Mitigation Monitoring Annual Report Year 4 (2015)
Tualatin Valley Environmental Bank

1: *Tualatin Valley Environmental Bank* Identifiers:

DSL Permit # APP46796 Corps Permit # NWP-2009-552 Permittee Dave Heikes Farms Inc.
County Washington Report Date Dec. 30, 2015 Monitoring Year 4
Date Removal-Fill Activity Completed October 2011
Date mitigation was completed: Grading October 2011 Planting _wetlands-various dates 2011-2015 & buffers 2013-2015
Date(s) of data collection: July 27, 28, 29, 30 & August 3, 2015
Report prepared by: C. Jonas Moiel & Jeff Handley

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:

	Performance standards (verbatim from permit)	Fully Met? (Y/N)	Comments/Reason for shortfall (mark NA if doesn't apply this year)
	VEGETATION PERFORMANCE STANDARDS		
Herbaceous (PEM) Wetlands			
FACW or FAC Dominated Herbaceous Wetlands			
1.1	The combined cover of native species for Year 1 shall be 40%; Year 2 shall be 50%; and Year 3 and thereafter shall be 60%.	Y	Average cover of native species in 20 sample plots in this habitat class for Year 3 was 110%. At an 80% confidence level, the upper confidence interval (CI) was 116% and the lower CI was 105%. This meets the final standard (Year 3 & thereafter).
1.2	The cover of non-native invasive species during the 1st and 2nd years shall not exceed 30%. For Year 3 and thereafter, the non-native invasive cover, excluding reed canarygrass (*Phalaris arundinacea*), shall not exceed 10%. The cover of reed canary grass shall not exceed 10% for Year 3 and thereafter.	Y	Average cover of invasive species in this habitat class for Year 3 rounded to 0%. At an 80% confidence level, the upper confidence interval (CI) was 0% and the lower CI was 0%. No reed canarygrass was present in any sample plot. This meets the final standard (Year 3 & thereafter).

1.3	Bare substrate represents no more than 20% cover by the 3rd year after planting.	Y	There was a total rounded average of 3% bare substrate in this habitat, the cover of bare mineral soil or moss rounded to 3% and the cover of dead, sprayed non-native plants rounded to 1%. The upper CI was 4% and the lower CI was 2%. This meets the final standard (Year 3 & thereafter).
1.4	The standard for diversity in herbaceous wetlands is at least 6 native species, each with 5% or more average cover and occurring in at least 10% of the plots by the 3rd year after planting.	Y	This habitat is achieving the final standard (Year 3 & thereafter). Six native species (*Deschampsia cespitosa, Epilobium densiflorum, Hordeum brachyantherum, Leersia oryzoides, Lotus unifoliolatus* and *Plagiobothrys scouleri*) met the diversity criteria.
1.5	The hydrophytic vegetation standard is that the Prevalence Index is ≤ 3.0 and/or the vegetation passes the "50/20 rule" for dominance of hydrophytic vegetation.	Y	The average rounded Prevalence Index (PI) for the habitat class is 2 (FACW). This meets the final standard (Year 3 & thereafter).
OBL Dominated Herbaceous Wetlands			
2.1	The standard for native cover for Year 1 shall be 10%; Year 2 shall be 20%; and Year 3 and thereafter shall be 40%.	Y	Average cover of native species in 22 herbaceous plots in this habitat class for Year 4 was 83%, which exceeds the Year 3 Standard. At an 80% confidence level, the upper confidence interval (CI) was 90% and the lower CI was 76%. This meets the final standard (Year 3 & thereafter).
2.2	The cover of non-native invasive species during the 1st and 2nd years shall not exceed 30%. For Year 3 and thereafter, the non-native invasive cover, excluding reed canarygrass, shall not exceed 10%. The cover of reed canary grass shall not exceed 10% for year 3 and thereafter.	Y	The average invasive species cover in this habitat class rounded to 0%. At an 80% confidence level, the upper confidence interval (CI) was 1% and the lower CI was 0%. The only invasive species in the plots was reed canarygrass. This meets the final standard (Year 3 & thereafter).
Forested (PFO) Wetlands, Shrub dominated (PSS) Wetlands and Buffers,			
3.1	The combined cover of native species for Year 1 shall be 40%; Year 2 shall be 50%; and Year 3 and thereafter shall be 60%.	PFO: Y PSS: Y Buffer: Y	**PFO:** Average cover of native species in the 36 herbaceous plots for this habitat class for Year 4 was 78% (upper CI = 86%, lower CI = 71%). There was an average of 22% cover of native woody species in the 18 woody sample plots (upper CI = 27%, lower CI =17%). Combining the herb & woody averages gives a total of 100% native cover, which meets the final standard (Year 3 & thereafter). **PSS:** Average cover of native species in the 41 herbaceous plots for this habitat class for Year 4 was 63% (upper CI= 71%, lower CI = 55%). There was an average of 42% cover of native woody species in the 20 woody sample plots (upper CI = 48%, lower CI =36%). Combining the herb & woody averages gives a total of 105% native cover, which meets the final standard (Year 3 & thereafter). **Buffer:** Average cover of native species in the 28 herbaceous plots for this habitat class was 74% (upper CI = 80%, lower CI = 68%). There was an average of 11% cover of native woody species in the 14 woody sample plots (upper CI = 12, lower CI =10). Combining the herb & woody averages gives a total of 85% native cover, which meets the Year 2 standard (this is Year 2 for the buffers).

3.2	The combined cover of non-native invasive species will not exceed 30% by Year 3 and thereafter.	PFO:Y PSS:Y Buffer: NA	**PFO:** The average cover of invasives in the herb plots for this class rounded to 1% (upper CI =1%, lower CI= 0%); invasive cover in the woody plots rounded to 0% (upper & lower CI= 0). This meets the final standard (Year 3 & thereafter). **PSS:** The average cover of invasives in the herb plots for this class was 1% (upper CI=2%, lower CI=0%); invasive cover in the woody plots rounded to 0% (upper CI=0%, lower CI=0%). This meets the final standard (Year 3 & thereafter). **Buffer:** This is Year 2 for the buffer so this standard is NA but average cover of invasives in the herb plots was 1% (upper CI= 1%. lower CI=0%) and average invasive cover in the woody plots rounds to 0% (upper CI & lower CI=0%).
3.3	Bare substrate represents no more than 40% cover by the 3rd year.	PFO:Y PSS:Y Buffer: NA	**PFO:** The average is 20% in the herbaceous plots (upper CI= 26%, lower CI =14%). **PSS:** the average is 15% in the herbaceous plots (upper CI=19%, lower CI =11%). **Buffer:** This is Year 2 in the buffer so standard is NA; the bare substrate averages 15% (upper CI= 20%, lower CI= 9%). **Note:** As of 2015, any herbaceous plot having ≥ 60% shade from woody species shall be excluded from the bare ground criteria.
3.4	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.	PFO:N* PSS: Y Buffer: NA	**PFO:** 5 native species (*Deschampsia cespitosa, Hordeum brachyantherum, Leersia oryzoides, Sparganium emersum* plus *Fraxinus latifolia* [from the woody plots]) met the criteria. ***Note-** There are many other native species with 1-4% cover in the PFO. It is expected that by next year, as woody species increase in cover, that the PFO habitats will meet the diversity standard; see Section 3 for discussion. **PSS:** 7 species (*Epilobium ciliatum, Juncus effusus, L. oryzoides* plus *Salix hookeriana, S. sitchensis, S. lucida* var. *lasiandra* and *Populus balsamnifera* [from the woody plots]) met the criteria. **Buffer:** NA for Year 2 but 6 species (*Bromus caritinatus, Deschampsia cespitosa, Deschampsia elongata, Elymus glaucus, Festuca idahoensis* and *Festuca rubra)* currently meet the criteria and thus the buffer would meet the Year 3 standard.
3.5	The density of woody vegetation is at least 1,000 native plants (shrubs) and/or stems (trees) per acre, including native volunteers. After the aerial canopy cover (*including* shrub cover) is 50% or greater, there will be no minimum number of plants/stems. Woody vegetation standards should be met for two successive years without irrigation.	PFO: Y PSS: Y Buffers: N	**PFO:** There was an average of 1,171 plants or stems/acre in 18 woody plots, which meets the standard. Percent cover was 22% (upper CI=27% & lower CI= 17%). **PSS:** There was an average of 1,131 plants or stems/acre in 20 woody plots, which meets the standard. Percent cover was 42% (upper CI= 48%, lower CI= 36%). **Buffers:** There was an average of 807 plants or stems/acre in 13 woody plots. This does not yet meet the standard but represents an improvement over the average of 675 in 2014. There was some continued mortality of newly planted trees due to drought conditions in 2015.
3.6	The hydrophytic vegetation standard for PSS and PFO wetlands is that the Prevalence Index is ≤ 3.0 and/or the vegetation passes the "50/20 rule" for dominance of hydrophytic vegetation.	PFO: Y PSS: Y	**PFO:** The average rounded Prevalence Index (PI) from the herbaceous and woody plots were both 2 (FACW). **PSS:** The average rounded Prevalence Index (PI) from the herbaceous and woody plots were both 2 (FACW). Three shaded herb plots were unvegetated and thus had no PI.

Notes: All the above cover percentages represent absolute aerial cover. In all cases, the "Year" refers to the number of years after *that portion of the site* was first planted. Thus **all habitat classes *except* the buffers are Year 4; the buffers are Year 2.** Bare substrate includes areas of bare soil and areas covered by moss, water, or dead herbaceous plants.

HYDROLOGY PERFORMANCE STANDARDS			
	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.*	Y*	Y* The post-construction wetland delineation "lite" was completed in 2014. DSL agreed with most of the delineated post-construction boundary but requested some additional data be collected in paired plots to fine-tune the boundary. It was expected that this would occur in 2015. However, precipitation frequency was abnormal during our typical hydrology monitoring period in the early growing season so the extra data collection was postponed until a more normal year, likely 2016.

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 ☐

*A credit release will be requested for the submittal of this monitoring in the spring of 2016. This release will be requested via a memo.

December 30, 2015

TUALATIN VALLEY ENVIRONMENTAL BANK

MONITORING REPORT YEAR 4 (2015)

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1.0 MITIGATION PLAN PURPOSE AND OVERVIEW

1.1 LOCATION:

The Tualatin Valley Environmental Bank (TVEB) is located on 105.95 acres at the confluence of the Tualatin River, Christensen Creek and several unnamed surface and sub-surface drainages. The TVEB is located near 9400 southwest Heikes Drive in Hillsboro, Oregon, 97123; Township 1 South, Range 2 West, Section 32, utilizing portions of tax lots 1200 and 691; and Township 1 South, Range 2 West, Section 29, tax lot 601.

1.2 MITIGATION GOALS AND OBJECTIVES:

At the request of DSL, we have removed some portions of text that are unchanged from year to year. To review the "Mitigation Goals and Objectives" please refer to either the text from any of the first three monitoring reports (Green Banks LLC 2012-2014) or the Mitigation Bank Instrument (Green Bank LLC 2010).

1.3 MAINTENANCE AND MANAGEMENT ACTIONS:

Green Banks uses an integrated approach to vegetation management at the TVEB. In 2015, there was a lower need for maintenance compared to previous years due to reduced non-native species cover. Most of the common target weeds have been reduced to very low numbers and small populations. This trend of decreased non-native cover has been noted for the past 3 years.

Green Banks' scientists observed all areas of the TVEB approximately monthly in 2015 to determine what maintenance/management actions were necessary. Vegetation maintenance included herbicide application, mowing, cutting, and hand pulling. Management strategies differ in various areas of the TVEB based on a variety of factors such as: row planting versus clustered/random planting, steep slopes, and saturated areas. Most of the wetland areas have a clustered planting of woody species and were managed on-foot with the use of backpack herbicide sprayers, saws and hand tools. Most of the buffer areas (except those on steep slopes) were planted in rows and managed on-foot and with ATV.

The use of herbicide (volume and frequency) has been greatly reduced since 2014 (and previous years) as a result of having much lower weed cover at the TVEB. The project area was backpack spot-sprayed twice in 2015.

Most of the buffer areas, except those on steep slopes or with existing mature forest, were mowed two times in 2015 (summer, fall). Mowing was completed in areas with row planting to reduce competition from grasses, reduce annual and biennial weed cover, and to maintain row visibility.

The wetland prairie area was heavily managed in 2013 and 2014, but had very little management in 2015. The entire area was burned, seeded and planted in 2014 and as a result had increased diversity and cover of broadleaf native species in 2015. The prairie area was spot sprayed in the spring, weeds were hand-pulled in the summer, and it was mowed in November.

Inter-seeding of native plant species is a common practice which has occurred multiple times per year since 2011. It will continue to occur until a diverse mix of native species, especially annuals, are common in abundance. Inter-seeding treatments were made to selected wetland and upland areas in 2015 including the wetland prairie and upland buffers.

1.4 MONITORING METHODS:

At the request of DSL, we have removed some portions of text that are unchanged from year to year. To completely review the "Monitoring Methods" particularly including the criteria for designating plant species as "non-native" and/or "invasive" please refer to either the text from any of the first three monitoring reports (Green Banks LLC 2012-2014) or the original Mitigation Bank Instrument (Green Bank LLC 2010). Section 1.5 addresses relevant aspects of this year's data collection, as well as the general protocol regarding plot locations and sizes.

The 2015 vegetation monitoring was completed from July 27th through 29th by C. Jonas Moiel and Jeff Handley, and on July 30th and August 3rd by C. Jonas Moiel. On August 4th, Dana Field (DSL) and Michael Ladouceur (Corps) were provided with monitoring data and visited the site for an annual walk-through. The response was generally positive, although there was some concern regarding tree and shrub mortality in certain portions of the buffers. There was also discussion regarding our revised protocol regarding the reintroduced herb plots under dense woody shade ($\geq$ 60%) from either pre-existing canopy (several plots on T6) or, in a few cases, in herb plots shaded by planted trees and shrubs. It was agreed that our approach in shaded herb plots was correct i.e. to record percent cover of woody shade, native, non-native and invasive herbs but to exclude those plots with $\geq$ 60% woody shade from the bare substrate performance standard.

1.5 MONITORING DATA LOCATIONS:

Please refer to Figures 1a-1c which display the planted habitat types (sample units), monitoring transect locations, monitoring data plots, photo monitoring locations, and hydrology monitoring pits and wells. The habitat types consist of PEM wetlands, PSS wetlands, PFO wetlands, and buffers. In the PEM wetlands, we divided the class into two sub-classes: OBL dominated and FAC/FACW dominated. This is the case because each of these sub-classes have different performance standards.

In the 2015 monitoring we had total of 22 herbaceous plots in the OBL PEM community; 20 herbaceous plots in the FAC/FACW PEM community; 36 herbaceous plots and 18 woody plots in the PFO community; 41 herbaceous plots and 20 woody plots in the PSS community; and 28 herbaceous and 14 woody plots in the upland buffer areas.

Over the first three years there have been some adjustments to the number and layouts of the plots; several were skewed, moved or removed to avoid the dirt road, property lines or habitat transitions. These adjustments were documented in the first three monitoring reports and are also summarized in the notes following the vegetation monitoring data tables in Appendix A.

Only a few modifications were made to the plot layout in 2015. Specifically several plots were added on the eastern side of Transect 10, using the standard spacing, to ensure full coverage of the transect. These

plots were T10-F3, T10-FH5, T10-BF3, T10-BH5, and T10-BH6. The five PSS herbaceous plots on Transect 6 (T6-SH2, T6-SH6, T6-SH11, T6-SH12, and T6-SH14) that had been removed in 2014 (due to being in total shade provided by scattered mature trees) were added back. However these herb plots (and any others with > 60% aerial cover from woody plants) are now excluded from the bare substrate criteria. Additionally, one of the OBL plots, T7-PEMOBL2 was too deeply inundated to estimate cover, so it was removed. *Note: pending approval from DSL/Corps we may remove several more of the deeply inundated PEM OBL plots from next year's monitoring. These plots have been dominated by native species for the past 4 years and are inundated approximately one foot or more.*

Monitoring Transect and Plot Details

Transects were established running west to east, beginning at the western edge of the project area. The first transect (T1) started near the northern end of the site, and subsequent parallel transects were located at intervals of approximately 500 feet south of each other. There were two transects (T1 and T3) that were slightly skewed to lengthen the transect distance across the wetland area and to incorporate a unique plant community (PEM, HGM Slope). Transect 12 was added in 2012 (Year 1) after reviewing the monitoring data to increase the number of PEM FAC/FACW dominated herbaceous wetland plots; it was located halfway between transects 10 and 11, approximately 250 feet south of transect 10.

In general, the first wetland plot on a transect was located 5 feet east of the beginning of the transect start point; if the wetland extended to the western site boundary. The first plots on two transects (T2-SH1 and T5-PEMOBL1) were offset more than 5 feet because the former was located in a narrow sliver at the tax lot edge and the latter was located in an area with inundation too deep to survey (>3 feet). Herbaceous plots were spaced every 50 feet after the first plot on a transect. On PSS and PFO transects, a corner of the first woody plot was located at the same location as the first herbaceous plot. Each subsequent woody plot was located 100 feet east of the previous woody plot. In situations where a transect crossed an inundated portion of the wetland that was too deep to survey (>3 feet), sampling plots were offset over the inundated area and restarted easterly along the transect at the nearest location with a water depth shallow enough to survey; sampling plots east of an offset plot were spaced at the standard interval described above.

Buffer plots were established at the ends of the existing transects, when space was available. Some wetland boundaries extend to, or near to, the project area boundary and some transects only have a small amount of buffer near the edge of the project area; these areas were not used for buffer monitoring plots. *Note: last year the wetland-facing edge of the buffer woody plots coincided with the first row of planted trees and shrubs. DSL requested we change this so the plot boundary is not defined by a planting row. This year the wetland-facing edge of the plot rectangle was located at 15 feet from the approximate wetland boundary, and perpendicular to transect and thus often did not coincide with a planted row.*

The herbaceous plots were 1 square meter in size. Most of the herbaceous plots were established with the northwest corner of each meter-square at the transect plot location and were located on the south side of the transect. Some plots were located on the north side of the transect to avoid impermeable surface, upland areas, or tax lot edges. The amount of bare substrate and the areal cover of each plant species growing in the plots was estimated and recorded.

The woody vegetation plots (used in the forested wetlands, shrub-dominated wetlands and buffers) were 1,350 square feet; rectangles measuring 45 feet by 30 feet. Most of the plots were established with the 45 foot edge laying east/west and the 30 foot edge facing north/south; located on the south side of the transect. Some of the plots were skewed either by having the 30 foot edge running east/west rather than north/south or were laid on the north side of the transect to avoid impermeable surface, upland areas, or tax lot edges. The number of individual stems (trees) or plants (shrubs) of each native species, including volunteers were counted in each woody vegetation plot. We also estimated the percent cover of both native and non-native invasive woody species in each woody vegetation plot. In later years, when it becomes difficult to count clonal shrubs and/or when the shrub and tree cover is approaching 50% we will visually estimate cover rather than completing total plant counts.

The locations of the start and end points of each monitoring transect, the northwestern corner of each herbaceous plot, and all four corners of the woody vegetation plots were GPS surveyed when the monitoring locations were established in 2012 and any subsequent modifications in 2012 through 2015 have been GPS surveyed.

1.6 HYDROLOGY METHODS AND CONTEXT:

Post-construction hydrology monitoring has occurred each year since bank establishment, beginning in 2012. The MBI specifies that the post-construction delineation (delineation "lite") would occur during years 3 (2014) through 5 (2016). The delineation "lite" was conducted last year (2014) and the resulting boundary is displayed on Figures 1a-1c and Figure 2. DSL generally agreed with much of the post-construction delineation boundary but indicated in an e-mail and attached map from Dana Field (dated March 13, 2015) that they wanted additional data collected in several areas, using paired plots, before a final concurrence would be issued (Appendix B). This response was given on March 13th which was over a month into the growing season, which had abnormal rainfall frequency in 2015. Due to these conditions, the additional data were not able to be collected in 2015; we hope to have normal conditions in 2016 so that we can collect additional data and receive concurrence on the delineation "lite".

Please refer to Figures 1a-1c, Figure 2 and Appendix B, for hydrology monitoring locations and information.

Table 1 compiles the National Weather Service (NWS) monthly precipitation data for Hillsboro, Oregon from the start of the "Water Year" (October 1, 2014) through March 2015. The recorded monthly totals are compared in the table with the monthly averages from the NRCS WETS tables for Hillsboro. Additionally, the percentage of the average "Water Year to Date" at the end of each month is shown, as well as indicating whether or not the monthly totals fall within the 30-70 percentile "normal" range. Table 2 shows the daily precipitation recorded in Hillsboro by the NWS from January 1 through March 14, 2015.

Table 1: Monthly Precipitation Data Table

Month	Total Precipitation (Inches)	Average Precipitation (Inches)*	Percent of Monthly Average Precipitation	Within "Normal" 30-70 percentile Range from WETS Table?	Current Water Year to Date (Inches)	Percent of Average Water Year to Date at end of Month*
Oct. 2014	6.12	2.68	228%	above normal range (1.45"-3.27")	6.12	228%
Nov. 2014	2.83	6.03	47%	below normal range (4.07"-7.21")	8.95	103%
Dec. 2014	5.88	6.44	91%	within normal range (4.44"-7.67")	14.83	98%
Jan. 2015	3.01	5.76	52%	below normal range (3.70"-6.93")	17.84	85%
Feb. 2015	4.57	4.72	97%	within normal range (3.17"-5.65")	22.41	87%
March 2015	4.68	3.93	119%	above normal range (2.96"-4.59")	27.09	92%

* The average monthly precipitation and calculated average water year to date are from the Hillsboro WETS table, which varies slightly from the NWS average data for Hillsboro in some months.

Table 2: Daily Precipitation Data from January 1 through March 14, 2015

January	Precipitation (in.)	February	Precipitation (in.)	March	Precipitation (in.)
1	0.00	1	0.23	1	0.00
2	0.00	2	0.47	2	0.02
3	T	3	0.17	3	0.00
4	0.14	4	0.14	4	0.00
5	0.00	5	0.90	5	0.00
6	0.00	6	1.13	6	0.00
7	0.00	7	0.89	7	0.00
8	0.00	8	0.21	8	0.00
9	0.00	9	0.26	9	0.00
10	0.04	10	0.00	10	0.00
11	0.08	11	0.00	11	0.11
12	0.01	12	0.00	12	0.00
13	0.00	13	0.00	13	0.05
14	0.00	14	0.00	14	1.44
15	0.70	15	0.00		
16	0.12	16	0.00		
17	1.51	17	0.00		
18	0.24	18	0.00		
19	0.00	19	T		
20	0.00	20	0.00		
21	0.00	21	0.00		
22	0.01	22	0.00		
23	0.09	23	0.00		
24	0.00	24	0.00		
25	0.00	25	0.01		
26	0.00	26	0.05		
27	0.02	27	0.11		
28	0.05	28	0.00		
29	0.00				
30	0.00				
31	0.00				

NWS 2015. "T"= trace.

The typical period used for hydrology monitoring has been from the time of bud-break (usually in early February, between February 7 and 10) until early March. Unfortunately, the ground water levels in the early growing season of 2015 were, in some hydrology plot locations, lower and/or less persistent than typical, due primarily to a prolonged dry period from February 10 through March 10, combined with a much drier than normal January. According to the NWS data, precipitation in January 2015 was only 3.01 inches. According to the WETS tables, average January precipitation in Hillsboro is 5.76 inches and the 30-70 percentile "normal" range is 3.70-6.93 inches; thus actual precipitation was 0.69 inches below the bottom of the normal range. Additionally almost all of the January precipitation occurred in the first two and a half weeks; rainfall from January 19 through January 31 was only 0.17 inches. Rainfall in the first nine days of February of 2015 was 4.40 inches, which likely recharged some of the ground water lost in January. However the rest of the month was quite dry; between February 10 and 28 there was only 0.17 inches of precipitation. The dry period extended into early March. Although the total March precipitation ended up at 4.68 inches, which is above the average of 3.93 inches, very little rain fell in the early portion of the month; from March 1 through March 10, only 0.02 inches of precipitation was

recorded in Hillsboro. Thus the majority of the typical period of our early growing season hydrology monitoring (usually the second week in February through early March) had very low precipitation amounts; between February 10 and March 10, a total of only 0.19 inches of precipitation fell in Hillsboro; see Table 2. As a result of the anomalous conditions in the early growing season, this was not a good year to fine-tune the post-construction wetland boundary.

Annual hydrology data have been collected in several ways: shallow monitoring wells, hydrology monitoring pits (open holes), spot-checks of hydrology, and aerial photography captured by a chartered plane in the early growing season. Figures 1a-1c display the locations of the shallow monitoring wells and hydrology monitoring pits. Most of the hydrology monitoring locations are in the same locations as established during the baseline study (prior to construction). Hydrology plots identified with only a number (e.g. H12, H9) are in the same locations as in the baseline delineation (2010). Hydrology plots identified with a number and letter (e.g. 12a, 12b) were established after bank construction; these plots were added near the predicted wetland boundary, to fine-tune the boundary line.

In 2015, the growing season began on February 4th based on the bud break of native plant species on-site. It was determined to begin on February 10th in 2010, for the baseline wetland delineation, and on February 7th in 2012 and 2013 (Years 1 and 2 of post-construction monitoring).

Hydrological monitoring began on February 6th 2015 with the monitoring of hydrology pits and shallow-wells. Monitoring of hydrology plots occurred 6 times (February 6, 10, 12, 16, 21; and March 19) in 2015. Due to the abnormal rainfall frequency in early growing season, several of the monitoring pits did not display 14 days of consecutive hydrology. DSL provided comments on the 2014 delineation "lite" on March 13th 2015, requesting additional data be collected in several areas. As a result, we observed the hydrology plots on March 19th to determine if additional data could be collected in these areas. Unfortunately, due to the abnormal precipitation conditions mentioned previously, and late spring request for additional data, we were not able to collect the requested data in 2015.

Aerial photography of the project area was captured by a chartered plane on February 21, 2015. Several aerial photos from this date are included in Appendix B.

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. In previous years, the verbatim text of each vegetation standard and the results were presented in this section, essentially repeating all the information that is presented in the Cover Sheet. This year, in the interest of brevity, please refer to the Cover Sheet, which provides the *exact wording* of all the Performance Standards, the current confidence interval (CI) ranges, and comments, as well as the Vegetation Performance Standards Summary Tables (Table 3a through 3e) and brief discussion below. Please note that for all wetland habitat types listed below, 2015 is considered to be Year 4. However, the upland buffers are considered to be Year 2 as this is the second year of monitoring since the initial planting was completed. The listed acreages for each habitat type are approximate; the final areas will be determined when DSL concurs with the final post-construction wetland boundary.

Table 3a: FAC/FACW PEM Habitat (~8.3 acres, 20 Herb Plots, Year 4)										
Criteria	**1.1:** Percent Native Cover		**1.2:** Percent Invasive Cover		**1.3:** Bare Substrate		**1.4:** Diversity		**1.5:** Hydrophytic Community	
Performance Standard	**1.1:** ≥ 60% by Year 3 and thereafter		**1.2:** ≤ 10% reed canarygrass and ≤ 10% other invasive Species by Year 3 and thereafter		**1.3:** ≤ 20% by Year 3 and thereafter		**1.4:** Six native species with ≥ 5% cover, occurring in ≥ 10% of the plots.		**1.5:** Prevalence Index is ≤ 3.0	
	Average	Pass? Y/N	Average	Pass? Y/N	Average	Pass? Y/N	Number of species	Pass? Y/N	Average	Pass? Y/N
Results	**110%**	**Y**	**0%** (rounded)	**Y**	**3%**	**Y**	**6**	**Y**	**2**	**Y**

Herbaceous Palustrine Emergent (PEM) Wetlands- FAC/FACW Dominated Community

The FAC/FACW PEM community is meeting all the performance standards (Standards 1.1-1.5). It is densely populated with a diverse suite of native grasses, forbs, sedges and rushes of varying heights with an average of 110% native cover, which is nearly double the standard of 60% by Year 3 (Standard 1.1). Invasive cover (Standard 1.2) rounds to 0%. Cover by other non-natives is also minimal; of the four non-natives recorded none have average cover as high as 1%. Six native species (*Deschampsia cespitosa, Epilobium densiflorum, Hordeum brachyantherum, Leersia oryzoides, Lotus unifoliolatus and Plagiobothrys scouleri*) met the diversity standard (Standard 1.4) of ≥ 5% average cover, and occurring in 10% of the plots. The average prevalence index (Standard 1.5) is 2 (FACW); only one plot had a PI of 4 (FACU) but this was due to dominance of the native *Lotus unifoliolatus,* which despite its indicator status, is common in floodplain wetlands.

Table 3b: OBL PEM Habitat (~18.9 acres, 22 Herb Plots, Year 4)				
Criteria	**2.1:** Percent Native Cover		**2.2:** Percent Invasive Cover	
Performance Standard	**2.1:** ≥ 60% by Year 3 and thereafter		**2.2:** ≤ 10% reed canarygrass and ≤ 10% other invasive species by Year 3 and thereafter	
	Average	Pass? Y/N	Average	Pass? Y/N
Results	**83%**	**Y**	**0%** (rounded)	**Y**

Herbaceous Palustrine Emergent (PEM) Wetlands- OBL Dominated Communities

The OBL PEM community is meeting all the performance standards (Standards 2.1 and 2.2). The average percent native cover (Standard 2.1) is 83%. Dominant native species included *Leersia oryzoides,* two native *Polygonum* species and, in the permanently inundated areas, submerged native aquatics like *Ceratophyllum demursum, Elodea canadensis* and various *Potomogeton* species. Cover by invasive species (Standard 2.2) rounded to 0% (a small amount of *Phalaris arundinacea* was present); no other invasives or other non-natives were recorded. The permanently inundated areas have a stable native-dominated community; we hope to reduce the number of plots there next year- see Section 1.5, fourth paragraph for more details.

Table 3c: PFO Habitat (~23.8 acres, 18 Woody Plots & 36 Herb Plots, Year 4)												
Criteria	**3.1:** Percent Combined Native Cover		**3.2:** Percent Invasive Cover		**3.3:** Bare Substrate		**3.4:** Diversity		**3.5:** Native Stem Count/ Cover		**3.6:** Hydrophytic Community	
Performance Standard	**3.1:** ≥ 60% by Year 3 and thereafter		**3.2:** ≤ 30% invasive species by Year 3 and thereafter		**3.3:** ≤ 40% by Year 3 and thereafter		**3.4:** Six native species with ≥ 5% cover, occurring in ≥ 10% of the plots.		**3.5:** Either ≥ 1,000 plants per acre or 50% aerial cover of woody species		**3.6:** Prevalence Index is ≤ 3.0	
	Average	Pass? Y/N	Average	Pass? Y/N	Average	Pass? Y/N	Number of species	Pass? Y/N	Average # Woody plants/acre	Pass? Y/N	Average	Pass? Y/N
Results	**100** (78% herbs 22% woody)	**Y**	**1%**	**Y**	**20%**	**Y**	**5**	**N**	**1,171**	**Y**	**2** (in both herb & woody plots)	**Y**

Note: As of 2015, any herbaceous plot having ≥ 60% shade from woody species was excluded from the bare substrate criteria.

Palustrine Forested (PFO) Wetlands

The PFO community is meeting all the performance standards except diversity (Standard 3.4). It is densely populated with native trees, shrubs and herbs. The combined percent cover of native species (Standard 3.1) is 100% (78% herbs and 22% woody species). Invasive cover (Standard 3.2) in the herb layer was 1% and the woody layer invasive cover rounds to 0%. Cover by other non-natives is also minimal; of the 11 non-natives recorded only one species (*Vulpia brominoides*) had average cover as high as 1%. Average bare substrate (Standard 3.3) was only 20%. This year only five native species (*Deschampsia cespitosa, Hordeum brachyantherum, Leersia oryzoides, Sparganium emersum* and *Fraxinus latifolia*) met the diversity standard (Standard 3.4) of ≥ 5% average cover, and occurring in 10% of the plots (six species is the standard). It is expected that by 2016 (Year 5) that percent cover of several woody species will have increased and the habitat will easily meet the standard. The average density of native of native woody species (Standard 3.5) is 1,171 plants per acre. The average prevalence index (Standard 3.6) in both the herb and woody plots is 2 (FACW).

Table 3d: PSS Habitat (~11.6 acres, 20 Woody Plots & 41 Herb Plots, Year 4)												
Criteria	**3.1:** Percent Combined Native Cover		**3.2:** Percent Invasive Cover		**3.3:** Bare Substrate		**3.4:** Diversity		**3.5:** Native Stem Count/ Cover		**3.6:** Hydrophytic Community	
Performance Standard	**3.1:** ≥ 60% by Year 3 and thereafter		**3.2:** ≤ 30% invasive species by Year 3 and thereafter		**3.3:** ≤ 40% by Year 3 and thereafter		**3.4:** Six native species with ≥ 5% cover, occurring in ≥ 10% of the plots		**3.5:** Either ≥ 1,000 plants per acre or 50% aerial cover of woody species		**3.6:** Prevalence Index is ≤ 3.0	
	Average	Pass? Y/N	Average	Pass? Y/N	Average	Pass? Y/N	Number of species	Pass? Y/N	Average # woody plants /acre	Pass? Y/N	Average	Pass? Y/N
Results	**105%** (63% herbs 42% woody)	**Y**	**1%**	**Y**	**15%**	**Y**	**7**	**Y**	**1,131**	**Y**	**2** (in both herb & woody plots)	**Y**

Note: As of 2015, any herbaceous plot having ≥ 60% shade from woody species was excluded from the bare substrate criteria.

The PSS community is meeting all the performance standards (Standards 3.1- 3.6). It is densely populated with native trees, shrubs and herbs. The combined percent cover of native species (Standard 3.1) is 105% (63% herbs and 42% woody species). Invasive cover (Standard 3.2) in the herb layer was 1% and the woody layer invasive cover rounds to 0%. Cover by other non-natives is also minimal; of the

non-natives recorded only two species (*Echinochloa crusgalli* and *Vulpia brominoides*) had average cover as high as 2%. Very little bare substrate (Standard 3.3) remains in this habitat; only 15% was recorded. This year seven native species (*Epilobium ciliatum, Juncus effusus, L. oryzoides , Salix hookeriana, S. sitchensis, S. lucida* var. *lasiandra* and *Populus balsamnifera*) met the diversity standard (Standard 3.4) of ≥ 5% average cover, and occurring in 10% of the plots (six species is the standard). The habitat's density of 1,131 plants per acre meets density standard (Standard 3.5). The average prevalence index (Standard 3.6) in both the herb and woody plots is 2 (FACW).

Table 3e: Buffer Habitat (~27.5 acres planted, 36.7 acres total; 14 Woody Plots & 28 Herb Plots, Year 2)

Criteria	3.1: Percent Combined Native Cover		3.2: Percent Invasive Cover		3.3: Bare Substrate		3.4: Diversity		3.5: Native Stem Count/ Cover	
Performance Standard	3.1: ≥ 50% by Year 2		3.2: ≤30% invasive species by Year 3 and thereafter		3.3: ≤ 40% by Year 3 and thereafter		3.4: Six native species with ≥ 5% cover, occurring in ≥ 10% of the plots		3.5: Either ≥ 1,000 plants per acre or 50% aerial cover of woody species	
	Average	Pass? Y/N	Average	Pass? Y/N	Average	Pass? Y/N	Number of species	Pass? Y/N	Average # woody plants /acre	Pass? Y/N
Results	**85%** (74% herbs & 11% woody)	**Y**	**1%**	**NA** (Yr.2)	**15%**	**NA** (Yr.2)	**6**	**NA** (Yr.2)	**807**	**N**

Note: As of 2015, any herbaceous plot having ≥ 60% shade from woody species was excluded from the bare substrate criteria.

This is Year 2 for the upland Buffer and the community is meeting one of the two standards that are applicable at Year 2. The combined percent cover of native species (Standard 3.1) is 85% (74% herbs and 42% woody species). Very little bare substrate (Standard 3.2) remains in this habitat; only 15% was recorded. Invasive cover (Standard 3.2) in the herb layer was 1% and the woody layer invasive cover rounds to 0%. Cover by other non-natives is generally minimal although *Vulpia brominoides* had an average cover of 9%. Although the diversity standard (Standard 3.4) is not applicable this year, six native grass species (*Bromus caritinatus, Deschampsia cespitosa, Deschampsia elongata, Elymus glaucus, Festuca idahoensis* and *Festuca rubra*) met the diversity standard (Standard 3.4) of ≥ 5% average cover, and occurring in 10% of the plots (six species is the standard). The only standard that is currently failing is the density of native woody species (Standard 3.5). We recorded an average of 807 plants/acre, which was much better than the Year 1 (2014) average of 675 but still falls short of the target of 1,000 plants/acre. Although the buffers were heavily re-planted in late 2014 and early 2015, there was some mortality likely due in part to an extremely hot and dry summer in 2015.

NOTES: All the above cover percentages in the preceding tables and discussions represent absolute areal cover. Bare substrate includes areas of bare soil and areas covered by moss, water, and/or dead herbaceous plants.

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 wetland delineation "lite" was completed for the project area in 2014. At that time, primary indicators of wetland hydrology were observed in all of the enhancement and restoration areas and nearly

all of the designed creation areas, and in an area that was designed as upland buffer but was determined to be wetland creation. In the early growing season of 2014, during "normal" precipitation conditions, 57 out of the 61 hydrology pit locations displayed 17 or more days of consecutive wetland hydrology; and all 3 shallow monitoring wells displayed more than 17 days of consecutive wetland hydrology. Please refer to the 2014 (Year 3) Monitoring Report (Green Banks 2014) for detailed information on the hydrology study and delineation "lite".

In February of 2015, prior to receiving comments on the 2014 monitoring report, we established hydrology monitoring plots in anticipation for the need to collect additional data. We began monitoring hydrology on February 6th but had abnormal precipitation frequency in February and March of 2015. Sixty-one of the sixty-one hydrology plots (61/61) monitored displayed primary hydrology indicators for 10 consecutive days (February 6th-16th). Fifty-five out of sixty-one (55/61) hydrology plots displayed primary hydrology indicators for 15 consecutive days (February 6th-21st). The plots which did not have a minimum of 14 days of consecutive hydrology were along the eastern wetland creation boundary; several of these plots met the hydrology standard in 2014 and in previous years.

We received comments on the delineation "lite" on March 13th 2015, with the request for additional data in several areas. We attempted to collect the requested data on March 19th but the site conditions were drier than normal and the timing was approximately 40 days into the growing season, so we were not able to collect the requested data in 2015. Green Banks will monitor hydrology in the early growing season of 2016 to collect additional data in the areas identified by DSL.

Standard met? Yes in 2014, *additional data needed in 2016*; In 2014, all areas of wetland enhancement and restoration, and most wetland creation areas displayed primary hydrology indicators; a small area (1.203 acres) of wetland creation did not display positive wetland hydrology, however an area designed as upland buffer was determined to have wetland hydrology (1.350 acres); consequently there was no loss of predicted wetland creation acreage (there was actually a small gain).

2.3 DELINEATION OF WETLAND ACREAGE ACHEIVED

The post-construction wetland delineation "lite" was completed in 2014. The post-construction delineation was completed using the hydrology data collected during a 17 day period (February 14-March 3) in the early growing season with "normal" precipitation, and utilizing wetland prevalence index data from herbaceous vegetation plots collected in the summer of 2014.

The post-construction wetland delineation identified a total of 58.533 acres of wetland within the project area, which includes 4.11 acres of wetland restoration (100% of the designed restoration area) and 18.427 acres of wetland creation (101% of the designed creation area). A small area (1.203 acres) adjacent to the constructed swale within the creation area did not display wetland hydrology indicators and was determined to be upland; however, another small area (1.350 acres) that was designed to be upland buffer had wetland hydrology and hydrophytic vegetation, so was determined to be wetland. The result is a gain of 0.147 acres of wetland creation above what was proposed in the MBI; 18.28 wetland creation acres was designed, 18.427 wetland creation acres was achieved.

In March of 2015, DSL agreed with most of the areas delineated as wetland in 2014. However, they requested that additional data be collected in several areas prior to final concurrence. Data will be collected in these areas in 2016, and if necessary, adjustments to the delineation "lite" boundaries will be made at that time.

2.4 FUNCTIONAL ASSESSMENTS

Post-construction functional assessments (HGM and ORWAP) were completed for the TVEB in 2014; please refer to the Year 3 Monitoring Report for more information regarding these assessments. Baseline functional assessments were completed in 2010 and are included in the Mitigation Bank Instrument.

2.5 WILDLIFE OBSERVATIONS

Since construction of the TVEB, the increased extent and duration of inundated areas have improved the habitat functions for amphibians, fish, insects, waterfowl and other avian species. Numerous species of ducks and Canada geese utilize the site. Great blue herons, egrets and belted kingfishers are often present, feeding in the water. A bald eagle's nest is present in the mature forest located in the southern portion of the site. A mating pair of eagles has been observed on-site since construction of the project in 2011. They have had two offspring per year in 2012 and 2013, and 1 offspring in 2014. Besides the eagles, other raptors that utilize the site include osprey, northern harriers (marsh hawks), and other hawk species. During a brief site visit on September 19th 2013, Dave Helzer, a biologist with the City of Portland's Bureau of Environmental Services observed 20 bird species. Black tailed deer are often present in portions of the site and utilize the area for grazing and bedding. A coyote has been observed multiple times within the project area since 2011. Evidence of beaver activity has been observed with beaver cuttings and downed trees throughout the site. Non-native nutria are also present in the inundated areas but are being actively controlled. Pacific chorus frogs have been more abundant than in previous years; potentially due to a reduction in the bull frog population and herbicide use. Bull frogs are present but seem to have smaller numbers than in previous years likely due to predation from fish and birds.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 PROJECT STATUS

The mitigation wetlands are essentially in compliance with the performance standards for Year 4; see discussion in this section regarding the diversity standard (Standard 3.4) in the PFO habitat. The upland buffers are in compliance with all of the Year 2 standards except for the woody stem density standard 3.5. The delineation "lite" was completed in 2014, but additional data has been requested for several areas. We consider the project to essentially be in compliance with the wetland hydrology standard as most of the wetland areas have demonstrated positive hydrology indicators and the areas in question are small, totaling approximately 2 acres or less. See the excerpt from the 2014 monitoring report below:

"The hydrology study and post-construction wetland delineation conducted in 2014, which included data from previous years, prove that the wetland mitigation bank has achieved the acreage targets for the enhancement, restoration, and creation areas as described in the MBI. The creation area was designed to be 18.28 acres, but ended up being 18.427 acres; slightly larger."

The wetland areas are on a positive trajectory toward maintaining diverse native-dominated plant communities. In the early years of a re-vegetation project, the primary concerns are invasion from non-native plant species and mortality of planted and seeded individuals. The TVEB wetland areas had very low weed cover for Year 4 with an average range of 0-1% non-native invasive cover within the various wetland plant community types. This meets the PEM non-native invasive cover standards (1.2 and 2.2) for Year 4, and also meets the PFO and PSS standard (standard 3.2). The non-native invasive cover was much lower in 2015 (as well as 2013 and 2014) than in 2012 (Year 1), when the combined herbaceous and woody invasive cover in the PSS habitat, for example, was 9%; whereas this year it was only 1%. It should be noted that very little reed canarygrass was present in any of the habitats whereas it had been

very dominant prior to the project start. Frequent vegetation management efforts have kept all non-native species at low cover amounts. The standards for percent native cover in the PEM sub-classes (standards 1.1 and 2.1), the PFO, PSS, and upland buffer habitat classes (standard 3.1) are all being met.

The wetland areas have diverse plant communities with a large number of native species in all plant community types- see the data tables in Appendix A. Many of these species have low cover and/or widely spaced individuals and do not yet have an average of 5% cover in 10% of the plots within a plant community. It is anticipated that as the site matures, more of these species will contribute to meeting the diversity standards (1.4 and 3.4). This is particularly true for some of the woody species, which are growing rapidly. It is anticipated that by next year (2016) more tree and shrub species will have high enough aerial cover to further contribute to the diversity standards in the PFO and PSS habitat classes. Currently the FAC/FACW dominated PEM and PSS wetlands are passing the diversity standards with six species in the FAC/FACW PEM and seven species in the PSS. However, the PFO habitat is barely failing the diversity standard 3.4 with five species instead of the six required to meet the criteria. Nonetheless, we believe this habitat to be *essentially* in compliance; there are a wide variety of native species dispersed throughout the habitat. In addition to the five native species meeting the 5% criteria in the PFO there were an additional fourteen herbaceous species and nine woody species that had between 1% and 4% cover in the habitat class. The woody species within this community have shown vigorous growth and we anticipate that one or more additional species will meet the diversity criteria in the PFO and PSS areas in 2016.

The planting of native trees and shrubs in the form of bare root, nursery plug and live cutting have been successful. Some mortality has been observed, but a majority of the woody plantings in the PFO and PSS habitats have high vigor. Annual re-planting of dead and low-vigor plants has occurred for the past 4 years. Both the PFO and PSS habitat classes exceeds the 1,000 plants and/or stems per acre (standard 3.5) at an average of 1,171 per acre in the PFO and 1,131 in the PSS habitat. This represents an increase in the woody plant density in both the PFO and PSS; in 2014 plant densities were 1,070 per acre and 1,028 per acre respectively. The buffers are not yet in compliance with standard 3.5; there was an average of 807 plants per acre. This represents an improvement over Year 1 where the woody plant density was only 675 plants per acre. Woody planting mortality was high in a few small portions of the buffer, likely resulting in part from the extremely hot and dry summer of 2015. Additional woody plants will be installed into the buffer areas in the late winter and early spring of 2016. It is expected that after additional planting that the buffer areas will be in compliance with standard 3.5 in 2016.

The bare substrate in the PEM FAC/FACW dominated community is only 3% and is meeting the final (Year 3 and thereafter) standard of 20% for that habitat class (standard 1.3). The cover by bare substrate is decreasing in the woody wetland habitat classes and the PFO and PSS communities are meeting the 40% limit for Year 3 and thereafter (standard 3.3). Bare substrate averaged 20% in the PFO herbaceous plots in 2015, which is a reduction from the 23% bare ground in 2014. The PSS class averaged having 15% bare substrate in the herbaceous plots compared with 40% in 2014. This year in the PSS, as in Years 1-3, some of the "bare substrate" consisted of dead sprayed weeds. It is anticipated that these areas of bare substrate will mostly be replaced by seeded, planted and volunteer native species, and it is likely these habitats will continue to meet the 40% bare substrate standard for the woody habitats in future years. This is Year 2 for the buffers and there was an average of 15% bare substrate, which is a significant improvement over 33% in 2014. There is no Year 2 standard for bare ground in the buffer but the habitat class is already achieving the Year 3 standard of less than 40% bare substrate.

The hydrological enhancements made through construction of the project in 2011 are performing as designed. Please review the MBI or As-Built report for more information about the hydrological

enhancements. The primary log-jam was observed approximately twice per month in 2015. Water flow through the log-jam was nearly perennial with very limited flows in the late summer. The primary log-jam is performing as it was designed as it delays the outflow of surface water from the site while providing safe fish passage.

The TVEB credit ledger for 2015 is included in Appendix E. The most recent credit release was on March 23rd 2015, for 6.55 credits. A total of 3.0699 credits were withdrawn from the bank in 2015. There are a total of 5.3837 currently released and available for withdrawal.

3.2 RECOMMENDATIONS

The TVEB is currently meeting nearly all of the performance standards for Year 4 and is on track to meeting the performance standards for future years. It is recommended that the current plan and strategy for vegetative community establishment continue. Additional woody plantings should be installed into the buffer areas as they are currently at approximately 80% of the target density (801 plants per acre rather than 1000). Non-native plant control efforts should continue multiple times per year for the next few years. There has been a decrease in weed cover within the wetlands since 2012, and it is likely that this trend will continue. However, the project area should be observed multiple times per year in 2016 to direct maintenance efforts and ensure that project goals are being met.

3.3 FINANCIAL SECURITY STATUS

A performance bond (Assignment of Deposit) in the amount of $89,782 was established for the release of enhancement area credits on October 24th 2011; $44,891 was returned to the bank sponsor after completion of hydrological enhancements and initial planting of the enhancement area, and $44,891 is currently in the account.

An irrevocable letter of credit was established for the release of restoration, creation and buffer credits in the amount of $196,075. Mr. Heikes, the bank sponsor, requested a partial reduction of this account in March of 2013. This partial reduction was granted on March 11th 2013, and was made prior to the scheduled reduction listed in Exhibit J of the MBI. The total amount remaining in the account is $114,125. An additional increment may be considered when the 3rd year performance standards have been met (DSL 2013).

The release of financial securities will generally follow the financial assurance release schedule as described in Exhibit J of the MBI.

4.0 REFERENCES

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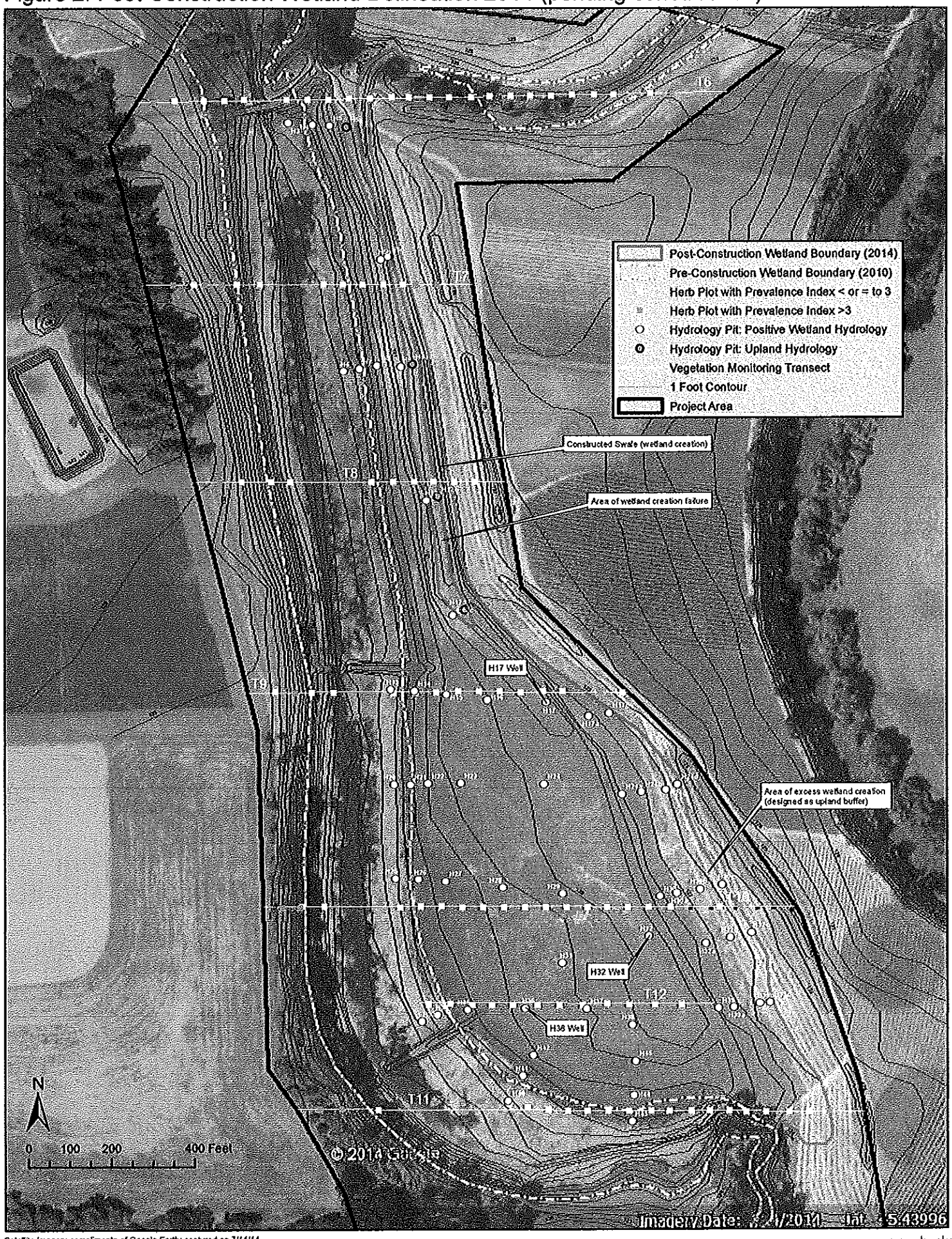
MAPS AND FIGURES:

Figure 1a-1c: Monitoring Location Maps
Figure 2: Post-Construction Wetland Delineation (pending concurrence)
Figure 3: Credit Determination Map (pending delineation concurrence)

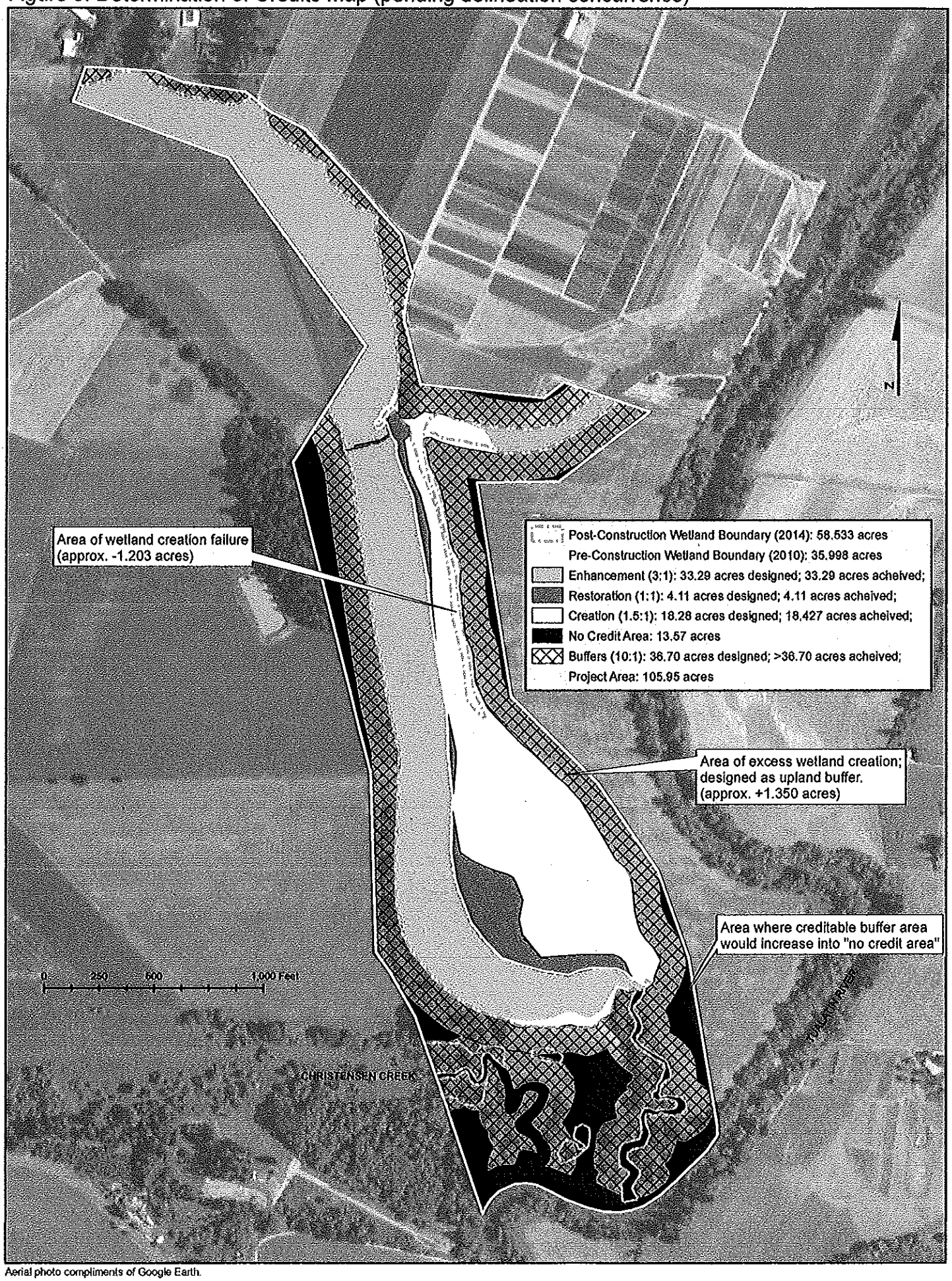
Figure 2: Post-Construction Wetland Delineation 2014 (pending concurrence)



Satellite imagery compliments of Google Earth; captured on 7/14/14.

greenbanks

Figure 3: Determination of Credits Map (pending delineation concurrence)



Aerial photo compliments of Google Earth.

APPENDICES:

APPENDIX A:	Vegetation Data
APPENDIX B:	Hydrology Monitoring Information
APPENDIX C:	Photographic Documentation
APPENDIX D:	Vegetation Monitoring Transect Location Table
APPENDIX E:	Credit Ledger (2015)

APPENDIX A: VEGETATION DATA

Vegetation Data Tables should be printed at the size of 11"x17".

Vegetation monitoring notes are included after the tables in this appendix.

TUALATIN VALLEY ENVIRONMENTAL BANK

2015 Vegetation Monitoring — Sample Date(s): 7/27/15-8/3/15

FAC / FACW PEM Community

Species	Origin (N, NN, I)	Wetland Status (1 - 5)	T10-PEM2	T10-PEM3	T10-PEM4	T10-PEM5	T10-PEM6	T10-PEM7	T10-PEM8	T10-PEM9	T10-PEM10	T12-PEM2	T12-PEM3	T12-PEM4	T12-PEM5	T12-PEM6	T12-PEM7	T12-PEM8	T12-PEM9	T12-PEM10	T12-PEM11	T12-PEM12	Average
Native Herbaceous Species																							
Agrostis exarata	N	2	0	0	2	7	0	0	0	5	0	0	0	0	0	0	5	0	20	0	3	6	2
Beckmannia syzigachne	N	1	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	0	0	0	0
Bidens cernua	N	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Carex scoparia	N	2	20	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Carex obnupta	N	1	0	0	0	2	0	0	0	0	0	0	25	0	20	0	0	0	0	0	0	0	2
Carex unilateralis	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus erythrorhizos	N	1	0	3	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Deschampsia cespitosa	N	2	0	5	40	50	30	0	40	40	78	0	0	0	25	55	10	50	20	65	67	86	33
Deschampsia elongata	N	2	0	0	0	0	0	5	0	3	10	0	0	0	0	0	0	0	3	0	0	3	1
Eleocharis obtusa	N	1	15	0	0	0	0	0	0	0	0	0	15	13	0	0	0	0	0	0	0	0	2
Eleocharis palustris	N	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Epilobium ciliatum	N	2	0	6	0	0	0	0	0	0	1	0	0	7	2	0	0	0	0	0	0	0	1
Epilobium densiflorum	N	2	0	0	0	0	0	0	20	35	0	0	0	0	0	0	0	4	45	20	25	0	7
Gnaphalium palustre	N	2	0	40	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	3
Hordeum brachyantherum	N	2	0	0	35	20	35	5	25	7	6	0	0	0	15	7	5	15	10	10	5	0	10
Juncus bufonius	N	2	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	1
Leersia oryzoides	N	1	30	5	0	0	0	0	0	0	0	70	40	12	0	0	0	0	0	0	0	0	8
Lotus unifoliolatus	N	4	0	12	30	30	40	100	20	6	0	0	0	3	45	7	100	25	0	0	0	0	21
Ludwigia palustris	N	1	35	4	0	0	0	0	0	0	0	0	20	12	0	0	0	0	0	0	0	0	4
Madia sativa	N	5	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Plagiobothrys figuratus	N	2	0	0	0	7	0	0	0	5	0	0	0	0	0	12	0	0	0	0	0	0	1
Plagiobothrys scouleri	N	2	0	1	0	10	5	10	0	3	0	0	0	8	0	7	40	7	6	1	0	0	5
Polygonum (Persicaria) hydropiperoides	N	1	10	0	0	0	0	0	0	0	0	55	5	0	0	0	0	0	0	0	0	0	4
Potetilla gracillis	N	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prunella vulgaris	N	4	0	0	1	0	0	0	0	0	0	0	0	0	0	3	10	0	0	0	0	0	1
Psilocarphus elatior	N	2	0	1	0	0	0	5	0	0	0	0	0	15	12	0	0	0	0	0	0	0	2
Sparganium emersum	N	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Veronica peregrina	N	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Invasive Herbaceous Species																							
Convolvulus arvensis	I	5	0	0	1	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Non-Native Herbaceous Species																							
Agrostis stolonifera	NN	3	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
Echinochloa crusgalli	NN	3	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gnaphalium uliginosum	NN	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Poa annua	NN	3	0	0	0	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bare Substrate																							
Bare ground and/or moss			0	3	0	0	0	0	0	10	5	0	0	0	0	5	0	5	5	10	5	5	3
Dead sprayed weeds			0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Shade & Woody Stem Cover on Ground																							
Shade from woody plants			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stem cover on ground			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Summary Information	T10-PEM2	T10-PEM3	T10-PEM4	T10-PEM5	T10-PEM6	T10-PEM7	T10-PEM8	T10-PEM9	T10-PEM10	T12-PEM2	T12-PEM3	T12-PEM4	T12-PEM5	T12-PEM6	T12-PEM7	T12-PEM8	T12-PEM9	T12-PEM10	T12-PEM11	T12-PEM12	Habitat Average	Standard Error
Cover of Native Herbaceous Species	125	82	109	127	110	125	108	104	95	128	105	112	119	93	170	101	104	96	100	95	110	4.2
Lower CI (80%)																					105	
Upper CI (80%)																					116	
Cover of Invasive Herbaceous Species	0	0	1	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1
Lower CI (80%)																					0	
Upper CI (80%)																					0	
Bare Substrate	0	13	0	0	0	0	0	10	5	0	0	0	0	5	0	5	5	10	5	5	3	0.9
Lower CI (80%)																					2	
Upper CI (80%)																					4	
Native Diversity																					6 species meet criteria: DECE, EPDE ,LOUN, LEOR, HOBR & PLSC.	
Prevalence Index	1	2	3	2	3	4	2	2	2	1	1	2	3	2	3	2	2	2	2	2	2	N/A
Weighted Prevalence Index	145	191	288	318	309	459	259	230	190	128	120	179	308	218	560	252	208	192	200	190		
Sum of plant cover	125	87	110	128	113	128	108	106	95	128	110	113	119	95	170	101	104	96	100	95		

TUALATIN VALLEY ENVIRONMENTAL BANK

2015 Vegetation Monitoring	Sample Date(s):	7/27/15-8/3/15	Percent (%) Cover																							
OBL Herbaceous Community																										
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	T4-PEMOBL1	T4-PEMOBL2	T4-PEMOBL3	T4-PEMOBL4	T4-PEMOBL5	T4-PEMOBL6	T5-PEMOBL1	T5-PEMOBL2	T7-PEMOBL1	T7-PEMOBL3	T8-PEMOBL1	T8-PEMOBL2	T9-PEMOBL1	T9-PEMOBL2	T9-PEMOBL3	T10-PEMOBL1	T10-PEMOBL2	T10-PEMOBL3	T11-PEMOBL1	T11-PEMOBL2	T11-PEMOBL3	T11-PEMOBL4	Row Average	
Native Herbaceous Species																										
Alisma triviale	N	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ceratophyllum demersum	N	1	0	0	0	0	0	0	0	0	0	10	0	0	10	40	0	0	30	0	0	0	0	0	4	
Eleocharis obtusa	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	
Elodea canadensis	N	1	0	0	0	0	0	0	0	0	0	30	0	20	20	15	0	0	30	0	0	0	0	0	5	
Elodea species	N	1	0	0	0	0	0	0	0	0	25	0	80	0	0	0	0	40	0	0	15	40	30	15	11	
Leersia oryzoides	N	1	97	100	100	70	95	97	10	0	0	0	0	0	0	0	95	0	0	50	0	0	0	0	32	
Lemna minor	N	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	5	0	0	10	25	20	25	4	
Ludwigia palustris	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	1	
Polygonum amphibium var. *emersum* (*Persicaria amphibia*)	N	1	0	0	0	0	0	0	70	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Polygonum (*Persicaria*) *hydropiperoides*	N	1	0	0	0	0	0	3	20	90	8	0	0	0	0	0	5	10	0	55	25	0	0	0	10	
Potomogeton foliosus	N	1	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	1	
Potomogeton natens and/or P. nodosus	N	1	0	0	0	0	0	0	0	0	0	0	0	20	15	5	0	35	0	0	15	10	15	20	6	
Sparganium emersum	N	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	20	1	
Stuckenia pectinata	N	1	0	0	0	0	0	0	0	0	0	15	0	0	0	20	0	0	5	0	0	0	0	0	2	
Typha latifolia	N	1	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Invasive Herbaceous Species																										
Phalaris arundinacea	I	2	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Non-Native Herbaceous Species																										
None this year	NN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bare Substrate																										
Bare ground			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unvegetated water (aprox.)			0	0	0	0	0	0	0	0	63	28	20	60	0	20	0	10	35	0	35	25	35	20	16	
Shade, Woody Stem Cover & Water Depth																										
Shade from woody plants			0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stem cover on ground			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Approx. water depth (feet)			0	0	0	0	0	0	2.5	2	2	2	2	2	2	1.5	0	2.5	1	0	2	3	2	1.5	1	
Summary Information																									**Habitat Average**	**Standard Error**
Cover of Native Herbaceous Species			100	100	100	100	95	100	100	100	37	72	80	40	45	80	110	90	65	125	65	75	65	80	83	6
Lower CI (80%)																									76	
Upper CI (80%)																									90	
Cover of Invasive Herbaceous Species			0	0	0	0	5	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%)																									1	
Bare Substrate			0	0	0	0	0	0	0	0	63	28	20	60	0	20	0	10	35	0	35	25	35	20	16	5
Lower CI (80%)																									10	
Upper CI (80%)																									22	
Native Diversity																									NA- there is no standard for this community	
Prevalence Index			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Weighted Prevalence Index			100	100	100	100	105	100	100	100	37	72	80	40	45	80	110	90	65	125	65	75	65	80		
Sum of plant cover			100	100	100	100	100	100	100	100	37	72	80	40	45	80	110	90	65	125	65	75	65	80	85	

TUALATIN VALLEY ENVIRONMENTAL BANK

2015 Vegetation Monitoring

PFO Herbaceous Community

Sample Date(s): 7/27/15-8/3/15

Percent (%) Cover

Species	Origin (N, NN, I)	Wetland Status (1 - 5)	T3-FH1	T4-FH1	T4-FH2	T5-FH1	T5-FH2	T7-FH1	T7-FH2	T7-FH3	T7-FH4	T8-FH1	T8-FH2	T8-FH3	T8-FH4	T9-FH1	T9-FH2	T9-FH3	T9-FH4	T9-FH5	T9-FH6	T9-FH7	T9-FH8	T10-FH2	T10-FH3	T10-FH4	T10-FH5	T11-FH2	T11-FH3	T11-FH4	T11-FH5	T11-FH6	T11-FH7	T11-FH8	T11-FH9	T11-FH10	T11-FH11	T11-FH12	Row Average
Native Herbaceous Species																																							
Agrostis exarata	N	2	0	0	0	0	0	0	0	0	45	0	0	0	0	12	0	3	0	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0	2
Beckmannia syzigachne	N	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	0	0	0	0
Bidens cernua	N	1	0	0	0	0	0	0	0	0	0	0	7	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
Carex densa	N	1	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	12	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Carex obnupta	N	1	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	15	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Carex scoparia and/or C. ovalis	N	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deschampsia cespitosa	N	2	0	0	0	0	0	0	0	0	0	0	0	8	35	0	15	70	70	98	64	95	91	40	60	98	4	0	0	0	0	0	0	0	0	0	35	35	23
Deschampsia elongata	N	2	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	2
Eleocharis obtusa	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	7	0	0	0	0	0	0	0	0	0
Eleocharis 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	35	0	0	0	0	0	0	0	0	0	1
Elodea species	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	40	30	0	0	0	2
Epilobium densiflorum	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epilobium ciliatum	N	2	0	0	0	0	10	0	6	0	0	65	0	7	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Equisetum palustre	N	2	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	0	0	0	0	0	0	0	0	0	1
Gnaphalium palustre	N	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hordeum brachyantherum	N	2	0	0	2	0	10	15	0	0	2	0	0	3	15	0	10	0	3	0	0	0	0	0	0	0	87	0	0	0	0	0	0	0	0	0	25	3	5
Impatiens capensis	N	2	60	2	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	0	0	2
Juncus bufonius	N	2	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	15	0	0	0	0	0	0	0	1
Juncus patens	N	2	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus tenuis	N	3	0	0	0	0	0	0	6	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
Leersia oryzoides	N	1	20	94	0	100	0	0	55	0	0	32	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	40	100	100	25	15	0	0	0	0	0	19
Lemna minor	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	3	0	0	0	0	0	15	15	0	0	0	1
Lotus unifoliolatus	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	80	12	0	0	0	0	0	0	15	7	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Ludwigia palustris	N	1	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	5	3	0	0	0	0	0	0	0	0	0
Plagiobothrys scouleri	N	2	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	10	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Polygonum (Persicaria) hydropiperoides	N	1	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	30	20	5	5	40	55	0	0	0	0	0	4
Prunella vulgaris	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psilocarphus elatior	N	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rorippa curvisiliqua	N	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubus ursinus	N	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	0	0	0	0	0	0	0	0	0	3	0	0	0
Sparganium emersum	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	65	5	2	0	45	45	10	0	0	0	0	5
Typha latifolia	N	1	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Veronica americana	N	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veronica peregrina	N	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Invasive Herbaceous Species																																							
Cirsium arvense	I	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Convolvulus arvensis	I	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyperus esculentus	I	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phalaris arundinacea	I	2	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0
Non-Native Herbaceous Species																																							
Agrostis capillaris	NN	3	0	0	0	0	0	10	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthemis cotula	NN	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geranium species	NN		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	0	0	0	0	0	0	0	0	0	0	0
Gnaphalium uliginosum	NN	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kickxia elatine	NN	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lolium perenne	NN	3	0	0	0	0	0	0	0	1	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago lanceolata	NN	4	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa annua	NN	3	0	0	0	0	0	0	0	0	3	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
Raphanus sativus	NN	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sonchus asper	NN	4	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vulpia bromoides	NN	4	0	0	0	0	0	10	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1
Bare Substrate														0																									
Bare ground and/or moss			0	0	0	0	0	0	0	0	41	0	0	28	25	17	0	0	0	0	0	4	5	30	6	2	0	5	0	0	0	0	0	0	0	100	10	7	8
Dead sprayed weeds			0	0	98	0	19	22	15	97	0	0	0	30	20	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	55	12
Unvegetated water			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	35	55	0	0	0	3
Shade, Woody Stem Cover & Water Depth																																							
Shade from woody plants			3	5	50	0	2	2	0	2	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	50	0	0	0	100	1	0	6
Stem cover on ground			1	3	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approx. water depth (feet)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0

Summary Information	T3-FH1	T4-FH1	T4-FH2	T5-FH1	T5-FH2	T7-FH1	T7-FH2	T7-FH3	T7-FH4	T8-FH1	T8-FH2	T8-FH3	T8-FH4	T9-FH1	T9-FH2	T9-FH3	T9-FH4	T9-FH5	T9-FH6	T9-FH7	T9-FH8	T10-FH2	T10-FH3	T10-FH4	T10-FH5	T11-FH2	T11-FH3	T11-FH4	T11-FH5	T11-FH6	T11-FH7	T11-FH8	T11-FH9	T11-FH10	T11-FH11	T11-FH12	Habitat Average	Standard Error
Cover of Native Herbaceous Species	108	97	2	100	80	45	90	0	56	97	100	39	50	27	105	106	99	98	89	95	91	80	94	98	94	100	105	117	120	110	115	65	45	3	65	38	78	5.7
Lower CI (80%)																																					71	
Upper CI (80%)																																					86	
Cover of Invasive Herbaceous Species	0	0	0	0	0	0	0	0	0	5	0	3	0	0	0	0	1	0	9	0	3	3	0	0	0	1	3	0	0	0	0	0	0	0	0	0	1	0
Lower CI (80%)																																					0	
Upper CI (80%)																																					1	
Bare Substrate	0	0	98	0	19	22	15	97	41	0	0	58	45	57	0	0	0	0	0	4	5	30	6	2	0	5	0	0	0	0	0	35	55	NA	35	62	20	5
Lower CI (80%)																																					14	
Upper CI (80%)																																					26	
Native Diversity																																					5 plants meet criteria- DECE, HOBR, LEOR & SPEM (herbs) + FRLA (woody)	
Prevalence Index	2	1	2	1	1	2	1	4	2	2	1	2	2	3	4	2	2	2	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	4	2	2	2	N/A
Weighted Prevalence Index	193	99	4	100	105	169	122	7	115	184	100	84	120	115	385	239	190	196	211	190	188	213	195	196	212	102	111	117	135	110	115	65	45	12	130	76		
Sum of plant cover	108	97	2	100	80	78	91	2	59	105	100	42	55	43	110	107	100	98	99	95	94	83	94	98	100	101	108	117	120	110	115	65	45	3	65	38		

2015 Vegetation Monitoring	Sample Date(s):	7/27/15-8/3/15																																															
			Percent (%) Cover																																														
PSS Herbaceous Community	Orig/n	Wetland	T1-SH1	T1-SH2	T1-SH3	T1-SH4	T1-SH5	T2-SH1	T2-SH2	T2-SH3	T2-SH4	T2-SH5	T2-SH6	T2-SH7	T2-SH8	T2-SH9	T2-SH10	T2-SH11	T2-SH12	T3-SH1	T3-SH2	T3-SH3	T3-SH4	T5-SH1	T5-SH2	T5-SH3	T5-SH4	T5-SH5	T5-SH6	T5-SH7	T5-SH8	T5-SH9	T5-SH10	T6-SH11	T6-SH12	T6-SH13	T6-SH14	T6-SH15	T6-SH16	T6-SH17	T6-SH18	T6-SH19	T6-SH20		
Species	(N, NN, I)	Status (1 - 5)																																											Average		
Native Herbaceous Species																																																	
Agrostis exarata	N	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	6	0	0	0	0	0	0	0	0	0	2	0	0	0		
Alisma triviale	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Beckmannia syzigachne	N	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	7	0	0	0		
Bidens cernua	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	0	0	0	0	20	0	0	0	0	0	0		
Bidens frondosa	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	1		
Carex obnupta	N	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	0	0	0	0	0	0	0	0	0		
Cyperus erythrorhizos	N	1	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	2	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		
Deschampsia cespitosa	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	1	0	0	0	10	0	0	0	0	0	0	0	7	8	40	0	0	2		
Deschampsia elongata	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0		
Eleocharis obtusa	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	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	1		
Elymus glaucus	N	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	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0		
Epilobium ciliatum	N	2	3	92	0	2	20	0	0	0	1	72	96	26	0	0	0	1	5	0	0	15	0	75	0	0	30	5	60	0	0	0	70	6	0	7	0	5	3	0	4	0	0	14		
Epilobium densiflorum	N	2	5	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Equisetum arvense	N	3	74	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
Equisetum palustre	N	2	0	0	0	5	0	0	0	1	0	0	0	0	42	10	0	1	7	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
Glyceria borealis	N	1	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	35	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
Gnaphalium palustre	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0		
Hordeum brachyantherum	N	2	0	0	0	0	0	0	0	0	25	5	0	0	3	0	0	0	3	0	0	0	0	0	0	0	2	5	2	0	5	0	0	0	0	0	0	0	5	3	3	0	0	1		
Impatiens capensis	N	2	0	3	0	0	10	35	10	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	0	2		
Juncus bufonius	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	12	0	0	0	1		
Juncus effusus	N	2	0	0	0	80	0	15	0	25	15	0	0	0	0	0	0	10	15	0	0	15	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5		
Leersia oryzoides	N	1	0	0	0	0	0	40	70	67	43	10	0	0	15	90	100	5	3	40	50	5	20	0	0	95	0	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18		
Panicum capillare	N	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	2	25	12	25	40	0	3		
Plagiobothrys scouleri	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	7	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	2		
Polygonum lapathifolium	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0		
Rorippa curvisiliqua	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	0	0	0	0	5	1	0	0	0	0	0		
Typha latifolia	N	1	20	0	0	7	0	0	20	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3		
Veronica americana	N	1	0	0	0	5	0	0	0	0	0	3	0	0	20	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Veronica peregrina	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	0	0	0	0	7	0	0	0	0	0	0		
Invasive Herbaceous Species																																																	
Cyperus esculentus	I	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0		
Holcus lanatus	I	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Hypericum perforatum	I	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	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Phalaris arundinacea	I	2	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	3	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1		
Non-Native Herbaceous Species																																																	
Agrostis capillaris	NN	3	0	0	0	3	0	15	0	1	7	0	1	0	5	0	0	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	1		
Agrostis stolonifera	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Alopecurus pratensis	NN	3	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	0	0	0	0	0	0	0	0		
Anthemis cotula	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	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bromus hordeaceus	NN	4	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Daucus carota	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	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0		
Digitaria sanguinalis	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	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0		
Echinochloa crusgalli	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	0	0	0	0	0	0	0	0	0	0	0	0	0	15	80	2		
Gnaphalium uliginosum	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	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0		
Holcolla elatine	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	3	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0		
Leontodon taraxacoides ssp.taraxacoides	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	0	0	0	0	0	0	0	1	0	1	0	0	0	0		
Lolium perenne	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	3	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0		
Lotus corniculatus	NN	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	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		
Misopates orontium	NN	5	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	0	0	0	0	0	0	0	0	0	0		
Plantago lanceolata	NN	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Plantago major	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	1	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	0	0		
Poa species	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	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
Raphanus sativus	NN	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Ranunculus repens	NN	3	0	0	0	1	0	0	0	0	1	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		
Rumex crispus	NN	3	0	0	0	0	0	1	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	0		
Sonchus asper	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	0	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0		
Trifolium species	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Vicia tetrasperma	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Vulpia bromoides	NN	4	0	0	45	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2		
Bare Substrate																																																	
Bare ground and/or moss			0	0	0	0	0	0	0	0	0	5	0	22	0	0	0	0	5	0	0	63	0	5	100	5	30	0	20	10	58	40	15	90	100	92	90	0	19	29	2	3	20	20	bare substrate is NA in some plots see summary	
Dead/sprayed weeds			0	0	55	0	65	0	0	0	0	0	0	0	10	0	0	12	5	0	0	0	0	0	0	0	5	0	0	61	10	50	15	0	0	0	0	0	15	0	0	0	0	7		
Shade & Woody Stem Cover on Ground																																																	
Shade from woody plants			0	0	60	10	25	20	0	0	0	50	0	25	0	0	0	0	5	3	0	80	0	0	100	40	60	5	80	5	0	0	0	100	100	70	100	0	0	70	1	0	0	24		
Stem cover on ground			0	0	0	0	0	10	0	0	0	0	0	5	0	0	0	0	3	1	0	0	0	0	0	3	3	1	0	1	0	0	0	1	0	1	10	0	0	0	0	0	0	1		
Summary Information			T1-SH1	T1-SH2	T1-SH3	T1-SH4	T1-SH5	T2-SH1	T2-SH2	T2-SH3	T2-SH4	T2-SH5	T2-SH6	T2-SH7	T2-SH8	T2-SH9	T2-SH10	T2-SH11	T2-SH12	T3-SH1	T3-SH2	T3-SH3	T3-SH4	T5-SH1	T5-SH2	T5-SH3	T5-SH4	T5-SH5	T5-SH6	T5-SH7	T5-SH8	T5-SH9	T5-SH10	T6-SH11	T6-SH12	T6-SH13	T6-SH14	T6-SH15	T6-SH16	T6-SH17	T6-SH18	T6-SH19	T6-SH20	Habitat Average	Standard Error
Cover of Native Herbaceous Species			102	100	0	99	35	90	100	93	87	95	104	28	90	100	100	84	69	101	50	37	110	90	0	100	55	105	72	20	24	0	70	9	0	7	0	110	46	65	81	67	0	63	6.1
Lower CI (80%)																																												55		
Upper CI (80%)																																												71		
Cover of Invasive Herbaceous Species			3	0	0	0	0	0	0	5	0	0	0	0	0	0	2	2	3	0	15	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	1	1
Lower CI (80%)																																												0		
Upper CI (80%)																																												2		
Bare Substrate			0	0	NA	0	65	0	0	0	0	5	0	22	10	0	0	12	10	0	0	NA	0	5	NA	5	35	0	NA	71	68	90	30	NA	NA	NA	NA	0	34	NA	2	3	20	15	3
Lower CI (80%)																																												11		
Upper CI (80%)																																												19		
Native Diversity																																												7 plants meet criteria- EPCI, JUEF, & LEOR (herbs) + POBA,SASI, SALA, & SAHO (woody).	
Prevalence Index			3	2	4	2	2	2	1	1	2	2	2	3	2	1	1	1	2	1	2	2	2	3		1	1	1	2	3	3	4	2	2		2		2	3	2	2	2	3	2	N/A
Weighted Prevalence Index			267	205	180	204	65	188	110	135	167	172	206	239	150	110	100	108	150	101	185	67	200	290	0	105	62	115	171	96	80	36	140	20	0	14	0	189	192	162	231	232	240		
Sum of plant cover			105	100	45	105	35	106	100	100	100	95	105	73	95	100	100	88	87	101	100	37	110	116	0	100	62	105	80	28	32	10	70	9	0	7	0	111	66	71	98	97	80	74	

TUALATIN VALLEY ENVIRONMENTAL BANK

2015 Vegetation Monitoring	Sample Date(s):	7/27/15-8/3/15		Percent (%) Cover																												
Buffer Herbaceous Community	Origin (N, NN, I)	Wetland Status (1 - 5)	T3-BH1	T3-BH2	T4-BH1	T4-BH2	T6-BH1	T6-BH2	T6-BH3	T6-BH4	T7-BH1	T7-BH2	T7-BH3	T7-BH4	T7-BH5	T7-BH6	T8-BH1	T8-BH2	T8-BH3	T8-BH4	T9-BH1	T9-BH2	T9-BH3	T9-BH4	T10-BH3	T10-BH4	T10-BH5	T10-BH6	T11-BH3	T11-BH4		
Species																															Average	
Native Herbaceous Species																																
Agrostis exarata	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0	0	
Bromus carinatus	N	5	0	0	0	6	0	0	7	10	8	5	0	0	0	0	7	0	1	4	4	0	12	80	0	20	15	85	3	7	10	
Deschampsia cespitosa	N	2	0	0	0	20	0	20	0	0	0	0	0	0	20	0	0	0	49	0	0	0	0	0	72	0	10	0	0	5	7	
Deschampsia elongata	N	2	3	0	0	15	0	0	5	2	0	3	7	12	0	15	0	40	5	35	5	5	25	20	0	25	46	0	20	33	11	
Elymus glaucus	N	4	0	41	76	35	12	5	0	0	55	30	25	35	10	20	45	35	0	3	15	45	45	3	0	15	25	12	2	10	21	
Epilobium ciliatum	N	2	3	0	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Epilobium densiflorum	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	
Equisetum arvense	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Festuca idahoensis	N	4	0	0	0	0	55	45	4	25	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	25	0	0	5	35	8	
Festuca rubra ssp. rubra	N	3	0	0	0	0	7	5	7	0	15	62	65	47	0	0	43	10	0	0	60	42	0	0	0	0	0	0	0	0	13	
Hordeum brachyantherum	N	2	0	0	5	5	5	0	4	0	0	0	0	0	10	2	0	0	25	0	0	0	0	0	7	0	0	0	0	0	2	
Invasive Herbaceous Species																																
Cirsium arvense	I	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Phalaris arundinacea	I	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	0	0	0	
Holcus lanatus	I	3	7	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	
Non-Native Herbaceous Species																																
Agrostis capillaris	NN	3	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	1	
Bromus hordeaceus	NN	4	0	7	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
Crepis setosa	NN	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	
Lactuca serriola	NN	4	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	4	0	0	
Leontodon taraxacoides ssp.taraxacoides	NN	5	0	0	0	0	6	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Lolium perenne	NN	3	0	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sonchus asper	NN	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	
Vulpia bromoides	NN	4	0	7	5	10	5	0	5	12	10	0	3	4	10	20	5	6	17	7	7	8	10	0	15	15	4	3	45	5	9	
Bare Substrate																																
Bare ground and/or moss			15	5	0	9	7	5	5	24	2	0	0	0	0	0	0	9	6	44	6	0	5	0	0	0	0	0	0	5	5	
Dead sprayed weeds			71	40	2	0	0	0	60	15	5	0	0	0	50	13	0	0	0	0	0	0	0	0	0	0	0	0	15	0	10	
Shade & Woody Stem Cover on Ground																																
Shade from woody plants			2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	
Stem cover on ground			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	

Summary Information	T3-BH1	T3-BH2	T4-BH1	T4-BH2	T6-BH1	T6-BH2	T6-BH3	T6-BH4	T7-BH1	T7-BH2	T7-BH3	T7-BH4	T7-BH5	T7-BH6	T8-BH1	T8-BH2	T8-BH3	T8-BH4	T9-BH1	T9-BH2	T9-BH3	T9-BH4	T10-BH3	T10-BH4	T10-BH5	T10-BH6	T11-BH3	T11-BH4	Habitat Average	Standard Error
Cover of Native Herbaceous Species	6	41	81	81	79	75	29	42	78	100	97	94	40	67	95	85	80	45	84	92	82	103	85	85	96	97	36	90	74	4.8
Lower CI (80%)																													68	
Upper CI (80%)																													80	
Cover of Invasive Herbaceous Species	7	0	2	0	0	10	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4
Lower CI (80%)																													0	
Upper CI (80%)																													1	
Bare Substrate	86	45	2	9	7	5	65	39	7	0	0	0	50	13	0	9	6	44	6	0	5	0	0	0	0	0	15	5	15	4.3
Lower CI (80%)																													9	
Upper CI (80%)																													20	
Native Diversity																													NA until year 3 (after initial buffer planting) but 6 native herb spp. (BRCA, DEEL, DECE,ELGL, FEID & FERU) meet the diversity	
Prevalence Index	3	4	4	3	4	3	3	4	4	3	3	3	3	4	4	3	2	3	3	3	4	4	2	4	3	5	3	3		
Weighted Prevalence Index	33	220	370	290	361	325	117	234	365	337	321	327	140	314	364	274	242	151	310	348	339	460	230	370	303	485	291	311		
Sum of plant cover	13	55	98	91	93	95	35	61	93	100	100	100	50	87	100	91	100	55	94	100	95	105	100	100	100	100	85	95		

TUALATIN VALLEY ENVIRONMENTAL BANK

2015 Vegetation Monitoring	Sample Date(s):	7/27/15-8/3/15																				
PFO Tree and Shrub Data	**Percent Cover**																					
Species	Origin (N, NN, I)	Wetland Status (1 - 5)	T3-F1	T4-F1	T5-F1	T7-F1	T7-F2	T8-F1	T8-F2	T8-F3	T9-F1	T9-F2	T9-F3	T9-F4	T10-F2	T10-F3	T11-F2	T11-F3	T11-F4	T11-F6	Row Average	
Native Tree and Shrub Species:																						
Alnus rubra	N	3	0	0	0	1	3	1	4	0	0	2	0	2	0	0	0	0	0	2	1	
Amelanchier alnifolia	N	4	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	
Cornus sericea ssp. sericea (alba)	N	2	2	8	0	0	4	0	2	0	0	1	1	1	1	0	0	0	0	2	1	
Corylus cornuta	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
Crataegus douglasii	N	3	0	0	1	0	3	0	4	4	40	1	1	1	1	1	0	0	0	2	3	
Frangula purshiana	N	3	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	
Fraxinus latifolia	N	2	1	10	4	12	10	10	5	2	0	7	6	4	3	3	2	3	0	6	5	
Lonicera involucrata	N	3	0	0	0	0	0	0	3	0	0	4	1	1	2	2	0	0	0	2	1	
Malus fusca	N	2	0	0	0	0	2	1	1	0	0	0	0	1	0	1	0	0	0	0	0	
Populus balsamifera	N	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rosa pisocarpa	N	3	0	0	0	0	1	0	0	0	8	1	0	0	0	0	0	0	0	10	1	
Rubus spectabilis	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	
Salix hookeriana	N	2	10	10	25	2	3	0	0	0	1	1	1	0	0	0	2	2	2	0	3	
Salix lucida var. *lasiandra (lasiandra)*	N	2	15	8	7	0	1	0	5	0	0	2	1	3	0	0	5	5	1	0	3	
Salix scouleriana	N	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salix sitchensis	N	2	5	15	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Spiraea douglasii	N	2	1	0	0	0	3	0	6	0	0	1	0	0	2	0	0	1	3	3	1	
Symphoricarpos albus	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Thuja plicata	N	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Non-Native Shrub and Tree Species																						
None this year																						
Invasive Shrub and Tree Species																						
Rubus armeniacus	I	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Native Shrub and Tree Count	**Woody Stem Count (Trees and Shrubs)**																					
Alnus rubra	N	3	0	0	0	2	1	1	2	0	0	1	0	1	0	0	0	0	0	2	1	
Amelanchier alnifolia	N	4	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
Cornus sericea ssp. sericea (alba)	N	2	2	6	0	0	6	0	2	0	0	2	2	2	3	0	0	0	0	4	2	
Corylus cornuta	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	
Crataegus douglasii	N	3	0	0	1	0	7	0	5	9	5	1	1	1	2	3	0	0	0	4	2	
Frangula purshiana	N	3	0	0	0	0	0	0	2	0	0	0	0	1	0	1	0	0	0	1	0	
Fraxinus latifolia	N	2	1	7	3	19	13	13	12	5	0	24	29	16	23	24	5	7	0	9	12	
Lonicera involucrata	N	3	0	0	0	0	0	0	6	0	0	14	4	5	13	9	0	0	0	5	3	
Malus fusca	N	2	0	0	0	0	3	1	1	0	0	0	0	1	0	2	0	0	0	0	0	
Populus balsamifera	N	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rosa pisocarpa	N	3	0	0	0	0	1	0	0	0	22	1	0	0	0	0	0	0	0	11	2	
Rubus spectabilis	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	
Salix hookeriana	N	2	6	15	21	3	3	0	0	0	3	1	1	0	0	0	4	3	3	0	4	
Salix lucida var. *lasiandra (lasiandra)*	N	2	19	3	12	0	1	0	7	0	0	6	1	10	0	0	16	18	8	0	6	
Salix scouleriana	N	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Salix sitchensis	N	2	1	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Spiraea douglasii	N	2	3	0	0	0	9	0	18	0	0	2	0	0	7	0	0	4	11	6	3	
Symphoricarpos albus	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	
Thuja plicata	N	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
Summary Information																					**Habitat Average**	**Standard Error**
Cover of Invasive Shrubs and Trees			0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Lower CI (80%)																					0	
Upper CI (80%)																					0	
Native Diversity--See PFO Herb table for summary info																						
Density of Woody Vegetation		Average per acre	1033	1194	1323	774	1549	484	1775	452	1065	1678	1226	1194	1549	1291	807	1033	710	1936	1171	
Plot Area (shrub/tree plot)	1350																					
Per acre multiplier: Input 4,047 if plot area entered in B60 is in sq.meters or 43,560 for sq.feet	43560																					
Percent Cover of Native Shrubs and Trees			34	51	40	15	35	12	31	6	54	20	11	14	9	9	9	11	6	33	22	4
Lower CI (80%)																					17	
Upper CI (80%)																					27	
Sum of native plants /plot			32	37	41	24	48	15	55	14	33	52	38	37	48	40	25	32	22	60	36	
Does Plot Pass Native Cover Standard based on ≥ 50% Native Cover Y or N?			N	Y	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N		
Does Plot Pass Native Cover Standard based on ≥ 1000 plants or stems per acre Y or N?			Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y		
Prevalence Index--woody strata			2	2	2	2	2	2	2	3	3	2	2	2	2	3	2	2	2	3	2	
Weighted Prevalence Index			68	102	84	31	78	25	74	16	170	48	24	33	21	23	18	22	12	91		
Sum of plant cover			34	51	40	15	35	12	31	6	55	20	11	14	9	9	9	11	6	33		

TUALATIN VALLEY ENVIRONMENTAL BANK

2015 Vegetation Monitoring	Sample Date(s):	7/27/15-8/3/15	Percent Cover																						
PSS Shrub and Tree Data																									
Native Shrub and Tree Species:	Origin (N, NN, I)	Wetland Status (1 - 5)	T1-S1	T1-S2	T2-S1	T2-S2	T2-S3	T2-S4	T2-S5	T3-S1	T3-S2	T6-S1	T6-S2	T6-S3	T6-S4	T6-S5	T6-S6	T6-S7	T6-S8	T6-S9	T6-S10	T6-S11	Row Average	
Acer macrophyllum	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
Alnus rubra	N	3	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	
Cornus sericea ssp. *sericea (alba)*	N	2	0	3	1	0	4	3	1	0	0	6	3	15	5	1	2	2	0	0	0	0	2	
Corylus cornuta	N	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Crataegus douglasii	N	3	0	0	3	0	3	5	0	0	0	0	0	0	4	1	0	0	1	0	0	0	1	
Frangula purshiana	N	3	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	
Fraxinus latifolia	N	2	0	7	0	0	3	20	0	0	0	3	0	2	6	4	3	10	0	1	1	0	3	
Lonicera involucrata	N	3	0	0	0	0	0	0	0	0	0	2	1	3	0	1	0	0	0	0	0	0	0	
Malus fusca	N	2	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
Physocarpus capitatus	N	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	
Populus balsamifera	N	3	0	0	2	0	0	0	0	0	0	0	0	0	0	20	7	60	60	15	0	0	8	
Rosa nutkana	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	
Rosa pisocarpa	N	3	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	
Salix hookeriana	N	2	50	20	6	15	2	7	5	15	20	15	20	7	6	0	0	0	5	5	8	1	10	
Salix lucida var. *lasiandra (lasiandra)*	N	2	0	25	3	20	3	1	1	3	5	0	30	5	0	0	0	0	1	3	3	6	5	
Salix scouleriana	N	3	0	0	0	0	0	0	0	0	0	0	2	3	0	0	40	0	0	10	3	7	3	
Salix sitchensis	N	2	1	5	4	10	0	0	2	10	5	50	5	0	0	0	0	0	2	1	0	0	5	
Spiraea douglasii	N	2	3	1	4	2	1	1	5	2	4	0	0	2	0	0	1	0	1	0	0	0	1	
Non-Native Shrub and Tree Species																								
Crataegus monogyna	NN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
Malus pumila	NN	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	
Invasive Shrub and Tree Species																								
Rubus armeniacus	I	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	
Bare Substrate- See the PSS herbaceous plot data on a separate table for bare substrate data.																								
Native Shrub and Tree Count			Woody Stem Count (Trees and Shrubs)																					
Acer macrophyllum	N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	
Alnus rubra	N	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
Cornus sericea ssp. *sericea (alba)*	N	2	0	4	1	0	2	6	1	0	0	6	5	17	3	1	3	5	0	0	0	0	3	
Corylus cornuta	N	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Crataegus douglasii	N	3	0	0	2	0	3	2	0	0	0	0	0	0	4	1	0	0	1	0	0	0	1	
Frangula purshiana	N	3	0	0	0	0	1	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	
Fraxinus latifolia	N	2	0	5	0	0	2	6	0	0	0	4	0	2	10	7	2	6	0	1	2	0	2	
Lonicera involucrata	N	3	0	0	0	0	0	0	0	0	0	2	1	4	0	1	0	0	0	0	0	0	0	
Malus fusca	N	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
Physocarpus capitatus	N	2	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2	1	0	0	0	0	0	
Populus balsamifera	N	3	0	0	1	0	0	0	0	0	0	0	0	0	0	20	12	22	48	23	0	0	6	
Rosa nutkana	N	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	1	
Rosa pisocarpa	N	3	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	
Salix hookeriana	N	2	24	8	9	11	3	1	6	10	15	10	18	6	2	0	0	0	6	10	18	3	8	
Salix lucida var. *lasiandra (lasiandra)*	N	2	0	10	4	8	3	1	1	8	10	0	28	3	0	0	0	0	2	5	6	12	5	
Salix scouleriana	N	3	0	0	0	0	0	0	0	0	0	0	3	1	0	0	2	0	0	6	5	13	2	
Salix sitchensis	N	2	1	2	6	4	0	0	3	10	3	16	4	0	0	0	0	0	1	1	0	0	3	
Spiraea douglasii	N	2	10	1	8	3	1	6	14	5	10	0	0	4	0	0	1	0	1	0	0	0	3	
Summary Information																							Habitat Average	Standard Error
Cover of Invasive Shrubs and Trees			0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Lower CI (80%)																							0	
Upper CI (80%)																							0	
See PSS Herb table for summary info on diversity																								N/A
Density of Woody Vegetation		Average per acre	1129	1065	1000	839	516	742	807	1065	1226	1226	1904	1258	807	1129	1355	1162	1904	1484	1097	903	1131	
Plot Area (shrub/tree plot)	1350																							
Per acre multiplier: Input 4,047 if plot area entered in B61 is in sq.meters or 43,560 for sq.feet	43560																							
Percent Cover of Native Shrubs and Trees			54	81	23	47	20	38	14	30	34	76	61	39	25	30	61	74	70	35	17	14	42	5
Lower CI (80%)																							36	
Upper CI (80%)																							48	
Sum of native plants/plot			35	33	31	26	16	23	25	33	38	38	59	39	25	35	42	36	59	46	34	28	35	
Does Plot Pass Native Cover Standard based on ≥ 50% Native Cover Y or N?			Y	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	Y	Y	Y	N	N	N		
Does Plot Pass Native Cover Standard based on ≥ 1000 plants or stems per acre Y or N?			Y	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N		
Prevalence Index--All strata			2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2	3	2	
Weighted Prevalence Index			108	182	51	94	46	81	28	60	68	158	125	85	57	85	180	236	201	95	39	35		
Sum of plant cover			54	81	23	47	20	38	14	30	34	77	61	39	25	30	62	80	70	35	17	14	43	

TUALATIN VALLEY ENVIRONMENTAL BANK

2015 Vegetation Monitoring	Sample Date(s):	7/27/15-8/3/15	Percent Cover															
Buffer Tree and Shrub Data			T3-BF1	T4-BF1	T6-BF1	T6-BF2	T7-BF1	T7-BF2	T7-BF3	T8-BF1	T8-BF2	T9-BF1	T9-BF2	T10-BF2	T10-BF3	T11-BF2		
Native Tree and Shrub Species:	Origin (N, NN, I)	Wetland Status (1 - 5)															Row Average	
Abies grandis	N	4	0	0	0	1	1	4	0	5	0	0	1	1	0	2	1	
Acer circinatum	N	3	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
Acer macrophyllum	N	4	2	2	2	1	0	0	0	0	1	0	1	1	0	0	0	
Alnus rubra	N	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
Amelanchier alnifolia	N	4	1	1	0	1	1	0	1	1	1	1	1	0	0	1	1	
Cornus sericea ssp. *sericea (alba)*	N	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Cornus nuttallii	N	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Crataegus douglasii	N	3	3	0	1	1	0	0	0	0	1	0	1	1	0	1	1	
Frangula purshiana	N	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Fraxinus latifolia	N	2	1	1	0	0	0	0	2	0	2	0	1	2	0	0	1	
Holodiscus discolor	N	4	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	
Mahonia aquifolium	N	4	0	0	1	1	2	0	1	0	2	0	2	1	1	1	1	
Mahonia nervosa	N	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Malus fusca	N	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
Philadelphus lewisii	N	5	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	
Pinus pondserosa	N	4	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
Prunus emarginata	N	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
Pseudostuga menziesii	N	4	3	2	2	2	6	6	2	6	1	6	1	1	1	1	3	
Quercus garryana	N	4	0	0	0	1	0	0	1	0	0	0	1	1	1	1	0	
Ribes sanguinium	N	4	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	
Rosa nutkana	N	3	0	1	0	0	1	1	1	2	1	1	1	1	0	1	1	
Rubus parviflorus	N	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Symphoricarpos albus	N	4	0	0	0	0	1	1	1	1	0	2	1	0	0	0	1	
Non-Native Shrub and Tree Species																		
None this year																		
Invasive Shrub and Tree Species																		
Rubus armeniacus	I	4	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	
Rubus cultivar	I		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
Native Shrub and Tree Count			Woody Stem Count (Trees and Shrubs)															
Abies grandis	N	4	0	0	0	3	2	7	0	8	0	0	1	2	0	3	2	
Acer circinatum	N	3	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
Acer macrophyllum	N	4	6	6	6	4	0	0	0	0	1	0	1	2	0	0	2	
Alnus rubra	N	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
Amelanchier alnifolia	N	4	2	2	0	1	2	0	1	1	5	3	2	0	0	1	1	
Cornus sericea ssp. *sericea (alba)*	N	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Cornus nuttallii	N	4	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
Crataegus douglasii	N	3	6	0	3	2	0	0	0	0	1	0	1	2	0	1	1	
Frangula purshiana	N	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Fraxinus latifolia	N	2	2	1	0	0	0	0	6	0	4	0	4	5	0	0	2	
Holodiscus discolor	N	4	0	1	0	0	0	0	1	0	0	0	1	0	3	0	0	
Mahonia aquifolium	N	4	0	0	3	5	5	0	7	0	10	0	11	7	7	3	4	
Mahonia nervosa	N	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Malus fusca	N	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
Philadelphus lewisii	N	5	0	0	0	3	0	0	0	0	0	0	1	0	1	0	0	
Pinus pondserosa	N	4	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
Prunus emarginata	N	4	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	
Pseudostuga menziesii	N	4	8	5	3	5	8	11	3	12	1	9	3	1	3	2	5	
Quercus garryana	N	4	0	0	0	2	0	0	1	0	0	0	2	1	4	1	1	
Ribes sanguinium	N	4	3	1	0	2	0	0	0	0	0	0	0	0	0	0	0	
Rosa nutkana	N	3	0	1	0	0	2	1	3	4	2	2	2	5	0	3	2	
Rubus parviflorus	N	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Symphoricarpos albus	N	4	0	0	0	0	6	11	1	4	0	8	8	0	0	0	3	
Summary Information																	Habitat Average	Standard Error
Cover of Invasive Shrubs and Trees			0	0	2	0	0	0	0	1	0	1	0	0	0	0	0	0
Lower CI (80%)																	0	
Upper CI (80%)																	0	
Native Diversity--See buffer Herb table for summary info																		
Density of Woody Vegetation		Average per acre	903	549	484	903	1000	1097	774	936	807	710	1194	903	581	452	807	
Plot Area (shrub/tree plot)	1350																	
Per acre multiplier: input 4,047 if plot area entered in B89 is in sq.meters or 43,560 for sq.feet	43560																	
Percent Cover of Native Shrubs and Trees			12	9	6	11	15	14	11	15	10	10	13	12	5	8	11	1
Lower CI (80%)																	10	
Upper CI (80%)																	12	
Sum of native plants /plot			28	17	15	28	31	34	24	29	25	22	37	28	18	14	25	
Does Plot Pass Native Cover Standard based on ≥ 50% Native Cover Y or N?			N	N	N	N	N	N	N	N	N	N	N	N	N	N		
Does Plot Pass Native Cover Standard based on ≥ 1000 plants or stems per acre Y or N?			N	N	N	N	Y	Y	N	N	N	N	Y	N	N	N		
Sum of plant cover			12	9	8	11	15	14	11	16	10	11	13	12	5	8	11	

2015 VEGETATION MONITORING NOTES:

General

-Occasionally a native woody species was rooted in herbaceous plots in various habitat classes. The percent cover at ground level of "stems" was recorded in the tables, but the woody cover recorded in herb plots was not added to the total native percent cover so as not to double up cover already captured in the woody plot data for the PFO, PSS & Buffer habitat classes.

- In the herbaceous plot data for the PFO, PSS & Buffer habitat classes we have started recording "shade from woody plants" i.e., aerial cover. *Starting in 2015, any herb plot with 60% or more aerial cover from woody plants is excluded from the bare substrate criteria.*

-Several herbaceous plots in the wetlands are listed as having *Carex scoparia* and/or *C. ovalis*. These two species are very similar looking native FACW sedges; we did not key every sample but it is likely both species are present.

PEM-OBL Herbaceous Community

- Several of the OBL plots e.g., T5-OBL1 & 2, T7-OBL2, T11-OBL 1 & 2 etc., were deeply inundated (2 to over 4 feet) and percent cover was estimated from a distance.

-There are some disagreements re: the nativity of *Sparganium emersum*. As per the Mitigation Bank Instrument, this species will be considered a native for this project.

-Both *Potomogeton nodosus* and *P. natens* are present in this community and have similar floating leaves (the submerged leaves differ). Populations within plots identified as one or the other may include both. Both species are native OBL aquatic plants.

-Identification of *Stuckenia pectinata* (formerly *Potomogeton pectinatus*) and *Potomogeton foliosus* is somewhat tentative; no flowers were present in samples, but they matched the vegetative characteristics of these species.

PSS-herbs

-In plot T1-SH1, the plant identified as *Equisetum arvense* is likely a known hybrid w/ *E. fluviatile*.

PFO, PSS and Upland Buffers-Tree & Shrub Plots

- Buffer woody plot T4-BF1: There may be about 5% encroachment into the wetland on this plot.

-In the woody habitats a few plots had pre-existing *dense* thickets of native roses or willows; the stem counts were conservatively estimated.

-As of 2015, as per guidance from DSL, in assigning percent cover to planted trees and shrubs, the smallest percent cover assigned is 1%, which is any cover > 0%.

-Willows identified as *Salix hookeriana* (aka *S. piperi*) may include *S. scouleriana* plants; the two may look very similar when young.

Removals and Addition of Plots in 2015:

- The five PSS herbaceous plots on Transect 6 (T6-SH2, T6-SH6, T6-SH11, T6-SH12, and T6-SH14) that had been removed in 2014 due to being in total shade provided by a few scattered mature trees were added back. However these herb plots (and any others with ≥60% aerial cover from woody plants) are now excluded from the bare substrate criteria.

- Several plots were added on the eastern side of transect 10 in 2015 to ensure full coverage of the transect. These plots were T10-F3, T10-FH5, T10-BF3, T10-BH5, and T10-BH6.
- One of the inundated OBL plots, T7-PEMOBL2 was too deep to estimate cover from a distance so it was removed.

Removals and Addition of Plots in 2014:

- PFO herb plot T5-FH2 was added; it had originally thought to have been in the buffer but it is in wetland.
- Five PSS herbaceous plots on Transect 6 (T6-SH2, T6-SH6, T6-SH11, T6-SH12, and T6-SH14) were removed due to being in total shade provided by a few scattered mature trees.
- Two PFO woody plots (T10-F1 and T11-F1) and the two associated herbaceous plots (T10-FH1 and T11-FH1) were removed because they were located in the pre-existing mature wetland forest, where no woody and herbaceous planting had occurred.
- One PFO woody plot (T11-F5) was removed from the PFO community because it was approximately 70% inundated.
- In the buffer we initially sampled but then removed two woody plots (T10-BF1 and T11-BF1) and associated herb plots (T10-BH1 and T11-BH1) because they were in the existing mature forested unplanted buffer.

Alterations of Plot Location or Orientation in 2014:

- PFO woody plot T4-F1 and associated herb plot T4-FH1 were moved approximately 20 feet to the east to the plant community break because the woody plot had previously been partially within the PEM OBL habitat.
- PSS woody plot T6-S4 was moved and skewed (as in 2013) and the associated herb plot T6-SH6 was moved to the west to avoid placement in the road, however the resulting placement varied from slightly from the 2013 location.
- Buffer woody plot T7-BF2 and associated herb plot T7-BH3 were placed only about 30 feet east of the previous herb plot (rather than the usual 50 feet) so that the woody plot would fit within the mitigation buffer; the rectangular woody plot was also skewed so that the short edge was parallel to the transect for the same reason. Buffer woody plot T9-BF2 was similarly skewed.

Removal or Re-Labeling of Plots in 2013:

- Herb plot T10-PEM1 (initially placed in the FAC/FACW community) was re-labeled as T10-OBL3 since it was actually in the OBL community.
- Herb T12-PEM1 (also initially placed in the FAC/FACW community) was inundated on August 1, 2013 and was discarded.

Alterations of Plot Location or Orientation in 2012 or 2013:

- PSS herb plot T2-SH1 started 15 ft from property line because of bisecting property line (the 1st shrub plot was not associated with this herb plot for the same reason (it was with T2-SH2 instead))

- PFO woody plot T5-F1 was moved approximately 10 feet to the east of its original location because a portion of it was in the OBL-dominated herbaceous habitat.
- PSS plots T6-S2 and T6-SH3 were skewed slightly because portions of them were in open water.
- PSS woody plot T6-S4 was moved approximately 25 feet west so it would be completely out of an unimproved access road, and the associated herb plot T6-SH6 was moved so it would be in the corner of the shrub plot.
- PSS woody plot T6-S11 was skewed north so that it would be entirely within one wetland habitat type.
- PFO woody plots T8-F1, T9-F1 and T10-F1 were skewed so that the short edge was parallel to the transect in order to fit within the community.

Plant Nomenclature:

-Plant nomenclature is up-to-date. The USDA PLANTS database (http://plants.usda.gov/java/) was our source for nomenclature. In cases where the latest nomenclature is different than that listed in the Corps WIS list, the name used name in the Corps' list, or closest synomy is in parentheses. Except for a few species as noted in the Mitigation Bank Instrument, this is also our source for nativity designations.

-The Wetland Indicator Statuses (WIS) are from the 2014 list for the Western Mountains, Valleys and Coast Region as presented in the Corps' *State of OREGON 2014 Wetland Plant List*

Principal Plant Identification Resources Used For This Project

Technical Flora and Keys:

-Hitchcock, C. Leo and Cronquist. 1974. Flora of the Pacific Northwest. University of Washington Press.

-Hitchcock, C. Leo et. al. 1955, 1959, 1961, 1964 and 1969. Vascular Plants of the Pacific Northwest (5 Volumes). University of Washington Press.

-Kozloff, Eugene N. 2005. Plants of Western Oregon, Washington and British Columbia. Timber Press.

-Various authors. 2014. The on-line Oregon Flora Project keys and plant descriptions. URL http://www.oregonflora.org/

Field Guides:

-Cooke, Sarah Spear (Editor). 1997. A Field Guide to the Common Wetland Plants of Western Washington and Northwestern Oregon. Seattle Audubon Society

-Guard, B. Jennifer. 1995. Wetland Plants of Oregon and Washington. Lone Pine Publishing.

-Whitson, Tom D. (editor) et. al. 1996. Weeds of the West. 5th Edition. University of Wyoming Press.

-Other Resources:

-USDA PLANTS database URL http://plants.usda.gov/java/. This site provides drawings, photos and distribution maps plus useful links to other web sites including the CalPhotos website URL http://calphotos.berkeley.edu etc.

-John Christy, Wetland ecologist for the Institute for Natural Resources was consulted in previous years concerning the identification of several native species

-Richard Brainerd and others from the Carex Working Group in Corvallis, Oregon were consulted in previous years concerning the identification of several native species

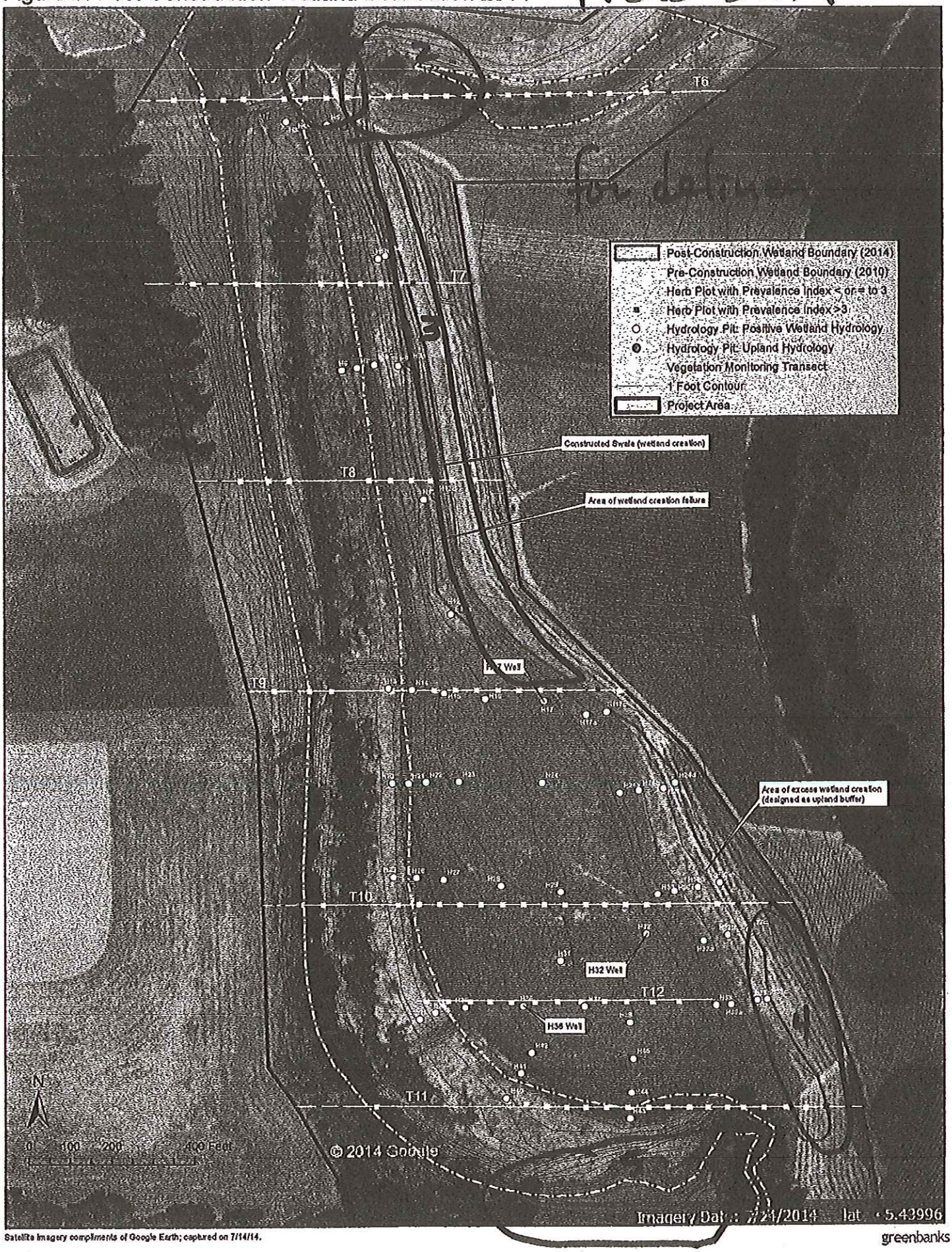
APPENDIX B: HYDROLOGY MONITORING INFORMATION

This appendix includes the following:

-DSL sketch map received from Dana Field on March 13th 2015 (via email) displaying areas where additional data is needed for the post-construction wetland delineation.

-Aerial Photographs captured February 21, 2015

Figure 2: Post-Construction Wetland Delineation 2014 Need Data



Satellite imagery compliments of Google Earth; captured on 7/14/14.

greenbanks

Aerial Photograph: February 21, 2015

Photographs Captured by Steve Sahnow

Aerial Photograph: February 21, 2015

Aerial Photograph: February 21, 2015

APPENDIX C: PHOTOGRAPHIC DOCUMENTATION

Photographic Documentation: Photos taken on 8/20/2015

Photo Point 1 NW: Photo displays native dominated plant communities within the wetland area and native grass dominated upland buffer.

Photo Point 1 SW: Photo displays native dominated plant communities within the wetland area and native grass dominated upland buffer

Photo Point 2 NW: Photo displays native dominated plant communities within the wetland area and vigorously-growing woody plantings.

Photo Point 3 SW: Photo displays the un-improved access road near the "north-south" ditch.

Photo Point 3 SE: Photo displays the un-improved access road which crosses the constructed swale.

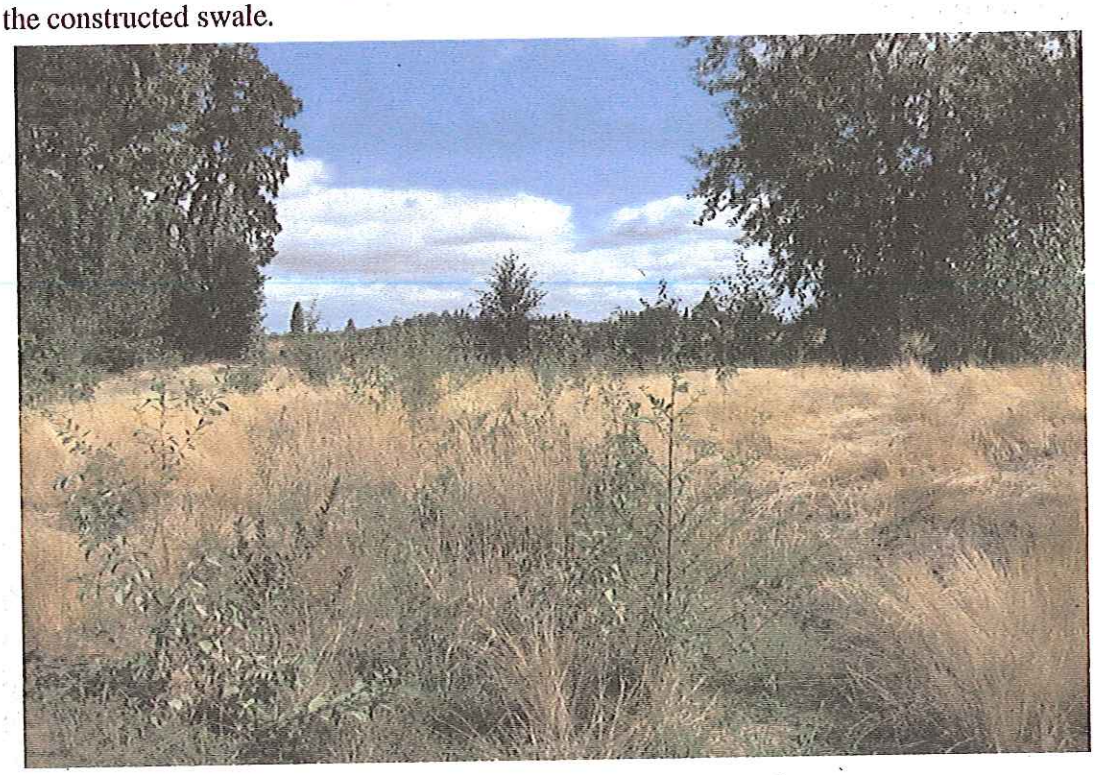


Photo Point 4 N: Photo displays the head of the constructed swale, at the un-improved access road crossing.

Photo Point 4 S: Photo displays head of constructed swale, at the un-improved access road crossing.

Photo Point 5 E: Photo displays northern woody-debris jam / ditch plug.

Photo Point 6 NW: Photo displays constructed swale and wetland creation area within the PFO vegetation community and upland buffer.

Photo Point 6 SE: Photo displays constructed swale and wetland creation area.

Photo Point 7 SE: Photo displays wetland enhancement, restoration and creation areas.

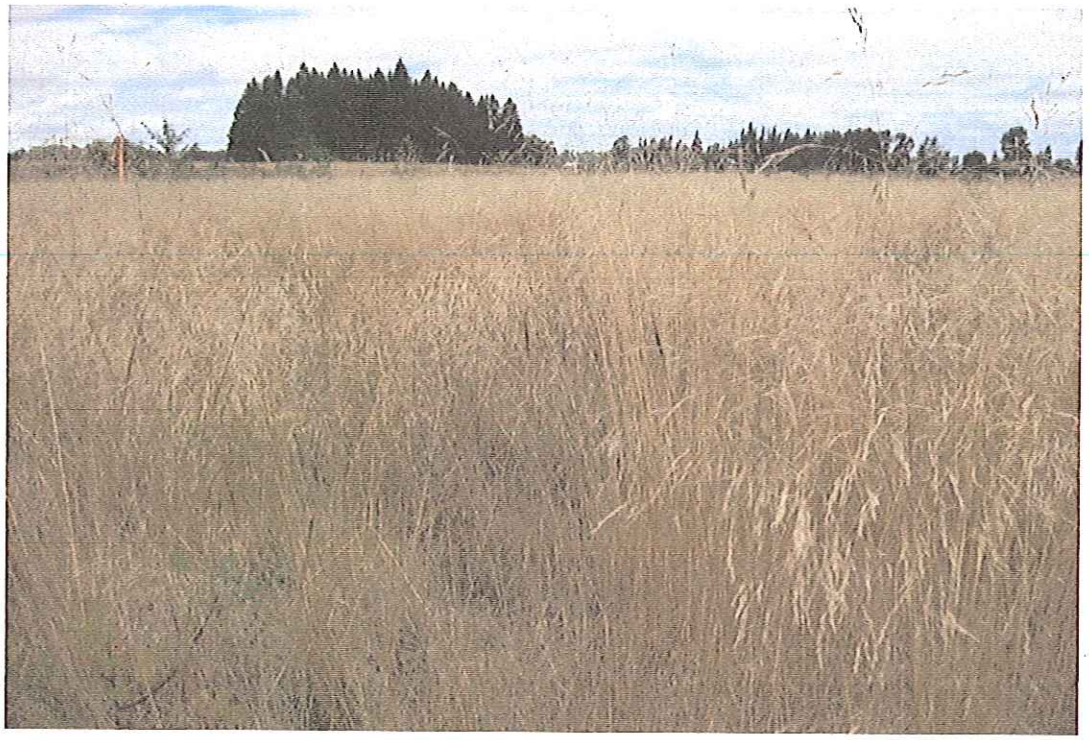


Photo Point 8 NW: Photo displays wetland creation area within the PEM FAC/FACW and PFO vegetation communities.

Photo Point 8 SE: Photo displays wetland creation and restoration areas within the PEM FAC/FACW and PFO vegetation communities.

Photo Point 9 SE: Photo displays southern woody-debris jam / ditch plug.

Photo Point 10 SW: Photo displays woody-debris jam / ditch plug, and an obligate dominated PEM community.

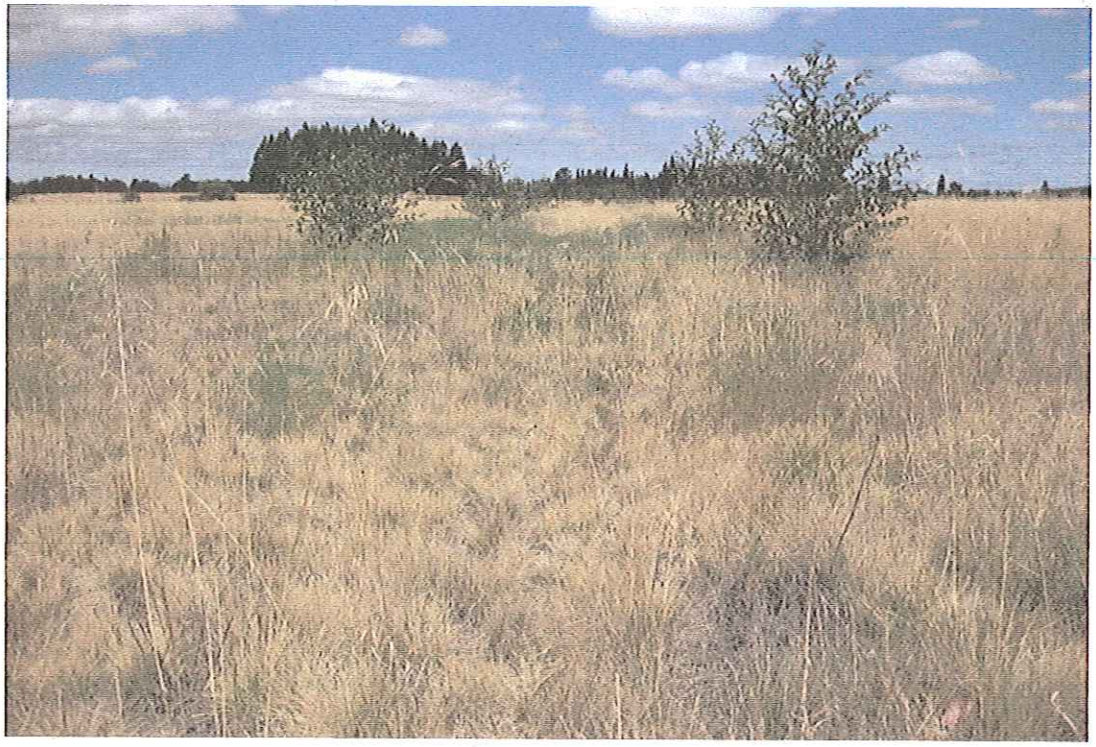


Photo Point 11 NW: Photo displays the mouth of the constructed swale and the wetland creation area.

Photo Point 11 SE: Photo displays the mouth of the constructed swale looking toward the log jams.

Photo Point 12 NW: Photo displays upland buffer area at Year 2.

Photo Point 13 SW: Photo displays the re-contoured location of the 18" culvert, ditch outfall, and adjacent hill-slope trench.

Photo Point 14 NW: Photo displays the re-contoured location of the 18" culvert and ditch outfall.

Photo Point 15 SW: Photo displays the secondary log jam.

Photo Point 16 SE: Photo displays primary log jam.

APPENDIX D: VEGETATION MONITORING TRANSECT LOCATION TABLE

TUALATIN VALLEY ENVIRONMENTAL BANK
Vegetation Monitoring Transect Locations:

Transect	Start Latitude	Start Longitude	End Latitude	End Longitude
T1	45.448	-122.968	45.448	-122.967
T2	45.448	-122.968	45.448	-122.966
T3	45.447	-122.965	45.447	-122.964
T4	45.446	-122.965	45.446	-122.963
T5	45.445	-122.963	45.445	-122.962
T6	45.443	-122.963	45.443	-122.959
T7	45.442	-122.963	45.442	-122.961
T8	45.441	-122.963	45.441	-122.961
T9	45.439	-122.962	45.439	-122.960
T10	45.438	-122.962	45.438	-122.958
T11	45.437	-122.962	45.437	-122.958
T12	45.437	-122.961	45.437	-122.959

Please refer to Section E: Monitoring Data Locations for an in depth description of plot locations. Transects ran west to east. In general, the first plot on a transect was 5 feet east of the transect start point; herbaceous plots were spaced every 50 feet and tree/shrub plots were spaced every 100 feet. Some areas were not sampled due to deep inundation, upland, or impermiable surface. The locations of the start and end points of each monitoring transect, the northwestern corner of each herbaceous plot, and all four corners of the woody vegetation plots were GPS'ed; this data is available upon request.

APPENDIX E: CREDIT LEDGER (2015)

TUALATIN VALLEY ENVIRONMENTAL BANK CREDIT LEDGER: 1/1/15 - 12/30/15

Date	Transaction Type	Jurisdiction	Permitee	Permit Number (DSL/Corps)	Wetland Impact Type	Number of Credits (ac.)	Balance of Credits after Transaction (ac.)
3/18/2015	withdrawl	State/Federal	Tualatin Hills Parks and Recreation	APP0054927, NWP-2013-00399	PEM; Slope/Flats	0.74	1.1636
3/23/2015	release	State/Federal	NA	NA	NA	6.55	7.7136
4/7/2015	withdrawl	State/Federal	Mike Behn, Pulte Group	32043-FP, NWP-2004-00212	PEM; Flats	0.092	7.6216
5/15/2015	withdrawl	State/Federal	Gary Stockhoff, Washington Co	57035-FP, NWP-2014-00468	PEM; Flats, Depressional	0.12	7.5016
7/24/2015	withdrawl	State/Federal	Michael Hansen	APP0056902, NWP-2014-00363	PEM, PFO; Slope/Flats	0.23	7.2716
8/6/2015	withdrawl	State/Federal	Miles Rusth	57484-RF, NWP-2015-00089	PFO; Slope	0.02	7.2516
9/3/2015	withdrawl	State/Federal	PGE- Scot Lawrence	57696-RF, NWP-2015-130	PFO; Slope/Flats	0.0014	7.2502
9/17/2015	withdrawl	State/Federal	Washington County	56946-GP, NWP-2014-00416	PEM; Slope	0.24	7.0102
10/6/2015	withdrawl	State/Federal	West Hills Development	57485, NWP-2015-00091	PEM; Flats	1.56	5.4502
11/10/2015	withdrawl	State/Federal	Summit Development Group	58358-NP, NWP-2015-00354	PEM; Depressional	0.02	5.4302
11/12/2015	withdrawl	State/Federal	Tualatin Hills Parks and Recreation District	57970, NWP-2015-00223	PSS; RFT	0.0165	5.4137
12/17/2015	withdrawl	State/Federal	Sean Foushee, Summit Development Group	58359-RF, NWP-2015-353	PEM, PFO; Slope	0.03	5.3837
Credits Released 2015 (ac.): 6.55			**Credits Withdrawn 2015 (ac.): 3.0699**				
Total Credits Released (ac.): 16.32			**Total Credits Withdrawn (ac.): 10.9363**			**Balance (ac.):**	**5.3837**