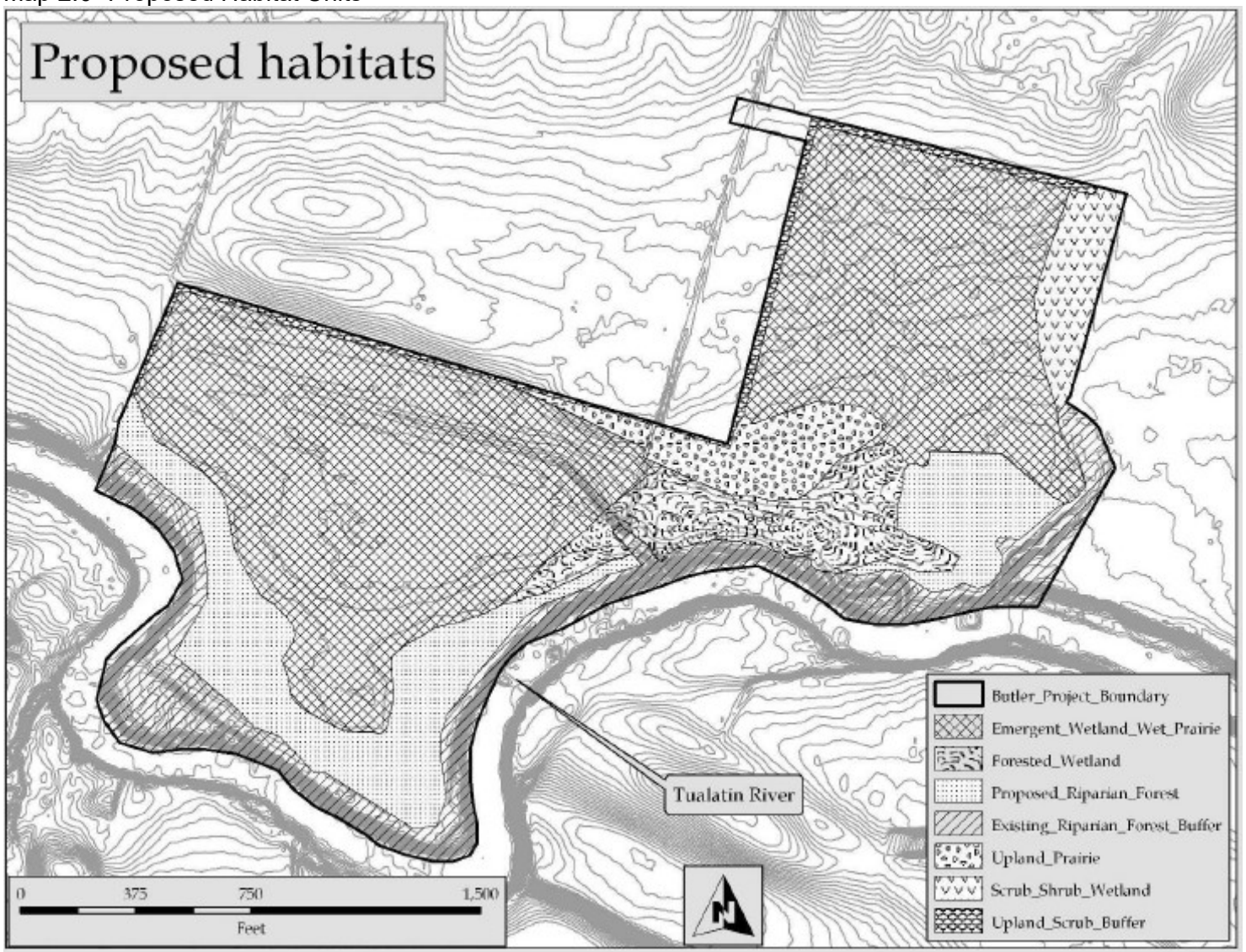
A (performance bond/ Letter of Credit/ other security) in the amount of $255,000 was established at permit issuance. In March 2017, the bond was adjusted to $98,300 in accordance with remaining budgeted costs.

5. Maps and Figures

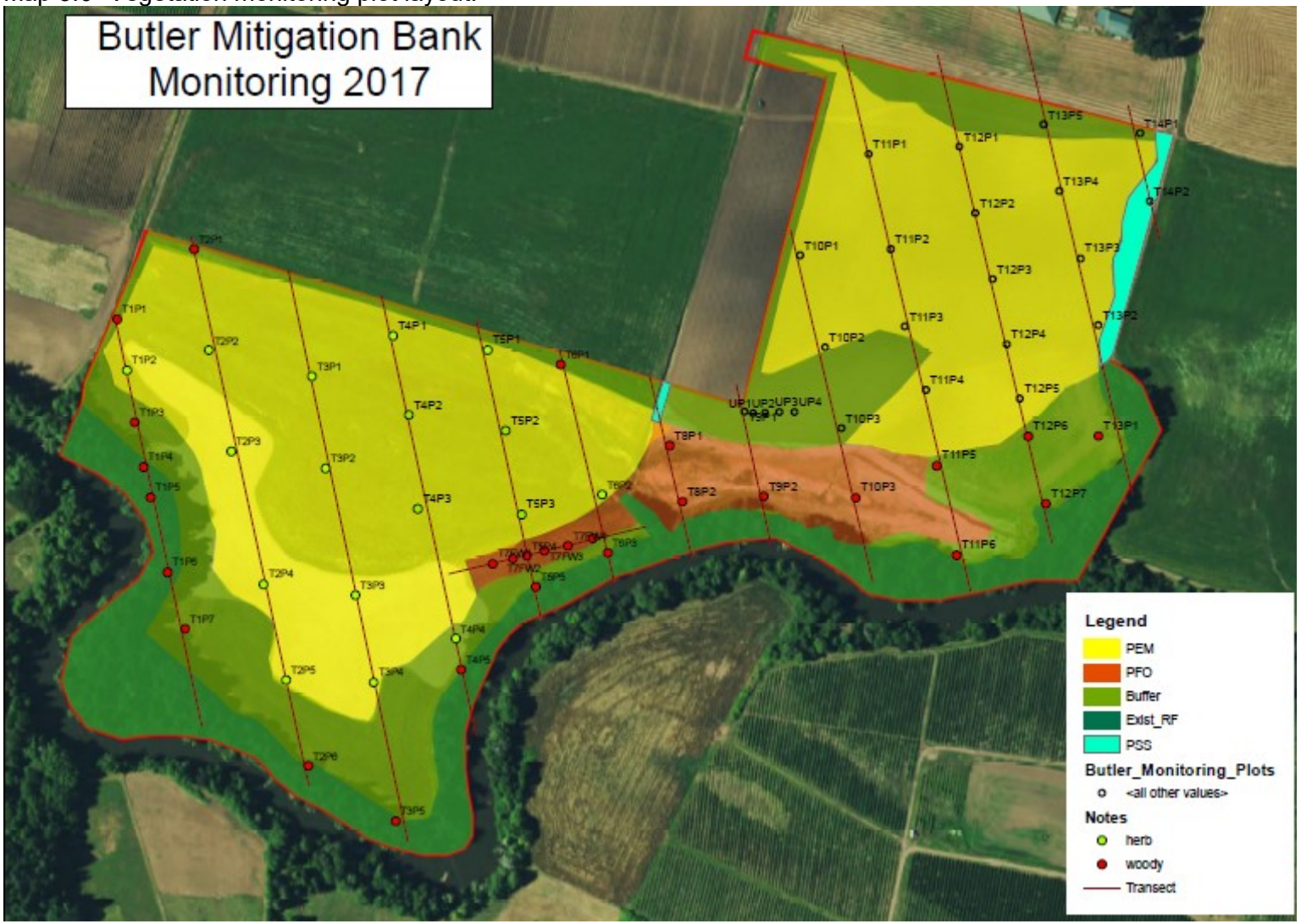
Map 1.0- Mitigation Plan



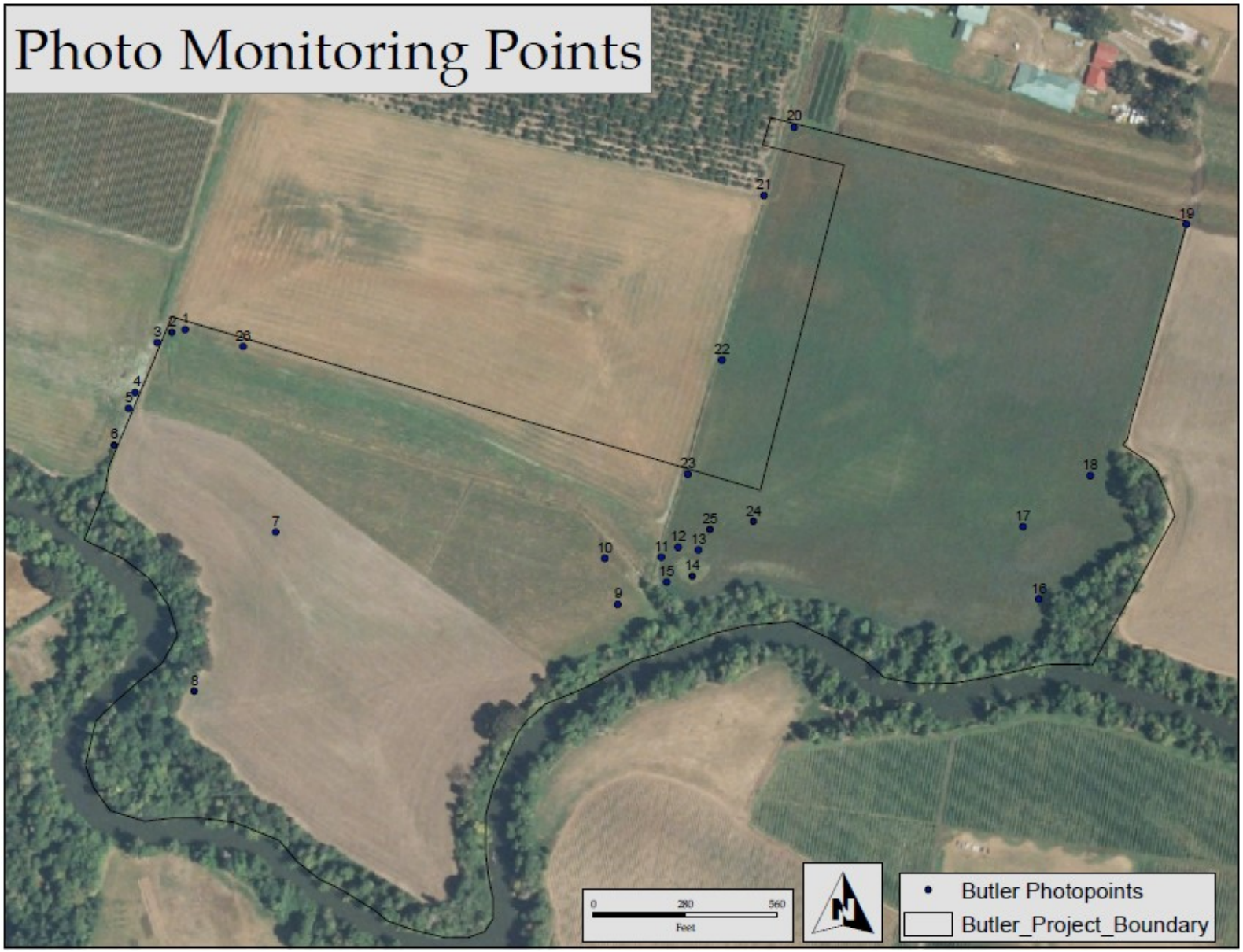
Map 2.0- Proposed Habitat Units



Map 3.0- Vegetation monitoring plot layout.



Map 4.0- Photo monitoring points



6. Appendices

Table 1- Baseline and transect layout details
Table 2. Data for Herbaceous Wetland Habitat Sampling Areas Phase 1
Table 3. Data for Herbaceous Wetland Habitat Sampling Areas Phase 2
Table 4. Data for Upland Prairie Herbaceous
Table 5. Data for Upland Buffer Habitat Sampling Areas
Table 6. Data for Forested Wetlands/Riparian Forest (PFO) Phase 1
Photo monitoring

Table 1. Baseline and Transect Layout Details Phase 1

	Closest Feature/Plot	End/intersection	Longitude	Latitude
Baseline	Oak Tree	Western end	122°54'36.45" W	45°24'35.16"N
	Water Control Structure	Eastern End	122°54'18.17" W	45°24'37.85"N
Transect 1	Plot 6	Baseline	122°54'36.82" W	45°24'35.14"N
Transect 2	Plot 4	Baseline	122°54'33.05" W	45°24'35.64"N
Transect 3	Plot 3	Baseline	122°54'29.44" W	45°24'36.21"N
Transect 4	Plot 3	Baseline	122°54'25.92" W	45°24'36.69"N
Transect 5	Plot 3	Baseline	122°54'22.15" W	45°24'37.20"N
Transect 6	Plot 2	Baseline	122°54'18.64" W	45°24'37.68"N
Transect 7	Plot 3	Transect 5	122°54'21.84" W	45°24'36.47"N

Table 2. Data for Herbaceous Wetland Habitat Sampling Areas

Site: W&M Butler Farms Mitigation Bank	Sample Date(s): 6/9- 7/5/17																																	
Herbaceous Wetland Habitat Unit																																		
Transect/Plot number			t1p2a	t1p2b	t2p2a	t2p2b	t2p3a	t2p3b	t2p4a	t2p4b	t2p5a	t2p5b	t3p1a	t3p1b	t3p2a	t3p2b	t3p3a	t3p3b	t3p4a	t3p4b	t4p1a	t4p1b	t4p2a	t4p2b	t4p3a	t4p3b	t4p4a	t4p4b	t5p1a	t5p1b	t5p2a	t5p2b	t5p3a	t5p3b	t6p2a	t6p2b	
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	**24**	25	26	**27**	28	29	30	31	32	33	34	Row Average
Native Herbaceous Species																																				
Alisma plantago aquatica	N	1	0	0	20	20	0	0	0	0	0	0	15	20	15	12	0	0	0	0	7	25	17	25	10	12	0	0	0	0	10	10	10	10	0	0	7.00
Beckmannia syzigachne	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5	0	0	0	0	0	0	0.44
Bidens frondosa	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0.29
Carex scoparia	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.15
Carex stipata	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	40	0	0	0	0	0	0	1.32
Carex unilateralis	N	2	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	20	30	0	0	0	0	0	0	1.85
Danthonia californica	N	3	2	2	0	0	0	0	15	30	65	65	0	0	0	0	0	0	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.74
Deschampsia cespitosa	N	2	5	10	0	0	55	65	40	20	20	20	0	0	0	0	30	70	25	40	0	0	0	0	0	0	45	50	0	0	0	0	0	0	0	0	14.56
Eleocharis acicularis	N	1	0	0	40	10	0	0	0	0	0	0	70	70	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	5.79
Eleocharis palustris	N	1	0	0	90	80	0	0	0	0	0	0	80	75	60	40	0	0	0	0	50	50	90	90	85	75	0	0	10	5	90	85	90	90	100	100	42.21
Epilobium ciliatum	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0.29
Grindelia integrifolia	N	2	25	18	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	1.55
Hordeum brachyantherum	N	2	20	30	0	0	10	0	10	8	5	5	0	0	0	0	2	0	15	20	0	0	0	0	0	0	55	50	0	5	0	0	0	0	0	0	6.91
Juncus bufonius	N	2	0	0	0	0	5	5	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Juncus ensifolius	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0.74
Juncus oxymeris	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	0	0	0	0	0	0	0.88
Juncus tenuis	N	3	0	5	0	0	10	15	0	5	0	0	0	0	0	0	30	12	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	2.56
Leersia oryzoides	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.06
Lotus purshianus	N	4	5	5	0	0	2	5	2	2	2	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.79
Ludwigia palustris	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	80	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3.74
Lupinus micranthus	N		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06
Madia spp.	N	4	5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.44
Plagiobothrys figuratus	N	2	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.26
Plagiobothrys scouleri	N	2	5	0	0	0	3	0	5	0	0	2	0	0	0	0	2	0	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.15
Potentilla gracilis	N	3	8	5	0	0	5	3	15		15	12	0	0	0	0	2	0	1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.06
Prunella vulgaris	N	4	0	0	0	0	0	0	20	20	5	5	0	0	0	0	0	0	20	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.50
Ranunculus scleratus	N	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.15
Ranunculus occidentalis	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Rumex salicifolius	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Sanguisorba annua	N	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09
Sagittaria latifolia	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0.09
Scirpus valetus	N	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	2	5	0	0	0.44
Veronica peregrina	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09
Typha latifolia	N	1	0	0	0	2	0	0	0	0	0	0	2	0	0	7	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	5	0	0	0	0	0.76
Non-Native Herbaceous Species																																				
Leontodon taraxacoides	NN	4	5	0	0	0	0	0	0	10	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.59
Rumex crispus	NN		0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.12
Lactuca serriola	NN		0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06
Bare Substrate																																				
bare soil			0	5	0	0	15	10	15	20	5	5	5	7	30	50	30	20	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.97
thatch			35	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.32
open water			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	10	15	20	0	0	0	0	0	0	0	10	10	0	0	2.21
Summary Information			**1**	**2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**Habitat Average**
Cover of Native Herbaceous Species			75	90	150	115	106	96	107	85	117	114	167	165	75	60	75	87	102	112	102	155	112	125	97	93	100	100	110	110	100	100	102	105	100	100	106
Lower CI (80%)																																					104
Upper CI (80%)																																					109
Cover of Invasive Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06
Lower CI (80%)																																					0
Upper CI (80%)																																					0
Bare Substrate			35	15	0	0	15	10	15	20	5	5	5	7	30	50	30	20	10	10	5	0	5	10	15	20	0	0	0	0	0	0	10	10	0	0	11
Lower CI (80%)																																					7
Upper CI (80%)																																					14
Cover of Non-Grass			48	48	150	115	41	31	42	27	27	24	167	165	75	59	43	17	37	27	102	155	112	125	97	92	0	0	100	100	100	100	102	105	100	100	77
Native Diversity			3	7	3	4	6	8	5	4	6	4	5	4	5	4	5																				5
Prevalence Index			2	2	1	1	2	2	3	3	3	3	1	1	1	1	2	2	2	2	1	1	1	1	1	1	2	2	1.86	1.5	1	1	0	0	0	0	1
Weighted Prevalence Index			170	172	150	115	199	204	278	289	328	335	167	165	75	60	168	186	238	255	102	155	112	125	97	93	200	200	205	165	100	100	0	0	0	0	153
Sum of plant cover			80	90	150	115	106	96	107	95	117	119	167	165	75	60	75	87	102	112	102	155	112	125	97	93	100	100	110	110	100	100	102	105	100	100	107

Table 3. Data for Herbaceous Dominated Wetland (PEM) Phase 2

Site: W&M Butler Farms Mitigation Bank	Sample Date(s):6/27-7/5/2017																															
Herbaceous Wetland Habitat Unit																																
Transect/Plot number			t10p1a	t10p1b	t10p2a	t10p2b	t11p1a	t11p1b	t11p2a	t11p2b	t11p3a	t11p3b	t11p4a	t11p4b	t12p1a	t12p1b	t12p2a	t12p2b	t12p3a	t12p3b	t12p4a	t12p4b	t12p5a	t12p5b	t12p4a	t12p4b	t13p2a	t13p2b	t13p3a	t13p3b	t13p4a	t13p4b	
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Row Average
Native Herbaceous Species																																	
Agrostis exarata	N	2	0	0	0	0	0	2	2	0	0	5	0	0	0	0	0	2	0	0	0	0	3	2	0	0	0	0	30	15	0	0	2.03
Alisma plantago aquatica	N	1	0	0	0	0	0	0	0	0	1	0	13	3	0	1	0	0	0	5	0	10	0	0	0	15	15	12	0	0	0	0	2.50
Alopecurus geniculatus		1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0.23
Beckmannia syzigachne	N	1	0	2	0	2	0	0	2	2	5	2	0	0	0	0	2	0	3	0	5	0	2	2	2	0	0	0	10	5	0	0	1.53
Bidens frondosa	N	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0.27
Boisduvalia densiflora		2	10	0	10	10	12	6	0	3	2	10	5	0	0	0	0	7	3	1	2	0	3	5	2	2	0	0	1	1	0	1	3.20
Carex sp			0	0	5	0	0	0	0	0	2	1	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.37
Carex unilateralis	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0.33
Carex vulpinoidea		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	5	0	0	15	2	0	0	0	0	0	0	1.23
Clarkia amoena			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.03
Danthonia californica	N	3	0	0	8	0	2	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.50
Deschampsia cespitosa	N	2	10	10	0	0	3	3	5	15	12	10	0	0	0	0	15	10	5	5	0	0	15	10	0	0	0	0	0	10	0	0	4.60
Deschampsia elongata	N	2	75	20	10	75	0	0	10	20	55	25	0	0	0	0	10	6	15	5	0	0	50	45	1	0	0	0	20	20	15	15	16.40
Downingia elegans		1	0	0	0	1	0	0	0	2	8	0	0	0	5	2	0	0	0	2	0	0	0	1	0	0	0	0	0	3	1	2	0.90
Eleocharis ovata		1	0	0	0	0	0	0	0	0	2	0	10	12	25	70	0	0	0	0	30	30	0	0	75	20	15	10	0	0	0	0	9.97
Eleocharis palustris	N	1	0	0	0	0	0	0	0	0	0	0	1	40	0	0	0	0	0	0	2		0	0	0	0	2	20	0	0	0	0	2.24
Epilobium ciliatum	N	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	10	0	0	0	10	1	1	0	0	0	3	0	0.83
Eriophylum lanatum			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.03
Grindelia integrifolia	N	2	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0.27
Hordeum brachyantherum	N	2	0	3	2	2	0	0	1	2	1	0	0	0	0	0	5	2	5	2	0	0	2	2	0	0	0	0	0	0	0	0	0.97
juncus accumuniatus		1	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.13
Juncus bufonius		2	8	20	20	10	0	0	60	10	40	70	0	0	0	0	10	0	40	50	30	0	10	15	20	0	0	0	10	15	0	2	14.67
Juncus ensifolius	N	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0.17
Juncus oxymeris	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.03
juncus spp.			0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.10
Juncus tenuis	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.03
Leersia oryzoides	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0.27
Lotus purshianus	N	4	5	0	10	10	15	45	2	2	0	0	0	0	0	0	7	20	2	0	0	0	3	5	0	0	0	0	3	15	0	1	4.83
Ludwigia palustris	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.03
lupinus sp			0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03
Microsteris gracilis		4	0	0	0	0	3	2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17
Plagiobothrys scouleri		2	0	0	8	2	25	10	2	0	0	10	5	2	0	0	3	2	5	5	0	0	2	10	0	0	1	2	5	10	30	10	4.97
Prunella vulgaris	N	4	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0.07
Psilocarphus elliator		2	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	2	2	0.60
Ranunculus orthoryncus		2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.03
Rorippa curvisiliqua		1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	7	2	0	1	0	0	0	0	0	0	0	0	8	5	0	1	0.93
Rumex salicifolius	N	2	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	5	4	1	0	0.57
Sanguisorba annua		2	0	0	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20
Torreyochloa pallida		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0.17
Typha latifolia	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	35	0	0	5	20	20	25	0	0	0	0	3.67
Veronica peregrina			0	1	4	1	1	1	1	0	0	0	0	0	0	0	2	0	0	1	0	0	0	1	0	0	1	1	0	0	3	5	0.77
Non-Native Herbaceous Species																																	
Spergula arvensis			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.07
Trifolium pratenses			0	0	0	0	5	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0	8	2	0.54
Anthimus cortula		2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	5	0	0	0	0	1	0	0		0.47
Echinochloa			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0.20
Gnaphalium uliginosum		1	1	3	0	1	3	5	10	2	5	0	2	0	0	2	5	3	10	0	0	1	1	0	0	0	0	0	5		1		2.10
Kickxia		2	0	2	0	0	0	5	1	0	0	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0	0	1	30	0		1.53
Leontodon taraxacoides	NN	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	3		0.43
Lolium perenne			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		0.03
Lythrum portula			0	0	0	0	0	0	0	0	10	15	12	18	0	0	0	0	0	6	0	0	0	2	0	0	5	5	5	5	0		2.77
Persecaria spp.			0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.07
Plantago major			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0.03
polygonum aveculare			0	0	15	5	40	30	0	2	0	0	3	3	0	0	8	0	0	0	0	0	50	30	0	0	0	0	0	0	30		9.20
Parentucellia viscosa			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.07
Unknown grass			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0.07
Misopates orontium			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0.03
Bare Substrate																																	
bare soil			15	10	10	8	8	10	8	15	5	7	75	70	30	30	10	6	20	10	0	0	0	0	0	20	60	50	0	0	0	5	18.35
thatch																																	#DIV/0!
open water																																	#DIV/0!
Summary Information			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**Habitat Average**
Cover of Native Herbaceous Species			108	59	86	113	72	75	86	58	133	140	35	20	70	73	62	53	80	82	111	80	90	99	140	62	56	70	99	116	55	41	81
Lower CI (80%)																																	77
Upper CI (80%)																																	84
Cover of Invasive Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Lower CI (80%)																																	0
Upper CI (80%)																																	0
Bare Substrate			15	10	10	8	8	10	8	15	5	7	75	70	30	30	10	6	20	10	0	0	0	0	0	20	60	50	0	0	0	5	18
Lower CI (80%)																																	15
Upper CI (80%)																																	21
Cover of Non-Grass			28	23	71	37	73	73	76	29	72	118	47	40	70	73	32	41	58	89	101	80	20	42	140	62	64	76	41	71	88	31	63
Native Diversity			5	4	5																												5
Prevalence Index			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weighted Prevalence Index			0	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum of plant cover			113	60	93	114	78	78	97	69	135	145	35	22	70	73	65	61	85	95	111	80	92	101	145	62	59	71	99	123	103	47	85

Table 4. Data for Upland Prairie Habitats

Site: W&M Butler Farms Mitigation Bank	Sample Date(s):6/27-7/5/2017														
Herbaceous Wetland Habitat Unit															
Transect/Plot number			**t9p1a**	**t9p1b**	**t10p3a**	**t10p3b**	**UP1a**	**UP1b**	**UP2a**	**UP2b**	**UP3a**	**UP3b**	**UP4a**	**UP4b**	
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	1	2	3	4	5	6	7	8	9	10	11	12	Row Average
Native Herbaceous Species															
Achilliea millefolium	N		2	5	0	0	2	2	2	0	4	4	5	5	2.58
Collomia grandiflora	N		10	3	0	0	2	0	1	0	0	5	3	0	2.00
Danthonia californica	N	3	0	0	0	1	0	2	0	2	0	2	0	2	0.75
Deschampsia cespitosa	N	2	0	2	6	10	0	2	5	5	0	5	2	2	3.25
Deschampsia elongata	N	2	40	60	45	30	70	70	60	65	60	65	50	75	57.50
Epilobium ciliatum	N	2	0	0	0	0	0	0	0	0	2	2	0	0	0.33
Eriophylum lanatum	N		0	5	2	2	2	4	1	1	3	2	8	5	2.92
Hordeum brachyantherum	N	2	0	0	0	1	0	0	0	0	0	0	0	0	0.08
Juncus bufonius	N	2	10	8	5	0	0	5	0	1	0	5	10	10	4.50
Lotus purshianus	N	4	0	0	0	0	5	8	10	0	10	5	15	5	4.83
lupinus sp	N		0	0	0	1	0	0	2	0	2	3	0	0	0.67
Plagiobothrys scouleri	N	2	0	5	20	3	0	5	0	5	10	10	0	0	4.83
Rumex salicifolius	N	2	0	0	0	0	2	0	0	0	0	0	0	0	0.17
Sanguisorba annua	N	2	0	0	0	1	0	0	0	0	0	2	2	0	0.42
solidago canadensis	N	4	0	0	1	0	0	0	0	0	0	0	0	0	0.08
Veronica peregrina	N		2	3	2	1	1	1	2	2	0	0	1	2	1.42
Non-Native Herbaceous Species															
Spergula arvensis			0	0	0	10	0	0	0	0	3	0	0	0	1.08
Trifolium pratenses			3	2	2	0	0	0	0	0	0	0	0	0	0.58
Anthimus cortula			0	2	1	1	0	5	5	5	8	2	0	10	3.25
Daucus carota			0	0	1	0	0	0	0	0	0	0	0	0	0.08
Gnaphalium uliginosum			4	2	0	1	0	0	0	0	0	0	0	0	0.58
Kickxia			2	2	0	1	0	0	2	0	2	2	0	0	0.92
Lolium perenne			0	2	0	0	0	0	0	0	0	0	0	0	0.17
polygonum aveculare			5	10	45	20	15	5	15	15	20	20	15	10	16.25
Sonchus spp.			0	2	1	0	0	0	0	0	0	0	0	0	0.25
Bare Substrate															
bare soil			20	20	0	18	10	12	15	10	5	0	10	10	10.83
thatch															#DIV/0!
open water															#DIV/0!
Summary Information			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Habitat Average**
Cover of Native Herbaceous Species			64	91	81	50	84	99	83	81	91	110	96	106	86
Lower CI (80%)															82
Upper CI (80%)															90
Cover of Invasive Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0	0.06
Lower CI (80%)															0
Upper CI (80%)															0
Bare Substrate			20	20	0	18	10	12	15	10	5	0	10	10	11
Lower CI (80%)															8
Upper CI (80%)															13
Cover of Non-Grass			22	24	30	8	12	23	16	9	27	34	39	22	22
Native Diversity			5	4											5
Prevalence Index															#DIV/0!
Weighted Prevalence Index															#DIV/0!
Sum of plant cover			62	86	81	50	82	97	81	81	87	106	91	101	84

Table 5. Data for Upland Buffer Habitat Sampling Areas

Site: W&M Butler Farms Mitigation Bank	**Sample Date(s): 6/9/2017 - 7/5/2017**																				
Upland Buffer Habitat Unit																					
Transect/Plot number			**T1P3A**	**T1P3B**	**T1P7A**	**T1P7B**	**T2P1A**	**T2P1B**	**T6P1A**	**T6P1B**	T11P5a	T11P5b	T11P6a	T11P6b	T12P7a	T12P7b	T12P6a	T12P6b	T13P1a	T13P1b	
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Row Average
Native Herbaceous Species																					
Agrostis exarata	N		0	0	0	0	0	0	0	0	0	0	0	5	10	0	5	5	5	15	2.50
Aster sp	N		0	0	0	0	2	2	0	5	0	0	0	0	0	0	0	0	0	0	0.50
Bidens frondosa	N	2	0	0	0	0	2	0	0	0	0	0	5	0	0	0	0	0	0	0	0.39
Danthonia californica	N	3	5	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.11
Deschampsia cespitosa	N	2	10	0	15	10	0	0	0	0	80	65	0	0	20	15	10	5	13	35	15.44
Deschampsia elongata	N		0	0	0	0	0	0	0	0	0	0	5	5	0	0	10	0	0	0	1.11
Epilobium ciliatum	N	2	2	0	0	0	0	0	0	0	0	0	0	0	5	0	0	2	0	0	0.50
Grindelia integrifolia	N	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0.17
Hordeum brachyantherum	N	2	35	30	60	60	70	90	80	90	0	0	0	0	0	0	0	0	0	0	28.61
Lotus purshianus	N	4	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.56
Potentilla gracilis	N	3	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	1.11
Prunella vulgaris	N	4	20	20	0	0	8	0	10	10	0	0	0	0	0	0	0	0	0	0	3.78
Invasive Herbaceous Species																					
none																					
Non-Native Herbaceous Species																					
Anthemis cotula	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	50	20	4.44
Agrostis sp.	NN		0	20	0	0	0	0	20	0	0	0	5	10	20	80	0	0	0	0	8.61
Cirsium sp.	NN		0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0.56
Crepis sp.	NN		0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	10	1.11
Daucas carota	NN		0	0	2	0	1	0	1	0	0	0	10	5	0	0	0	0	0	0	1.06
Festuca arundinancea	NN		0	0	0	0	0	0	0	0	0	0		5	0	10	0	0	0	0	0.88
Leontodon taraxacoides	NN	4	8	10	10	0	0	0	0	0	0	0	70	75	0	0	0	0	0	0	9.61
Lolium perenne	NN		0	0	0	0	0	0	0	0	0	0	10	0	10	0	0	0	0	0	1.11
Lythrum portula	NN		0	0	0	0	0	0	0	0	15	20	0	0	0	0	0	0	0	0	1.94
Serriola sp.	NN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2			0.13
Sonchus asper	NN	3	15	5	5	10	0	0	0	0	0	0	5	5	0	0	10	15	15	10	5.28
Trifolium pratenses	NN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Kickxia elatine	NN		0	0	5	10	0	0	0	0	0	0	0	0	0	0	8	10	10	20	3.50
Rubus armeniacus	NN		0	0	0	0	0	0	0	0	0	0	0	0	20	20	0	0	0	0	2.22
Bareground	N		5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.56
Litter						10			20						20		50	20	30		
Native Shrub and Tree Species			count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	
Acer circinatum			1																		1.00
Cornus serriola	N	2	3				10		4		5	5	5	10	5	35					82.00
Crataegus douglasii	N	3	2		2		5	60	1										2		72.00
Fraxinus latifolia	N	2	5	5	2		1				2	5	2		12		3	8	3		48.00
Holodiscus discolor	N																1				1.00
Lonicera involucrata	N	3	5				2		6				1								14.00
Mahonia aquifolium	N	4	3		6																9.00
Malus fuscus	N										1		4				1				6.00
Philadelphus lewisii	N	5			8	5					3										16.00
Physocarpus capitatus	N	2			3		6				8		8	20	3		6	30			84.00
Populus trichocarpa	N	3					1														1.00
cascara	N		1										1								2.00
Rosa pisocarpa	N	3					5		5		5		5		7	65					92.00
Rubus occidentalis	N				2																2.00
Salix scouleri	N																1				1.00
Salix prolixa	N												2								2.00
Spiraea douglasii	N	2					7	35		60	5		1		2				12	4	126.00
Symphoricarpus albus	N	4	6		2		5		5				2.00		8.00		5.00				33.00
			count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	
Routine Performance Standards			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**											**Habitat Average**
Cover of Native Herbaceous Species			82	60	80	70	92	105	90	105	80	65	10	10	35	15	25	12	18	50	86
Lower CI (80%)																					78
Upper CI (80%)																					93
Cover of Invasive Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0	20	20	0	0	0	0	2.22
Lower CI (80%)																					2
Upper CI (80%)																					2
Cover of Native Shrubs and Trees				5		5		95		60		10		30		100		38		4	41
Lower CI (80%)																					13
Upper CI (80%)																					70
unt of Native Shrubs and Trees			26		25		42		21		29		31		37		17		17		27
			2600		2500		4200		2100		2900		3100		3700		1700		1700		2722

Table 6. Data for PFO (Forested Wetlands/Riparian Forest) Phase 1

Site: W&M Butler Farms Mitigation Bank	Sample Date(s):	########																						
FW and PFO			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	
Transect/Plot number			T8P1a	T8P1b	**T8P2A**	**T8P2B**	**T9P2a**	**T9P2b**	**T10P4A**	**T10P4B**	**T7FW1a**	**T7FW1b**	**T7FW2a**	**T7FW2b**	**T7FW3a**	**T7FW3b**	**T7FW4a**	**T7FW4b**	**T7FW5a**	**T7FW5b**	**T5P4a**	**T5P4b**	T1P1a	T1P1b	
Species	Origin (N, NN, I)	Wetland Status (1 - 5)																							Row Average
Native Herbaceous Species																									
Alisma plantago aquatica			3	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.00	0.00	0.82
Alopecurus geniculatus			0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20.00	10.00	1.50
Agrostis exarata	N	2	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.59
Beckmannia syzigachne	N		5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20.00	0.00	1.36
Bidens frondosa	N	2	10	5	10	5	2	0	0	5	0	0	0	0	0	2	0	0	0	0	0	0	3.00	45.00	3.95
Boisduvalia densiflora			0	0	30	10	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	2.00	6.45
Carex sp small			0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.14
Danthonia californica			0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0.00	0.23
Deschampsia cespitosa	N	2	10	0	0	0	0	0	0	0	40	60	75	85	10	35	5	5	0	15	40	25	0.00	0.00	18.41
Deschampsia elongota			0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45
Downingia elegans	N	1	0	0	10	3	0	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.95
Eleocharus palustris	N	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09
Grindelia integrifolia	N	2	0	0	1	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	2.00	10.00	1.05
Hordeum brachyantherum	N	2	0	0	0	0	10	8	0	0	15	5	10	5	75	30	85	30	80	80	30	20	5.00	30.00	23.55
Juncus bufonious	N	2	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.68
Lotus purshianus	N	4	0	5	0	0	8	15	0	0	5	10	0	0	0	0	0	0	0	0	0	0	0	0	1.95
navarretia interexta			0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45
Prunella			0	0	0	0	0	5	0	0	20	10	0	0	0	0	0	0	0	0	0	0	0	0	1.59
Plagiobothrys figuratus			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.00	0	0.23
Plagiobothrys scouleri	N	2	15	10	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0	1.23
Psilocarphus elatior	N	2	5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0	0.68
Ranunculus sceleratus			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	12.00	0.59
Baresground	N		0	0	10	5	0	0	20	15	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	2.27
thatch/ litter			0	0	0	0	0	0	0	0	10	5	5	10	5	10	0	30	15	10	0	0	0.00	0.00	4.55
Non-Native Herbaceous Species																									
Agrostis capillaris	I	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30.00	15.00	2.05
Anthemis cotula	I	3	2	2	5	8	40	20	0	0	0	0	1	0	0	20	0	0	0	0	5	10		2.00	5.48
Daucus carota	NN	3	0	0	0	0	15	50	0	0	2	1	2	1	0	0	0	1	0	0	0	0	0	0	3.27
Echinochola			0	0	10	10	0	0	0	10	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1.59
Trifolium pratense			0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.45
Kickxia elatine	NN	5	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.23
Lythorum portula			0	0	10	15	0	0	25	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.95
Leontodon taraxacoides	I	4	5	10	0	0	10	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1.59
Lotus corniculatus			0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	10	10	3	0	0	0	1.73
Mentha			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.00	0	0.09
Plantago major			0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18
Poa sp			5	5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.48
Polygonum aviculare	NN	3	0	0	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.68
Persicaria spp.			0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.91
Rumex crispus	NN	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09
Sonchus asper	NN	3	0	0	0	0	15	5	0	0	5	1	0	1	8	3	5	3	0	0	10	50	0	0	4.82
panic grass			0	0	0	0	0	0	5	10	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.68
Native Shrub and Tree Species			count		count		count		count		count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	
Abies grandis	N	4																							
Acer circinatum	N	3																							
Cornus sericola/ stolonifera	N	2			2		5	30			1														
Crataegus douglasii	N	3					2				12	20	3		2		5		10	30			2.00	20.00	
Fraxinus latifolia	N	2			22		2		4		1				12	5	2								
Holodiscus discolor	N	4																			3				
Lonicera involucrata	N	3											2				2		2						
Mahonia aquifolium	N	4					1										1								
Malus fuscus	N	3					3								2		1		6						
Oemleria cerasiformus	N	4																							
pinus ponderosa	N																3								
Philadelphus lewsii	N	5									1		2		1		1				1				
Physocarpus capitatus	N	2					6														5				
Quercus garryana	N	4									1		2		1				1						
Rhammus pershianus	N																								
Rosa pisocarpa	N	3	15	10			7						11	20	3		5		4						
Salix lucida	N	2	2		4																				
Salix scoulerii	N	3			3				1																
Salix rigida	N				1		2		1																
Salix sitchensis	N	2							1																
Spiraea douglasii	N	2	2		4	10	4		9	10	8		10	60			2	30					5.00	5.00	
Symphoricarpus albus	N	4																			5	20			
Routine Performance Standards																									**Habitat Average**
Cover of Native Herbaceous Species			68	58	57	21	20	38	55	59	80	100	85	90	85	67	90	35	80	95	70	45	66	109	67.0
Lower CI (80%)																									60
Upper CI (80%)																									73
Cover of Invasive Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.00	0	0.09
Lower CI (80%)																									
Upper CI (80%)																									
Cover of Native Shrubs and Trees				10		10		30		10		20		80		5		30		30		20		25	24.54545
Lower CI (80%)																									0.09
Upper CI (80%)																									0
total herbaceous sum																									
			count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	
Count of Native Shrubs and Trees			19		36		32		16		24		30		21		22		23		14		7		22
Density			1900		3600		3200		1600		2400		3000		2100		2200		2300		1400		700		2218

Butler Photo Points 2017

Photo point 1, August 2017

Photo point 2, August 2017

Photo point 3, August 2017

Photo point 4, August 2017

Photo point 5, August 2017

Photo point 6, August 2017

Photo point 7, August 2017

Photo point 8, August 2017

Photo point 9, August 2017

Photo point 10, August 2017

Photo point 11, August 2017

Photo point 12, August 2017

Photo point 13, August 2017

Photo point 14, August 2017

Photo point 15, August 2017

Photo point 16, August 2017

Photo point 17, August 2017

Photo point 18, August 2017

Photo point 19, August 2017

Photo point 19a, August 2017

Photo point 19b, August 2017

Photo point 20, August 2017

Photo point 21, August 2017

Photo point 22, August 2017

Photo point 23, August 2017

Photo point 24, August 2017

Photo point 25, August 2017