

**MARION MITIGATION BANK Monitoring Report Cover Sheet**  
**Oregon Department of State Lands**

**Block 1: Report Information**

DSL Permit Number: 37253-RF	COE Permit Number: NWP-2007-701	
Permittee: Marion Mitigation Bank LLC		
County: Marion	Report Date: January 31, 2017	Monitoring Year 17
Date Removal-Fill Activity Completed: 2008		
Date mitigation was completed	Grading: 2008	Planting: Ongoing
Report submitted by: Green Banks LLC		

**Block 2: Monitoring Report Purpose**

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

- Compensatory **freshwater** 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 our wetland mitigation revolving fund.
- Voluntary wetland enhancement, creation or restoration (General authorization or individual permit) funded with money from **our wetland mitigation revolving fund**.

**X Mitigation Bank** Report

**Block 3: Results**

	Success Criteria ( <i>verbatim</i> , except spelling edits, from the 2001 MBI)	Met? (Y/N)	Comments/ Reason for failure*
1.	“Open water areas will have no more than 15% cover of undesirable invasive species [undesirable species include Eurasian watermilfoil ( <i>Myriophyllum spicatum</i> ), hydrilla ( <i>Hydrilla verticillata</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), and canarygrasses ( <i>Phalaris</i> sp.) smooth cordgrass ( <i>Spartina alterniflora</i> ), South American waterweed ( <i>Eleocharis acicularis</i> ), and <i>Spartina</i> (sp)].”	P1: NA P2 PEM: Y P3 PEM: Y	
2.	“Areas of herbaceous vegetation will be dominated (more than 50% cover and more than 50% frequency of occurrence) by desirable herbaceous wetland species (FAC or wetter) and plant associations, the species richness will be at least 50% as great as that of the reference; no more than 50% of the area will be dominated by one species; and they will have no more than 15% cover of invasive, undesirable herbaceous species*.”	P1: Y P2 PEM: Y P2 PSS/PFO: Y P3 PEM: Y P3 PSS/PFO: Y	
3.	“Scrub- shrub areas will have no fewer than 3 species of desirable shrubs and will have a stem density of planted trees and shrubs (or volunteers of desirable species) of at least 100 stems per acre or at least 50% of the density at the reference (whichever is greater); and will have no more than 15% cover of invasive, undesirable herbaceous species*.”	P1: Y P2 PEM: NA P2 PSS/PFO: Y P3 PEM: NA P3 PSS/PFO: Y	
4.	“Forested areas will have no fewer than 3 species of desirable trees and will have a stem density of planted trees and shrubs (or volunteers of desirable species) of at least 100 stems per acre or at least 50% of the density at the reference; and will have no more than 15% cover of invasive, undesirable herbaceous species*.”	P1: Y P2 PEM: NA P2 PSS/PFO: Y P3 PEM: NA P3 PSS/PFO: Y	

5.	<p>“Upland (Oak Savannah) will have at least oak (<i>Quercus garryana</i>) and other desirable tree species (with a stem density of at least 25 stems per acre) and at least one desirable herbaceous species that covers 50% or more of the upland area. There will be no more than 15% cover of undesirable invasive species [undesirable species include any canary grasses (<i>Phalaris</i> sp.) Canadian thistle (<i>Cirsium arvense</i>), Scots broom (<i>Cystisus scoparius</i>), Himalayan blackberry (<i>Rubus discolor</i>), and tansy ragwort (<i>Senecio jacobaea</i>)]. These criteria will be used to demonstrate success after the required five years.”</p>	<p><b>P1 UP: N</b>  <b>P2 UP: Y</b>  <b>P3 UP: Y</b></p>	<p><b>P1 UP:</b> These buffers nearly pass the stem count with 24/acre.  <b>P2 and P3 UP:</b> These buffers easily pass the stem count (84 &amp; 31 respectively).</p>
6.	<p>Invasive List for Performance Standards 2 through 4:  “*Undesirable species include the species in 1) above and any reed canarygrass (<i>Phalaris</i> Sp.), purple loosestrife (<i>Lythrum salicaria</i>), Canadian thistle (<i>Cirsium arvense</i>), Scots broom (<i>Cystisus scoparius</i>), Himalayan blackberry (<i>Rubus Discolor</i>), and tansy ragwort (<i>Senecio jacobaea</i>). Other species may be deemed undesirable by the MBRT in discussion with the sponsor.”</p>		

**Remedial work recommended**

Yes

No X

**Deed Restriction or other protection instrument attached (note: if a filed deed restriction was required as a permit condition, please attach a copy):**

Yes

No X

**Final Monitoring Report?**

Yes

No X

**GIS Data Submitted?**

Yes

No X

**Requesting release or partial release of bond?**

Yes

No X

January 31, 2018

MARION MITIGATION BANK  
MONITORING REPORT YEAR 17 (2017)

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## 1.0 MITIGATION PLAN PURPOSE AND OVERVIEW

### 1.1 LOCATION:

The Marion Mitigation Bank (Bank) is located 1.5 miles northeast of the community of Marion in Marion County, T9S, R2W, Sec. 27. The site is in the headwaters of Marion Creek, a tributary of the North Santiam River, in Hydrologic Unit 17090005 (USGS Hydrologic Unit Map for Oregon, 1974).

### 1.2 MITIGATION GOALS AND OBJECTIVES:

The mitigation goals and objectives were defined in the 2001 Mitigation Bank Instrument (MBI), prepared by R. P. Novitski and Associates, Inc. as: *“The goal of this bank is to convert marginal farmland back to natural wetland resources to enhance diversity, provide wildlife habitat, and support natural wetland functions. The project will restore a wetland complex comprised of several habitat types that will include temporarily -flooded, seasonally- flooded, and semi-permanently flooded Palustrine emergent, scrub-shrub and forested habitats. The restoration will be successful (certified) when species richness (in herbaceous areas) and stem density (in scrub- shrub and forested areas) is at least 50% that of reference. However, ongoing management of the site will strive to achieve 75% species richness and 75% stem density (of reference) by the fifth growing season (it is expected that the density will increase annually until it peaks and then decreases as the site reaches maturity).”*

### 1.3 MAINTENANCE AND MANAGEMENT ACTIONS:

Green Banks LLC took over site management in the summer of 2017. Maintenance efforts focused on non-native plant control and preparation for seeding and planting. These efforts included a summer herbicide application targeting invasive plants such as reed canarygrass, thistle species, and pennyroyal. The upland buffer areas were field mowed to reduce competition on existing native woody species and prepare for additional planting in the winter 2017-2018. The oak buffer areas located on the hill in Phase 3 were also mowed in preparation for supplemental planting this winter. The upland buffer areas will be planted in meandering rows of trees and shrubs to allow for maintenance mowing in future years; the locations of these rows were marked with herbicide in the fall-winter of 2017. In the fall of 2017, some areas of bareground located within the Phase 1 wetlands were seeded with native grass and herb species and planted with slough sedge plugs.

### 1.4 MONITORING METHODS:

The original vegetation sampling protocol involves a stratified random sampling strategy which is described in the 2001 monitoring report. In 2017, vegetation sampling was completed at the same locations as in 2016, and some new plots were added in the upland buffer areas. Green Banks LLC took over management of the Bank just prior to the summer monitoring and annual site inspection, and monitored the site using the same methods as in previous years.

The 2017 vegetation monitoring was conducted on July 3rd through 5th by C. Jonas Moiel (Senior Ecologist) and Moe Stellrecht (Ecologist). Monitoring was conducted about a month later in 2017 than in 2016 due to the transition of Bank management. On July 11th, Dana Field (DSL) and Tom Taylor

(USACE) were provided with monitoring data and visited the site for an annual site visit. Additional monitoring in the buffers was done by Moe Stellrecht on January 12, 2018.

During the site inspection, the agencies requested that several changes be made to the monitoring methods and reporting; these topics were summarized in a letter from DSL on July 24, 2017. The following changes were made this year in response to the agencies feedback:

- Develop a Cowardin class map that displays the existing habitat types.
- Monitor ten plots per habitat type, per phase. This will cause a reduction in the monitoring of some habitats and the addition of plots in other habitats; but an overall reduction in data collection.
- Addition of upland buffer (oak savannah) woody stem plots to allow for easier data review; previously, total stem counts were completed and are difficult to check for accuracy.
- Update the monitoring report to follow the DSL template.

The preliminary data were collected at the same locations as in 2016 and are included in Appendix B; these are the data that were given to the agencies in the summer. During the July 11th site inspection, Green Banks LLC provided a sketch map of the current Cowardin classes to the IRT and it was agreed upon. These Cowardin class boundaries were digitized in GIS and are shown on Figure 1.

The plot data were sorted by phase and habitat type (Cowardin class) in an effort to achieve ten plots per habitat type, per phase. Most habitats had more than ten plots and the number of plots needed to be reduced. In order to remove existing plots in an unbiased manner, we evaluated several options. The plot ID's all include a letter followed by a number. We decided to remove the odd-numbered plots because it allowed us to reduce the number of plots close to ten per habitat, per phase; although, some habitats still have slightly more than ten plots (i.e. P1 PFO/PSS, and P2 PFO/PSS). We did not remove additional plots from those habitats, so that they would have exactly ten plots, because it was difficult to determine a random way of doing so. Some habitats had less than ten plots (i.e. P2 PEM, P1 and P2 buffers). Additional herbaceous plots will be added to the Phase 2 PEM habitat in 2018, there are currently only four plots; it was late in the growing season by the time we made decisions about adjustments to the monitoring methods which makes plant identification for herbs difficult.

The upland buffer areas (Oak savannah) needed the addition of thirty woody (tree/shrub) plots to achieve ten plots per habitat, per phase; there were previously no woody plots in the upland buffers. The stem density requirement is 25 stems per acre in the upland buffers which would require only one plant every 1,742 square feet. We decided to use fixed transects with rectangular plots measuring 50' x 25' spaced every 75 feet along the transect (or with a space of 25 feet between plots). Even with a plot of this size, there would only need to be one stem counted within the plot to exceed the density standard. DSL suggested that we consider using fixed diameter plots to sample the buffers but many of the buffer areas are narrow in width making rectangular shaped plots a better fit. We established seven new buffer monitoring transects. Previous buffer monitoring locations were randomly generated but we determined that in order to sample the narrow buffer areas that transect sampling would be more suitable. We did not sample herbs within the new buffer plots because they were established late in the growing season; we will collect herb data for these plots in 2018.

A table displaying the original plots and modified plot list is included in Appendix C. *It is important to note that the data and results described in this report are referring to the reduced plot list, not the original data collected prior to the site inspection. Additionally, the upland buffer herbaceous data shown in the report and data tables are from the original buffer plots, not the newly established woody plots.* These data are included in Appendix A.

The term “desirable” herbaceous species is mentioned in the performance standards and MBI. For wetland areas it is defined as non-invasive species that are FAC or wetter. However, it is not well defined for the upland buffer areas. We interpret “desirable” herbaceous species in the upland buffer areas to mean *non-invasive species that are frequently mowed in vicinity of newly planted trees and shrubs.* During the summer site inspection, Dana Field suggested that mowed vegetation is desirable vegetation in the buffers. We agree as keeping the buffer areas mowed will reduce herb competition on the newly planted trees and shrubs.

The term “open water areas” is mentioned in the Performance Standard 1 but is not well defined. Based on the Cowardin definition, open water areas can be unvegetated areas <20 acres in size, shallower than 6.6 feet, lacking a wave-formed or bedrock shoreline, and with a salinity of <0.5%. The purpose of this standard seems to be observing open water areas to ensure that invasive aquatic species are not becoming established. There is no cover standard for open water areas as it is assumed that most of the plot area will be areal cover by water (by definition). When monitoring the PEM plots this year, we had several plots that had low herbaceous cover and the remaining cover was water, not bareground. These plots were inundated 24 inches or more at the time of sampling. We believe that these plots are located in transitional areas between PEM and “open water” habitats as portions of the plots were inundated deeply enough to have sparse vegetation. The PEM areas do have a requirement for 50% cover of desirable species. We assume that this means the other cover could be bare ground (or invasive species) which is a concern for invasive species establishment. However, cover by water at a depth unsuitable for terrestrial species should not be a concern as it is not bare ground. *For PEM plots that were sparsely vegetated with the remaining cover by water we did not apply the PEM cover standard as we believe these plots are located in a transitional area and are a mix of “open water” and PEM.*

## 1.5 MONITORING DATA LOCATIONS:

Please refer to the Monitoring Location map (Figure 1) which displays the locations of vegetation sampling plots and habitat types. The habitat types consist of Palustrine Emergent (PEM) wetlands, Palustrine Scrub-Shrub (PSS) wetlands and Palustrine Forested (PFO) wetlands (classes combined), and upland buffers (oak savannah).

### **Monitoring Transect and Plot Details-**

The areal cover of species found in a one-meter square quadrat placed at each of the sampling locations were recorded for the wetland habitats, and herbaceous upland plots. Estimates of bare ground and other non-vegetated space were made at each quadrat, and estimates of overstory cover (canopy) were also included, if present. In 2017, a new category was added for bare ground to record the area occupied by woody stems. Because the wetland monitoring protocol at this site has historically included adding

herbaceous and overhanging woody cover in the same plots, we are continuing to use this approach in the wetlands.

The stem density in the PSS/PFO habitats was last sampled in 2008 for Phases 1 and 2, and 2013 for Phase 3. Density data were collected using ten random plots that sampled a ten-meter fixed radius around the plot point. The PSS/PFO wetlands have exceeded the density standard for more than a decade and therefore woody stem density data are no longer collected.

The newly established upland buffer plots are displayed on Figure 1. The woody sampling plots measure 50' x 25', with the 50-foot edge placed along the transect. The plots are spaced every 75 feet along each transect, with 25 feet between each plot. Native woody stems (including volunteers) were counted within each woody plot. In 2018, herbaceous data will also be collected at the starting corner of each woody plot using a 1-meter quadrat.

This year we did not sample two plots in Phase 2, (E- 143 and E-160) that were inundated approximately two feet.

## 1.6 HYDROLOGY METHODS AND CONTEXT:

Post-construction hydrology monitoring had occurred in observation wells and pond staff-gauges from the time of Bank establishment until 2016. A post-construction wetland delineation was completed in 2015 by Allen Martin at Geo Resources. The agencies have agreed with most of the delineated areas but have requested supplemental data be collected in a small area in the southeast corner of Phase 1.

## 2.0 RESULTS

### 2.1 VEGETATION STANDARDS RESULTS

The raw vegetation monitoring data for all the herbaceous and woody plots are presented in eight tables included in Appendix A; these data are the result of re-organization of the plots by habitat as requested by the agencies. Appendix B includes the monitoring data collected at all of the plots from 2016 prior to the plot re-organization; the purpose of including these data are to display the herbaceous upland buffer/oak data as no new herbaceous data were collected at the newly established plot locations in 2017. The performance standards from the 2001 MBI for the Marion Mitigation Bank are written verbatim in the cover sheet; in order to reduce redundancy, they are not reprinted here. The following paragraphs present a summary of the vegetation sampling results by phase and Cowardin class habitat type.

#### **Phase 1:**

The Phase 1 wetland areas are all in the combined PSS/PFO Cowardin class. The vegetation in this habitat class is meeting the applicable performance standards (Standards 2, 3, and 4). FAC or wetter species accounted for 79% of the total cover (Standard 2). In 2008, a stem density survey was conducted in the PSS/PFO area which demonstrated that it had a stem density of 554 stems per acre and greater than three desirable tree/shrub species; this met the Standard 3 and 4 (density criteria of at least 100 desirable native trees and shrubs per acre). Woody stem counts in the PSS/PFO areas have been discontinued after more than a decade of increased woody species growth and establishment. There are six native tree and shrub species which meets the combined Standard 3 and 4 (woody species criteria of three native woody species in PSS or PFO area). Note: one species, *Fraxinus latifolia* is abundant in this habitat but ceased to be included in the data tables when we reduced the number of plots from 37 to 16. The average invasive



cover in this habitat was 1%, which met the Standard 3 and 4 (no more than 15% invasive cover). Native species accounted for 67% cover. Common native species found in this habitat type include woody species such as *Salix sitchensis*, *Salix hookeriana*, *Populus balsamifera ssp. trichocarpa*, and *Spiraea douglasii*; and herbaceous species such as *Eleocharis palustris*, *Deschamsia cespitosa*, *Carex obnupta*, *Juncus effusus*, *Ludwigia palustris* and *Hordeum brachyantherum*. The Prevalence Index (PI) was calculated as an additional way to demonstrate the presence of a hydrophytic plant community; any PI of 3.0 or less is considered to be hydrophytic. The average PI in this habitat was 1.8.

The Phase 1 upland habitat is not yet meeting Standard 5, native woody plant density criteria of 25 stems per acre, although it is close. The average native stem density recorded in 10 plots is 24 stems per acre. Tree and shrub species present were *Alnus rubra*, *Rosa nutkana*, and *Symphoricarpos albus*. Only one buffer plot existed in Phase 1 prior to adding plots in late 2017; the herbaceous data from this plot are included in Appendix B. The ten newly added woody plots did not have herbaceous data taken in late 2017 but these data will be collected in 2018. Desirable herbaceous species (non-invasive) accounted for 106% of the total cover, which meets the Standard 5 criteria of 50% or more cover by one or more desirable herb species. There were no invasive species recorded in the upland habitat.

### **Phase 2:**

The Phase 2 PEM community is meeting all of the applicable performance standards (Standards 1 and 2). Four plots were sampled in 2017 (six more will be added in 2018 in order to have 10 plots per habitat, per phase). The PEM community is meeting the “open water” and herbaceous invasive species criteria (Standards 1 and 2), with no invasive species recorded. The average percent cover of desirable (non-invasive) FAC or wetter species was 46% in three plots (one plot was too deep to sample and thus not included in the average). All of these plots were inundated 8 inches to 2 feet in depth and the remaining areal cover was water; therefore, we assumed portions of the plots were “open water” and have no desirable species cover criteria. Common native species included *Polygonum hydropiperoides*, *Hydrocotyle ranunculoides*, and *Juncus effusus*. The prevalence index was 1.2.

The Phase 2 PSS/ PFO plant community is meeting all of the performance standards (2, 3, and 4). There was a total of eleven plots sampled. The desirable (FAC or wetter) species cover averaged 131%, far exceeding the Standard 2 criteria of 50%. Invasive cover consisted solely of *Phalaris arundinacea* and averaged 8%, thus meeting the Standards 2, 3, and 4 invasive criteria of 15% or less. In 2008, a stem density survey was conducted in the PSS/PFO area which demonstrated that it had a stem density of 1,363 stems per acre with 5 native woody species; this met the Standards 3 and 4 (density criteria of at least 100 desirable native trees and shrubs per acre and greater than three desirable tree/shrub species). Woody stem counts in the PSS/PFO areas have been discontinued after more than a decade of increased woody species growth and establishment. Combined native cover averaged 116%. Common native species recorded were *Populus balsamifera ssp. trichocarpa*, *Salix sitchensis*, *Salix hookeriana*, and *Juncus effusus*. The prevalence index was 2.2, demonstrating a hydrophytic community.

The Phase 2 upland habitat is meeting performance standard 5 (oak savannah). The average stem density from the ten newly established woody plots was 84 stems per acre. Tree and shrub species present were *Alnus rubra*, *Fraxinus latifolia*, *Rosa nutkana*, and *Quercus garryana*. Only two buffer plots existed in Phase 2 prior to adding plots in late 2017; the herbaceous data from these plots are included in Appendix B. The ten newly added woody plots did not have herbaceous data taken in late 2017 but these data will be collected in 2018. Based on the data collected at the two herbaceous plots, desirable (non-invasive) herbaceous cover averaged 52% and thus met the Standard 5 criteria of 50% cover by one or more desirable herbaceous species. Invasive species cover averaged 15%, which is the upper limit for invasive species in Standard 5. The only invasive species recorded was *Rubus armeniacus* (*Rubus discolor*).

### Phase 3:

The Phase 3 PEM habitat is meeting all of the applicable performance standards. Ten plots were sampled in July 2017. FAC or wetter species accounted for 82% of the cover, which meets the Standard 2 criterion of 50% or more desirable species. There was one invasive species recorded, *Phalaris arundinacea*, which accounted for 1% of the cover and thus met the Standards 1 and 2 invasive species criteria. The average percent native cover was 77%. The most prevalent native species recorded were *Eleocharis palustris*, *Paspalum distichum*, and *Polygonum hydropiperoides*. The prevalence index was 1.5.

The Phase 3 PSS/PFO community is meeting all the applicable performance standards (3 and 4). A total of eleven plots were sampled in this habitat. FAC or wetter species cover averaged 78%, thus meeting the Standards 3 and 4 criteria for desirable FAC or wetter species. The invasive cover averaged 6% with two invasive species recorded, *Cirsium arvense* and *Phalaris arundinacea* and which meets the Standards 3 and 4 criteria. The average percent native cover was 52%. Common native species present included *Salix lucida*, *Polygonum hydropiperoides*, and *Eleocharis palustris*. The prevalence index was 2.3. A stem density survey conducted in 2013 showed an average of 18,237 stems per acre with at least three desirable shrub/tree species, which passed the Standards 3 and 4 stem density criteria of 100 stems per acre. Woody stem counts in the PSS/PFO areas have been discontinued after more than a decade of increased woody species growth and establishment.

The Phase 3 upland habitat is meeting performance standard 5. The average stem density from the ten newly established woody plots was 31 stems per acre. Native tree/shrub species present were *Alnus rubra*, *Quercus garryana*, and *Spiraea douglasii*. The herbaceous vegetation was sampled at the 11 old buffer plots in July 2017 and data are shown in Appendix B. The average cover of desirable (non-invasive) herb species was 85%, which meets the Standard 5 criterion of 50% or more native herbaceous cover. The most common native herbaceous species recorded were *Festuca occidentalis* and *Elymus glaucus*. The average invasive cover was 3.2% (all *Rubus armeniacus* [*discolor*]), thus meeting the invasive criterion. In 2018, data will be collected from the ten new upland buffer herb plots.

## 2.2 HYDROLOGY STANDARDS RESULTS:

**Standard:** "The criteria for achieving wetland hydrology at the mitigation site will be met if hydrologic conditions meet or exceed the basic standard of the 1987 *US Army Corps of Engineers Wetland Delineation Manual*, and refined in the *Corp's May 2010 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region*."

**Result:** A post-construction wetland delineation was conducted by Allen Martin from Geo Resources LLC in 2015. The IRT agreed with most of the areas delineated but requested that additional data be collected in a small area in the southeast corner of Phase 1. Green Banks will collect additional data in this area in the spring of 2018.

**Standard Met?** Yes, hydrologic conditions meet or exceed the basic standard in nearly all areas of the mitigation wetlands. The exact acreage of wetland success will be determined after concurrence is received on the post-construction delineation.

## 2.3 WILDLIFE OBSERVATIONS

Many species of wildlife continue to utilize the habitat of the Bank. In April 2017, we found a western pond turtle for the first time on site. The individual was a female, within egg laying age. Western pond turtles are rare in the Willamette valley north of Eugene. We also observe garter snakes, pacific tree frogs, and red-legged frogs frequently. Beaver activity is also frequently observed on-site and has been increasing each year. Evidence of wildlife usage and scat from deer, raccoon, and coyote demonstrate that there are mammalian species present. A heron rookery is thriving on the western adjacent property boundary located in cluster of cottonwood trees. Many migratory birds are using the site on a seasonal basis. The Bank provides ideal nesting habitat for both migratory and resident avian species. We continue to observe a wide range of species from the pheasants nesting in the uplands, to the American bittern nesting in the emergent wetland areas.

## 3.0 CONCLUSIONS AND RECOMMENDATIONS

### 3.1 PROJECT STATUS

The Marion Bank is meeting all of its vegetative performance standards except for upland buffer stem density. In 2017, there were efforts made improve the site including: herbicide applications throughout the entire site targeting invasive species, field mowing of all buffer areas including the large hill in Phase 2, preparation for the installation of tree and shrub rows in the buffer areas, and the removal of litter found on-site. Additionally, changes were made to the monitoring protocols, and the report and data tables were updated to be compliant with the 2009 DSL Routine Monitoring Guidance per the request of the agencies.

Vegetation monitoring plots were added and removed this year in an effort to have ten plots per habitat type, per phase. This adjustment to the data set resulted in some variations in the summary data; however, the data seem to be representative of site conditions. Thirty woody plots were added to the buffer areas which will allow for a better measurement of stem density than total stem counts.

The Prevalence Index (PI) is an accepted way of documenting jurisdictionally accepted hydrophytic communities. The five wetland habitats have hydrophytic PIs that range from 1.2 (OBL-dominated) in the Phase 2 PEM to 2.3 (FACW/FAC-dominated) in the Phase 3 PSS/PFO.

Invasive species cover is low throughout the site. *Phalaris arundinacea* is present in some densely forested portions of the Bank but these areas have near to, or exceeding, 100% canopy cover and are inaccessible for management due to extremely dense shrub cover. During the site inspection, DSL (Field) mentioned that the open areas in the PEM communities, or developing forests are the highest concern for *Phalaris arundinacea* and that areas with closed canopies are of less concern. In the summer of 2017, Green Banks LLC made an herbicide application on all *Phalaris* located in open areas and accessible wooded areas. The application appeared to be effective with a large reduction in *Phalaris* cover noted in the winter of 2017.

The upland buffer areas (oak savannah) have been the main focus for enhancement in 2017. These areas will be planted with 7,400 native trees and shrubs in January to February of 2018. This will result in the addition of nearly 650 stems per acre in the buffer areas; the buffers are required to have a minimum of 25 stems per acre. We are planning to over-plant the buffer areas in an effort to accelerate plant community establishment. We also assume some level of mortality due to a variety of common factors (e.g. browse, desiccation).

Positive wetland hydrology has been proven through a multi-year hydrological study which took place from 2001-2016. A post-construction wetland delineation was conducted in 2015, and is pending concurrence dependent on a small area on the southeast corner of Phase 1. Green Banks LLC is preparing to collect additional paired-plot data in the area of concern in the spring of 2018.

The MBI describes using reference sites “*to identify the desirable plants that can be expected to succeed at the mitigation bank site, the species richness, and the stem density in the scrub-shrub and forested habitats*”. It also mentions reviewing information provided by local experts. This step was not formally documented during the establishment of the site. At this point, the PSS/PFO and PEM areas are well established and the information provided from a reference site and literature study seem to be no longer relevant. If the agencies would like reference site data collected we will complete this effort in 2018.

The Marion Bank credit ledger for 2017 is included in Appendix D. The most recent credit release was on October 6<sup>th</sup> 2016, for 1.45 credits; bringing the total number of credits released to 23.36 credits or 61% of the total anticipated for the Bank (38.3). A total of 0.695 credits were withdrawn from the bank in 2017. There are a total of 0.753 credits currently released and available for withdrawal (as of 1/1/2018).

### 3.2 RECOMMENDATIONS

The Marion Bank is well established and on track to being a low maintenance site. The largest issue is the lack of trees and shrubs in the upland buffer areas. We recommend installing additional trees and shrubs in the buffer areas in January-February of 2018. As of January 31, 2018, we have acquired 7,400 bareroot trees and shrubs and have installed nearly all of it (approximately 6,000 plants so far). We anticipate finishing the planting by the first week in February 2018. These newly planted buffer areas should be mowed a minimum of twice per year for the next couple years to reduce competition on the new plantings.

Weed control efforts should continue within the wetland areas in 2018, targeting invasive species. The site should be observed a minimum of once per month during the growing season to identify any potential management concerns and plan for maintenance efforts.

### 3.3 FINANCIAL SECURITY STATUS

The Bank sponsor, Marion Mitigation Bank LLC, pledged a financial assurance in the form of a Performance Bond for \$30,000 for the release of mitigation credit. This Bond is currently active.

## 4.0 REFERENCES

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## **MAPS AND FIGURES:**

Figure 1: Monitoring Location and Habitat Map



## **APPENDICES:**

APPENDIX A:	Vegetation Data (Adjusted Plots by Habitat Type)
APPENDIX B:	Preliminary Vegetation Data
APPENDIX C:	Vegetation Plot Reduction Table
APPENDIX D:	Credit Ledger (2017)



## **APPENDIX A: VEGETATION DATA (Adjusted Plots by Habitat Type)**

Marion Mitigation Bank																					
2017 Vegetation Monitoring		Sample Date(s):	7/3/17 - 7/5/17																		
Phase 1 PSS/PFO																					
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	ENS-04	F-034	F-096	F-144	S-020	S-040	S-046	S-056	S-058	S-116	E-066	E-080	E-086	EN-008	EN-052	ENS-02	Average		
<b>Native Herbaceous &amp; Woody Species</b>																					
<i>Agrostis exarata</i>	N	2	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	
<i>Beckmannia syzigachne</i>	N	1	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0.4	
<i>Carex obnupta</i>	N	1	0	0	12	0	0	0	0	4	0	0	0	80	55	35	15	0	0	12.6	
<i>Carex sp.</i>	N		0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	
<i>Cornus sericea</i>	N	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	
<i>Deschampsia cespitosa</i>	N	2	0	35	45	0	0	0	0	35	0	0	0	0	0	0	0	0	0	7.2	
<i>Eleocharis acicularis</i>	N	1	0	0	0	0	0	0	45	2	0	0	0	0	0	5	0	0	0	3.3	
<i>Eleocharis palustris</i>	N	1	0	0	0	0	4	0	30	0	0	3	40	0	35	3	35	0	0	9.4	
<i>Galium trifidum</i>	N	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	
<i>Geranium carolinianum</i>	N	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	
<i>Gnaphalium palustre</i>	N	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	
<i>Hordeum brachyantherum</i>	N	2	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8	
<i>Juncus acuminatus</i>	N	1	0	0	0	0	0	0	0	0	0	0	3	0	0	6	0	0	0	0.6	
<i>Juncus bufonius</i>	N	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	
<i>Juncus effusus</i>	N	2	0	30	5	0	0	0	0	0	0	0	0	0	6	0	0	0	0	2.6	
<i>Juncus patens</i>	N	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	
<i>Ludwigia palustris</i>	N	1	0	0	0	0	0	0	0	0	0	0	35	0	0	0	25	0	0	3.8	
<i>Madia glomerata</i>	N	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	
<i>Polygonum hydropiperoides</i>	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
<i>Populus balsamifera ssp. trichocarpa</i>	N	3	0	0	0	0	10	0	15	0	5	0	0	30	0	10	0	0	0	4.4	
<i>Populus balsamifera ssp. Trichocarpa seedlings</i>	N	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	
<i>Salix hookeriana</i>	N	2	0	0	0	0	10	0	10	0	5	0	0	0	70	0	0	0	0	5.9	
<i>Salix lucida ssp. lasiandra</i>	N	2	0	10	0	0	0	0	0	0	0	0	0	10	5	0	0	0	0	1.6	
<i>Salix sitchensis</i>	N	2	0	60	0	0	0	0	0	0	0	0	0	0	0	5	60	0	0	7.8	
<i>Schoenoplectus acutus</i>	N	1	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0.5	
<i>Spiraea douglasii</i>	N	2	0	0	0	0	20	5	0	0	5	0	0	0	0	0	0	0	0	1.9	
<i>Veronica peregrina ssp. xalapense</i>	N	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.1	
<b>Invasive Herbaceous Species</b>																					
<i>Phalaris arundinacea</i>	I	2	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0.8	
<b>Non-Native Herbaceous Species</b>																					
<i>Agrostis capillaris/castellana</i>	NN	3	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	5.0	
<i>Agrostis stolonifera</i>	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	
<i>Bromus hordeaceus ssp. hordeaceus</i>	NN	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	
<i>Convolvulus arvensis</i>	NN	5	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	
<i>Daucus carota</i>	NN	4	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	
<i>Holcus lanatus</i>	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0.5	
<i>Leontodon taraxacoides (nudicaulis)</i>	NN	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	
<i>Lotus corniculatus</i>	NN	3	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	
<i>Lythrum portula</i>	NN	1	0	0	0	0	0	8	0	2	0	0	0	0	0	0	0	0	0	0.6	
<i>Mentha pulegium</i>	NN	1	20	0	4	0	2	10	8	3	0	8	1	0	0	30	0	0	0	5.4	
<i>Poa sp. (assumed to be FAC)</i>	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
<i>Rumex crispus</i>	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0.2	
<i>Vicia sativa</i>	NN	5	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	
<i>Vulpia bromoides</i>	NN	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	
<b>Bare Substrate</b>																					
Bare (soil, mud, rock)			2	27	10	0	72	7	2	50	22	0	21	5	15	2	25	0	0	16.3	
Algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)			10	0	15	0	10	50	0	0	75	89	0	0	0	0	0	92	0	21.3	
<b>Shade, Woody Stem Cover &amp; Water Depth</b>																					
Approx. water depth (inches)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
Basal woody stem cover on ground			0	0	0	0	0	0	10	0	0	0	0	15	0	0	0	0	0	1.6	
<b>Summary Information</b>																					
Cover of Native Species			68	148	62	7	44	9	100	44	18	3	78	120	165	78	135	0	0	67	13.5
Lower CI (80%)																				50	
Upper CI (80%)																				85	
Cover of Invasive Species			0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	1	0.8
Lower CI (80%)																				0	
Upper CI (80%)																				2	
Bare Substrate			12	27	25	0	82	57	2	50	97	89	21	5	15	2	25	92	0	38	8.8
Lower CI (80%)																				26	
Upper CI (80%)																				49	
Percent of FAC or wetter cover			88	148	76	84	46	27	108	48	18	11	79	120	165	113	135	8	0	79	
Prevalence Index (aka SMI)			1.7	2.0	1.9	3.3	2.1	1.4	1.4	1.9	2.1	1.0	1.0	1.6	1.5	1.4	1.4	3.0	0	1.8	N/A
Weighted Prevalence Index			153	290	146	359	120	40	148	94	38	11	79	190	240	154	195	24	0		
Sum of plant cover			88	148	76	108	58	28	108	50	18	11	79	120	165	113	135	8	0		

Marion Mitigation Bank

2017 Vegetation Monitoring		Sample Date(s):	1/12/2018											
Phase 1 Buffer-Woody														
Native Tree and Shrub Species:		Origin (N, NN, I)	Wetland Status (1 - 5)	UP-21	UP-22	UP-23	UP-24	UP-25	UP-26	UP-27	UP-28	UP-29	UP-30	Row Average
Native Shrub and Tree Count		Woody Stem Count (Trees and Shrubs)												
<i>Alnus rubra</i>	N	3	0	0	0	1	0	0	0	0	0	0	0	0.1
<i>Rosa nutkana</i>	N	3	0	0	0	0	5	0	0	0	0	0	0	0.5
<i>Symphoricarpos albus</i>	N	4	1	0	0	0	0	0	0	0	0	0	0	0.1
Summary Information		Habitat Average												
Native Diversity--See buffer Herb table for summary info														
Density of Woody Vegetation		Average per acre	35	0	0	35	174	0	0	0	0	0	0	24
Plot Area (shrub/tree plot)	1250													
Per acre multiplier: Input 4,047 if plot area entered in B49 is in sq.meters or 43,560 for sq.feet	43560													
Sum of native plants /plot			1	0	0	1	5	0	0	0			0	1
Does Plot Pass Native Cover Standard based on ≥ 25 native woody plants per acre Y or N?			Y	N	N	Y	Y	N	N	N	N	N	N	

Marion Mitigation Bank								
2017 Vegetation Monitoring	Sample Date(s):	7/3/17 - 7/5/17						
Phase 2 PEM			E-014	E-160	E-162	E-143		
Species	Origin (N, NN, I)	Wetland Status (1 - 5)					Average	
<b>Native Herbaceous &amp; Woody Species</b>								
<i>Hydrocotyle ranunculoides</i>	N	1	0	40	0	w	13.3	
<i>Juncus effusus</i>	N	2	0	0	30	w	10.0	
<i>Lemna minor</i>	N	1	0	1	1	w	0.7	
<i>Polygonum hydropiperoides</i>	N	1	20	20	10	w	16.7	
<i>Sparganium emersum</i>	N	1	0	10	0	w	3.3	
<i>Wolffia borealis</i>	N	1	2	3	1	w	2.0	
						Note, w= water too deep to sample		
<b>Invasive Herbaceous Species</b>								
None recorded this year	I							
<b>Non-Native Herbaceous Species</b>								
None recorded this year	NN							
<b>Bare Substrate</b>								
Bare (soil, mud, rock)			0	0	0	0	0.0	
Algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)			0	0	0	0	0.0	
<b>Shade, Woody Stem Cover &amp; Water Depth</b>								
Approx. water depth (inches)			30	8	24	>24	>21.5	
Basal woody stem cover on ground			0	0	0	0	0.0	
<b>Summary Information</b>			<b>E-014</b>	<b>E-160</b>	<b>E-162</b>	<b>E-143</b>	<b>Habitat Average</b>	<b>Standard Error</b>
Cover of Native Species			22	74	42	unknown	46	15.1
Lower CI (80%)							27	
Upper CI (80%)							65	
Cover of Invasive Species			0	0	0	unknown	0	0.0
Lower CI (80%)							0	
Upper CI (80%)							0	
Bare Substrate			0	0	0	0	0	0.0
Lower CI (80%)							0	
Upper CI (80%)							0	
Percent FAC or wetter cover			22	74	42	unknown	46	
Prevalence Index (aka SMI)			1.0	1.0	1.7	unknown	1.2	N/A
Weighted Prevalence Index			22	74	72	unknown		
Sum of plant cover			22	74	42	unknown		

Marion Mitigation Bank															
2017 Vegetation Monitoring		Sample Date(s):	7/3/17 - 7/5/17												
Phase 2 PSS/PFO															
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	F-070	F-076	F-090	F-106	S-022	S-036	S-056	S-106	S-140	E-020	F-028	Average	
<b>Native Herbaceous &amp; Woody Species</b>															
<i>Eleocharis palustris</i>	N	1	0	0	0	0	0	0	0	0	0	10	0	0.9	
<i>Epilobium ciliatum</i>	N	2	8	0	0	0	0	0	0	3	0	0	0	1.0	
<i>Equisetum arvense</i>	N	3	75	0	0	0	8	0	0	15	0	0	10	9.8	
<i>Fraxinus latifolia</i>	N	2	0	0	0	5	0	0	0	0	0	5	0	0.9	
<i>Fraxinus latifolia seedling</i>	N	2	0	0	0	0	2	0	0	0	0	0	0	0.2	
<i>Juncus effusus</i>	N	2	0	50	40	90	0	0	0	0	0	0	0	16.4	
<i>Lemna minor</i>	N	1	0	0	2	0	1	0	0	0	10	1	0	1.3	
<i>Ludwigia palustris</i>	N	1	0	0	0	2	0	0	0	0	0	65	0	6.1	
<i>Polygonum hydropiperoides</i>	N	1	0	0	0	0	0	0	0	0	45	8	0	4.8	
<i>Populus balsamifera ssp. trichocarpa</i>	N	3	0	40	0	0	0	0	0	0	0	0	70	10.0	
<i>Salix hookeriana</i>	N	2	0	55	0	0	98	80	95	65	65	0	0	41.6	
<i>Salix lucida ssp. lasiandra</i>	N	2	80	0	0	0	0	0	0	0	0	0	0	7.3	
<i>Salix sitchensis</i>	N	2	0	0	90	50	0	0	0	0	25	5	0	15.5	
<i>Veronica americana</i>	N	1	0	0	0	7	0	0	0	0	0	0	0	0.6	
<b>Invasive Herbaceous Species</b>															
<i>Phalaris arundinacea</i>	I	2	0	0	0	0	3	85	0	0	0	0	0	8.0	
<b>Non-Native Herbaceous Species</b>															
<i>Agrostis stolonifera</i>	NN	3	0	0	0	0	0	0	3	0	0	6	3	1.1	
<i>Daucus carota</i>	NN	4	0	0	0	0	0	0	0	0	0	0	8	0.7	
<i>Holcus lanatus</i>	NN	3	0	5	0	0	0	0	0	35	0	0	50	8.2	
<i>Holcus mollis</i>	NN	4	0	0	0	0	0	0	25	0	0	0	0	2.3	
<i>Leucanthemum vulgare</i>	NN	4	0	0	0	0	0	0	0	0	0	0	10	0.9	
<i>Lotus corniculatus</i>	NN	3	0	35	0	0	0	0	0	4	0	0	6	4.1	
<i>Mentha pulegium</i>	NN	1	0	0	0	0	0	0	0	0	0	4	0	0.4	
<i>Plantago lanceolata</i>	NN	4	0	0	0	0	0	0	0	13	0	0	0	1.2	
<i>Schedonorus arundinaceus</i>	NN	3	0	0	0	0	0	0	0	0	0	0	5	0.5	
<i>Vicia sp.</i>	NN		0	0	0	0	0	0	0	1	0	0	0	0.1	
<i>Vicia pannonica</i>	NN	5	0	0	0	0	0	0	0	0	0	0	4	0.4	
<b>Bare Substrate</b>															
Bare (soil, mud, rock)			17	10	58	1	86	15	72	24	0	6	4	26.6	
Algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)			0	0	0	0	0	0	0	0	0	0	0	0.0	
<b>Shade, Woody Stem Cover &amp; Water Depth</b>															
Approx. water depth (inches)			0	0	0	0	0	0	0	0	0	0	0	0.0	
Basal woody stem cover on ground			0	0	0	0	0	0	0	0	1	0	0	0.1	
<b>Summary Information</b>															
Cover of Native Species			163	145	132	154	109	80	95	83	145	94	80	116	9.7
Lower CI (80%)														104	
Upper CI (80%)														129	
Cover of Invasive Species			0	0	0	0	3	85	0	0	0	0	0	8	7.7
Lower CI (80%)														-2	
Upper CI (80%)														18	
Bare Substrate			17	10	58	1	86	15	72	24	0	6	4	27	9.2
Lower CI (80%)														15	
Upper CI (80%)														38	
Percent FAC or wetter cover			163	185	132	154	109	80	98	122	145	104	144	131	
Prevalence Index (aka SMI)			2.5	2.4	2.0	1.9	2.1	2.0	2.4	2.6	1.6	1.2	3.2	2.2	N/A
Weighted Prevalence Index			401	450	262	299	231	330	299	350	235	126	524		
Sum of plant cover			163	185	132	154	112	165	123	136	145	104	166		

Marion Mitigation Bank														
2017 Vegetation Monitoring		Sample Date(s):												
Phase 2 Buffer-Woody														
Native Tree and Shrub Species:		Origin (N, NN, I)	Wetland Status (1 - 5)	UP-1	UP-2	UP-3	UP-4	UP-5	UP-6	UP-7	UP-8	UP-9	UP-10	Row Average
Native Shrub and Tree Count		Woody Stem Count (Trees and Shrubs)												
<i>Alnus rubra</i>	N	3	0	0	0	0	1	1	0	0	1	1	0.4	
<i>Crataegus douglasii</i>	N	3	0	0	0	0	1	1	0	0	1	0	0.3	
<i>Fraxinus latifolia</i>	N	2	0	0	0	0	0	0	0	1	4	0	0.5	
<i>Oermleria cerasiformis</i>	N	4	0	0	1	0	0	0	0	0	2	0	0.3	
<i>Physocarpus capitatus</i>	N	2	0	0	0	0	0	0	0	0	0	1	0.1	
<i>Populus balsamifera</i>	N	2	0	0	0	0	0	0	0	2	0	0	0.2	
<i>Quercus garryana</i>	N	4	0	0	0	0	0	0	1	0	0	0	0.1	
<i>Rosa nutkana</i>	N	3	0	1	0	1	1	1	0	0	0	0	0.4	
<i>Spiraea douglasii</i>	N	2	0	0	0	0	0	0	1	0	0	0	0.1	
Summary Information													Habitat Average	Standard Error
Native Diversity--See buffer Herb table for summary info														
Density of Woody Vegetation		Average per acre	0	35	35	35	105	139	35	105	279	70	84	
Plot Area (shrub/tree plot)		1250												
Per acre multiplier: Input 4,047 if plot area entered in B50 is in sq.meters or 43,560 for sq.feet		43560												
Sum of native plants /plot			0	1	1	1	3	4	1	3	8	2	2	
Does Plot Pass Native Cover Standard based on ≥ 25 native woody plants per acre Y or N?			N	Y	Y	Y	Y	Y	Y	Y	Y	Y		

Marion Mitigation Bank														
2017 Vegetation Monitoring		Sample Date(s):	7/3/17 - 7/5/17											
Phase 3 PEM														
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	E-078	F-034	E-282	E-304	E-349	E-348	E-375	E-327	E-387	E-316	Average	
<b>Native Herbaceous &amp; Woody Species</b>														
<i>Azolla filliculoides/mexicana</i>	N	1	0	0	0	0	0	5	w	0	0	0	0.6	
<i>Bidens cernua</i>	N	2	0	0	0	0	0	0	0	0	0	2	0.2	
<i>Carex sp.</i>	N		0	0	0	0	0	0	0	0	0	2	0.2	
<i>Eleocharis palustris</i>	N	1	87	0	70	80	35	5	w	0	17	0	32.7	
<i>Elymus triticoides</i>	N	3	0	0	2	0	0	0	0	0	0	0	0.2	
<i>Equisetum arvense</i>	N	3	0	0	0	0	0	0	0	0	0	4	0.4	
<i>Epilobium ciliatum</i>	N	2	0	0	0	0	0	0	0	0	0	5	0.5	
<i>Galium aparine</i>	N	4	0	0	0	0	0	0	0	0	0	0	0.0	
<i>Juncus effusus</i>	N	2	0	15	0	0	0	0	w	0	0	25	4.4	
<i>Leersia oryzoides</i>	N	1	0	0	0	0	0	0	w	6	0	0	0.7	
<i>Lemna minor</i>	N	1	0	0	1	1	1	1	w	3	0	0	0.8	
<i>Ludwigia palustris</i>	N	1	10	35	5	3	0	0	w	25	0	2	8.9	
<i>Paspalum distichum</i>	N	3	0	0	0	10	18	0	w	0	60	0	9.8	
<i>Polygonum hydropiperoides</i>	N	1	0	0	3	4	12	0	w	8	30	0	6.3	
<i>Salix lucida ssp. Lasiandra</i>	N	2	0	0	0	5	0	0	w	20	0	0	2.8	
<i>Salix sitchensis</i>	N	2	0	0	0	0	0	0	0	30	0	0	3.0	
<i>Schoenoplectus acutus</i>	N	1	0	0	0	0	5	0	w	0	0	0	0.6	
<i>Sparganium emersum</i>	N	1	0	0	5	0	0	25	w	0	0	0	3.3	
<i>Wolffia borealis</i>	N	1	0	10	0	0	1	0	w	0	0	0	1.2	
<b>Invasive Herbaceous Species</b>														
<i>Phalaris arundinacea</i>	I	2	0	5	0	0	0	0	w	2	0	0	0.8	
<b>Non-Native Herbaceous Species</b>														
<i>Echinochloa crus-galli</i>	NN	2	0	0	0	0	0	0	0	0	3	0	0.3	
<i>Holcus lanatus</i>	NN	3	0	0	0	0	0	0	0	5	0	3	0.8	
<i>Lactuca serriola</i>	NN	4	0	0	0	0	0	0	0	0	0	0	0.0	
<i>Lapsana communis</i>	NN	4	0	0	0	0	0	0	0	0	0	0	0.0	
<i>Lotus corniculatus</i>	NN	3	0	0	0	0	0	0	0	0	0	25	2.5	
<i>Mentha pulegium</i>	NN	1	0	0	0	0	0	0	w	0	8	0	0.9	
<i>Potamogeton sp.</i>	NN	1	0	0	5	0	0	0	0	0	0	0	0.5	
<b>Bare Substrate</b>														
Bare (soil, mud, rock)			3	0	0	0	0	0	0	0	0	42	4.5	
Algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)			0	0	0	0	0	0	0	0	0	0	0.0	
<b>Shade, Woody Stem Cover &amp; Water Depth</b>														
Approx. water depth (inches)				6	6	10	12	20	>36	0	0	0	> 10.0	
<b>Summary Information</b>														
Cover of Native Species			97	60	86	103	72	36	unknown	92	107	40	77	8.9
Lower CI (80%)													66	
Upper CI (80%)													88	
Cover of Invasive Species			0	5	0	0	0	0	unknown	2	0	0	1	0.6
Lower CI (80%)													0	
Upper CI (80%)													2	
Bare Substrate			3	0	0	0	0	0	unknown	0	0	42	5	4.6
Lower CI (80%)													-1	
Upper CI (80%)													11	
Percent FAC or wetter cover			97	60	91	103	72	36	unknown	97	118	68	82	
Prevalence Index (aka SMI)			1.0	1.3	1.0	1.2	1.5	1.0	unknown	1.6	2.0	2.4	1.5	N/A
Weighted Prevalence Index			97	85	95	128	108	36	unknown	161	241	162		
Sum of plant cover			97	65	91	103	72	36	unknown	99	118	68		

Marion Mitigation Bank

2017 Vegetation Monitoring		Sample Date(s):	7/3/17 - 7/5/17												
Phase 3 PSS/PFO			E-051	E-052	E-070	E-138	S-027	S-028	S-075	S-076	S-100	S-103	S-105		
Species	Origin (N, NN, I)	Wetland Status (1 - 5)												Average	
<b>Native Herbaceous &amp; Woody Species</b>															
<i>Bidens cernua</i>	N	2	1	0	0	0	0	0	0	0	0	0	0	0.1	
<i>Eleocharis palustris</i>	N	1	0	25	0	0	0	0	0	0	0	0	0	2.3	
<i>Epilobium brachycarpum</i>	N	5	0	0	0	0	0	0	0	0	0	0	3	0.3	
<i>Epilobium ciliatum</i>	N	2	0	0	0	0	0	0	0	0	0	6	6	1.1	
<i>Equisetum arvense</i>	N	3	0	0	0	0	0	0	0	0	0	6	0	0.5	
<i>Festuca rubra</i>	N	3	0	0	0	0	0	0	0	0	0	5	0	0.5	
<i>Galium aparine</i>	N	4	0	0	0	0	0	0	0	0	0	3	3	0.5	
<i>Geranium carolinianum</i>	N	5	0	0	0	0	0	0	0	0	0	3	0	0.3	
<i>Hordeum brachyantherum</i>	N	2	0	0	0	0	0	0	20	0	0	3	0	2.1	
<i>Juncus effusus</i>	N	2	0	0	0	0	0	0	0	3	0	0	0	0.3	
<i>Lemna minor</i>	N	1	1	10	1	10	20	20	0	0	0	0	0	5.6	
<i>Madia elegans</i>	N	5	0	0	0	0	0	0	0	0	0	0	4	0.4	
<i>Madia sp. (assumed native)</i>	N		0	0	0	0	0	0	7	0	0	0	0	0.6	
<i>Polygonum hydropiperoides</i>	N	1	0	35	6	4	0	0	0	0	0	0	0	4.1	
<i>Populus balsamifera ssp. trichocarpa</i>	N	3	10	10	10	30	0	0	0	0	0	0	0	5.5	
<i>Rosa nutkana</i>	N	3	0	0	0	0	0	0	0	0	0	0	15	1.4	
<i>Salix lucida ssp. lasiandra</i>	N	2	85	80	80	45	0	0	0	0	0	0	0	26.4	
<i>Veronica americana</i>	N	1	0	0	0	0	0	0	0	0	0	0	5	0.5	
<b>Invasive Herbaceous Species</b>															
<i>Cirsium arvense</i>	I	3	0	0	0	0	0	0	0	0	0	15	0	1.4	
<i>Phalaris arundinacea</i>	I	2	25	8	10	7	0	0	0	0	0	5	0	5.0	
<b>Non-Native Herbaceous Species</b>															
<i>Agrostis capillaris/castellana</i>	NN	3	0	0	0	0	0	0	65	0	8	10		7.5	
<i>Alopecurus geniculatus</i>	NN	1	0	0	0	0	0	0	30	8	0	0	0	3.5	
<i>Daucus carota</i>	NN	4	0	0	0	0	0	0	0	15	12	0		2.5	
<i>Holcus lanatus</i>	NN	3	0	0	0	0	0	0	0	8	0	20	15	3.9	
<i>Lotus corniculatus</i>	NN	3	0	0	0	0	0	0	0	1	0	0	0	0.1	
<i>Mentha pulegium</i>	NN	1	0	0	0	0	0	0	40	0	0	0	0	3.6	
<i>Poa sp. (assumed FAC)</i>	NN	3	0	0	0	0	0	0	0	0	0	2	0	0.2	
<i>Poa trivialis</i>	NN	3	0	0	0	0	0	0	0	0	0	0	20	1.8	
<i>Rumex crispus</i>	NN	3	0	0	0	0	0	0	0	0	0	3	0	0.3	
<i>Solanum dulcamara</i>	NN	3	0	0	70	8	0	0	0	0	0	0	0	7.1	
<i>Trifolium sp</i>	NN		0	0	0	0	0	0	5	0	0	0	0	0.5	
<i>Vicia hirsuta</i>	NN	5	0	0	0	0	0	0	0	0	0	0	10	0.9	
<i>Vicia pannonica</i>	NN	5	0	0	0	0	0	0	0	3	0	35	0	3.5	
<i>Vicia tetrasperma</i>	NN	5	0	0	0	0	0	0	0	0	0	0	25	2.3	
<i>Vulpia bromoides</i>	NN	4	0	0	0	0	0	0	0	0	0	3	0	0.3	
<b>Bare Substrate</b>															
Bare (soil, mud, rock)			73	22	0	71	0	0	5	5	0	0	0	16.0	
Algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)			0	0	0	0	0	0	0	0	0	0	0	0.0	
<b>Shade, Woody Stem Cover &amp; Water Depth</b>															
Approx. water depth (feet)			0	0	0	0	16	24	0	0	0	0	0	3.6	
<b>Summary Information</b>			<b>E-051</b>	<b>E-052</b>	<b>E-070</b>	<b>E-138</b>	<b>S-027</b>	<b>S-028</b>	<b>S-075</b>	<b>S-076</b>	<b>S-100</b>	<b>S-103</b>	<b>S-105</b>	<b>Habitat Average</b>	<b>Standard Error</b>
Cover of Native Species			97	160	97	89	20	20	20	10	0	26	36	52	15.2
Lower CI (80%)														33	
Upper CI (80%)														72	
Cover of Invasive Species			25	8	10	7	0	0	0	0	0	20	0	6	2.7
Lower CI (80%)														3	
Upper CI (80%)														10	
Bare Substrate			73	22	0	71	0	0	5	5	0	0	0	16	8.6
Lower CI (80%)														5	
Upper CI (80%)														27	
Percent FAC or wetter cover			97	160	167	97	20	20	90	85	0	53	71	78	
Prevalence Index (aka SMI)			2.1	1.6	2.4	2.2	1.0	1.0	1.2	2.6	4.0	3.6	3.6	2.3	N/A
Weighted Prevalence Index			253	276	427	232	20	20	110	251	60	467	419		
Sum of plant cover			122	168	177	104	20	20	95	95	15	129	116		



Marion Mitigation Bank														
2017 Vegetation Monitoring														
Phase 3 Buffer-Woody														
Native Tree and Shrub Species:														
Native Shrub and Tree Count														
Woody Stem Count (Trees and Shrubs)														
Summary Information														
Sample Date(s):	1/12/2018													
Origin (N, NN, I)	Wetland Status (1 - 5)	UP-11	UP-12	UP-13	UP-14	UP-15	UP-16	UP-17	UP-18	UP-19	UP-20	Row Average		
<i>Alnus rubra</i>	N	3	0	1	4	0	0	0	0	0	0	0	0.5	
<i>Quercus garryana</i>	N	4	0	0	0	1	0	0	0	0	0	0	0.1	
<i>Spiraea douglasii</i>	N	2	0	2	1	0	0	0	0	0	0	0	0.3	
Native Diversity--See buffer Herb table for summary info														
Density of Woody Vegetation	Average per acre	0	105	174	35	0	0	0	0	0	0	0	31	
Plot Area (shrub/tree plot)	1250													
Per acre multiplier: Input 4,047 if plot area entered in B49 is in sq.meters or 43,560 for sq.feet	43560													
Sum of native plants /plot		0	3	5	1	0	0	0	0	0	0	0	1	
Does Plot Pass Native Cover Standard based on $\geq 25$ native woody plants per acre Y or N?		N	Y	Y	Y	N	N	N	N	N	N	N		

## **APPENDIX B: PRELIMINARY VEGETATION DATA**



Marion Mitigation Bank Plant Monitoring, 2016 Phase 1				
Oak Savannah/Upland Habitat Type			7/5/2017	
Cover (%)				
Species	Common Name	Native	Sample Station	
			ENS-01	Mean
Elymus repens	quackgrass		75	75.0
Geranium carolinianum	Carolina geranium	yes	3	3.0
Holcus lanatus	common velvetgrass		15	15.0
Poa sp.			5	5.0
Vicia sp.			8	8.0
bare (soil, mud, rock)				
algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)				
Total cover:			106	106
Native cover:			3	3
Percent native of total:			3	3
				0.0
				100.0

Marion Mitigation Bank Plant Monitoring, 2017 Phase 2											
Emergent Habitat Type											
Cover (%)											
Sample Station											
Species	Common Name	Native	Indicator	SMI	Wet	Woody	E-014	E-160	E-162	E-143	Mean
Hydrocotyle ranunculoides	floating marshpennywort	yes	OBL	1	y			40		w	10.0
Juncus effusus	soft rush	yes	FACW	2	y				30	w	7.5
Lemna minor	duckweed	yes	OBL	1	y			1	1	w	0.5
Polygonum hydropiperoides	waterpepper	yes	OBL	1	y		20	20	10	w	12.5
Sparganium emersum	European bur-reed	yes	OBL	1	y			10		w	2.5
Wolffia borealis	northern watermeal	yes	OBL	1	y		2	3	1	w	1.5
bare (soil, mud, rock)	BENEATH CANOPY, IF ANY										
algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)	"										
standing water (inches)							30	8	24	>24	>21.5
	Invasive species cover:	0.0									
	Soil Moisture Index:	1.22				Total cover:	22	74	42	w	35
	Percent vegetated (under canopy):	100				FAC and wetter cover:	22	74	42	w	35
	Native Species:	6				Native cover:	22	74	42	w	35
	Introduced Species:	0				Woody cover:	0	0	0	0	0
						Percent FAC and wetter of total:	100	100	100	w	100
						Percent native of total:	100	100	100	w	100

Marion Mitigation Bank Plant Monitoring, 2017 Phase 2		Date(s) sampled: 7/5/2017																				Cover (%)									
Forested/Scrub-Shrub Habitat Type		Sample Station																				Cover (%)									
Species	Common Name	Native	Indicator	SMI	Wet	Woody	E-055	E-081	F-070	F-076	F-083	F-090	F-103	F-106	S-022	S-036	S-056	S-106	S-140	S-195	S-227	S-153	E-020	S-245	F-028	S-073	F-049	E-189	Mean	SMI_m	
<i>Agrostis stolonifera</i>	creeping bentgrass		FACW	2	y												3						6		3				0.6		
<i>Alisma triviale</i>	northern water plantain	yes	OBL	1	y															4									0.2		
<i>Alnus rhombifolia</i>	white alder	yes	FACW	2	y	y	95														60								64.0	128.0	
<i>Daucus carota</i>	wild carrot/ Queen Anne's lace		NOL	5	u																					8			0.1		
<i>Eleocharis palustris</i>	common [creeping] spikerush	yes	OBL	1	y																	4	10						0.6	0.6	
<i>Epilobium ciliatum</i>	fringed willowherb	yes	FACW-	2	y				8									3											0.5	1.0	
<i>Equisetum arvense</i>	common [field] horsetail	yes	FAC	3	y		5	75							8			15							10				5.1	15.3	
<i>Fraxinus latifolia</i>	Oregon ash	yes	FACW	2	y	y					70			5										5			20		4.5	9.0	
<i>Fraxinus latifolia seedling</i>	Oregon ash seedling	yes	FACW	2	y	y									2														0.1	0.2	
<i>Hordeum brachyantherum</i>	meadow barley	yes	FACW-	2	y																			3				0.1	0.2		
<i>Holcus lanatus</i>	common velvetgrass		FAC	3	y		4			5								35					50	50		80		10.2	30.6		
<i>Holcus mollis</i>	creeping velvetgrass		FACU	4	y												25											1.1	4.5		
<i>Juncus effusus</i>	soft rush	yes	FACW	2	y				50	85	40	15	90							45		5						15.0	30.0		
<i>Lemna minor</i>	duckweed	yes	OBL	1	y						2	25		1						10		20	1			1	5	3.0	3.0		
<i>Leucanthemum vulgare</i>	oxeye daisy		UPL	5																					10			0.5			
<i>Lotus corniculatus</i>	birdsfoot trefoil		FAC	3	y					35	7														6			2.4	7.2		
<i>Ludwigia palustris</i>	marsh seedbox	yes	OBL	1	y								2										65					3.0	3.0		
<i>Mentha pulegium</i>	pennyroyal		OBL	1	y						1												4					0.2	0.2		
<i>Phalaris arundinacea</i>	reed-canary grass	invasive	FACW	2	y		90	50							3	85				45	70			15				16.2	32.4		
<i>Plantago lanceolata</i>	buckhorn plantain		FACU+	4														13										0.6	2.4		
<i>Poa sp.</i>																												0.2			
<i>Polygonum hydropiperoides</i>	waterpepper	yes	OBL	1	y							8								45	5	12	8			80		7.2	7.2		
<i>Populus balsamifera ssp. trichocarpa</i>	black cottonwood	yes	FAC	3	y	y	25			40																70		6.1	18.4		
<i>Rubus ursinus</i>	trailing blackberry	yes	FACU	4																				5				0.2			
<i>Salix hookeriana</i>	Hooker willow	yes	FACW	2	y	y	20			55																		23.3	46.6		
<i>Salix lucida ssp. lasiandra</i>	Pacific [red] willow	yes	FACW+	2	y	y	30		80																			12.5	25.0		
<i>Salix sitchensis</i>	Sitka willow	yes	FACW	2	y	y						90		50						25			5					7.7	15.4		
<i>Schedonorus arundinaceus</i>	tall fescue		FAC	3	y																						5	0.2	0.6		
<i>Sparganium emersum</i>	European bur-reed	yes	OBL	1	y																						10	0.5	0.5		
<i>Spiraea douglasii</i>	Douglas' spiraea	yes	FACW	2	y	y				20												22		25			80	6.7	13.4		
<i>Veronica americana</i>	American speedwell	yes	OBL	1	y		40							7														2.1	2.1		
<i>Vicia sp.</i>																		1										0.0	0.0		
<i>Vicia pannonica</i>	Hungarian vetch		NOL	5	u																							0.2	1.0		
<i>Wolffia borealis</i>	northern watermeal	yes	OBL	1	y																	10				4	1	10	1.0	1.0	
bare (soil, mud, rock)	BENEATH CANOPY, IF ANY						6	5	17	10	7	58		1	86	15	72	24		1	8		6		4		20		15.5		
algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)	"																														
standing water (inches)												2										4					20		16		
woody basal cover												20							<1			10									
Invasive species cover:	16.2																														
Soil Moisture Index:	2.03																														
Percent vegetated (under canopy):	85						FAC and better cover:	169	190	163	185	183	132	138	154	112	165	95	122	145	130	152	116	98	103	159	91	180	5	195	397
Native Species:	19						Native cover:	75	140	163	145	175	132	138	154	109	80	95	83	145	85	82	116	94	33	80	91	100	5	162	
Introduced Species:	10						Woody cover:	75	95	80	95	90	90	90	55	100	80	95	65	90	35	82	75	10	25	70	0	100	0	125	
Percent FAC and better of total:								100	100	100	100	100	100	100	100	100	100	79	90	100	100	100	100	100	90	89	100	100	100	98	
Percent native of total:								44	74	100	78	96	100	100	97	48	79	61	100	65	54	100	96	32	50	100	56	100	83		
"e" = standing water:													e										e				e				
"w" = >30% cover of woody species:							w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w	w		

Marion Mitigation Bank Plant Monitoring, 2017 Phase 2					
Oak Savannah/Upland Habitat Type			Date sampled: 7/5/17		
Cover (%)					
Sample Station					
Species	Common Name	Native	F-006	F-0112	Mean
<i>Alnus rhombifolia</i>	white alder	yes		35	17.5
<i>Centaureum erythraea</i>	European centaury		1		0.5
<i>Daucus carota</i>	wild carrot/ Queen Anne's lace		7		3.5
<i>Epilobium ciliatum</i>	fringed willowherb	yes		1	0.5
<i>Festuca occidentalis</i>	western fescue	yes	5		2.5
<i>Galium aparine</i>	catchweed bedstraw/ cleavers	yes		1	0.5
<i>Holcus lanatus</i>	common velvetgrass		30	5	17.5
<i>Leucanthemum vulgare</i>	oxeye daisy		25		12.5
<i>Parentucellia viscosa</i>	parentucellia		1		0.5
<i>Plantago lanceolata</i>	buckhorn plantain		8		4.0
<i>Rubus discolor</i>	Himalayan blackberry	invasive		30	15.0
<i>Rumex acetosella</i>	sheep [red] sorrel		2		1.0
<i>Salix lucida ssp. lasiandra</i>	Pacific [red] willow	yes		60	30.0
<i>Schedonorus arundinaceus</i>	tall fescue		6		3.0
<i>Trifolium pratense</i>	red clover		12		6.0
bare (soil, mud, rock)	BENEATH CANOPY, IF ANY		3	93	48.0
algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)	"				
Total cover:			97	132	115
Native cover:			5	97	51
Percent native of total:			5	73	45
Native Species:		5	Invasive Species:		15.0
Introduced Species:		10			52

Marion Mitigation Bank Plant Monitoring, 2017 Phase 3																			
Forested/Scrub-Shrub Habitat Type		Date(s) sampled: 7/4/2017																	
Cover (%)																			
		Sample Station																	
Species	Common Name	Native	Indicator	MTI	Wet	Woody	E-051	E-052	E-070	E-138	S-027	S-028	S-075	S-076	S-100	S-103	S-105	Mean	MTI_m
Agrostis capillaris/castellana	colonial/dryland bentgrass		FAC	3	y									65		8	10	7.6	22.65
Alopecurus geniculatus	water foxtail		OBL	1	y								30	8				3.5	3.45
Bidens cernua	nodding beggar's-ticks	yes	FACW+	2	y		1											0.1	
Cirsium arvense	Canada thistle	invasive	FAC-	3												15		1.4	
Daucus carota	wild carrot/ Queen Anne's lace		NOL	5	u										15	12		2.5	12.25
Eleocharis palustris	common [creeping] spikerush	yes	OBL	1	y			25										2.3	2.27
Epilobium brachycarpum	tall annual willowherb	yes	UPL	5													3	0.3	1.35
Epilobium ciliatum	fringed willowherb	yes	FACW-	2	y										6	6		1.1	2.18
Equisetum arvense	common [field] horsetail	yes	FAC	3	y												6	0.5	1.62
Festuca rubra	red fescue	yes	FAC+	3	y											5		0.5	1.35
Galium aparine	catchweed bedstraw/ cleavers	yes	FACU	4												3	3	0.5	2.16
Geranium carolinianum	Carolina geranium	yes	NOL	5	u												3	0.3	1.35
Holcus lanatus	common velvetgrass		FAC	3	y									8		20	15	3.9	11.70
Hordeum brachyantherum	meadow barley	yes	FACW-	2	y								20			3		2.1	4.18
Juncus effusus	soft rush	yes	FACW	2	y									3				0.3	0.54
Lemna minor	duckweed	yes	OBL	1	y		1	10	1	10	20	20						5.6	5.63
Lotus corniculatus	birdsfoot trefoil		FAC	3	y									1				0.1	0.27
Madia elegans	common madia	yes	NOL														4	0.4	
Madia sp.														7				0.6	
Mentha pulegium	pennyroyal		OBL	1	y								40					3.6	3.63
Phalaris arundinacea	reed-canary grass	invasive	FACW	2	y		25	8	10	7						5		5.0	10.00
Poa sp.																2		0.2	
Poa trivialis	rough [roughstalk] bluegrass		FACW	2	y												20	1.8	3.62
Polygonum hydropiperoides	waterpepper	yes	OBL	1	y			35	6	4								4.1	4.09
Populus balsamifera ssp. trichocarpa	black cottonwood	yes	FAC	3	y	y	10	10	10	30								5.5	16.35
Rosa nutkana	Nootka rose	yes	FAC-		3												15	1.4	
Rumex crispus	curly dock		FAC+	3	y											3		0.3	0.81
Salix lucida ssp. lasiandra	Pacific [red] willow	yes	FACW+	2	y	y	85	80	80	45								26.0	52.00
Solanum dulcamara	bittersweet nightshade		FAC+	3	y				70	8								7.1	21.30
Trifolium sp													5					0.5	0.00
Veronica americana	American speedwell [brooklime]	yes	OBL	y	1												5	0.5	
Vicia hirsuta	tiny vetch		NOL	5	u												10	0.9	4.50
Vicia pannonica	Hungarian vetch		NOL	5	u									3		35		3.5	17.25
Vicia tetrasperma	four-seeded vetch		NOL	5	u												25	2.3	11.35
Vulpia bromoides	barren fescue		UPL	5												3		0.3	1.35
bare (soil, mud, rock)	BENEATH CANOPY, IF ANY						73	22		71			5	5				16.0	
algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)	"						195	190	177	175	20	20	100	100	15	129	116	112.5	
standing water (inches)											16	24						3.6	
	Invasive species cover:	6.4																	
	Soil Moisture Index:	2.28				Total cover:	122	168	177	104	20		95	95	15	129	116	96	219
	Percent vegetated (under canopy):	-28				FAC and wetter cover:	122	168	177	104	20		90	85	0	56	51	81	
	Native Species:	17				Native cover:	97	160	97	89	20		20	3	0	26	36	51	
	Introduced Species:	18				Woody cover:	95	90	90	75	0		0	0	0	0	0	31	
						Percent FAC and wetter of total:	100	100	100	100	100		95	89	0	43	44	84	
						Percent native of total:	80	95	55	86	100		21	3	0	20	31	53	
	1 emergent, not woody					"e" = standing water:					e								
	0 emergent, woody					"w" = >30% cover of woody species:	w	w	w	w									



Marion Mitigation Bank Plant Monitoring, 2016 Phase 3

Emergent Habitat Type		Date(s) sampled: 7/4/2017														w = deep water; no vegetation									
Cover (%)																									
		Sample Station																							
Species	Common Name	Native	Indicator	MTI	Wet	Woody	E-031	E-047	E-078	E-219	E-224	E-282	E-299	E-304	E-349	E-348	E-315	E-375	E-327	E-387	E-316	S-055	Mean	MTI_m	
<i>Azolla filliculoides/mexicana</i>	mosquito-fern [water-fern]	yes	OBL	1	y											5		w					0.31	0.31	
<i>Bidens cernua</i>	nodding beggar's-ticks	yes	FACW+	2	y																2		0.13		
<i>Bromus hordeaceus ssp. hordeaceus</i>	soft brome		FACU	4																		5	0.31		
<i>Carex sp.</i>																					2		0.13		
<i>Echinochloa crus-galli</i>	large barnyard-grass		FACW	2	y																3		0.19		
<i>Eleocharis ovata</i>	ovate spikerush	yes	OBL	1	y			4															0.25		
<i>Eleocharis palustris</i>	common [creeping] spikerush	yes	OBL	1	y			4	87	12		70	80	80	35	5	2	w			17		24.50	24.50	
<i>Elymus triticoides</i>	creeping wildrye	yes	FAC	3	y			6				2											0.50		
<i>Equisetum arvense</i>	common [field] horsetail	yes	FAC	3	y																4		0.25		
<i>Epilobium ciliatum</i>	fringed willowherb	yes	FACW-	2	y																5	3	0.50		
<i>Galium aparine</i>	catchweed bedstraw/ cleavers	yes	FACU	4																		25	1.56		
<i>Holcus lanatus</i>	common velvetgrass		FAC	3	y														5		3	30	2.38		
<i>Juncus effusus</i>	soft rush	yes	FACW	2	y			4	15									w			25		2.75	5.50	
<i>Lactuca serriola</i>	prickly lettuce		FACU	4																		3	0.19		
<i>Lapsana communis</i>	nipplewort		FAC	3	y																	15	0.94		
<i>Leersia oryzoides</i>	rice cut-grass	yes	OBL	1	y					20								w	6				1.63	1.63	
<i>Lemna minor</i>	duckweed	yes	OBL	1	y		1	2		1		1	1	1	1	1	2	w	3				0.88	0.88	
<i>Lotus corniculatus</i>	birdsfoot trefoil		FAC	3	y																	25	1.56		
<i>Ludwigia palustris</i>	marsh seedbox	yes	OBL	1	y		30	3	10	65	35	5	5	3			10	w	25		2		12.10	12.10	
<i>Mentha pulegium</i>	pennyroyal		OBL	1	y													w		8			0.50	0.50	
<i>Paspalum distichum</i>	knotgrass	yes	FACW	2	y								5	10	18			w		60			5.81	11.62	
<i>Phalaris arundinacea</i>	reed-canary grass	invasive	FACW	2	y		1	7			5							w	2				0.94	1.88	
<i>Populus balsamifera ssp. trichocarpa</i>	black cottonwood	yes	FAC	3	y	y																15	0.94	2.82	
<i>Polygonum hydropiperoides</i>	waterpepper	yes	OBL	1	y		9	15				3	7	4	12		60	w	8	30			9.25	9.25	
<i>Potamogeton sp.</i>												5											0.32		
<i>Salix hookeriana</i>	Hooker willow	yes	FACW	2	y	y												10					0.63		
<i>Salix lucida ssp. lasiandra</i>	Pacific [red] willow	yes	FACW+	2	y	y			5					5			5	w	20				2.19	4.37	
<i>Salix sitchensis</i>	Sitka willow	yes	FACW	2	y	y															30		1.87		
<i>Schoenoplectus acutus</i>	hardstem bulrush	yes	OBL	1	y										5			w					0.31	0.31	
<i>Sparganium emersum</i>	European bur-reed	yes	OBL	1	y		25	20				5			25			w					4.68	4.68	
<i>Typha latifolia</i>	cattail	yes	OBL	1	y		20	50										w					4.38	4.38	
<i>Vicia pannonica</i>	Hungarian vetch		NOL	5	u																	15	0.94	4.69	
<i>Vicia sativa</i>	common vetch		UPL	5																		10	0.63	3.13	
<i>Wolffia borealis</i>	northern watermeal	yes	OBL	1	y					10					1			w					0.69	0.69	
bare (soil, mud, rock)	BENEATH CANOPY, IF ANY						4	3	3	3												42	3.44		
algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)	"																								
standing water (inches)											6	6	8	10	12	20	24	>36						5.4	
Invasive species cover:	0.9																								
Soil Moisture Index:	1.10																								
Percent vegetated (under canopy):	97		FAC and wetter cover:	96	97	97	111	65	91	98	103	72	36			0				118		121	85	93	
Native Species:	22		Native cover:	95	90	97	111	60	86	98	103	72	36			0				107		43	76		
Introduced Species:	12		Woody cover:	0	0	0	5	0	0	0	5	0	0			0				0		15	6		
Percent FAC and wetter of total:				100	100	100	100	100	95	100	100	100	100			NA				100		52	95		
Percent native of total:				99	93	100	100	92	95	100	100	100	100			NA				91		36	89		
7 emergent, not woody			"e" = standing water:						e	e	e	e	e	e	e	e									
0 emergent, woody			"w" = >30% cover of woody species:																						
0 woody, not emergent																									

Marion Mitigation Bank Plant Monitoring, 2017 Phase 3														
Oak Savannah Habitat Type														
Cover (%)														
Date(s) sampled: 7/3 and 7/4, 2017														
Sample Station														
Species	Common Name	Native	O-BE	O-BN	O-BS	O-BW	O-007	O-027	O-028	O-059	O-060	S-002	S-037	Mean
<i>Agrostis capillaris/castellana</i>	colonial/dryland bentgrass				25	10	80					5		10.9
<i>Bromus carinatus</i>	California brome	yes							30					2.7
<i>Bromus hordeaceus ssp. hordeaceus</i>	soft brome				20							5		2.3
<i>Bromus sterilis</i>	barren brome			50								35		7.7
<i>Convolvulus arvensis</i>	field bindweed								3					0.3
<i>Daucus carota</i>	wild carrot/ Queen Anne's lace		2		8		3			2	5		3	1.9
<i>Elymus glaucus</i>	blue wildrye	yes		30			10	5	8	30				7.5
<i>Elymus repens</i>	quackgrass					30		50	40					10.9
<i>Festuca occidentalis</i>	western fescue	yes					7	20		8	70			9.5
<i>Fraxinus latifolia seedling</i>	Oregon ash seedling	yes											1	0.1
<i>Galium aparine</i>	catchweed bedstraw/ cleavers	yes		6				3	4			15		2.5
<i>Geranium carolinianum</i>	Carolina geranium	yes						1	3					0.4
<i>Holcus lanatus</i>	common velvetgrass		3	8	3					6		5	75	8.8
<i>Holcus mollis</i>	creeping velvetgrass									30				2.7
<i>Hordeum brachyantherum</i>	meadow barley	yes									2			0.2
<i>Leontodon nudicaulis</i>	lesser hawkbit		8										4	0.4
<i>Lactuca serriola</i>	prickly lettuce			5										0.5
<i>Madia elegans</i>	common madia	yes									7			0.6
<i>Parentucellia viscosa</i>	parentucellia												1	0.1
<i>Poa sp</i>				2	5	5						10		2.0
<i>Rubus armeniacus</i>	himalayan blackberry	invasive							15		20			3.2
<i>Sonchus asper</i>	prickly sow-thistle												4	0.4
<i>Trifolium sp</i>													2	0.2
<i>Vicia pannonica</i>	Hungarian vetch			4			1			3		30		3.5
<i>Vicia sativa</i>	common vetch				35									3.2
<i>Vulpia bromoides</i>	barren fescue				5		2	20		10	3			3.6
bare (soil, mud, rock)	BENEATH CANOPY, IF ANY							2	2	8				1.1
algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.)	"					55								
	Total cover:		13	105	101	45	103	98	101	92	107	105	90	86
	Absolute percent native cover:	0	36	0	0	17	28	43	41	79	15	1		24
	Relative percent native of total:	0	34	0	0	17	29	43	45	74	14	1		27
	Native Species:	8												3.2
	Introduced Species:	18												99

## APPENDIX C: VEGETATION PLOT REDUCTION TABLE

**APPENDIX C: Plot Reduction Table 2017**

2016 Existing Plot List with Selected Plots Highlighted in RED.		
Phase 1		
Cowardin Class/ Habitat	Vegetation sample plot	Comments
PFO (originally 37 plots) 16 total after reduction	E-035	Selected even numbered plots that were accessible in 2017.
	E-053	
	F-149	
	E-079	
	E-082	
	E-109	
	E-123	
	EN-070	
	EN-076	
	ENS-04	
	F-009	
	F-033	
	F-034	
	F-096	
	F-097	
	F-103	
	F-144	
	F-205	
	S-011	
	S-020	
	S-021	
	S-040	
	S-046	
	S-056	
	S-058	
	S-116	
	S-119	
	S-155	
	E-003	
	E-066	
	E-080	
	E-086	
	EN-008	
EN-052		
ENS-02		
ENS-03		
F-071		
Oak Savannah/ Upland (1 plot)	ENS-01	Need to add 9 buffer plots.

Phase 2		
Cowardin Class/ Habitat	Vegetation sample plot	Comments
PEM (4 plots)	E-014	Need to add 6 PEM plots. These plots will be added in 2018.
	E-160	
	E-162	
	E-143	
PSS/ PFO (originally 24 plots) 12 plots total after reduction	E-055	Selected even numbered plots that were accessible in 2017.
	E-081	
	F-070	
	F-076	
	F-083	
	F-090	
	F-103	
	F-106	
	S-022	
	S-036	
	S-056	
	S-106	
	S-140	
	S-195	
	S-227	
	S-153	
	E-020	
	S-245	
	F-028	
	S-073	
F-049		
E-189		
E-091	Surrounded by over 36" inundation, could not sample	
E-112	Surrounded by over 36" inundation, could not sample	
Oak savannah/ Upland (2 plots)	F-006	Need to add 8 upland buffer Plots
	F-0112	

Phase 3			
Cowardin Class/ Habitat	Vegetation sample plot	Comments	
PEM (16 plots)	E-031	selected even numbered plots, but there were less than 10, so left any of the highest numbered odd plots to achieve 10 plots total.	
10 plots total	E-047		
	E-078		
	E-219		
	E-224		
	E-282		
	E-299		
	E-304		
	E-349		
	E-348		
	E-315		
	E-375		inundated over 36" water, could not sample
	E-327		
	E-387		
	E-316		
	S-055		
PSS/ PFO (11 plots)	E-051	Only 11 plots, so didn't remove any.	
	E-052		
	E-070		
	E-138		
	S-027		
	S-028		
	S-075		
	S-076		
	S-100		
	S-103		
	S-105		
Oak Savannah/ Upland (11 plots)	O-BE	added 10 new woody plots, will monitor herbs at these plot locations in 2018.	
	O-BN		
	O-BS		
	O-BW		
	O-007		
	O-027		
	O-028		
	O-059		
	O-060		
	S-002		
	S-037		

## **APPENDIX D: CREDIT LEDGER (2017)**

MARION MITIGATION BANK CREDIT LEDGER: 1/1/2017 - 1/1/2018

Date	Transaction Type	Jurisdiction	Permitee	Permit Number (DSL/Corps)	Wetland Impact Type	Number of Credits (ac.)	Balance of Credits after Transaction (ac.)
9/27/2017	withdrawl	State/ Federal	Ted and Sue Painter	30202-FP, NWP-2003-00232	Flats, PFO	0.69	0.758
10/18/2017	withdrawl	State/ Federal	City of Keizer	59870-GP, NWP-2017-00087	Slope, PEM	0.005	0.753
<b>Credits Released 2017 (ac.): 0.00</b>		<b>Credits Withdrawn 2017 (ac.): 0.695</b>					
<b>Total Credits Released (ac.): 23.36</b>						<b>Total Credits Withdrawn (ac.): 22.657</b>	
						<b>Balance (ac.):</b>	<b>0.753</b>