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: 12-4-2015 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: 6/15- 6/17/2015
Report prepared by: Nicole Nielsen-Pincus, 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%	Y	
2.	Herbaceous wetlands- invasive species cover is no more than 10%	Y	
3.	Herbaceous wetlands- Bare substrate is no more than 20%	Y	
4.	Herbaceous wetlands- After year 3, at least 6 different native species	Y	
5.	Herbaceous wetlands- prevalence index is <3.0	Y	
6.	Shrub/Forested wetlands- native species cover is >60%	Y	
7.	Shrub/Forested wetlands- cover of invasive herbaceous species <10%	Y	
8.	Shrub/forested wetlands- cover of invasive trees and shrub species is no more than 10%	Y	

9.	Shrub/forested wetlands- Cover of bare substrate is no more than 20%	Y	
10.	Shrub/Forested wetlands- By year 3, at least 6 different native species	N	Only 2 species met the criteria; shrubs and trees are still too young to produce much cover.
11.	Shrub/Forested wetlands- prevalence index is <3	Y	
12.	Shrub/Forested wetlands- native shrub and tree stem density is at least 1600/acre	N	Stem density was a 1520 stems/acre possibly due to some mortality
13.	Upland buffers- cover of native species is at least 60%	N	Cover of native herbaceous species in established forests is low due to natural shrub dominance in understory. Cover of native shrub and tree species in newly planted areas is low due to newly establishing plants. In long-term (20 years) shrub and tree cover will easily exceed 60%, but native herbaceous species cover will remain naturally low.
14.	Upland buffers- cover of invasive species is no more than 10%	Y	

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.

2. W&M Butler Mitigation Bank Mitigation 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:
5/2015- Spot sprayed nonnative grasses and broadleaf weeds throughout project area.
7/2015- Spot sprayed nonnative grasses and broadleaf weeds throughout project area.
8/2015- Buffer grass mow
10/2015- Phase 2 Site grading, rock placement, tile removal, ditch filling, and temporary structures
10/2015- Phase 2 seeded with *camassia quamash* and *camassia leichtlinii* and erosion control cover (wheat and oats)
11/2015- Construction on Phase 2 finished, erosion control complete, construction permits closed
11/2015- Spot-treat blackberry in forest buffers

D. Monitoring methods.
Vegetation and hydrology monitoring followed the routine methods specified in the DSL Removal-Fill Monitoring Guidelines with the following exceptions:

1. Vegetation monitoring only took place in the western half (Phase 1) of the project area due to the phased approach to the project implementation.

2. In order to achieve the required number of monitoring plots for the forested buffers within the existing transects, the distance between plots landing in forested buffers was half the distance as those within the emergent wetland areas.

3. The forested wetland acreage in the sampled western field is very small and narrow and would not have been adequately sampled in the transect layout in the rest of the project area. Therefore, a single transect was installed down the middle of the forested wetland in a direction perpendicular to those in the rest of the project area. The distance between

plots in this habitat type was 90 feet. This allowed for adequate sampling of this habitat type to achieve the minimum number of plots.

E. Monitoring data locations.

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 30ft diameter circles around center of the plot.

Habitat	Acres	Number of herbaceous plots	Number of woody plots
PEM	16	34	0
PFO	5	10	5
Shrub/Forest Buffers	14	28	14
TOTAL		**72**	**19**

3. Results

We sampled a total of 72, one meter square plots for herbaceous vegetation in the mitigation bank. Within these plots we detected a total of 58 herbaceous species. Eighteen were non-native, but none were considered invasive. This is the same number of herbaceous species detected in 2014, however with a slightly different make up. Fifteen native species and 9 non-native species we detected in 2015, were not detected in 2014. Overall, the balance between native to non-native species remains similar with 39 native and 19 native/invasive species in the 2014 data and 40 native and 18 non-native species in 2015. The vast majority of the vegetative cover in the plots was made up of native species. A total of 26 native and zero non-native tree and shrub species were identified in the 2015 monitoring. This remains consistent from 2014.

<u>Herbaceous Wetlands</u>

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

This standard was fully met. The average cover of native herbaceous species was 100%.

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

This standard was fully met. The average cover of invasive species was 0%.

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

This standard was fully met. The average cover of bare substrate was 10%.

Performance Standard 4. By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class, **and** occur in at least 10% of the plots sampled.

This standard was fully met with 6 different native species that meet these requirements. These were (in order from most cover): *Eleochaeris palustris, Hordeum brachyantherum, Deschampsia cespitosa, Danthonia californica, Alisma plantago-aquatica,* and *Prunella vulgaris.*

Performance Standard 5. Prevalence Index is <3.0.
This standard was fully met. The prevalence index was 1.

<u>Shrub Dominated and Forested Wetlands</u>
Performance Standard 1. The cover of native herbaceous species is at least 60%.
This standard was fully met. The cover of native herbaceous species was 83%.

Performance Standard 2. 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 as no non-native species were considered invasive (0% coverage of invasive species). The *Lotus corniculatus* that was invasive in 2014 was treated with herbicides and fully under control.

Performance Standard 3. 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 4. Bare substrate represents no more than 20% cover
This standard was fully met. Bare substrate represented approximately 15% of the cover in these plots.

Performance Standard 5. By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class, **and** occur in at least 10% of the plots sampled
This standard is not met. Currently, there are 2 species that meet this criteria: *Hordeum brachyantherum* and *Deschampsia cespitosa.* Another year of growth may allow for native shrubs to contribute more to cover.

Performance Standard 6. Prevalence Index total for all strata is <3.0
This standard was fully met. The prevalence index was 2.

Performance Standard 7. 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 not fully met. The average density of woody vegetation was 1,520 plants/acre. Monitoring the same plots in 2014, we estimated 1,974 plants/acre so this year's sample represents a decrease. With such a small portion of this wetland type in Phase 1, monitoring a representative sample is somewhat difficult. Sampling only 5 plots, a deduction of a just a few trees can have a big impact on these calculations. Already the protocol was modified and sample size increased to capture this area in Phase 1, but once we are monitoring Phase 2 and the larger Forested/Shrub Wetlands acres, a better sense of the plants/acre will be achievable. However, some mortality did occur and this area in Phase 1 should be inter-planted in 2016 so that the Performance Standard is met.

<u>Upland Buffers</u>
Performance Standard 1. The cover of native species is at least 60%

This standard was not fully met. The coverage of native herbaceous species was approximately 51%, while the coverage of native shrubs and trees was approximately 125%. The reason for this failure was that in the plots that landed in areas of established forest, the ground cover is actually dominated by native woody species, with few herbaceous species. Plots that landed in newly established buffers have higher rates of native herbaceous cover (71%).

If the areas of established forest are included in this sampling in subsequent years, we will continue to fail on this standard. If passing this performance standard is essential for the coming years, we recommend only sampling the newly planted forest buffer areas for herbaceous species and/or the established forest areas for woody species.

Performance Standard 2. 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 0%.

4. Conclusions and Recommendations

A. Project status.

The mitigation project is in compliance with most performance standards. The trend from the previous years' monitoring is not perfectly comparable due to differences in monitoring methodology in the first couple years, however, 2014 and 2015 were consistently monitored with permanently marked plots. With similar results in 2014 and 2015, we are starting to see some stabilization of the native wetland, yet continue to find a greater diversity of native species and non-native species as years pass. Overall, an absence of invasive species, growth in diversity, decrease in bare ground, high coverage of native species and overall wetland health are notable improvements at Butler.

The native herbaceous species cover in the wetland habitat types is easily being met, and will continue to grow over the coming years. We also expect the number of species with significant cover to grow over the coming year and to easily meet the species diversity performance standards.

Cover of non-native species is very low and with the control of *Lotus corniculatus,* we reported no species as invasive in 2015.

In 2014 we were concerned about higher rates of bare ground in the herbaceous wetland and shrub/forested wetland habitat types, but as expected, in 2015 these areas were more heavily vegetated with native species.

We counted less live woody plants/acre in the shrub forested wetlands in 2015. Given drought conditions early in 2015, we concluded that some mortality affected this area. As we fell short of the performance standard, we will look to interplant this area in early 2016.

The only other performance standard failure was in the native species cover in the forested buffers. Due to existing shady and woody forest conditions in the established forest portions of these units, it is unlikely that we will achieve 60% cover in the herbaceous layer. Similarly, due to the small size of the planted trees and shrubs in newly planted portions of this habitat type, it's unlikely that we will achieve 60% cover of woody species in these areas. While each of these areas is thriving and in very good ecological condition, the average of the two makes the whole habitat type look as if it's in poor condition. In general, we do not find the failure of this performance measure to be concerning.

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. Some additional interplanting is necessary over the coming two years to ensure forest closure and successful establishment across the site, particularly where we fell short of the performance standard in the shrub/forested area.

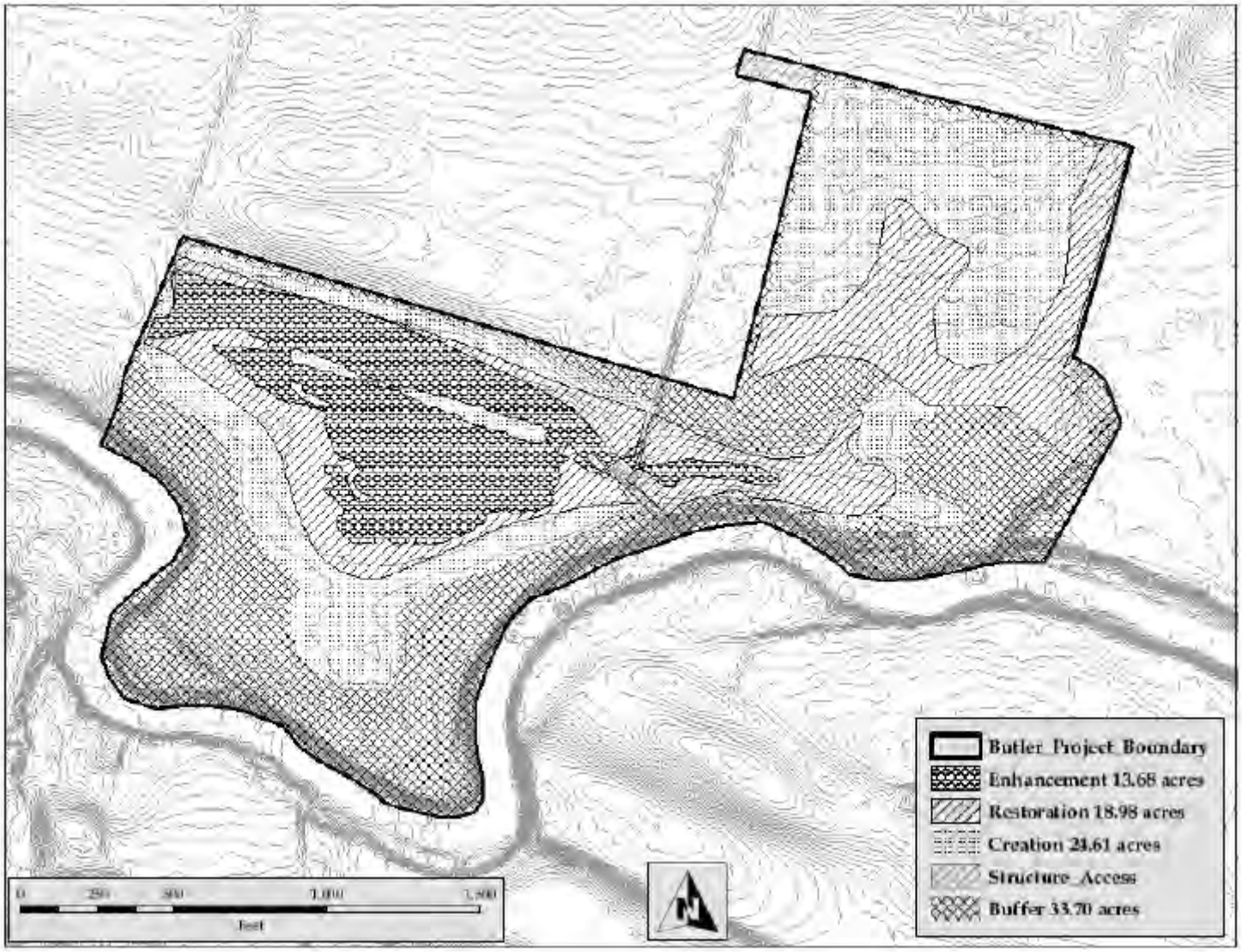
The edge between the existing riparian forest and newly established forest buffers should be treated for non-native species. This is an area that we noted the establishment of some non-native species seen elsewhere in the wetland (*Poa annua*, *Lolium multiflorum..*).

C. Financial Security status.

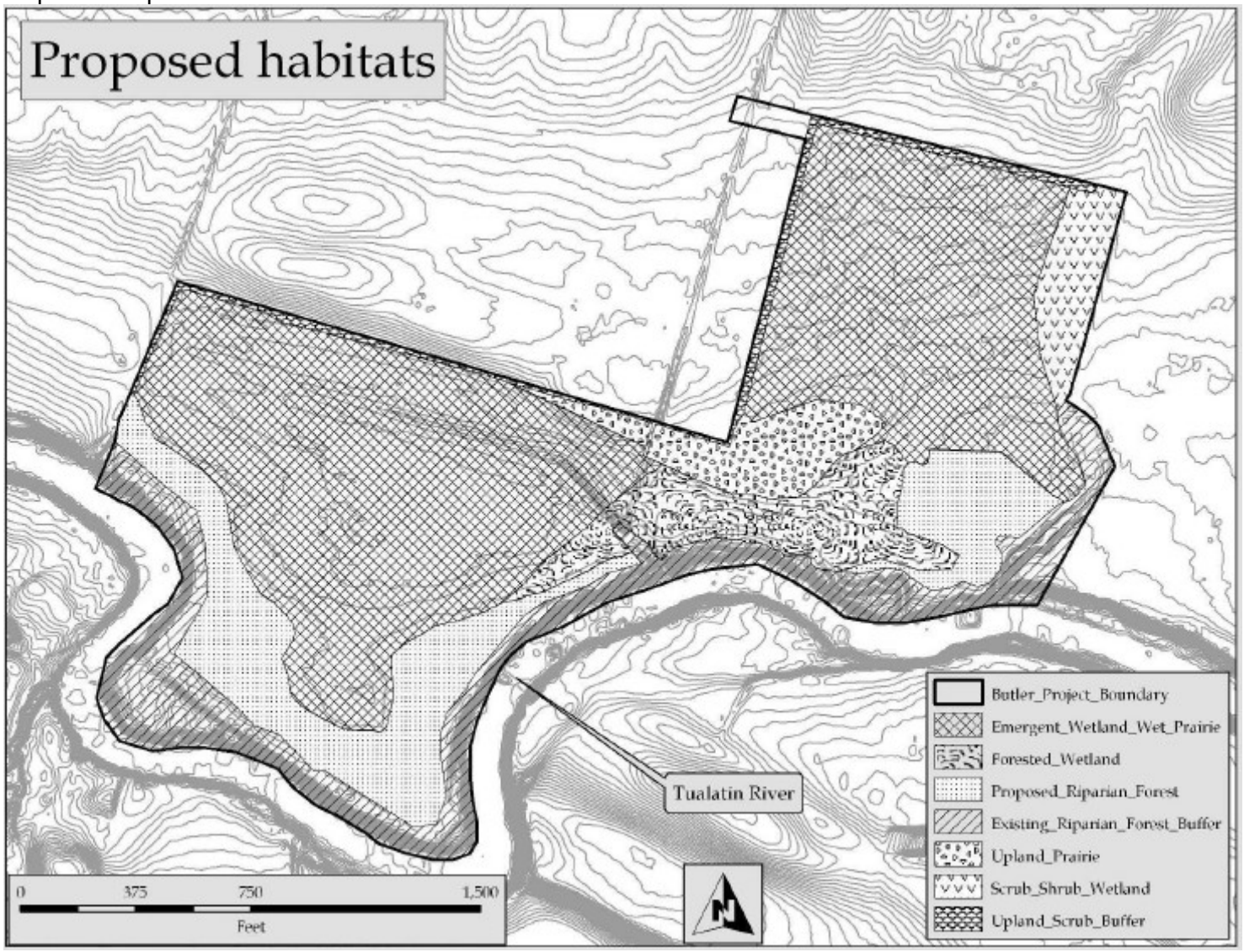
A (performance bond/ Letter of Credit/ other security) in the amount of $255,000 was established at permit issuance. In April 2015 we requested that the bond be fully released due to completion of Phase 1 construction and revegetation and the bank operator opting to forgo further Phase 2 credit release at this time.

5. Maps and Figures

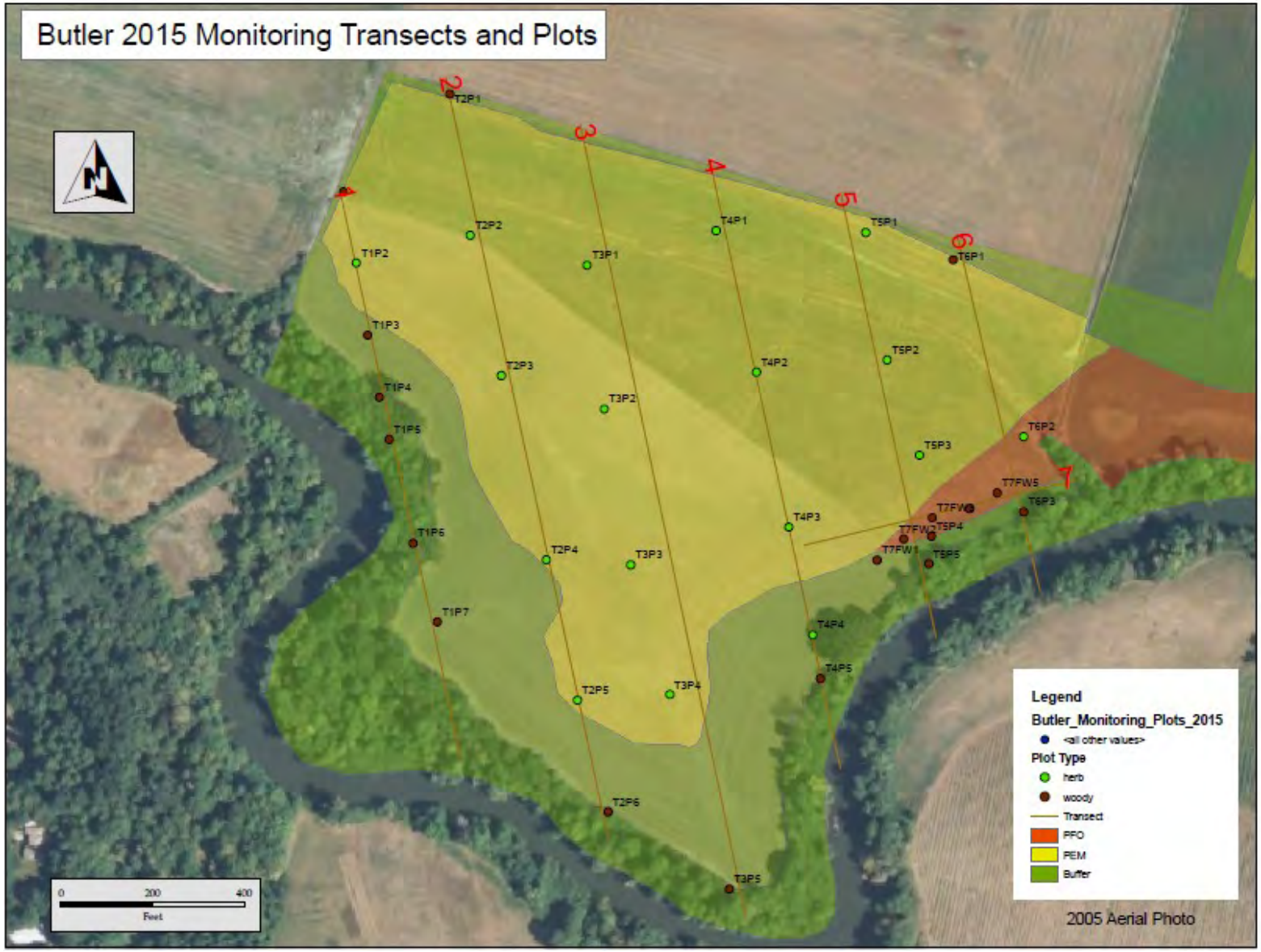
Map 1.0- Mitigation Plan



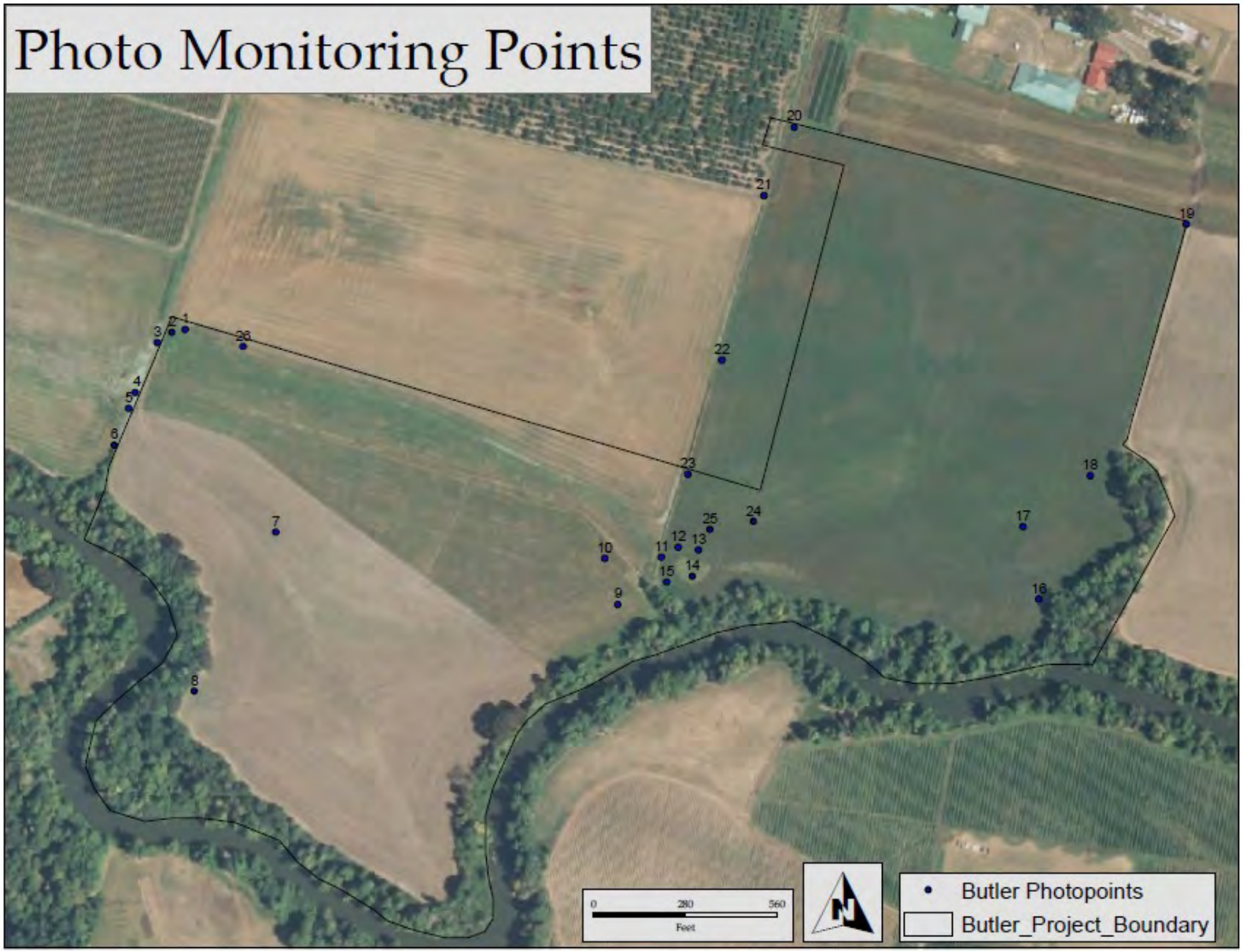
Map 2.0- Proposed Habitat Units



Map 3.0- Vegetation monitoring plot layout.



Map 4.0- Photo monitoring points



6. Appendices

Table 1- Baseline and transect layout details
Photo monitoring
Table 2. Data for Herbaceous Wetland Habitat Sampling Areas
Table 3. Data for Shrub Dominated and Forested Wetland Habitat Sampling Areas
Table 4. Data for Upland Buffer Habitat Sampling Areas

Table 1. Baseline and Transect Layout Details

	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):	6/15/2014 - 6/27/2015																																			
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	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																																					
Agrostis exarata	N	2	5	8	0	0	20	20	0	0	0	0	0	0	0	0	20	30	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	3.62
Alisma plantago aquatica	N	1	0	0	35	35	0	0	0	0	0	0	40	8	2	10	0	0	0	0	30	30	5	15	10	8	0	0	0	0	10	10	15	5	0	0	7.88
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
Carex pachystachya	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.29
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	6	50	0	0	0	0	0	0	1.65
Carex unilateralis	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	1.47
Carex vulpinoidea	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	0	25	0	0	0	0	0	0	0.74
Danthonia californica	N	3	0	3	0	0	25	15	30	10	20	60	0	0	0	0	5	5	60	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.76
Deschampsia cespitosa	N	2	30	10	0	0	60	40	10	5	70	10	0	0	0	0	75	10	0	0	0	0	0	0	0	0	10	50	8	5	0	0	0	0	0	0	11.56
Deschampsia elongata	N	2	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	0	0	0	0	0.15
Downingia elegans	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	7	0.50
Eleocharis acicularis	N	1	0	0	0	0	0	0	0	0	0	0	10	25	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	2	1.24
Eleocharis ovata	N	1	0	0	8	10	0	0	0	0	0	0	10	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.12
Eleocharis palustris	N	1	0	0	20	10	0	0	0	0	0	0	70	85	85	60	0	0	0	0	30	25	95	70	80	80	0	0	0	0	70	90	80	85	95	85	35.74
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	3	0	0	0	0	0	0	0	0.09
Eriophyllum lanatum	N	5	0	0	0	0	0	0	0	0	25	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	0.74
Galium aparine	N	4	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	0	0	0	0	0	0	0.03
Grindelia integrifolia	N	2	0	8	0	0	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	0.38
Hordeum brachyantherum	N	2	70	75	0	0	10	10	10	5	5	0	0	0	0	0	5	10	40	35	0	0	0	0	0	0	80	40	8	0	0	0	0	0	0	0	11.85
Juncu effusus	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	5	0	0	0	0	0	0	0	0.15
Juncus acuminatus	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	10	0	0	0	0	0	0	0	0	0	0	0.53
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	15	0	0	0	0	0	0	0	0.44
Juncus tenuis	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0.74
Leersia oryzoides	N	1	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50
Lotus purshianus	N	4	0	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	0	0	0	0	0	0	0.03
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	0	0	0	0	0	0	0	3	0	0	0.09
Madia sativa	N	4	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
Plagiobothrys scouleri	N	2	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	0	0	0	0	0	0	0.03
Potentilla gracilis	N	3	0	0	0	0	5	0	5	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	0.44
Prunella vulgaris	N	4	0	0	0	0	5	0	60	80	8	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.24
Rumex salicifolius	N	2	0	0	0	0	0	10	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	0	0	0	0.53
Sagittaria latifolia	N	1	0	0	0	30	0	0	0	0	0	0	5	0	2	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	10	0	0	0	0	0	1.53
Scirpus valetus	N	1	0	0	0	0	0	0	0	0	0	0	0	5	5	20	0	0	0	0	0	15	0	5	0	0	0	0	0	0	0	0	0	0	0	0	1.47
Typha latifolia	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	0	0	5	0	0	0	0	0	0.15
Non-Native Herbaceous Species																																					
Festuca arundinacea	NN	4	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	0	0	0	0	0	0	0	0	0	0.15
Leontodon taraxacoides	NN	4	0	1	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	0	0	0	0	0	0	0	0.18
Rumex crispus	NN	3	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	0	0	0	0.09
Vicia	NN	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	5	0	0	0	0	0	0	0	0	0.15
Lolium multiflorum	NN	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	10	0	0	0	0	0	0	0	0.29
Bare Substrate														0	0																						
bare soil			10	0	40	30	0	5	5	5	5	5	0	5	5	20	5	5	2	3	35	30	0	0	10	15	10	5	0	0	10	5	5	5	5	10	8.68
open water			0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	20	30	0	0	0	0	0	0	0	0	0	0	0	0	1.76
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			105	107	63	85	125	102	115	100	133	100	135	123	96	105	120	95	100	100	65	70	100	100	103	103	90	90	98	100	95	100	95	93	95	99	100
Lower CI (80%)																																					100
Upper CI (80%)																																					100
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
Lower CI (80%)																																					0
Upper CI (80%)																																					0
Bare Substrate			10	0	40	30	0	5	5	5	5	5	10	5	5	20	5	5	2	3	35	30	20	30	10	15	10	5	0	0	10	5	5	5	5	10	10
Lower CI (80%)																																					10
Upper CI (80%)																																					10
Native Diversity			3	7	3	4	6	8	5	4	6	4	5	4	5	4	5	7	2																		6
Prevalence Index			2	2	1	1	2	2	3	4	3	3	0	0	0	1	2	2	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1
Weighted Prevalence Index			210	236	43	75	290	221	405	370	382	310	65	43	16	65	215	185	80	70	65	70	100	100	103	103	180	105	204	110	95	100	95	93	95	99	147
Sum of plant cover			105	111	63	85	125	102	120	100	133	100	135	123	96	105	120	95	100	100	65	70	100	100	103	103	95	95	108	100	95	100	95	93	95	99	101

Table 3. Data for Shrub Dominated and Forested Wetland Habitat Sampling Areas

Site: W&M Butler Farms Mitigation Bank	Sample Date(s): 6/15/2015 - 6/27/2015													
Shrub-Dominated and Forested Wetland Habitat Unit			**Percent Cover**											
	transect/plot number		**t5p4fw0a**	**t5p4fw0b**	**t5p4fw1a**	**t5p4fw1b**	**t5p4fw2a**	**t5p4fw2b**	**t5p4fw3a**	**t5p4fw3b**	**t5p4fw4a**	**t5p4fw4b**		
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	1	2	3	4	5	6	7	8	9	10	Row Average	
Native Herbaceous Species														
Deschampsia cespitosa	N	2	90	90	20	10	85	85	45	20	80	90	61.50	
Deschampsia elongata	N	2	0	0	0	0	20	0	0	0	15	0	3.50	
Hordeum brachyantherum	N	2	0	0	10	40	0	0	50	75	0	0	17.50	
Non-Native Herbaceous Species														
Poa annua	NN	3	0	0	0	5	0	0	0	0	0	0	0.50	
Lotus corniculatus	NN	3	0	0	0	0	2	5	0	1	1	5	1.40	
Native Shrub and Tree Species					0	0	0	0	0	0	0	0		
Acer circinatum	N	3	0	5	0	0	0	0	0	0	0	0	0.50	
Quercus garryana	N	4	0	0	0	5	0	0	0	0	0	0	0.50	
Rosa pisocarpa	N	3	0	0	0	0	0	10	0	10	4	0	2.40	
Spiraea douglasii	N	2	0	0	0	0	0	0	0	4	0	0	0.40	
Non-Native Shrub and Tree Species														
Invasive Shrub and Tree Species			0	0	0	0	0	0	0	0	0	0		
species-latin name			0	0	0	0	0	0	0	0	0	0	0	
Bare Substrate			10	5	70	40	0	10	5	0	0	5	15	
			Plant Count (Shrubs) + Stem Count (Trees)											
Native Shrub and Tree Count														
Acer circinatum	N	3	0	3	0	1	0	0	0	0	0	0	0	
Cornus serriola	N	2	0	0	0	0	0	0	0	3	0	0	0	
Crataegus douglasii	N	3	0	4	0	4	0	2	0	0	0	0	1	
Fraxinus latifolium	N	2	0	1	0	1	0	1	0	0	0	1	0	
Mahonia aquifolium	N	4	0	0	0	0	0	4	0	0	0	0	0	
Physocarpus capitatus		2	0	0	0	0	0	0	0	0	0	1		
Philadelphus lewisii	N	5	0	1	0	0	0	0	0	0	0	0		
Pinus ponderosa	N	5	0	1	0	0	0	0	0	0	0	0		
Quercus garryana	N	4	0	1	0	3	0	1	0	2	0	0	1	
Rosa pisocarpa	N	3	0	0	0	1	0	9	0	3	0	6	2	
Sambucus cerulea	N	5	0	1	0	0	0	0	0	0	0	0	0	
Spiraea douglasii	N	2	0	4	0	3	0	5	0	4	0	4	2	
Symphoricarpus albus				0	0	0		0		1		0		
Routine Performance Standards			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Habitat Average**	**Standard Error**
Cover of Native Herbaceous Species			90	90	30	50	105	85	95	95	95	90	83	7.4
Lower CI (80%)													73	
Upper CI (80%)													92	
Cover of Invasive Herbaceous Species			0	0	0	0	0	0	0	0	0	0	0	0
Lower CI (80%)													0	
Upper CI (80%)													0	
Cover of Invasive Shrubs and Trees			0	0	0	0	0	0	0	0	0	0	0	0
Lower CI (80%)													0	
Upper CI (80%)													0	
Cover of Native Species in Overstory			0	5	0	5	0	10	0	14	4	0	4	2
Bare Substrate			10	5	70	40	0	10	5	0	0	5	15	7
Lower CI (80%)													5	
Upper CI (80%)													24	
Native Diversity (all layers)														N/A
Prevalence Index–All strata			2	2	2	2	2	2	2	2	2	2	2	N/A
Weighted Prevalence Index			180	195	60	135	216	215	190	231	205	195	182	
Sum of plant cover			90	95	30	60	107	100	95	110	100	95	88	
Density of Woody Vegetation		Average per acre		16		13	0	22	0	13	0	12	10	N/A
	76	15.2		1600		1300		2200		1300		1200	1520	
Plot is .01 acres, multiply by 100	100	1520												
Cover of Native Shrubs and Trees				5		5		10		14	4		8	2
Lower CI (80%)													5	
Upper CI (80%)													10	

Table 4. Data for Upland Buffer Habitat Sampling Areas

Site: W&M Butler Farms Mitigation Bank	Sample Date(s): 6/15/2015 - 6/27/2015																													
Upland Buffer Habitat Unit																														
Transect/Plot number			**T1P1A**	**T1P1B**	**T1P3A**	**T1P3B**	**T1P4A**	**T1P4B**	**T1P5A**	**T1P5B**	**T1P6A**	**T1P6A**	**T1P7A**	**T1P7B**	**T2P1A**	**T2P1B**	**T2P6A**	**T2P6B**	**T3P5A**	**T3P5B**	**T4P5A**	**T4P5B**	**T5P4A**	**T5P4B**	**T5P5A**	**T5P5B**	**T6P1A**	**T6P1B**	**T6P3A**	**T6P3B**	
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	Row Average
Native Herbaceous Species																															
Adenocaulon bicolor	N								0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	2	0	0	0	0	0.55
Agrostis exarata	N	2	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.36
Beckmannia syzigachne	N	1	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	0.18
Carex scoparia	N								0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0.23
Carex unilateralis	N		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	0.36
Danthonia californica	N	3	0	0	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	0.18
Deschampsia cespitosa	N	2	70	10	0	0	0	0	0	0	0	0	0	20	20	25	0	0	0	0	0	0	60	50	0	0	50	10	0	0	11.25
Epilobium ciliatum	N	2	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	0	0.36
Gallium aparine	N	4	0	0	0	0	1	0	0	0	30	0	0	0	0	0	20	15	30	0	0	0	0	0	5	0	0	0	0	0	3.61
Grindelia integrifolia	N	2	0	15	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	0.71
Hordeum brachyantherum	N	2	30	50	20	25	0	0	0	0	0	0	95	90	85	60	0	0	0	0	0	0	35	45	0	0	0	0	0	0	19.11
Lotus purshianus	N	4	0	0	10	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	0.39
Phlox gracilis	N				10	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	0.42
Plagiobothrys scouleri	N	2	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	0	0.04
Prunella vulgaris	N	4	0	0	8	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.82
Rubus ursinus	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	50	0	0	0	0	0	0	0	0	0	0	2.68
Rumex salicifolius	N	2	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	0.18
Tellima grandiflora	N	4	0	0	0	0	15	10	20	20	20	25	0	0	0	0	40	30	20	25	35	5	0	0	0	0	0	0	0	0	9.46
Trillium ovatum	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0.71
			121	75	48	52							95	110	115	85											50	10			
Bareground	N		0	0	25	0	30	25	40	15	20	10	0	5	0	0	10	5	15	0	35	0	0	0	70	10	0	0	0	0	11.25
Invasive Herbaceous Species																															
none																															
Non-Native Herbaceous Species																															
Anthemis cotula	NN	3	0	0	40	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1.54
Antirrhimum orontium	NN			0	1	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	0.07
Chicorium intybus	NN		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	0.18
Cirsium sp.	NN		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	0.18
Convolvulus arvensis	NN	5	0	0	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14
Daucus carota	NN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0.36
Geranium disectum	NN	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	20	15	1.46
Holcus lanatus	NN		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	0.54
Hypochaeris sp.	NN		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	0	0	0.54
Lactuca serriola	NN	4	0	0	5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0.39
Leontodon taraxacoides	NN	4	0	0	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	50	70	5.29
Lolium multiflorum	NN						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	45	0	0	3.54
Lotus comiculatus	I	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0.25
Poa annua	NN		0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0		0	40	0	0	0	0	0	0	0	0	2.96
Trifolium repens	NN	3	0	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	0.04
Native Shrub and Tree Species			count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	count	cover	
Abies grandis	N	4	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	0	0	0	0.04
Acer circinatum	N	3	0	0	0	0	1	0	10	50	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2.25
Acer macrophylum	N	4	0	0	0	0	7	50	2	80	9	100	0	0	0	0	2	80	0	0	0	0	0	0	2	100	0	0	0	0	15.43
Amalanchier alnifolia			0	0	0	0	0	0	0	0	0	0	0												4	0	0	0	0	0	0.24
Cornus serriola	N	2	0	0	0	0	2	15	0	0	5	0	0	0	0	0	15	0	9	60	1	10	0	0	7	10	3	0	4	0	5.04
Corylus cornuta	N	4	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.21
Crataegus douglasii	N	3	2	0	0	0	0	0	0	0	0	0	0	0	4	30	0	0	0	0	8	100	0	0	0	0	0	0	3	45	6.86
Fraxinus latifolia	N	2	0	0	0	0	1	100	0	0	0	0	0	0	0	0	2	60	2	0	0	0	0	0	0	0	0	0	2	40	7.39
Holodiscus discolor	N	4	0	0	0	0	0	0	6	20	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1.14
Lonicera involucrata	N	3	1	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	5	0	0.25
Mahonia aquifolium	N	4	0	0	7	0	14	0	3	0	0	0	4	0	0	0	0	0	14	0	0	0	5	5	0	0	4	0	1	0	2.04
Oemleria cerasiformus	N	4	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	0.04
Philadelphus lewisii	N	5	0	0	0	0	0	0	3	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0.57
Physocarpus capitatus	N	2	0	0	2	0	11	0	0	0	6	0	0	0	0	0	3	0	0	0	5	0	1	0	18	20	1	0	10	60	4.89
Pinus ponderosa			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	0.04
Populus trichocarpa	N	3	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	0	0	0.04
Pseudotsuga menziesii			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	0.04
Quercus garryana	N	4	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	0.04
Rosa pisocarpa	N	3	0	0	0	0	10	20	0	0	0	0	0	0	1	0	0	0	0	0	8	30	0	0	4	5	0	0	0	0	2.79
Rubus parviflorus	N	3	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	17	25	0	0	0	0	0	0	0	0	0	0	1.89
Rubus ursinus	N		0	0	0	0	0	0	0	5	0	50	0	0	0	0	0	25	0	0	0	10	0	0	0	0	0	0	0	0	3.21
Salix sitchensis			0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	20	0	0	0	0	0	0	0	0	0	0	0	0	0.96
Sambucus cerulea	N	4	0	0	5	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.36
Spiraea douglasii	N	2	7	0	0	0	0	0	0	0	0	0	0	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.39
Symphoricarpus albus	N	4	2	5	3	0	38	0	54	40	18	0	0	0	0	0	0	0	5	0	0	0	0	0	26	0	0	0	3	0	6.93
Thuja plicata	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	80	0	0	0	0	0	0	0	0	0	0	2.89
Routine Performance Standards			**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**	**Habitat Average**
Cover of Native Herbaceous Species			121	75	48	52	16	10	20	20	50	25	95	110	115	85	60	45	95	80	45	15	95	95	5	2	50	10	0	0	51
Lower CI (80%)																															42
Upper CI (80%)																															61
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	5	0	0	0	0	0	2	0	0
Lower CI (80%)																															0
Upper CI (80%)																															0
Cover of Native Shrubs and Trees				5				185		195		150				60		185		165		150		5		135				145	125
Lower CI (80%)																															99
Upper CI (80%)																															152
unt of Native Shrubs and Trees			12		18		95		83		39		18		36		31		49		23		7		61		18		30		37

Butler Photo points 2015

Photo point 1, June 2015

Photo point 2, June 2015

Photo point 3, June 2015

Photo point 4, June 2015

Photo point 5, June 2015

Photo point 6, June 2015

Photo point 7, June 2015

Photo point 8, June 2015

Photo point 9, June 2015

Photo point 10, June 2015

Photo point 11, June 2015

Photo point 13, June 2015

Photo point 14, June 2015

Photo point 17, June 2015

Photo point 18, June 2015

Photo point 24, June 2015